

Block Play Project Report

The block play project ran across the spring term in 2024, starting in early January and with a final data collection meeting at the start of the summer term on 24th April. It was part of wider work within Dorset focussed on girls and maths. This project explored supporting block play with focus learners, all girls, aiming to have a positive impact on their interest in block play and a more long-term impact on their spatial skills.

Research reviewed for the project suggested that spatial play is important for developing spatial reasoning:

Our findings show that spatial play specifically is related to children's spatial reasoning skills," says psychological scientist and lead researcher Jamie Jirout of Rhodes College. "This is important because providing children with access to spatial play experiences could be a very easy way to boost spatial development, especially for children who typically have lower performance, such as **girls and children from lower-income households.**"

Playing With Puzzles and Blocks Could Build Children's Spatial Skills [Science Daily](#) January 28, 2015

Developing spatial skills has been found to also contribute to general maths achievement in early childhood (Hawes & Ansari, 2020; Gilligan et al., 2019; Verdine et al., 2014) and there is evidence that understanding of number relies on early interactions with objects and an understanding of physical space. *Giles et al (2018:1335)*

There is also evidence that girls and boys tend to engage differently with blocks:

In the absence of a carefully considered block program, when children do use blocks in free play, boys and girls may play differently: boys tend to choose block play more often and build taller, more complex structures than the girls, who, when they choose to play with blocks, tend to build flat environments used for sociodramatic play (Kersh, Casey, & Young 2008). These distinctions result in very different opportunities to develop spatial reasoning skills.

[Tepyllo Moss and Stephenson.pdf \(utoronto.ca\)](#)

The project therefore looked at setting challenges for the focus learners that involved using blocks to construct beyond flat environment. These were linked to four block-play trajectories from Tepyllo, Moss and Stephenson (2015):

- Patterning, Symmetry, and Intentionality
- Symbolism and Spatial Relations
- Architectural Features
- Composition and Decomposition

Participants were encouraged to invite their focus learners to engage frequently with the blocks, in different ways, daily where possible, and support engagement as follows:

- Provoke thinking. This was identified as taking place at two levels:
 - Micro – focus directed to the blocks (intrinsic).
 - Macro – focus directed to the structure (extrinsic)
- Construct alongside.
- Engage in sustained shared thinking about the structure.

Each participant was asked to choose three girls as their focus learners and for each of these learners to:

- Observe first engagement with the new blocks.
- Undertake a simple assessment:
 - Can you make something with these blocks and tell me about it?
 - Can you make something else with the blocks?
 - Can you build a house for...with a roof to keep them dry?
- Talk with parents about the project and carry out a short interview:
 - What sort of things do you have at home that X can build with?
 - What have you noticed about their interest in building things?
 - Could you spend ten minutes a week building something you have agreed to build and talk with them as you are doing this?
- Use the above to write an anonymised pen portrait with observations and reason for selection.

Structure of the project and engagement

All meetings were online to allow engagement from settings across Dorset.

Timing	Activity	Attendance
Early January	Meeting 1: half day launch exploring existing research on block play, introducing the blocks, related key ideas, and data collection on case studies.	52 people 46 settings
Between meetings 1 and 2	In settings: select three girls as focus learners, observe their mathematical behaviours and engagement with block play, talk with parents and complete a pen portrait of each child plus a simple assessment (see appendix 1)	
Late January	Meeting 2: half day meeting sharing observations, exploring important aspects of block play including how to introduce vocabulary/concepts during play, present a play challenge, and use structured activities and games.	62 people 49 settings (100%)
Up to February half term	Use block play challenges with focus girls over half a term.	
Late February	Meeting 3: one and a half hour meeting: share observations and consider how to set further challenges.	55 people 45 settings
Rest of spring term	Continue with a focus on block play with the focus learners for another half term. Re-assess and talk to parents again.	
Late April	Meeting 4: two hour meeting to share observations and complete end of study questionnaire and pen portraits of focus learners.	50 people 42 settings

Fifty-one settings were provided with a new set [Wooden Jumbo Blocks | Wooden Construction | TTS \(tts-group.co.uk\)](#) with mathematical relationships between the dimensions of the different blocks.

Sixty-two people from forty-nine of these settings attended at least one meeting, with all attended the second meeting. Of these, fifty-six people (90%) from forty-five of the settings (92%) attended at least three of the four sessions.

Session 3 data

During session 3, midway through the project, observations were collected via Jamboard:

What challenges have you set/used?

make an animal with them	a focus child now building rather than hording the blocks & filling bags with them.	adding other resources from the setting: Log, shapes with different length sides, grass squares....	a focus child is now able to focus for longer on the task & really struggled before to use her voice.	Can you make it taller, better, wider	can you make a building for your people	What could you add so we can identify that it's a garage	Used pictures of buildings and re-created them with the blocks	can you make a bridge over the river (blue scarf) for the dog to cross	We rolled a dice and the children chose that amount of blocks and built something
Can you make a house for your animal	Can you build the tower to make less wobbly?	will it be big enough for our character to fit in? (can you explore sizes)	can you copy me,	We used a ruler and found the numbers and built to that measurement, putting bricks on or taking off	Children had to copy what i had made	playing domino's standing them up and learning they need to be spaced out to work and them rolling a ball to knock the first one down so they all then follow	can you build a shelter for an animal	sort and name groups	Can you make another robot that is taller
Asking them to make something and see if the adult or friends can copy	Can you make a house	We made a house for the 3 little pigs (little soft toys) and realised it couldn't be blown down	Can you build zoo?	Can you build a house for the tiger?	Can you copy me	I've made models tall and flat to see them make it and copy	We made a house for the 3 little pigs (little soft toys) and realised it couldn't be blown down	Can you make it taller, longer, smaller	Rolling dice game
Billy Goats Gruff bridge	I find that my children added furniture and things themselves without me asking	asked them to make them in 2d and 3d	Photos of different buildings and challenge the children to make them	can you add furniture ie bed, chair	Can you copy the diagram?	copy your friend's model?	i made a model and hid it around a corner, the children went back and forth to try and replicate	can you build a farm	We set a challenge to build castles and extended and new language introducing turrets! The children loved this new word.
build a house for..... with a roof?	I've made some models & took photos & challenged them to create them.	our topic is red riding hood, so we built Grandmas house & a wolf den	Can you make a house, with a roof?	Can you build a tower	making a zoo, adding animals to the blocks	Can you make a castle for Princess and her dog	bricks out with trains, can you make some tunnels big enough for the train to fit through	Story 3 little pigs and then asked them to make a house	Can you fit the blocks onto the picture?
can you make a functioning roof?	we have used the dice and set the challenge of making different structures using the amount of bricks they rolled, we then observed and set different challenges of making it taller etc	added different small parts to the block area	big bricks, can you lay out a road you walk on	Bug hotels rolling on from our minibeast themes	Making models and getting the children to copy	they have really engaged with the builder/ copier game & creating their own ideas	can you build a tower		
make a farm for animals	each child chooses a brick to add on top a tower we are all building, we counted how tall it was each time and had a record for the tallest before it fell	copy model - 2D to 3D- transpose	Can you build your house	can you make the walls taller / stronger?	Can you only use 5 blocks and build me something	challenge - given them an object and said they needed to get it here to over here without it touching the floor as the floor is water	build a castle to keep out a dragon- can you add a roof? add a room?		
Making houses for little figures. One child made a house with a swimming pool.	make something that is special to them	What can you add to extend your building	build a bridge	Each child to make a house for a dragon, then make a trap for a dragon. Fill a template. Build a tower	Can you make a road for your cars	Making the structure taller - tree house, including a bridge to structure and building an enclosure for a bunny	I have taken pictures of the children and printed them out to Velcro on the blocks so that some are more intrigued to build with them as they are using small characters		
Can you create it taller	Can you make a rocket	Can you fit them in a box how many	make a seesaw	adding other resources from the setting: Log, shapes with different length sides, grass squares....	Made different sized homes for different animals	I've set challenges for them to complete at home and had photos sent in and then had them try to recreate their structures.	draw from a character's perspective		

What have you observed about engagement with and impact of these challenges:

helped EAL child	more 3d	challenge- amount of blocks so developing collaboration sharing and team work skills	Children compete with each other who make better one bigger one	the boys were wanting to get heavily involved with building	Focus learners feel special taking part in "block club"	able to slow down and look at the details of the brick positions when copying	one focus learner cant see past a tower still	ring leaders to peers setting challenges of what to build	storytelling	My focus learners are good at perspective
Increased engagement in wanting to play when didn't want to play with the blocks before.	children actively want to participate	More focused on building	parental involvement - working parents finding little time to do it at home	resilience has improved, engagement increased	Use of mathematic language	Interest not sustained as long if no small world people added	Girls are more now interested in blocks then before	linking to other areas of learning eg making planes	better at spotting patterns and getting other mathematical concepts	
All children not just learners really engaged and coming up with their own ideas of what to add or build	Children working together to make one big building	feedback from parents, they are playing with blocks at home which they wouldn't have before	More focussed now on building with all learners	Not just our focused learners that are interested and eager to create, but all of our children are getting more involved.	The children have loved acting out stories adding in block play s	Loads children showing interest in blocks	it has been difficult when your focused children haven't been engaged with the blocks as much	one learner has turned from avoider to loving bricks	Boys have tended to dominate block play, however by providing the girls with focused time just for them has really made a difference.	
Staying for long periods of time	Lots more maths language being used	The challenge it has presented for children exceeding the EYFS-	The confidence boost it has given to children with SEND to achieve the activity.	Anxiety child is more open up and happy to play	More interested to build with blocks they ask shall we build something	need encouragement to build at times. they aren't asking to play with them	working together with others more	choosing blocks more often independently in free play	Better positional language	
worked better together as a pair rather than by themselves	Has helped hugely with expressive language for some that are less vocal have been able to explain their creations more confidently.	one child built a tennis wall to add to a game outside, spontaneous	challenges, one focus learner is very capable and hasn't found it tricky	different sized animals, can you build different sized homes for them	they are communicating with each other on what they are building	becoming more creative	more language	better interaction skills with peers	our preschool now revolves around blocks, all areas they seek the blocks to add engagement	

What will you do next?

explain the mathematising language to ensure children know how to use it in their block play	Having built a bridge previously will move onto adding steps/way for the goats to get onto the bridge	get the children to draw a structure first before making it	printed sheets / outlines of symmetrical structures building upon transforming from 2D to 3D structures	we are going to enlarge our construction area so they have more space	discuss the shapes, how many sides and corners etc	Team work focus children working with other learners	more architectural features- discuss for more micro-macro language	Copying a photo	Photograph something can you copy this
done a lot of focus on enclosures, replicating real life structures around the world, constructing secret rooms, adding features within our structures - like to focus on symmetry	builder/copier	Copy from pictures	Extend building a house can you add a garden	Build a road with a bridge included a tunnel to go through	use certain number of bricks and see what they can make	get them to draw their build on paper & use the camera to take photos themselves to review & display for their friends to copy	use certain types of bricks	Compose in a different place	get the children to think and plan what they are going to build
start a block club- rather than in free play or just being able to with focus learners with my own key group	more internal building	build and copy	build a road - 2D	Builder/copier game	Build and copy	use photographs to support the building of structures or objects e.g castles, garages, mansions, churches, pyramids...links to planned texts and themes	larger construction area	Copy from a picture	Have more specific time with my focus learners in a group as well as 1:1
build and copy - print off pictures for them to copy - adult child copy working onto child child copy	copy from drawings/photos	copy from drawings	build and copy	build structures with higher levels of architecture such as a bridge for trains to go under.	builder - copy	copy a photo	build and copy	notice board to parent on the benefits of block play	start using cameras to display work
encourage the children to converse more while building	Block house compose next to it	design the building on paper before we build as a group	Use language and the children might copy the language	Think about the different 'trajectories' ensuring I am including them all	encourage them to make them from the other side of the room & use mind memory.	numbering bricks and asking them to use certain numbers to build with	Using a certain number of bricks	using a dice to win bricks to build with	Can you build a bridge to get from here to here
put shapes so they can tidy away by using shapes	build with different resources, cable drums, cardboard boxes, etc	expand our symmetry work, maybe use mirrors to extend the learning	Filling spaces/shapes with bricks.	Mirror a friends structure	We have been including their favourite small world toys and basing the structures around them	can we build something relating to our topic of the week	Focus on balance and symmetry which they have been doing make it more explicit/	Mirror other people's structures	Done a lot with enclosure and adding to structure eg bridge or driveway. Will focus on extending mathematical language and composition. Will also try builder copies
done some in each but keen to add more extensions eg tower with a room at the top, passage under etc	expand the challenges, have more depth to them	Ask the children to think of something and then build it.	use photos of real buildings to copy	Going to do more work on 'strengthening' our buildings	Create mini environments	Can you add a bridge,	Could you build another tower the same size using different bricks	Number the blocks and ask them to build with certain number blocks	Who's going to sleep in yours, a giraffe? it will need to be taller can they fit
How many can you fit in the room	enhance our block club to have more children and add to our routine	more symbolic with the younger 2 focus learners	speak more about what im doing as i build a complex structure	Mine not really interested in bridges so I think ill give them some animals and ask them to get somewhere to safety. Link with 3 Billy goats gruff	Can you add on a garage	encourage mini environments	tunnels for trains	explore more buildings eg 2 storey house	

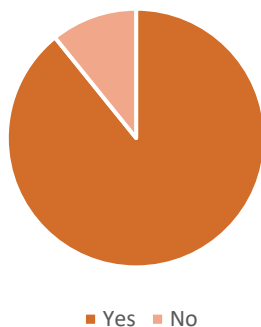
End of project data

Impact on settings and provision

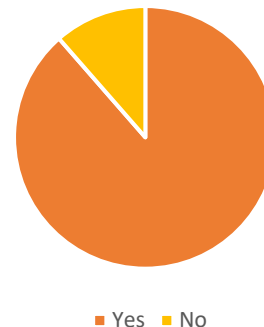
Data was collected via a simple questionnaire at the final meeting; the questionnaire was sent to those not attending the meeting. Thirty-seven people submitted completed questionnaires; data was received from 69% of settings that started the programme which was 76% of settings that attended at least three of four sessions. Eleven settings did not return any data.

The data revealed a positive change in approach to using block play across the settings.

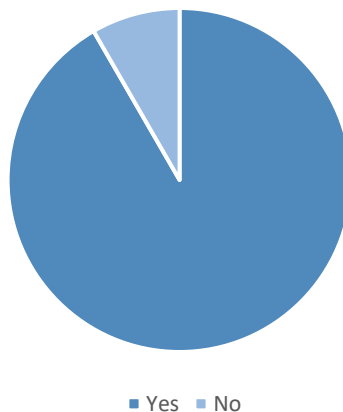
Q1: Have you changed anything about how blocks are accessed and used in your setting



Q5: Have you changed how you plan for the use of blocks in your setting?



Q2: Are there any challenges which you have used during the project, which you had not used before?



Each online sessions included ideas for different 'challenges' that might be useful to help focus, or initiate, children's engagement with the blocks. These challenges fell into five broad categories:

Category	Questions (see appendix a)	Average use
1. Matching/ sorting	(2a and b)	31
2. Imaginative	(2c and d)	36
3. Technical	(2e, f, g and h)	29.5
4. Copying an example	(2i1, 2i2 and j)	25.6
5. Copying 2d to 3d, or 3d to 2d	(2i3a, 2i3b, 2i4 and 2k)	16

The single most popular prompt used by practitioners was simply the imaginative ‘can you build a...?’ Here the teacher sometimes derived their suggestion from ongoing group activities or themes such as the story they were reading:

“we have made lots of castles for the toy princesses to live it and we have built bridges to use a prop alongside our billy goats gruff story sack”.

Often the ideas for these constructions would also emerge from small world play, *“...they use any small world characters to make homes.”* The use of small play to prompt building was another widely used imaginative prompt. These sorts of activities would draw on the more extrinsic qualities of the blocks as the learners created a range of structures by fitting and balancing the blocks together in contrast to the matching/ sorting activities – ‘sort the blocks’ or ‘match two blocks to another’ – which tended to focus more on the intrinsic properties of the blocks.

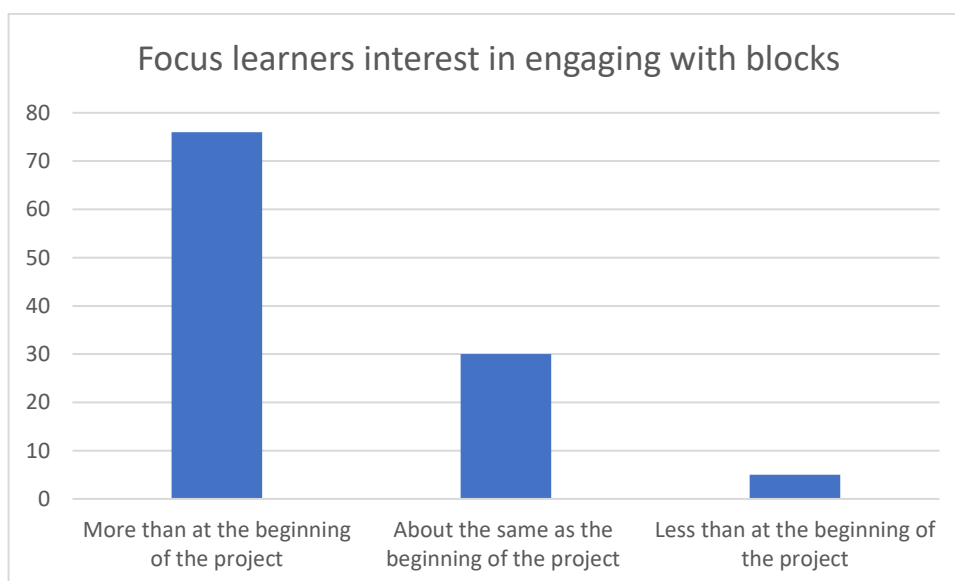
Of the technical challenges specifying the blocks for use – use ‘these blocks’, ‘any blocks’ and ‘all the blocks’ – was well taken up, as well as comparison. The challenge to create symmetrical constructions was the third least taken up challenge of all. This may have something to do with young children’s limited understanding of the terminology.

“Children used a lot more thought and asked lots more questions, they often asked for me to ‘show them’ some words they didn’t know the meaning (e.g symmetry)”

or the teachers’ lack of confidence in conveying the concept.

Copying an example was quite popular, especially if the example was directly in front of the learner whether that was copying the live construction of another in the builder/ copier challenge, or copying a model or finished structure. Copying an example from ‘across the room’ was not well used. Perhaps most interesting of all was how relatively sparsely copying from 2d to 3d or vice versa appeared on the responses with very few examples of children drawing their own structures, and not many more of working from a photo. The use of a template was reasonably popular, but probably more like working within 2 dimensions as the learners would lay their blocks on a flat template.

Impact on learners



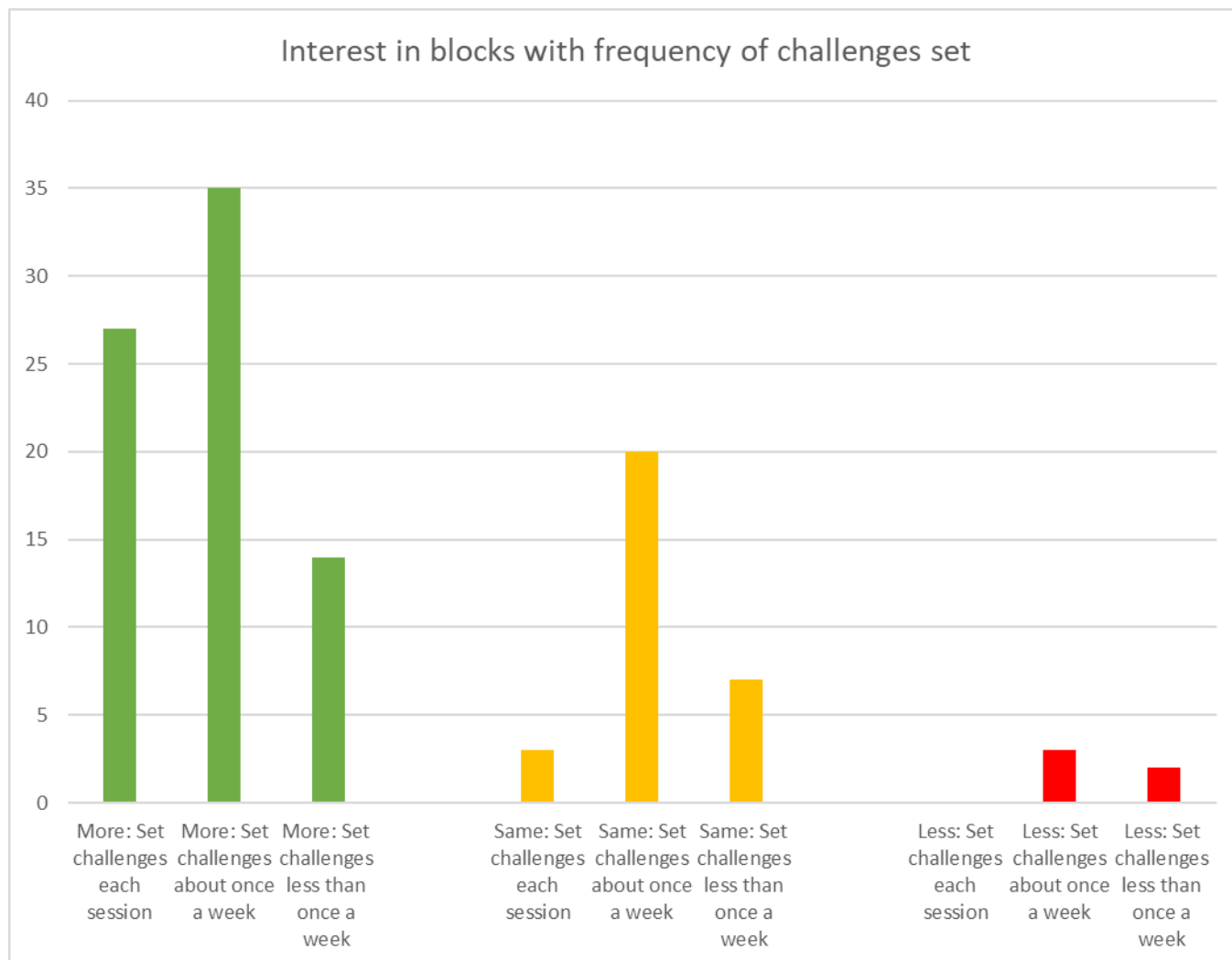
Participants were asked to explicitly engage their focus learners in block play using the challenges and ideas shared. 68% of the focus learners were more interested in engaging in block play at the end of the study compared with the start of the study. Observations about focus learners provided more detail about the changes, for example:

Start of project	End of project
Does not really play with blocks. Not interested	Interested straightaway. Focussed. Builds with purpose and concentration.
Never plays with blocks by choice	Builds towers. Very careful and pleased. Takes care of her buildings.
C+L bit behind, encourage single words and descriptive commenting. Will engage in short period of play with blocks in the setting.	Speech is much better she will sit and chat about what she's making and the blocks she has used. She likes to play with blocks more and builds more complicated structures.
Doesn't access the block play in setting, likes small world play, very outgoing and will engage with peers.	Will go over to the block area and play with the blocks more and will make more abstract structures and will play with the boys more.
Does not play with blocks often	Will follow the member of staff with the special box of blocks until they are put down and she can access them, she often chooses to play with the continuous play blocks and has started adding them into her every day play. She likes to involve others in her play and teaches them how to use the blocks or shows them ways they could use them in their play.
Doesn't often build	Eager to build, has grown in confidence to talk a lot more while she is building, not just about maths but in general.
Never shows a particular interest in blocks and doesn't choose to play with them.	A lot happier to interact and play; more of a development at home but even wants to get them out here.



Representing structures from the real world

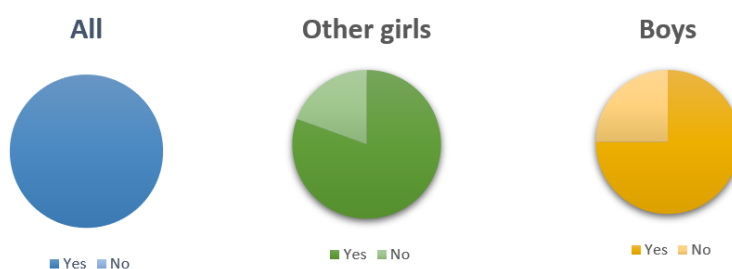
The change in interest was influenced by how frequently participants had explicitly set challenges for the learners with the blocks. Setting challenges more than once a week was more likely to result in an increase in interest whilst setting challenges less than once a week tended to have less impact. For the five children who showed less interest at the end of the study than at the beginning, three were set challenges about once a week and two less than once a week.



Ripple effect

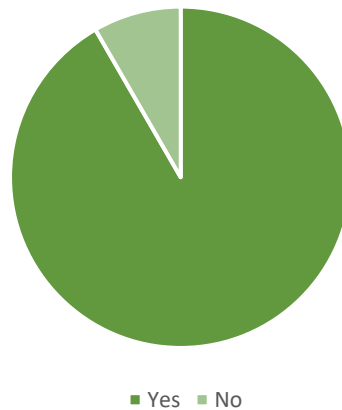
Whilst the focus of the project was on increasing interest in and engagement with block play for the focus girls, participants were asked to consider if there had been a wider impact. All participants noticed an impact on the interest of other learners in their setting:

Q 4b: Have you noticed any change in interest across the other children in your setting?



Linked to this wider impact was observation of collaboration within block play:

Q4: Have you noticed collaboration in block play in your setting?



Impact on participants

The feedback from the project elicited a range of responses on a number of aspects related to block play. Broadly speaking the responses to Q5b (*What are the key things you are taking away from this project? How has it had an impact on your thinking about the use of blocks?*) and Q5d (*Any other comments*) were overwhelmingly positive. Many participants referred to how much they had learned for themselves and how the project had changed their understanding of what block play might have to offer:

My perception of block play has been broadened with regard to practical ideas I can introduce to the children...I have a greater awareness of how children develop their structures.

I didn't think much about bricks before, I saw them as a simple construction activity, maybe for counting how tall you made it. It has completely changed my view. I know we will continue the block club we started as we can see the impact it is making in many ways.

Our children have loved it and have benefitted hugely, thank you for all the advice, ideas, and support!

Thank you so much for an interesting set of meetings which has made a positive impact on our children and a lasting change on how we view block play.

Many were surprised by how much their children could get out of block play. Although the whole programme was framed in a mathematical context the very nature of early years education is such that a well-executed mathematics intervention, for example, can have positive outcomes for learners beyond their mathematical development:

Children have found a new love for blocks play, which has inspired and influenced imagination, creativity, maths talk, language, confidence, turn taking and many other aspects of their development.

Blocks have always been one of my favourite toys but great to really think about how they are used and how to extend the play. It is great to be able to share things from this training with other staff to increase their enjoyment of blocks as well. The impact of skilful block play is clear to see and does not only improve mathematical thinking, but also communication and personal, social, and emotional development.

Children representing structures from the real world around them - this child's recreation of St Basil's Cathedral in Moscow was just wonderful and had to share!



Parental engagement

Parental engagement is widely thought to be an important factor in achieving the best outcomes for children in the early years, and beyond (EEF, 2024). As a relatively inexpensive way to boost outcomes for learners it certainly merits attention and was a deliberate part of the programme design for just that reason. At the design stage we considered that including an element of parental engagement could work quite well as the nature of block play was essentially non-threatening to parents and could easily be transferred from setting to home. Participants talked with parents of their focus learners to encourage engagement with block play at home. Some parents bought new blocks whilst others borrowed from the setting in order to support block play. At the end of the project, parents were asked to comment and feedback obtained was generally very positive:

They are playing with blocks at home which they wouldn't have before.

Built castles, bridges, beds for her barbies, stables for her horses, used them to make a number line. Once she gets going and into it her imagination really starts to come out. Will independently play with the blocks at home regularly.

Siblings are joining in too. Structures are being built all around the home and in the garden. Using everything and anything they can find to build (Lego, wood, pipes etc).

Very keen builder at home. Loves to make homes for her animal toys.

Block play is of huge interest at home. We use questions to ask (from pre-school). Started making things related to letters; A = aeroplane.

Has involved little brother and they work together.

G wouldn't ever play with blocks at home. She is now asking to play with them and enjoys playing together and on her own. She is making better structures, and her concentration has improved.

She has absolutely loved having the blocks at home. She has a brilliant imagination, and it has been great to see her incorporating other blocks and building toys from around the house to make her structures bigger and more unique. I like to talk to her through her building experience but mostly I get involved with the play using toys around the structure she's created.



Example of home engagement

However, a theme that emerged from a number of settings was the challenge of engaging parents. Just getting some parents involved was remarked upon by a number of settings:

It has been a lovely exercise. One to continue. It was a shame my parents didn't really get on board with the benefits of the resource or share my enthusiasm.

Or more simply "We haven't had much interest from parents". Two participants noted what parents gained when they did engage:

Really enjoyed the block play project although sometimes it was hard to encourage some adults to really become involved and give us feedback. However, the ones that did had more of an eye opener into what their children know and can do, giving them more time at home together.

Some parents have even become aware of how much time they are spending with their children at home and even learning more about their child having those one to one moments at home which is great.

Summary

Overall, we leave the programme with a real sense that many participants have learned a lot, about themselves, about the blocks and about their children. Many explicitly intend to continue with to work with, and develop, their use of block play: *Everything I've learned will be a continued programme in the setting, starting again in September.* And often this sort of remark is prompted not just by the positivity shown by the children, but the engagement and interest of the practitioners:

The impact and difference we have seen is substantial, and it is now part of our daily learning through play. It has become so natural for staff and most of the children to approach the bricks to engage with so I can't see us changing anything going forward. I've found the children's resilience and pride has grown while we take part in block club, knowing it's ok for it to fall down, or change it where it may have gone wrong. The staff often get called to see a wonderful structure that's been created, pride beaming from their faces.



Child A

'A tower with stairs to get to the top of the lookout'



'A long bridge to get across'



