Building Curriculum during Block Play

Blocks are not just for play! Learn how they can help support critical thinking skills, physics exploration and the development of language and social skills.

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Intensely involved in the kindergarten block center, Adam, Colton and Connor were conversing enthusiastically as they changed the structure they were building. I overheard phrases such as *"Try this," "Wait, too low,"* and *"That won't be strong enough."* When I sat down close to the boys, Connor invited me to observe what they were attempting. He said, *"Look at the car ramp we're building."* The other boys (who were playing nearby) chimed in to explain that they were having trouble getting the ramp tall enough without collapsing so their car could run down it and reach a place about three feet away. They told me that when they put the car on top of the ramp, the structure kept toppling down as shown in the following excerpt.

"The car is too heavy," said Adam.

"And we don't have blocks with curves," continued Colton.

Connor added, "The ramp has to be tall to get the car running fast enough to go where we want it to go. We've been trying to build this ramp for days without any luck."

What I realized was that kindergarten boys were problem solving, using critical thinking skills, exploring and experimenting with physics, and using language as well as social skills during their play. This block play episode combined elements of math, science, social skills, and language and contained learning far beyond the kindergarten standards.

Block play can include math, science, social skills and language activities.

Problem Solving and Critical Thinking

The National Council of Teachers of Mathematics (NCTM) includes problem solving as one of the five process standards necessary in which all children from prekindergarten to grade 12 should be involved. Problem solving involves children attempting to obtain a goal not readily within reach (NCTM, 2000). Children should regularly be supported to solve problems as they arise whether in mathematics or a different context (NCTM). Clements and Sarama (2009) state that children benefit from many opportunities to solve problems and explain their thinking while discussing solutions.

The three boys had the goals of building a car ramp that would not collapse and that would be fast enough for the car to reach an end point. They used a variety of strategies, trying to reach this goal. The critical thinking was evident in talking to the boys. They understood that their failed attempts showed them what to change. For example, Adam said, *"Using too many small blocks makes the ramp fall apart. That's why I decided to use larger blocks that are the same amount as those little ones."* In this example, Adam shared his experiences and explained his thoughts and ultimately, the solution. Adam was critically considering what went wrong and also demonstrating geometric understanding that the larger blocks have the same measurement as multiple smaller blocks. The boys were demonstrating critical thinking skills when they concluded that previous attempts at building the ramp produced a ramp that was "too low" and would not allow the car to reach their destination.

Exploring and Experimenting with Physics

Could kindergartners actually experiment with physics? Adam, Colton, and Conner proved to me that they could on a basic level. The boys were experiencing difficulty with the ramp collapsing when they placed one of the larger cars on the top of the ramp. Colton

explained, *"We need a ramp as heavy as the car so it won't let the car break it up."* Through this play episode, Colton was beginning to understand the basics of force between objects. He was describing the need for an equal force from the ramp pushing against the car (force). Additionally, the boys desired their car to have greater velocity when they realized that the ramp was too low to allow it to reach the end destination (motion). The boys concluded that raising the inclination of the ramp achieved this goal. The concepts of motion and force these students naturally experienced are taught later in physical science (National Research Council, 1996).

Language

Oral language skills were strongly present during Adam, Colton and Connor's block building. The boys were not only communicating their ideas and thoughts, but they were also listening, an important component of language skills and a part of the Common Core Standards for Literacy (CCSS.ELA- Literacy.SL.K.1a) developed by the National Governors Association Center for Best Practices and the Council of Chief State School Officers (n.d.). The boys demonstrated the ability to express their opinions, explaining their thinking clearly such as when Colton suggested, *"Make the bottom part taller so it will go faster"* (CCSS.ELA-Literacy.SL.K.6). Additionally, the boys demonstrated language skills when they elaborated on one another's ideas (CCSS.ELA-Literacy.SL.K.3).

Social Skills

At the age where egocentric behavior and perspectives have diminished for the most part, these boys showed the ability to fully cooperate and share during block play. Researchers have varied in the number of categories defining prosocial behaviors, but one behavior, cooperation, is consistently listed as an important action (Kostelnik, Gregory, Soderman, Stein & Whiren, 2012; Marion, 2003). The boys were sharing ideas and attempting or discussing all options. At one point, Adam stated, *"Let's at least try it,"* demonstrating the ability to negotiate with the other boys.

Social Play

Using Parten's (1933) epic work on social play, I noticed that these three boys were clearly demonstrating cooperative play as revealed in their agreeing on tasks for each other while reaching for the common goal of building a car ramp. Colton busied himself with retrieving the car they used in the demonstration, while Adam and Connor attempted to straighten their collapsed ramp. Previously, I noted that the block center afforded itself a variety of social play opportunities, generally associative or cooperative play with the occasional student at the beginning of the year having solitary or parallel play. After reflecting on Adam, Colton and Connor's play episode, I recognized opportunities to provide activities to students leading toward more cooperative play.

Learning that is not planned can be significant.

Photo by Elisabeth Nichols

Blocks come in all forms and shapes. Building can promote critical thinking skills.

Learning without a Plan

Looking back at the boys' play episode, I realized that the learning that took place was not something planned for that week. A physics lesson was not planned. Was this learning worthwhile? After thinking about the learning that had taken place, I would answer, *"Yes"*. These boys taught ME that following developmentally appropriate practice, such as giving time for exploration and play, allows for rich learning in multiple content areas.

Could I have planned learning experiences for **all students** in the class and still have developmentally appropriate practice in the classroom? A common misconception with early childhood teachers is that developmentally appropriate practice, especially during center time, requires the teacher to take on the role of passive observer, allowing the students to construct meaning on their own. While free exploration does produce opportunities for children to construct some meaning (Piaget, 1983), as demonstrated by

the play episode of Adam, Connor and Colton, it does not allow children to construct meaning about all learning objectives. Teachers should intentionally plan activities and organize the classroom environment in such a way that all learning objectives are met while remaining developmentally appropriate and giving children time to explore alone, with a group or with teacher involvement. This supports Vygotsky's Sociocultural Theory (Vygotsky, 2009) of "scaffolding" which provides the teacher opportunities to further support learning observed during free exploration.

Building Developmentally Appropriate Curriculum

The National Association for the Education of Young Children (NAEYC) suggests guidelines that teachers should consider while constructing appropriate curriculum (Copple & Bredekamp, 2009). Integration between subjects is one guideline a teacher would attempt to incorporate while planning appropriate curriculum. From our block episode example, math, language and science were all involved during the boys' play.

Furthermore, block play for young children considers multiple areas of child development. As noted, the three boys were using social skills by cooperating on a goal, using linguistic skills to effectively communicate and using physical skills to build their ramp. The goal of their building was relevant and personally meaningful to the boys, which accounts for another guideline. Without purposeful planning, the curriculum guidelines were already met through block play.

So, how can a teacher then purposefully plan, while incorporating the appropriate curriculum guidelines and content standards needed to develop appropriate curriculum? Let your students be the guide! Let's take a look again at the block play episode.

Before I introduced the "building" activity, I decided on learning objectives (intellectual integrity) in various areas (mathematics and literacy) that I wanted to integrate into a learning experience. My objectives for mathematics were for the students to recognize the shapes needed to draw their buildings. I also considered having students use a specific number of blocks or having students build a building as tall as something in the classroom, such as the height of the block shelf. Students were encouraged to work in teams (social skills) to complete their project. I called them "architect firms." Also, clipboards with paper were included for students to draw their "blueprints" and describe with labels the shapes in their final buildings (literacy and mathematics).

We also had a brainstorming session that allowed children to design something of their choice based on structures they remembered from their community such as playgrounds, amusement parks, a new McDonald's to replace the one that caught on fire (personally relevant to community), a house and a ramp.

Finally, I incorporated the use of a digital camera for photographs from all perspectives of the buildings (technology integration). These pictures were downloaded onto a computer into students' electronic portfolio and developed into a classroom book of "blueprints." This activity concluded with the various "architecture firms" presenting their developments. The excitement in the room resembled that of the three boys building their car ramp!

Photo courtesy of Heritage Montessori, Red Bank, TN

Block play can be an indoor or outdoor activity.

Whole Class or Individual Activity

Building tasks can be given to the class as a whole or to individuals. In planning building activities for the whole class, the teacher decides the types of tasks that should be given

to the children. The tasks can be related to specific math skills such as numeracy and geometry. A math lesson could challenge students to build a structure with only 7 rectangular prisms or be connected to a community lesson on the local rodeo such as building a structure to house two stuffed horses side-by-side with a roof to protect them from rain and including a gate that can be opened.

Students can also be given different tasks based on observations made by the teacher while observing previous building. If a teacher notices that a specific group of students all continue to build structures that are tall, but without enclosed spaces, a lower level block stage (Johnson, Christie & Wardle, 2004), the teacher can provide support to increase their thinking by giving a building challenge similar to the one suggested previously with the horses. By having the teacher provide an actual object such as a horse during their building, the students can visually understand the need to provide an enclosure instead of possibly considering that the thickness of the block provided an "interior" for an object such as a horse. Instead, the student would begin treating the block as an outer structure such as a wall and use additional blocks to provide an enclosed space for the given object.

Assessing Playful Learning

As with any activity, teachers can assess the learning occurring during block building activities, spontaneous or planned. When a teacher plans a specific learning activity or challenge, the teacher first develops a set of learning objectives. From these objectives, assessments are planned. Assessments can take the form of checklists listing all objectives, thus allowing the teacher to quickly check each learning objective a student demonstrates. Anecdotal records can also be kept on the learning activity to document and support learning taking place. Recording children's words provides support of learning and also provides a helpful way to explain to parents the learning that takes place in the building (block) center.

Time for exploration and play allows for rich learning in multiple content areas.

When first introducing this activity, I decided that I would assess via anecdotal records using a form I created for groups titled, "What Learning I Saw Today." This allowed me to capture various types of learning from social behaviors to language and mathematics. When we repeated this activity, I decided on learning objectives as mentioned. For specific objectives such as students recognizing the shapes needed to draw their buildings, I developed a checklist, which listed the shapes covered in class lessons, a space to check if the shape was used in their structures and another space to check if the child could correctly identify by name the shapes used. I used these assessments to determine if some of the students needed further help with shape identification and for planning individualized lessons for these students.

Reluctant Builders

If students are reluctant to participate in block building, the teacher can suggest other lessons while still exercising their problem solving. One such way is to provide other materials. For example, observing in a classroom, I noticed a teacher providing a crate of various boxes (cereal, macaroni, rice, etc.) and cans. She also provided several colors of construction paper the students used to cover these objects. In my mind, these objects were similar

Photo by Nancy P. Alexander

Math areas in a developmentally appropriate classroom can contain a variety of building materials and blocks.

to blocks, but students were able to decorate them and creatively manipulate them into new items. With these items, the teacher challenged students to create cities or new inventions. Additionally, students who are not interested in the block building process could also take the same challenge and write or draw a solution to a specific posed problem. Luckily during our building project, reluctant builders did not appear. It could've been the chance to wear a hardhat or opportunity to "play" architect.

This one activity is just an example of how a child-centered curriculum allows students to help their teachers build the curriculum. While planning remains the main ingredient, children directing the curriculum allows for more incidental cooperative learning experiences. Amazing how observing our students during block play can spark a plethora of ideas!

Note: Pseudonyms were used in this article to protect the children's privacy.

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