In this presentation, we describe a project being implemented in low-income communities in Jamaica to help parents engage in their children’s mathematics-related activities at home. Through activities implemented as part of this project, we provide parents, particularly mothers, with (a) teaching strategies in mathematics topics their children are learning in school; (b) training in how to use mathematics games and storybooks specially designed to focus on relevant mathematics concepts; and (c) support from on-site coaches. The purpose of this presentation is to describe the research activities that were implemented across multiple content areas and grade levels to support mathematics learning materials for this project. We, therefore, report findings from a series of focus groups conducted with parents, teachers, community members, and members of the Jamaican Ministry of Education (MoE) to design materials that would be engaging and relevant for parents in Jamaica. First, we describe the procedures and outcomes of a feasibility study conducted with a small sample of parents in Jamaica during which draft mathematics learning materials were distributed to determine their feasibility. As a result of these research activities, we refined the mathematics materials to be maximally relevant, interesting, and feasible for parents to use with their children. We propose that the research described in this presentation may support other governmental efforts to design materials that encourage parent engagement in mathematics, thereby improving student achievement.

**Focus Groups**

Purposes: Conduct six focus groups with different stakeholders to (a) evaluate the relevance of the prototype learning materials, and (b) develop a better understanding of the Jamaican education system and culture.

Sample: Four focus groups comprising (a) members of the Ministry of Education (MoE), (b) curriculum developers, (c) teachers, and (d) parents/caregivers to obtain their input on the prototype learning materials we created. Two additional focus groups comprising (a) community leaders and (b) members of local advocacy groups were conducted to better understand the Jamaican education system and culture.

Methodology: Prototype materials were developed by the research team and presented to each focus group. Input was solicited on the accessibility of the materials for parents, especially given the low rates of literacy, the cultural relevance of the games, characters, and story lines for Jamaican families, ease of implementation and dissemination with parents and other cultural mathematics that may impact the success of the project. Each focus group lasted approximately 1-2 hours. Field notes and audio or video recordings were obtained and subsequently analyzed for themes.

**Themes that Emerged from the Focus Study**

- Increased accessibility for parents: Stakeholders suggested using readily available materials (e.g., domino, bottle caps) in games. For example, paper clips (used in games) are not readily available. Also, the game directions were too heavy and parents in the sample have low literacy.
- Increased cultural relevance of materials: Stakeholders pointed out that some of the words and/or phrases were not used in Jamaica. For example, the word “feverless” was not used locally. Stakeholders suggested using Jamaican names within books and using culturally relevant math examples while teaching content.
- Increased the reliability of the language: Stakeholders noted that scripting in the sample materials was less obvious and that teachers had difficulty comprehending them. Teachers had noted that the teachers did not fully understand the sample materials and the materials were not representative of Jamaican culture. An expert in Jamaican cultural was consulted to revise the storieslines used in the books are representative of the Jamaican culture. The “school-like feel” was reduced by making the materials more relatable. Language was revised to increase relatable content.
- Materials were finalized after a rigorous review cycle in which we implemented an iterative development mechanism. The materials were finalized after a rigorous review cycle in which we implemented an iterative development mechanism.

**Feasibility Study**

Purpose: A small scale feasibility study was conducted to determine if the project design is feasible.

Sample: Seven parents or caregivers of children in grades 1 or 2 were selected by the project design to create the mathematics learning materials with parents in a workshop format. The following day, the educator conducted the workshop at a convenient location. The workshop lasted for approximately 5 hours. During the workshop, parents received an overview of the project, parent/caregivers were observed using the materials and were instructed to engage with their children prior to returning. At the follow-up session, parents demonstrated their experiences as they played the games or read the storybook with their children. Field notes and audio or video recordings were obtained and subsequently analyzed for themes. Data on the educator’s fidelity of implementation were analyzed.

**Themes that Emerged from the Feasibility Study**

- Design is feasible: The project design was feasible to implement. The educator was able to deliver the material with a high degree of fidelity after receiving training.
- The materials and manipulatives are usable for the educators and parents: The educator was able to use the materials effectively throughout the workshop. The parents were able to engage with the materials during the workshop. The three parents who came to the follow-up session, all were able to successfully play the game with their children after the workshop. One of the other parents did not read the storybook due to time constraints.
- Role of coaching: Parents showed that they had fun learning the material during the workshop with effective coaching. Parents were engaged and motivated to continue participating. Parents also reported that the game was fun to play with their child, which was challenging for children.
- Streamline the content delivery in the workshop: During the training session with the educator, the script was modified to improve clarity and encourage active engagement of parents: To deliver the workshop as designed, the educator spent over 3 hours with the parents and caregivers. Because the workshop is intended to last at least 2 hours, the amount of content was reduced for future workshops.

**Sample Revised Materials**

Using the themes that emerged from the materials and feasibility study, revisions were made to the design of the mathematics learning materials.

- Accessibility: Principles of universal design were implemented throughout the mathematics learning materials. Many was reduced. All materials were designed to be accessible to parents or are readily available (e.g., pebbles, bottle caps).
- Relatability: The content was simplified. Examples were provided to show how the materials appear less like homework and the language less abstract.
- Cultural relevance: More stories were used in the books are representative of the Jamaican culture. An expert in Jamaican cultural was consulted to revise the storieslines so that they are representative of the Jamaican culture.

**Conclusions**

- The purpose of the first phase of this project was to develop mathematics learning materials for parents to use with their children based on principles of explicit instruction and universal design.
- The materials were finalized after a rigorous review cycle in which we implemented an iterative development mechanism.
- Input was solicited from a broad range of stakeholders on prototype materials. We conducted informal feedback sessions with parents, and subsequently made additional revisions prior to finalizing materials.

- We hypothesize that these validated and culturally relevant materials will be helpful for parents in engaging with their children in activities that have an educational purpose and thus, eventually impacting the children’s performance in mathematics.

**Next Steps**

- Development of workshops based on the iterative design process.
- Solid and incorporate feedback and input from the Jamaican Ministry of Education, the coaches, and a cultural expert.
- Conducted feasibility studies for each workshop using a convenient sample of participants in the U.S.
- Training of coaches using coaches’ guides and other training materials will continue through the end of the project.
- Implementation of the randomized controlled trial with 1600 female students February 2017 through August 2017.

**References**


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