LEARNING TO PREPARE MATHEMATICS TEACHERS OF ENGLISH LANGUAGE LEARNERS

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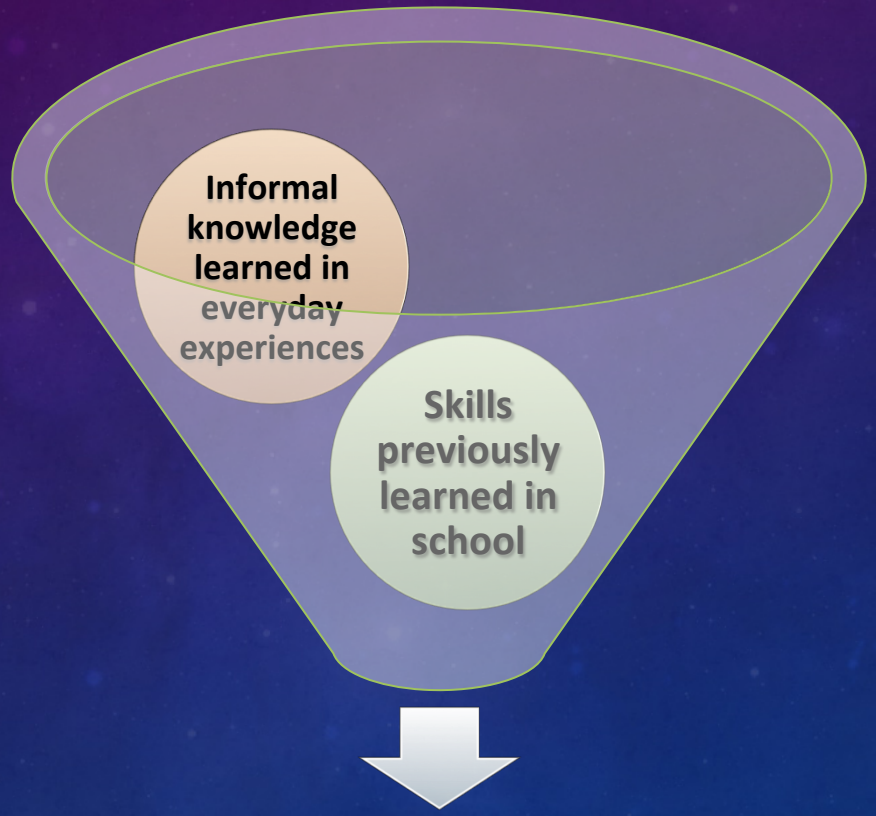
RETRIEVAL OF STUDENTS' PRIOR KNOWLEDGE



STUDENTS PRIOR KNOWLEDGE

RETRIEVAL OF STUDENTS' PRIOR KNOWLEDGE

- Students' everyday activities and experiences should be seen not only as a field of application, but as a source of conceptual development (Domínguez, 2011).

THE IMPORTANCE OF CONTEXT IN PROBLEM-SOLVING

- Studies have shown that familiar contexts help students retrieve prior knowledge and transform that knowledge into formal, written mathematics (e.g. Linchevski & Williams, 1999).

- Context-based tasks may be particularly helpful for students in linguistically diverse classrooms, since academic, context-free environments make the acquisition of academic language very difficult for English Learners.

- Conversational language, which happens in context-embedded situations where gestures and other visual cues help children understand what is being said, may help students acquire the academic language.

THE IMPORTANCE OF CONTEXT IN PROBLEM-SOLVING

- Context-based tasks stimulate conversations among peers that may involve translanguaging, which is the use of two languages in a sense-making, strategic way (Baker, 2011).

- The closer the activity is to a familiar context, the easier it will be for students to access their prior knowledge, engage in a collaborative learning process, and use translanguaging as the mediator between students' experiences and culture and the solution of the mathematical task.

- For example, a geometry task involving thunder and lightning should be accessible to all students, regardless of their cultural background, ensuring that connections are made between students' experiences and the solution of the task.

THE TASK: THUNDER AND LIGHTNING*

- Light travels almost instantly, but sound travels at approximately 1/5 miles per second in dry air. That explains why, during a thunderstorm, the farther away the lightning strikes, the longer it takes to hear the thunder. Moreover, two individuals located miles apart may hear thunder at the same time if lightning strikes at a point that is equidistant from where each individual is located.

- Suppose that two individuals are located miles apart, and at two different points P and Q. If lightning struck and both individuals heard the thunder at the same time, find all the possible places where lightning might have struck. Explain your answer.

*Adapted from Wilcox, S. K., Dennis, M., & Zielinski, R. (2000). Geometric constructions: The contributions of context. In S. K. Wilcox & P. E. Lanier (Eds.),*Using assessment to reshape mathematics teaching* (pp. 173-222). Mahwah, NJ: Lawrence Erlbaum Associates.

THE TASK: THUNDER AND LIGHTNING

- Suppose that three people are standing at the noncollinear points P, Q, and R. Lightning struck and the person at P and the person at Q both heard the thunder after the same amount of time. Is it possible that the person at R heard the thunder at the same time as the persons at P and Q? If so, can you locate where the lightning struck by means of a geometric argument?