

**Sport Wales
PESS and PLPS Case Study**

Deeper Learning:

***'Applying knowledge in the
physical environment'
A flipped learning
approach***

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Deeper Learning

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Key Points

- *Deeper learning maps the progress of learners applying numeracy and ICT skills in the physical environment to improve their academic attainment in multiple subject areas.*
- *Engaging subject leads in cross-departmental work effectively provided learners with the opportunity to apply and enhance other subject knowledge in PE practical sessions.*
- *This case study highlights how physical education can be effectively used as a cross curricular planning, development and assessment tool to heighten engagement in learning and improve academic achievement.*

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Context

Physical literacy is a holistic concept which can be described as the 'motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life.' (Whitehead, 2014). A growing body of evidence strongly suggests that physical literacy not only allows children and young people to fulfil their physical potential, but also improves attention, concentration, engagement and on-task behaviour. This ensures children and young people are 'available to learn' and have the potential to achieve better outcomes through physical, cognitive and affective development. Physical literacy is unique to each individual and considered fundamental for a child and young person's health and wellbeing as well as playing a key role in facilitating academic achievement.

In 2000 a Welsh task force outlined a number of key actions required to improve standards of PE across Wales. As a result the PE and School Sport (PESS) Programme was set up and managed by Sport Wales (funded by the Welsh Government in 2001) and continued until 2014. The primary aim for the programme was to ensure that 'every young person is challenged and supported in PE and school sport'. PESS focused on up skilling the practitioners. High quality provision across curricular, extracurricular and community activity helps to engage children and young people, providing them with positive activity experiences and the skills, confidence and motivation to be 'hooked on sport' for life. The PESS project has developed a suite of professional development courses and resources to support practitioners working with 3 to 19-year-olds (Foundation Phase to Key Stage 4 and above).

Delivery was managed and supported by expert regional consortia teams with an understanding of physical literacy and the ways in which it can be achieved and improved through the curriculum and the wider community. PESS interventions investigated the potential value of using the physical to create and enhance meaningful learning and improve academic achievement through movement. This approach allowed for the creation and development of bespoke, holistic and child-centred interventions driven by need (as opposed to a 'one-size fits all' approach). Dragon Multi-Skills and Play to Learn developed wide reaching and extensive activities which were used as facilitative vehicles, accepting that the stage of development was more important than age.

The bespoke evolutionary nature of PESS has provided an excellent foundation for the new Physical Literacy Programme for Schools (PLPS). The primary focus of PLPS is to create engaging opportunities that meet the needs of every child, helping them to fulfil their full potential.

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Context (Cont.....)

In conjunction with the PLPS a newly developed Physical Literacy Framework (PLF) will provide practitioners with clear expectations that will help track the progress of every child along their physical literacy journey. The implementation of the PLF across Wales will raise the importance of developing a physically literate nation. However, the need to independently collate, review, analyse and evaluate the PESS evidence base and the introductory phase of the PLPS in raising standards across physical literacy, academic achievement and whole school outcomes is paramount.

SPEAR

In October 2014, the Centre for Sport, Physical Education and Activity Research (SPEAR) at Canterbury Christ Church University was commissioned by Sport Wales to independently review the evidence base for the Physical Education and School Sport Programme (PESS), the Physical Literacy Programme for Schools (PLPS) and the Physical Literacy Framework (PLF). Part of this independent review involves the collation, review, selection, secondary analysis and innovative presentation of case studies evidencing and sharing a range of best practice across PESS and PLPS initiatives. As such, the narrative and analysis of this case study has been conducted by SPEAR with the resources provided by Sport Wales. Consent to identify children, adults and organisations within this case study has been granted.

SPEAR is a cross school and cross faculty research centre at Canterbury Christ Church University established to bring together expertise across and outside the university and to facilitate collaborative working. In particular, SPEAR brings together expertise in Sport and Exercise Science, Physical Education, Education, Health and Tourism and Leisure. SPEAR's research has helped guide and inform public policy to increase physical activity and sport participation among young people by identifying the processes most successful in increasing participation. It has provided a rationale for government investment, contributed to the wider evidence base used by policy makers, and steered programme improvements that enhance physical activity opportunities and experiences.

More details on SPEAR and its work can be found at:

www.canterbury.ac.uk/SPEAR

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‘Applying knowledge in the physical environment’ A flipped learning approach

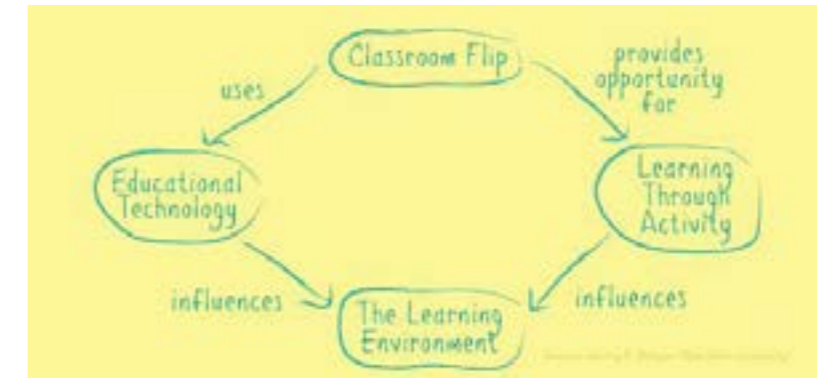
Profile

There is a growing body of research supporting the association of physical activity (school based and non-school based) and academic performance among school aged learners (Rasberry et al. 2011; Trudeau and Shephard, 2010). The impact occurs through a variety of direct and indirect physiological, cognitive, emotional and learning mechanisms (Rasberry et al. 2011). Children and young people who are physically fit perform better at attentional tasks that require greater amounts of cognitive control. This includes a subset of goal directed, self-regulatory processes such as planning, organisation, abstract problem solving, working memory, motor control and inhibitory control (Donnelly and Lambourne, 2011). However, schools may unintentionally promote a sedentary lifestyle; children and young people spend much of their academic day sitting down and schools face increasing pressure to focus on subjects such as maths, english and science. The association between physical activity and academic achievement provides an opportunity to create innovative programmes that improve both academic performance and health outcomes. For example the Physical Activity Across the Curriculum (PAAC) project in America successfully used physical activity in a variety of academic areas including maths, language, spelling, arts, history, science and health. The PAAC project found that physically active academic lessons are cost effective, do not require additional teacher preparation time, are enjoyable for both the learner and teacher and result in improved academic achievement and improved health outcomes.

The concept of bringing physical activity into traditional lessons, ‘flipped learning’, embraces the underpinning principles of the Physical Literacy Framework developed through the PESS programme . Resources, tools and training opportunities provided through PESS facilitated the use of physical development as a cross curricular planning, development and assessment tool. Using physical education to bring the ‘physical’ into the ‘traditional’ learning environment provided a valuable opportunity to involve children and young people in their learning journeys and enhance their outcomes.

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Profile (Cont.....)



The flipped learning approach; applying knowledge in a physical environment

Maesteg Comprehensive wanted to investigate whether the application of numeracy skills (specifically tally, frequencies and percentages) and ICT skills within PE lessons would contribute to increased understanding and attainment in both maths and PE. This case study follows the ‘flipped learning’ journey of Maesteg Comprehensive School using physical education as a vehicle to better understand numeracy at Key Stage 3.

The Challenge: What was the problem?

Maesteg Comprehensive School completed an action research intervention to investigate whether the use of statistics in PE could provide a personalised learning experience that improved academic performance in maths and PE (and to some extent ICT). The school aimed to understand whether applying the learners’ knowledge and understanding of ‘tally’, ‘frequencies’ and ‘percentages’ gained from maths lessons to ‘real life’ scenarios in PE would enhance learners’ understanding of the collection and use of data. The secondary aim was to introduce ICT to support the numerical learning. The idea of a ‘flipped classroom’ was used to plan and introduce cross curricular activity and embed an innovative and unique learning opportunity for learners at Key Stage 3. Fundamentally Maesteg Comprehensive wanted to examine the extent to which the concepts of physical literacy and ‘flipped learning’ could personalise the learning journey, with the aid of improved ICT opportunities, to improve outcomes in PE and numeracy.

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The Challenge: What was the problem? (Cont.....)

The specific Outcomes to Action Research were as follows:

1. Improved theoretical understanding of tally, frequency and percentages demonstrated in pre and post test results.
2. Improved application of numerical skills demonstrated in practical lessons.
3. Improved confidence demonstrated in applying numeracy skills in non-maths setting. Learners to apply knowledge and skills to a new situation.
4. Improved cross curricular links to embed numeracy in PE.
5. Improved confidence through sharing good practice in PE faculty.

"Tell me and I will forget. Show me, and I may remember. Involve me, and I will understand" Confucius 450 BC.

The Intervention: What did they do?

The PE and ICT departments liaised with the Key Stage 3 numeracy co-ordinator to map the numeracy framework standards to PE and work with ICT to develop a series of mini videos aimed at reinforcing the skills of tally, frequencies and percentages. These videos were shown to the 23 learners involved in the intervention prior to the 'flipped learning' lesson with the aim of encouraging the learners to arrive at the lesson already 'switched on' to the numeracy focus/objective. The subsequent PE session (with a particular focus on basketball) then served to reinforce, refresh and apply prior learning. Pre intervention learners completed a baseline test on tally, frequency and percentages at the beginning of the basketball session. Learners also answered a separate questionnaire about their confidence to apply numeracy skills outside of a maths classroom. The test and questionnaire were undertaken again post intervention. Comparative data was explored to assess the impact of the personalised learning journey (using basketball passing and shooting) on the learners' numeracy skills and their confidence to use these skills outside of a maths context.



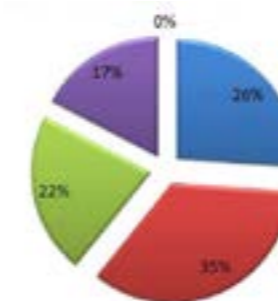
Examples of using numeracy and ICT to improve performance in basketball

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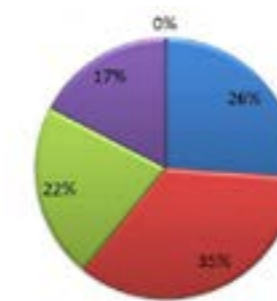
Impact: What changed for the young people?

Post intervention 61% of the learners believed that through the application of tally, frequency and percentages in PE (with the support of ICT) their numeracy skills had improved. Further, 61% of the learners enjoyed using numeracy in PE and believed that numeracy skills improved their passing skills within basketball sessions.

Q1. Using tally, frequency and percentages in PE has improved my numeracy skills



Q2. I have enjoyed using numeracy in PE



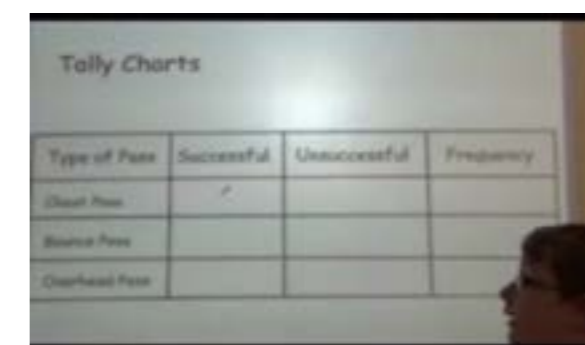
Q3. Using numeracy skills helped to improve passing skills in basketball



strongly agree agree not sure disagree strongly disagree

Post intervention graphs highlighting the views of learners on their improvements in numeracy and PE

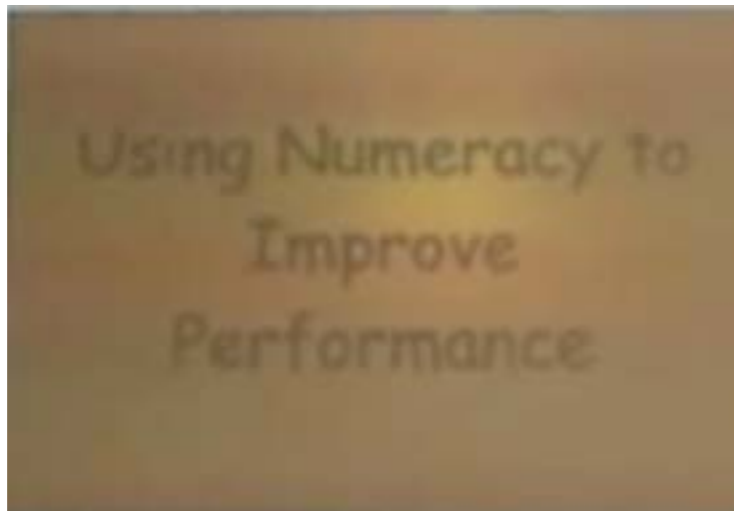
The comparison of pre and post intervention test scores showed a considerable increase in the learners understanding of the numeracy skills explored in the action research. Pre intervention the average pupil test mark was 3.2/8, rising to 5/8 post intervention. Two questions in the test involved specific calculations and analysis in a game related scenario, replicating the action research. 23% of pupils were able to answer these correctly pre intervention, rising to 52% after the action research.



Introducing tally charts through PE (click picture to play video)

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Impact: What changed for the Young people?



Introducing percentages through PE (click picture to play video)



Using numeracy skills through basketball (click picture to play video)



QR codes, iPads and numeracy in PE (click picture to play video)

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Impact: What changed Maesteg Comprehensive School?

Cross faculty and departmental working allowed schemes of work and cross curricular outcomes to be mapped across several subject areas. Maesteg Comprehensive created an effective 'flipped learning' environment using the theory learnt in maths and ICT and applying these skills in PE lessons. The application of knowledge gained within theory sessions to a new environment facilitated a greater understanding of the subject areas. This approach enabled teachers from three subject areas to work together to achieve their subject learning outcomes using a consistent message and teaching style. Maesteg Comprehensive School learners have improved their numeracy skills, their ability to apply these skills in a practical environment and their confidence to do so.

Sam McElroy
Using Numeracy to Improve Performance

Tally & Frequency Charts

Using the Tally system to record your results is faster than trying to write out words or figures all the time!

Skill: Passing Use the table below to record the success of a partners' passes

Player Name: Jack Lewis

Type of Pass	Successful	Unsuccessful	Frequency
Clear Pass	9	1	9
Blocked Pass	15	0	15
Overhead Pass	8	1	8

Using Numeracy to Improve Performance 2

Percentages

Using the data collected in your previous lesson we can see how successful each type of pass was. The success is measured as a PERCENTAGE %

75% Pass Success - Player A made 9 passes of which 6 were successful
50% Pass Success - Player B made 12 passes of which 6 were successful

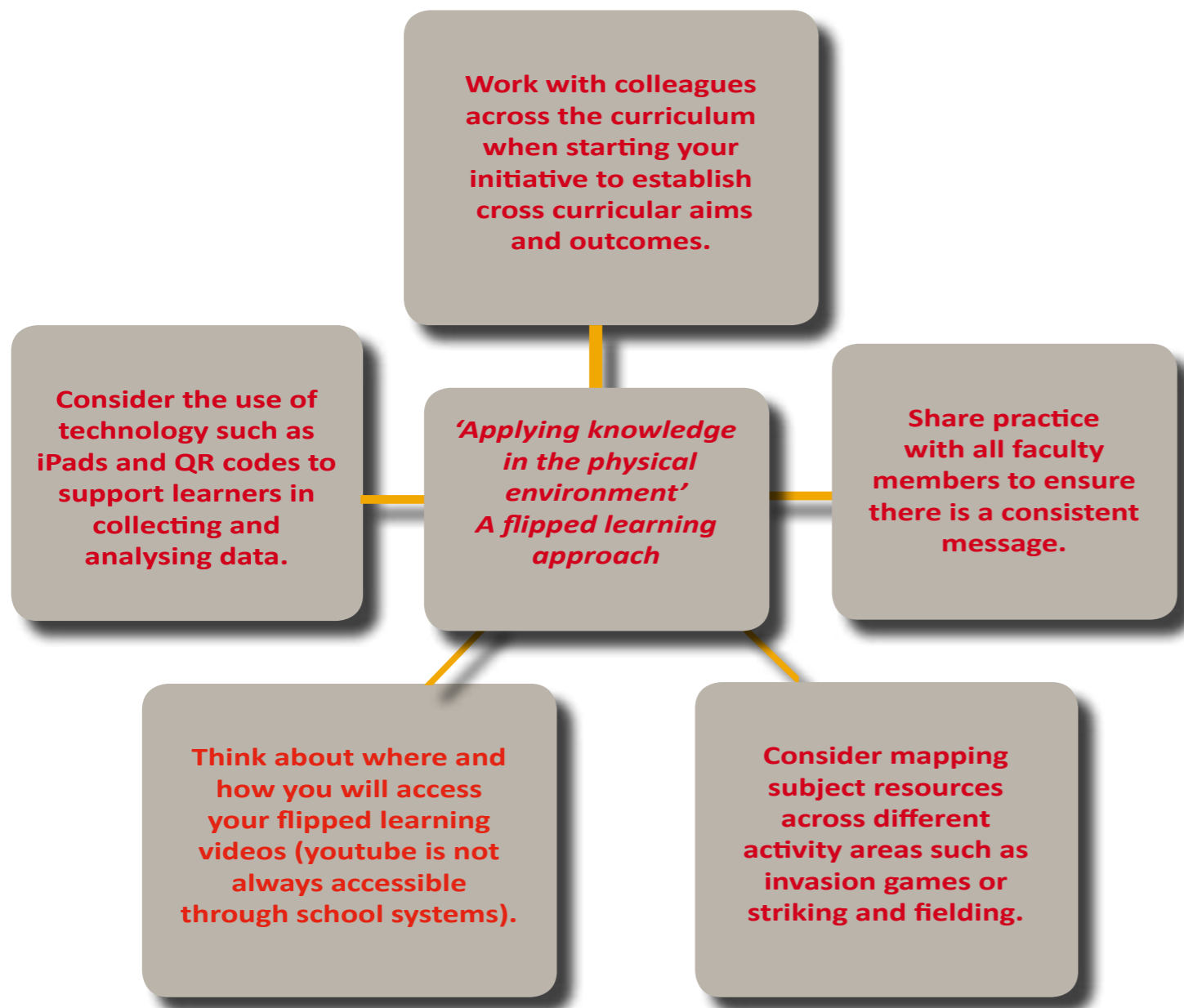
Type of Pass	Successful	Frequency	% Success
Clear Pass	6/9	9	66.6% to 1dp
Blocked Pass	15/15	15	100% to 1dp
Overhead Pass	8/9	8	88.8% to 1dp

Using a calculator to find your % success:
Number of successful passes ÷ Number of Passes (Frequency) × 100 = %
6 ÷ 9 × 100 = 66.6%

Example of the numeracy work produced by learners using a flipped learning approach

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Recommendations: Advice for schools and practitioners



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