Inclusive Design for Engaging All Learners (IDEAL): Designing Technology for Cultural Brokering

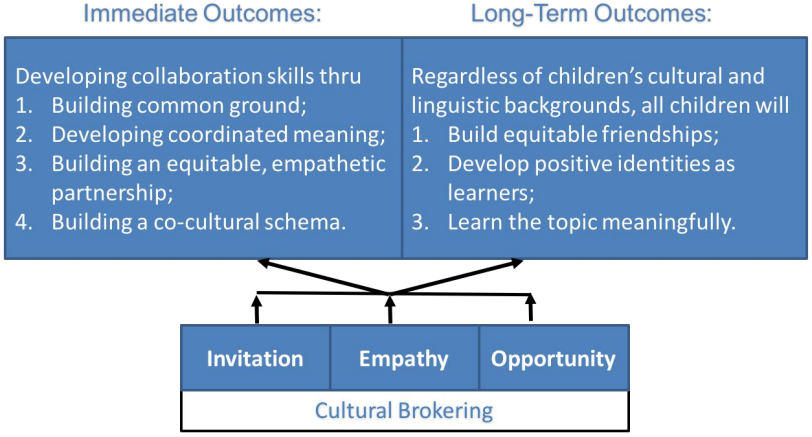
Societal Needs:

- Language minority children typically **struggle academically and socially** because of their developing English skills and **consistently score lower than their native English-speaking peers** in all subject areas (Kena et al., 2015).
- Viewing the children as deficient in language, social, and academic skills **marginalizes them, which negatively affects their identity** and contributes to their disengagement from schooling. (Valencia, 2010).
- The early school years are an especially critical period when children are first exposed to academic English and also when they start developing their identities as learners. **There is an urgent need for early intervention to re-position the children as valuable contributors to the classroom learning community**.

Research Goals:

- We view English-learning students as a **culturally and linguistically diverse group who can enrich the mainstream school culture** with their cultural and linguistic assets.
- We envision technology that serves as a cultural broker, helping all learners to expand the boundaries of their intellectual, social, and cultural communities and **feel included as valuable participants** in a classroom learning community.
- We design robot-mediated collaboration activities between native English-speaking (ES) and English-learning (EL) children, where both children are **invited to learn** from each other and t**o learn to interact in equitable ways.**

A Cultural Brokering Framework



The figure above represents a theoretical framework for cultural brokering. In a framework of invitation, empathy and opportunity, an embodied robot helps children develop communication skills that is crucial for equitable collaboration. Through repeated participation in a triadic learning community of robot, EL children, and ES children, all the children gradually build respectful friendships and construct positive learner identities.

The picture on the left shows a human-mediated activity. The picture on the right shows a robot-mediated activity. Children pay attention to the robot continuously and interact much more enthusiastically throughout the robot-mediated session.

Methods:

- A class of 24 kindergarteners is divided into twelve pairs. In a socio-technical triad of robot and two children, each pair works together to help the robot, *Skusie,* learn about life on Earth.
- Activities address a wide range of topics including birthday parties and being the new kid in school.
- Each interaction activity focuses on one communication goal while incorporating several Common Core standards for kindergartners.
- Ethnographic observations are employed using a "Wizard of Oz" method in which a researcher controls the robot from afar.
- In an iterative cycle of design and observation, robot/children interaction sessions are videotaped, transcribed, and analyzed in order to continuously refine the robot mediated activities.

Expected Outcomes:

- Understanding of critical variables involved in designing robot mediation and the conditions that support children's positive outcomes.
- Children will develop collaboration skills, positive learner identities, and learning gains.

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