Technological Speech Adaptation for Professional Work as a Lawyer and Law Professor: A Case of a Patient with Multiple Sclerosis

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Abstract

This paper presents a case study of a female patient with multiple sclerosis (MS) who has successfully adapted to the challenges of her condition through the use of advanced assistive technologies. Focusing on the use of speech-generating devices and predictive text software, this study highlights the practical applications of these tools in supporting her career as a lawyer and lecturer. The findings underline the critical role of technology in maintaining professional roles and the patient's resilience in overcoming significant physical disabilities.

Keywords

Speech-generating device, AAC technology, communication methods, SwiftKey, mobility, voice

1 Introduction

Multiple sclerosis (MS) is a chronic, progressive neurological condition that affects the central nervous system, leading to a wide range of physical and cognitive impairments. Among these, communication difficulties are common, particularly in cases where the disease progression results in the need for a tracheostomy, as it impairs the patient's ability to speak [1]. This paper presents a case study of a female patient with MS who, despite facing severe communication barriers due to a tracheostomy and loss of speech, has successfully adapted to the challenges of her condition through the use of advanced assistive technologies.

The central focus of this study is on speech-generating devices and predictive text software, specifically the Tobii Dynavox i-16 and Microsoft SwiftKey, and their role in enabling the patient to maintain her dual professional roles as a lawyer and a lecturer. These technologies, part of the broader category of Augmentative and Alternative Communication (AAC) systems, have been demonstrated to significantly improve communication capabilities for individuals with severe speech impairments [2].

The aim of this research is to evaluate the effectiveness of these tools in supporting her professional activities and to explore the strategies she employed to overcome the physical limitations imposed by MS. By examining her journey, the study underscores the importance of resilience, adaptability, and the integration of technology in enabling individuals with disabilities to remain active in high-demand professions.

The paper is organized as follows: Section 2 describes the methods used, including the case study approach and data collection techniques. Section 3 presents the results of the study, with discussions on communication methods, technological advancements, and adaptive strategies. The conclusion offers insights into the potential for future technological developments to further enhance the quality of life for individuals with severe disabilities.

2 Empirical Research Procedure

2.1 Problem Definition and Purpose

The primary problem addressed in this empirical research is understanding how a patient with a 12-year diagnosis of multiple sclerosis (MS), who has a tracheostomy and is unable to speak, has adapted to her professional roles as a lawyer and lecturer. The study also seeks to evaluate the role that assistive technologies play in enabling her to maintain her professional activities despite severe physical limitations. The purpose of this research is to explore both the emotional and practical aspects of her adaptation process, providing insights into the benefits and limitations of technological interventions in helping her continue to work in high-demand professional environments.

2.2 Objective of the Empirical Research

The objective of this empirical research is to identify the key strategies and tools that allow a person with severe MS to adapt to and continue working in professional settings. The study focuses on understanding how the patient copes with the limitations imposed by her condition and examines the impact of assistive technologies on her ability to perform her professional tasks. Specifically, the research aims to:

• Investigate how the participant has adapted emotionally and practically to her condition, focusing on her mindset, routines, and coping mechanisms.

• Identify the technological interventions that facilitate her ability to work as a lawyer and lecturer, with a particular focus

on the use of assistive devices like speech-generating tools and predictive text software.

• Analyse the practical implementations and challenges of using assistive technologies in real-world professional settings such as courtrooms and lecture halls.

2.3 Methodology

This research employs a qualitative case study methodology, chosen for its suitability in exploring complex real-life phenomena, particularly when the boundaries between the phenomenon and its context are not clearly evident [3]. The case study focuses on a single participant-a female patient with a 12-year diagnosis of MS, who has a tracheostomy and is unable to speak-allowing for an in-depth analysis of her experiences, adaptations, and the role of assistive technologies in her professional life.

2.3.1 Procedure
The study involved data collection through in-depth interviews with the participant and systematic observations of her professional activities, including lectures and court sessions. These methods provided firsthand insights into how assistive technologies are applied in her day-to-day life, allowing for a detailed exploration of their practical uses and effectiveness [4].

2.3.2 Measuring Instruments
The effectiveness of various assistive technologies was assessed using several tools, chosen based on their role in aiding communication and mobility. Key instruments included:

• Speech-Generating Device (Tobii Dynavox i-16): Used to convert text to speech, this device was analysed for its usability, customization options, and reliability in different professional environments [5].

• Predictive Text Software (Microsoft SwiftKey): Evaluated for its predictive capabilities, learning curve, and integration with other devices, focusing on its efficiency in aiding communication [6].

• Augmentative and Alternative Communication (AAC) Systems: These systems were analysed for their speed, accuracy, and user-friendliness during interactive professional sessions [7].

2.3.3 Research Questions
The following research questions guided the investigation:

• How has a patient with MS adapted to her professional roles as a lawyer and lecturer? The study explores the emotional and practical strategies the participant employed to adjust to her condition and continue working. It aims to reveal how she overcame challenges, adjusted her routines, and adopted new tools to maintain her career.

• What technological interventions have facilitated her continuation as a lawyer and lecturer? The research identifies key technological aids, such as speech-generating devices and predictive text software, that assist her in communicating effectively and performing professional tasks.

• What are the practical implementations and challenges associated with the assistive technologies she utilizes? This question addresses the real-world applications of the assistive technologies, evaluating both their strengths and limitations in various professional settings like courtrooms and classrooms.

2.3.4 Participants
A single female participant with a 12-year diagnosis of MS, who has a tracheostomy and is unable to speak, was selected for this case study. This unique case allows for an in-depth exploration of her adaptation to her condition and the role of assistive technologies in her professional life. The personalized focus on one participant enabled a detailed examination of her experiences, providing valuable insights that might be diluted in a study involving multiple participants.

3 Results

The collected data refers to the information gathered during the study on how the patient adapted to her condition and utilized various assistive technologies to maintain her professional roles. This data was gathered through comprehensive interviews, observations, and assessments of the tools she used, such as the Tobii Dynavox speech-generating device and Microsoft SwiftKey predictive text software.

Figure 1: Tobii Dynavox i-110, dry-erase board and Tobii Dynavox i-16 (All photos are from the personal archive of the participant of the study)

The data were analysed to identify recurring themes related to the efficacy of these technological aids, challenges encountered, and their overall impact on her professional life as a lawyer and lecturer. The results aim to provide insights into how the assistive technologies supported her communication and work, as well as the practical implementations of these tools.

3.1 Early Communication Methods

Initially, the participant's primary channel of communication was the dry-erase board. Because she could not speak, she used the avenue to document (write) her cases or notes, which was effective then, especially in classrooms. The students acquired comprehensive notes, which allowed them to gain vast knowledge of European law. A dry-erase board is an effective interactive teaching tool, considering that lecturers can project notes to help students understand complex concepts [8].

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However, this approach was slow and laborious. However, this approach was slow and laborious, leading to delays in covering the syllabus and impacting the efficiency of her work. Additionally, within a few weeks, she lost the ability to write with her right arm, necessitating the search for alternative communication methods. This early phase is illustrated in Figure 1, which shows the Tobii Dynavox i-110, dry-erase board, and Tobii Dynavox i-16.

3.2 Technological Advancements

The improvement in technology made communication easier for her. Kumar et al. (2019) and Unwin (2017) asserted that technology enables instant communication, irrespective of geographical limitations [9, 10]. Kumar et al. (2023) and Sahoo and Choudhury (2023) added that applications, software, and voice-controlled devices (wheelchairs), which are elements of the latest technologies, facilitate easier communication with MS patients, illustrating their criticality in her life [11, 12]. Mainly, she uses a speech-generating device that converts text to speech. She controls the narration by typing on the keyboard of Tobii Dynavox i-16. In addition, she uses Microsoft SwiftKey, a predictive text software, to improve her communication speed, ensuring that she is competitive in class and court. Google Inc. (n.d.) stated that SwiftKey is an intelligent keyboard that learns a person's writing style to hasten writing [13]. These tools enabled her to communicate more efficiently, maintaining competitiveness in her professional roles. A real-world example of her using the Tobii Dynavox i-110 and i-16 in public is shown in Figure 2.

Figure 2: A patient with MS in public with Tobii Dynavox i-110 and i-16 (All photos are from the personal archive of the participant of the study)

3.3 Lecturing Strategies and Public Engagement

The technologies mentioned above play an integral role in the preparation and execution of her lectures. She is an organized individual who prefers to define the lecture's content and prepare in advance. Thus, a few days prior to a class, she usually types

out her speech using the predictive text system. This technology gives her enough notes and follow-up assignments or questions to engage the classroom. Narang et al. (2022) noted that an open discussion forum is an evidence-based strategy that bolsters students' engagement and awareness of the coursework [14]. During interactive sessions, she utilized augmentative and alternative communication (AAC) systems to compose feedback, although this process required patience from the audience due to time delays. Despite these challenges, her lectures remained thorough and engaging.

3.4 Evolution and Adaptation

Since the onset of her condition, she has realized the significance of transforming and adapting to the emerging life changes and latest technologies. Cahill (2020), Singh (2021), and Sampathkumar (2020) argued that change is inevitable, warranting individuals to modify their behaviours or actions to succeed [15, 16, 17]. She actively researched and adopted new systems to facilitate communication, recognizing the importance of evolving alongside technological developments.

The evolution of AAC technology has been particularly beneficial, reflecting advancements in both hardware and software that support her ability to communicate sophisticated ideas and engage professionally. Her current use of the Tobii Dynavox i-16 in her daily professional life, at both work and home, is shown in Figure 3.
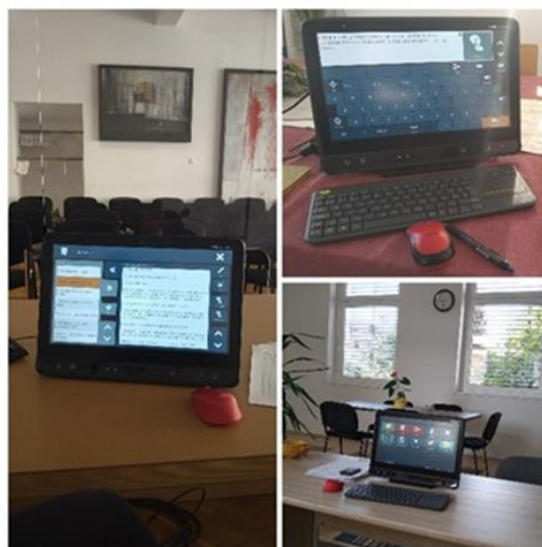

Figure 3: A patient with MS uses the Tobii Dynavox i-16 nowadays at work and home (All photos are from the personal archive of the participant of the study)

4 Conclusion

This study examined how a patient with multiple sclerosis adapted to her condition to continue her professional roles as a lawyer and lecturer. The findings address the research questions as follows:

The patient adjusted her mindset and routines to accommodate her physical limitations. She demonstrated resilience by seeking alternative methods to fulfil her professional responsibilities, including extensive preparation and the use of assistive technologies. Her determination enabled her to overcome initial setbacks and maintain her career.

Key technological aids, such as the Tobii Dynavox i-16 speech-generating device and Microsoft SwiftKey predictive text software, were instrumental in facilitating her communication. These tools supported her professional tasks by compensating for her lost abilities, allowing her to prepare lectures, engage with students, and represent clients effectively.

The assistive technologies were implemented in real-world settings, such as classrooms and courtrooms. While they significantly enhanced her communication capabilities, challenges included the slower pace of real-time interactions and the need for audience patience during interactive sessions. Technical issues and the learning curve associated with new devices also presented obstacles. Nonetheless, these technologies succeeded in enabling her to continue her professional activities.

In conclusion, the case study underscores the critical role of advanced assistive technologies in supporting individuals with severe disabilities to maintain their professional roles. The patient's experience highlights the importance of adaptability.

Acknowledgments

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