

## Evaluating the Validity of an Epistemic Belief Questionnaire: Evidence Based on Internal Structure, Content, and Response Process

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The development of epistemic beliefs is regarded as an important goal of education. Three studies were conducted with preservice teachers in Australia to evaluate the validity of a new instrument that has the potential to measure sophistication of epistemic beliefs in a theoretically grounded manner. Two surveys gathered evidence on internal structure and content, and an interview study collected evidence on response process. Findings indicate that the original model and instrument required modifications. The modified instrument exhibited better internal structure. Interview data show that the instrument prompted respondents to think about the target constructs. However, the interview data also show that there are nuances in respondents' beliefs about scientific knowledge which were not captured by the written questionnaire.

*Keywords:* epistemic beliefs, scientific knowledge, validity, self-report questionnaire

Pengembangan keyakinan epistemologi (ilmu pengetahuan) pada siswa dianggap sebagai salah satu tujuan penting pendidikan. Artikel ini memaparkan hasil tiga studi pada guru-guru magang di Australia mengenai validitas sebuah instrumen baru yang mengukur perkembangan keyakinan epistemologi. Dua studi survei menyajikan bukti tentang konten dan struktur internal, dan sebuah studi wawancara memaparkan bukti mengenai proses merespons. Survei pertama menunjukkan bahwa model original dan instrumennya perlu dimodifikasi. Survei kedua menunjukkan bahwa instrumen hasil modifikasi memiliki struktur internal yang lebih baik. Data wawancara menunjukkan bahwa instrumen tersebut memaksa para responden untuk memikirkan konstruk yang disasar. Namun, data wawancara juga menunjukkan adanya nuansa dalam keyakinan responden tentang pengetahuan ilmiah yang tidak terungkap melalui kuesioner tertulis tersebut.

*Kata kunci:* keyakinan epistemologi, pengetahuan ilmiah, validitas, kuesioner lapor-diri

Epistemic beliefs refer to individuals' views and understanding about the nature of knowledge and knowing (Bendixen & Feucht, 2010; Hofer & Pintrich, 2002). Epistemic beliefs has become the focus of much research because of its influence on how students learn, and also because its development is regarded as a valued aspect of education (Bendixen & Feucht, 2010; Magolda, 2008; Magolda, King, Taylor, & Wakefield, 2012).

Psychologically, the development of epistemic beliefs is founded upon early cognitive achievement that begins at around the age of four, when children start to become aware that one's knowledge represents, rather than simply copies or reflects, objective reality (Kuhn, 2000). By viewing knowledge as representations,

children also start to become aware that knowledge could be false and that claims to knowledge may need to be evaluated. Such awareness paves the way for higher order cognitive processes valued in education, such as critical thinking and causal reasoning (Kuhn & Pearsall, 2000; Kuhn & Udell, 2003).

Studies of epistemological development often employ interviews and other intensive data collection methods (Kitchener & King, 1981; Magolda, et al., 2012; Perry, 1970/1999). To complement such methods, researchers and educators also need self-report instruments that allow the efficient collection of data across many individuals. The present study seeks to evaluate the validity of a new instrument which has the potential to assess the sophistication of epistemic beliefs in a theoretically sound manner (Greene, 2007; Greene, Azevedo, & Torney-Purta, 2008; Greene,

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