The Performance of Students with Cochlear Implants in Mainstream Classrooms in Comparison to Mainstreamed Students with Hearing Aids and Normal Hearing Peers

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Introduction

• Cochlear Implants (CI) contribute to the inclusion rates of children with severe to profound hearing loss, and improve their inclusion in mainstream educational settings.
• Most Deaf and Hard of Hearing students (DHH) are currently enrolled in mainstream educational settings.
• Various studies indicate the challenges these students face in terms of academic achievements and social-emotional functioning.
• Only a few studies have addressed and described the DHH students’ functioning during class and the difficulties involved in their classroom participation.

(Damen et al., 2006; Francis et al, 1999; Vermeulen et al., 2007; )
Classroom Participation is Adversely Affected by Hearing Loss Due to:

- Spoken language deficits
- Low speech intelligibility
- Limited auditory speech perception skills
- Classmates' behavior
- Teacher's behavior
- Social-emotional issues arising from hearing loss
- Lack of visual support: Lack of availability of sign language interpreter, restricted eye contact between all the speakers in class
Classroom Participation’s Contribution to the Students' Learning Process

• Provides opportunities for students to speak and to be heard, allows social and cognitive development.
• Encourages critical thinking, self-awareness, and social involvement

(Dallimore, Hertenstein & Platt, 2004)

Special importance for DHH students: Classroom participation allows both the student and the teacher to verify the student’s perception and understanding of the material taught during class.
Objectives:

• To add to existing knowledge, both theoretical and practical, by quantifying:
  • Classroom performance
  • Feelings during class
  • Academic achievements

of mainstreamed students with CI in comparison to mainstreamed hearing-aids users (HA), and normal hearing peers (NH)
Subjects
70 4th to 6th graders attended 34 different mainstream classrooms. None of the students had been suspected of having or being diagnosed with learning disabilities.

35 students (10 boys, 25 girls) with moderate to profound hearing loss, communicate through spoken language at school. None were supported by a sign language interpreter.

- 20 HA users: 7 boys, 13 girls
- 15 CI users: 3 boys, 12 girls (10-unilateral, 5-bilateral)
- 9 Nucleus
- 5 Advanced Bionics
- 1 Med-El

35 classmates, 10 boys, 25 girls, with normal hearing.
Materials 1: Academic Performance

- The academic achievements were assessed using grades in two core subjects: mathematics and language.
- The scores were determined by the average of the two last tests grades reported by teachers.
Academic Achievements - Results:

• No differences between the groups were found in their mathematics’ and language’ grades.
Materials 2:  
Classroom Participation Observation
Quantitative Assessment in Four Typical Classroom Situations:

• **The teacher asking questions:** The number of questions that were asked by the teacher was documented as well as five optional student's responses for each question: answering the question correctly, answering the question incorrectly, raising a hand in order to answer the question but not receiving permission to speak, making eye contact with the teacher, or ignoring the question (doesn't make any eye contact).

• **The teacher giving instructions:** The number of times the teacher gave instructions in class was documented as well as one of the three optional responses for each instruction: the student following the instructions independently, the student following the instructions with the help of teacher or friend, or the student doesn't follow the instructions.
Materials 2:
Classroom Participation Observation
Quantitative Assessment in Four Typical Classroom Situations:

• **Classmate speaking**: the number of times that classmates spoke was documented as well as one of three optional student's responses: making eye contact with the student who spoke, responding to the student verbally, or ignoring the student (doesn't make eye contact).

• **The student participating without prompts from the teacher**: raising a new topic, asking a question, asking for help or raising a hand but doesn't get permission to speak
Classroom Participation Observation-Results

- The teacher asking questions
- The teacher giving instructions
- Participating without prompts from the teacher

No differences were found between the groups
Classroom Participation Observation-Results: Making Eye Contact with Classmates Who are Speaking During Class

CI users made more eye contact with classmates who were speaking during class compared to NH students (P=0.000)

HA users made more eye contact with classmates who were speaking during class compared to NH students (P=0.001)

No differences were found between the CI users and the HA users.
Is the primary objective of DHH mainstreamed students to understand the teacher?

• The current findings suggest that many DHH students wouldn't agree with this claim. Many DHH were observed investing a lot of effort in following their speaking classmates.

• Despite the importance of eye contact to DHH communication in class, only one DHH student was located in a seat that allowed her to make eye contact with most of her classmates due to a U-shape seating arrangement in her classroom. All the other participants were seated in columns, rows, or groups, at the front of the class, with limited visual access to their classmates’ face.
Materials 3: 
Classroom Participation Questionnaire - CPQ

(Antia et al., 2007).

• Self reporting questionnaire, relates to the students‘:
  • Understanding of the teacher
  • Understanding of the other students
  • Positive affects
  • Negative affects
• CI users reports were not significantly different from the NH reports.
• HA users reports were significantly different from the NH group in their sense of: understanding of the students (p=0.001), positive affects (p=0.001) and negative affects during class (p=0.001)
Conclusions

- Today, the support that most mainstream DHH students receive focuses successfully on improving academic achievement. However, classroom participation gets minimal or no attention at all. This situation can be reflected in high grades based on independent learning or on the assistance of the itinerant teacher, regardless of the level of involvement during class.

- The current findings highlight the fact that even mainstream DHH students who perform similar to their hearing classmates in terms of academic achievements are expected to experience significant challenges in classroom participation.

- Relying exclusively on grades as a measure of academic inclusion may present a false impression of high academic performance and may obscure the existence of difficulties.
Conclusions

• Unlike HA users, CI users did not report on less positive affects, more negative affects or difficulties in understanding the teacher and the classmates during class. However, the observation tool indicated that they work harder than NH students in participating the class by tracking the faces of the different speakers.
Therefore:

• Special adjustments are needed, including: classroom seating arrangements; choosing the preferred seat for a student with CI; and managing class discourse in a supportive way that will encourage and enhance classroom participation of students with CI.

• The participation of CI students in class should be evaluated as a separate measure that has its own importance, and the academic support given to them should include specific attention to their classroom participation difficulties.