



Virtual Inclusion Via Telepresence Robots In The Classroom

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PROBLEM STATEMENT

Virtual Inclusion via Mobile Robot Unit

Every year, large numbers of K-12 students are not able to attend class due to illness. Extended absence from the classroom has negative and overlapping educational, social, and medical consequences as students may fall behind in instruction, feel isolated from their peers, and experience difficulties in their recovery due to loneliness and depression. School districts sometimes provide individual tutors who can make occasional home visits, but such tutoring cannot substitute for regular participation in the classroom environment. Telepresence robots provide a way for students to remain connected to their school and maintain or develop critical social relationships via virtual inclusion.

KEY QUESTIONS

Q1) How is the robot used in classrooms by homebound students, their teachers, and classmates?

Q2) What appear to be the effects of robot use on the homebound students, classmates, teachers, and families?

Q3) Is classroom inclusion via telepresence robot financially and functionally feasible?

VIRTUAL INCLUSION

The goal of inclusion is to promote the academic and social inclusion of all students. Academic virtual inclusion allows for academic and social inclusion via live, two-way, secure audio-visual communication between the homebound child and the classroom using digital technology. When the technology includes a telepresence robot, virtual inclusion is enhanced by the increased autonomy and self-efficacy of the student controlling the robot's movement around the classroom or school. Use of the robot, in theory, allows a child to actively participate in educational and social activities throughout the day.



PRELIMINARY RESULTS

Three primary themes have emerged from a local case study:

- **Overcoming isolation**
 - For one child, robot is only means of human interaction during the school day
 - Child whose family thought his behavior was due to heart condition but after acquiring a robot, realized it was depression
 - Child able to audition for and join the school choir via the robot
 - Children who use a mobile "hotspot" to be in school during long drives to the hospital, waiting room times, and lengthy medical treatments
- **Anthropomorphization of the robot**
 - Classmates do not differentiate between the student and robot. Said things like:
 - "We don't like it when he turns off"
 - "We wish he had arms"
 - "He's raising his hand" (lights were blinking)
 - Robots are bullied
 - A bully smeared ketchup on robot's screen and taunted him
 - A boy called a female robot user a "vacuum cleaner"
 - Children identify with robot
 - When homebound child complains of (robot) falling face down, classmates commiserate and recount their experiences with falling face down
 - Robot is viewed as the student, not an extension of the student
 - Classmates did not want the homebound child and the robot in the same picture
- **Robot as a bridge for the future**
 - Frequent references made by both teachers and classmates to "when he comes back to school"
 - Overwhelming interest by a class of 2nd graders on how robots are designed, constructed, and operated

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METHODOLOGY

There are two main parts to the study:

- a local case study
- a set of national surveys

Local case study was conducted where five robots are currently being deployed for academic virtual inclusion.

The case study consisted of:

- Interviews
 - Five homebound children
 - Five parents
 - Eleven teachers
 - Five school and district officials
- Observations and classmate focus groups
 - Two classrooms



National surveys are currently underway to capture the experiences of the estimated 50-60 current and past users of robots. The national survey consists of three groups for this population:

- (1) parents/guardians
- (2) classroom teachers
- (3) administrators/technology support personnel

Survey questions will address

- how the robot is used
- advantages and disadvantages of robot use
- perceived impact of its use

FUTURE DIRECTIONS

Future research should:

- Evaluate effectiveness of robot use by age, gender, and illness
- Examine how robot is interpreted by various people
- Use a larger sample
- Use a comparative group of students who do not have access to a robot

IMPLICATIONS

This research may have great impact on how humans interact with robotic technologies on a daily basis, at early ages and may find additional applications for and consequences of using emerging robotic technologies in education and healthcare. Future studies may lead to changes in how robotic technologies, digital inclusion practices, and inclusion interfaces are designed and utilized. Also, this research and future studies may change the standard of care provided to isolated students with medical conditions in our educational and healthcare systems.