

Epistemological beliefs of secondary school teachers in light of their teaching practices based on the grounded theory

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Abstract

The current study aimed to identify the epistemological beliefs of secondary school teachers in light of their teaching practices. The researchers applied the qualitative approach based on the method of grounded theory. Data were collected through classroom observations, interview sheets and focus groups. Having determined the credibility and reliability of the instruments, the data were thoroughly read, and analysed using the topology data model. Results indicated the participants' responses converged in the dimension of the nature and certainty of knowledge, the dimension of knowledge acquisition and in the speed of knowledge acquisition, while responses varied in the dimension of the concept of epistemological beliefs, the dimension of the sources of epistemological beliefs and the factors in their formation, and in the dimension of knowledge authority. The study highlighted the importance of integrating epistemological beliefs in teachers' qualification programmes to practise such beliefs in the classroom environment.

Keywords: Epistemological Beliefs, Teaching Practices, Secondary School Teachers

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1. Introduction

The concept of epistemological beliefs, which are set of perceptions and ideas on the meaning, nature and stability of knowledge, emerged to represent an essential factor in the learning process, which includes many features derived from the abstract philosophical dimension of knowledge and includes a set of perceptions and ideas centred on knowledge, its nature, source, validity, acquisition and speed of acquisition. Needless to say, that epistemological beliefs directly affect the teaching performance, being a set of behaviours that include the educational processes, procedures, and activities carried out by the secondary school teacher during the class session.

Kardash and Sinatra (2003) consider epistemological beliefs as an individual's ideas about knowledge, its organisation, stability, speed of acquisition and control it.

Epistemological beliefs are the most important factor in guiding thinking processes; explaining how to obtain knowledge and judge its quality; and in understanding mind processes, motivation, and academic performance. Moreover, they have a strong and effective influence on all behaviours and decisions that an individual may make (Schommer, 2004).

Hofer (2004) considers epistemological beliefs in the classroom environment to be very significant, as they affect the selection of educational goals, teaching strategies, ways of thinking and the applied skills. That is why the study (Phan, 2008; Kardash & Sinatra, 2003) highlights the importance of epistemological beliefs in self-learning, perseverance in facing difficult tasks, the use of metacognitive processes and the development of achievement among students.

Ongowo (2021). Studied the relationship between science epistemological beliefs and achievement among coeducational secondary schools of Homa Bay County, Kenya. The study showed grade level differences in terms of source, certainty and development, where non-significant grade level differences in terms of justification were shown, which means that grade level has an influence on development of epistemological beliefs (source, certainty and development).

Schommer (2004) assumes the existence of five dimensions of epistemological beliefs, indicating that these beliefs have two poles; in other words, the degree to which an individual possesses these aspects or dimensions can vary. These dimensions can be summarised as follows:

The first dimension: the structure of knowledge refers to either the belief that knowledge is comprised of simple, separate units or the belief that knowledge is complex, complicated, and cumulative.

The second dimension: the stability of knowledge refers to the individual's gradual thinking from believing that knowledge is absolute, stable, and certain, or it is empirically developed.

The third dimension: the source or the authority of knowledge refers to the individual's belief that authority is the source of knowledge as opposed to developed empirical knowledge.

The fourth dimension: controlling knowledge acquisition is the belief in the innate ability to learn as opposed to the acquired ability to learn.

The fifth dimension: speed of knowledge acquisition that is the belief in speedy learning, as opposed to gradual learning.

2. The Study Problem

It is acknowledged that teachers play a major role in directing and managing the educational process, with their epistemological beliefs and performance skills being reflected in their teaching

practice and in how they deal with various classroom situations. Therefore, the disclosure of teachers' epistemological beliefs poses a challenge to the educational system's ability to achieve its educational goals, as these beliefs directly influence students' thoughts and behaviours. Many studies have indicated the impact of epistemological beliefs in shaping and building the educational environment; for example, Paulsen and Feldman's study (2005) indicates that teachers' epistemological beliefs are related to behaviour, motivation and self-organised learning among students, while Phan's study (2008) indicates that teachers' epistemological beliefs are related to academic achievement and self-motivation. A study by Chan et al. (2011) indicates that epistemological beliefs play a role in directing thinking processes, skills, and motivational beliefs.

It is worth mentioning that some studies (Al-Mohammadi, 2017; Baqi'i, 2013) argue that epistemological beliefs are closely related to the objectives and content of the curriculum and the teaching strategies used, and that this is an indication of the importance of understanding the nature of teachers' epistemological beliefs.

In light of the foregoing, the study problem is represented in the question:

What are secondary school teachers' perceptions of the nature of epistemological beliefs in light of their teaching practices?

The study problem can be defined in detail through the following questions:

- 1- What are the sources of epistemological beliefs according to the responses of secondary school male and female teachers?
- 2- What is the concept of epistemological belief according to the responses of secondary school male and female teachers?
- 3- What are the participants' responses regarding the nature of epistemological beliefs (the structure of knowledge), the certainty and stability of knowledge, the control of its acquisition and the speed of this acquisition?

Thus, given the absence of relevant studies in the Saudi educational environment, there is an urgent need, in the researchers' opinion, to extrapolate the epistemological beliefs of secondary school teachers in light of their teaching practices to identify the strengths and weaknesses in these beliefs and help decision-makers to develop teaching performance. It is hoped that this study will pave the way for researchers to reveal the role of epistemological beliefs in the classroom.

3. Methodology and Procedures

Study approach

In this study, the two researchers used a qualitative approach based on the methodology of the grounded theory due to its relevance to the nature of the research, as the purpose of the current study is to build an explanatory theory that describes the epistemological beliefs of secondary school teachers in the light of their teaching practices. The study questions and its dimensions were derived from the relevant theoretical literature, particularly a study conducted by Schommer (2004).

The collected data was analysed using the topological model. The data was classified into two main categories, which were then searched for patterns and sub-categories emerging from the data, searching for the relationship between them, and then displaying them with some quotes (Croswell, 2017).

Context of the study and description of the participants

The study included all secondary school teachers in the public and private schools of Dammam, Khobar and Dhahran in the Eastern Province of the Kingdom of Saudi Arabia working during the 2021 academic year – 4,063 teachers according to the statistics of the General Administration of Education in the Eastern Province of 2021. Twenty-two participants in the study were chosen in an intentional way, as they were the most willing, able and flexible to communicate with researchers, and they were ready to provide responses, information and documents that would help develop a theory regarding the epistemological beliefs of secondary school teachers. The researchers used sampling with maximum spacing, as it allows researchers to form a study sample from participants with different characteristics and traits (Corbin, 2015). The differences between the chosen participants in this study are clarified in Table 1.

Table 1. Distribution of participants according to characteristics and traits.

Education type	Public (government)	10
	Private	12
Gender	Male	9
	Female	13
Teaching experience in years	10 years or less	8
	11 years and more	14
Discipline	Scientific	7
	Health	5
	Humanities	10
Total		22

4. Instruments and procedures of the study

Interview

The two researchers first conducted a semi-structured oral interview on the epistemological beliefs of secondary school teachers in Dammam. The interview included a number of open questions related to the research objective and topic, allowing investigating and probing the depth of the theory to be discovered. These questions included the axes and dimensions of the main epistemological beliefs referred to in the theoretical literature, namely, the concept of epistemological beliefs, their sources, the dimension of knowledge structure and its stability, sources and acquisition and the speed of learning or the speed of knowledge acquisition.

The interviews were conducted through social media platforms, independently with each teacher, and the average time of each interview was 30 minutes. A data dump was performed manually after the fifth interview for a preliminary analysis and classification of the data. Subsequently, an axial classification was done by linking and organising concepts and ideas in similar frameworks, up to the stage of selective coding, which constitutes the final outputs of the participant's responses.

5. Observation

The free class observation model was used to observe teachers and identify the reality of their epistemological beliefs during actual teaching, and the sides that can be viewed during the

observation procedure. The researchers recorded everything that could be observed during 37 class sessions of the participants.

Each participant chose the date and topic of the lesson. The observations were recorded by the researchers immediately after the class session, after discussion and dialogue, to record the most important observations, after discussion with the participating teacher to express his/her opinion, and make amendments, if any.

6. Focus group

Seven of the twenty-two participants were interviewed as a group. The teachers all held a bachelor's and master's degree in their disciplines. The group included two life sciences teachers, an Islamic sharia teacher, a female computer teacher, a female chemistry teacher, a female social studies and national education teacher, and an Arabic language teacher. Their teaching experience ranged from 3–16 years. The group was asked open and interactive questions on the concept of epistemological beliefs and their main sources and dimensions. The group were given opportunities for discussion, internal dialogue and free expression of opinion in order to reach a common and close understanding about the presented responses. The researchers recorded the most important information and observations that took place between the participants or with the researchers.

7. Credibility and objectivity

Credibility refers to the researchers' attempt to match the results with reality or represent the extent to which the interpretations are consistent with the facts. Credibility was enhanced in the current study by building positive relationships with the participants and giving them the freedom to choose the time, topic, or lesson to be observed. Observation was repeated for several participants in various lessons and topics. Their observation data was shown to them for modification with a view to involving them in reading, analysing, classifying and interpreting the data.

To ensure consensual validity or validity of arbitrators, findings and interpretations were reviewed by two arbitrators specialised in curricula and teaching methods.

8. Data analysis

The following steps were taken to analyse the data from the study instruments:

- Opening coding by collecting primary data, dumping it and arranging and comparing concepts in groups in the form of categories created by adopting coding for each response in the interviews, observations and focus group.
- Axial coding by rearranging and classifying the data and linking the categories in both an inductive and deductive manner, placing similar ideas with common denominators in sub-categories to facilitate dealing with them and recording observations during in-depth reading of the data.
- Determining the patterns and types or selective coding. Through this process, the relationship between the categories is understood, and linked with each other in order to obtain one main category that explains the phenomenon under study.

9. Formulation of Results

The researchers formulated the patterns and types identified in the previous stage in the form of results and compared them with the results of related studies. The results were interpreted and justified in light of the participants’ teaching performance as follows:

1- The concept of epistemological beliefs and their characteristics

Since this question revolves around the concept of epistemological beliefs of secondary school teachers in the light of their teaching practices, the responses of participants were dumped by the researchers according to the following table:

Table 2. Participants’ responses to the concept of epistemological beliefs.

Subject, feature, or open coding	Closed coding	Frequency in interviews	Frequency in observations	Focus group	Total frequencies
Concept of epistemological beliefs and their components	Amount of information	27	9	16	52
	Lifestyle	19	2	12	33
	Personal convictions	7	-	3	10
	Mental thoughts and ideas	41	12	19	72
	Previous concepts	36	10	20	66
	Perceptions on the nature of knowledge	5	2	6	13
	Religious and linguistic background	21	-	14	35
	Culture components	24	10	14	48
	Higher thinking methods and skills	12	6	10	28

Through their responses and interaction with the data collection instruments, represented by the interview, observation and focus group, the participants showed a variation in their understanding of the concept of epistemological beliefs. A group of responses indicated that the concept of epistemological beliefs is a set of ideas, concepts, mental perceptions, information related to culture and ways of thinking and lifestyle. The phrase ‘ideas and mental perceptions’ was widely repeated among the participants. This contrasted with the low use of the phrase ‘perceptions about the nature of knowledge’ and the low use of ‘areas and dimensions of epistemological beliefs’ on the observation sheet based on classroom observation of the teaching reality.

The phrases ‘how much information’, ‘previous concepts’, ‘religious and cultural background’ and ‘thinking skills’ were also mentioned, possibly indicating a lack of understanding of the concept of epistemological beliefs among the participants or that the concept is difficult to explain. The latter concurs with Sadiq (2018) and Mango (2011), who contend that despite the growing interest in these beliefs, there is no unified model for understanding and interpreting them; hence, the multiplicity of definitions of epistemological beliefs and the divergence of researchers' views.

This discrepancy in the views of the participants may be attributed to their different disciplines, years of teaching experience and academic degrees. In this context, the study of Shommer (2004) may be relevant, as it indicates that there are different opinions regarding the definition of epistemological beliefs, which may be due to different understandings of the nature of knowledge and ways of acquiring it in addition to differences in scientific and practical experience, age and mental abilities. Epistemological beliefs are characterised by autonomy, which indicates that an individual can have deep and complex ideas in some beliefs, while his/her ideas are simple in others.

Chan et al. (2011) confirm that a teacher’s ability to realise and develop their epistemological beliefs directly affects his/her classroom teaching, adoption of learning and teaching strategies and ways of thinking. Therefore, there is a need to form and develop teachers' epistemological beliefs in a way that integrates modern learning theories, scientific developments and social philosophy. Epistemological beliefs can act as criteria for judging the accuracy and validity of individuals' understanding, as they are the psychological structure that refers to the concepts of individuals on the nature of knowledge and how to acquire it, and varies according to the field, the experiences of individuals, and the tasks assigned to them.

2- Sources of epistemological beliefs and the factors of their formation

To consider the sources of epistemological beliefs and the factors of their formation according to the participants' interaction and responses, the responses were dumped as indicated in Table3.

The participants’ responses indicate that the Internet and social media are the most important sources of epistemological beliefs, followed by family and community life and educational environment. According to this dataset, epistemological beliefs are more often formed through external means and sources than through internal ones, as represented by responses such as reading, personal experiences, needs and interests.

These results may also indicate that teachers believe that epistemological beliefs, just as they are not clearly defined, have undetermined sources, especially given the technical and scientific acceleration, and the multiplicity of cognitive, political, economic and social trends worldwide. Such status may form a gap between the epistemological beliefs adopted by family and those that students learn from the Internet. The teacher’s role as a model and expert is very important, as he/she adapts between modernity and contemporary on the one hand, and originality and the prevailing cognitive and social systems on the other hand, and integrates them consistently in classroom experiences and educational situations. This is indicated by Patrick and Pintrich (2001) as to the need for a systematic model that includes the manifestations of epistemological beliefs, in a way that integrates the rapid scientific and technical developments and the individual's needs, beliefs, social environment, personal experiences, and mental abilities.

Table 3. Participants’ responses on the sources of epistemological beliefs and the factors involved in their formation.

Subject, feature or open coding	Closed coding	Frequency in interviews	Frequency in observations	Focus group	Total frequencies
Sources of epistemological beliefs	Family and community life	27	7	29	63
	School life and learning	24	11	21	56

environment				
Internet and social media	31	20	41	92
Additional readings	15	2	17	34
Colleagues, peers and modelling	17	4	13	34
Interests, needs, and personal experience	9	4	7	20
Research, conferences and empirical theories	3	7	5	15

Suleiman et al. (2015) also show that epistemological beliefs are self- and private beliefs, with emotional dimensions related to feelings and sensations and are transmitted from one generation to another as part of the cultural and family heritage of the individual. They also note that these beliefs require filtering and adaption to societal visions without neglecting global developments.

3- The nature and certainty of knowledge

Participants' beliefs (Table 4) were extrapolated from their responses on the nature of knowledge, i.e. the belief in simple, discrete and static knowledge versus complex, integrated and advanced knowledge.

The responses of most of the participants indicate that the cognitive structure is integrated, cumulative, experimental, mostly developed and not fixed, as knowledge is subject to interpretation, development and modification, and there are multiple sources of knowledge, and the degree of cognitive mastery can be reached by exerting more effort by students, as the reference of most participants repeated the fact that the curricula contain complex and difficult information, emphasising the dynamism of facts and concepts, its ability to develop and change, and the possibility of effectively merging concepts and facts with each other. Responses also indicate that teachers believe they are fully responsible for building the students' knowledge and conceptual diagrams. Some of the responses denoting this are:

- Integrated and complicated knowledge is the best for providing students with necessary experience.
- Knowledge is variable, renewable and gradual according to the nature of science, and starting with complexity may make the learner lose motivation.
- By enriching the educational environment and raising students' motivation, the teacher can develop students' concepts and modify their behaviour.
- The most important goal in teaching is to develop students' thinking.
- Everything is subject to change.
- Knowledge is changing due to technology and continuous scientific development.

These results are consistent with those of Al-Mohammadi (2017), who indicates that the female students of King Saud University believe in the development of knowledge and its susceptibility to modification and change.

Table 4. Participants' responses on the nature, or structure, of knowledge and its certainty.

Subject, feature or open coding	Closed coding	Frequency in interviews	Frequency in observations	Focus group	Total frequencies
3-Nature and certainty of knowledge structure	Cumulative information and experience in all branches of knowledge	17	9	32	58
	The course contains a lot of difficult information	47	3	39	89
	Facts are produced collectively	30	6	14	50
	Simple ideas are the easiest and the best	38	10	32	80
	Concepts and facts can be effectively combined together	28	11	35	74
	A good teacher has the ability to encourage his/her students to build their own cognitive schemes	43	3	16	62
	All students can reach the level of proficiency in the courses and subjects	41	6	33	80
	Knowledge is subject to interpretation, development and modification	24	13	21	58
	Increasing the effort made by students leads to more acquisition of knowledge and scientific mastery	35	23	19	77
	Multiple knowledge sources	43	33	36	112
Using a variety of teaching methods	27	21	16	64	

helps build new
cognitive experiences
for students

They believe that such is due to multiple factors, including thinking skills, teaching strategies, acceptance of others and societal openness. Sayed (2020) believes that an individual's beliefs affect their view of the nature of knowledge and the ways to acquire it. Complex-minded individuals believe that there is a great deal of knowledge that can be developed, there is knowledge that must be discovered, and there is a little knowledge that is fixed and does not change. In contrast, simple-minded people believe that a great deal of knowledge is subject to development, a lot of information is fixed and certain, and there is little information that is subject to change. Schommer (2004) believes that the importance of epistemological beliefs lies in their relationship to teaching performance. Learners with the strong belief that dealing with knowledge on the basis that it is separate from the overall view often have difficulty understanding texts, and they find increasing difficulty in understanding learning issues and scientific concepts. These difficulties arise from the excessive simplification of information.

4- Knowledge acquisition

Participants' beliefs were extrapolated from their responses regarding knowledge acquisition, i.e. the belief in the innate and inherited ability to learn versus the acquired and developed ability. The frequency of responses is shown in Table 5.

The responses of participants indicate that they believe a student's ability to acquire knowledge in an advanced and cumulative manner is based on their educational stage and age. The participants also believe that scientific experiences, the diversity of learning sources and educational experiences are significant factors in the acquisition of knowledge. In addition, they believe that the effort exerted by students is more important for knowledge acquisition than the students' level of intelligence or special abilities.

Table 5. Responses of individuals involved in knowledge acquisition.

Subject, feature or open coding	Closed coding	Frequency in interviews	Frequency in observations	Focus group	Total frequencies
4-Control of knowledge	Increase in experience and information with school progress	45	12	15	72
	The more a student learns, the more he/she knows	27	17	19	63
	Acquiring new experiences depends on the level of intelligence	11	2	9	22
	Students must understand the science of their learning	39	12	16	67
	Diverse courses give	34	16	26	76

students more advanced knowledge				
Gifted students have the ability to develop new ways of learning	12	4	9	25

Other relevant studies support these beliefs. For example, Paulsen and Feldman (2005) indicate the possibility of developing strategies for the self-regulation of knowledge and thus developing the structure of epistemological beliefs. They add that this is affected by the level of an individual’s motivation to learn and his/her effort as well as his/her thinking methods and skills. Individuals who have high epistemological beliefs confirm that learning is the rebuilding of knowledge through the understanding and organisation of information and the ability to self-regulate learning.

Schommer and Easter (2006) note that epistemological beliefs are affected by age and gender. They add that these beliefs are developmental in nature, as age and level of education affect their development and stability, and that they become more complex as they develop. Therefore, further insight into epistemological beliefs may develop our understanding of human learning. Although some studies have focused on the importance of cognitive schemas and metacognition for understanding, they have not explained why some students fail to integrate knowledge or to observe their understanding.

5- The authority of knowledge

Participants' responses were extrapolated from the field of the authority of knowledge, i.e. is the source of knowledge external or internal? The frequency of responses is shown in Table 6. Although teachers were aware of the importance of participation and dialogue in the classroom environment, they provided different responses in the field of knowledge authority. Some responses were that the source of knowledge is internal, that the student is the centre of the educational process and can build and organise knowledge him/herself, and that the effective teacher should organise the classroom environment in a way that facilitates the sharing of experiences, cooperation, dialogue and effective discussion, thus facilitating students’ possession of knowledge in multiple forms. That the classroom environment should be safe, motivating and avoid memorisation were mentioned frequently. Some of the responses reflecting these categories are:

- Students give examples of each part of the drawing.

Table 6. Participants’ responses on the authority of knowledge.

Subject, feature or open coding	Closed coding	Frequency in interviews	Frequency in observations	Focus group	Total frequencies
5- Authority or source of knowledge	The student is the centre of the educational process	44	7	29	80
	The teacher should focus on activities and skills, not initiation and memorisation	31	17	28	76
	Students may have	33	-	12	45

information that teachers do not have				
Students have the ability to learn new concepts on their own	26	7	19	52
Teachers realise the importance of students' participation in active dialogue and discussion	29	10	12	51
Students can connect new ideas to their personal experience and previous information	17	14	21	52
The teacher is a maestro in the classroom environment and a facilitator of teaching procedures	23	7	19	49
Most students can correct their own mistakes	21	5	11	37
The teacher's duty is to reorganise information properly	25	3	15	43

- Students' group members cooperate to adjust the text.
- Students correct each other's mistakes.
- The student writes a literary text based on imagination and eloquence.
- The student runs some network applications.
- Students' development is a hypothesis based on careful observation.
- Group members cooperate in defining the characteristics of the scientific text.

However, a number of responses in the classroom observation instrument indicate that some teachers believe that the source of knowledge is external and that its authority is represented by the teacher's possession of knowledge and his/her management of most of the class activities. Here, the responses provided through the observation instrument diverge from those provided through the interview and focus group, indicating a gap between theoretical beliefs and their implementation in the classroom learning environment. This explains the previous discrepancy in teachers' responses on the authority or source of knowledge, the reality of teachers in the classroom and reflects the

discrepancy in their responses, where the difference is clear between teaching based on memorisation and modern teaching based on experimentation, dialogue and the use of thinking skills and modern learning theories, and this was confirmed by the studies of Suleiman et al. (2015) and Baqiei (2013). These studies indicate that individuals respond differently to the social learning environment and multiple mindsets, which justifies the relativity of knowledge and its multiplicity of sources and authority in response to the cognitive and moral growth of individuals. This calls for intensifying efforts to educate teachers on the importance of the student being the focus of the educational process and to provide more specialised and educational courses in this regard. Trakulphadetkrar (2012) indicates that epistemological beliefs in the field of knowledge authority are affected by the social and economic environment, which may show a fundamental difference in the adoption of teaching strategies and learning theories that teachers apply in the classroom. Some of the teachers' responses indicating the external source of knowledge are:

- Training examples are presented before the students.
- The teacher discusses the groups' mistakes.
- The teacher deliberately reads the text with mistakes and asks the students to correct them.
- The teacher is the reliable source for building experiences and modifying behaviours.
- The teacher solves the exercises and problems of (mathematics) with a percentage of not less than 70%.
- Training issues are presented before the students, and then I ask them to participate in solving the problems with my participation as well.

6- The speed of knowledge acquisition

The frequency of responses regarding the speed of knowledge acquisition, i.e. the belief in the rapid acquisition of knowledge versus incremental learning, is shown in Table 7.

The responses of the participants indicate their belief that the acquisition of knowledge takes place in a phased and gradual manner upon the passing of sufficient time for learning. The responses also indicate the importance of revising previous lessons and concepts for gradual learning effectiveness in addition to repetition to help maintain the impact of learning and knowledge growth. Some of the responses reflecting this are:

- Repetition helps maintain the impact of learning and knowledge growth.
- Students' experiences grow gradually along teaching stages and engaging in authentic learning environments.

Schommer (2004) believes that such responses affect the speed of learning, as individuals who believe that the ability to learn is fixed from birth face difficult learning tasks, while those who believe that the ability to learn develops and that learning takes place gradually will persevere and exert more effort when faced with difficult tasks. Also, Chan et al. (2011) and Huling (2014) indicate that individuals who believe in gradual learning versus rapid learning have greater ability to achieve and direct thinking processes, motivational beliefs, setting goals and directing them.

Table 7. Participants' responses on the acquisition of knowledge.

Subject, feature or open coding	Closed coding	Frequency in interviews	Frequency in observations	Focus group	Total frequencies
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	Students need enough time to learn	26	14	17	57
	Acquisition of knowledge is gradual	31	16	26	73
	Successful students learn things gradually	23	11	21	55
6- Speed of knowledge acquisition	Effort by students helps them learn over time	24	15	17	56
	Previous lessons and important concepts are constantly revised	17	46	19	82
	Student learning occurs through repetition, discussion and thought-stimulating thinking	27	24	19	70

10. Conclusion

The findings of the study revealed the importance of epistemological beliefs, therefore there is a necessity for creating learning environment experiences or contexts that enhance epistemic competence. This can be achieved through constructive learning environment, where learners are engaged by teachers on inquiry activities related to the subject of their study. In terms of research, more detailed studies need to be done on various disciplines.

11. Recommendations and Suggestions

The study revealed that acquisition of knowledge changes according to capabilities, and it is linked to age and relevant social and educational conditions, also the effort exerted by the student is of great importance in this regard. The researchers recommend reconsidering teacher training through prepare programmes and workshops on the theoretical and practical aspects related to epistemological beliefs. There is also a need to conduct further studies addressing the role of epistemological beliefs in teaching performance.

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References

- Al-Mohammadi, Afaf. (2017). Contemplative thinking and its relationship to the Epistemological Beliefs of university students. Arab Educators Association, p. 89, 517-540. DOI: 10.21608/saep.2017.49483
- Baqiei, Nafez. (2013). Epistemological beliefs and the need for knowledge among university students, *Dirasat Journal*, Educational Sciences, 40, 1021-1035.
- file:///C:/Users/user/Downloads/4563-9423-1-SM.pdf
- Chan, N., Ho, I., & Ku, K. (2011). Epistemic beliefs and critical thinking of Chinese students. *Learning and Individual Differences*, 21, 67-77.
- DOI:10.1016/j.lindif.2010.11.001
- Corbin, J., & Strauss, A. (2015). *Basics of qualitative research: techniques and procedures for developing grounded theory*. (4th ed.). California: Sage Publications.
- https://www.researchgate.net/profile/Brad-Wuetherick/publication/277197202_Review_Basics_of_Qualitative_Research_Techniques_and_Procedures_for_Developing_Grounded_Theory_3e_Corbin_and_Strauss/links/55d44f6f08ae0a34172296a1/Review-Basics-of-Qualitative-Research-Techniques-and-Procedures-for-Developing-Grounded-Theory-3e-Corbin-and-Strauss.pdf
- Croswell, J. (2017). *Qualitative inquiry and research design: Choosing among five traditions*. (2nd ed.). California: Sage Publications.
- <https://revistapsicologia.org/public/formato/cuali2.pdf>
- Hofer, B. K. (2004). Epistemological understanding as a metacognitive process: Thinking aloud during online searching. *Educational Psychologist*, 39(1), 43-55.
- DOI:10.1207/s15326985ep3901_5
- Huling, M. (2014). *The effect of teachers' epistemological beliefs on practice*. PhD thesis, University of South Florida.
- <https://digitalcommons.usf.edu/cgi/viewcontent.cgi?article=6240&context=etd>
- Kardash, C., & Sinatra, G. (2003). *Epistemological beliefs and dispositions: Are we measuring the same construct?* Poster session presented at the Annual Meeting of The American Educational Research Association, 84th, Chicago, IL. April 21-25.
- <https://files.eric.ed.gov/fulltext/ED479164.pdf>
- Mango, C. (2011). Exploring the relationship between epistemological beliefs determination. *The International Journal of Research and Review*, 7(1), 1-23.
- https://www.academia.edu/26580062/Exploring_the_Relationship_between_Epistemological_Beliefs_and_Self-Determination
- Ongowo, R. Owino (2021). Students' epistemological beliefs from grade level perspective and relationship with science achievement in Kenya.
- file:///C:/Users/user/Downloads/OngowoR.O2021.pdf
- Patrick, H., & Pintrich, P. (2001). Conceptual change in teachers' intuitive conceptions of learning motivation, and instruction: the role of motivational and epistemological beliefs. In B.

Aldossari, A. T. & Khalidi, J.K. (2021). Epistemological beliefs of secondary school teachers in light of their teaching practices based on the grounded theory. *Cypriot Journal of Educational Science*, 16(6), 2930--2945. <https://doi.org/10.18844/cjes.v16i6.6478>

file:///C:/Users/user/Downloads/Patrick_Pintrich.01.pdf

Paulsen, M. B., & Feldman, K. A. (2005). The conditional and interaction effects of epistemological beliefs on the self-regulated learning of college students: Motivational strategies. *Research in Higher Education*, 46(7), 731-749.

<https://www.jstor.org/stable/40197444>

Phan, H. P. (2008). Multiple regression analysis of epistemological beliefs, learning approaches, and self-regulated learning. *Electronic Journal of Research in Educational Psychology*, 6(14), 157-184 <https://www.redalyc.org/pdf/2931/293121940009.pdf>

Sayed, Ola. (2020). Parents' epistemological beliefs about the educational role of the primary school: a case study. *Educational Journal*, 70, 591-630.

DOI: 10.21608/edusohag.2020.66711

Schommer, M. (2004). Explaining the epistemological beliefs system: Introducing the embedded systematic model and coordinated research approach. *Educational Psychology*, 39(3), 19-29.

DOI:10.1207/s15326985ep3901_3

Schommer, M, & Easter, M. (2006). Ways of knowing and epistemological beliefs: Combined effect on academic performance. *Educational Psychology*, 26(3), 411-423.

DOI: 10.1080/01443410500341304

Statistics Department. (2021). General Administration of Education in the Eastern Province.

https://edu.moe.gov.sa/Sharqia/support_main_page_2/Pages/under-construction.aspx

Trakulphadetkria, N.V. (2012). Relationship between classroom authority and epistemological beliefs as espoused by primary school mathematics teachers from the very high and very low socio-economic regions in Thailand. *Journal of International and Comparative Education*, 1(2), 71-89.

<https://pdfs.semanticscholar.org/a2de/36e63095b3ae2d1f8e9d93d6ebfeffd7dcef.pdf>