



CASE STUDY: ENDEAVOUR ACADEMY

The Impact of the **CardioWall®** on Young People with Autism and Severe Learning Difficulties

OVERVIEW

This case study **analysed the effectiveness of the CardioWall for children and young people who have autism and severe learning difficulties** at Endeavour Academy. Students used the CardioWall every school day for three months and feedback was collected from both students and staff. Parameters were monitored and analysed including (1) motor skills, (2) physical activity levels and mental alertness, (3) motivation to be physically active, and (4) social and communication skills.

The following will provide a brief overview of Endeavour Academy, their pupils, **and will look in depth at how the CardioWall has impacted the students' behaviour and physical abilities.**



HIGHLIGHTS

- 1) **CardioWall use contributed to the development of students' motor skills** which had a positive impact on their independence with everyday activities such as eating and drinking, getting dressed, and washing
- 2) **Students' engagement and willingness to participate in physical activity**, both individually and with peers, improved with CardioWall use
- 3) **The CardioWall promoted activities that enabled students to be at an optimum level of alertness**, which was fundamental for their engagement in learning
- 4) Students have shown more interest and motivation to improve key life skills such as turn-taking, waiting, observing and playing together, **as a result of frequently playing on the CardioWall**

WHAT IS ENDEAVOUR ACADEMY?

Based in Oxfordshire, UK, Endeavour Academy is a specialist school and residential children's home for 8 – 19-year-olds with autism and severe learning difficulties who benefit from an autism-specific environment.

Their aim is to provide children and young people with the skills and opportunities that will equip them to live more purposeful lives. The curriculum they follow helps to ensure that all students receive a highly personalised, relevant education – with communication and sensory integration embedded throughout. Residential students also benefit from a waking day curriculum which focuses on educational, social, and emotional development, as well as sensory aspects of the curriculum.

The staff work creatively and flexibly to tailor-make learning opportunities that motivate the students and reinforces learning; as well as working closely with parents and carers to ensure each student is receiving the best possible education.



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The CardioWall has been a huge benefit to our students, as it encourages development of skills which are needed for independent living tasks such as eating and drinking, washing, getting dress and school work.

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TARA ROSSOW

**Specialists Paediatric Occupational Therapist,
Endeavour Academy**

HOW IS THE CARDIOWALL USED?

The CardioWall was **integrated into each students' sensory circuit**. This sequence of physical activities is performed daily **to facilitate sensory processing and integration**, and help students prepare for their morning work. The CardioWall games enabled staff to tailor the sessions based on the individual student's focus, motivation, and the task objective. For example, score-based games were used when the students were motivated to exercise and achieve high scores, and non-score-based games facilitated a more relaxed, experience-focused environment.

Staff observed, monitored and recorded students' progression and development in their motor skills, physical activity levels, mental alertness, motivation to exercise, and social and communication skills. This was supported by a student voice form, where students gave feedback on their experience.

(1) MOTOR SKILL DEVELOPMENT

Since children with autism often have motor skill difficulties (6), this was an important parameter to monitor, so staff could assess whether the CardioWall help students develop in these areas. The Royal College of Occupational Therapy (8) states that children with autism should learn a range of skills that can be transferred to independent and functional tasks. This includes improving physical activity, building muscular strength and increasing hand-eye coordination, which all contribute to supporting children's gross motor skills.

Staff used the CardioWall to specifically target these skills, with the addition of bilateral integration, crossing the midline (developing balance and core control), targeting accuracy, and encouraging the use of non-dominant hands. Due to its versatility, staff were able to creatively use the CardioWall to utilise both a bottom-up and top-down approach, as demonstrated in figure 1 below (9). Staff could easily progress and/or regress the activity so students could target specific motor skills (Bottom-up) or focus on the wider participation of the activity (Top-down).

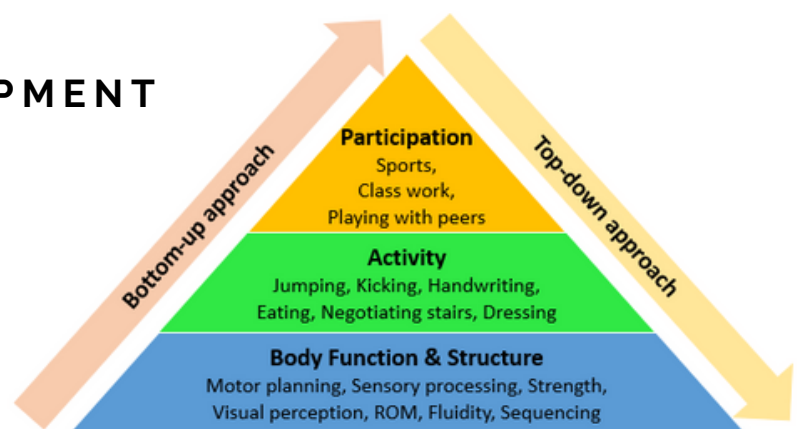


Figure 1: Bottom-up / Top-down Skill Development Learning Approach



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CardioWall improves students' engagement in learning

Every student has their own personalised approach to achieving their goals within these four focus areas. Students are encouraged to regularly participate in physical activity throughout their school week to help maintain and improve their cardiovascular fitness and mental alertness.

The CardioWall was introduced into Endeavour Academy's curriculum to help achieve these physical activity targets. **Staff have found the CardioWall to be an excellent addition because it promotes activities that enable students to be at an optimum level of alertness**, which is fundamental for their engagement in learning (2).

Staff concluded that, by mimicking everyday activities through play on the CardioWall, students were able to develop their motor skills in a non-clinical and enjoyable way, which was extremely beneficial for both students and staff. This consequently had a positive impact on everyday activities such as eating and drinking, washing, getting dressed and completing schoolwork; which ultimately contributed to improving students' independence.

(2) PHYSICAL ACTIVITY AND MENTAL ALERTNESS

Due to the specialism of Endeavour Academy and the highly individual requirements of their students, the curriculum for physical activity is unique and does not measure against the recommended physical activity guidelines outlined by the American College of Sports Medicine (1). Instead, Endeavour Academy's curriculum (3) is based on four areas: **(A) Wellbeing, (B) Social Skills, (C) Independence and Knowledge, (D) Skills and Understanding** (Figure 2).

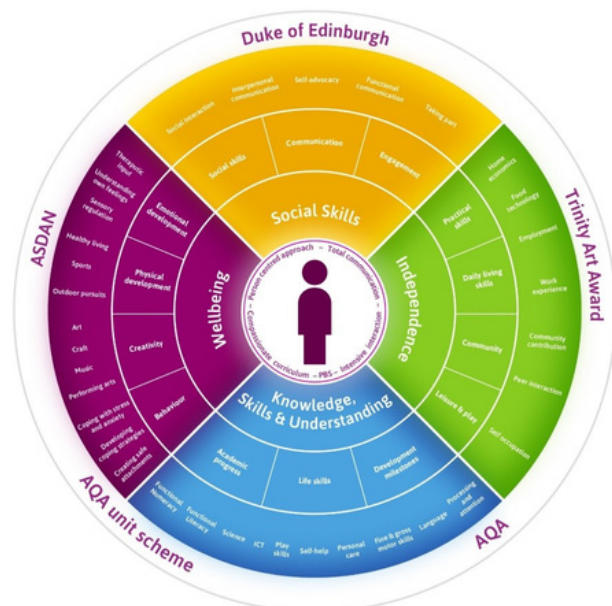


Figure 2: Endeavour Academy's Curriculum



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90% of students have shown more interest and motivation to develop skills such as turn taking, waiting, observing and playing together.

The CardioWall has proved to be a highly effective tool for engaging even the most reluctant of exercisers through the fun of a game.

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CardioWall increases enjoyment and engagement in exercise

(3) ENGAGEMENT AND ENJOYMENT IN EXERCISE

Motivation and participation in physical activity can be adversely affected by a disability (4). However, if individuals with a disability have sufficient motivation, participation in physical activity can be positively affected (5). Therefore, it's essential for Endeavour Academy **to provide students with equipment that increases students' motivation to be physical active.**

The CardioWall gives users a score to beat which encourages repeated use as players aim to improve their score. Coupled with exciting sound effects and lights, **the CardioWall has proved to be a highly effective tool for engaging even the most reluctant of exercisers through the fun of the game.**

Students have explained how much they've **enjoyed using it with their peers as a shared group activity** where they can achieve high scores together. In addition, the sensory aspects of the CardioWall (lights and sounds) are highly motivating for these students. Gameplay involves action-reaction as players press the lightpods to score points, which requires attention and accuracy.

The CardioWall can be played as a sensory-only activity, or a score-based activity. This flexibility allows all students to participate in a way that suits their needs.

(4) DEVELOPMENT OF COMMUNICATION AND SOCIAL SKILLS

Since Endeavour Academy introduced the CardioWall, **90% of students have shown more interest and motivation to develop skills such as turn-taking, waiting, observing and playing together.** As the majority of children with autism find such communication challenging (7), these improvements are extremely positive and encouraging.

As the CardioWall is used within their sensory circuits, students have the opportunity to play on the CardioWall together, or individually and take turns. **Students have developed key life skills** such as communication and teamwork which are fundamental for life outside of a secure school environment.





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WHAT DO STUDENTS THINK?

Student voice forms were used to collect feedback after CardioWall use. As children with autism are often strong visual learners, a visual form focuses on this strength, enabling staff to receive the most accurate feedback from the students.

The students provided positive feedback after using the CardioWall, which exemplifies how beneficial it is to students at Endeavour Academy, as not every activity receives positive feedback. Figure 3 is one example of a student voice form, giving positive feedback after using the CardioWall.

CONCLUSION

Since the CardioWall was installed at Endeavour Academy **it has had a profound effect on the participation and motivation of students** to engage in physical activity. The simple gameplay with lights, sounds and scores has helped students who often find more traditional activities challenging to develop their sensory and motor skills. The social impact on the students who participate on the CardioWall together has been extremely beneficially for improving their communication and teamworking skills. **Overall, the CardioWall has proved to be highly accessible and engaging for those with learning difficulties.**

Figure 3: Student voice form

THANK YOU ENDEAVOUR ACADEMY

Our thanks to Endeavour Academy staff and students for their fantastic feedback and insight into how the CardioWall can benefit children and young people with learning difficulties.

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