Title
Student Beliefs about Professional and School Science

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Students’ Beliefs about Professional and School Science

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Introduction

Previous Research
- Closed-ended questionnaires have been used to assess students’ beliefs about the nature of professional science
- Consistent finding that students have naïve views about the nature of science
- Prior studies have not assessed students’ beliefs about school science
- It is often assumed that students’ beliefs in one context (professional science) are consistent and coherent with another context (school), this may not be the case

Students’ Beliefs about Professional Science
- The purpose of experimentation
  - To gain flawless knowledge which will provide the correct answer to a question
  - To gain evidence, which then becomes a theory
- The status of scientific knowledge
  - Scientific knowledge changes because right ideas replace wrong ideas
  - Theories as a whole do not change

Methods
- 12 tenth grade students (5 female, 6 male) from one science class in an urban school
- Students’ beliefs about professional science were measured with an open-ended questionnaire prior to an inquiry unit on protein synthesis
- Students’ beliefs about school science were measured with a group interview, conducted after the inquiry unit
- Measurements were coded and analyzed for themes relevant to students’ beliefs about the purpose of an experimentation and status of scientific knowledge

Results and Discussion

Professional Science–Purpose of Experimentation (Fig. 1)

- Students see professional scientists as experimenting to get answers or understanding (Figure 1)
- Students see school science as getting right answers, and working with materials or following directions (Figure 2)
- Responses are short, vague, and ambiguous.

Professional Science–Sources of Change (Fig. 4)

- All students agreed that professional and student scientific knowledge can change, but their reasons for the source of change are inconsistent between the two contexts.
- Students claimed professional science knowledge changes in general ways, through addition, replacement, or vague change in knowledge (Figure 4).
- Students claimed their school science knowledge could change due to specific changes in experimental materials or procedures (Figure 5).
- In this case, such specific changes would not, in fact, have changed the broad outcome.

School Science–Purpose of Experiment (Fig. 2)

- Students saw their work as like scientists’ work.
- Students’ reasons for the likeness similar to ideas about professional experimentation: putting things together or figuring something out (Figure 3).
- Brevity and vagueness of students’ responses suggest limited knowledge of what scientists actually do.

School Science–Sources of Change (Fig. 5)

- Students saw their work as like scientists’ work.
- Students’ reasons for the likeness similar to ideas about professional experimentation: putting things together or figuring something out (Figure 3).
- Brevity and vagueness of students’ responses suggest limited knowledge of what scientists actually do.