

Chapter 11

Technologies for Intelligent and Inclusive Education

Valentina Terzieva

 <https://orcid.org/0000-0002-5830-3114>

Institute of Information and Communication Technologies, Bulgarian Academy of Sciences, Bulgaria

Svetozar Ilchev

 <https://orcid.org/0000-0002-4930-1889>

Institute of Information and Communication Technologies, Bulgarian Academy of Sciences, Bulgaria

Tatyana Ivanova

Technical College, Technical University of Sofia, Bulgaria

Katia Todorova

 <https://orcid.org/0000-0002-9152-5915>

Institute of Information and Communication Technologies, Bulgarian Academy of Sciences, Bulgaria

Teodor Savov

Institute of Information and Communication Technologies, Bulgarian Academy of Sciences, Bulgaria

ABSTRACT

The chapter presents the main functionalities of an Intelligent Educational System (IES) that enables a personalized and adaptive learning process matching the requirements of inclusive education and discusses corresponding pedagogical and technological approaches. Effective ways of organizing the tutoring process using intelligent technologies are proposed based on a comprehensive analysis of inclusive education approaches. The authors show how ontological models can be used to develop and recommend suitable adaptive learning content and to support the personalized tutoring process. This chapter also discusses the design and implementation of laser projection systems to increase learning efficiency. The goal is to raise students' engagement and ensure a more authentic learning experience by employing these systems as augmented reality displays. Knowledge gained from industry, entertainment, and show business is utilized to create hardware and software for the practical implementation of a laser projection system targeting education.

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INTRODUCTION

Inclusive education means all students attend age-appropriate or interests-appropriate general education classes regardless of their individual characteristics. They should receive high-quality instruction, interventions, and support to help them achieve the general curriculum goals (UNESCO, 2005). Successful inclusive learning is based on accepting, understanding and teaching following students' physical, cognitive, psychological, social, academic, and emotional differences. Different students should spend different times in different ways outside of regular classes to achieve better success (McManis, 2017).

The essential goal of inclusive learning is to provide the most useful tutoring for every learner, with or without difficulties or talents. Inclusive learning has the following significant benefits:

- Allows attending the course;
- Stimulates learning;
- Makes learning engaging and successful;
- Ensures efficient learning in groups, classes, and communities but following individual goals;
- Provides possibilities for developing friendships and teamwork.
- Tracks continuously all the achievements and difficulties of learners;
- Proposes individual learning goals;
- Suggests the best learning content;
- Offers different ways to ensure effective learning for students with diverse knowledge backgrounds and abilities.

However, the educational process comes across several significant issues. First, some individual characteristics of learners might hamper them from acquiring basic skills such as reading, writing, and arithmetic. Many students still lag behind their classmates because they have a specific way of perceiving and processing information and have different origins or learning difficulties. The educational system rejects them when such students do not receive adequate teaching. Thus, society loses possible future qualified workers and specialists just because they do not receive inclusive education.

Second, factors that influence inclusive education concern the learning community: teachers' authority and knowledge, student-teacher relationships, peer collaboration, school structure, discipline, and other social aspects. Considering all these factors during course designing or customizing is crucial to decrease dropouts and increasing tutoring effectiveness.

Students needing inclusive education might have different obstacles and difficulties, but regulations require their integration into schools (Save the Children, 2016). However, efficient learning needs individual curricula, extra teachers with special training, psychologist consultations, speech therapist, or other remedies (Florian & Black-Hawkins, 2011). The aim is to provide a personalized teaching process matching their strong personal qualities and skills and use appropriate teaching strategies to support and develop the weak ones. That is why students with specific learning needs require personalized education. The teaching process is not an automatic transfer of knowledge, information, and skills but requires an appropriate structuring and presentation of the learning material to match the specific educational needs.

According to the above analysis, inclusive education is very close to adaptive and personalized education. The main difference between these approaches and inclusive education is their driving subject. Whereas personalized or adaptive education is performed mainly in intelligent electronic environments, traditionally, tutors drive inclusive education. Therefore, the authors consider that adaptivity and per-

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