

Case study

6 months of speech therapy for 20 students with autism spectrum disorder using QTrobot



**Institute for Autistic and Psychotic Children (EIPA)
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Institute Profile

Institute's name: Institute for Autistic and Psychotic Children (EIPA), Luxembourg



Institute's type: Public, under the authority of the Ministry of National Education, Childhood and Youth.

Institute's activities: Specialized school providing the education, teaching and rehabilitation of children and adolescents with an autism spectrum disorder subject to compulsory education.

Case study duration: January 2018 to June 2018

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Integration of QTrobot in the institute

The institute received the QTrobot in January 2018. LuxAI, the vendor of QTrobot, presented a 2-hours workshop to therapists and educators of the institute on how to program and control the QTrobot using its graphical user interface.

LuxAI did not provide any pre-developed educational curriculum to the institute. Instead, it encouraged the therapists and educators to develop their own programs for the robot, and integrate the robot in their existing activities as they see fit.

The therapists and educators learnt how to program and control the QTrobot following the workshop and were able to program the robot and integrate it in their activities without further support of LuxAI.

The QTrobot was then used by a speech therapist for a duration of 6 months with:

- 14 children with autism spectrum disorder during individual sessions,
- and with 7 children in group setting.

Impact of QTrobot on children in one to one sessions

Using QTrobot facilitated the speech training sessions in a variety of ways, including improving the attention and engagement of students, reducing their stereotypical behaviours, improving imitation and enhancing the use of verbal language.

1- Eliciting spontaneous interaction in children:

Some children spontaneously approached the robot from the first robot assisted training session. This behaviour was observed even from the students who tend to avoid interaction with the teachers and therapists.

Children initiated the interaction with QTrobot by the following ways:

- **Looking at QTrobot:** All the children looked at the robot with interest and analyzed the screen representing the face. This happened in all children, even those who tend to avoid eye contact, to have fleeting eye contact, and those who tend to look out of the corner of their eyes.
- **Touching QTrobot:** Most children also tried to touch the robot. They often tried to touch the hands and arms of the robot to prompt the robot to move. They also touched the face of the robot while it showed facial expressions.
- **Verbal interaction with QTrobot:** some children said hello to the robot as soon as they saw it. Some took the initiative to speak to the robot and made a request or made a comment. For example, when reading a book, children showed an image and addressed the robot while commenting on the picture. Children imitated the robot when it was showing a facial expression while talking.

Impact of QTrobot on children in one to one sessions

2- Increasing children's collaboration and motivation to participate in the therapy sessions:

Working with QTrobot improved children's motivation and collaboration during the speech therapy sessions. Therapists observed that during the speech therapy sessions, children collaborate better when at the beginning of the session, they are informed that they will work with QTrobot at the end of the session. They tended to remain seated and had a better performance in the proposed exercises and the given instructions. In this case, QTrobot acted as a reinforcer for children.

In the case of one particular child, he tended to refuse to leave his class to attend the speech therapy session and the therapist had difficulty to attract him to the session. However, since the QTrobot was introduced in his training session, he started to willingly leave the class to participate in the speech therapy sessions, while smiling and showing a collaborative mood. He also regularly asked to work with the robot.

3- Improving attention, engagement and concentration:

Most of the children had higher attention and concentration while working with QTrobot. Children spent a longer time working with the robot compared to the times that they usually work with their therapist alone.

The combination of gestures, facial expressions and speech had the highest effect on attracting children's attention.

4- Improving the usage of verbal language:

Some children used more verbal language and words when they were informed that they will be working with QTrobot. Also in speech exercises, children put more effort, when they were working with the robot. moreover, they were more tolerant to be corrected and they repeated the words more often. Before using the robot, children used to turn their heads and avoid the articulation exercise when working with their therapist.

Impact of QTrobot on children in one to one sessions

5- Reducing disruptive and stereotypical behaviours:

During the activities with QTrobot, therapists observed that the number and the duration of stereotypical behaviours in children are reduced. Those disruptive behaviours happened less often and lasted shorter comparing to the time that QTrobot was not used in the training session. Also, the behaviours had less intensity. For example, if the child moved the arms and the whole body during the session without the robot, when working with QTrobot, the movements were just limited to shaking in the hands.

6- Elevating children's mood and attitude:

Most children had a better mood during the interaction with QTrobot comparing to the time they worked with the therapist alone. Children showed their happiness and interest by smiling and laughing more frequently when working with QTrobot.

7- Improving imitation:

Most children imitated different expressions and behaviours of the robot directly, while the same children did not imitate the same expressions when they were demonstrated by their therapist or when some cards with the same expressions of the robot were shown to them.

- Some children spontaneously imitated the robot's exclamations associated with emotions after doing the same activity three or four times.
- Some children imitated the robot's behaviours when they were prompted.
- Some children did not imitate the robot directly. However, they just listened to the robot and they repeated the pronounced words just when they were asked: "What did you hear?"

Impact of QTrobot on children in group sessions

During the group sessions, QTrobot was used in mainly two type of activities:

- **Music activity:** During a music activity in the classroom, therapists observed that children were quieter and more focused. Children watched robot's activities closely and attentively and followed its directions.
- **Reading a book:** Therapists also used QTrobot in activities to read some books for children. During the activity, therapists witnessed that:
 - Children directed their attention effectively to the robot and listened to it reading the book. The same children often get distracted if the same activity is done without the robot.
 - When the robot was holding a book, children didn't try to change the pages. When the activity is done without the robot, they tend to insist on turning the pages and pass from the pages quickly.
 - They reacted more to the exaggerated vocal expressions of the robot and its intonations.
 - Some children commented more on the images of the book when the activity was done by the robot.
 - Most children repeated the words more often, when the robot was reading the stories from the book.

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The reports presents various cases of using QTrobot in activities with children with autism and the observations made by the therapists. These activities are developed by the therapists without the LuxAI's help.

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