PARTNERING WITH PARENTS: USING CAP KITS TO SUPPORT LEARNING ACTIVITIES AT HOME

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ABSTRACT

The idea of using plastic bottle caps to enhance children's literacy and math skills was introduced in a pre-kindergarten methods and field class at West Chester University. We wanted an essentially cost-free way to create fun, hands-on, educational games for young students to learn basic skills supporting the Common Core State Standards (adopted by 45 states, www.corestandards.org/in-the-states). University education students began bringing plastic bottle caps, packaging them into kits, and taking them into local schools to help children learn. We have now not only formalized the Cap Kits program, but we have also conducted dozens of teacher trainings and parent workshops and have given away thousands of Cap Kits. By placing these materials into the hands of children, we are giving them manipulatives that can be used for meaningful, hands-on, engaging, and fun learning activities. Cap Kits are not just for the classroom; parents can also use them to support learning activities in the home environment.

As a university professor who helped start a popular, service-learning project called Cap Kits, the above quote was rewarding to read. It captures the nature of what my university teacher candidates and I set out to do. Our project goals were to 1) use basic, everyday materials and turn them into hands-on learning manipulatives, 2) bring them into local schools and child care centers in the greater Philadelphia area, and 3) teach in-service teachers, as well as parents (who are many times left out of learning opportunities), how to effectively use the Cap Kits to support children's emergent reading and math skills.

Almost five years later I can say that this project is still gaining popularity across our region. It is engaging for students, developmentally appropriate, and easy to replicate. Specifically, parents have enjoyed becoming part of the learning process. Our project has purposefully targeted parents and includes them as vital partners in their children's education. By hosting multiple parent workshop nights over the years, university teacher candidates have demonstrated to parents how to use the Cap Kits to support emergent literacy and math skills in the home environment. Our belief is that, by being inclusive and involving parents in this hands-on learning opportunity, we are empowering them to support student learning at home while simultaneously fostering strong parent-child bonding.

This article conveys the story of why and how we developed Cap Kits to assist early learning. We explain how Cap Kits are developmentally appropriate for young students

based on child development learning theory and why the use of hands-on manipulatives as a teaching tool is ideal during the early childhood years. We also share how we involved parents to be part of the process, give practical applications for how to use the learning materials with students, and share reflections from university teacher candidates and parents who have participated in the project.

Early Learning Theory

Young children benefit when their teachers and families engage and connect with each other in ways that help them learn and grow (Lawrence-Lightfoot, 2003). Early childhood educational professionals recognize the importance of parental involvement in a child's education and understand that "students learn more and succeed at higher levels when home, school, and community work together to support students' learning and development" (Epstein & Sanders, 2006, p. 87). It is becoming more evident that children whose families are involved in their education are more successful in school (Dearing, Kreider, Simpkins, & Weiss, 2006).

Research has stated that the development of young children's literacy skills is tied to academic achievement (Washington, 2001) and that the process of children's literacy development is influenced by many factors involving sociocultural and ecological perspectives of learning (Hammer & Miccio, 2004; Martinez-Rodan & Malave, 2004). Furthermore, Vygotsky's (1978) sociocultural theory and Bronfenbenner's (1986) ecological theory emphasize that interactions among people, as well as interactions between people and their environments, influence learning. Both theories help to explain how a child learns and develops concepts in collaboration with adults and peers in and out of the school environment (Martinez-Rodan & Malave, 2004; Ortiz & Ordonez-Jasis, 2005). Specifically, the influences of the family and home environment, namely support and engagement, contribute to young children's language and literacy acquisition. Clearly, children benefit from exposure to a variety of literacy activities (Goin, Norquist, & Twardose, 2004; Hammer & Miccio, 2004), and because so much learning takes place both in and out of school, it is critical for teachers to a) engage families in ways that develop a positive connection between home and school, and b) teach parents that children need to actively participate in the learning process through hands-on activities.

Why Hands-on Learning?

When researching child development, Dewey (1938), Piaget (1954), Bruner (1968), Vygotsky (1978), Kolb (1984), and others are often cited as the founders of active, hands-on learning. These theorists believed that learning is an active, highly-evolving, and complex process. Children need to experience their learning with their mind, heart, and hands simultaneously. They have to (a) become the learning, (b) use all their senses, and (c) experience first-hand learning for themselves as it is evolving. This is active, experiential learning that is hands-on in nature. It is the manner in which young children acquire their knowledge.

The use of manipulatives is highly recommended and is supported by both learning theory and educational research when it comes to young children and processing new information. Specifically, when looking at mathematical research, "manipulatives can be important tools in helping students to think and reason in more meaningful ways" (Stein & Bovalino, 2001, p.356). Manipulatives, such as bottle caps, can help students learn by permitting them to move from concrete experiences to abstract reasoning (Heddens, 1986).

It is widely known that children learn best when they are encouraged to explore, interact, create, and play (Thompkins, 1991). In fact, research confirms what most early childhood professionals already know – children learn the most when they actively participate in the learning process (Katz, 1994). Cap Kits offer a variety of learning opportunities through play and hands-on exploration. Children manipulate the game pieces, which helps them remember and retain the information that is learned. "During play, young children use hands-on exploration and sensory learning in a very important way; they confidently: (a) test new knowledge in a relaxed atmosphere, (b) relate it intuitively to existing knowledge, and (c) store that information for future use" (Blaustein, 2005, p. 4). Through the simple act of playing with the caps, either individually, in pairs, or with a group of others, students can use their sense of touch to help them acquire new information and build their basic skills.

The Origin of Cap Kits

In an effort to link the learning that happens both in and out of school and provide a developmentally appropriate, hands-on way to enhance youngsters' basic literacy and math skills, a small group of dedicated university teacher candidates studying Early Grades Education at West Chester University, along with their professor, started a project called Cap Kits. In fall 2012, during a class session of my course, EGP 322: Pre-Kindergarten Methods & Field, I demonstrated how every day, basic objects such as rocks or plastic bottle caps can be used to create learning materials. After class, one teacher candidate came to talk with me and we began brainstorming ways to take ordinary bottlecaps and package them into kits to support young children's learning. The idea quickly spread through our class and the Cap Kit Project was formed. Every semester for the past five years, a core group of highly motivated teacher candidates have been working to create homemade learning manipulatives from recycled bottle caps and take them into local schools and child care centers in the greater Philadelphia area. This project has grown so that Cap Kits are now being used in Costa Rica, Peru, the Bahamas, and seven other countries. It is a thriving project with many benefits for teachers, parents, and students. It is effective and engaging for students, developmentally appropriate for young children, and easily replicated. Another asset is that, through conducting parent workshops, the teacher candidates have not only trained parents how to use the Cap Kits with their children, but each family has received a free kit to support home learning.

We teach our students about using plastic bottle caps to enhance children's literacy skills in sections of the Pre-Kindergarten Methods & Field class at West Chester University as a way to support the Common Core Standards. Teacher candidates saw a need in our local community to increase learning manipulatives in the schools and to collaborate with parents as partners in students' learning. Through their teacher certification program, the teacher candidates learn the value of teachers and parents working together; therefore, they wanted to be involved with a project that included this home and school connection. To date, the teacher candidates have conducted 51 teacher trainings during staff development in-service days, and faculty meetings. They have also conducted workshops for parents that take place in the evenings at local schools. The purpose of these is to share with parents the importance of home learning experiences. Research states that positive interactions between families and schools increase children's success in school settings and support on-going family involvement in the child's education (Colombo, 2004; Galindo & Sheldon, 2012). During these family nights, youngsters are able to visit multiple learning stations conducted by the university teacher candidates. Each station has a math or literacy theme and small groups of students play learning games with the bottle caps. The games are hands-on, interactive, and above all, fun. One example includes playing the literacy game Silly Soup, where students write each letter of their name on a separate bottle cap and place them in a

small tub of water. They stir the water, and with a slotted spoon, fish out the letters in their name one-by-one and place them in the correct order. This simple, yet fun and enjoyable game, supports communicative interactions, letter identification, print recognition, phonological awareness, writing skills, and fine motor skill control. Many of these important skills have been documented as forerunners of literacy development (Horn & Jones, 2005; Snow, 2002). To date, thousands of Cap Kits have been given to parents for no cost so that they can be placed into the hands of children to create meaningful, hands-on, engaging and fun experiences that support their learning.

What Exactly is in a Cap Kit?

A Cap Kit is a bag of 124 plastic bottle caps, from either water bottles or milk containers, decorated with multiple copies of uppercase and lowercase letters and numbers and numerical symbols for children to manipulate and master. Included are an additional 20 blank caps for creating more letters and/or numbers at their discretion. Each bottle cap has been washed, affixed with a white sticker, and labeled with a marker. A detailed list explaining how to make a Cap Kit is included in this article.

Creating Cap Kits is one way to increase student interest in learning literacy and math concepts. When students explore with Cap Kits, they are not only having fun, but are reinforcing basic skills. The benefits of using these highly versatile materials are many. Cap Kits are recyclable and promote a "green awareness"; are developmentally appropriate for a variety of age groups and grades; can be used at both home and school; support the Common Core Standards; and are creative and limited only by the imagination.

When the West Chester University teacher candidates create Cap Kits, they also place into each kit an invitation for the teacher or parent to visit the specialized website. This professional website offers hundreds of different math and literacy games that increase basic knowledge and skills. The games are divided into two levels on the website; one for Prekindergarten through second grade and one for third through fifth grade. The website is www.thecapcreations.wix.com/capcreations.

Effectively Using a Cap Kit

In classrooms during the school day, teachers use Cap Kits to differentiate instruction; assist English Language Learners; provide struggling students with extra literacy and math skills; and reinforce skills to above-level students. Cap Kits are versatile and can be used in a multitude of ways. Teachers may direct the learning individually, in pairs, in small groups, as a whole class, as part of a lesson, or as a classroom learning center. At home, parents may spend quality time playing games with their children and interacting with them. Parents may also turn to the website for resource packets and a complete list of cap games.

Practical Applications

Literacy Activities: The Cap Kits resource packets provide activities that increase children's awareness of the sounds of language, letter recognition, beginning spelling and word building. For example, a emergent language learner may practice word building skills by using the caps. A teacher may use the caps to display a word family ending such as *–ig*. By manipulating the cap letters, the student is challenged to add different consonant caps to the beginning of the word to build words within the family. The student learns that words (e.g. *big, pig, dig*) share common letters and sounds and belong in the same word family. Likewise, a student might engage in multiple alphabet activities since the caps promote identification of the letters of the alphabet. An

ELL student in need of help with alphabet recognition might manipulate the caps into alphabetical order, match the uppercase and lower-case letters, or play "find the missing letter in the alphabet." By manipulating the caps and putting the alphabet back in the correct order, the student would learn the correct order of the alphabet and practice how to visually discriminate each individual letter.

MATH ACTIVITIES: Many math skills can be practiced using the caps such as: (a) number identification, (b) ordering, (c) shape-matching, (d) basic number sentences (addition, subtraction, multiplication), (e) sequencing, (f) sorting, (g) counting money, and much more. For example, if a younger student needs extra help in learning the concept of greater than/less than, the student can draw one cap out of a bag and write it down. Next, he or she pulls a second cap out of the bag, writes it down, and decides if it is greater than, less than, or equal to. Likewise, if a student is struggling with the concept of skip-counting, the teacher can begin a number pattern with a missing number in it and help the student figure it out. For example, the teacher creates the pattern 1, 3, 5, __, 9. To make the activity easier, the teacher can give the student a few caps from which to choose the answer. To make the activity more challenging, the teacher can provide more caps. Students manipulate the caps by touching them, and they can take risks by moving them around, and changing their answers, unlike making a mistake with pencil and paper and having to erase. The learning is like a game and children have fun as they learn important skills. Cap Kits can also be used for assessing students' learning. Students may be more engaged in the activity and less preoccupied with the fact that they are being tested on what they know.

UNIVERSITY TEACHER CANDIDATES AND PARENT REFLECTIONS

The university teacher candidates who have been part of the Cap Kits project reflect every semester on their experiences using the Cap Kits with the youngsters and their parents. Overall, their reflections indicate they view this project as rewarding for themselves, the young students, and their parents. When the teacher candidates were specifically asked the question, "What did you learned about the parents, teachers and students you worked with this semester?" they were quite positive in their responses.

I learned how eager the parents were to learn! It was nice to see people of all ages wanting to learn new skills. I loved how they listened to us, even though we are so much younger. It felt nice to be the expert in a situation like that and share our expertise. I truly enjoyed working in the schools with the families.

> *I have learned that parents and teachers, especially those who have attended our events, are always eager to find ways to help make learning more accessible and engaging for their children. Everyone that we had the chance to interact with was extremely positive about the project. Many seemed to leave inspired with new ideas for the caps that we hadn't even thought of! I also realized how busy parents/teachers are and how important it is to always show appreciation when they take time out of their busy weekday schedules to come to an event that benefits their children/students.*

Overall, the common response themes from the university teacher candidates were that they found the parents to be sincerely interested in the Cap Kits project and appreciative of the time the teacher candidates took to bring the free materials to the families at night. There was a general sense of optimism that parents enjoyed learning about the Cap Kits and followed through with using the learning manipulatives with their children to increase literacy and math skills. Likewise, the written reflections gathered from parents have been equally positive and express a sincere appreciation for the learning materials.

A great big thank you to you and your students! Thank you all so much for coming out to share different ideas that I can incorporate at home for my daughter. I am impressed at all the research that went into the caps program and Lillian really enjoyed doing the games - she talked about it all night, a rave review for a three-year-old. I, also, was excited to take home caps with letters and numbers already in place. What a timesaver and it will ensure that we initiate the caps program.

Thank you for the wonderful presentation and workshop for preschoolers yesterday evening! My son Jack and I thoroughly enjoyed learning all the various CAPS games and were excited to bring home a set of our own. As a parent of an upcoming Pre-K little boy, I am always looking for new ways to introduce academic skills in a fun manner. My son loved each station and activity and walked away wanting to play more. I'm thrilled to integrate these activities to keep the learning structure of his current preschool classes while we approach the summer off months. We look forward to working more with you all in the future and are big supporters of the university's involvement in early childhood education.

Way to go West Chester University! What a highly creative and innovative idea you are graciously sharing with the parents in our community. Materials that are free of charge, hands-on training, and students who seem to love these learning games. You knocked it out of the park with this idea. So thankful!

Conclusion

The Cap Kit Project has been viewed as highly successful by parents, principals, and school directors and is in demand around the greater Philadelphia area. Placing these free learning materials into the hands of families and providing sound training and demonstration on how to use them effectively are important goals of the project. University teacher candidates will continue

offering these materials to the local community because they know the importance that family involvement plays in the role of early childhood development and learning. Cap Kits provide a developmentally appropriate and unique opportunity for students to construct their own knowledge while they play. Also, the kits are easy to reproduce and their cost is minimal. With just a little time, a few materials, and a lot of creativity, teachers and parents can create learning materials that help students practice basic skills while having fun.

Making a Cap Kit

Cap Kits offer unlimited possibilities as sustainable, hands-on, and authentic learning tools. Children will benefit from the engaging and play-based activities that can be created using plastic, recyclable bottle caps. To create a Cap Kit, gather plastic caps from milk, water, ice tea, or soda bottles. Feel free to build your collection slowly, marking the caps with letters, numbers, or number symbols and leave a few blank in case they get lost and you need to replace them.

Here is what you need to make one complete Cap Kit:

- 124 plastic bottle caps
- White stickers, one for each cap (optional)
- Permanent marker, dark in color and fine tipped
- One gallon-size bag per Cap Kit for storage

1. Wash the caps and allow to air dry.
2. Affix one sticker to each bottle cap directly in the middle.
3. Use a permanent marker to write on the stickers, as described here.

For the alphabet set, you'll need three caps for each of these frequently used letters: E, T, A, O, I, N, S, H, R, D, L, and U. Draw one capital letter, and two lowercase letters for each. For the less frequently used letters C, M, W, F, G, Y, P, B, V, K, X, J, Q and Z, draw one capital and one lowercase letter for each.

For the math set, you'll need three caps for each of these numerals: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0. Use two caps for each of these symbols: + (plus), - (minus), = (equal), < (less than), > (greater than).

4. Leave 20 bottle caps blank to make more letters or numbers as needed.
5. Place the bottle caps in the gallon-size bag.

Variations in color: You can collect only the transparent caps that come on water bottles, or only the red caps from milk bottles, for example. For preschoolers, you may consider one color for all the alphabet letters and a different color for the numbers and number symbols as a visual to help them differentiate. Collect extra caps of the same colors that will stay blank and use at your discretion.

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