Gender and Grade Level Differences in Epistemological Beliefs of Iranian Undergraduate Students

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Abstract: The aim of this study was to investigate gender and grade level differences in epistemological beliefs of undergraduate students in an Iranian university. The sample consisted of 302 Iranian students at Shiraz University (Mean age = 20.78 year, SD = 1.58), selected by random clustering sampling. They completed Epistemological Beliefs Questionnaire. Results showed males had some more naive epistemological beliefs than females. Also, first year students viewed learning as quick and knowledge as simple more than last year students.

Key words: Ability to learn, innate ability, fast learning, simple knowledge, certainty of knowledge

INTRODUCTION

Epistemological beliefs which defined as individual's beliefs about knowledge and knowing (Pintrich, 2002) have been first introduced in educational research about 30 years ago (Perry, 1970). Today, these beliefs have received a considerable amount of attention from researchers (Phan, 2008; Lodewyk, 2007; Cano, 2005; Whitmire, 2004; Schommer, 1993a). Schommer (1990) proposed a multidimensional system of epistemological beliefs as opposed to unidimensional one. Schommer hypothesized five dimensions of epistemological beliefs including:

Stability (Is knowledge certain or tentative?), structure (Is knowledge simple or complex? Is it isolated or integrated?), source (Does knowledge originate from an external source or from personal experience?), speed of acquisition (Is knowledge acquired quickly or gradually? Is the process easy or effortful?) and control of acquisition (Is the ability to learn fixed or developed overtime?).

To assess these different dimensions of epistemological beliefs, Schommer (1990) developed an instrument and found evidence to support the multidimensionality of beliefs. Furthermore, Schommer (1990) argued that these beliefs were more or less independent from one another.

Schommer (1993a) reports that the higher the beliefs in innate learning, simple knowledge, quick learning and certainty of knowledge, the higher the student's tendency to subscribe to a simpler view of the world. Schommer's research caused a lot of interest on epistemological beliefs and metacognition in learning processes and produced a series of research on related issues such as epistemological beliefs in text comprehension (Schommer et al., 1992), goals and academic performance among students (Braten and Stromso, 2004; Schommer, 1993b), comparison of beliefs between gifted and non-gifted high school students (Marzooghi, 1996; Schommer and Dunnell, 1994) and domain independentness of epistemological beliefs (Schommer and Kiersten, 1995).

There have also been a series of research focused on gender differences in epistemological beliefs, but, their results are inconclusive. Some studies have found important gender differences in epistemological beliefs (Cano, 2005; Baxter Magolda, 1992; Belenky et al., 1986). In some studies, females showed more advanced beliefs than (Lodewyk, 2007; Mason et al., 2006; Schommer and Dunnell, 1994; Schommer, 1993a). On the other hands, there are many other studies that find almost no gender differences in epistemological thinking or beliefs (Phan, 2008a; Buehl et al., 2002; Hofer, 2006; Kulh et al., 2000; King and Kitchener, 1994; Kulh, 1991).

Pintrich (2002) has suggested that there may not be important gender differences in epistemological thinking when it is defined in terms of separate dimensions of epistemological beliefs. That is, when individuals are asked to focus on specific dimensions of epistemological beliefs, rather than more holistic and general ways of thinking, gender differences do not emerge.
Development of epistemological beliefs during academic years has also been studied. Some researchers found evidence in supporting the effect of grade level on epistemological beliefs of students in middle school or university years (Mason et al., 2006; Cano, 2005; Kuhn et al., 2000; King and Kitchener, 1994; Schommer, 1993a; Jehng et al., 1993; Perry, 1970). Mason et al. (2006) noted at the different ages, more educated students hold more sophisticated beliefs about the nature and acquisition of knowledge. University students with more sophisticated epistemological beliefs use more elaborate learning strategies, enjoy thinking deeply about subject and are motivated to learn because of an inherent interest in or appreciation for the subject (Harris, 2003). Research findings showed that epistemological beliefs of undergraduates affect topic, the use of mediators, search techniques, the evaluation of information and the ability to recognize authority (Whitmire, 2003, 2004).

In a longitudinal study, Phan (2008b) showed that epistemological beliefs influence students learning approaches. Braten and Stromso (2005) noted that epistemological beliefs predict self-regulated learning among Norwegian postsecondary students. Also research findings suggest that higher education institutions should provide scaffolding to foster the development of a mature learning experiences among their students (Rodrigues and Cano, 2006).

The purpose of the present study was to investigate gender and grade level differences in epistemological beliefs among Iranian undergraduate students. This provides the opportunity to determine whether gender and grade level differences were related to differences in students' epistemological beliefs across a different culture (Iran). Two questions of this research are: Is there any significant differences between epistemological beliefs of male and female and between first and last year students in a sample of Iranian undergraduate students?

MATERIALS AND METHODS

The study was carried out in 2007-2008 education year. The participants were 302 Iranian undergraduate students at Shiraz University (64% female and 36% male), selected by random clustering sampling. They consisted of students from the faculties of Humanities (16%), Education and Psychology (38%), Art (7%) and Engineering (39%). The age range of the respondents were between 18 to 27 years (Mean = 20.78, SD = 1.58). Most students came from middle income families, 51% of them were 1st year and 49% were 4th year students.

Instrument: Schommer's (1990) Epistemological Questionnaire has served as an effective tool to assess student's beliefs regarding learning and the nature of knowledge. Schommer's questionnaire has 63 items divided into four subscales of fixed ability, simple knowledge, fast learning and certainty of knowledge. Items scored on a 5 point likert-type scale, with 1 = strongly disagree and 5 strongly agree for each item.

The questionnaire has been adapted by Marzocchi (1996) in a earlier study on Iranian students. Marzocchi (1996) did a factor analysis on the data and extracted five factors including:

- Inability to learn to learn
- Innate ability
- Fast learning
- Simple learning
- Certainty of knowledge

This adapted instrument was used for data gathering in this study and Cronbach's alpha coefficients were calculated as a measure of the reliability of the data obtained. Alphas' coefficients were from 0.52 to 0.63. In Schommer's studies, the reliability coefficients were in the range of 0.45 to 0.71 (Schommer, 1993a).

Also, items having low correlation with subscales' total scores were deleted. As a result, 51 items remained in the questionnaire. Mean composite scores for each of the variables were used in the current investigation.

Procedure: The student's agreement to participate in the study was sought. The students agreed and completed the questionnaire during classroom time. They were asked to give other information such as their age, grade level and sex.

RESULTS AND DISCUSSION

To study gender differences in epistemological beliefs, a multi variate analysis of variance (MANOVA) was conducted, with the dimensions of epistemological beliefs as dependent variables and gender as independent variable (Table 1). The analysis yielded significant differences between male and female students on the beliefs of ability to learn how to learn [F (1, 280) = 7.83, p<0.005], innate ability [F (1, 280) = 5.78, p<0.017] and

| Table 1: Means and standard deviations for females and males on epistemological beliefs scores |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Epistemological beliefs                      | Females (N = 181)                             | Males (N = 101)                               | Total (N = 282)                               |
| Ability to learn                              | 2.08±0.44                                     | 2.24±0.46                                     | 2.14±0.46                                     |
| Innate ability                                | 2.28±0.50                                     | 2.43±0.59                                     | 2.33±0.54                                     |
| Fast learning                                 | 2.93±0.52                                     | 3.00±0.52                                     | 2.96±0.53                                     |
| Simple learning                               | 2.18±0.43                                     | 2.34±0.50                                     | 2.23±0.46                                     |
| Certainty                                     | 2.36±0.36                                     | 3.29±0.34                                     | 3.30±0.35                                     |

The values are shown in Mean±SD
simple learning \[F(1, 280) = 7.83, p=0.005\] (Table 2). In these beliefs, mean score of males were higher than females. It means male students showed naive view of learning significantly more than female students. There was no significant difference between males and females in beliefs of fast learning and certainty of knowledge.

Similar to the previous analysis, regarding grade level differences, a MANOVA was computed, with the dimensions of epistemological beliefs as dependent variables and grade level as independent variable. Descriptive statistics are shown in Table 3.

MANOVA revealed that first year students significantly differentiated from last year students in the beliefs of innate ability \[F(1, 300) = 6, p<0.02\] and simple learning \[F(1, 300) = 5, p<0.03\] (Table 4). In these beliefs, mean score of first graders were higher than last graders. It means innate and simple view of knowledge appears to decrease as the year level goes up. The effect of year level on other beliefs scores were not significant.

There was evidence of gender differences in epistemological beliefs of undergraduates. In line with much of the research on gender differences in epistemological beliefs (Lodewyk, 2007; Mason et al., 2006; Cano, 2005; Schommer and Dunnell, 1994; Baxter Magolda, 1992; Belenky et al., 1986) girls were higher than boys in terms of their thinking about the nature of learning, the source of knowledge, or the structure of knowledge.

In addition, the results related to grade level showed last graders had more sophisticated epistemological beliefs than first graders. This provides support for some studies which document a positive trend across graders in middle school or university years (Kuhn et al., 2000; Mason et al., 2006; King and Kitchener, 1994; Schommer, 1993; Jehng et al., 1993; Perry, 1970).

These results have both theoretical and practical values. These findings can help teachers and planners understand how gender and grade level affect individuals' epistemological beliefs. Teachers and classrooms can influence the development of undergraduates' epistemological beliefs which influence the decisions they make as they study and learn. So, there is a need to help students move from naive epistemologies to more complex epistemological beliefs as Lee and Ashby (2000) suggest.

This research represents an investigation on the gender differences in epistemological beliefs of a nonwestern culture (Iran). Research on similar samples is required to verify the present findings. It is also recommended that future research consider the interaction of gender and other personal or contextual variables, such as age, classroom environment and academic disciplines. In addition, longitudinal studies are needed to determine how epistemological beliefs of students change during university years.

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