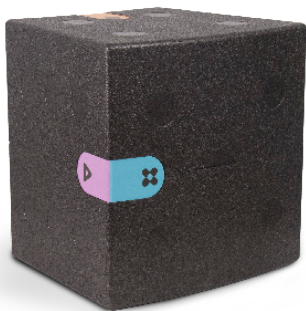


# Using flexible furniture that engages students to move and promotes physical activity within the classroom

## Tackling the issue of sedentary behavior in the schools



The decreasing levels of physical activity among children are alarming. The fact that physical activity is declining— and that time spent in sedentary behaviors is increasing dramatically has become a great matter of concern. The American Heart Association has recently issued an advisory summarizing the existing evidence about sedentary behavior as a potential risk factor for cardiovascular morbidity and mortality.<sup>1</sup>

In response to this evolving evidence, the European Union Work Plan for Sport 2014-2017, an expert group on health-enhancing physical activity, has compiled a set of direct recommendations to encourage physical education in schools. The school environment naturally plays a key role in the development of physical education and promotion of physical activity. However, it has been estimated that about 80% of school-age children only practice physical activities and sports in school<sup>2</sup>. Schools are, therefore, recommended to dedicate more time and budget to physical activities outside the PE curriculum, and adapt the PE curriculum from performance oriented to health conscious.<sup>3</sup>

A recent study shows that replacing part of sedentary activity with light physical activity has a positive effect on health.<sup>4</sup> Physical activity also promotes the brain's executive functioning or, put more precisely, enhances the ability to ignore distractions (inhibition), maintain and use information (working memory) and understand all possible options and alternatives (cognitive flexibility).<sup>5</sup>

A Swedish study (by physician Maria A. I. Åberg) substantiates that physical activity and better fitness have a positive effect on the development of brain structures. More than 1.2 million male adolescents were tested based on their physical fitness and intelligence performance data. It turned out that there is a clear association between cardiovascular fitness, logical thinking and language comprehension.<sup>6</sup>

### What is sedentary behavior?

Sedentary behavior is any waking behavior characterized by an energy expenditure  $\leq 1.5$  metabolic equivalents (METs), while in a sitting, reclining or lying posture. In general this means that any time a person is sitting or lying down, they are engaging in sedentary behavior. (SBRN)

<sup>1</sup> Deborah Rohm Young, Marie-France Hivert, Sofiya Alhassan, Sarah M. Camhi, Jane F. Ferguson, Peter T. Katzmarzyk, Cora E. Lewis, Neville Owen, Cynthia K. Perry, Juned Siddique, Celina M. Yong (2016). Sedentary Behavior and Cardiovascular Morbidity and Mortality. A Science Advisory From the American Heart Association.

<sup>2</sup> Woods CB, Tannehill D, Quinlan A, Moyna N & Walsh J (2010). Children's Sport Participation and Physical Activity Study (CSPPA). Research Report No 1. School of Health and Human Performance, Dublin City University and Irish Sports Council, Dublin, Ireland. <https://www4.dcu.ie/shhp/downloads/CSPPA.pdf>

<sup>3</sup> Report by the European Commission. Expert Group on. Health-enhancing physical activity. EU Work Plan for Sport 2014 – 2017. <http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetailDoc&id=19860&no=1>

<sup>4</sup> Overgaard, K. et al. (2012) Stillesiddende adfærd - en helbredsrisiko? (First ed., pp. 96).

<sup>5</sup> Diamond A. (2013) Executive functions. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4084861/>

<sup>6</sup> Åberg et al. (2009) Cardiovascular fitness is associated with cognition in young adulthood. Proceedings of the National Academy of Sciences.



Another study (by John Ratey, an Associate Clinical Professor of Psychiatry) substantiates that physical exercise immediately before a math test gives better performance results than several hours before a test. The study examined children who did an exercise before a test and compared the results with children who didn't do an exercise. The results show that short physical activity breaks improve learning processes and concentration.<sup>7</sup>

In conclusion, studies show that less time for academic learning in school, due to increased time for daily activity, does not decrease students' educational achievements. On the contrary, there is a positive relationship between physical activity and students' behavior in the classroom, their executive abilities, IQ, general school performance, mental function and wellbeing.

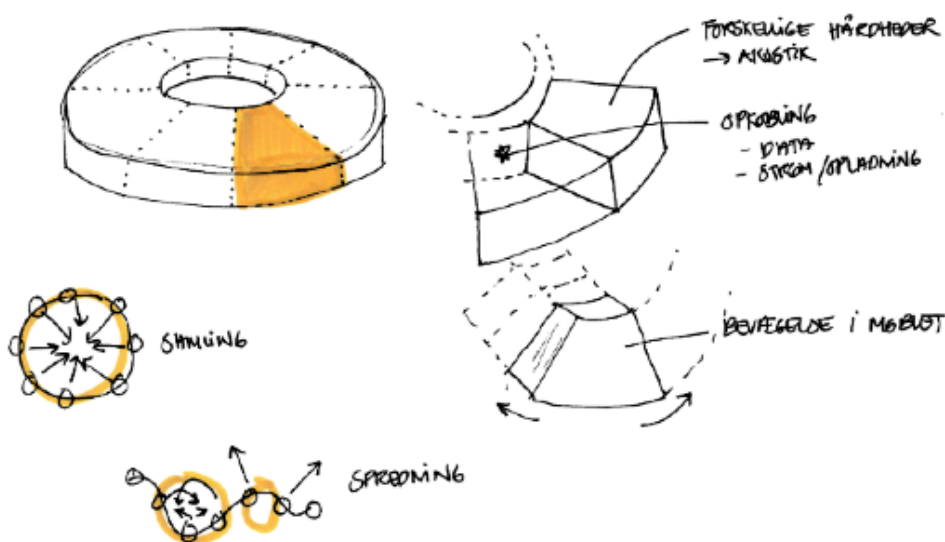
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Research into increasing physical movement in the classroom revealed that physical activities can be combined with cognitive challenges: to exercise students' brain as well as their body. This type of activity is called brain teasers and it is considered to be an intermediate step towards embodied learning, which is a type of learning in which we use our entire body to process information. In embodied learning, physical movement is linked to specific learning matters to support and promote the learning process.

**What is embodied learning?**  
 Embodied learning is an educational method that has been around for a while in (primary) education. In this method, one does not only offer an intellectual way of teaching, but also involve the whole body. (Waag Society, 2012)

## The birth of the iMO-LEARN solution

In conjunction with the Southern Denmark University, i3-Technologies searched for a solution to implement physical activity in classroom practices. They started with a circular bench that naturally engages students to move. The circle



was then divided into 24 separate units that can be integrated in any classroom setting without replacing the furniture. They dubbed it iMO-LEARN, a smart piece of furniture that gives students the opportunity to be physically active while learning.

You can work with every side of the iMO-LEARN. It's made of durable EPP (expanded polypropylene) which is highly damage-resistant. Its unique and lightweight shape promotes dynamic sitting and makes it easy to change the class

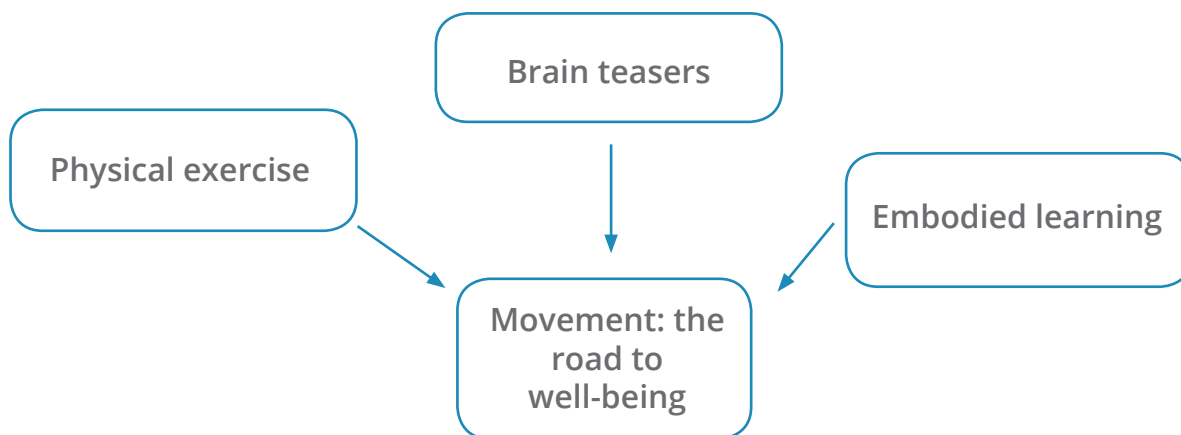
organization. Four configurations have been predefined: circle, semi-circle, dialog circle and duo chair.

<sup>7</sup> Ratey, J. & Hagerman E. (2013) Spark: The Revolutionary New Science of Exercise and the Brain. Little, Brown and Company; Reprint edition.

## Implementing iMO-LEARN in the classroom

There are many sides to iMO-LEARN. An intense co-creation process involving 100 pupils and 8 teachers showed that iMO-LEARN can be used for diverse movement activities such as physical exercises, brain teasers, embodied learning as well as various subject domains including mathematics, languages and balancing exercises.

i3-Technologies developed an activity manual with 100 basic exercises for teachers to use as a basis.



In addition to the activity manual, there is a set of 40 building activities to help students practice teamwork and spatial orientation. The set includes building constructions that students need to recreate while paying attention to the number of iMO-LEARNs and the position in order to build an identical construction.

iMO-LEARN can also be used for digital exercises in combination with a motion detection module. The module uses a Bluetooth connection to send movements to the online learning platform i3LEARNHUB.

Using the Quick Quiz module in i3LEARNHUB the teacher can create interactive quizzes. Students respond with the iMO-LEARN by using the iMO symbols or dots, which are linked to the responses. The system automatically detects the responses and the results are immediately displayed in i3LEARNHUB.

Last but not least, students can use the iMO-LEARN to solve interactive exercises in the i3LEARNHUB activity builder. The available activities include word finder, category sort, hangman, memory, image match, arrange and multiple choice. Students have to turn and move the iMO-LEARN while they collaborate to solve the exercises. The activity builder helps them develop language, literacy, mathematical, science and social skills in a playful, yet efficient way.



## Best practices & results

i3-Technologies has been testing the usability of the iMO-LEARN project in practice. For the past year, the company has been researching its added value in a number of schools and educational institutions.

One of those schools is De Bremberg, a school in Diest, Belgium, for preschool, elementary school children and adolescents with moderate to severe mental disability. The research provided a lot of information in the field of learning with a mental disability and it generated valuable feedback.

Teachers at De Bremberg said iMO-LEARN brings the different subjects into practice, making it easier for children to pick up the subject matter. It's a fact that children learn better and more efficiently when they are personally involved in the lessons. This is even more true for children with mental disabilities. By getting started with iMO-LEARN, they learn to work together to achieve a common goal, such as a solution to a math question or a building construction.

## Begin your journey

Introducing this ground-breaking solution to promote collaboration and get students more physically engaged in learning in 6 simple steps.

