

Facilitating children's sensorimotor* development in DEIS schools: relevance and recommendations

Appendix C

*The term *sensorimotor* is used here rather than *motor* to incorporate the influence of the senses. This includes the lesser known vestibular and proprioceptive senses, which identify different types of movement (O'Connor, 2016).



INTRODUCTION

Children's sensorimotor development in Ireland is particularly compromised in disadvantaged communities. A striking indicator of this is the fact that children from households with the lowest level of income are more than twice as likely to be obese (Walsh & Cullinan, 2015). Disadvantage is strongly associated with children spending more time on sedentary activities (Growing Up in Ireland, 2011). Access to safe outdoor play areas is often reduced, especially in disadvantaged urban communities (particularly where there is a higher level of violent crime). In seeking to promote the physical and mental wellbeing of children in disadvantaged areas, through addressing sensorimotor development, this paper is in line with the principles of *Better Outcomes, Brighter Futures: The National Policy Framework for Children and Young People 2014-2020* and *Get Ireland Active: National Physical Activity Plan*. Both these documents highlight DEIS schools as a route to improving outcomes for children. As well as the benefits of improved sensorimotor development related to physical health, this paper outlines others which are more directly related to successful school

participation. A number of key recommendations are highlighted, including a pilot study to identify best practice in meeting children's sensorimotor needs in DEIS schools.

PHYSICAL HEALTH

It is widely recognised that physical activity amongst children in Ireland is at an all-time low. Compared with official recommendations, 80% of Irish children are **insufficiently active** (Layte & McCrory, 2013). 26% of nine-year-olds are either **overweight or obese** (Growing Up in Ireland, 2011). As these figures are for the general population and (as previously stated) children in disadvantaged communities are more likely to be obese and inactive, it is clear that the figures for disadvantaged areas are even worse.

Lower income is also associated with an increased risk of **developmental coordination disorder** (Lingam, Hunt, Golding, Jongmans & Emond, 2009).

The figures above have grave implications for children's future **physical health**. As it is not happening naturally, adults need to facilitate physical activity amongst children. Many children in disadvantaged communities do not have access to safe outdoor spaces where they can be physically active at or near home. DEIS schools could play a vital role in changing these statistics.

SOCIAL, EMOTIONAL AND BEHAVIOURAL NEEDS

Figures from the Department of Children and Youth Affairs (2012, 2014) highlight serious **mental health** issues in relation to children in Ireland. Poverty related risks, substance abuse and parental stress leave children who are socioeconomically excluded at a higher risk of developing mental health problems (Costello & Lawler, 2014; Graham & Easterbrooks, 2000). Physical activity has a positive effect on mental health, acting against depression and anxiety (Ratey & Hagerman, 2008). As well as benefiting children in the short-term, establishing the habits necessary to attain and maintain physical fitness contributes to the prevention of mental health difficulties emerging in adolescence or later.

There is a higher rate of disruptive **behaviour** in DEIS schools, particularly in Urban Band 1 (Quail & Smyth, 2012). Increased physical fitness is associated with improved behaviour, evidenced by decreased levels of violence in schools (Ratey & Hagerman, 2008). Poor sensorimotor functioning can lead to children being overwhelmed by sensory overload in class (Ayres, 1989). This can lead to behaviours which (especially if they are not understood) can be very difficult to manage in a school environment. Strategies involving the use of appropriate movements during class can improve classroom behaviour (Mac Cobb, Fitzgerald, Lanigan-O'Keefe, Irwin & Mellerick, 2014).

Poor sensorimotor functioning negatively affects children's **social and emotional development**, which can lead to unintentional disruption at school for the individual and classmates (Ayres, 1989). Physical activity can positively contribute to the development of skills in this area (Sandford, Duncombe, Mason & Butler, 2015).

LEARNING

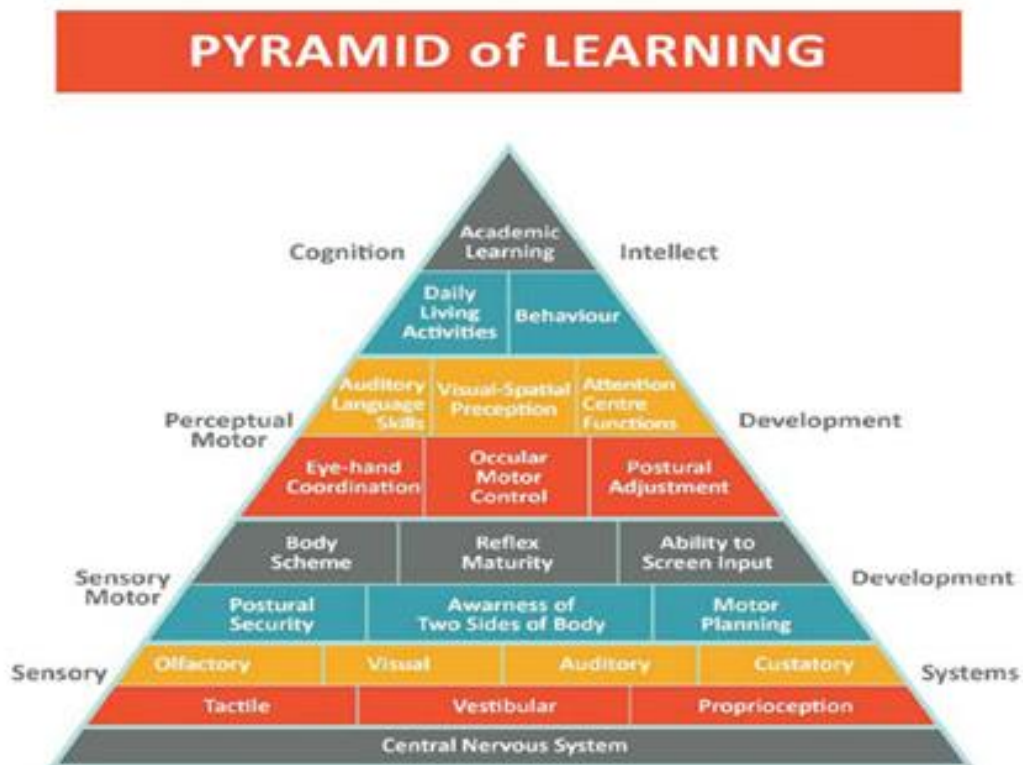


Figure 1. The Pyramid of Learning. Taylor and Trott, 1991, cited in and reprinted from *How does your engine run?* (p. 4) by M.S. Williams & S. Shellenberger 1994, Albuquerque NM USA: Therapy Works. Copyright 1991 by Taylor and Trott. Permission granted for reprinting for educational purposes.

Brain development is strongly influenced by the type or lack of childhood physical activity (Schaff & Millar, 2005). As represented in Figure 1, all learning is dependent on the prior development of the necessary sensorimotor skills (Williams & Shellenberger, 1994). Up to relatively recently, children in Ireland automatically played in ways that promote the sensorimotor development on which cognitive skills are based. Problems such as homelessness and cultural changes in the way children play means that such movement opportunities are no longer automatically part of many socio-economically excluded children's experience.

Physical activity can improve children's ability to **pay attention** in class (Ratey & Hagerman, 2008). Self-regulation skills developed through physical activity allow children attend to academic learning (Williams & Shellenberger, 1994) and enable socioeconomically excluded children develop resilience leading to good educational outcomes (Better Outcomes, Brighter Futures, 2014). Increased physical fitness has been shown to improve **academic performance** (Sattelmair & Ratey, 2009).

The precise movements required for **handwriting** depend on the prior development of the muscles of the trunk, shoulder and upper arm (Myers, 1995). These are developed through physical activity, including floor play. Starting to teach handwriting before these foundation skills have been sufficiently developed can cause long-term handwriting difficulties.

RECOMMENDATIONS

Recommendation	Actions to be taken
Funding	<p>The recommendations below require a certain investment of resources. When considering costs involved, a comprehensive cost-benefit analysis should be carried out. Money spent towards increasing physical activity would be an investment, as evidenced by an Australian study (as cited in Get Ireland Active, 2016, p.9). This found that if Australian people became more active for just 30 minutes per day, it could save AUS\$1.5 billion (€815 million) a year in health costs.</p>
Urgently address schools' "no running" policies	<p>Many DEIS schools do not allow running in the schoolyard. This is a major obstacle to physically active play. It is recommended that the concerns leading schools to implement this policy would be addressed at a governmental level, for example, by issuing relevant health and safety guidelines. For schools with limited space, this might involve staggered breaktimes. For schools with green space available, this might involve slippers being worn inside. Fears that schoolyard surfaces are unsafe need to be investigated. Where this is found to be the case, it is recommended that financial aid would be provided to change to a more suitable surface (please refer to the development of schoolyards below). Fears of litigation should be considered, resulting either in schools being reassured or in relevant laws being amended.</p>
Occupational therapists collaborating with teachers in schools	<p>Time should be allocated for occupational therapists (OTs) to collaborate with teachers in schools (see pilot study below). The OTs should have a role in working with teachers on a whole-school, preventative level, as well as in supporting teachers in providing for the school-based needs of pupils with specific sensorimotor difficulties. (Children who require clinic-based occupational therapy, perhaps due to the need for access to specialised equipment, should also receive that service.) A collaborative, school-based approach has been shown to be successful (McWilliams & Scott, 2003; Missuna et al., 2012).</p>
Education of stakeholders on sensorimotor needs	<ul style="list-style-type: none"> The role of sensorimotor development in children's learning should be included in teachers' undergraduate and postgraduate education, as well as in training offered by the teachers' professional development service (PDST). Education and training should include methods to promote the integration of learning in the workplace, for example, alternating training with a period of work (Pastré, 2011). Training without explicit measures to integrate work and learning are associated with a poor rate of transfer to the workplace

	<ul style="list-style-type: none"> • Those involved in school/teacher evaluation should be provided with education on how to meet pupils' sensorimotor needs in a school environment • There should be communication with parents on the links between physical activity, play and learning.
Expansion of SPHE to include sensorimotor strategies for self-regulation	<p>Instruction on the use of sensorimotor strategies for self-regulation should be included in the Social, Personal and Health Education (SPHE) curriculum. This requires an increase in the time allocated to SPHE. This subject is a priority in DEIS schools, where there is often a high prevalence of emotional and behavioural difficulties (Quail & Smyth, 2012). The allocation of extra time (necessarily coming from another subject) is considered to be warranted, given that it is impossible for a child to learn while dysregulated. This type of instruction has been shown to have a positive impact (Mac Cobb et al., 2014).</p>
Physical Education review	<p>Time allocated to Physical Education during the week should be increased, as the current level of an hour per week in primary school is far below the European average (McGuire, 2014).</p> <p>In approximately half of schools, PE is currently cancelled if it rains due to lack of a suitable indoor space (McGuire, 2014). This situation needs to be investigated and addressed. If funding was to be provided to build indoor facilities, they would also allow physical activity during rainy breaktimes.</p> <p>The delivery of Physical Education should be reviewed to ensure that cardiovascular fitness and developmental skills are emphasised, rather than sports skills (Ratey & Hagerman, 2008). Children's progress should be measured rather than their skills, to motivate those who are less skilled.</p> <p>The language/terms in the PE curriculum should be reviewed to include the term sensorimotor development.</p>
Integration of physical activity into class	<p>Effective, frequent movement should be integrated into the classroom to enhance learning. Where possible, learning should be combined with movement. Particularly in junior classes, movement can be integrated as an effective transitioning strategy between lessons as well as being incorporated into all lessons.</p>
Allocation of appropriate time to physical activity throughout the school day	<p>Adequate time should be allocated in the school day to allow teachers to implement the recommended increase in pupils' physical activity. This may have to come from other subjects (where it cannot be integrated with them), in recognition that academic performance is positively affected by physical activity and dependent on good sensorimotor development.</p>

<p>Development of schoolyards into sensorimotor-rich environments</p>	<p>DEIS funding should target the development of green playgrounds (based on the natural environment rather than manufactured equipment) in DEIS schoolyards, to allow play in environments rich in sensorimotor opportunities. Strong evidence reveals the superiority of this type of playground to traditional playgrounds for the child’s holistic development (Fjørtoft, 2004; Kerrins, Fahey & Greene, 2011; Barron, 2013; Frost, 2012; Gray, 2011; Coolahan, Mendez, Fantuzzo, and McDermott, 2000; Wood, 1988; Brown & Vaughan, 2009; Howard and Alderson, 2011; Sandford, Duncombe, Mason & Butler, 2015; Lindholm, 1995; Taylor, Kuo & Sullivan, 2001; Carr & Luken, 2014). This type of playground meets universal children's needs and would be a powerful resource for children with difficulties such as ADHD (Taylor, Kuo & Sullivan, 2001; Kaplan, 1995). Structural indicators should guide the development of these playgrounds to ensure quality of play provision. As schools are generally within walking distance for many children in areas of socioeconomic exclusion, these playgrounds should be accessible to the community outside of school hours with correct security systems in place.</p>
<p>Monitoring progress in addressing sensorimotor needs</p>	<p>Physical Education and the general level of physical activity should be included as part of the Whole School Evaluation. Handwriting progress should be monitored and explicitly linked to Physical Education goals and attainments.</p>
<p>Preschool guidelines on sensorimotor needs</p>	<p>Early years are fundamental in developing the sensorimotor skills needed to succeed in junior primary and all the way through school. Governmental guidelines should be provided to preschools, to address the sensorimotor needs and progress of children at this critical period of development. These guidelines should be available to parents, to allow them to make more informed choices regarding preschools.</p>

PROPOSED PILOT STUDY

Pilot Study

The research study proposed below should be carried out by a pair or small team of teachers and OTs. The involvement of both disciplines is considered essential, in order ensure the required expertise. Any OTs involved should have adequate postgraduate education in sensory processing. The research process should be as follows:

Phase 1

1. Review the international research to gain insights into good practice for addressing sensorimotor needs in primary schools.
2. Devise a complete sensorimotor programme for the junior cycle of DEIS primary schools, including a toolkit of specific guidelines and activities for primary teachers to implement, in order to address pupils' sensorimotor needs. This should be in accordance with the relevant recommendations listed above.
3. Identify how progress and outcomes will be monitored.
4. Liaise with DEIS primary schools to identify a small number (perhaps three) that would be willing to trial the sensorimotor toolkit with the junior pupils (up to and including second class).
5. Time should be allocated for the school staff involved to receive training in the sensorimotor programme rationale and guidelines.
6. An OT should collaborate in the schools on the implementation of the guidelines. The OT should have access to professional supervision and should liaise with other relevant professions as needed, for example, health professionals and educational psychologists.
7. The research approach should be collaborative, with a feedback loop whereby the guidelines can be modified by the research team to address issues raised by school staff.
8. The process of trial, review and modification should be repeated as necessary (within a set time limit).
9. Results of study should be reviewed. If successful, Phase 2 (see below) should be implemented.

Phase 2

1. The sensorimotor programme should be implemented with the junior classes of a larger number of DEIS primary schools, including in-school collaboration with OTs.
2. It should be reviewed and adjusted as necessary.
3. The final programme should become part of the curriculum for all DEIS primary schools in Ireland.

At a later date, similar studies should be carried out first for the senior classes of DEIS primary schools, and then for post-primary DEIS schools.

SUMMARY

Irish children are less active than ever before, particularly in disadvantaged areas. Children's sensorimotor development is negatively affected by insufficient physical activity. By **addressing sensorimotor needs in DEIS schools**, research indicates that there would be a positive impact on children's:

- Physical health
- Social, emotional and behavioural needs
- Learning capacity

This can be done through:

- Urgently addressing schools' "no running" policies
- Occupational therapists collaborating with teachers in schools
- Education of stakeholders on sensorimotor needs
- Expansion of SPHE to include sensorimotor strategies for self-regulation
- Play-based physical activity during breaktime
- Physical Education review
- Integration of physical activity into class
- Allocation of appropriate time to physical activity throughout the school day
- Development of schoolyards into sensorimotor-rich environments
- Monitoring progress in addressing sensorimotor needs
- Preschool guidelines on sensorimotor needs

A pilot study is proposed to identify best practice, to be carried out by teachers and occupational therapists. A detailed sensorimotor programme is to be developed for the junior classes of DEIS primary schools. Occupational therapists in schools are to collaborate with teachers to implement the programme.

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