

Epistemological Beliefs and University English Learning Demands: The Case of First-year Students

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Abstract

Research evidence shows that epistemic beliefs, among other individuals' affective characteristics, play an important role in the process of language learning. The aim behind the present study is to substantiate the role students' language learning preconceptions play in predicting the success or failure of instructional methods. For this end, the epistemological beliefs of 110 freshman students enrolled in the Department of English, University of Mentouri were analysed using the Epistemic Beliefs Inventory (EBI). The data analysis showed that university students during their entire first year hold naive epistemological beliefs ($M=3.18, >2.72$). This paper suggests that students' unintended and immature views may interfere with their ability to learn the English language at the university level given that the latter is a context where there is no room for spoon-feeding and where students are expected to be mature self-regulated learners. Pedagogical implications are suggested not only to help students adapt to university demands and adopt sophisticated beliefs but also to help teachers take instructional decisions that promote students' future conceptual change.

Key words: naive and sophisticated epistemic beliefs, conceptual change, English learning, and adapting/adopting instructional methods

Introduction

Previous research emphasized the importance of providing sufficient and more context-specific evidence to better current instructional practices. To this end, researchers studied learners from different age groups and learning contexts. In the hope of contributing to the international understanding of teaching and learning English as a foreign language, we decided to study epistemological beliefs among Algerian English learners. Why investigating epistemological beliefs and not any other individuals' characteristics? Epistemological beliefs are the factors that help students manage and survive "the highly complex, contradictory, and evolving nature of knowledge" that they have to deal with at the university level (Schommer, 1998, p.138).

Epistemological beliefs are the assumptions that individuals accumulate about knowledge and knowing. They were first thought of as a simple process of dependent beliefs that people share about epistemological questions. They were explained in a linear model of nine stages starting from fact-oriented, right or wrong, dualistic thinking to relativistic context-oriented thinking (Schommer, 1994). An alternative conceptualization of beliefs was proposed in 1990. The latter suggested that epistemological beliefs consist of independent factors and that students can hold mature beliefs toward one dimension and naïve beliefs toward the other (Schommer, 1994). Students' epistemological beliefs include assumptions about the nature of knowledge itself (simple and certain vs. complex and changing), source of knowledge (external vs. internal) and the process of obtaining it (quick vs. gradual) (Schmeisser et al., 2013).

The importance of investigating students' epistemological beliefs is twofold. Research studies showed that all the epistemological dimensions, namely certain and simple knowledge, innate ability, quick learning and omniscient authority, are strong predictors of school achievements and successful learning (Rukavina & Daneman, 1996; Savojj, Nuisha & Boreiri, 2013). In the language learning context for example, students' epistemic beliefs were found to have a direct effect on student readers multiple text comprehension- intertextual understanding (Strømsø, Braten & Samuelstuen, 2008; Braten, Britt, Strømsø & Rouet, 2011). Research showed that students with less evolving beliefs about knowledge and learning will find it difficult to integrate meaning and to make text-to-text connections. The impact epistemological beliefs have on academic learning is due to the fact that these beliefs also have an effect on students' choice and use of learning strategies, problem-solving tactics, motivation, learning objectives and regulation of learning (Bernardo, 2009; Mellat & Lavasani, 2011).

In the same way, epistemic assumptions can affect the way students benefit from instructional trainings. Teachers expect their students to know certain things and based on those expectations they take instructional decisions. Teachers who take for granted that their students hold mature beliefs about knowledge expect them to understand concepts and do tasks that might be cognitively challenging for them. For example, when students who believe that knowledge is simple and made of isolated facts are asked to synthesize, they will not only do the task poorly but also might not even understand what the task is all about to begin with.

In fact, the present work is an offshoot of a larger research work that investigates the extent to which epistemological beliefs can predict the success or failure of instructional practices. Epistemological beliefs can be regarded as a mediating variable; a variable that "transmits the effect of one variable on the other, making up a causal chain" (Matthews, Deary &

Whiteman, 2009, p. 284). Teachers and researchers have to take into consideration the role of epistemic beliefs in mediating the effect of any given instruction on students' learning.

Learners' epistemological assumptions are subjected to change. When talking about epistemological beliefs, one has to consider conceptual change. Conceptual change is the process of evolving and reconstructing one's beliefs, attitudes and expectations. It is fundamental for learning and academic success. Motivation and intentional conceptual change are closely related, for individuals cannot make a change by revising old beliefs and formulating new ones unless they are willing to (Patrick & Pintrich, 2001). Change in one's beliefs is twofold: the product (the change itself) and the process (Luque, 2003). Conceptual change is "a process that demands some prerequisites. Different outcomes may result from the process, but the prerequisites to initiate the process are the same." In addition to motivation, learners have to know what to change and how to control the change (ibid, p. 138) that is why teachers can be found very helpful in assisting students in the process of altering beliefs.

The Present Study

Participants

The participants who took part in the current study are 110 first-year students enrolled in the Department of Letters and English Language, University of Mentouri. The reasons why we have decided to work with first-year students are the following: first-year students often find it hard to adapt to university demands; they also often come from high school with a set of language misconceptions that might interfere with their future construction of knowledge. The sample was comprised of 83 female (75.5%), and 27 male participants (24.5%). As regards age, they were between 18 and 24 years of age for both sexes. For that matter, in the present work we do not aim to study any gender or age differences.

Research Instrument

To evaluate our sample's epistemological beliefs and later, in the post-treatment phase, conceptual change, we used the Epistemological Beliefs Inventory (EBI) developed by Schraw, Bendixen, and Dunkle (2002). The EBI is a 32-item questionnaire based on the original instrument of Schommer (1990). Revisions and pilot testing of the original 63-item inventory led to the development of the version used in this study (Bendixen et al., 1998). The EBI includes the five dimensions of epistemological beliefs suggested by Schommer including: simple knowledge (items# 1, 10,11,13,18,22,24,30), certain knowledge (items# 2,6,14,19,23,25,31), innate ability (items # 5,8,12,15,17,26,32), omniscient authority (items# 4,7,20,27,28) and quick learning (items# 3,9,16,21,29). The simple knowledge subscale includes items such as: 'It bothers me when instructors don't tell students the answers to complicated problems.' A sample item from the certain knowledge subscale is 'I like teachers who present several competing theories and let their students decide which is best.' The innate ability subscale includes items like: 'Really smart students don't have to work as hard to do well in school.' The omniscient authority includes items like: 'Students should always obey the law.' Finally, a sample item from the quick learning subscale is 'Students who learn things quickly are the most successful.'

This questionnaire is based on a five-point likert scale in which subjects answer by expressing to what extent they agree with the statements. Items # 2,6,14,20,24,30,31 are reverse coded; instead of giving a value of 5 to 'strongly agree,' we gave a value of 1. It is a cumulative scale; the general score is obtained by adding up the value of each agreement or disagreement option. High obtained scores indicate naive epistemic beliefs while low scores indicate

sophisticated beliefs. Students with naive epistemic beliefs are likely to think that the ability to learn and excel is fixed at birth, i.e. it is impossible to improve and develop one's skills and capacities; learning is a process that either happens quickly or never at all, and that knowledge is handed down by authority and it should never be subjected to questions (Winne & Nesbit, 2009). They also think that knowledge is simple and easy to understand because it is made of unrelated small bits rather than complex and coherent wholes (Winne & Nesbit, 2009).

Description of the Results

Table 1. Students' Pre and Post Treatment Epistemological Beliefs

	Pre-Treatment Results		Post-Treatment Results	
	Mean	Std.	Mean	Std.
Overall Scale Results	3.18	.33	3.19	.29
Simple Knowledge	3.3	.64	3.46	.42
Certain knowledge	3.1	.52	2.91	.57
Innate Ability	3.36	.62	3.41	.50
Omniscient Authority	3.39	.71	3.38	.60
Quick Learning	2.64	.33	2.65	.51
Valid N	110		110	

Data were collected via the EBI survey. As can be seen in the table above the five dimensions of epistemic beliefs described earlier are reported. The mean scores of the five subscales in addition to the overall scale were used in the analysis thanks to summative nature of the instrument. Students' beliefs were investigated at the beginning and the end of the academic year to study the possibility of promoting students' beliefs about knowledge. In the present paper, studying for an entire academic year was considered the treatment.

The majority of participants started the academic year with naive *general* epistemological beliefs ($M= 3.18 > 2.72$). Only 5.45% of students (6 respondents) had mature beliefs towards knowledge and learning. Students held naive beliefs regarding the simple knowledge ($M= 3.3 > 2.72$), certain knowledge ($M= 3.1 > 2.72$), innate ability ($M= 3.36 > 2.72$) and omniscient authority ($3.39 > 2.72$) subscales. Students only had sophisticated beliefs regarding the quick learning subscale ($M= 2.64 < 2.72$). The participants thought that learning is not a process that can be accomplished rapidly. They thought that learning success is not associated with the speed of doing things and finding answers and solutions.

Unfortunately, the post-treatment general mean did not show any improvements in students' epistemological beliefs. Spending an entire year at university, more specifically in the Department of Letters and English Language, University of Mentouri, as freshman students did not result in any conceptual change in the majority of our students. However, instead of 5.45%, 8.18% held at the end of the treatment sophisticated beliefs and showed signs of conceptual change. A raise of 0.01 was noticed in students' post general epistemic beliefs. In fact, higher

means indicate less sophisticated epistemological beliefs. Nevertheless, after running t-test for paired samples ($t(109) = -.489, p(.626) > 0.05$), we found out that the 0.01 raise in the post general mean was not significant; therefore, pre and post general means are not statistically different.

At the end of the academic year, students still think that knowledge is simple ($M=3.46 > 2.72$), certain and invariable ($M=2.91 > 2.72$) and the ability to obtain it is fixed at birth ($M=3.41 > 2.72$). They ($N=110$) also believe that knowledge is unquestionable and often handed down by authority: usually teachers and parents ($M=3.38 > 2.72$). They thankfully still think that learning is anything but a quick process ($M=2.65 < 2.72$). Regarding the quick learning subscale, students experienced a slight change in the mean of only 0.01. However, such post-treatment mean raise was also found insignificant ($t(109) = -.163, p(.871) > 0.05$). In other words, students' assumptions regarding the quick learning subscale did not get less sophisticated.

Table 2. Pre and Post T-test Results

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Simple knowledge	-.1602	.5784578	.0551538	-.269540	-.050914	-2,905	109	.004
Certain Knowledge	.1519	.70579	.06729	.01857	.28532	2,258	109	.026

As could be observed in the table 1, an increase of 0.16 was noticed in the students' post-test beliefs regarding simple knowledge. A t-test for dependent samples was used to see to what extent this mean difference is significant. The t-statistic is -2,905 with 109 degrees of freedom. The corresponding two-tailed p-value is .004 which is less than the threshold probability value 0.05 indicating that there is a significant mean difference between students' pre and post-treatment simple knowledge subscale results. Given that any increase in the mean implies less sophisticated beliefs, one can say that students ended the academic year with more naive assumptions regarding simple knowledge. This indicates that students do not try to put ideas together to solve learning problems and answer questions. It also indicates that students think that knowledge consists of isolated facts, and that learning is the process of memorizing bits of information

Although students post-treatment mean regarding the certainty of knowledge still indicates naive beliefs, we have noticed a change towards more sophisticated attitudes. As can be seen in table 2 (second row), there is a statistically significant difference in scores between pre ($M=3.1, Std=.52$) and post-treatment assumptions ($M=2.91, Std=.57$), $t(109) = -2.258, p(.026) < 0.05$. The mean drop in post-treatment results was 0.15 with a 95% confidence interval ranging from .018 to .285. Students now less think that knowledge consists of unchanging facts.

Discussion

The two aims behind this research work are: to try to shed some light on students' learning preconceptions grounded in their previous years of studies and to investigate to what extent spending a year at university as freshman English language students would promote conceptual change. Pre-treatment EBI results indicated that students enter university with strongly held misconceptions about knowledge and learning. In addition, spending an entire academic year at university did not seem to help much in promoting students' conceptual change. The majority of freshmen believe that knowledge is made of completely separate and unconnected simple facts rather than integrated concepts. This latter also indicates that students are unable to put together information in complex networks and are unable to construct their own knowledge, something which is vital for learning.

As for the omniscient authority dimension of epistemic beliefs, students think that knowledge is inaccessible unless provided by a source of authority: teachers, for example. Despite the fact that information nowadays is easier to obtain than any time before, students still depend on others. This finding is consistent with the fact that languages are still taught in teacher-centred environments in which students play the role of passive recipients. As a result of these omniscient authority beliefs, students also think that knowledge is unquestionable something which leaves literally no room for debate and negotiation of meaning. Admittedly, students have developed relatively more sophisticated beliefs in relation to certain knowledge. Students now, after finishing their first year at university, less think that knowledge is invariable and fixed.

The results of the quick learning subscale tell us that the freshmen under study thankfully do not think, either before or after the treatment, that learning is a process that can be accomplished rapidly or never at all. They believe that learning is an ongoing process. However, a previous study demonstrated that beliefs about the speed of the learning process were not found to be significant predictors neither of university students' academic achievement nor of strategy choice and use (Dahl, Bals & Turi, 2005).

The present work tried to draw attention to an influential affective variable. Epistemological beliefs are suggested as a way to explain why some students do not respond positively to the offered instructional trainings and find it hard to adapt to the university environment. The main aim of this paper is to urge teachers to know about their students epistemological assumptions and take the necessary remedial instructional decisions. Simply put, students with naive beliefs have a different understanding of the nature of knowledge and learning which is not often communicated and which teachers must be aware of.

Thankfully, students' epistemological beliefs can be changed and conceptual change can be promoted. Research evidence showed that instructional environments can mitigate naive beliefs and promote sophisticated ones. Learner-centred teaching approaches in which teachers dethrone themselves from being the centre of the instruction and give more chance to students to take control of their own learning and construct their own knowledge can promote students' epistemological beliefs (Goldburg, 2010). For what is worth, a teacher "with more sophisticated epistemological beliefs [is] more likely to endorse student-centred instructional practices that emphasize critical reasoning" (Schraw et al, 2013, p. 268).

Constructivism, a learner-centred approach, can be suggested as a way to promote students' epistemological development given that it is "an epistemology, a learning or meaning-making theory, that offers an explanation of the nature of knowledge and how human beings learn"

(Siddiqui, 2008, p. 139). This teaching and learning approach may help change students' naive beliefs regarding the source and certainty of knowledge. To help students understand the changing and tentative nature of knowledge, constructivist teaching allows students to experiment, question and explore the different facets of knowledge rather than just blindly swallow whatever they are presented with. Constructivist instructions also encourage students to go seek information, integrate ideas and build their own networks of information. In other words, constructivism help students understand that knowledge is not often external and handed down by authority.

In addition to learner-centred constructivist- instructions, teaching students' critical thinking proved to promote sophisticated epistemological beliefs. According to Kienhues, Bromme & Stahl (2008), a short refutational epistemological instruction,' as opposed to a non challenging informational instruction, will help change students' epistemic assumptions from unintended to more mature domain-specific beliefs. Subjecting students to controversial topics where they have to question and argument will help students change their opinions about the certainty and simplicity of knowledge.

There are other teaching practices that can promote students' mature beliefs (Siddiqui, 2008). Test questions, for example, should encourage students to apply and put into practice, analyze, synthesize and evaluate the learned notions. Teachers should choose test questions that address high cognitive abilities by giving students the opportunity to go beyond merely remembering the learned materials. In the same way, teachers should not adopt the 'traditional lecture and test' way of teaching. When teachers teach, *solely*, to prepare students for tests, they encourage students to adopt performance rather than learning objectives. They also encourage students to memorize whatever it was taught without any further processing or integration with previously acquired notions.

Conclusion

Epistemological beliefs are a challenging construct to investigate. Just like other cognitive and affective variables, epistemological beliefs are difficult to measure. Despite the fact that there is a plethora of research methods and instruments, there is still a need for investigation tools that tackle epistemological beliefs from different angles and in different learning contexts (Bernat, 2012). Researchers also have to study more in depth the direct and indirect effects of epistemic assumptions on leaning and knowledge because "less has been said about their actual impact in the classroom and beyond" (Bernat, 2012, p. 449).

Another challenge in studying students' epistemological development is the impact of teachers' beliefs about learning and knowledge on their students'. Teachers' epistemological beliefs, just like students', experience change and influence both **their teaching** and **their students' learning**. Teachers' epistemological beliefs are of a great importance especially "when teachers are confronted by and engaged with changes to their practice" (Harteis, Gruber, and Lehner, 2006, p. 127). Given that the teaching industry is experiencing a lot of changes like integrating technology, e-learning and constructivist-aligned instructions, teachers have to constantly revise their beliefs.

About the Author

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