JOINT MEDIA ENGAGEMENT AND LEARNING

Media and Learning Group at SRI International[1]

Joint media engagement (JME) refers to spontaneous and designed experiences of people using media together. JME can happen anywhere and at any time when there are multiple people interacting together with media. Modes of JME include viewing, playing, searching, reading, contributing, and creating, with either digital or traditional media. JME can support learning by providing resources in a current activity to participants for creating meaningful connections among media representations, interests, and experiences. These resources may also be available to co-participants in future activities.

The concept of JME builds on research showing that co-viewing educational television programming with adults or older siblings enhances young children's learning (Reiser, Williamson, & Suzuki, 1988; St. Peters, Huston, & Wright, 1989). Co-viewing of educational television, however, is just one example of what we call JME. An expanded notion of JME encompasses a range of digital media applications and technologies and forms of social interaction.

An important focus of research is on how JME can *augment social processes in learning.* Social processes such as imitation, observation, and joint attention are fundamental to human learning from an early age (Meltzoff, Kuhl, Movellan, & Sejnowski, 2009). Television producers design programs to spark and support these processes of learning when they have a character in an educational television program prompt children to respond directly to a question in order to advance the plotline (Linebarger, 2006). Children respond more often to these prompts when others are present, suggesting that the opportunities for parallel, "in-room" interaction offers additional possibilities for learning (Dugan, Stevens, & Mehus, 2010; Stevens & Penuel, 2010).

Teachers, parents, and other adult guides may use media artifacts to support learning by introducing content in ways that can help bring the material to life, spark class discussions, and scaffold questioning. Media can also be a powerful catalyst for child-driven learning, providing an independent means of exposure to new ideas that children can then choose to talk about with their parents or teachers and engage in deeper joint exploration.

[1] Group members who contributed to this white paper are: Hannah Lesk, Carlin Llorente, Vera Michalchik, Savitha Moorthy, Bill Penuel, and Mieke VandenBorght

Research on Fostering *Intent* JME in the LIFE Center

As part of its work with the LIFE Center,[2] researchers at SRI International are collaborating with Reed Stevens (Northwestern University), Brigid Barron (Stanford University), and Lauren Bates (Education Development Center [EDC]) to study joint media engagement in science. This research, led by SRI's Media and Learning Group, builds on findings from a study conducted by EDC and SRI on a 10-week media-rich science curriculum supplement. In that study, we found that children who participated in the supplementary activities talked with their home caregivers about science significantly more than their peers who did not participate (Penuel, et al., 2010).

Based on this earlier work, we conducted an in-depth qualitative study on the implementation of a media-rich preschool science curriculum. Our goal was to learn more about how JME can promote children's science learning and engagement at school and at home. We observed teachers, children, and in-class parent volunteers using our materials and approach within a multifaceted curricular activity system (Roschelle, Knudsen, & Hegedus, 2010) in two preschool classrooms in the San Francisco Bay Area. Our work attended closely to interactions among adults and children during media viewings as well as their science-focused talk and behaviors across activities before and after viewings.

Each week, adults in the classroom introduced children to an everyday science concept such as growth, decay, or reversible change, through a viewing of *Sid the Science Kid*[3]. An adult led each video viewing, pausing the show and asking children questions at key learning moments to encourage their active engagement. During that same week, children participated in complementary PBS computer games and designed hands-on activities that allowed them to engage with the concepts in a different way. The curriculum is structured so that children have the opportunity to move back and forth between media-rich and hands-on activities, each time using previous experiences to create stronger and more nuanced understandings as they re-engage with concepts multiple times, each time better prepared to make better use of the opportunity to learn.

A Vignette to Illustrate a Curricular Sequence with Multiple Modes of JME

Data from our observations and conversations with parents and teachers suggest that intentionally designed JME experiences support learning by creating both "in the moment" opportunities when content-rich media can be leveraged for learning while viewing, and affordances that inspire possibilities for continued learning.

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[2] LIFE (Learning in Informal and Formal Environments) is a Science of Learning Center whose purpose is to develop and test principles about the social foundations of learning in informal and formal environments with the goal of enhancing human learning from infancy to adulthood.

[3] *Sid the Science Kid* is a public television program produced by Jim Henson Productions and KCET in Los Angeles

The vignette below describes the sequence of learning activities as they unfolded on the topic of melting and freezing, or "reversible change." The sequence of activities engage children in learning activities with different media—video, material objects, and print. The vignette shows the ways that these sequences, organized across several weeks and designed to facilitate conversations across time and settings (e.g., home and preschool), can support children's learning.

Co-Viewing of Video

Carla[4] and Dorie's classes of four-year-olds, nearly all of whom were English language learners, began their multi-day exploration of reversible change through a teacher-led viewing of an episode of *Sid the Science Kid.* In this episode, Sid learns about reversible change by observing ice melting, then water freezing into ice again. During the episode, Carla paused the video to ask questions like, *Have you ever eaten something that was frozen?* and *What do you think will happen if you put the water back in the freezer?* She also makes a point of talking with children while the video plays. At one point, to let the children have a direct experience of the phenomenon of reversible change in a different way, the teachers paused and led the children in a game in which they practiced "freezing" (standing motionless) and "melting" (moving their bodies) before returning to the narrative.

Hands-on Activity

After using the video, the class, children rotated through hands-on activities in which they had the opportunity to explore reversible change firsthand. In one investigation, each child was given his/her own ice cube in a plastic sandwich bag. Teachers and parent volunteers asked the children how it looked and felt and prompted the children to observe and comment as the cubes got smaller and smaller and turned into water.

Child 1:	It's cold! (Shivers.)
Carla:	What do you think? (Asks each child – they all say "cold")
Child 2:	Water!
Carla:	You can see water. (Invites them to touch the water in the melting ice cube tray.) What do you think is going to happen if we left our plastic bags at the table for a long time?
Child 3:	The ice is going to melt!
Carla:	What's going to happen when the ice gets melted? What's going to be in there.
Child 4:	Water!
Child 3:	(Holds up his bag to show dripping water.)

Using children's observations and the video's content on melting and freezing as a guide, adults also asked children to predict what would happen if they left their ice cubes out and then returned them to the freezer.

[4] All names are pseudonyms.

Reflective Discussion

When they finished playing with their ice, children practiced making observations and drew pictures of their ice cubes in journals, just as they saw the characters do in the episode. Carla and the parent volunteers asked children to describe what was happening in their drawings and wrote down what they heard, just as they had watched Sid's teacher do onscreen.

Carla: Tell me what you did. Is that your ice cube right here. (Child nods, Carla writes "ice cube" in child's journal) What happened to your ice cube?

Child: It melted

Home-school Connections

Carla and Dorie sent the children home with their plastic bags of ice and told them to put the bags in their freezers at home and take them out in the morning. The children returned with the bags the next day, eager to share how their ice cubes had changed shape. Dorie remarked that it is rare for her children's families to return anything to school so quickly; she credited this to children's interest in the ice cubes and their talk about the ice at home.

Review and Extension

Several weeks later, the class repeated the viewing of the same *Sid* content as part of a review episode on how things change. Both teachers and students were excited to watch the characters do the ice activities that the classes had now experienced firsthand, to talk about their own experiments, and to recall the circumstances under which their ice cubes melted and froze. Dorie asked children to predict what would happen when the characters poured warm water on ice, which the children were able to do correctly. Everyone delighted in seeing children's predictions borne out instantly onscreen.

Parent volunteers reported that their children brought this enthusiasm for science home, as they expressed interest in playing with water and putting things in the refrigerator and freezer for weeks after the media-based experience had concluded. One child, thinking deeply about the process of reversible change, attempted to connect learning from this unit to that of the previous unit on decay. His mother reported that he asked her if they put a decayed banana in the freezer and then took it out, would that also reverse the process of decay.

Key Opportunities for Enhancing Learning from JME

During JME, media draws, focuses, and drives attention and engagement with new learning concepts, while associating the experience with a fun, positive valence. For example, an episode exploring growth sparked discussion on what plants need to grow. Children eagerly drew on their memory of watching the same episode several weeks

before and on their experience of planting seeds in the classroom to mention water, sun, and time. Media can also present concrete representations of abstract ideas and high quality media presentations are designed artifacts of intentional and mindful production processes ensuring that concepts are introduced and explored in particularly effective ways. For example, media can present time-bound content in ways that fit more naturally into the limited time in preschool and home settings. In the classrooms we observed, watching a time-lapsed video clip of various plants decaying allowed the teachers and children to build a shared concept of decay (a process that occurs over days or weeks) in a matter of minutes. Children and their caregivers can thus easily build a shared understanding of science concepts, which in turn allows for them to explore phenomena in ways that might not otherwise be possible,

Promoting Engagement Even After Media Are Powered Off

Importantly, JME need not end when media is "powered off"—it offers a second set of affordances that promote continued and sustained engagement with ideas presented during viewing. JME introduces a set of shared experiences that serve as common referents or touchstones for continued discussion and exploration. It can support learners in moving back and forth between abstract and concrete representations, offering examples that allow children to "pick up" and play with meanings and talk about concepts with caregivers and peers. For example, children and teachers compared watching the decay process onscreen at "hyper-speed" to what they saw happening to the bananas and pumpkins in their classroom over a period of weeks, which helped them to engage in conversation and extend their understanding.

Creating a Foundation for Developing Ideas That Can Travel

The experience of JME can help children develop fluency with ideas and vocabulary that can be useful in subsequent classroom interactions and beyond. When media are accessible outside the classroom, children may bring their JME experiences into contexts. In our research, children went home talking and asking questions about the science concepts that were introduced through media, giving parents who were not at the preschool access to their children's school world and creating opportunities for intergenerational engagement in learning content of interest to young children. Similarly, media can also introduce new or unfamiliar places, ideas, people, and phenomena one is unlikely to experience first hand.

Making Learning through Repeated Practice Fun and Relevant

JME can enable teachers and learners to benefit from repeated exposure to the same content, with a twist: each time adults and children "re-experience" the same media together, they bring to it relevant conversations and real-life experiences they have had between viewings. This allows children to not only attend to the media again with a new eye for learning relevant content and target vocabulary, but also to say "I did this, too!" and ask and answer questions that act as the basis for more sophisticated conceptual discussion. Each linked experience provides preparation for the next, with previous experiences increasing the potential efficacy of subsequent opportunities to learn. These interactions also provide caregivers with feedback on what the children

have learned, in turn creating possibilities for correcting misconceptions and exploring concepts in new ways tailored to children's understanding and interest.

In the words of one participating teacher, the variety of affordances made available through joint media engagement make it a powerful tool that allows teachers to "reach all the children in the classroom"—and for children to continue expanding their learning.

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