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Abstract

The master's thesis at hand deals with the current accessibility challenges in technology and the University of Vienna serves as the framework. This is especially true for individuals with disabilities. It also delves into the main accessibility issues that blind and low-visibility individuals may encounter, as well as deaf individuals. Those with impaired bodily movement and cognitive abilities are also included in the analysis. It discusses the existing norms in accessibility and emphasizes how significant it is to make technology perceivable, operable, understandable, and robust. The key aspect of the paper lies in analyzing the current University website in terms of how much it complies with the accessibility guidelines i.e. how easy it is to use the existing website, with all its advantages and disadvantages. Another aspect of the research delves into a survey (interviews) that was conducted. The Barrier-free team interviewed a group of students with and without disabilities who were asked to comment on how successful the University has been in complying with the accessibility guidelines. The results are discussed primarily in a qualitative capacity. The conclusion emphasizes the significance of putting accessibility into place when it comes to technology. It suggests future directions for research in this area. The thesis explains accessibility and attempts to improve usability for individuals who might be suffering from diverse disabilities.

Zusammenfassung

Die vorliegende Masterarbeit befasst sich mit den aktuellen Barrierefreiheitsherausforderungen in der Technologie, wobei die Universität Wien als Rahmen dient. Dies gilt insbesondere für Menschen mit Behinderungen. Es wird auch auf die Hauptprobleme eingegangen, mit denen blinde und sehbehinderte Personen sowie gehörlose Menschen konfrontiert sein könnten. Personen mit eingeschränkter Körperbewegung und kognitiven Fähigkeiten werden ebenfalls in die Analyse einbezogen. Die Arbeit diskutiert die bestehenden Normen der Barrierefreiheit und betont, wie wichtig es ist, Technologie wahrnehmbar, bedienbar, verständlich und robust zu gestalten. Ein zentraler Aspekt der Arbeit liegt in der Analyse der aktuellen Universitätswebsite hinsichtlich der Einhaltung der Barrierefreiheitsrichtlinien, d.h. wie einfach die bestehende Website mit all ihren Vor- und Nachteilen zu nutzen ist. Ein weiterer Aspekt der Forschung befasst sich mit einer durchgeführten Umfrage (Interviews). Das Barrier-free-Team interviewte eine Gruppe von Studierenden mit und ohne Behinderungen, die gebeten wurden, ihre Meinung dazu abzugeben, wie erfolgreich die Universität die Barrierefreiheitsrichtlinien einhält. Die Ergebnisse werden hauptsächlich qualitativ diskutiert. Analyse unterzogen werden. Die Schlussfolgerung betont die Bedeutung der Umsetzung von Barrierefreiheit in der Technologie und schlägt zukünftige Forschungsrichtungen in diesem Bereich vor. Die Arbeit erklärt Barrierefreiheit und versucht, die Benutzerfreundlichkeit für Personen mit unterschiedlichen Behinderungen zu verbessern.

Foreword

The thesis deals with making higher education more accessible for students who have problems with disabilities. It analyzes the University of Vienna's website and goes into the past and present accessibility attempts. It also does research into people who are involved and tries to understand the problems and chances to improve access to education by means of using technological tools. The work calls for educational institutions to meet standards and also to introduce technology that is inclusive for all individuals. The thesis is of significance when it comes to contributing to the conversation about inclusivity in education. It guides universities worldwide to serve all students and make sure that education is a right at the disposal of everyone. I would first like to thank my supervisor, Univ.-Prof. Dipl.-Ing. Dr. Helmut Hlavacs, whose dedication and assistance have played a crucial role in helping me reach my objectives. Thank you, Professor, for your invaluable support! Also, I must express my very profound gratitude to my husband Jovan, and to my parents Branka and Momcilo for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

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Chapter 1

Introduction

The thesis addresses the challenges faced by individuals with disabilities when accessing online materials, emphasizing the importance of inclusive education in the digital age. The rise of online learning has highlighted the need for user-friendly interfaces in educational systems. Despite technological advancements, a significant portion of society, particularly individuals with disabilities, still faces barriers to accessing education.

This section of the paper delves into the problems that exist when it comes to the accessibility of online materials (webpage content) which individuals with disabilities may experience when attempting to obtain data online. We are witness to a time when pursuing education has become popular among large sections of the population. One of the reasons is that society today acknowledges the significance of education and what self-improvement can do for individuals about market competitiveness [59]. Another aspect that needs to be considered is the fact that students all over the world have at their disposal the opportunity to study online, regardless of the part of the world they are located in [30]. The fact that distance learning has become a reality for many people has led to user interfaces gaining importance in the education system. However, regardless of the technological development and innovations that characterize the modern world, a certain section of society has almost completely been left out of the education system [63]. If we ask ourselves why this is the case, more answers could emerge, one of them being that disabled people probably already use some techniques themselves to alleviate their physical impediments. However, another way of looking at the matter is that it is up to educational institutions to do whatever is in their power to provide the highest possible quality of education themselves, which would entail making it possible for all individuals to equally participate in the education process [9]. Two sides of the whole matter need to be addressed – the categories of students with impediments and what their problems are as well as what the current state of the university websites is and what could be

improved. The introduction briefly lists the types of disabilities and how these individuals could have problems when using the sites.

The master's thesis addresses accessibility issues in technology for individuals with disabilities and focuses on blind, low-visibility, and deaf individuals. It also deals with those individuals with impaired bodily movement and cognitive abilities. Furthermore, it reviews the existing norms and the importance of making technology perceivable, operable, understandable, and robust. The thesis thoroughly examines the existing University website of Vienna to assesses it through qualitative methods, including stakeholder interviews. It further stresses how important it is to implement accessible technology solutions and proposes future research directions in this field.

Chapter 2

Related Work

It should be taken into account that there is a large body of literature that deals with the existing websites and their accessibility to users with disabilities. What follows is a brief analysis of a number of such papers pertaining to the topic and the findings they have come to. It should be noted that the master's thesis at hand focuses on the University website of Vienna, similarly to the following ones, which narrows down the research, making it tailored to the field of education rather than any websites.

The article written by Kate Brown discusses a project at McMaster University where students and staff, both disabled and non-disabled, collaborated to user-test the University's accessibility website [13]. This partnership was aimed at improving the website's usability for all the users. In doing so, the unique perspectives of the disabled students were considered. The case study highlighted the successes, challenges, and significant contributions of these students to improving technological accessibility on campus, emphasizing the broader impact of including disabled students in meaningful roles and decision-making processes related to accessibility.

Alahmadi and Drew focused on the accessibility evaluation of university websites and Learning Management Systems (LMS) from 2005 to 2015 [4]. They used a comparative quantitative approach to estimate randomly selected websites from top-ranking universities worldwide, including those in Oceania and the Arab regions. The evaluation targeted different page types such as homepages, administration pages, and course description/syllabus pages. The results indicated no significant improvement in website accessibility over the examined period, with the most notable accessibility issues found in accessing media and document files. The study found 27,308 homepage errors in accessibility among 180 pages from 60 top universities, emphasizing that there are no differences in accessibility between universities in developed and developing countries. The findings point out the need for universities to improve the accessibility of their online content to

support the increasing number of students and support equity in education.

The paper by Bayan Abu Shawar examines the web accessibility of educational websites. It focuses on how these sites meet the needs of visually impaired individuals [57]. This study evaluates the compliance of educational websites from selected universities in Jordan, the Arab region, and the UK with the Web Accessibility Initiative (WAI) guidelines developed by the W3C. The research shows that there are certain differences between the web accessibility standards in various regions. The Jordanian and Arab university websites show more accessibility errors than their UK counterparts. This difference is explained by the web accessibility laws in the UK, which are absent in Jordan and the Arab region. The paper emphasizes the necessity for educational institutions, especially in regions lacking strict accessibility regulations. The aim is to improve their web environments to be more inclusive for disabled learners, in this way supporting more equal access to educational resources.

The study by Solovieva and Bock examines web accessibility at a major north-eastern U.S. public university [58]. This is conducted to estimate its compliance with the Americans with Disabilities Act (ADA). By using automated tools, they assessed 509 web pages from the university's website. They came to the conclusion and finding that only 51% passed the Section 508 compliance test (WCAG 1.0) with the Cynthia Says tool, while only 35% passed the stricter WCAG 2.0 Level A compliance test using the WAVE Accessibility Tool. The results show that there is a big gap in web accessibility. This can suggest that many university web pages are not accessible to people who have disabilities. The study talks about the importance of having a higher degree of compliance measures. Ultimately, it concludes that improving web accessibility is in line with ADA mandates. This benefits current and prospective students and employees who suffer from a certain number of disabilities.

The study by Rachel Johnson and John R. Hegarty delves into the use of websites as educational tools for adults with learning disabilities [32]. It pinpoints the motivating aspects and the challenges of web-based learning for this demographic. The conducted project involved eight students with mild to moderate learning disabilities. They were helped to find and engage with websites that matched their personal interests. Additionally, they were supported in creating multimedia projects that had to do with their chosen sites. The findings show and suggest that while websites can significantly motivate these students, they often pose accessibility barriers because of complex navigation and high demands in terms of literacy. The study suggests the need to carry out further research and development of methods to improve website accessibility and make use of the motivational benefits of the internet for adults who are experiencing learning disabilities of different kinds.

Chapter 3

Current Accessibility Problems

In today's educational setting, providing equal access to learning content is of utmost importance. When taking account of various disabilities, from visual limitations to cognitive and physical obstacles, students face barriers. They prevent them from participating and academic success. Resolving such issues requires measures and strategies to create an accessible educational environment.

3.1 Blind Individuals and Individuals with Low Visibility

This subsection focuses on users with visual impairments. It deals with how partial or complete blindness affects their ability to navigate and understand the content that is provided online. It points out how important it is to have alternative formats, such as audio descriptions, to make educational materials accessible to those with impaired vision.

One category of users with impediments refers to individuals whose eyesight is either partially impaired or who cannot see at all. Blind individuals and those who suffer from low vision have to deal with peculiar issues in a learning setting. Such problems can strongly influence the learning experience that they will have, as well as the level and success in their social integration, and their opportunity to access resources in such institutions. The ability to comprehend these problems is significant for institutions that would like to create an educational environment that is inclusive and accessible to a high degree. Apart from not being able to find their way around the facilities and lecture halls, they also have issues reading the instructions and the course material provided online [2]. If they have partially impaired vision, the text they are trying to read, if enlarged, is often not easy to follow since a large portion of it is not shown on screen due to its size [4]. The text is often not tailored for their sensitive eyesight and can cause

negative physical reactions. The colors tend not to have contrasts and make it difficult for some of them to follow and the controls are often not large enough. In addition, as a result of not seeing, they can make mistakes in interacting with the interface and misinterpret the material [11]. An alternative to written text needs to be provided that will be clear and informative enough if presented in the form of sound messages (videos), which the websites often fail to provide [20]. Such alternatives could prove to be highly beneficial.

When it comes to their access to printed materials, it must be noted that textbooks, scientific papers, and a plethora of University materials are seldom accessible in formats such as Braille, large print, or audio. When considering sources such as written materials given to them in class, they might not be at their disposal, and it would be necessary to prepare them and tailor them to a format that would be suitable for them.

In terms of digital accessibility, a great number of educational resources (websites and platforms) do not take account of accessibility, which could render them tough to navigate when utilizing screen readers or alternative technologies that are used to assist them [56]. PDFs and slides might not be tagged appropriately or another problem is that they might not be formatted for screen readers. This author adds that concerning classroom and laboratory accessibility, it must be made clear that the students cannot access PowerPoint presentations, videos, and whiteboard notes. Moreover, science labs may lack equipment tailored to the needs of this category of users.

With regard to the navigational challenges on campus, physical navigation around campus tends to be problematic for such users [44]. The issues might range from finding adequate accommodation and on-campus services that could be useful for them. In cases when there are insufficient tactile walking surface indicators as well as crossings that have a poor design or inappropriate signage, their problems can magnify these difficulties.

In addition to the mentioned challenges, problems might occur even during examination and assessment [22]. In cases when more standardized testing formats are not at the disposal of the students, this could require diverse testing arrangements, which could potentially result in delays or misinterpretations. In order to overcome such complications, time extensions, or Braille exams could be the only solution but are unfortunately not accessible. The same authors add that when discussing technology and equipment, it must be noted that assistive technology such as screen readers, Braille note-takers, and magnification devices tend to be costly, and the students cannot equally access the above-mentioned aids. Furthermore, training for both sides of the education process would enable them to utilize these technologies appropriately and efficiently.

When discussing the issue of social and extracurricular activities, social isolation could possibly pose a challenge as a result of barriers pertaining to extracur-

ricular activities [41]. In cases when their peers do not possess an adequate degree of consciousness, this could lead to an increased level of exclusion. With regard to the available support services, it can be said that there could potentially be a lack of appropriate services, which could include trained sighted guides as well as orientation. The issue with some universities could lie in the fact that there may be a deficiency in staff that possess a sufficient amount of knowledge concerning the basic needs of this category of students. What needs to be addressed is the fact that awareness among university staff is often inadequate [54]. Institutions can lack training on how to accommodate and support blind or low-vision students effectively. They are generally not fully informed about the challenges that these students have to deal with, leading to unintentional neglect of their needs. When discussing the university policies, they might not be aware enough to address the needs of blind and low-vision students. It must be noted that numerous institutions are working to deal with these challenges, but the support tends to vary considerably from one institution to another. Dialogues, feedback from these students and following standards are essential when it comes to improving the experience they have when studying.

When it comes to the existing university websites and how they address the problems of visually impaired individuals, the analyzed paper in this section focuses on the significant accessibility challenges faced by *totally blind (TB)* users and is structured into two main phases [28]. The initial phase implied identifying the key accessibility factors for TB users. This was done based on the Web Content Accessibility Guidelines (WCAG). A high-fidelity prototype that simulates the design of typical Palestinian university web pages was developed. It was done with the aim of enhancing the interaction and facilitation evaluation on the part of visually impaired users. This prototype was created using the Throw-away prototyping method and was integrated within the framework of the study. Before being evaluated by end users, the prototype's compliance with the proposed model factors was rigorously tested. The second phase aimed to indirectly validate the proposed model through the evaluation of the developed prototype. This evaluation was conducted at the ATC center of the Islamic University of Gaza, Palestine. An online questionnaire with a 5-point Likert scale, reflecting the identified accessibility factors, was designed for this purpose. Special attention was given to ensuring the accessibility of the questionnaire for totally blind users. The feedback obtained from 16 participants showed that the prototype was easily accessible to this group. A regression analysis test was used to examine the correlation that exists between the questionnaire items and the basic principles of accessibility. The findings demonstrated differences that were statistically significant among these items. This has led to validating the accessibility model. The paper concludes by implying that the research carried out in the future should extend this framework to various other disability groups.

The academic study by Lourens and Swartz from the Department of Psychology in South Africa deals with embodied experiences. These pertain to those students in higher education who are visually impaired [46]. It focuses on the bodily aspects of their lives on the campus. Fifteen students with visual impairments from a South African university were interviewed. The study researches the physical and emotional issues that these students have. Such challenges include navigating the campus, reading, and social interactions. The paper suggests including disabled students in higher education by improving their social and learning experiences. The study provides a description of the experiences of visually impaired students. This is given to help us understand the effectiveness of inclusive policies. The paper discusses the historical neglect of embodied experiences. These refer to disabled individuals within the disability theory. It has traditionally focused on social and medical models. It argues for a phenomenological approach that recognizes the personal and emotional aspects of disability. This approach would show how societal structures and physical environments have an impact on disabled bodies. The research used interpretative phenomenological analysis (IPA). It examined the lives of 15 visually impaired students. Interviews with open-ended questions were used to compile detailed answers. The students found university campuses to be challenging and often dangerous to navigate. Visually impaired students had difficulties reading. This led to physical strain and they required extra time for assignments. They felt isolated and struggled with feelings of shame and inferiority. The physical and social environments at universities do not adequately support visually impaired students. This leads to significant emotional and physical distress. The narratives reveal gaps in the provision of inclusive education. Listening to the embodied experiences of visually impaired students is important if we want to design inclusive environments. Practical measures such as specialized orientation programs, awareness campaigns, and the provision of personal readers or audiobooks to improve the inclusion and well-being of visually impaired students in higher education are recommended. Universities need to make structural changes to better accommodate visually impaired students. This would ensure that their experiences and needs are considered in the design and implementation of inclusive policies that they could benefit from.

Another paper reports the planning and conducting of a three-week workshop to teach the basics of programming to adults with VI [7]. Such teaching strategies had a beneficial impact on their accomplishment and attitudes. Such improvement was also reported by the participants themselves in their positive responses to the post-questionnaire, during interviews, and in classroom examinations. When it comes to the attitudes they displayed, the participants demonstrated high levels of interest in learning programming and positive attitudes toward the experience. Furthermore, we plan to conduct programming workshops so as to get new programmers involved and to help bridge the digital gap.

3.2 Deaf Individuals and Individuals with Partially Impaired Hearing

By looking at the challenges faced by deaf or partially hearing individuals, this section emphasizes the need for alternative formats for audio content. This content comes in the form of captions or pre-recorded sign language videos. It ensures complete access to educational materials that the students could use.

The situation is slightly different in the case of deaf students or those who have impaired hearing as the audio content that is included on websites has to be conveyed to them in another format so that they could fully interact with it in order to understand the message being put across [5]. Not all the videos and presentations have captions or prerecorded sign language videos. This fact makes it tough or impossible to follow the content.

Deaf individuals and those with partial hearing impairment experience specific difficulties in university settings. As a result, their educational journey, interactions with peers and professors, and access to university resources are greatly affected by this [16]. It is crucial for universities to address these challenges. In addition, it is vital to create an inclusive and accessible learning environment. What follows in the next paragraphs are some of the primary issues that these students are realistically facing on a daily basis.

When it comes to the existing obstacles in communication, there is a limited availability of sign language interpreters. Not all classes or events offer sign language interpreters. However, they are essential for students who primarily communicate through sign language [29]. It also needs to be said that the communication formats can be ineffective. Namely, traditional lecture styles often do not meet the needs of deaf or hard-of-hearing students. The necessity for visual attention for lip-reading or sign language interpretation is one such example [8]. The authors add that with regard to real-time captioning, some students require such services, but they may not be universally accessible to them.

Students with partial hearing impairment often need improved audio systems. These may include FM systems or loop systems. However, such technology might not be available in all the classrooms [38]. The same author states that educational videos and audio materials often lack captions or transcripts. This makes them problematic for deaf students and those with hearing impairments. Occasionally, captions are available but are of low quality. They also tend to be inaccurate or not synchronized properly with the audio. He explains that deaf students might have issues when socializing and participating in group activities. This takes place as a result of obstacles in communicating. Students and staff who have no such problems may lack awareness or understanding of deaf culture. Consequently, they could unintentionally exclude deaf individuals. Conventional testing formats may not accommodate the communication needs of these students.

This calls for alternative arrangements that are not always readily provided.

Those students whose native language is sign language might experience difficulty when trying to understand and express intricate concepts in English or any other language [40]. Hearing aids, FM systems, or captioning devices may not be accessible or affordable for all students [45]. The technical problems with assistive devices can disrupt learning. In addition, timely technical support may not always be available. What is also suggested by these authors is that universities may lack an adequate number of trained personnel. These include sign language interpreters or specialized support staff, for deaf and hard-of-hearing students. Some students may lack the training needed to navigate the campus effectively. Faculty and staff often lack training on how to effectively accommodate and support deaf students. There may be a general lack of understanding regarding the legal and educational needs of these individuals. University policies may not sufficiently address the specific needs of deaf and hard-of-hearing students. Advocating for necessary accommodations can be challenging for students. This is particularly true of environments that do not completely recognize their needs [55]. The same source suggests efforts to enhance the university experience for deaf and hard-of-hearing students. This involves ensuring effective communication methods. Moreover, providing essential technological aids and support services, and cultivating an inclusive campus culture can be included. Continuous improvement in these areas is essential to offer fair educational opportunities.

When it comes to concrete research that has been conducted in the field, the instruction of sign languages as foreign languages has experienced substantial growth in diverse educational settings and organizations [42]. This kind of expansion has allowed students to obtain foreign language credits. On the other hand, it has run into resistance in terms of acceptance. Traditionally, sign language classes were conducted in physical settings across various academic departments and programs worldwide. This document serves as a resource for understanding the global landscape. This is a landscape where sign language and deaf culture are taught and this covers both historical and current teaching approaches. An important trend that has been on the rise is the provision of online sign language courses. This is performed to meet the high demand and reach a wider audience. What is also emphasized is the importance of employing qualified instructors and utilizing contemporary teaching techniques and materials. The aim is to integrate cultural elements to boost the effectiveness of sign language education [64].

Advancements in technology and communication aids have opened up opportunities for academic success among deaf students. However, persistent challenges, such as a lack of awareness about deafness in higher education, continue to exist [53]. Educators may have issues with technology and may not fully understand the requirements of deaf students. Conversely, they might also face social barriers and issues related to self-esteem. This is especially true if their hearing

loss occurs later in life. Lip reading is often perceived as a universal solution for deaf individuals. However, it can be said that it is an unreliable and physically taxing method [3]. Many deaf individuals, especially those who are not native speakers of English, find lip reading a daunting task. Misinterpretations are frequent, and it is estimated that lip reading can only comprehend roughly 30% of spoken language. Relying solely on written communication is insufficient for many deaf students. It can be said particularly for those who primarily use British Sign Language (BSL) as their first language. Their challenges with written English are explained by educational and linguistic factors. On other words, they are not attributed to intellectual limitations or dyslexia. The term *hearing impaired* is commonly used but is not universally accepted within the deaf community [61]. The categories used to describe hearing loss should be considered adaptable guidelines. Another way of looking at them is as individual preferences and support requirements can change over time.

One more paper analyzed in this thesis has the objective to investigate the current state of knowledge about students with dual disabilities (DWD). Moreover, it aims to identify the competencies required by teachers in the 21st century to satisfy the needs of these students and their families [12]. The DWD student population is both diverse and on the rise. Additionally, they have observed that researchers and university teacher training programs have generally overlooked this group of students. The authors add that it is well-documented that the combination of a disability alongside hearing loss gives rise to distinctive educational requirements. These may differ from those of deaf or hard-of-hearing (d/Dhh) students without additional disabilities. The scholars are strongly encouraged to carry out research specifically focused on DWD students. Also, they are advised to include this demographic in their broader research involving d/Dhh students. Despite good intentions, DWD students are frequently excluded from research studies due to eligibility criteria. Furthermore, the researchers are told to collaborate with professionals from related fields. The goal of such collaboration should be to gain a deeper understanding of the specific needs associated with different disability categories. A concentrated effort on DWD students will improve our basic knowledge. Furthermore, it can establish evidence-based practices and communication/language interventions. This will systematically address obstacles and challenges while identifying effective educational practices. This will ensure a high-quality educational experience for all children who suffer from hearing impairments. This can be said regardless of the accompanying disabilities. In the interim, borders and colleagues propose that we seek insights from and collaborate with professionals. They should be in adjacent fields and this cooperation should help us discover effective practices applicable to DWD students. Increased research opportunities and a focused multidisciplinary approach will enable the existence of evidence-based practices. These could subsequently be implemented

by teachers with DWD students. Simultaneously, university teacher preparation programs must take action to integrate content, assignments, and practical experiences. It should be related to working with DWD students for pre-service professionals. These topics should align with the appropriate d/Dhh Specialty Set of standards. These are endorsed by national accrediting bodies and individual state licensure standards. Lastly, educational administrators at the school, district, and program levels should collaborate with state directors of special education and university programs. The goal ought to be the creation of incentives for pre-service teachers so that they could pursue careers in education for d/Dhh students. The current severe shortages and shortfalls of qualified Teachers of the Deaf and Hard of Hearing (TODHH) cause concern. TODHH plays a critical role in conducting proper assessments and designing educational programs. It also plays a role in student-centered instruction and ensuring communication access for d/Dhh students. Those with dual disabilities are included. Due to the differences in identifying and assessing the degrees of accompanying disabilities, there is no universal solution. Instead, professionals (teachers and support staff) must recognize the strengths and individual needs of each student. This approach will create opportunities for students to receive the right education. It can also benefit them in completing it with the necessary modifications and by giving them access to general education and specialized curricula. Bowen adds that with effective planning, deaf or hard-of-hearing students can achieve significant levels of academic success.

3.3 Individuals with Impaired Bodily Movement and Cognitive Disabilities

By looking at the difficulties faced by students with impaired movement and cognitive disabilities, this subsection talks about the necessity of implementing features such as speech recognition. In addition, it provides concise, organized, and easy-to-understand material and content.

In addition, those students who cannot move their arms or hands have difficulty navigating the controls, which also needs to be addressed [19, 23, 24]. In most cases, speech recognition is missing on websites, making it impossible for such users to interact with the online material [25, 29, 31]. Finally, cognitively disabled students are often faced with the lack of material that will be concise, organized, and not difficult to follow and understand [33, 37].

University students with physical and cognitive disabilities often face specific challenges within their academic environments. These can have a strong impact on their academic performance, access to university resources, and overall campus experience [60]. It is imperative that educational institutions recognize and deal with these challenges. In other words, it is important to create an educational

environment that would be inclusive and accessible to all users. He adds that there are issues related to getting around campus. This happens as a result of insufficient wheelchair ramps, manual doors, and buildings or classrooms that do not have accessibility features. He also says that there are difficulties in utilizing university transportation services if they are not designed to accommodate students with mobility impairments. According to this author, classrooms and laboratories lack adjustable desks, accessible workstations, or appropriate seating for students with physical disabilities. Physical barriers prevent participating in practical learning experiences. These may include laboratory work or field trips. There are challenges in participating in practical aspects of courses, such as lab work or fieldwork, without appropriate accommodation. There is living accommodation that is not accessible. This can considerably influence the daily lives of students who suffer from physical disabilities.

There are not enough evacuation plans and safety measures for students who suffer from mobility impairments when situations of emergencies [34]. Traditional lecture-based teaching methods may not effectively satisfy the needs of students with cognitive disabilities. They may benefit from more interactive or diverse instructional approaches. In addition, what is said is that there are difficulties in processing complex information, following lectures or grasping abstract concepts. These often do not accommodate the unique requirements of students with cognitive disabilities, such as extended time, breaks, or alternative formats. Anxiety and stress are related to academic assessments, which can disproportionately affect these students and there is a lack of accessible learning materials tailored to diverse cognitive abilities, such as simplified texts or visual aids.

There are problems when students talk to university peers and staff. Potentially, this leads to feelings of isolation or exclusion. Problems may happen when engaging in extracurricular activities. This may come about as a result of cognitive or social challenges [62]. What is more, the support for students who suffer from cognitive disabilities is not satisfactory. This may include specialized tutoring or counseling. There is a lack of understanding or training among university staff. This pertains to the support and accommodation requirements of these special students [26]. University policies may not adequately deal with the academic and social needs of students with cognitive disabilities. Also, there are challenges in advocating for oneself and this is crucial for accessing necessary accommodation and support.

To resolve these obstacles, a detailed approach is necessary. It needs to include improving physical accessibility. Also, adapting teaching and assessment methods needs to be performed. Additionally, it ought to provide suitable support and nurture a campus culture that would be inclusive in nature [47]. Continuous feedback from affected students and meeting accessibility standards are essential for making progress in these areas.

A study that has been analyzed by Karvonen focuses on English learners (ELs) with significant cognitive disabilities who participated in Dynamic Learning Maps Alternate Assessments in 16 states during the 2016-2017 academic year [35]. Utilizing teacher surveys, it examines student characteristics, accessibility supports during assessments, and the provision of EL services. The key conclusions in this study show that there is a need for more detailed language surveys. This can accurately identify EL students with significant cognitive disabilities. These surveys should account for the students' communication methods. These methods are sign language or augmentative and alternative communication (AAC) devices. Moreover, the languages used in receptive communication within their families are another such example. The study suggests further research to understand the identification process of these students as ELs, examining the roles of professionals involved, the evidence used, and how student characteristics are attributed to either disability or language acquisition. It also highlights the low usage of language-translation supports in assessments and instances of non-EL students receiving such support. This calls for research into teachers' decision-making for selecting support and possibly improved criteria for support selection or training for test administrators. Overall, the study emphasizes the need for specialized assessments and support services for this unique group of students to ensure equitable educational access and success. Therefore, education can become an impactful tool in society.

One more research states that understanding the characteristics of students with specific communication needs and disabilities is crucial. It is important to provide them with the needed support and services and help them in numerous ways. They need to be able to access the general education curriculum. In addition, they need to meet grade-level standards and improve their communication skills [21]. The First Contact Survey was created to gather important information about students who are eligible for the Dynamic Learning Maps™ (DLM®). This is an alternate assessment based on alternate achievement standards. Between November 2012 and May 2013, the survey collected data on over 44,787 students. The aim was to be informative regarding the development of the DLM assessment. The survey contains a great amount of information on the student population and the study analyzes the data. It focuses on the students' motor, sensory, language, reading, and writing abilities. It specifically touches on their speaking skills. The results showed differences across these domains. This was evident when comparing students who use speech with or without aided augmentative and alternative communication, to those who do not.

Another study investigates the challenges faced by students with disabilities in accessing higher education in Lesotho. This study uses qualitative methods and includes document analysis, interviews, and focus groups. It also utilizes social constructionism and the social model of disability for analysis [48]. In addition,

there is limited support and resources for students with disabilities, especially in special education needs. In addition, there is inadequate psychosocial and academic support and exclusion from extracurricular activities. Furthermore, according to this author, there is a prevalent ableism and normalism in university culture. This leads to a lack of advocacy from students with disabilities. The conclusion is that special education needs have been met. However, these are not inclusive enough. Moreover, the university's practices and infrastructure do not support students with disabilities. In addition, there's a need to improve the management and implement the support services. They need to be tailored to individual needs. The recommendations are to improve special education needs support services and make them more inclusive. What is more, lecturers should provide accessible learning materials. Furthermore, we need to tailor special concessions to individual student needs and invest in inclusive technology. We also need to implement recommendations from previous reports on special education. Universities should also increase human resources for disability support. It would also be essential to enforce anti-discrimination regulations more strictly, reform tutorship services and include more diverse sports options. It is significant to encourage self-advocacy among students with disabilities and investigate the lack of management involvement in recognizing the needs of students with disabilities. In addition, universities should explore perspectives on special education services and how they should be structured and conduct a longitudinal study comparing the experiences of students with and without disabilities. Finally, this author concludes by saying that it is important to research ways of making certain courses accessible to blind students and explore successful practices in other countries and that it is important to study the family backgrounds of students who succeed despite challenges.

Chapter 4

Accessibility Principles

This section introduces accessibility guidelines categorized into four principles. Each principle is discussed briefly, emphasizing the importance of making content perceivable, operable, understandable, and robust.

The number of people who experience difficulty with accessing web pages is significant [10, 15, 37]. Not only is their number high, but the nature of the disabilities that they are facing in their daily lives differs greatly. This is why they can be placed within diverse categories of physical problems that they might be dealing with. According to the official website that specializes in matters of accessibility and assisting individuals pursue a career in education, the guidelines can be divided into 4 main categories.

4.1 Principle 1 – Perceivable

Outlined in this principle are guidelines related to visual and auditory interactions [14, 29]. Suggestions include providing textual alternatives, captions, transcripts, and audio descriptions to accommodate users with auditory or visual impairments. The importance of user customization options for better accessibility is also highlighted.

This set of guidelines has to do with the way that individuals interact with the content in a visual and auditory capacity [14, 29]. One of the first points that is listed on the W3C website pertains to text in relation to those users who cannot access it due to auditory impediments. A possible solution that is suggested to aid auditory-impaired individuals would be to provide all the content of websites in the form of text so that those individuals who cannot listen to it can interact with it in a visual context. In addition, the textual representation of buttons and diagrams could help students overcome their problem of perceiving such visual images in case they cannot clearly see them, as text might be a means they are more familiar with. In other words, if they have difficulty following content such

as illustrations, they could do this more easily when reading. Another form of textual content that is advised is the introduction of captions or transcripts for those students who cannot hear audio content. Another way of overcoming the problem that deaf or auditory impaired students may experience is through the use of sign language, although such a means of conveying information to the users may be difficult to achieve.

Conversely, for those students who cannot access visual material due to blindness or impaired vision, what is suggested is the introduction of audio descriptions which are in the form of narrated content [6, 39, 52, 63]. By redirecting the means of communication differently, students who cannot access content visually can feel almost fully included in the process of education if the material is provided to them auditively, as they can follow the content in a way that they are already comfortable with and accustomed to [20].

What also needs to be taken into account is the manner in which the material is being presented to the users. Namely, one must bear in mind that the tables, lists and headings ought to be marked up adequately i.e. in a way that the users feel they are in a user-friendly environment [5]. What also needs to be considered is that the information that the students are exposed to on the web pages is independent of the presentations, in order to make it easier for them to follow and so that they would be able to follow it if the presentations are impossible for them to hear or see for any reason [14]. Finally, what is of great assistance to the users is if the browsers give students the opportunity to customize the presentations to fit their personal needs, either pertaining to their visual or auditive ability to access it [29]. The mentioned techniques would enable the users to manipulate the content so that the size and color are adapted, and getting the chance to have the material read aloud to them is also a significant benefit they could appreciate.

As can be concluded from the listed sources, the guidelines attempt to suggest ways of avoiding those features of websites that the users cannot tap into but rather exploit those functionalities that are in line with the student's capabilities [5, 14, 18, 29]. When it comes to the color itself, the same sources suggest that this visual aspect of web pages should not be the sole means of presenting content to the users. When it comes to the very colors, they add that the creators of websites should bear in mind that the choice of colors in the foreground and background is such that the contrast enables a clear view of the presented details as the wrong combination of colors can result in a bland image that is virtually impossible to see, especially in cases of color-blindness are different types of impaired vision. When it comes to the size of the letters and visual information on the screen, utilizing the resize option should not result in any content disappearing from view. What happens too often is that enlarging certain sections of the text can lead to the rest of the text getting lost, which, in turn, results in them getting confused and lost as they no longer know where they are in the whole

text and what they had previously read. With regard to the audio quality of the material, it is essential that the volume of the content can be adjusted adequately to fit the needs of the listeners as not everyone can hear equally well. In addition, the students should have the option to pause the audio content and play it again at their convenience. One more requirement that needs to be considered is that they need to be able to turn off the sound coming from the background.

4.2 Principle 2 – Operable

This principle focuses on physical interactions with the website, addressing issues such as keyboard-only navigation, time limitations, and potential harm from certain content. Recommendations include keyboard accessibility, voice recognition options, and features to hide distracting or harmful content [14, 18, 29].

When it comes to the second principle, it entails the manner in which the users physically interact with the website [14, 18, 29]. It should be noted that some users are not able to utilize the mouse and are reduced merely to the keyboard. Bearing this fact in mind, it is vital that keyboards have all the options that a mouse can offer, but it should also be important to have the option of voice recognition in order to minimize the use of the keyboard or any other physical means of interacting with the websites. One of the aspects that can be attributed to operability is time. Namely, time limitations tend to pose a problem for a certain number of users if they have physical difficulty operating and navigating the system. This is why they should be able to make adjustments in this respect, as well as to hide the content that is moving or posing any kind of distraction or interruption. Also, in the event that a session expires, they need to be given the chance to re-access the information they were looking at without any additional particular difficulty.

Another significant aspect of operability has to do with the content not leading to any harmful responses on the part of the users, such as epileptic seizures, especially in cases where it has particular colors or sequences of appearing in front of them at a fast pace [14, 18, 29]. For instance, the same authors say that the content that they are exposed to should under no conditions be excessively flashy, and even if so, the students need to be notified of this negative phenomenon. Another way of surpassing this potential pitfall would be to find some kind of replacement that could possibly take into account this potential threat. Thus, some means of disabling visually harmful content should be at the disposal of the students. In a similar fashion to the previous points, the guidelines assume that the students need to be able to navigate the material without any difficulties, and a suggested method of doing this would be that the pages have titles that are easy to follow and that the language in them is of a descriptive nature. In addition, the users need to have at their disposal a variety of ways in which they

can find what they need instead of being reduced merely to one option. As the guidelines very explicitly suggest, this could be achieved by letting them know about their current whereabouts. In addition to this, they need to be able to skip the material that repeats.

Another way of making it easier for them to find their way on websites is by making the point of links clear and straightforward so as to make the search process more meaningful and efficient [14, 18, 29]. Furthermore, to get around problems with operability, the dexterity aspect of manipulating the content needs to be reduced to a minimum and the possibility of inadvertently activating some options should also be taken into account by giving them the chance to undo their previous actions. Voice recognition and user interface should also be utilized and features such as buttons would need to be visible.

4.3 Principle 3 – Understandable

Discussing cognitive aspects, this principle stresses the importance of using clear and user-friendly language, maintaining consistency in interface design, and offering predictability in navigation [14, 18, 19, 29, 50]. Creating shortcuts and providing descriptive instructions are suggested to enhance user understanding.

The previous two principles were in connection with the physical aspect of interacting with the content, whereas the one that follows is related to the cognitive side. What is meant by this is that the material is comprehensible [14, 18, 19, 29, 50]. This implies being given the chance to identify the language of the text, as well as having the opportunity to read descriptions and definitions of any linguistic units (complex phrases) that may pose a problem for a user to comprehend. As suggested in the guidelines, this could be achieved by means of utilizing language that is inviting, straightforward, and user-friendly rather than unnecessarily difficult to grasp and cope with. Simplified language devoid of complex terminology could be used. Another point worth noting is the predictability of the content that the students have in front of them. What this implies is that if there are any inconsistencies in how the matter is presented to them, the students can become lost in grasping the meaning. As suggested, one way of overcoming this issue is if the mechanisms that are utilized for the navigation of the websites are positioned consistently in the identical spot on the web page. This approach enables a more simple and efficient way of finding your way.

In addition, the components of the interface would need to be marked and designed consistently throughout the website, so that the users can learn from previous interactions and know what to expect in the future [14, 18, 19, 29, 50]. What is more, within the category of predictability, it must be acknowledged that large and unexpected changes on pages can cause confusion and should, therefore, be made with the exclusive consent of the students themselves. A

practical way of achieving predictability and speeding up the process of operating the material is by creating shortcuts. Finally, when discussing the subject matter of understandability, the students can be assisted in minimizing mistakes in cases when the content itself is complex in nature. A possible way of overcoming this is by providing instructions that would be descriptive and sending textual content to them to give them support on how to correct the errors that have been made. They should also be given the chance to have their submissions reviewed, which would eliminate the number of mistakes that might occur.

4.4 Principle 4 – Robust

The final principle emphasizes the technical aspect of compatibility, ensuring web page content remains accessible across various browsers and devices, both present and future [50]. The goal is to guarantee that the users can access educational materials regardless of the technological advancements.

Unlike the previous three principles, this one pertains more to the technical side of things [50]. What is meant by robustness is that there needs to be compatibility of the material being presented to the users with the existing technologies as well as those that are coming in the future. In reality, what this implies is that the users can freely access the web page content regardless of the browser or device that they would like to utilize and regardless of the time. In other words, accessing the desired material should be made possible in years to come rather than being restricted only to the present moment.

Chapter 5

Evaluation

The evaluation process in this thesis is critical because it assesses the effectiveness of web accessibility measures at the University of Vienna. It analyzes past and present website configurations to identify areas for improvement. The evaluation helps to understand how well the university meets the accessibility needs of people with disabilities. It also serves the purpose of guiding future advancements to support inclusivity in educational environments. The evaluation process is complex and contains more aspects. It provides a deep understanding of which areas could be improved. To assess the influence that accessibility has, we are conducting research into the past and current organization of the web pages belonging to the University in Vienna, Austria. What this implies is examining how web design has evolved and responded to the needs of individuals who have different types of disabilities.

The *before-after* analysis makes it possible to visually represent what has been improved with time. This research gives an insight into whether the implemented measures are efficient or not. It also guides us on how we can make future improvements in the field. The document analyzes web accessibility at the University of Vienna and considers different criteria in line with the Web Content Accessibility Guidelines (WCAG) 2.1. These criteria are derived from WCAG, which include Perceivable, Operable, Understandable, and Robust (POUR) aspects. What follows is the set of criteria considered for the analysis.

Proper HTML is emphasized for utilizing semantic markups for headings, subheadings, and other structural elements. This is done to make sure that the content is easy to navigate by screen readers. When it comes to alternative texts for non-text content, it should be noted that providing alternative text descriptions for images is significant, as well as videos, and other non-text content. This makes it perceivable by screen reader users. When dealing with adaptability, the content should be presented in numerous formats. However, it should not lose information or structure. Such an approach improves adaptability for users.

When talking about navigation and keyboard accessibility, the elements of navigation have menus and the search functionality needs to be operable via the keyboard. In addition, the focus indicators for keyboard users need to be clear. When referring to time-based events, the information concerning updates or events must be accessible. It should give the users a possibility to be ready for service interruptions. If we make reference to readable and predictable content, logical structure and clarity in language use are vital. The content needs to be comprehensible and navigable. Concerning consistency in navigation and identification, it should be stated that it assists in making web content more predictable and easier to understand. When dealing with compatibility with assistive technologies, the content would need to be robust enough to be interpreted reliably by a variety of user agents and assistive technologies. These include compliance with WCAG 2.1 at the AA level. When it comes to expert review and automated testing, we must recognize the limitations of automated tools and the need for manual testing and expert review. This is the only way to ensure that we meet the accessibility standards.

Concerning data privacy and security, it is essential to ensure GDPR compliance with the use of accessibility evaluation tools. These criteria reflect a balanced approach to web accessibility evaluation. They combine automated tools with human expertise to create and maintain web content. This methodology facilitates the identification and removal of accessibility barriers and ensures ongoing compliance through continuous monitoring.

5.1 The University Website in the Past

If we take into account the global trends and the role of educational institutions, the University of Vienna began incorporating some web accessibility standards into its site roughly 25-20 years ago (see Figures 5.1, 5.2, 5.3) [1, 17].

The text content was made to be accessible. This was done in order to make the navigational structures clear. The accessibility of multimedia content was also addressed. However, some challenges remained in terms of compliance with WCAG 1.0. In addition, the accessibility of dynamic content and interactive applications had to be addressed. Content creators had to be trained as well as the developers. Twenty years ago, the University of Vienna's website was navigating the evolution of web accessibility with certain success [1]. What marked the period was growing awareness. The initial phases of implementing accessibility standards were also put in place and they were driven by legal requirements. The development from those days in the past to today's approaches to digital accessibility reflects the dedication to the inclusivity that different institutions strive for. After analyzing the images of the University website when it comes to accessibility, what we need to consider is a number of aspects of the WCAG.



Figure 5.1: The University website in the past - History

What follows in the coming paragraphs are the criteria that we can evaluate based on the images that have been provided:

1. Are there text alternatives for any non-text content? We pose this question to see if it can be changed into other forms that people could benefit from. These include large print, braille, speech, symbols, and simple language.
2. Is there an alternative for time-based media?
3. Can content be presented in different ways without losing information and preserving the structure? An example of this is a simple layout.
4. Is it easy for users to see and hear content? This might include separating foreground from background.
5. Can all functionalities be accessed via keyboard?
6. Is there enough time for users to use the content?
7. Are there ways of preventing seizures caused by visual stimuli?
8. Are there ways to help users navigate and find the content, and determine where they are?



Figure 5.2: The University website in the past - Epochs

9. Is the text easy to read and understand?
10. Do web pages operate in predictable ways?
11. Is help provided when the users make errors?
12. Is the content compatible with current tools? [17]

If we look at the images, we can note a few things. The pages have a clear and consistent layout. This fact makes it easier to navigate and helps with predictability. The text size options are given. This helps make the text readable for users who have visual problems. The contrast between the text and background is clear and, as a result, the readability is at a higher level. The language selection options (*DE EN*) improve accessibility for non-German speakers. The search function helps users find content more easily. The text content is primarily in HTML rather than images. This would be more readable for screen readers. However, taking into account the images alone, we cannot fully assess the following: if all interactive elements are accessible by the keyboard, if there are alternative texts for

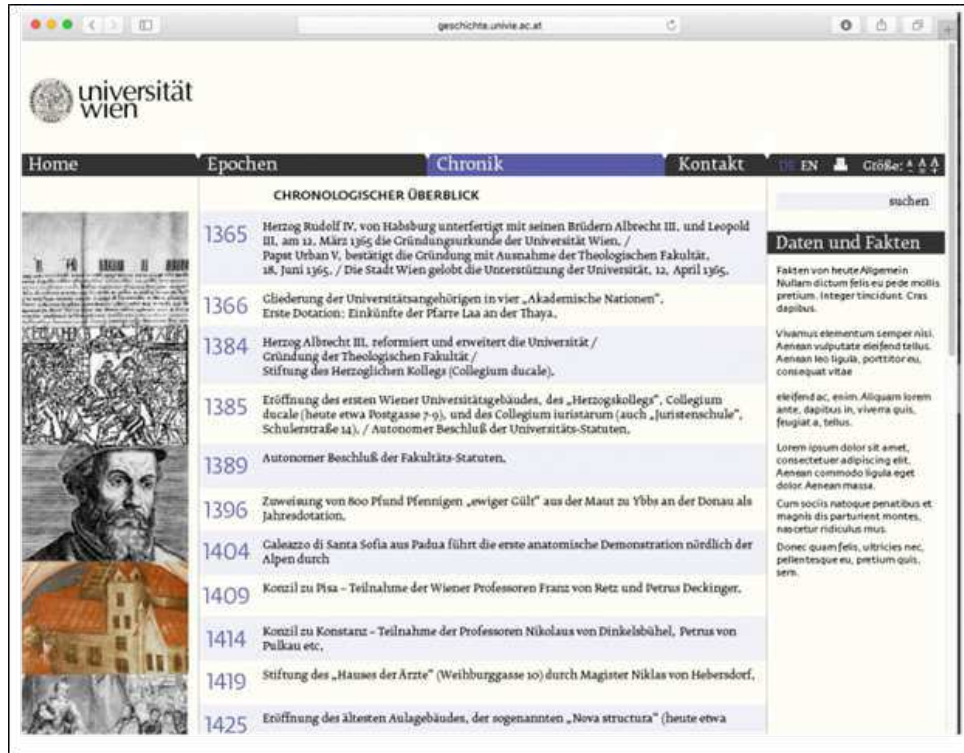


Figure 5.3: The University website in the past - Timeline

images and descriptions for non-text content, if there are captions or transcripts for audio or video content, if any elements could cause seizures, and if there is assistance for those particular users who make input errors.

5.2 The Current University Website

When talking about the website and what it offers today, a detailed analysis of it can be performed. The University website gives us a variety of features. They are aimed at improving accessibility and usability for all users. These features can also be said to be accessible to those students experiencing disabilities. The site gives direct access to the main content with links like *Direkt zum Hauptinhalt gehen*. This allows users to avoid navigation menus. Furthermore, the website is organized in such a way that it contains clear headings and sections, which ultimately leads to an increase in its navigability. However, it must be said that the website is facing certain challenges. These can be a lack of alternative texts for non-text content which is essential for screen reader users. These features and limitations are part of the university's attempts to improve its presence.

Landing page. The landing page is naturally discussed first. The text is in a readable format with no indication of non-text content such as images or multimedia. In addition, the *Direkt zum Hauptinhalt gehen* link is present. This encourages us to consider operability and it allows users to skip repetitive content and navigate to the main content. This feature improves accessibility. This is especially true for users who rely on keyboard navigation or assistive technologies. The text contains links to numerous sections as well as events. It also indicates that there is a navigable structure. Although the *Direkt zum Hauptinhalt gehen* link implies keyboard accessibility, more analysis needs to be carried out to ensure that interactive elements, links, and forms are operable with a keyboard. This includes focus management and ensuring that all interactive elements are reachable by using the keyboard. The text has sufficient color contrast against the background and improves readability. There is no time-based media in the text that would be of any help to the users.

Bachelor studies. What follows is a breakdown based on the content from the Bachelor Studies program (see Figure 5.4). The information and user interface are presentable to the users. The text contains sections and headings (e.g., *Bachelor-/Diplomstudien an der Universität Wien*, *Studieren an der Universität Wien*). This suggests that there is a structured layout that is good for perception. *Druckversion* implies an option for a print-friendly version. This makes information perceivable in different formats. No alternative text for non-text content (like images or videos) is mentioned. This is crucial for users who rely on screen readers.

The user interface components and navigation are operable. It needs to be noted that the text includes references to various navigation aids. Examples of these are *Quicklinks*, *Kontakt & Services von A-Z*, and a structured menu (e.g., *Studienangebot*, *Zulassung*, *Aufnahmeverfahren*). These are positive for operability and they have been implemented with keyboard navigability. The search function (*Suche*) is beneficial for operability. It helps users find information quickly. Its accessibility depends on how it is implemented for users with disabilities. Keyboard shortcuts or navigation aids for screen reader users are not mentioned.

The information and the operation of the user interface are understandable. The content is structured logically and straightforwardly. In other words, the headings and sections are clear. The understandability of the site also depends on how clear the language is, meeting a logical reading order, and giving instructions or guidance for complex tasks. Terms like *u.space* and *u.find* are mentioned, but no explanation is given. This could lead to confusing the users who are not familiar with the system. The content is robust.

It can be interpreted reliably by user agents as well as assistive technologies. *Barrierefreiheit* (accessibility) suggests an awareness of the need for robust and accessible content.

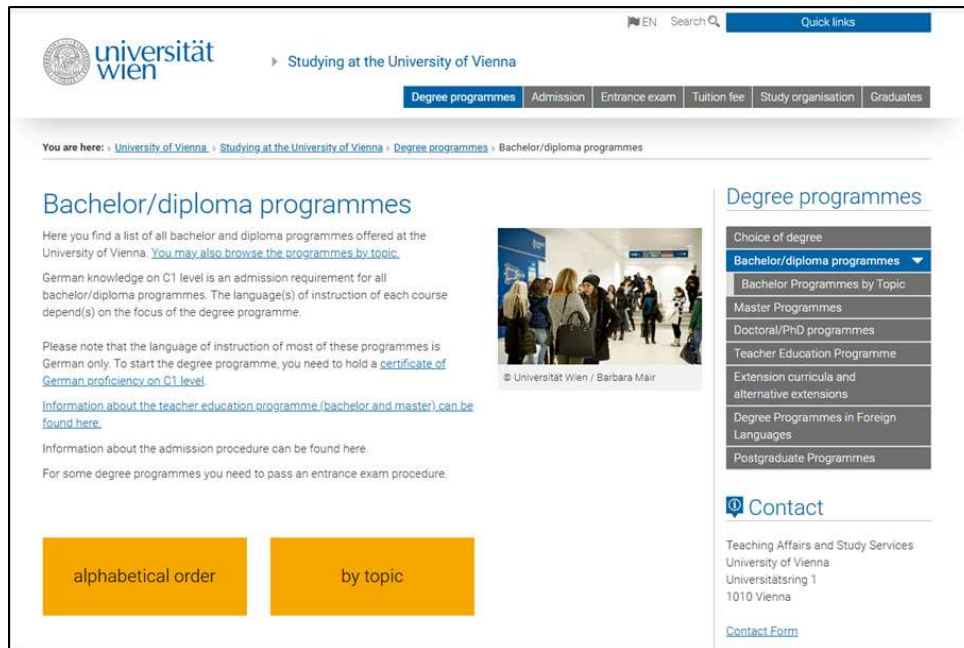


Figure 5.4: Current Website of Bachelor/Diploma programs

TYPO3. The content related to TYPO3 at the University of Vienna aligns with these principles in the following way. The text shows structured content that contains clear section headings. This is important so that users can perceive the given information. Implementing these headings using proper HTML markup is of great significance for screen reader users. A responsive design makes it easy for the content to be accessed and perceived across different devices. This is an important aspect of perceivability that needs to be considered.

The structure suggests navigable content. The links are direct and the hierarchy is clear. All navigation elements need to be keyboard accessible. The form to register a TYPO3 site and other interactive elements are operable through the keyboard and screen readers, with appropriate labels and instructions. The content of the page is written in clear language. It is important that the instructional content, such as how to use TYPO3 or register a site, is easy to understand. This is surely the case on this page. Using navigation elements and a site structure helps users predict where to find information. TYPO3 support and a design that is responsive in nature

show that there is an awareness of the need for compatibility that will be robust and cross-platform. The content is functional with numerous browsers. Different devices and assistive technologies also work with it. Following the web standards for HTML and CSS makes it possible for the content to be interpreted better by user agents. The page shows a dedication to accessibility and mentions compliance with the Web-Zugänglichkeits-Gesetz (Web Accessibility Law). It offers services to check for accessibility compliance. The templates (header, footer, navigation) meet the required accessibility standards, making them more helpful for the special users.

Terms of use. The page deals with the terms of use for websites at the University of Vienna. It covers general provisions, publishing personal websites, and publishing websites for official purposes. The guidelines offer a clear framework for content that can be published. This indirectly supports creating perceivable content and encourages clarity and relevance in published materials. Prohibiting malware and spam shows a commitment to operable and safe web environments.

The guidelines promote understandable content. They do not address users by means of clear and simple language or offering instructions and feedback. The necessity to adhere to the university's corporate design manual could support consistency across university web properties. This makes them more predictable and easier to understand for all users.

The guidelines mention using a central Content Management System (TYPO3) and adhering to the corporate design manual. This implies a structured approach to web development. It means that web content can be interpreted by different user agents. This is considered to be a key aspect of web accessibility. The guidelines do not mention giving accessibility statements or resources for web developers.

Domain registration process. The page deals with the domain registration process and guidelines at the University. It covers aspects such as possible domain names, prerequisites for domain registration, and procedures for registering, transferring, canceling, or assigning domains. The information about domain registration is text-based and perceivable to users with disabilities. PDF forms for domain services are accessible. These documents are tagged PDFs and allow screen readers to interpret and navigate the content. The visual aids used in the process are accompanied by text descriptions or alternative text to ensure they are perceivable by users who cannot see them. The domain registration process involves interacting with forms. These forms are keyboard navigable and the form fields are labeled clearly for screen reader users. The process for domain registration, transfer, cancellation, or assignment involves several steps described in clear and

simple language. The web pages containing domain registration procedures can be said to have a consistent layout and predictable operation. This fact makes it easier for all users to understand how to carry out the required actions. The information and forms related to domain registration are designed to be compatible with a lot of browsers, devices, and assistive technologies. This ensures that the website's HTML/CSS is valid. Client-side scripting improves functionality without hindering accessibility. Using standard web technologies for the domain registration process makes the information and services work for users now and in the future. The text gives domain registration policies. This also includes an accessibility statement that covers the university's commitment to making its digital services accessible. This statement provides information on accessibility features. Also, it contains information on how users can report issues, and how these reports are handled. Helping users who encounter difficulties in the domain registration process improves accessibility. This includes providing an email address and phone number for the users where they can get help. The domain registration guidelines at the University of Vienna give a framework for managing domains. Introducing references and practices to ensure web accessibility makes the process better. By ensuring that all users can easily access, understand, and navigate the domain registration information and services the web environment becomes inclusive.

Axe Monitor Tool. The University's wish to use the Axe Monitor Tool to check the accessibility of its web pages enables compliance with the Web Content Accessibility Guidelines (WCAG) 2.1. Enabling automated checking of web pages for accessibility issues allows the University of Vienna to have perceivable web content. This tool identifies issues that prevent the content from being accessible. This includes missing alternative text for images or insufficient color contrast.

The ability of Axe Monitor to perform repeated checks at set intervals helps in maintaining the operability of web content. It makes sure that new content or updates are following the accessibility standards. The University's decision use the Axe Monitor to estimate accessibility shows that there is a strong aspiration to comply with WCAG principles. This approach makes identifying and removing obstacles easier. Moreover, it ensures that there is compliance through continuous monitoring. Automated tools like Axe Monitor have limitations. For that reason, they need to be supplemented in a certain way. This can be done by means of manual testing or expert review. This balanced approach to web accessibility evaluation is a solid foundation. It can create and maintain web content that is accessible to all users, especially those with disabilities. The text is written in clear and

simple language. It should also be made clear that German phrases might potentially be challenging for speakers who are not German natives. Terms like *Axe Monitor*, *WCAG*, and *CMS TYPO3* could be problematic to understand as they might be unknown to the users. This is the case if they are not familiar with web development or accessibility standards. The instructions for using the Axe Monitor software as well as requesting checks of accessibility have been given logically. This way, the users can easily follow the process. The Axe Monitor cloud service is operated by Deque Systems Europe B.V. This shows that it relies on a third-party service to perform accessibility checks. GDPR compliance pays attention to data protection and privacy concerns. The page deals with maintenance work schedules for servers. This shows that there is a commitment to making systems up-to-date and functioning the right way. Putting the Axe Monitor to use for automated checks shows that this is a robust approach. It can ensure compliance with the necessary accessibility standards.

Server. The University's Server housing services offer a significant infrastructure for managing IT services by organizational units within the University. The details about virtual and physical server housing are perceivable. The operability of the server housing service may not be related to web content accessibility. The process for requesting server housing, which involves forms or digital requests, is fully accessible. This implies that all users can navigate and complete these requests regardless of assistive technologies.

The explanations offered for virtual and physical server housing services are clear and understandable. This includes plain language and giving clear instructions for how organizational units can request and manage these services. The interfaces used for managing server settings or configurations are designed with understandability in mind. This enables descriptive labels and feedback is provided for actions. The web interfaces utilized to manage server housing are compatible with current and future user agents. Accessible documentation for how to use the server housing services is present. This documentation is easy to access, navigate, and understand. It complies with WCAG guidelines. Support services are available and accessible and help via accessible communication channels is also at the students' disposal.

Backup service. The central Backup Service at the University is a valuable resource for employees to copy data from their computers to university servers. The service description and instructions are text-based. This is beneficial for screen reader users. Requesting central backup involves filling out a form. These forms are navigable and operable for those individuals who are relying on keyboard navigation or assistive technologies. The labels are properly associated with form fields. Any form errors are communicated

to the user. The backup software is operable via keyboard. It is compatible with assistive technologies – all users can configure their backup settings.

The instructions for requesting backup and using the backup software are clear and straightforward. Technical jargon is minimized and explained. In addition, the steps are logically ordered. This helps all users follow the process without confusion. Consistency in the website’s navigation and structure helps users understand and predict how to find and use different parts of the service. What this implies is consistent and uniform labeling of sections and actions. The content and information on the website as well as the backup software are designed to work within different browsers, operating systems, and assistive technologies. Users who have diverse preferences when it comes to technology and requirements have the chance to access and use the backup service without particular difficulties. Giving users the opportunity to have a clear means of reporting problems with accessibility pertaining to the backup service or requesting help in case they run into barriers is important for the process of making accessibility more present. The main backup service gives employees the chance to have a crucial functionality. What it does is enable the web presentation of the service and any software to be accessible. This makes it possible for all employees to utilize the service in an effective manner.

SSL Certificate Services. The information about SSL Certificate Services for servers at the University offers a critical function for ensuring secure, encrypted communication between the servers and users’ devices. The details on SSL certificates are text-based and accessible. This is the case if they are properly structured with semantic HTML. What this involves in headings, as well as lists and links. The listed components can be used by screen reader users for easy navigation. In addition, downloadable documents or forms related to the SSL certificate application process are provided in accessible formats.

The process is about filling out forms to ask for or renew SSL certificates. These forms are keyboard accessible. In addition, they are operable by users of assistive technologies. What this includes is the existence of clear focus indicators. Also, these can entail logical tab orders, and accessible form controls. Website navigation that leads to the SSL certificate service information and forms is easily operable. These have the opportunity to avoid repeated sections of content. In addition, they can access different parts of the page in an efficient manner.

The process that is used for requesting or renewing SSL certificates is described in language that is clear and simple. The instructions are easy to

understand. They avoid unnecessary jargon. The web interface used in the SSL certificate process behaves predictably. Submitting a form leads to expected results, and errors in form submission are clearly explained and easy to correct. The website and any associated web applications for SSL certificate management are compatible with the current and future user agents. These agents include various browsers and assistive technologies. Putting to use standard web technologies and following the best approaches to developing the web helps ensure that the SSL certificate service remains accessible. This includes using HTML, CSS, and JavaScript properly. What is also implied is compliance with WCAG guidelines. Having the chance to ask questions and report issues clearly with the SSL certificate process improves accessibility. This includes an accessible contact form, email address, or phone number. The University regularly reviews and updates its web content and services. By doing so, it makes sure that there is the right degree of compliance with the WCAG guidelines.

WCAG. Although the SSL certificate service is a technical backend feature important for web security, applying, renewing, and managing these certificates is also of great significance. The University's provision for departments to request their zone under *.univie.ac.at* shows a significant IT service. Analyzing this service in terms of web accessibility involves examining how requesting and managing a subdomain is accessible. What follows is an analysis based on the core principles of WCAG. The service details are text-based, which is accessible to users who rely on screen readers. It is vital to enable all users to perceive the forms, downloadable documents, or multimedia (if used) related to the service, which should be provided in accessible formats, with alternative texts for images and captions for videos. Requesting a subdomain involves interacting with web forms. It is critical that these forms are keyboard accessible and that all users can navigate through the form fields using assistive technologies. The right kind of labeling, clear instructions, and error messages are important for making the page operable. The guidelines that help us request a subdomain or change the subdomain data are written clearly. The same could be said about those instructing us how to renew a subdomain as the language is simple. Technical procedures are explained in an understandable manner. The steps are logically ordered. It also implies making sure that the web interface or forms used for these processes have logical structures.

The web pages and forms that have to do with the subdomain service are designed in such a way that they are compatible with a wide range of devices, browsers, and assistive technologies. This implies using standard-compliant HTML, CSS, and JavaScript. These ensure that content remains accessible

as technology advances. Having a mechanism that the users can utilize to ask for help or report problems with accessibility is invaluable. This includes an accessible contact form, email address, or phone number. These ensure that users can get support throughout the process. The documentation or online resources that assist us manage subdomains are accessible. They provide help in different formats (e.g., text, video tutorials with captions) to meet the users' needs and preferences.

The subdomain service that the University offers is an IT feature of infrastructure. What it does is ensure the accessibility of the web content and processes associated with this service. This includes making application forms, instructions, and support resources which are in line with the WCAG principles.

Study programs. The text on the website deals with various aspects of studying. The information on the Bachelor and Diploma studies has been included. The same can be said about the data on the enrollment processes, costs, study organization, new developments, and support services.

The content is text-based and is accessible to users with screen readers. Images, videos, and other multimedia have alternatives for text (old text) to make non-text content perceivable to blind users. Headings, lists, and links follow semantic HTML practices and it could be said that the information is organized. Moreover, the information can be navigated by screen readers and assistive technologies. The site can also be navigated by means of a keyboard. It enables users to access all features and there is no need for a mouse. This includes navigating through menus, links, forms, and interactive elements. The forms that are used for enrolling, feedback, or other interactions can be accessed. This implies properly labeled fields in forms. In addition, clear error messages and understandable instructions are also included. The language that we are exposed to on the site is simple. In other words, it does not lose the intended meaning. Technical and academic terminology is explained and does not impede communication. The site has consistent navigation and predictable behaviors. This is why the users do not run into unexpected changes that could potentially confuse them.

The website is designed in such a manner that it needs to work across various devices, browsers, and assistive technologies. What this implies is using valid HTML and ARIA roles to improve accessibility. The website is responsive. In other words, it ensures that the content is accessible. Furthermore, it makes sure that it is legible on different screen sizes and orientations so that everyone could use it with ease. For instance, these devices may range from desktop monitors to mobile phones.

Master's studies. The web page with information about the Master's Studies at the University has different sections important for potential master's students (see Figure 5.5). The page gives text-based information made using proper HTML headings, lists, and other semantic elements. This is done to make it navigable and perceivable by users with screen readers. The images and videos used on the page have appropriate alternative text descriptions that can be helpful.

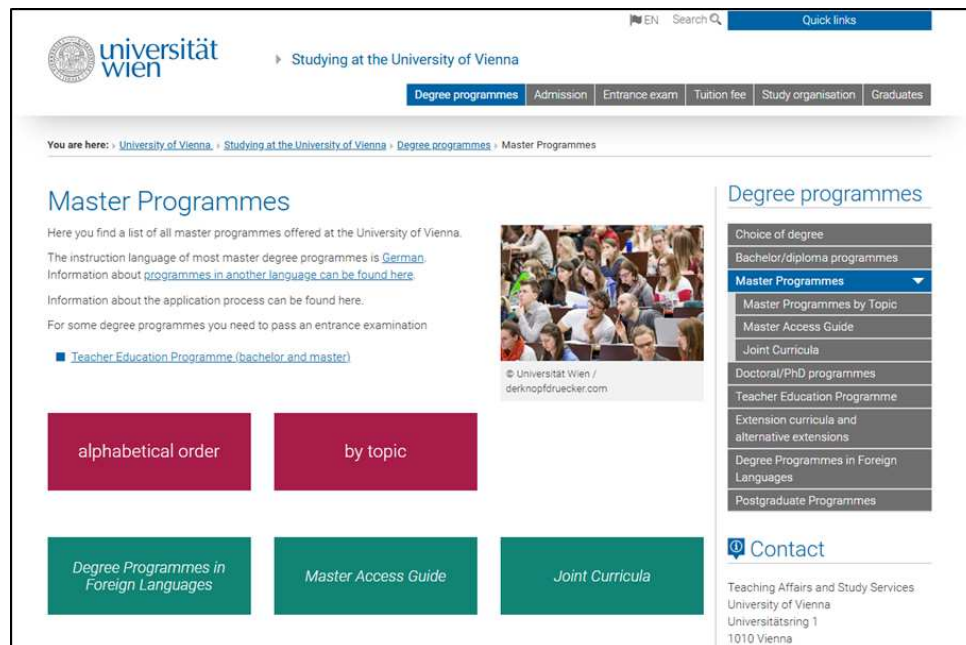


Figure 5.5: Current Website of Master programs

The page offers more ways to navigate. This means having a search function, navigation menus, and the chance to skip to the main content. All elements are keyboard accessible. This way, users who cannot use a mouse can still have access to the webpage. The forms for enrolling, feedback, and other interactions are also accessible. What is meant by this is having labeled fields. Also, the instructions are clear and error messages are simple and easy to understand. The feedback is such that one can understand it and the language is clear and straightforward. Unnecessary jargon is avoided and the page behaves predictably. The users do not need to understand complex or unintuitive navigation patterns. Instructions for enrolling, organizing your studies, and other processes are easy to understand. Assistance (e.g., contact information for further questions) is available and accessible. The webpage is designed to be compatible with current and future browsers and

assistive technologies. This means using HTML, CSS, and JavaScript and following best practices in web development. The design of the web page is responsive. For that reason, the content is easy to access and legible on different devices and screen sizes. Offering a mechanism for users to report issues and suggest improvements is crucial to maintain the accessibility of the web page. The University's web page for master's studies contains essential information that is accessible to all potential and current students and is, therefore, considered useful.

Postgraduate center. This web page contains information about the Postgraduate Center at the University (see Figure 5.6). It includes its educational offerings, events, and contact information. This is important for giving access to continuing education. The information is text-based. It is accessible to users with screen readers if it is structured with semantic HTML. Headings, lists, and links follow semantic HTML practices and ensure that information is organized and navigated easily by screen readers and assistive technologies. The site has many ways of navigating to different sections. This is done through a search function, navigation menus, and quick links. All interactive elements, including forms for newsletter subscriptions or contact inquiries, are keyboard accessible. They are compatible with assistive technologies. The text is written clearly and simply. The instructions that help us apply to programs, attend info sessions, or contact the center are straightforward. The website works across different browsers and devices, as well as assistive technologies. No content or functionality is lost by using clean, validated HTML and CSS.

Doctoral studies. The web page contains information about the Doctoral Studies program at the University (see Figure 5.7). It has various sections important for potential doctoral students. This includes information about different fields of doctoral studies and the process. The field may also include workshops, financing, and advisory services. The content is text-based, and it should be mentioned that it is structured using proper HTML headings and other semantic elements. This makes it navigable by screen readers and using the semantic HTML ensures that the information is logically organized. This includes using headings in a correct way to structure content and lists to group related items. This makes the information easier for the users of a screen reader to understand. The site offers more ways to navigate to different sections. This is conducted through a search function, navigation menus, and quick links. All interactive elements are accessible via the keyboard. It can also be used with assistive technologies. The language on the site is clear and simple. The website has navigation that is

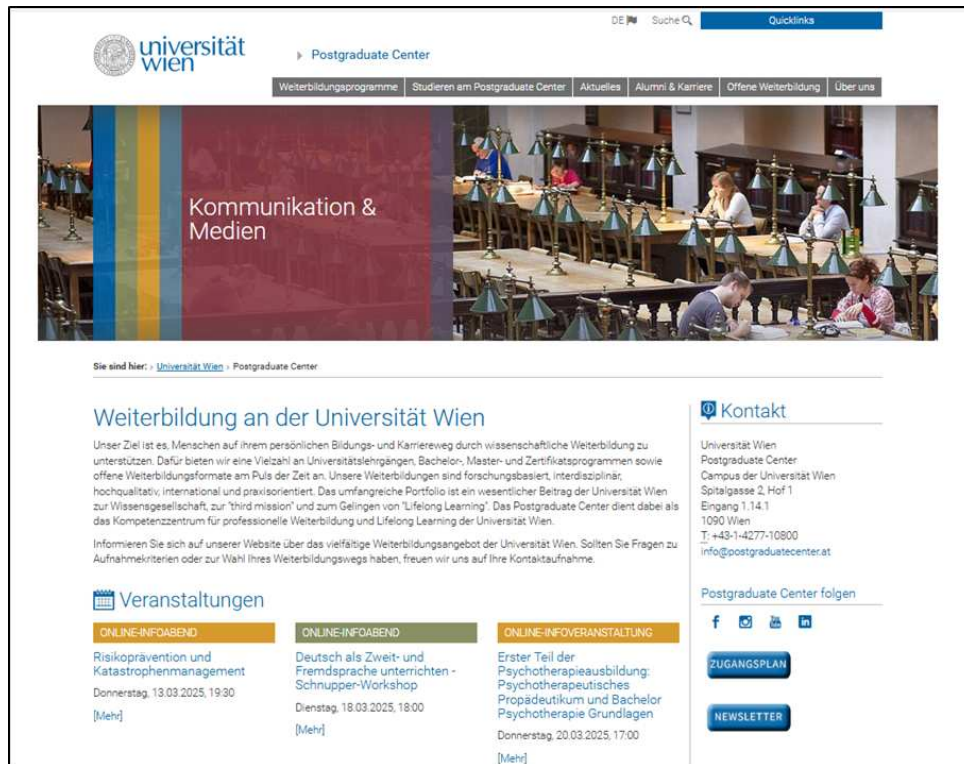


Figure 5.6: Current Website of Postgraduate Center

consistent and displays predictable behaviors on different pages. The aim of the website is to minimize confusion among users who suffer from cognitive disabilities. The content is accessible on a number of devices, browsers, and assistive technologies. What this involves is using HTML and ARIA roles so that the interpretation of content by various users would be improved. Giving a genuine chance to users to report accessibility issues or request information in accessible formats is important for improvement and making the users slightly more included.

Accessibility Statement for u:space. The Accessibility Statement for the University's u:space website shows its wish to make an accessible platform. It has been made in accordance with the Austrian Web Accessibility Act and the EU Directive on web accessibility. The focus is on areas where the website is in line with the Web Content Accessibility Guidelines (WCAG) 2.1 standard. In addition, specific issues and plans for improvement are also discussed. The website is partly compliant with the

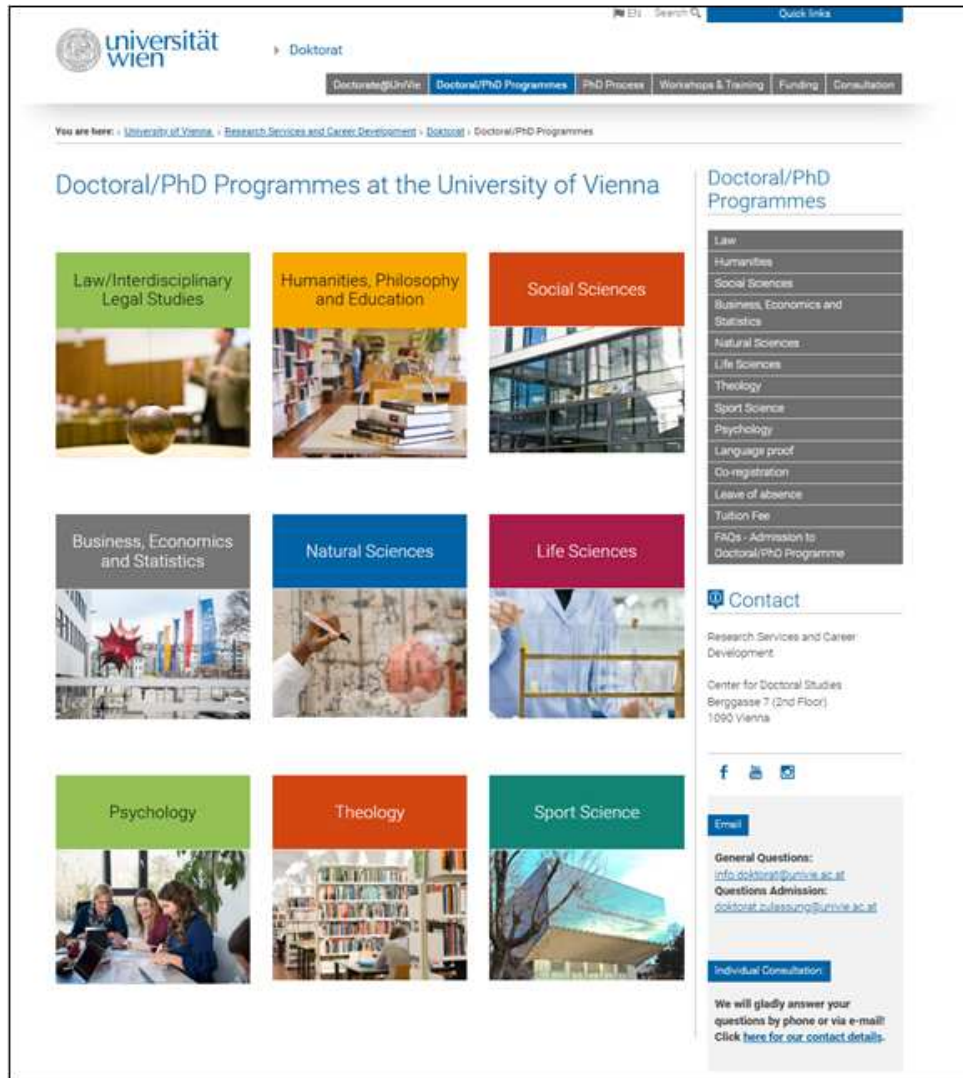


Figure 5.7: Current Website of Doctoral/PhD Programmes

standard AA of WCAG 2.1. It also lists aspects that are not compliant. They are divided into different parts of the website. These include general information, a dashboard, emergency text messaging, a help section, etc. The statement points out various issues. These pertain to difficulties while navigating menus, problems with form elements and interactive elements for screen reader users, inconsistent labeling, focus order issues, and more across different parts of the website. The statement emphasizes that some issues will be resolved in the next development stage. On the other hand,

others will be addressed in the following months. It also mentions cases where adjustments would be problematic because of relying on third-party software or pilot projects. The accessibility statement was released on September 23, 2020, while it was updated on May 2, 2023. The users get instructions to give feedback about their problems with accessibility that they have been experiencing. The contact details have also been provided so that they could report their problems and make suggestions. If users are not happy with the way their accessibility request is being handled, they can contact the Austrian Research Promotion Agency to complain about their problem. It will be investigated to make sure there is compliance with the accessibility requirements. The statement shows the University's wish to improve the website accessibility. It also illustrates that there is a desire to enable inclusivity for all users.

Accessibility improvements. The Accessibility Improvements sections contain a list of resolved issues on the u:space website. They are divided into categories based on the date of resolution. What follows is a summary.

The stated issues were resolved until May 2023: When talking about my u:card, there were inconsistencies in navigation. Furthermore, incorrect reading of error messages could be found. Moreover, there were low contrast elements as well as issues with form elements. In addition, there was an incorrect use of WAI-ARIA attributes and missing text descriptions for a certain number of errors.

The following issues were resolved until September 2021: There were low contrast texts, incorrect use of WAI-ARIA attributes, and issues with dynamically generated content. WAI-ARIA stands for Web Accessibility Initiative - Accessible Rich Internet Applications. These are specifications of a technical nature that are written by the World Wide Web Consortium (W3C). Their aim is to make the web content and web applications more accessible to people with disabilities. It particularly helps with dynamic content and advanced user interface. These are developed by Ajax, HTML, JavaScript, and technologies similar to these. The following issues were resolved until May 2021: There were low contrast elements, issues with dynamically generated content, and incorrect prioritization of status messages, missing or incorrectly read form field descriptions by screen readers, incorrectly defined ARIA attributes and issues with form element operation.

The following issues were resolved until March 2021: There were issues with language selection, button operation problems, lack of visible keyboard focus indicators, inconsistency in navigation, low contrast texts, markup language application issues, and missing indication of dynamically generated

content. When it comes to the payment process following the application for admission, there was a non-automatic reading of text instructions and timing the issues with messages.

The following issues were resolved until December 2020: There were low contrast texts, incorrect application of WAI-ARIA attributes, and inconsistencies in button location. Also, the button statuses and accessibility problems with keyboard operation were not specified in the correct manner. The summary suggests that there is an effort to resolve accessibility obstacles among different functionalities of the u:space website. This ensures better usability for all users. This is especially true when talking about those users relying on assistive technologies.

Additional services. The University's Team gives different counseling and support services to those individuals who have different impairments. These services deal with numerous aspects of life at university. They can range from admission procedures and accommodation to tailored study support. The team works with students to meet their needs and make sure they can perform their obligations successfully. The counseling options provided by the Team include corresponding by email, consultations by phone, audio/video conferencing, and personal consultations through appointments. These different channels of communication make it possible for students to get support in a way that suits their preferences and needs. For students who need alternative ways of being assessed because of their specific impairments, the University offers two options. One is that students can communicate with their lecturers to book the accommodation that meets their needs. This means talking about the necessary adjustments with the lecturer and agreeing on the practical means of implementation. The documentation of the agreement, often through email correspondence, makes it easy and clear for all the sides to participate. The students can apply to the directorate of studies or send a medical certificate to confirm their impairment. This process means filling out a form and showing evidence of the impairment/health issue. The Team can help students in this process and offer them guidance and support. Examples of alternative methods of examination are oral exams, written exams, presentations, and lab work. Such methods are devised to keep the same level of content coverage and performance requirements. They are also meant to accommodate the students' impairments. The aim is to make a fair and accessible environment where students can show their knowledge and abilities without being impaired. In cases of health issues during the exams, students can request to stop their assessment without suffering penalties. This process implies com-

municating with the instructor and, if necessary, applying for recognition of a significant reason for withdrawal from the study dean. The University of Vienna is committed to promoting inclusivity and equal opportunities for all students, including those with disabilities. By providing counseling and support services, along with alternative assessment options, the University wants to create an environment where every student can do well in an academic capacity.

What can be concluded from this chapter is that the University is dedicated to maintaining a level of accessibility and inclusivity across its digital platforms and academic processes. It has the goal of ensuring that web content, forms, study information, and support services are in line with WCAG standards. This makes them accessible to users with disabilities. The website is designed in such a way that it can be navigable with screen readers and keyboards. What is apparent is that the language is clear, the content is structured, and there are alternative formats for multimedia. What needs to be made clear is that accessibility improvements are being implemented continuously. Also, those students with disabilities get tailored support, which includes alternative assessment methods and counseling. This kind of approach reflects the dedication of the University's to giving everyone a fair and equitable environment for learning.

Chapter 6

Interviews with Stakeholders

In November of 2023, a meeting regarding digital accessibility in teaching at the University of Vienna was held on one side between the University’s Barrier-free team (of whom 22 were present) who were the examiners and led the meeting, as well as the examinees on the other side, who gave their insights into the matter. The examinees were 13 students from the University of Vienna. Eight of them had difficulties while 7 did not suffer from any kind of impairments. At 5 tables, the participants discussed questions based on a discussion guide. The key findings were then presented to the plenary. In total, there were 35 stakeholders.

When it comes to the stakeholder categories, the first one pertains to 8 students with disabilities. These included subcategories such as students with visual, hearing, physical, and cognitive impairments. The students at hand gave feedback regarding the challenges they faced with university platforms like Moodle and u:space, as well as on teaching materials and infrastructure. The second one included the general student population (7). These were the students without disabilities who gave feedback about the degree of usability and accessibility of university systems. In addition, the discussions were also about broader university infrastructure. The final category was the Barrier-free team, which was diverse in nature as it consisted of professors and teaching assistants (6 of them), secretaries and technical staff, of whom 22 attended the meeting. Although the Barrier-free team led the meetings and asked questions, the teaching staff within the team also provided valuable insights and feedback about accessibility, infrastructure and their own experiences with the matter so that both the students’ and professors’ views could be observed.

The interviews incorporate first-hand experiences, as well as the challenges and views about the existing accessibility measures. The different viewpoints offer us a complete understanding of the impact the web accessibility initiatives have. The text that follows is based on a meeting with students about digital accessibility in education at the University. It contains protocols based on discussion

guides from various tables where participants (the students) talked about their experiences with digital tools and content. The following headings talk about their experiences and assessments of digital accessibility. What is additionally discussed is the infrastructure, as well as the digital services, and the need for improvements in accessible digital studying. Finally, the ideas for generating interest in the topic are also considered. What is also pointed out is the challenges they encountered. This could be due to the lack of text recognition in documents. It could also be the need for a higher level of awareness and support for digital accessibility.

There were concerns about the accessibility of digital documents on platforms such as Moodle. The participants talked about the need to have text recognition in documents to help neurodivergent students and to improve the general level of accessibility. When it comes to the accessibility issues in connection with the web and software, the participants concluded that there were problems with the University's platforms such as u:find and u:space. There were issues that implied navigational challenges. There was also a lack of clarity. Furthermore, there were technical problems that have an impact on accessibility. With regard to awareness and training, the discussions showed that there was a lack of awareness and training among the staff involved in the education process. This is true for digital accessibility. Another point that they emphasized was the need for improved programs for training.

When referring to the infrastructure and support, the feedback showed that there was a need to have better infrastructure support. What this means is allowing the teaching materials to be accessible. This improves the practice of recording lectures. In addition, it makes induction loops for hearing-impaired students available. When it comes to participation and feedback mechanisms, what was observed was the desire for more students to participate in accessibility initiatives. Moreover, there is a need for effective feedback mechanisms that would solve problems of accessibility. The discussions emphasize the importance of resolving problems with digital accessibility. This would create an inclusive learning environment. Various improvements to enhance digital accessibility at the University are also suggested.

6.1 The Students' Experience with Digital Tools

The first table of the meeting on digital accessibility in teaching discussed the experience and challenges that the students had when they were using digital tools and similar content. The focus of the discussion table was on analyzing the students' personal interaction with digital tools and content, such as Moodle, u:find, and PDF documents (see Table 6.1).

When dealing with the personal experiences with digital tools and content,

Issue	Recommendation	Desire/Feedback
Documents on Moodle are often just images or poor-quality PDFs without text recognition.	Implement Bionic Script on all University of Vienna platforms.	Make document accessibility checks automatic on Moodle, benefiting neurodivergent students.
Examination documents and teaching materials are not prepared by the Literature Service.	-	Raise the preparation of literature services to a higher level, although it has improved. It's not available in all languages or swiftly.
Mathematical formulas are not read correctly by screen readers.	There is better annotation in PDF/documents.	-
There are navigation and usability issues with u:find and u:space.	-	Clearer headings and search improvements in u:find and u:space, as well as fixing registration errors in u:space.
There are issues with PDF forms.	Preference for web forms and digital signatures, possibly by utilizing Bionic Script.	Explore digital options, like u:sign, for students.
Lack of induction loops	-	Request for widespread induction loops and attention to acoustic disturbances.

Table 6.1: Experiences and recommendations regarding digital accessibility at the University of Vienna

the students made reference to documents on Moodle. They stated that these are digital, but often just images (jpg) or that they come in the form of low-quality PDFs that do not have the option of text recognition. It would be beneficial if Moodle could check whether the documents have been processed with text recognition. One of the recommendations was to have a bionic script. The integration of bionic script into all Uni Vienna platforms was requested. The is a type of font that enhances focus and makes reading easier for neurodivergent individuals.

The same problem was observed with exam materials and teaching resources. The university's literature service is not responsible for exam materials, but rather for the items in the library. It can be concluded that the materials provided by professors are not processed. The literature service has improved in general but it

is not available for all languages and is quite slow. In some cases, it was said that even the introductory literature was not accessible. In addition, the mathematical formulas are not read correctly. In other words, an improved markup in PDFs and other documents is necessary. Another major issue was in connection with u:find. It was stated that it lacks proper headings and clarity. For example, the professors' names are missing from the overview. It makes course registration take twice as long. The search function in u:find does not work well. It also gives the impression that the filter bar can only be used with a mouse. There is also an issue with screen readers since there is no spaces or line breaks. What this means is that the words get merged when they are read aloud. When it comes to u:search, the library service (OBVSG) corrects spelling mistakes, which is not the case with u:search. The spellcheck functionality would help students with dyslexia. Also, there are issues when registering for courses with multiple groups. This often results in an unknown error. The SLW is reviewing the issue and is in contact with the students. Furthermore, there are problems with PDF forms. It is necessary to have web forms, digital signatures, and implement a Bionic Script. When it comes to the request for digital signatures, this could possibly be done via u:sign for students, which was suggested by Rainer Jantscher. When discussing whether PDFs can be digitally signed using A-Trust or mobile signature, a suggestion was to discuss the PDF Signatur barrierefrei positionieren tool in the Blindenverband Digitaler Dienstag event.

A further conclusion was that induction loops should be widely available. However, most professors are not aware of them. For events, students request mobile induction loops and attention to acoustic disturbances (e.g., squeaky chairs). It was also concluded that COVID-19 was a boost for accessibility. However, there was a consensus that many improvements have been removed. It was noticed that there is a need for more streaming (u:stream). Although the necessary infrastructure exists, recordings are still not made. This is because there is a concern about losing access to rooms or copyright issues. When it comes to specific feedback and bad experience with the Team Barrierefrei, one of the students stated that they went there at the beginning of the semester because of an alternative exam method. They were told to come back closer to the exam (two weeks before). When they returned two weeks before the exam, they said it was too late, which happened multiple times. One more negative aspect that was conveyed was the fact that there were unclear responsibilities. Namely, the feedback is always just forwarded. The students do not know who is responsible or what happens with their feedback. They asked themselves about who can provide valid feedback and where the ticket system is. They said that they were sent in circles and that it takes time to understand the university structure and get a response. They all stated that they would be interested in contributing. They also said that they would stay within WCAG guidelines and allow enough time for details. A lot of

students requested a self-help forum to share suggestions for assistive tools.

There is generally a wish to have networking through a forum or in-person meetings. It can be said that data protection laws often prevent networking.

6.2 Overall Accessibility Assessment

The focus of the second table was to evaluate the accessibility of the University of Vienna's, assign scores to its services and discuss the awareness levels (see Table 6.2). This was done on a scale of 1 to 10 and the reasons spanned from insufficient fundamental adjustments (rating of 1) to digital accessibility on a good path (rating of 7). The average rating was 3.86 (see Figure 6.1). The figure shows the distribution of answers of the 7 participants. One of them provided score 1, three of them gave score 3, two of them assigned score 5, while one of them gave answer 7.

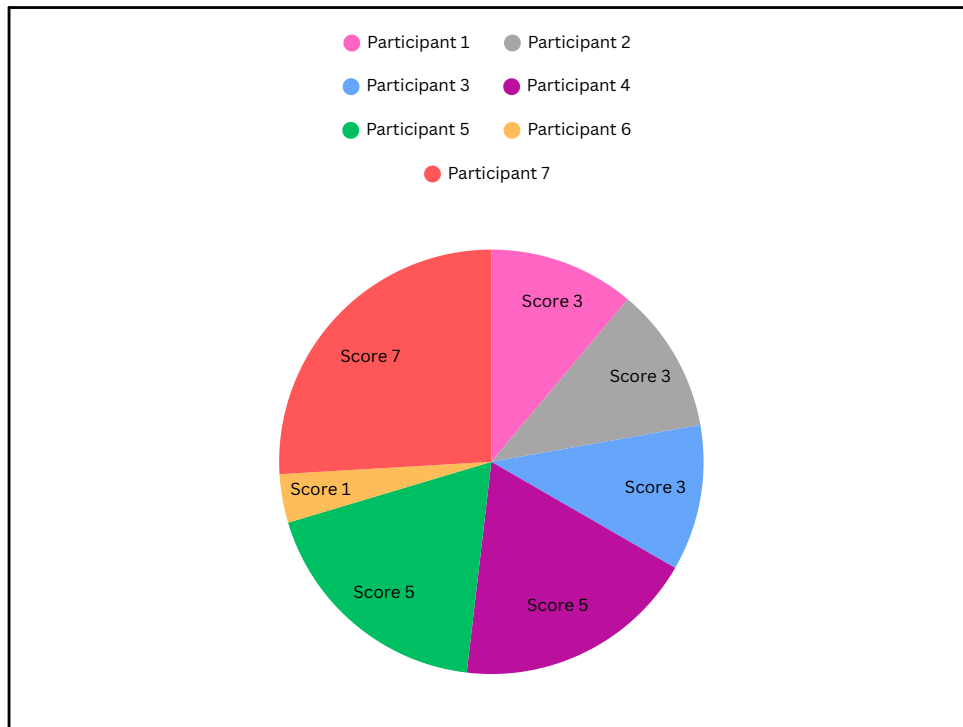


Figure 6.1: Accessibility Ratings Distribution from Table 6.2 (average rating: 3.86)

When giving score 1, one of the participants said that the University fails to provide a simple ramp, which is a fundamental adjustment. In the instance when score 7 was given, the participant said that digital accessibility is already

Category	Key Insights and Suggestions for Improvement
Assessment of Digital Accessibility	On a scale of 1-10. The ratings varied. The average is slightly over 3. The need for ramp accessibility was singled out as a basic necessity.
Infrastructure and Digital Services	Difficulties in finding students' needs because of a lack of training. Diverse-sensitivity teaching courses are provided. The University's digital tools, such as u:find and u:space, face issues that hinder and generally prevent their accessibility.
Barrier-Free Teaching	Problems with digital tools' usability and the lack of recordings for teaching sessions were mentioned. It was suggested that making teaching universally accessible would alleviate many current issues.
Areas for Improvement	The main areas for improvement are enhancing the presence of accessibility topics, becoming a role model for accessibility, and dealing with the lack of awareness and sensitivity. It was also stated that there should be better guidance for students and teachers about whom to contact.
Digital Accessibility and Individual Work Areas	The importance of personalized centralization to resolve accessibility was discussed. The suggestions included a chatbot for the University of Vienna. In addition to this, utilizing open-source technology and avoiding compensatory payments instead of removing barriers was suggested.
Strengthening Interest in the Topic	Proposals to increase engagement with digital accessibility include highlighting the universal benefits of accessibility improvements, extending the model of excellence to certify study programs for their accessibility.

Table 6.2: The discussions and recommendations focusing on the evaluation of digital accessibility at the University of Vienna

on a good path. For score 3, one of the respondents said that there is enough material to work with at the University of Vienna. For score 5, it was said that the focus is mainly on students, whereas for the teaching staff, accessibility is much less developed and is rarely considered outside of disability as a profession. The disability quota for employees is not met. In other words, support should not be limited to those with an official disability status.

When it comes to infrastructure and digital services, the challenge was how lecturers find out whether and what difficulties students face. There is no training regarding this for students. The teaching handbook is continuously expanding and provides good orientation, but it is overloaded. The intranet is very bad, many can no longer navigate the Wiki and the information is difficult to find. One of the questions was regarding what happened to the structured “A to Z” intranet. It was concluded that a KI (AI) for the intranet would help users navigate it. The old intranet has unfortunately been deleted and the keywords did not remain the same after the switch from the old to the new system.

When it comes to accessible teaching, it was concluded that there were problems with u:find as it is not properly labeled, and there are also readability issues with u:space. Regarding teaching, it would be much easier if lectures could generally be recorded. The positive thing is that there is no ban on digital teaching (although some SPLs recommend in-person teaching). If a lecture is recorded, copyright remains with the lecturer, but usage rights belong to the university. There were concerns among the lecturers that they would become. When it comes to the need for improvement, fields such as digital tools and services, digital communication, documents (PDF, Office, etc.) and digital information (websites) were considered. It was also said that overall visibility of the topic needs to increase, e.g., in newsletters. This needs to be presented in an accessible format and not just under the label of “disability.” In other words, the University of Vienna should become a role model. The contact persons for all need to be available and asking for help should not be a stigma. The issue lies in awareness and technical drawbacks. The documents, websites, and services must be accessible since all the tools are affected. First, what needs to be done is to improve the technical foundation and build from there. At the beginning of the semester, clear information needs to be given to students and lecturers about who to contact. What was also suggested was having a central contact point. A problem that was identified was that too much implicit knowledge is expected from students and staff. It was also advised to remove old information or exclude it from search results.

When it comes to the terminology of the information system (legal terms), it does not match the language of the target audience. The topic of having a chatbot for the University of Vienna was considered as well as what content can be fed into it. Another question that was raised was about whether it would be better to remove barriers or pay compensation fees.

6.3 Barriers in Teaching and Learning

The focus of the third discussion was to analyze the experience of both students and professors in the process of implementing those teaching and learning methods that are accessible.

The participants rated the University's accessibility a 5 on average (see Table 6.3). This shows optimism about progress and includes structural implementations such as ramps. The topics that were discussed varied and can be seen in Figure 6.2. They mentioned power struggles, but recognized a higher degree of awareness in society and general openness towards accessibility. There was little knowledge in the group about the quality of accessible studying and digital services and there were assumptions about the potential improvements. However, there were also concerns about the accessibility of grade entry and PDFs. The participants talked about their experiences from the pandemic. They mentioned that there are advantages of doing digital exams. However, they also discussed the existing challenges of using mathematical formulas. They also talked about the need for individual adjustments and sensitization among lecturers.

The improvement areas included more videos with subtitles as well as better infrastructure for screen reader users. It was said that there needs to be clearer communication from the University's side. In addition, it was concluded that a budget was needed for accessibility as well as commitment from the University. The participants discussed what needed to be done to overcome the language barriers. The problems affect both disabled and non-German-speaking individuals. There are challenges in communication between the university and students about the differentiation between the studies and teaching. Another issue is the reduced opening hours for admissions. There were attempts to solve technical problems and promote visibility. The participants discussed the strategies to engage more people with digital accessibility. What is necessary to have additional communication channels that would involve the affected students, raising awareness, tailoring centralization, and including basic qualifications for pre-docs.

6.4 Infrastructure and Digital Accessibility

In the fourth discussion, what was explored was the accessibility challenges in physical spaces and digital systems at the university.

The fourth section deals with the topics listed in the table (see Table 6.4). It was concluded that everyone should be aware of the digital and physical barriers in their area. When it comes to the university building, the university started implementing EU accessibility standards too late. A large number of them are still far from being fully accessible. For example, the observatory building has accessibility issues because of its protected historical status. Even those that

Category	Insights and Recommendations
Digital Accessibility Rating	The accessibility rating was around 5. This shows a moderate level of digital accessibility. There was optimism due to recent initiatives. However, there was an acknowledgment that more work remains.
Infrastructure and Digital Services	Lack of knowledge among staff about available digital services as well as accessibility options. There is an enhancement in digital offerings. However, obstacles still exist. These include non-accessible grade entry and PDF documents. There is a need for staff training. There is also an awareness to create content that is accessible. It is also made clear that there is potential in AI to help accessibility.
Barrier-Free Teaching	The pandemic showed the benefits of digital exams. These include better readability and accommodation. It emphasized how important it is to have dialogue between teachers and students and understand the need to make adjustments. It recognized the need for teaching materials to be made digitally accessible. Examples of these benefits are digitized scripts with proper structuring.
Areas for Improvement	Increased use of video content with subtitles for flexible learning. Improving the infrastructure for clearer navigation and room descriptions. A call for dedicated budgets for creating accessible documents and training personnel. There is a need for centralized coordination and clear points of contact.
Digital Accessibility in Individual Work Areas	Overcoming language barriers and using simple language to aid understanding for all.

Table 6.3: The current state of digital accessibility at the University of Vienna

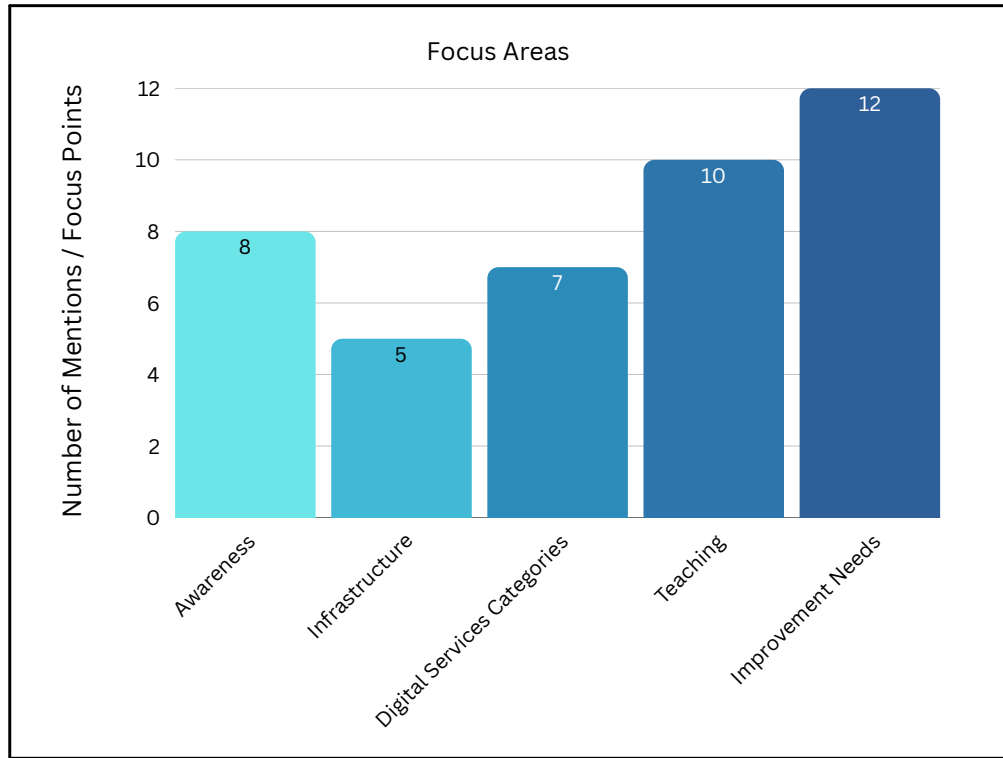


Figure 6.2: Focus Areas Based on Discussions (see Table 6.3)

were newer had planning errors that could have been identified through on-site inspections. For instance, in the UZA 2 building, an emergency exit for wheelchair users leads onto a roadway with thresholds that are too high for wheelchairs. However, improvements have been made. The hallways and staircases are now labeled and equipped with navigation systems.

When it comes to field-specific needs and study requirements, there are fewer students who rely on accessibility features because the nature of the program is not easy to adapt for people with disabilities (e.g., those who need precise readings from measurement instruments, fieldwork, or excursions). Certain fields have little interaction with students with visible physical disabilities. Pharmacy or botany are challenging for blind students so adjusting the curriculum may be necessary. Distinguishing plants by touch is not always equivalent to identifying them visually. The level of need is diverse across different student groups and study programs.

Concerning the overall accessibility rating for the University of Vienna, it was difficult to give a score. The situation is not extremely bad, but many accessibility issues get little attention. The rating of 6-7 is a reflection of the fact that

Aspect & Accessibility	Insights and Recommendations
Accessibility Evaluation	The overall assessment of digital accessibility at the University of Vienna varied, indicating a medium level of accessibility.
Infrastructure and Digital Services	Late implementation of EU norms. Need for better planning and execution of accessible infrastructure in university buildings. Introduction of services like ‘Transcription on the fly’.
Barrier-Free Teaching	A lack of awareness and training among teaching staff. Encouragement for recording lectures to make teaching more accessible.
Improvement Areas	Preference for editable formats like Word documents over PDFs. Suggestion for more centralized efforts and clear communication.
Digital Accessibility in Work Areas	Initiatives like website and PDF accessibility, video captioning, and consideration for the blind in botanical garden descriptions through QR codes. The challenges imply the need for more testing.
Communication with Students	Importance of improving usability and using diverse channels of communication. There is a shift towards more digital communication.
Interest Engagement	Recommendations for promoting digital accessibility as beneficial for all, not just individuals with disabilities. Establishing role-specific accessibility officers within departments.

Table 6.4: Enhancing digital accessibility for teaching and learning at the University of Vienna

there are more resources and support services, and they are well-publicized. Even students who do not personally need them see these resources more often. The reasons for a lower rating were that fewer than 30 deaf students have successfully completed a degree. It is also difficult to arrange interpreters and students need to organize them on their own. In addition, the learning materials are not designed for deaf students. Structural and legal barriers exist, such as limited funding for interpreters and written language can be difficult for sign language users. The reason the rating was around 5 in some areas is that there is inconsistency in different departments. There is no centralized monitoring mechanism for accessibility. Also, some technical systems like i3V have limitations.

When it comes to the quality of accessible studying at the University of Vienna, sign language interpreters are arranged through an interpreter association. For individual students, they must be organized independently. Funding for interpreters varies by federal state. A new service called “Transcription on the Fly” exists, but the problem is that many students are not satisfied with it because of data protection. The system processes and transcribes voices and stores the data on Microsoft servers. Accessibility solutions need to comply with data protection frameworks. The university library provides a digitization service. However, this does not refer to lecture materials. The students need to negotiate this individually with lecturers, which can be problematic. The students can now complete the entire admission process online and minimize the need for travel. This is useful for students with mobility impairments as well as problems with anxiety or autism. The process is also accessible to blind applicants. They need to present identity documents via webcam with no need to interpret visual elements. The students can ask for modifications when they apply for admission.

Regarding the experiences of lecturers and students with accessible teaching and digital options, many lecturers do not consider accessibility. The reason is that the need for it is not always visible. Awareness should be emphasized from the beginning. Few lecturers attend training sessions on digital accessibility. It is not clear whether the lecturers understand that they need to consider accessibility. They already have a heavy workload and need to read a lot of material.

Concerning the areas for improvement, the fields that need to be taken into account are digital tools and services, digital communication documents (PDFs, Office files) and websites. The students would often prefer Word documents instead of PDFs. However, the lecturers mainly provide PDFs. Awareness campaigns should be aimed at lecturers so that accessible materials are prepared from the beginning and not as a special service. Lecturers are overwhelmed with duties so they may not deal with such topics unless they have a need. The university staff are often too busy to participate in training sessions. The Leadership and Study Program Directors (SPL) should spread awareness to all the staff. Accessibility should not be perceived as a one-size-fits-all issue.

The websites and PDFs need to be accessible and subtitles should be added to videos. Some departments have barely been involved in accessibility but are now coming up with new ideas. These include using QR codes in the botanical garden. What often happens is that accessibility problems become apparent when students raise complaints. Many people only recognize accessibility issues when they are temporarily affected themselves. For example, if they personally need an elevator after breaking a leg, they start to consider these issues. A big challenge is that there is no centralized authority to help or carry out accessibility tests for PDFs, documents and websites.

Regarding the University-Student communication, it needs to improve by enhancing usability and using more communication channels. Digital communication also needs to increase. Reducing flickering screen ads helps people with epilepsy but also many other students. Searchable text instead of scanned PDFs is useful for all students, not just visually impaired ones. We need to put in place a certification system for study programs in order to promote the ones that are fully accessible. We also need to create a teaching award for accessibility to recognize engaged lecturers. We also need to have a buddy system for new employees with disabilities. In addition, we need to give incentives to students to participate in accessibility focus groups. What is also necessary is to appoint specific accessibility officers.

6.5 Centralized Support for Accessibility

What was addressed in the fifth table was the necessity to have centralization in accessibility services. Moreover, what was also discussed was better communication between university departments and students.

Section 5 deals with the following issues (see Table 6.5). When it comes to the assessment of accessibility at the University of Vienna, there is limited support for neurodivergent students. There are very few resources and little accommodation available for such students. More tailored support services are needed for them. Many essential infrastructure elements are missing or are not adequate. Examples of these are ramps for wheelchair users and malfunctioning accessibility aids (e.g., elevators that are out of order and that make it difficult to navigate stairs or overcome thresholds). There is also a lack of awareness among teaching staff. Many professors and lecturers are not aware of accessibility needs. New faculty members get little guidance about accessibility during their onboarding. However, there have been improvements in some areas. The Moodle platform has incorporated some accessibility features. The university library is also making study materials more accessible.

Regarding the overall accessibility rating, the university is rated between 4 and 5 on a scale from 1 to 10. This shows that although there have been positive

Aspect	Details and Recommendations
General Assessment	Neurodivergent individuals have limited support. Basic accessibility features, like ramps, are often missing. There's a lack of awareness among lecturers. Positive note: significant improvements in Moodle and library media accessibility. Overall rating: 4-5 out of 10.
Infrastructure and Digital Services	The Barrierefrei Team is aware of the available services but is overloaded. Suggestions include having personnel at institutes and a more centralized type of approach.
Barrier-Free Teaching	The need for barrier-free teaching to be part of the core training for lecturers and pre-docs. A standard set of accessible equipment for all teaching rooms is recommended. There's a call for better communication of available services.
Improvement Needs	All areas need improvement, particularly in making services accessible and providing training for lecturers. Both software and hardware, as well as social skills in dealing with students with disabilities, need to be addressed.
Digital Accessibility in Work Areas	The focus is on technical implementation, with the Barrierefrei Team providing individual support. Departments (SPLs) also have a role in supporting students with disabilities. The Library is working towards a service for blind and visually impaired individuals.
Communication with Students	Due to time constraints, this aspect was not discussed in depth.
Strengthening Interest	Mandatory training on digital accessibility for all university members is suggested. Increase awareness of accessibility across all media used by the University.

Table 6.5: Student Feedback on Digital Accessibility Tools and Services

changes, some flaws still remain. The “Barrier-Free Team” at the University of Vienna is well-informed about the accessibility services. It can provide information on request. The university has a dedicated website called “Barrier-Free Teaching”. It offers guidelines on accessibility. The “Teaching Manual” also includes some references to best practices. It would be useful for each department to have staff dedicated to preparing classrooms and making accessible documents. The central Barrier-Free Team is already too burdened with existing responsibilities.

Accessibility should be an integral part of teacher training programs. It should be included in the pre-doctoral phase for future academics. All classrooms should be equipped with basic accessibility tools by default, rather than requiring students to make special requests for necessary accommodation. The university provides a room plan, but it is only available as a PDF. This is difficult for individuals with disabilities to access and navigate. A more user-friendly format should be put in place.

When it comes to the interest among faculty, many instructors are interested in improving accessibility. They are asking for help from the Barrier-Free Team, but the university should improve the communication. The rectorate has issued a message which says that support should not be stopped by a lack of resources. It is said that the university is committed to ensuring accessible teaching for all students. If students with disabilities have obstacles, they report it to the Barrier-Free Team. It reaches out to the instructors to ensure compliance.

When it comes to centralized accessibility services, the university should have a unified center. It should not leave this responsibility to individual faculty members. There needs to be a balanced focus on software and hardware. Although accessibility efforts often focus on digital tools and platforms, what needs to be prioritized is assistive devices and ergonomic classroom setups. The Faculty and staff should get training on interacting with students with disabilities. The University’s IT Department (ZID) focuses on technical implementations like software development, usability testing, and system improvements. The Barrier-Free Team gives personalized support to students and faculty members who need accommodation. Program Directors (SPL) help students with disabilities who do not engage with the Barrier-Free Team. The University Library offers a literature service for blind and visually impaired students. Obligatory training for the staff means introducing training that would help all employees become aware of best practices and legal obligations.

6.6 Summary of Results from Table Groups (Flipchart)

The following section focuses on summing up and consolidating the collective results as well as the opinions from the previous discussions. Therefore, it provides a view of the crucial challenges regarding accessibility and solutions that have

been proposed across different digital tools, infrastructure, and teaching methods at the University. The 6th section deals with the following topics and conclusions (Table 6.6).

From the teaching perspective, accessibility must be integrated into basic teaching training. In terms of exams, existing resources, equipment, and support options must be made transparent. In addition, a standardized lecture hall setup would make many things easier. When rising interest, a teaching award should be linked to accessibility. Also, a quality seal criterion for accessibility should be introduced. Concerning the University's intranet, there is an information overload in the tool and it creates problems with clarity. Regarding the teaching handbook, too much implicit knowledge is assumed. A low-threshold approach to the topic is needed. Accessibility should not be treated as an extra point. When it comes to teachers with disabilities, they are rare and often only employed in fields related to their own affectedness. The central expert office should serve as a contact point for all individuals who are interested in accessibility topics. This should not be merely for affected persons. When referring to documents and materials, the campus maps of the University of Vienna and PDF downloads are often not accessible. The implementation strategies need to be relevant for both general and academic staff. The feedback from people shows that there are poorly scanned documents, difficult to read or be read aloud. Also, mathematical formulas in PDFs are not easily readable. The literature service is not a contact point for teaching materials. More labeling for accessible services and teaching, more streaming options. When it comes to the existing institutes, SPL support is necessary, with designated and trained personnel. Expertise that is specific to each discipline and deals with accessibility is also required. The University services must become inherently accessible. Concerning the language, simpler language is needed in all areas and this is not just an accessibility issue. In terms of technology, mobile induction loops are often unknown. Fixed installations would be very helpful and the infrastructure must be better promoted. It was conveyed that digital signature (e.g., u:sign) is a useful tool. The issues are that u:search and u:find pose accessibility challenges. Regarding self-help forum, it is desirable for students and staff to enable networking and exchange. The conclusion was that material preparation is central for students.

Area	Recommendations and Observations
Teaching	Barrier-free teaching should be integrated into basic training sessions.
Examinations	Resources, equipment, and available support options need to be made transparent; uniform equipment in lecture halls would simplify processes.
Stimulating Interest	Introduce a teaching award linked to barrier-free teaching. Implement a <i>barrier-free</i> quality seal criterion.
Intranet	Overloading of information in the tool complicates its use, especially for people with disabilities.
Teaching Manual	There's an assumption of too much implicit knowledge. A more accessible approach to the topic is necessary.
Lecturers with Disabilities	They are rarely employed and typically only within their areas of disability.
Central Contact Point	Establish a central contact point for everyone interested in accessibility issues.
Documents and Materials	Plans of the University of Vienna and PDF downloads are often not barrier-free. There's a need for better labeling of barrier-free services.
Implementation Strategies	Interesting for both general and academic staff, highlighting the need for discipline-specific expertise in accessibility.
Feedback from Students	Scanned documents and PDFs are poorly readable. Mathematical formulas in PDFs are poorly legible.
Technology	Mobile induction loops are often unknown; fixed installations would be beneficial. Digital signatures, like u:sign, are useful tools.
Self-Help Forum	Desired for students and staff for networking and exchange.
Material Preparation	Centralized preparation for students is needed.

Table 6.6: Key recommendations from various discussion groups at the University of Vienna

Chapter 7

Evaluation and Interview Results & Discussion

Section 7 examines the qualitative aspect of digital accessibility at the University of Vienna. The qualitative analysis deals with the content both from the university website and the survey in a descriptive nature. It observes the experiences of users as well as the interviews with students who suffer from certain disabilities. It goes into the usability, satisfaction, and the effect of accessibility measures. This analysis gives a complete view of the University's efforts and problems to ensure digital environments.

The evaluation in this study implies analyzing both the user experiences and interviews with individuals with disabilities. This analysis involves examining the user feedback on the usability and experience of the website. This includes looking at the nature of navigation. In addition, understanding the content and the effectiveness of the features pertaining to accessibility is also covered. Interviews with students with disabilities are important when trying to understand the problems they face and the impact of web accessibility measures. The analysis examines the narratives and experiences during these interviews. This gives an overview of the aspects of accessibility that cannot be captured through quantitative metrics. When dealing with the analysis of the website, the following can be concluded (see Table 7.1).

Perceivable. The content is structured with clear headings. They are vital for screen reader users. Proper HTML markup is emphasized to make these headings more helpful for perception. Responsive design exists and ensures content accessibility on different devices. The importance of including alternative text descriptions for images and multimedia is highlighted.

Operable. The content suggests navigability with direct links and a hierarchy. It emphasizes the need for all navigation elements to be accessible via key-

Accessibility Principle	Findings and Recommendations
Perceivable	The content is structured. It has clear headings essential for screen reader users. A responsive design for content accessibility on various devices is important. There is an emphasis on including alternative text descriptions.
Operable	Content suggests navigability with direct links and a hierarchy. All navigation elements should be accessible via keyboard. Forms and interactive elements need to be operable through the keyboard.
Understandable	Content uses clear language, making instructions easy to understand. The consistent use of navigation elements and site structure aids predictability.
Robust	Support for TYPO3 and responsive design for cross-platform compatibility. Meeting the web standards for HTML and CSS is crucial. There is compliance with Web-Accessibility Law and the role of editors in maintaining accessibility.
User and Student Feedback	Challenges with digital documents' quality and navigation of educational platforms. Lack of awareness and training on accessibility issues. Willingness to improve accessibility among lecturers but faced with a gap in support.
Student and University Communication	Identified barriers in understanding the difference between academic and administrative services for students. Suggested improvements in browser support for digital services and clearer communication about technical requirements.
Induction Loops	Lack of awareness among some professors' desire for mobile induction loops for events.

Table 7.1: The critical aspects of the qualitative analysis, focusing on the perceivability, operability, understandability, and robustness

board. Forms and other interactive elements should be operable through the keyboard and friendly to screen reader users with proper labels and adequate instructions.

Understandable. The content is in clear language, with instructional content using TYPO3. The consistent use of navigation elements and site structure helps make the website more predictable and understandable for users. Giving clear messages in instances of errors is highly emphasized. In addition, the instructions in forms are there to improve understandability.

Robust. There should be TYPO3 support and a responsive design. In addition, there is a need for cross-platform compatibility. The content should be able to function in browsers, as well as devices and assistive technologies. The web standards for HTML and CSS need to be met as well. Another important aspect of using the website is that the content needs to have the capacity to be interpreted by various user agents and assistive technologies need to be among these. What is more, the commitment to accessibility is extremely important in the process of improving the site. In other words, there needs to be complete compliance with the Web-Accessibility Law. The editors need to maintain accessibility in their content, which is particularly underlined. The availability of TYPO3 support is beneficial in educating content creators about the best practices for accessibility. A mechanism for users to provide feedback on accessibility problems is suggested as a means to solve problems. The effectiveness of such measures depends on their implementation. So as to make sure that all content is accessible, we need to consider the structure of the web content. We also need to take into account the presentation. In addition, the interaction design and training for content creators and web developers ought to be the topic of public discussion.

The qualitative analysis of the survey offers a rich examination of both the user experiences from the website as well as the interviews with students with disabilities. It focuses on the University's approach to digital accessibility. This analysis aims to understand the challenges of web accessibility measures from the perspectives of those who are affected. What follows is a summary of the key findings that were obtained from the comprehensive qualitative analysis and they will be listed below:

1. The students and faculty have significant problems with digital documents that are of poor quality. In other words, they are difficult to access and navigate. There are issues when navigating educational platforms. They tend to be confusing. They are additionally poorly structured for users. Both the

students and the lecturers lack awareness or proper training on accessibility issues. This slows down implementing the accessibility measures.

2. Lecturers show a willingness to improve accessibility. However, there is a gap in awareness and support. It limits their capability to make the necessary changes. The analysis points out the existing gaps that are visible in the support structures. Moreover, what is additionally emphasized is the unclear responsibilities and communication problems. They slow down the improvements in accessibility. The study looks at the user feedback on usability, satisfaction, and experience with the website. This also has to do with the issue of how easy it is to navigate and understand the content. Moreover, the effectiveness of incorporating accessibility features is also scrutinized within the study.
3. The interviews with students with disabilities gave a glimpse into the challenges they face. The effects of web accessibility measures were also examined. Such narratives go into various aspects of accessibility that cannot be captured or analyzed by means of quantitative metrics.
4. The qualitative analysis talks about the awareness and initiatives related to digital accessibility in the University. However, it also highlights the most important issues that exist in their implementation. These include high-quality training, clear communication of responsibilities and duties, and adapting the teaching materials and platforms to meet the accessibility standards. In order to achieve visible progress, it is necessary to have a joint effort among all university stakeholders. In addition, it is important to have strategies for awareness, training, and infrastructure development. This analysis accentuates the specific issues and experiences related to digital accessibility at the University of Vienna. In addition, it suggests a framework for other institutions with the goal of improving their efforts with regard to accessibility. The qualitative findings offer a more holistic understanding of the effectiveness of accessibility measures. The findings also make reference to the areas that would need to be considerably improved.

Table 7.2 shows the topics that were discussed and the points that were included within them. We see that 16 topics were the most predominant ones, and each one contained either one or two subcategories (points) that were covered.

The table shows the topics that were covered at the discussion tables as well as the number of points that were dealt with for each topic. The most frequent topics that were covered, with two points each, are Teaching, Exams, Raising Interest in the Topic, Teaching Manual, Documents and Materials, Central Specialist Office, Student Feedback, Institute, and Technology. These topics show us that there is

a strong focus on pedagogical approaches and assessment methods. Also, there is an emphasis on engagement strategies as well as institutional support, and the role of technology in education is another one worth mentioning.

On the other hand, topics for which we see only one point for discussion each have to do with the preparation of material, intranet Uni Wien, teachers who have disabilities, implementation strategies, University services, language, and self-help forum. These areas are related to aspects like resource preparation, digital platforms and accessibility for educators. The remaining ones include strategic execution of teaching methods, available university services, communication, and student self-support mechanisms.

This kind of distribution of points for discussion gives us a chance to see that more attention was paid to instructional methods, accessibility resources, and institutional structures that support the education system. Topics like student engagement, assessment fairness, and teaching resources were also investigated and analyzed in more detail. Conversely, the administrative and logistical aspects were done comparatively less.

Topic of discussion	Number of points discussed per topic
Material Preparation	1
Teaching	2
Exams	2
Raising Interest in the Topic	2
Intranet Uni Wien	1
Teaching Manual	2
Teachers with Disabilities	1
Central Specialist Office	2
Documents and Materials	2
Implementation Strategies	1
Student Feedback	2
Institute	2
University Services	1
Language	1
Technology	2
Self-Help Forum	1

Table 7.2: Summary of discussion topics from Table 6.6 (Flipchart)

Chapter 8

Conclusion

The assessment of the current website's accessibility features as well as the analysis of the survey (conducted interviews) that were carried out concerning digital accessibility give us a better understanding of the perceptions, challenges, and areas for improvement in digital accessibility.

The website makes it obvious that the University strives towards clear and straightforward language in its instructions. This primarily refers to requesting or renewing SSL certificates. Another such instance is managing subdomains. Such a step reduces confusion and makes these services accessible to many students lacking in technical knowledge. Another point is that the University is trying to make its services comply with the Web Content Accessibility Guidelines (WCAG). This refers to the inclusion of standard-compliant HTML, CSS, and JavaScript. The services are also designed to be predictable and easy to navigate. Errors made when submitting forms are explained in a clear manner. Moreover, the interface is compatible with various browsers and assistive technologies. The University regularly reviews and updates its web content and services to solve problems with navigation inconsistencies. Other issues may refer to low contrast elements, and problems that have to do with content that is dynamically generated. The University provides accessible channels for asking questions, reporting issues, and asking for help. In other words, the contact forms need to be accessible, as well as email addresses and phone numbers. In addition, students with disabilities need to have equal opportunities on their academic path. This means that they need alternative assessment methods. Another such requirement is personalized counseling, which could be essential in the process of improving accessibility.

The survey touches on diverse aspects of digital accessibility. These range from infrastructural and digital service availability and go all the way to more accessible educational practices. Moreover, the need for greater awareness and training for the faculty staff is also a topic of great interest. It also mentions the daunting challenges that lie ahead. What remains to be done is to fully imple-

ment the measures to satisfy all the users' needs and requirements. The findings call for a joint effort that would involve all university stakeholders as well as appropriate strategies for awareness, training, and infrastructure development, all with the aim of enhancing digital accessibility in a complete manner. By carefully looking at the technical solutions, performing detailed assessments, and incorporating accessibility into the workflow of the enterprise, the survey highlights how important it is to possess a comprehensive and inclusive approach. Universities on a global scale tackle such challenges and it is, therefore, of the utmost significance to understand that the evolving landscape of web accessibility is vital for creating an educational setting that is genuinely customized for the numerous needs of all learners. The appearance of a society that is inherently technological at a global level and the recent presence of the pandemic have made it necessary for a large number of students to pursue education via distance learning tools. This frequently implies extensive exposure to web pages of universities where different activities have to be conducted in order to register for exams or interact with the course content. A growing number of students with disabilities are being included in the education system. Obviously, this is why there is a rising need to tailor web pages to their needs. A set of recognized guidelines has been devised in order to accommodate the needs of such individuals. These guidelines (principles) can be classified into four categories. This classification depends on the senses they are connected to – perceivable, operable, understandable, and robust [23, 27, 36, 37, 39, 43, 49, 51, 57]. The main conclusions of the survey are that the University's current digital accessibility is rated around 5 out of 10. This shows moderate progress with room for improvement. There is also a lack of staff knowledge concerning available digital services and options. Non-accessible grade entry systems and PDF documents make progress much slower. There is an obvious need to train staff. The COVID-19 pandemic showed what the benefits are of digital exams. The teaching materials should be digitized. Using video content with subtitles is of great importance in the future. What needs to be improved is the infrastructure to have easier navigation. Budgets for making accessible documents and training personnel need to be allocated. There needs to be centralized coordination and the language barriers need to be overcome. Simple language needs to be used for the benefit of all users. The students should be able to report challenges on the website. These can range from inaccessible documents on Moodle, to problems with course registration and bad readability of math formulas. The institutional support is not sufficient. At the moment, there is a visible shift towards digital communication. In summary, while the University of Vienna has taken steps in improving digital accessibility, significant challenges remain. These areas are staff training, infrastructure, communication, and the accessibility of teaching materials. The text that is present on five important pages does not have accompanying audio content, which makes it impossible for

blind users to access. Even students with impaired vision would have difficulty following as they do not have the option to zoom in and not lose the text. The video presentations that have been provided do not have captions, although they do have the most important points listed in them. In addition, not all the pages can be translated into English, although the majority of them can. Moreover, not all of the pages have starkly contrasted colors, making it hard to read the text. There are no voice recognition tools for physically disabled students and the textual content does not seem to have text that would be simplified and tailored to the needs of cognitively disabled students.

Bearing in mind such flaws, it should be noted that future research should be done with the intention of improving the accessibility of web pages in those very respects. Therefore, most attention should be paid to blind and deaf students, as well as those who cannot move freely. In short, what the University would need to do in order to have a more accessible website is include complete audio material for all the texts. In cases where videos exist, captions would need to be provided. The screen would also need to include contrastive colors and options to zoom in. Voice recognition tools would make it easier for students to access some features if they have physical difficulties.

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