



Old Problems: NEW Solutions

*USING THE PLAYGROUND AS A COST EFFECTIVE
PREVENTATIVE MEASURE TO REDUCE
CHILDHOOD OBESITY*



South West Essex

INDEPENDENTLY RESEARCHED BY:



Summary

Background: The study has been designed to provide indicators of change following installation of new playground facilities in all 163 schools in SW Essex PCT. Data were captured before playgrounds were installed (Dec/January) to provide baseline (before) data. Data were then captured after playgrounds were installed (June). Assessments of intervention effectiveness were based on comparing these before-after data, using standard statistical testing procedures.

Methods: The MAIN form of data capture was based on independent observers reporting on the playground behaviour of INDIVIDUAL children in 15 schools drawn to represent median enrolments in SW Essex schools (primary and secondary). In these same schools interviews with teachers and pupils assessed qualitative experiences of the new installations and any change they may have initiated.

As a subsidiary form of quantitative data, teachers from all schools were invited to provide their estimates of observations of playground behaviour of ALL CHILDREN in their class. Additionally, to provide corroboration, a simpler observation report document was forwarded to head teachers in all schools. Finally, in the schools volunteering for intensive observations of playground behaviour, interviews with teachers and pupils were undertaken before and after installation to assess subjective experiences of change and of implementing the new facilities within routines and habits.

Findings: the main finding is that independently observed children were more physically active following installation. Comparing before with after, teacher observations suggest that more than 1 in 7 children became more active after installation. This converts to four pupils/class who would have remained inactive but for the new installation. Teacher interviews, but not class observations, noted an important positive impact on activity types. Head teachers saw high 'physical' value in the new installation but also reported other important benefits for the climate of the whole school. The installations created a new energy for break times and encouraged more staff to spend time there, which itself may catalyse further engagement of children.

Playground access during the school day reaches almost every enrolled child, yet, schools have especially different practice regarding access to playgrounds before and after the school day begins. Untrained staff were often anxious about encouraging playground activities, especially that involving equipment. In contrast, training builds on 'whole school' commitments to physical activity and multi-skill development.

Summary: Within the limitations of response rates, the range of sources and different, robust and valid, methods shows that the installation has been associated with increased physical activity among active children. Further, more children were more highly engaged during playground time, including those who had previously been only lightly engaged. The full value of these findings emerges when contextualised to the growing concerns about rising obesity and declining physical activity among young people, especially females.

METHODOLOGY

QUANTITATIVE

Two elements generated quantitative data. The most important of these is the repeated observation of *individual pupils' playground behaviour* by independent observers. These data are aimed at showing how observed pupils' physical activity and general playground behaviour responded to new playground provision.

Schools were invited to participate according to their proximity to the enrolment median for their respective area within each of the three educational constituencies in the SW Essex PCT. Invitations, alternatively drawn from above and below the mode enrolment (based on figures provided in the SW Essex School Organisational Plan, 2007) were continued until a 10% sample of 163 schools was complete.

Two independent observers then attended each contributing school to observe different children's playground behaviour. Pupils were selected using a standardised system (SOCARP) to ensure impartiality both in pupil selection and recording of behaviour. Based on 10-minutes of dedicated observation (with 15 second bouts of recording), scoring was based on a well-validated schema, providing individual indicators of pupil activity level, the size of their social group, numbers of social interactions during break times.

The second, subservient, form of quantitative data was based on observational forms distributed to all schools. This approach was aimed at providing estimates of *numbers of pupils* involved in different playground activities. A one-page questionnaire was prepared for Head teachers, six A3 observational reporting forms for class teachers (in primary and junior schools; in secondary schools only two were provided) and four A4 sheets for midday supervisors. This was circulated to 163 schools in December (with a follow-up in February for those who had not yet had the new playground installed) and to all schools again in June 2009. As well as asking for numerical data, there were also opportunities to provide qualitative comments using open-ended sections.

To identify any impacts of the new playground provision, percentages (rather than actual numbers) of pupils attributed to the different engagement categories and activities were calculated and compared (Baseline vs Follow-up). Using percentages helps to overcome inconsistencies introduced by pupil absence and facilitates including all responses, including those where only one set of observations was returned.

QUALITATIVE

Interviews

Here the purpose was to investigate teachers' and pupils' perceptions of their play facilities prior to the introduction of the new equipment and then their perceptions after the new equipment had been installed and teachers trained. The initial phase of the research identified what activity and behaviour was prevalent in the schools prior to the installation and what teachers and pupils were hoping to gain from the development. Semi-structured interviews were aligned with the quantitative purpose of the study. These took place with pairs of teachers/teaching assistants in 16 schools (infants, primary and secondary) and with groups of up to 6 pupils across the 4 School Sport Partnerships in the area.

All interviews were recorded to enable in-depth analysis following data collection.

Before Installation:

- what activity pupils took part in:
 - before school, during break times and after school
- What supervision/structure was provided at these times
- What training/experience staff had to support activity at these times
- How different groups of pupils engaged in activity at these times
- What schools/staff were hoping to gain from the installation and the training.

Pupil interviews were carefully planned to for age suitability and appropriateness for phases of development. For infant and primary children this involved using drawings to help children explain their feelings and to create an environment in which they felt happy to talk. This approach follows established protocols drawn from prominent researchers and reports. Despite different interviewing styles interviews with, infants, primary and secondary school were designed to identify:

- How children spend break/playtime
- Who spends time with who at break/playtime
- How break/playtime could be made more fun
- How children felt about their existing play spaces
- What children would like to see in their play areas
- How the children felt the new facility would impact on play activities.

After Installation:

The follow-up interviews carried out once the new equipment had been installed and staff training was underway. Again, interviews involved pairs of teachers and groups of children. Interviews with the teachers/teaching assistants were designed to identify:

- Changes in activity types and levels
- Changes in behaviour
- Use of different areas/equipment (new and old)
- Staff involvement and influence over any change
 - School management of the facilities/equipment
 - Staff training
- The impact of new equipment on different groups of children
- Staff perception of the impact of the development
- Evaluation of the training and the resource

FINDINGS

Independent Observers

Fifteen schools provided access. Two observation periods are reported here; January 2009 and again approximately 6-months later (July 2009). A total of 348 child observation periods were recorded by three independent observers. Their

observations were distributed as follows; 114 in morning (32.8%), 211 in lunch time (n=2118, 62.8%) and two in afternoon (0.6%) breaks. There was an even gender spread among observed pupils (Males n=171, 49.2%; Females n=176, 51.8%). Observers averaged 3.7 reports/break period; the largest number of observations/break per observer was 8.

Table 1 shows that the magnitude of difference in observation (before implementation versus after) achieved statistical significance for 'Activity level' and for 'number of Adult supervisors'. In each case the follow-up data are higher, suggesting a positive effect of providing the new playground facilities. These effects are independent of group size or numbers of interactions.

Checking data quality

There was only one difference in scoring by the two main observers (contributing 92% of scores): average activity level reports differed by 0.23, $p < 0.01$.

Table 1. SOCARP: Baseline (January) versus Follow-up (July) differences

Variable (range)	Mean (SD)		Difference	P value
	Before installation	After installation		
Activity level (1-5)	3.64 (0.58)	3.79 (0.67)	+0.14	.05
Group size*	2.32 (0.60)	2.29 (0.52)	-0.02	n.s.
No of interactions†	2.30 (0.44)	2.38 (0.48)	+0.07	n.s.
Adult supervisors	2.39 (1.28)	3.72 (1.53)	+1.32	.001

*Refers to the size of the group in which observed pupils were engaged.

†Refers to number of social interactions reported during the observation

Teacher Observers

Baseline

Thirty-six schools (23% return rate, 148 teachers) provided completed baseline questionnaires. Observations spanned an average of 3.93 ($s=1.70$) school days, for a total of 507 days of teacher observation. This represented observations of 4212 pupils from class sizes averaging 27.05 ($SD=4.51$), with 44.5% female pupils ($n=1782$). Among respondents the average total break time in the school day was 66.77 ($s=20.26$) minutes. Teachers reported that only 203 of their pupils (i.e., <1%) could not participate in playground activities, indicating almost universal reach.

Table 1 shows important differences in the numbers of pupils teachers assigned to the three different intensity categories of playground activity. Roughly, these

proportions appear to double, starting with after school (15%), to before school (25%) to during school (59%). Expressed as percentages, 40.6% pupils were considered highly engaged at some point during the school day, compared to 34.5% for 'moderately' and 25.1% for 'lightly' engaged. Male:female ratios in high and moderate playground engagement routinely show consistently greater male involvement.

Table 2. Teachers observations: Pupils' levels of playground engagement at different periods

	N of pupils (row %)		
	Highly engaged	Moderately engaged	Lightly engaged
[n, column %]			
Before school	376	405	306
[1077, 25.6%]	(34.9%)	(37.6%)	(28.4%)
During school	994	867	627
[2488, 59.2%]	(39.9%)	(34.8%)	(25.2%)
After school	334	180	123
[637, 15.1%]	(52.4%)	(28.3%)	(19.3)
Total (female n)	1704 (637)	1452 (542)	1056 (489)

Total pupil reports may not match attributions to categories of activity engagement. These disparities may reflect pupils being occupied in other break time activities.

In relation to engagement using existing playground equipment, 102 teachers noted that the highly engaged pupils were using this equipment. This was lower for 'moderately' (n=69) and 'lightly' (n=27) involved pupils. Figure 1 shows the profile for the three levels of pupil engagement.

Teachers could endorse up to six positive options (excluding the 'Don't know' option) for playground activities that they saw pupils engage in. Teachers made 1284 endorsements of activity options for highly, moderately and lightly engaged pupils before, during and after school. Teachers averaged most endorsements for highly engaged pupils (n=412), especially for during the school day (2.73, SD=1.59). This compares to 1.99 (SD=1.46) for moderately and 1.21 (SD=1.21) for lightly engaged pupils.

Results show a distinctive profile of playground activity across the school day. Given balanced male:female class ratios, and almost universal capacity for involvement, the low involvement of females is problematic. The results are limited by the time dedicated to making these observations, the relatively low return rate and taking observations during a period of severe winter weather (January 2009). Only 43% of pupils were highly active, and these were dominated by boys, showing the wide potential for playground interventions to help more children to be regularly active.

Baseline vs Follow-up differences

Reports of follow-up observations were returned by 103 teachers (n=21 schools). Compared to Baseline there were no differences in the average class size, number of days contributing to the observations, or the number of girls in the classes.

Statistically significant differences were found in the follow-up data; these show a positive effect on more intensive engagement with a concurrent reduction in low levels of playground engagement. These are shown in table 3. Differences identified by changes in the girls' level of engagement do not explain the total level of change that was observed, which suggests that boys and girls responded equally to the new playground provision. Teachers' reports of the activities they saw children doing were tallied for each period in the school day and for each level of engagement. There were no differences in the respective tallies between before and after installation.

Table 3. Teacher observations: Percentages of pupils attributed to playground engagement categories.

Variable (%)	Mean (SD)		Change (vs Before)	P value
	Before	After		
Highly engaged pupils	54.43 (26.18)	69.15 (24.87)	14.7% increase	<.001
Moderately engaged pupils	27.82 (17.15)	23.36 (16.49)	No difference	n.s.
Lightly engaged pupils	17.25 (18.11)	6.89 (9.18)	10.3% decrease	<0001
Girls highly engaged	18.64 (17.16)	25.17 (16.32)	10.6% increase	<.01
Girls moderately engaged	15.76 (12.57)	14.39 (11.27)	No difference	n.s.
Girls lightly engaged	11.52 (12.44)	5.63 (7.49)	5.8% decrease	<.01

Other statistically significant differences ($P < 0.05$) were also found among teachers reporting follow-up observations. These were linked to the three levels of exposure to playground (PG) training (No PG training at my school [n=55], Other school staff have received PG training [n=49], I have received PG training [n=16]). Staff in schools with no exposure to PG training, reported more pupils as 'Lightly' engaged (a 7.78% difference) and more girls being 'Lightly' engaged (5.64) than staff whose colleagues had received training. Further, staff who had received PG training reported basing their reports on fewer days of observations (2.5 vs 4.4) than staff with no direct or indirect exposure to PG training.

Open-ended comments from teachers

Teachers provided a total of 95 written comments in follow-up reports. It was clear that teachers were positive about the new playground provision, with relatively few comments provided in the questionnaire (C2) 'What, if any, NEGATIVE pupil impact(s) have you noticed for children in your class?'. One comment related to training; 'Because of no training as yet, staff weren't able to help pupils and so interest waned as quickly as it was aroused'. Another saw problematic behaviour; 'Has caused some negative behaviour in that some children have been unable to share or take turns or have argued over equipment'. This same teacher had concerns about the quality of surface; '...weeds are growing through. Tarmac is not even with holes in it.' Negative impacts were also linked to pupils' over-exuberance, disagreements, fights and injury.

One teacher was concerned that children may require adult help to use the equipment and that this might not always be available. Other teachers commented about the orientation of equipment, 'faces away from playground making it so you cannot see the children', whereas another found benefits –presumably through reducing overcrowding in hotspots - in 'the children spread out more.' For others there were classroom effects 'Some children refuse to come off the apparatus at the end of break times'. This contrasted with a positive classroom effect expressed as 'More ready to learn when returned to class', 'A way to use unspent energy before settling back down to classroom activities. Children could then refocus', and 'Helps to reduce fidgeting during learning time. Increases their self confidence.'

In relation to 'surprising' pupil impacts (C3), there were positive comments about sociability; '...more collaborative play', '...encouraging each other', '...more team/group activities enhancing social skills', '(especially girls) who play with younger pupils who are not always siblings', 'The number of pupils'...how spontaneous they were' and 'Trying to play chess – fantastic!'. Others noted 'It was good to see children that are not usually active talking part in class games' and '...their self-esteem and confidence was definitely raised.'

Others valued the variety produced by the changes; '...more interaction between boys and girls', 'Children have more things to keep them active when not playing football', 'Children engaged and created games with the new equipment', 'Children enjoy challenging themselves on the trim trail – children who I did not consider to be physical', 'Children not previously engaged enjoyed the new facilities', 'Children are much more likely to be involved in positive activities' and '...my children, who all have speech and language difficulties, were integrating further with their mainstream counterparts.' Another teacher reported that her school was trying to optimise the activity potential; 'We are all aware and encourage physical activity in the playground'. Two teachers summarised their feelings by commenting; 'The children really enjoy them and it helps with keeping them active' and 'The playground is great. Thank you'.

Head teachers

Forty-five baseline reports were provided by head teachers, four from secondary schools. Table 5 shows head teacher estimates of current school performance and how playground play contributes to those variables. These five variables were drawn from the literature regarding the wider impact of playground provision and show that before the new installed were in place 'attitudes to learning' was most favourably rated, with playground play making the greatest contributions to PA involvement and PA attitudes.

Table 4 identifies the proportions of pupils currently estimated by head teachers to be involved with playground activities before during and after the school day. The final column shows aspirations for change; head teachers would like to double involvement before and after school involvement, while making almost a 20% increase in involvement during the school day.

Head teachers: Before versus after differences

Head teachers generated 24 full sets of responses after playgrounds had been installed. From these there were no differences in estimates of the activity they either reported seeing among their pupils or in their aspirations for the new installations. Table 4 shows the proportions of pupils identified as active at different times in the day. None of these scores differed statistically when compared to the equivalent baseline values.

Table 4. Headteacher assessments of pupil playground involvement and aims for change.

	Mean (SD)			
	Before estimate	After estimate	Before aim	After aim
Pupil involvement %				
Before school	12.88 (22.33)	22.42 (32.64)	23.87 (29.89)	24.86 (35.23)
During school	61.62 (36.34)	75.45 (31.16)	82.87 (29.49)	78.64 (34.23)
After school	11.74 (21.36)	18.50 (28.53)	21.43 (26.61)	21.43 (16.90)

Table 5 highlights scores for the current school performance and for the relative contributions of playground activity. Underlined items indicate statistically significant differences in follow-up scores for estimates of current school performance. Items in bold indicate statistically significant differences in the contribution attributed to playground play. Of 10 possible comparisons, eight achieved a higher score once the playgrounds had been installed.

Table 5. Head teachers' estimates of school performance and contributions of playground play.

	Before		After	
	Performance (1-100)	Play contribution (1-5)	Performance (1-100)	Play contribution (1-5)
Attitudes toward learning	69.69 (14.25)	3.76 (0.71)	76.19 (13.59)	4.64 (0.63)
Citizenship	70.16 (20.90)	3.76 (0.74)	81.10 (12.50)	4.36 (0.74)
Movement competence	<u>63.55</u> <u>(14.96)</u>	3.59 (0.69)	<u>72.38</u> <u>(9.95)</u>	4.36 (0.65)
PA involvement	<u>68.71</u> <u>(18.41)</u>	3.79 (0.81)	<u>80.95</u> <u>(13.39)</u>	4.71 (0.73)
PA attitudes	<u>67.66</u> <u>(14.42)</u>	3.76 (0.75)	<u>80.95</u> <u>(13.39)</u>	4.65 (0.74)

Heads provided fewer qualitative comments than other staff, although one ended his commentary 'I think the scheme is brilliant.' In contrast to the worries of some teachers, one headteacher reported 'fewer minor incidents' since the playground had been installed.

Qualitative interview outcomes

Evidence from the interviews across the observation schools suggests that the playgrounds have already had an impact on activity levels and there is the potential to raise participation rates amongst all age pupils through the development of appropriate facilities and the training of staff to work alongside the pupils.

Teachers feel that the new playground developments have had a significant impact on pupil activity levels and types. Following installation both children and staff believe that there is a higher level of activity and that the playgrounds have brought about greater levels of co-operation.

Teachers routinely reported a positive impact on the range of activities undertaken by primary aged children. Many now take part in different activities before during and after school, suggesting that children have been introduced to activities previously not available. This has allowed children to practice and master new skills. Early evidence from the interviews and from general observations suggest increased activity levels at play times and among a majority of pupils although there still needs to be greater attention paid to groups of non-participants. In secondary schools this appears to be an issues among older girls and those pupils who appear to have weight and fitness issues.

Schools where staff have thought carefully about the design and usage of the facilities have seen the most striking of changes. Previously inactive children were

now involved in a number of semi-active and active pursuits and mastering a number of cognitive challenges. Where schools have changed systems and identified appropriately trained staff to work alongside the children at break times there seems to have been the largest change in behaviour.

Both playgrounds *and* staff act as catalysts for change and appropriately trained staff with appropriate facilities can have an important positive impact on pupil perceptions of the value of activity and ultimately the amount of activity in which the children take part. Staff report a continued need for support that allows them to develop the activities and to ensure their knowledge and expertise in motivating pupils to be active and to help them to develop a range of physical skills which will prepare them for future active lives.

The importance of supporting resources for both children and staff will be essential at all stages of the project. Staff will need to be provided with resources which will help them develop the activities performed by the children and the resources will need to be made accessible to children who will develop the 'recommended' activities to suit their own particular needs. Children will take the use of the facilities beyond the expectations of us all if they are given the opportunities to explore and experiment for themselves.

The indications from this initial research would suggest a positive outcome for pupils suggests that the facility development and the training of staff can influence children's levels of activity, how children respond to each other and the development of a range of core physical skills.

Questionnaire data suggest that the potential of playground space both before and after school is not optimised. The low level of involvement with after school (versus before school) suggests that different influential processes may be operating.

The training of staff and whole school commitment to physical activity and multi-skill development as well as a focus on cross-curricular active learning will cement the impact of the facilities.

Discussion and Summary

To-date the project has generated two main lines of robust and triangulated evidence. The first, based on independent observers and on teacher observations of pupils in their classes, show not only more activity among individuals, but also, greater numbers of pupils engaging more fully during breaktimes. The second line of evidence is afforded by interviews (with school staff and children) and by open-ended commentaries provided by school observers. These data not only correspond to the broad direction of the observational data but also build on the local implantation issues. To bring together the different forms of data, the discussion is based on the RE-AIM framework, which was used to develop the research design.

Reach

Playground access during the school day **reaches** every enrolled child. Fewer than 1% of pupils were fundamentally unable to participate in activities.

Effectiveness

Comparing before with after installation, school staff observations suggest that more than 1 in 7 children became more active after the playgrounds were installed. Based on the follow-up sample of 1552 pupils in observed classes, this represents four more active pupils/class and 220 extra engaged pupils in these schools who responded with follow-up responses.

At a public health level, and in the context of declining PA involvement, this scale of change underlines one indicator of the value-for-money represented by this initiative. Of particular note is the positive change in girls' PA behaviour, despite lower baseline estimates (provided by class teachers). This substantial scale of behaviour change needs to be seen in the context of return on investment of £17K for primary/junior schools and £25K for secondary schools. The additional benefits identified by head teachers, in terms of overall school performance and contributions attributable to levels of playground activity among pupils is a further endorsement of the value of these installations.

When reports were provided by independent observers, those children who were observed were also identified as being more physically active. Importantly, the differences in numbers of pupils and in levels of activity engagement were found in both boys and girls. These differences were not associated with changes to pupils' group size or attributable to the number of their interactions during observation periods. In staff reports, neither were these differences associated with doing more types of activity. New installations revitalised interest in activities that some children were already doing. Many of the changes relate to the playground being seen differently; the new provision made the playground a more valuable and pleasing venue for most people in the school community.

Staff noted a wide array of benefits following the installation, and a number emphasised the beneficial effects on children who ordinarily had not been especially involved in any playground activities. These benefits may provide important motivational 'levers' when developing further training and staff development opportunities. Staff reported that there were more reasons to be in the playground, which made them more energetic environments. Although seasonal factors may have played a role here, staff were encouraged to report their observations based on days when using the playground was a reasonable option; this may have discounted days of especially bad weather, which made the winter reports more alike to those of the summer observations. It should be noted though, that just as winter may have dissuaded active engagement in playground activities, in summer the more active children may be drawn away from the playgrounds in favour of on-site playing fields (where they are available).

More specific benefits ranged from fewer children being regarded as 'Lightly' engaged (which corresponded with more children being regarded as 'Highly' engaged) and evidence of higher activity in randomly selected pupils. There were comments about children developing better motor skills, learning to play co-operatively and finding cognitive challenges in the newly available facilities.

Adoption

All schools with capacity for the new provision accepted it. Some teachers seemed reluctant about encouraging pupils, until they had received their own training, while others progressed irrespective of access to training. Where some school staff had been trained there was evidence that this had been cascaded to others, whereas in other schools this was not the case and low staff confidence prevailed. In the data that are available (from 148 teachers before the installation and from 103 after), a number of themes emerged. Independent observers noted that more staff were involved in break time 'supervision', which, in its own right may further amplify pupil involvement. The extent to which this reflects renewed interest in playground activity, better weather or a change in school policy regarding how staff are deployed during breaks is not clear.

Implementation

Implementation poses some interesting challenges. Notwithstanding the almost 100% reach of access to the new playground during the school day (and the substantial increases in the numbers of pupils who were more involved, but also the level of activity in those who were systematically observed), universality does not extend to before and after school access. Schools have especially different practice regarding opening before the school day begins. This may be due to 'staffing problems' as was reported by a number of teachers on their observation forms. At least one school has now taken steps to establish a playground rota among pupils' parents to ensure before school access to the playground. In these cases the playground is unifying at least some local parents and the school and is extending service to the community. Before school involvement seems more of an issue than after school involvement, which suggests different mechanisms of (dis)engagement may be operational.

In one school there were comments about adopting a 'whole school' approach to promoting PA on the playgrounds and the forms that this takes should be investigated. Another feature identified as important was access to training for school staff. One teacher noted that lack of awareness on the part of staff may mean that some children become discouraged from using specific items of equipment. Others noted that despite encouragement, some items of the new installation were 'never used' by pupils.

Maintenance

Maintenance provides some interesting challenges. While the data are limited to two observations (and these were made in the most contrasting seasonal periods), the important changes in behaviour reported here meet both Public Health and Educational objectives and policy drives. However, maintenance can be profoundly affected by immediate and negative experiences. Staff were often anxious about encouraging playground activities, especially that involving equipment. Uppermost in these negative concerns were injuries, but more commonly, concerns about disputes. Given this concern, it may be helpful to provide in-service training that enhances social skills. Staff were also keen that equipment was located where they could 'keep an eye on' pupils. For this reason, the location (and possible relocating)

of some items of playground provision may need to be considered. Qualitative data suggest that the greatest benefits (and fewest subsequent problems) were noted in schools where teachers' concerns were carefully addressed in the design stages.

More positive issues related to provision of on-going training. Although our data do not show important differences in the positive outcomes associated with training (probably due to only 16 of our follow-up teachers having had personal training in developing play on the new playgrounds), providing such training was a recurrent topic in interviews and in open-ended sections of observational reports. It will be helpful to look more closely about the value associated with training, since a negative use of attending in-service training is for 'box ticking.' Given that there were examples of older pupils showing younger pupils how to use the different elements of the new provision, some attention might also be given to delivering interventions to pupils within some form of peer leading. Training of staff builds upon a whole school commitment to physical activity and multi-skill development. Adding a focus on cross-curricular active learning will cement the positive impact of these new playground installations.

Limitations

As always it is important to appreciate limitations in the data. Regarding observational data, the baseline figures were drawn from a period where heavy snow predominated. Since all independent observations were arranged through the schools it is possible that an element of self-presentation has influenced pupil behaviour, and staff reporting of it, both for the before and the after installation periods. Prolonging the observation for two more periods (to December 2009) may help to reduce any such influences, although we cannot be sure that similar issues will not influence the independent observers. These further observations are also likely to overcome the 'novelty value effects' associated with any new installation.

Schools have different exposures and, therefore, accommodation, to the new provision. For example, with playground installation in January, observations in early July represent over five months of exposure. In contrast, later installation may have limited exposure to only two months.

Although we encouraged teachers to base their recordings on five days of observations, few met this standard; neither can we be sure how well they completed this task. Further, the response rate regarding teacher observations was disappointing, albeit that it was in line with response rates to other pencil-and-paper approaches in schools. Neither can we be certain that the same teachers provided before and after scores within the individual schools. Finally, the low response rate, especially at follow-up, risks over-emphasising data from enthusiasts. These features limit how far the data can be used to generalise across schools or teachers and justifies using these data to support the independent observational findings.

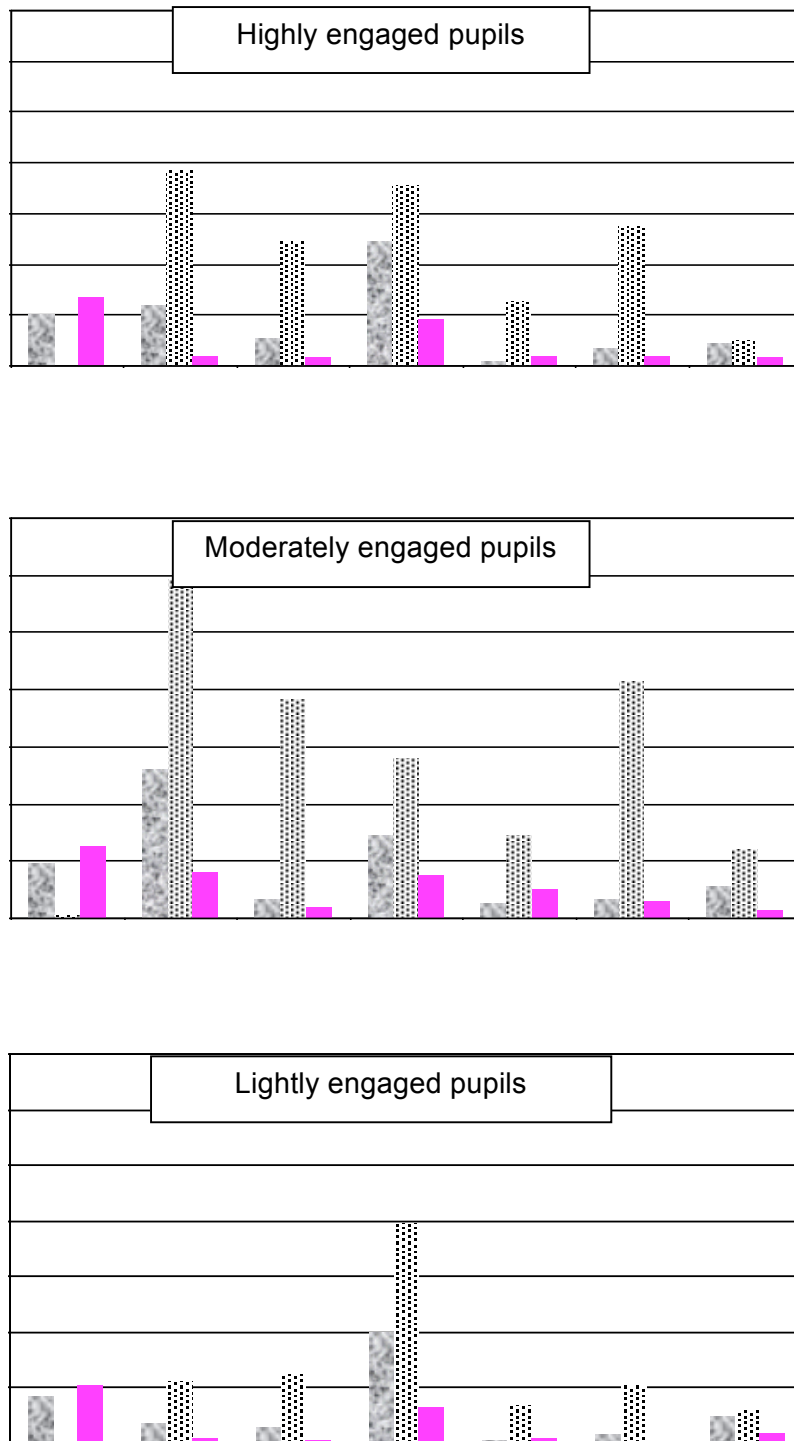


Figure 1. Activities endorsed by teachers for pupils at three different times in the day and for three levels of engagement.