

Chapter 8

Methods for Accessible Computer Science and Computer Programming Education for Visually Impaired and Blind Students

Habibe Güneş

 <https://orcid.org/0000-0002-3479-2195>

Firat University, Turkey

ABSTRACT

Just like our fingerprints, we are born different from each other with many characteristics. What is expected from education is to respect these differences, to highlight individuals' unique and special characteristics, and to create experiences that will enable them to maximize their talents. However, when structuring education for individuals with special needs, it should be tailored to their individual needs and provide accessibility that allows them to develop skills relevant to the current technological age. In this book chapter, suggestions are presented for developing the basic skills of visually impaired individuals in computer science and coding education.

DOI: 10.4018/979-8-3693-4542-9.ch008

INTRODUCTION

The Universal Declaration of Human Rights, the Convention on the Rights of the Child, the International Covenant on Economic, Social and Cultural Rights, the United Nations Convention on the Rights of the Child, and the Salamanca Statement on Special Needs Education all emphasize that education is a fundamental right and freedom accessible to everyone (Ciftci, 2021). Accordingly, education should be organized in a way that is supported by the state, equally accessible to all, and provides an environment where individuals can develop their vocational and technical skills. However, the emphasis on the need for education to be specifically tailored to individuals with special needs is highlighted only in the Salamanca Statement, created in 1994. Additionally, reviewing the United Nations' (UN) 2030 Agenda reveals that it includes 17 Sustainable Development Goals (SDGs) aimed at achieving a better and more sustainable world for everyone. The fourth Sustainable Development Goal encompasses “ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all.” To speak about educational equity, it is essential to provide maximum opportunities and necessary supports for children to participate in computer science courses and extracurricular activities, regardless of gender, race, ethnicity, disability, and other factors (Milne & Ladner, 2019). Despite international efforts to achieve such a goal, many visually impaired students seeking degrees in computer science face significant challenges and must overcome social and technical barriers. One of the challenges is learning programming as a fundamental skill for obtaining a degree in computer science (Alotaibi et al., 2020). In addition to education, there is a disadvantage for visually impaired individuals in the workforce due to the lack of education tailored to their individual differences. Disabled individuals (DIs) are often excluded from the growing IT job market, with a general inequality in employment and recruitment opportunities between disabled and non-disabled individuals. In 2022, it was observed that 21.3% of disabled individuals in the US were employed, while 65.4% of non-disabled individuals were employed. Specifically, blind and visually impaired (BLV) professionals have lower employment rates compared to their visually impaired peers. As the software industry rapidly expands, the employment rate of BLV professionals is even lower; a 2022 survey revealed that only 1.7% of software professionals were BLV individuals. However, a general trend of increasing numbers of BLV software employees has been observed (Bureau of Labor Statistics, 2023; Stack Overflow, 2022).

To overcome these challenges, it is crucial to structure education for individuals with special needs, considering the rights and freedoms outlined in these declarations. This is important for enabling disabled individuals to smoothly continue their social lives, adapt to society, and comfortably sustain their lives. Since each individual possesses distinct characteristics, it is not possible to evaluate everyone

28 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/methods-for-accessible-computer-science-and-computer-programming-education-for-visually-impaired-and-blind-students/365431

Related Content

Theater as the STEAM Engine for Engaging Those Previously Disengaged

Paul C. Jablon (2020). *Cases on Models and Methods for STEAM Education* (pp. 55-91).

www.irma-international.org/chapter/theater-as-the-steam-engine-for-engaging-those-previously-disengaged/237790

A Research of Employing Cognitive Load Theory in Science Education via Web-Pages

Yuan-Cheng Lin, Ming-Hsun Shenand Chia-Ju Liu (2015). *STEM Education: Concepts, Methodologies, Tools, and Applications* (pp. 902-917).

www.irma-international.org/chapter/a-research-of-employing-cognitive-load-theory-in-science-education-via-web-pages/121880

Reflections on Inquiry

Stuart Bevins, Louise Lehanand Josephine Booth (2019). *Comparative Perspectives on Inquiry-Based Science Education* (pp. 197-210).

www.irma-international.org/chapter/reflections-on-inquiry/226330

Foundational-Level Mathematics Teaching Using Learners' Mother Tongue

Tebogo J. Mampane (2024). *Impacts of Globalization and Innovation in Mathematics Education* (pp. 258-271).

www.irma-international.org/chapter/foundational-level-mathematics-teaching-using-learners-mother-tongue/351138

Science and Mathematics Teacher Collaboration in Higher Education: A Pedagogical Experience Using Inquiry Learning Spaces

Bento Cavadasand Neusa Branco (2023). *Handbook of Research on Interdisciplinarity Between Science and Mathematics in Education* (pp. 196-223).

www.irma-international.org/chapter/science-and-mathematics-teacher-collaboration-in-higher-education/317909