

# Humanoids in Secondary Education: Special Education

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## Abstract:

Humanoids can potentially assist in special education by providing personalized support, engagement and feedback to students with diverse learning needs. They can be programmed to adapt their interactions and teaching methods to suit individual learning styles, pace and preferences. This article explores the innovative applications of humanoid in special education in secondary education.

## I. INTRODUCTION

Humanoid refers to something that resembles or has characteristics similar to a human, particularly in terms of physical appearance or behaviour. It is often used in various contexts, including robotics, science fiction, and anthropology, to describe creatures, robots, or objects that possess human like features or traits. In the context of education and special needs humanoid may refer to assistive technologies or robots designed to support students with disabilities or special needs. These humanoid robots are often programmed to interact with students in ways that promote learning, communication and socialization skills. They can provide personalized assistance and engagement tailored to the unique needs of each student.

## II. HUMANOID IN SECONDARY EDUCATION

With a growing emphasis on personalized and innovative approaches to education, humanoid robots present a promising avenue for enhancing student engagement, motivation and academic achievement. Humanoid robots have various potential applications in secondary education.

### A. Teaching Assistant

Humanoid robots can assist by providing additional support in the class room, such as helping with demonstrations, answering basic questions, or providing personalized feedback to students

### B. Language Learning

Humanoid robots can be programmed to interact with students in different languages, providing a more immersive and engaging language learning experience.

### C. STEM Education

They can be used to teach concepts in science, technology, engineering and mathematics (STEM) through interactive demonstrations and experiments.

### D. Special Education

Humanoid robots can support students with special needs by providing individualized instruction and assistance in a way that is non-judgemental and patient.

### E. Social and Emotional Learning

They can help students develop social and emotional skills by engaging in role-playing scenarios, practising conversations, and providing feedback on social interactions

### F. Virtual Field Trips

Humanoid robots equipped with cameras and sensors can take students on virtual field trips to distant locations, allowing them to explore different cultures, environments, and historical sites without leaving the classroom

### G. Coding and Robotics Education

Humanoid robots can be used to teach coding and robotics concepts by allowing students to program their movements and behaviours, providing

hands-on learning experiences.

### **III. HUMANOID IN SPECIAL EDUCATION**

Inclusive education for students with special needs, particularly in secondary schools, poses unique challenges requiring innovative solutions. Drawing upon recent advancements in robotics and educational psychology, the paper highlights the benefits of humanoid assistance in fostering engagement, personalization of instruction, and social skills development. Future research directions and implications for practice are also discussed, emphasizing the importance of collaboration between educators, technologists, and stakeholders to realize the full potential of humanoid assistance in special education contexts.

#### ***H. Social Interaction***

Humanoid robots can engage students in social interactions to help them develop social skills such as turn-taking, eye contact, and conversation. They can provide a non-judgmental and consistent presence for students who may struggle with social interactions with peers.

#### ***I. Emotional Support***

Robots can be programmed to recognize and respond to emotions, providing comfort and encouragement to students who may experience anxiety, frustration, or other emotional challenges. They can also teach coping strategies and relaxation techniques.

#### ***J. Personalized Learning***

Humanoid robots can adapt their teaching style and pace to match the individual needs and learning preferences of students with special needs. They can provide additional explanations, repetition, or alternative methods of instruction as needed.

#### ***K. Behavioural Therapy***

Robots can assist in delivering behavioural therapy interventions by providing immediate feedback and reinforcement for desired behaviours. They can also help students practice social skills, such as managing anger or following instructions, in a safe and controlled environment.

#### ***L. Communication Support***

For students with communication difficulties, humanoid robots equipped with speech recognition and synthesis capabilities can facilitate communication by serving as a communication partner or by helping students practice language skills.

#### ***M. Routine Assistance***

Robots can assist students with daily routines and tasks, such as organizing materials, following schedules, and completing assignments. This can help students develop independence and self-management skills.

#### ***N. Motivation and Engagement***

Humanoid robots can make learning more engaging and motivating for students with special needs through interactive games, stories, and activities. Their novel and engaging presence can help sustain student interest and attention.

### **IV. HUMANOID IN SPECIAL EDUCATION ADVANTAGES**

There are several potential advantages to using humanoid robots in special education settings:

#### ***O. Engagement***

Humanoid robots can capture the attention and interest of students, including those with special needs, making learning more engaging and enjoyable.

#### ***P. Consistency***

Robots can deliver lessons and instructions consistently, without the variability that human teachers may exhibit. This consistency can be particularly beneficial for students who thrive on routine and predictability.

#### ***Q. Personalization***

With advances in artificial intelligence, humanoid robots can adapt their teaching style and content to the individual needs and preferences of each student, providing a more personalized learning experience.

#### ***R. Non-judgmental***

Robots are non-judgmental and non-threatening, which can help reduce anxiety and fear of failure in

students with special needs, creating a more conducive learning environment.

#### *S. Repetition and Practice*

Robots can provide unlimited opportunities for repetition and practice, which is essential for skill development in many special education programs.

#### *T. Visual and Interactive Learning*

Humanoid robots can incorporate visual and interactive elements into their teaching, catering to different learning styles and enhancing comprehension for students with special needs.

#### *U. Social Skills Development*

Some humanoid robots are designed to facilitate social skills development by engaging students in interactive activities and simulated social interactions, which can be particularly beneficial for individuals with autism spectrum disorders.

Overall, the use of humanoid robots in special education holds promise for enhancing learning outcomes and promoting inclusion for students with diverse needs. However, it's important to note that robots should complement, not replace, human teachers and support staff in these settings.

### **V. HUMANOID IN SPECIAL EDUCATION DISADVANTAGES**

While there are potential benefits to using humanoid robots in special education, there are also some disadvantages to consider:

#### *V. Cost*

Humanoid robots can be expensive to purchase and maintain, which may limit their accessibility for some educational institutions or individuals.

#### *W. Lack of Emotional Connection*

Despite their human-like appearance, robots lack the ability to form genuine emotional connections with students. This absence of emotional rapport may hinder certain aspects of the learning experience, particularly for students who benefit from strong emotional support.

#### *X. Limited Flexibility*

Robots may lack the flexibility and adaptability of human teachers in responding to unexpected situations or adjusting teaching strategies based on subtle cues from students.

#### *Y. Technical Issues*

Humanoid robots are susceptible to technical malfunctions or glitches, which can disrupt lessons and require technical expertise to resolve.

#### *Z. Dependency on Technology*

Relying heavily on humanoid robots for instruction may inadvertently reinforce students' dependence on technology and reduce opportunities for human interaction and social learning.

#### *AA. Cultural Sensitivity*

Humanoid robots may not be culturally sensitive or responsive to the diverse cultural backgrounds and experiences of students, potentially leading to misunderstandings or inappropriate interactions.

#### *AB. Ethical Considerations*

The use of humanoid robots raises ethical questions regarding privacy, data security, and the potential for depersonalization of education.

### **VI. CONCLUSIONS**

Overall, humanoid robots have the potential to enhance learning experiences in secondary education by providing personalized, interactive, and engaging instruction across various subjects and learning styles. Humanoid robots have the potential to complement existing special education interventions by providing personalized support, promoting social interaction and communication, and fostering independence and learning in students with diverse needs. However, it's essential to ensure that their use is carefully integrated into the educational environment and aligned with individualized education plans to maximize their effectiveness and benefits. The use of humanoid robots in special education holds promise for enhancing learning outcomes and promoting inclusion for students with diverse needs. However,

it's important to note that robots should complement, not replace, human teachers and support staff in these settings. While humanoid robots offer exciting possibilities for enhancing special education, it's important to carefully weigh these disadvantages and consider how they can be mitigated to ensure the best possible outcomes for students.

#### **ACKNOWLEDGMENT**

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