A Guide to ROK Blocks Adventures

Olga A. Vásquez

Robert C. Carr & Ivana Guarrasi

Artwork by Kim Cyprian & Robert Carr

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Okay, so this is a helicopter. But there's no wheels and I went to the store but there was none. And then when I found a bridge somewhere and I took it off and then, um, there was a trashcan, but it was for mail. And then when I saw blocks I wanted to put it on my sculpture. And then I found more blocks. Now I got more chairs. Save this for me.

- Jacob, 5 years old
Introduction

This guide draws on a three-year research study on the cognitive affordances of children’s constructive play with Rokenbok toys during free and guided playtime. The study was carried out by a University of California, San Diego (UCSD) research team, in partnership with The Center for Academic and Social Advancement (CASA). Four local preschools and an after school program called, La Clase Mágica provided the classrooms settings to conduct the research as well as the child participants. The study sought to enhance children’s early skill-development and an affinity for skills in Science, Technology, Engineering and Mathematics (STEM) among non-mainstream children that would eventually lead them to pursue careers in STEM related fields and thus increase their representation in this highly critical area in our 21st century society. Three distinct phases are identifiable across the length of the study:

1. This first phase focused on exploring the affordances of Rokenbok toys (5+) in promoting the acquisition of science related skills among elementary school age children enrolled in an afterschool program called La Clase Mágica. Given that children’s imaginative and sustained play did not advance to building sturdy constructions after 5, one-hour sessions, an intervention was designed to facilitate the use of external literacy models— i.e. graphic instructions and images of possible constructions displayed on the box covers. An adult mentor trained in scaffolding children’s learning and development became the central feature of the intervention, guiding children to construct architectonically sound constructions. The adult mentor used a child-centered pedagogy to help socialize children into making connections between language and symbol, planning and action, and image and material reality. The findings show that a combination of the theoretically based intervention and structured play with Rokenbok toys enabled children to develop the logic of a step-by-step progression towards a predetermined goal, promoted sequential and linear thinking typical of academic instruction, and fostered the formation of multi-modal relationships between the complex systems and patterns of the Rokenbok play world.

2. This second phase focused specifically on how a strategically designed curriculum amplifies the affordances of ROK Blocks toys (3+) in spurring social and cognitive development among ethnically diverse preschool children enrolled in 6 Head Start classrooms. This follow-up study explored the capacity of these theoretically grounded curricular activities and materials for promoting pre-
school children’s readiness for acquiring school and science-related skills and concepts—critical elements for success in K-12 education. Specifically, this study arrived at several conclusions: 1) children need to be socialized into the basic ROK Blocks building skills using the guidance from a supportive adult before they can more easily rely on the use of graphic instructions; 2) non-verbal communication that utilizes gestures and manipulation with the blocks provides an essential means for inciting social interaction, learning and development; and, 3) ROK Blocks activities are more readily engaging and successful when at least one or more forms of “aspirational objects” are available to children—e.g., pictures of possible constructions as well as fully assembled constructions that the adult mentor can use to model the building process of a particular construction at the same time engaging children in the assembling process. The curricular materials were iteratively designed until they produced just the right amount of interest and the facility among children to build the suggested designs and then expand creatively on their constructions.

3. The third phase involved a comparison between ROK Blocks toys and 3 other brand-name construction toys commonly found in preschool settings. A team of undergraduate student researchers entered several preschool classrooms to engage children in free and guided play with culturally specific curricular activities designed to promote the building of block structures related to a diverse range of cultures. Our analysis focused on video and observational field notes taken by the researchers depicting an exploratory stage when children were familiarizing themselves with the physical properties of the toys and discovering effective ways to manipulate the blocks during these free play and adult-guided activities. In order to code for children’s engagement with each toy the research team used the Toy Effects on Play Instrument—a 5-point rating scale that measures the blocks ability to promote thinking/learning, creativity/imagination, and social interaction in 8 categories. The research team also developed an additional category to measure children’s engagement with adult guidance. Among the other comparison toys in this segment of the study, ROK Blocks toys rated well in all categories and very highly in three: encourages children to actively construct new knowledge and engage in thinking/learning processes; attracts, engages and holds children’s interest; and use of adult guidance is able to help children achieve their optimal potential (performing at higher levels).

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1 For more information see Measuring the effects of toys on the problem-solving, creative and social behaviours of preschool children by Trawick-Smith, Russell & Swaminathan; 2011.
Overall, the study as a whole provides valuable insights into the critical role that the Rokenbok toys can play in promoting social, cognitive, and language development. A careful review of the data reveals the added value of the specially designed curricular activities and the role of the adult mentor in inciting multiple levels of development. The following sections offer lessons learned from the study to help parents and educators alike in effectively using Rokenbok toys to support pre-school children’s learning and development. These research-based tips are meant to help teachers, parents, and adults to scaffold children’s engagement and motivation for creating imaginative Rokenbok play worlds and at the same time that they promote learning and development.

The Driving Force of Play in Development

This research builds on leading theories on learning and development to emphasize the critical role that play has on children’s development. These theories pose play as the driving force of development among preschool children and suggest that the convergence of social interaction and the physical manipulation of objects (e.g. block toys) in play is critical for concept and language development.

Some of the key points highlighted throughout our study include:

Key Points on Development:
Children’s development during the early childhood years occurs on three planes—biological, social and cultural. To achieve a greater understanding of the whole child, all three developmental planes must be considered equally. At this age, children are growing quickly and developing capacities to manipulate their physical surroundings with ever increasing ease. They begin to gain greater access to the social world around them, remain attentive to their surroundings and begin to form complex theories about nearly any and all situations they encounter. They generally test and revise these theories continuously against the backdrop of experience. Children also begin to learn the basic behavioral scripts they must acquire for participation in local cultural community activities. For example, many children as young as the age of 2 years old begin preparing for the demands and opportunities of life in the classroom setting by learning how to wait their turn, share with friends, and use language to solve their problems. It is not easy to pinpoint the precise moment in which development occurs on any one of these three planes, however the ideas below present insights into understanding the process:

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2 For more information see Mind in society by Lev Vygotsky, 1978.
For more information see Tools of the mind by Bodrova & Leong, 2007.
Development is a non-linear process and children often display different competencies on different days. If provided appropriate support and encouragement, children are able to engage in more complex activities at the upper ends of their competencies—far beyond what they can accomplish alone.

Development occurs when a child is able to accomplish a task that he or she was previously unable to do or to complete without help from others.

Cognitive development occurs as language and concepts that previously existed on the social level become internalized into unique meanings that each individual child acquires as a result of personal experiences.

Children actively participate in directing the course of their own development, using the support and language of the community around them.

Key Points on Play:
Play is an important force in young children’s development and there is much to be learned by participating in it. If we peek into a child’s play world we are able to assess how the child is experiencing and responding to the world around him or her. We can note the objectives of play and determine the social, motor, and cognitive competencies of the child— which change dramatically from day to day. Play gives us the opportunity to appraise:

- Children’s budding perceptions of the world around them
- Children’s language and concept development
- Children’s ability to engage in cooperative play, to control their impulses and to maintain focused attention
- Children’s level of development of readiness to engage in literacy, visual literacy, motivation, and keen engagement
- Children’s problem-solving skills in action
What We Learned About Rokenbok Toys

Rokenbok served as a medium through which we were able to observe children’s play and development. The findings of our overall study speak to the interconnectedness of social practices, cognitive development and children’s learning how to behave in the world. In this process, we have learned a lot about Rokenbok toys and the results are exciting …

In a nutshell…

❖ Rokenbok toys create opportunities for children to access a wide range of skills and inclinations– offering a low floor and a high ceiling. These toys make it easy for young children to engage in the most basic forms of block building at the same time that older children find opportunities to perform complex operations and problem solving at the higher ends of their capabilities; especially with the assistance of a supportive adult. All children are capable of using Rokenbok toys to engage in opportunities for symbolic transformation, imagination and creativity. When children are able to overcome the challenges of the physical properties of the Rokenbok materials, this toy’s weakness becomes its greatest strength. The constructions are sturdy and moveable.

❖ Rokenbok toys engage children in thinking and learning processes as they actively use blocks to construct new worlds using new concepts and words during sustained concentration.

❖ Rokenbok toys provoke curiosity and foster inquiry when children play with the toy on their own and demonstrate exploratory behavior. Adults can create endless opportunities to support children’s inquiry by readily answering questions and prompting more complex inquisitive behaviors.

❖ Rokenbok toys friction and snap fit capability provide strong support that allows children to construct sturdy structures capable of being moved from place-to-place and used for dramatic play.

❖ Rokenbok toys attract, engage and hold children’s interest. Children show clear indications of their desire to play with Rokenbok, they exhibit positive reactions and they regularly persist in using it for extended periods of time.

❖ Rokenbok toys offer children the opportunity to practice previously acquired skills as well as the ability to explore new levels of competency in ways that are playful and enjoyable.

❖ When parents and caregivers join children in Rokenbok play, they are presented with the ideal opportunity to support and learn about children’s cognitive development and school-based learning.
Rokenbok toys afford young children the opportunity to manipulate blocks that function like real life engineering components (i.e., joints, hinges & sturdy fit) exposing children to the fundamentals of engineering and architecture.

ROK Blocks Adventure curricular materials complement the physical properties of the Rokenbok toys by amplifying fundamental skills that foster STEM thinking. They encourage children to pursue a predetermined goal and stimulate goal oriented thinking as well as persistence, intention and focused motivation.

Free play with Rokenbok toys enables children to design personally meaningful creations that contain complex stories and backgrounds. Rokenbok sets children imagination free to construct play themes of their own without specific predetermined commercial narratives so often promoted by other toy manufactures. The possibility for imaginative building with Rokenbok is vast as children actively create their own unique play worlds to build anything they can imagine.

The ROK Blocks play world provides children playful opportunities to engage in a more open-ended building, in which they imaginatively transform the physical properties of the Rokenbok toy instead of following a predefined “toyetic” storyline designed by promotional marketing strategies. Children’s creativity is not foreclosed within the micro-world, constructed by adult “imagineers” whose stories children are directed to mimic. Rather it is the child’s own imagination that is prioritized and endorsed.

The physical properties of the Rokenbok toys foster children’s inquiry by means of physical manipulation of the construction the pieces themselves. These toys provoke curiosity and encourage children to create imaginative meanings of their own. They build the characters and play scenarios that are not easily identifiable by a distinct role and function within the operational logic of particular toy-inspired micro-worlds such as those of Harry Potter, Star Wars, and Pirates of the Caribbean.

### Tips for Adult Participation in Rokenbok Play

An adult’s role in interacting with children can range from instructive to hands-off, providing just the right amount of assistance at just the right time. Consider a group of children who are attempting to build two

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3 Toyetic storytelling creates narratives that have “commercial potential in developing spin-off merchandizing” (p.161); for more information please see Children, media and culture by Davies, 2010.

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cities: The children may quarrel over where each city can be built and who is allowed to participate. Without asserting too much control over the conflict, the adult can offer a useful resolution by pretending to be a city planner and building a telephone system. He or she can arrange a conference call for the children to communicate with each other or brainstorm ways to connect the two cities together—such as building a park or a road in the middle.

Be open to new possibilities...

- Recognize different ways of learning. If a child experiences difficulty understanding one mode of instruction, try other modalities. Children may learn better by teaching others (interpersonal); by using their bodies, hands and movement (bodily-kinesthetic); visually through images/pictures (spatial); through conversations and engaging in discussions (linguistic); through self-direction (intrapersonal).

- Avoid making assumptions about the children’s creations. Rather than saying, “Is that a car?” choose words that allow the child to describe their creation. Questions such as, “Tell me about what you’ve made” gives respect their individual creativity and opens up opportunities for further dialogue (rather than a simple ‘yes’ or ‘no’ response). An object that looks like a car to you may in fact be a dinosaur.

- Be flexible. This covers many circumstances. Learning is not always linear, with one foreseeable end. Having specific goals for instruction is important, but being too rigid removes the possibility for unexpected learning. Being flexible and open to new interpretations allows space for creativity and spontaneity to arise. For example, if the child attaches the wheels on the wrong side of his car, an adult could respond with response such as how “Cool” it is and how “This car can drive both ways.” Children might notice their “mistakes” and make corrections independently, increasing their ownership of their creations.

- Allow the child to lead. When at play, children are engaged in a basic form of expression similar to speech and written language. Following children as they express their fantasy world builds rather than disrupts the conception of their creation. This helps the child maintain control of their imaginative play and thus their developmental process.

Encourage imaginative play...

- Join in the fun. When a child signals the start of an imaginative playtime scenario, adults can enhance children’s play by becoming a player themselves. A parent may play the role of passenger
when the child is playing the racecar driver and driving her Rokenbok car; or play the customer when a child is pretending to be the server in a restaurant, asking the child to use Rokenbok to build specific dishes and food (cups, fruit, and silverware). These “make-believe” scenarios are rich in thought and important to the development of more complex language and literacy.

- Build “aspirational objects.” Imitation serves an important role in the life of a preschool child. Children naturally want to imitate what they see or hear from adults, such as words, songs, stories, or games. When an adult builds an aspirational object and encourages children to reproduce a similar object using their own imagination, this can generate new interest in building, inspire creativity, and provide an opportunity for a personally meaningful adult-child interaction.

- Build what you know. Make Rokenbok building an activity that is relevant to the everyday life of the child whenever possible. Building constructions that represent objects in a child’s world is a form of self-expression and an important step towards reading and writing.

- Play games with the Rokenbok. The adult can start to build an object, but rather than finishing the object, he or she can enlist children’s help and present the situation as a “problem,” needing children’s help to fix it. When playing games in groups, be encouraging of goals that emphasize collective instead of competitive behavior.

Use language to guide children’s development...

- Engaging with stories. Storytelling is a wonderful way to engage in personally meaningful interactions with children. In some interactions adults may encourage children to tell their own stories about their constructions (using the blocks as characters in the stories). The process of having an adult write down a child’s spoken story is another way to extend play. It provides children an opportunity to reflect on their constructions and make connections between sounds, written language, and objects. Personalizing children’s creations helps them relate to the construction process by making it more meaningful.

- Ask leading questions. When adults lead children in conversations by asking open-ended questions, they provide children with the opportunity to elaborate on their immediate thoughts, with greater potential for using more words and more complex language. When children express their most immediate thoughts and ideas, it provides a glimpse into their current development and interests, which can serve as an entry point into future interactions and expansion of children’s skills. When leading conversations with a child, reduce your reliance on asking questions that lead to well-known answer (“What color is this?”) and yes or no questions (“Is this a butterfly?”). Instead, try to
ask questions such as “What are you going to do with this?” “Who uses this?” and “What does it do?” These open-ended questions are intended to draw out a child’s current thoughts and elicit more complex dialogue. Questions that lead to rich dialogue help to support the development of language and literacy during the preschool years—the time that scholars believe this skill should begin to develop—a child’s ability to represent their thoughts using spoken language is a precursor to written language.

• Rich descriptive language. Challenge yourself to be observant and deliberate about the words you use. The language skills of preschool children change rapidly and they look to adults for modeling. Rather than responding “This is a blue block” to a child’s question of “What is that?”, the adult could say, “This is a strong construction block that has a beautiful blue color like the sky, look, this is the shape of a square and has four small holes on each of its sides.” Additionally, children always benefit from being encouraged—“You’re doing a great job, this robot looks so real!” or “You must be so proud of yourself!”

• Being an appreciative listener. Children love to have an audience when they are talking about such things as the space ship they have just built and are flying around the room. Adults can easily talk too much and overwhelm children’s opportunities for speech. Paying keen attention to identify just the right moment to step in, or to step out and allow the child to take the lead are important means to help children take control in developing their own creativity, settling their own conflicts, and pursuing their own ideas. Sometimes, the best thing to do is to simply listen and let children play.

• Facilitating play between children. On occasion, children’s independent play can be guided towards more collaborative play with
another child (an important academic skill). An adult can explain the building project of one child to the other or can set up the situation for two or more children to engage in cooperative Rokenbok play. For example, suggest making different components of a city or announcing the need for more players—“We need two or more children for this project!”

- Promote the use of the Kids Tips Leaflets. A central goal of the Kids Tips Leaflets is to cultivate children’s motivation to engage in foundational science, engineering and literacy related skills at an early age. Although some children will be challenged in their first attempts to engage independently with the leaflets, the practice of following this step-by-step progression sparks the development of goal-oriented behavior for building. Once children achieve this goal-oriented behavior they will exhibit a higher level of persistence in problem solving, a motivation to succeed, and an enhanced vision for a wider range of building possibilities. These are some of the very same skills necessary for the emergence of reading and writing. A child’s acquisition of these skills and ability to engage independently with these leaflet’s can be greatly facilitated by your encouragement and generous guidance. This type of assistance helps them to understand the value of these exercises as a reliable source of information to reach a desired goal. Although children’s creativity and imagination are evident in their free play without the use of the leaflets, these skills come to the forefront in a more advanced way after a child has developed the visual literacy skills necessary to follow instructions. When children follow a pre-determined pattern and achieve greater complexity in their building they acquire the basic abilities to expand, alter, re-invent, and experiment with their constructions.

- Build on classroom curriculum with Rokenbok. Prompt the use of the block materials in a way that relates classroom curriculum (or homework) themes to block play activities. Rokenbok toys can also be used to explicitly teach concepts such as counting, classification, or dimension that lead to greater understandings of physical properties such as the relationship between distance and speed or size and shape.

- Employ demonstration. Challenging situations offer children opportunities for growth. When children are experiencing difficulty with the assembly of Rokenbok toys, rather than snapping the blocks into place for them, demonstrate how to solve their problem by using your own model. This is especially true if the adult and child have been working together for a while and the adult is familiar with the child’s capabilities. Providing similar examples of work by other children is also relevant and meaningful.
References and Useful Sources


