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INCLUSIVE IT EDUCATION, SOUTH KOREAN METHODS OF TEACHING PROGRAMMING TO STUDENTS WITH DISABILITIES

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Annotation. This article examines the best practices of South Korea in teaching IT programming to people with disabilities (HIA). South Korea, as a world leader in digitalization, has developed a unique ecosystem that combines adaptive technologies (Assistive Technology), specialized educational frameworks and government support. The paper analyzes such approaches as the use of multimodal interfaces, pair programming, and геймификацияlearning gamification. The results show that the systematic integration of ICT solutions and individual educational trajectories significantly increases the employment rate of graduates with disabilities in the high-tech sector.
Keywords: Inclusive education, IT programming, South Korea, adaptive technologies, students with disabilities, teaching methods, digital accessibility.

ИНКЛЮЗИВНОЕ ОБРАЗОВАНИЕ, ЮЖНОКОРЕЙСКИЕ МЕТОДЫ ОБУЧЕНИЯ ПРОГРАММИРОВАНИЮ СТУДЕНТОВ С ОГРАНИЧЕННЫМИ ВОЗМОЖНОСТЯМИ

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Аннотация. В этой статье рассматриваются лучшие практики Южной Кореи в обучении ИТ-программированию людей с ограниченными возможностями. Южная Корея, являясь мировым лидером в области цифровизации, разработала уникальную экосистему, сочетающую вспомогательные технологии, специализированные образовательные платформы и государственную поддержку. В статье анализируются такие подходы, как использование мультимодальных интерфейсов, парное программирование и обучающая игра. Результаты показывают, что системная интеграция ИКТ-решений и индивидуальных образовательных траекторий значительно повышает уровень трудоустройства выпускников с ограниченными возможностями в сфере высоких технологий.
Ключевые слова: инклюзивное образование, IT-программирование, Южная Корея, адаптивные технологии, учащиеся с ограниченными возможностями, методы обучения, цифровая доступность.

Introduction

Problem statement

Global digitalization requires the involvement of all segments of the population in software development. However, students with physical, sensory or cognitive impairments face barriers in traditional educational environments. The problem lies in the insufficient adaptation of standard integrated development environments (IDEs) and curricula to the needs of special students. [1]

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South Korean context

South Korea has implemented a "Digital Inclusion Policy" strategy, where programming training is seen as a tool for social mobility. The main question of the studyis: what methodological techniques allow Korean universities and centers (for example, with the support of KADSA-Korea Agency for Digital Opportunity and Promotion) to achieve high results in teaching coding? [2]

Methods

The South Korean model is based on four pillars:

1. Adaptive interfaces and tools

For students with visual impairments, on-screen announcers with syntax support are used (for example, specialized plugins for VS Code), as well as tactile Braille displays. For students with motor disorders, the following methods are used:

- Eye-tracking systems for entering code.
- Voice-to-Code interfaces (protocols for dictating logical constructs).

2. The "Pair adaptive programming"model

A technique in which students work in pairs: one (the driver) writes the code, the other (the navigator) checks the logic. In inclusive groups, couples form "student with disabilities + tutor" or "student with disabilities + student without restrictions", which contributes to socialization and mutual learning.

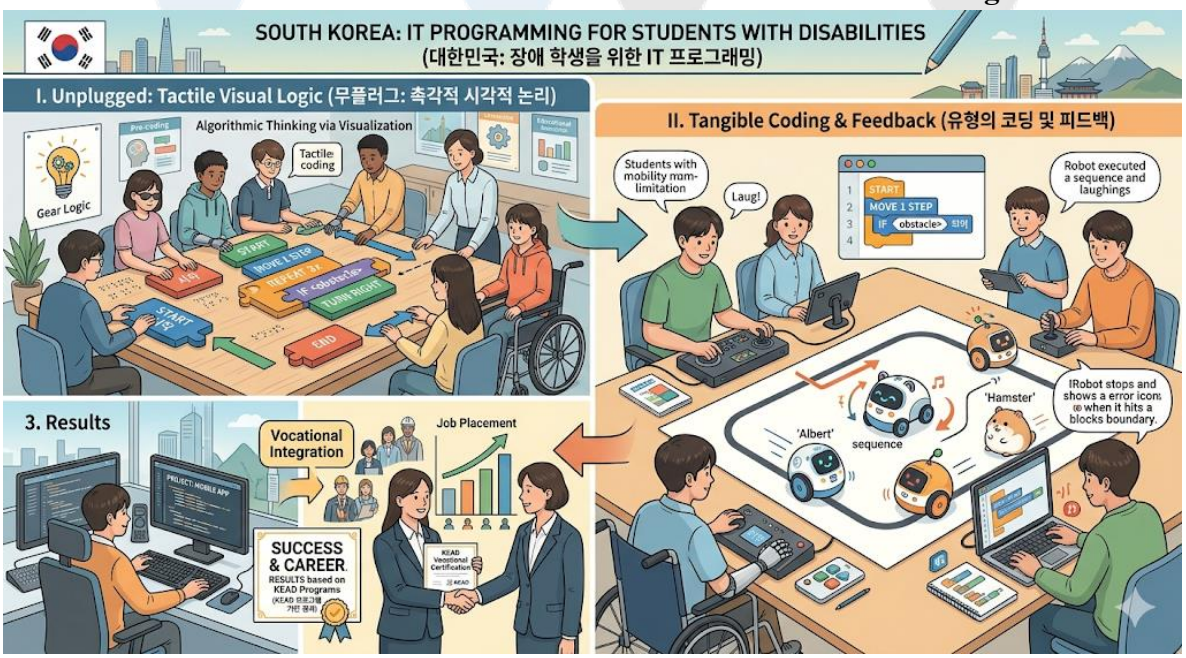
3. Algorithmic thinking through visualization

Before switching to complex syntax, the "Unplugged" methods are used, adapted for tactile perception. South Korean teachers actively use modular robot kits (for example, Albert or Hamster robot), which provide instant physical feedback on the written code.

Results

Based on the analysis of programs of organizations such as the Korea Employment Agency for Persons with Disabilities (KEAD), the following results are highlighted:

Figure 1



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Training effectiveness **(Table 1)**

Method	Target group	Learning rate (%)
Multimodal IDEs	Visual Impairments	78%
Gamified blocks	Cognitive Impairments	65%
Voice control	Motor impairments	72%

Drawings and graphs

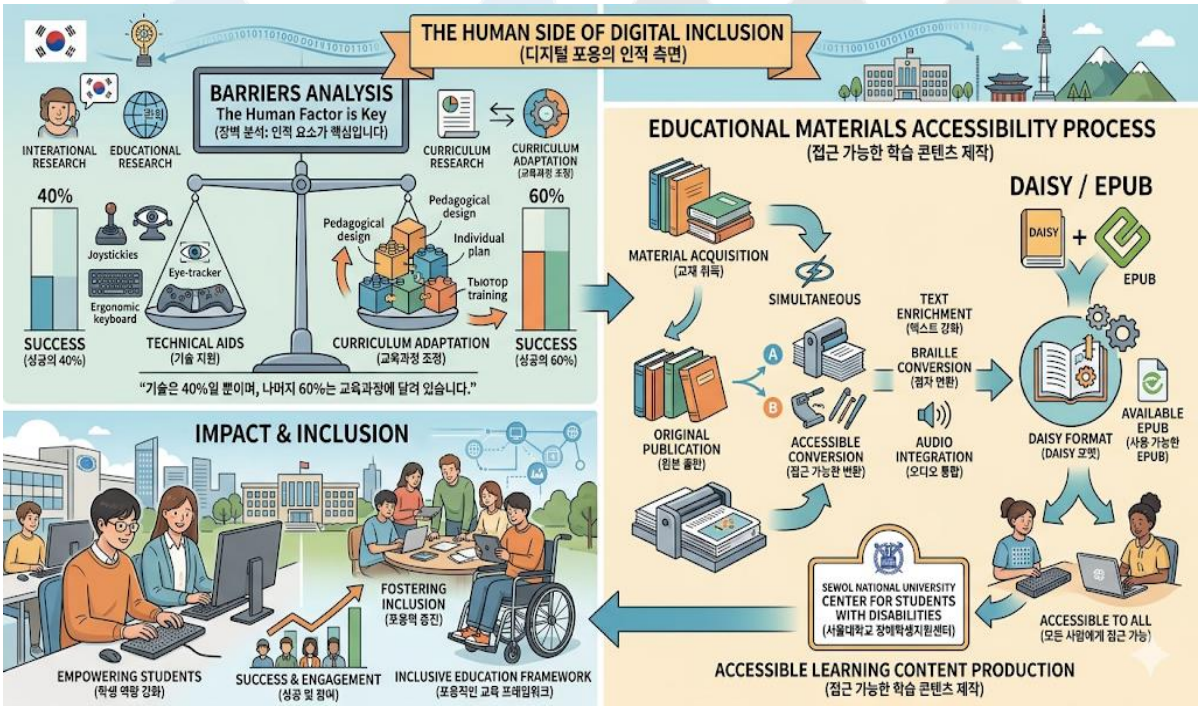
The South Korean approach demonstrates a correlation between the use of specialized UX / UI interfaces of educational platforms and the speed ofdebuggingprogram code by students.

Discussion and reports

Analysis of barriers

Reports from Korean institutions (such as the Seoul National University Center for Students with Disabilities) indicate that technology is only 40% of success. The remaining 60% depend on the adaptation of curricula. In Korea, educational materials are translated into DAISY or available EPUB format at the same time as they are published for regular students.

Figure2



Implementation recommendations

1. Creating "Sandboxes" : Using isolated cloud environments where students can experiment with code without the risk of system errors.
2. Certification: Integration of international certificate preparation programs (Oracle, Microsoft) into the basic course.

Conclusion

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The rapid digitalization of the global economy has created unprecedented opportunities in the field of Information Technology. However, for a significant portion of the population-specifically students with disabilities- these opportunities have often remained out of reach due to systemic and physical barriers. South Korea, standing at the forefront of the digital revolution, has developed a pioneering framework that challenges the traditional perception of disability in tech. By shifting the focus from physical limitations to cognitive potential, South Korean methodologies demonstrate that with the right pedagogical infrastructure, a career in IT is accessible to everyone.

The first essential component of this success is the introduction of algorithmic thinking through physical objects. Before a student ever touches a keyboard, the South Korean model emphasizes "unplugged" programming. For students with sensory or motor impairments, abstract concepts like loops, variables, and logic gates are translated into tactile, physical manipulatives. By using blocks, robots, or physical maps to solve problems, students build a robust mental model of computational logic. This foundational step ensures that the cognitive "language" of coding is mastered independently of the physical demands of a computer interface.

As students progress from logic to implementation, the use of high-tech assistive devices becomes the critical bridge. South Korea’s investment in specialized hardware- such as eye-tracking software for those with limited mobility, braille-based displays for the visually impaired, and AI-driven speech-to-text interfaces-effectively neutralizes physical constraints. These tools are not merely "supports"; they are sophisticated digital extensions that allow the student to navigate complex IDEs (Integrated Development Environments) with the same speed and accuracy as their peers. In this ecosystem, technology serves as the ultimate equalizer.

The final requirement for a successful career path is the close connection between training and the labor market. South Korea has established a seamless transition from the classroom to the corporate world through high-level partnerships. By facilitating internships at global industry leaders like Samsung and Naver, the educational system ensures that students gain practical, high-stakes experience. These internships do more than build a resume; they dismantle corporate stigmas, proving to employers that inclusive hiring is not just a social responsibility but a strategic advantage that brings diverse problem-solving perspectives to the tech industry.

Ultimately, the South Korean methods of teaching programming to students with disabilities prove that physical limitations are not an obstacle to a career in IT, provided that there is a committed investment in early logical foundations, adaptive technology, and real-world industrial integration. By prioritizing these three pillars, South Korea has moved beyond the theory of inclusion into the reality of empowerment. The experience of South Korea can be successfully adapted in other countries to reduce the digital divide, offering a universal blueprint for a future where the digital economy is truly open to all, regardless of physical ability.

The experience of South Korea can be successfully adapted in other countries to reduce the digital divide.

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