RESEARCH ON INSTRUCTOR QUESTIONS

There has been a lot of research in education about the use of questioning strategies (for example, Almeida, Pedrosa de Jesus and Watts, 2008, Chin and Osborne, 2008; Graesser and Olde, 2003). In general, research on questioning in classrooms shows that using broad questions leads to better student outcomes, but teachers tend to ask mostly narrow questions. "Studies on questioning behavior have correlated higher-level questions with higher-level thinking and better student outcomes. Despite these findings...factual questions are the most prevalent type of inquiry posed by teachers and students (Albergaria-Almeida, 2010, as cited in Walker, 2014)."

"Teachers ask typically low level questions, requiring mainly memory. The finding of teachers' characteristic use of low-cognitive-level questions has been verified in all school levels (from elementary teaching to university) and in a variety of subject areas." (Almeida, 2010). This research dates back several decades, from the 1960's on, and shows little change in how teachers use questions to the present day. Because of this overuse of recall questions, "... other functions associated to teachers' questioning such as encouraging students to think, arousing interest and curiosity, developing students' reflection and stimulate students to ask questions of their own are not frequently found on classroom questioning" (Almeida, 2010).

Examples of specific research findings:

Experienced teachers use more broad questions than novice teachers:

From 2001-2007, Teinken, Goldberg, and DiRocco (2009) studied 98 teachers of grades 3-12 in New York City and New Jersey. They found that more experienced teachers (those with 4 or more years of teaching under their belts) asked over twice as many broad* questions as teachers with less than four years of teaching experience:

- 15% - Average percentage of broad questions* asked by new teachers
- 32% - Average percentage of broad questions asked by experienced teachers

Citation: Tienken, C. H., Goldberg, S., & Dirocco, D. (2009). Questioning the questions. Kappa Delta Pi Record, 46(1), 39-43.

*In their study, Teinken, Goldberg, and DiRocco categorized questions into "productive" and "reproductive". Productive questions were those that provided students with the opportunity to "create, analyze, or evaluate" while reproductive questions were those that asked students to "imitate, recall, or apply knowledge or information taught by the teacher." We suggest that what they describe as productive questions are equivalent to what we've defined as broad questions, and reproductive questions serve the same purpose as narrow questions.

Classroom teachers in general tend to ask more narrow questions:

In 1981, Levin and Long reviewed research on questioning from 1900 through 1980 for their book, Effective Instruction. They documented the following findings:

- Classroom teachers ask between 300-400 questions a day (Gall, 1970; Floyd 1960; Schreiber, 1967; Stevens, 1912).
- On average, only 20% of questions asked by teachers stimulated students' independent or critical thinking (Arnold and others, 1973; Corey, 1940; Floyd, 1960; Gallagher, 1965; Haynes, 1935; Wilson, 1969; Tinsley and others, 1970).

Citation: Levin, T., & Long, R. (1981). Effective Instruction. Association for Supervision and Curriculum Development, 225 North Washington Street, Alexandria, VA 22314

Asking a Series of Narrow Questions "takes over" Learner Thinking:

A video study of 129 teachers engaged in one-on-one conversations about 1798 math problems found that asking a series of narrow questions was a common teaching move used to take over children's thinking. Through these questions, the problem is broken down into tiny steps that are easy and obvious, and that require minimal effort and little understanding on the part of the student. These have the effect of getting students to an answer without engaging them in reasoning for themselves, and without them understanding what happened. See Asking a quick barrage of leading narrow questions on the handout, Common Mistakes with Questioning.

Citation: Jacobs, Martin, Ambrose, & Philipp. (2014). Warning signs! Teaching Children Mathematics, 21, (2), [107-113]

In addition to this research, BEETLES found, in field observations, that:

- Field instructors tend to overuse narrow questions and underuse broad questions.
- In observations of outdoor science instruction in 2012, similar questioning trends were observed by BEETLES staff. BEETLES staff visited 6 Northern California residential outdoor science programs and observed 8 all day hikes led by instructors that their program leaders identified as representative of their program. BEETLES staff observed that:
  - Very few broad questions were asked.
  - Many narrow questions were asked.
  - The broad questions that were asked were often about feelings or values, not about science ideas.
- In 2014, observations of three Northern California outdoor science schools using BEETLES approaches revealed that ~80% of the questions asked by field instructors were broad, and ~20% were narrow.