

## EPISTEMIC BELIEFS ON FIELD-DEPENDENT AND FIELD-INDEPENDENT LEARNING STYLE

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**Abstract:** Research in contemporary education over the past few decades has led to considering the influence of non-cognitive factors such as learning styles in various learning behaviors. This study aims to examine the influence of the epistemic beliefs that consist of belief in knowledge and belief in learning on field-dependent and field-independent learning styles. The sample consisted of 129 students at the Early Childhood Islamic Education Study Program, Department of Islamic Education, at a state Islamic institute in Kudus through the simple random sampling technique. The data collection technique was through the use of questionnaires. There are three scales employed in this study, namely epistemological trust scale, dependent learning style and independent learning style. Data were analyzed by using Structural Equation Modeling. The results show that the belief in learning has a significant and positive effect on the field-dependent and field-independent learning style. Meanwhile, the belief in learning has only a significant and negative effect on the field-independent learning style and has no significant effect on field-dependent learning style. The results provide some insightful considerations regarding the utilization of epistemic beliefs for improving learners' interaction with the surrounding context to obtain an optimal academic performance.

**Keywords:** *epistemic beliefs, field-dependent, field-independent, learning style*

### KEPERCAYAAN EPISTEMOLOGIS TENTANG GAYA BELAJAR DEPENDEN DAN GAYA BELAJAR INDEPENDEN

**Abstrak:** Penelitian dalam pendidikan kontemporer selama beberapa dekade terakhir telah mendorong mempertimbangkan pengaruh faktor non-kognitif seperti gaya belajar dalam berbagai perilaku belajar. Penelitian ini bertujuan untuk mendeskripsikan pengaruh kepercayaan epistemologis yang terdiri atas kepercayaan tentang pengetahuan dan belajar pada gaya belajar dependen dan independen. Sampel penelitian ini terdiri atas 129 siswa program studi Pendidikan Islam Anak Usia Dini, Jurusan Tarbiyah pada suatu sekolah tinggi agama Islam negeri di Kudus melalui teknik *simple random sampling*. Teknik pengumpulan data yang digunakan adalah kuesioner dalam bentuk skala yang diadopsi dari penelitian sebelumnya. Ada tiga skala yang digunakan dalam penelitian ini, yaitu skala kepercayaan epistemologis, gaya belajar dependen dan gaya belajar independen. Data dianalisis dengan menggunakan model *Structural Equation Modeling*. Hasil penelitian menunjukkan bahwa kepercayaan dalam belajar memiliki efek yang signifikan dan positif pada gaya belajar dependen dan independen. Sementara itu, kepercayaan tentang belajar hanya memiliki efek yang signifikan dan negatif pada gaya belajar independen, dan tidak memiliki efek signifikan pada gaya belajar dependen. Hasilnya memberikan beberapa pertimbangan mendalam tentang pemanfaatan kepercayaan epistemologis untuk meningkatkan interaksi peserta didik dengan konteks sekitarnya untuk mendapatkan kinerja akademik yang optimal.

**Kata Kunci:** *kepercayaan epistemologis, dependen, independen dan gaya belajar*

#### INTRODUCTION

Various studies of psychology and education reveal that the learning style is considered not directly obtained by students from

within themselves as it is highly related with cognitive, affective and psychological process (Felder & Silverman, 1988; Reid, 1987; Mayer & Massa, 2003). It means that even though

everyone has feelings, can develop his interests, and has the ability to think, everyone is different from other people's way of feeling, the way he develops his thoughts, the way he determines the development of his personal interests. Likewise, their tendency to choose a learning style obtained during the learning period will be profoundly affected by the learning process and the involvement of academic environment. In this context, students will relate to the external environment such as teachers, partners, and texts as references used in learning.

In addition, students' needs for the environment and their dependence on factors outside them will be strongly related to how they perceive the value of knowledge, the process of knowing, and the use of learning. This relates to the fact that the way a person processes and reacts to different needs that come from outside himself is different from how other people does it. Here, it should be noted that learning is not only solely related to the process at school, but also related to the extent to which students fundamentally believe the knowledge and learning (Muis, 2007; Bendixen, 2002).

Practically, understanding of knowledge will determine the extent to which students depend on the environment, learning style, and personal tendencies and orientation chosen for the success of the study. Students with an understanding that knowledge can be obtained by their own business are more likely to work individually and less dependent on others. Conversely, students with an understanding that knowledge can only be obtained from others or experts with higher knowledge authority will be more likely to be dependent on others and the environment. The first group is called field-independent learners which more tend to be actively involved in teams, work on group assignments and material discussion, and the second group is classified as field-dependent learners, which is less dependent on teachers and peers, and more competitive in learning activities based on reading and writing (Kienhues, 2015). In short, field-dependent learners are less able to separate the context from the environment, while field-independent learners are better able to separate details from the context of the environment. In this view, they will have a high degree of involvement in

the team, intensive interpersonal relationships, and participation in groups in the completion of tasks.

The extent to which students' understanding and belief in knowledge and learning and their effects on the choice of learning styles perceptions about academic achievements are more likely to involve the environment (field-dependent), or focusing on themselves (field independent) has not received much attention from previous studies (e.g Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Higgins, Peterson, Pihl, & Lee, 2007; Rohde & Thompson, 2007).

In the last few decades, predictions of academic success are highly emphasized on cognitive factors such as intelligence and academic ability, although recently, researchers in the field of education and social sciences have realized that non-cognitive factors and skills play an important role in the success and achievement of education (McKenzie & Schweitzer, 2001; Bastian, Burns, & Nettelbeck, 2005; Nasim, Roberts, Harrell, & Young, 2005). It is strongly believed that non-cognitive skills factors are the same or even more important than the cognitive aspects of the education and work process (Khine, 2016).

Furthermore, previous research tends to be more interested in examining aspects of learning styles that are more concrete to be tested empirically, compared to examining the relationship between learning styles and epistemic beliefs (Franzoni, Assar, Defude, & Rojas, 2008; Komarraju, Karau, Schmeck, & Avdic, 2011; Hsieh, Jang, Hwang, & Chen, 2011; Wong & Nunan, 2011). Here, it is assumed that student learning styles are the reflection of students' understanding and beliefs regarding knowledge and learning functions. This is related to the function of learning styles capable of explaining how individuals learn or how each person concentrates on the process, and masters difficult and new information through different perceptions. Style is personal characteristics for each person, and it serves to distinguish one person from another. Thus, in general the learning style is assumed to refer to the personalities, beliefs, choices, and behaviors used by individuals to assist in their learning in a conditioned situation.

### Epistemic Beliefs and Learning Style

One important and decisive factor in exposing the use of learning strategies used by students is the students' epistemic beliefs. Huglin (2003) conducted research on personal epistemology with learning styles (feeler, thinker, sensor and intuiter) showed that these four learning styles differ significantly in terms of epistemic beliefs. Hashim, Ramly & Ishak (2009), exploring the relationship between personal epistemology and learning styles mediated by self-efficacy, found that personal belief has a direct and positive effect on learning style. Günes, Bati & Katranci (2017) shows that statistically, significant relationships were found between participants' learning styles and their epistemic outlook. The personality models of field-dependent - field-independent learning style are the derivation of learning style theory (Witkin, Oltman, Raskin, & Karp, 1971). The individual considered as having a field-dependent learning style is when he perceives himself under the influence of the environment. Instead, the individual is considered to have a field-independent learning style when he perceives that most behaviors are not influenced by the environment.

Various studies have shown that epistemic beliefs influence the use of approaches in learning (Cano, 2005; Phan, 2006; Tsai & Chuang, 2005; Bråten & Strømsø, 2005). Educational researchers such as Hofer & Pintrich (1997) claim that epistemic beliefs play an important role in academic behaviors, such as influencing the use of techniques in learning, for example, students who believe that the knowledge structure consists of cut-pieces that are not related to information, are likely to use memorization techniques as a learning technique and not an understanding technique. The study also concludes that students who see equally unchanging and stable knowledge tend to use memorization techniques of scientific facts. In contrast, learners who view knowledge as dynamic will prioritize aspects of information understanding (Davis, 1997). Moreover, students who believe that understanding technique is the best strategy in learning will have better results at the final exam than those who believe that memorizing techniques are the best (Davis, 1997).

Chan (2007) argues that learning behavior

is strongly influenced by students' beliefs in the nature of their knowledge and abilities. For field-independent learners, they are not much influenced by authority, social and external figures outside of themselves and more guided by their own needs. Their dominant characteristics are closed nature (introvert), tendency to perform an activity on their own initiative to the best of their abilities (e.g., self-study) even without being motivated or persuaded by the people around them, working regularly and focusing and loving competition. Compared with a field-dependent personality, field-independent individuals have a lower social orientation (Witkin *et al.*, 1971). Witkin *et al.* (1971) also said that individuals with a field-independent learning style have a clear purpose and more freedom to learn.

This study attempts empirically to examine the effect of epistemic beliefs in the forms of belief in knowledge and belief in learning in the choice of learning styles from field-dependent or field-independent. Conceptually, this study adopts the logic theory of contingency, primarily the logic of contradiction, where it is assumed that students with high belief, either in knowledge or in learning, will only have a logical choice regarding the selection of learning styles of field-dependent or field-independent. This model is considered more likely to be able to offer empirical evidence that is more consequent to the learner's belief epistemic level.

## METHODS

### Research Design

This study seeks to examine the effect of epistemic beliefs on learning styles in students. Regarding the selection of respondents at the tertiary level, and not at the lower levels of the school, this study confirms to test the sustainability of the epistemic belief in learning styles. This is basically the selection of learning styles and beliefs in knowledge and knowing seems to have been formed during the previous education period.

### Sampling

Population in this research is all students of study program of Early Childhood Islamic Education, Department of Islamic Education, at a state Islamic institute in Kudus amounting to 252 students. The selection of students in the Early Childhood Islamic Education program

is because these students become prospective teachers at the initial level of pre-school learning which forms the basis for the development of epistemological beliefs and learning styles for their students. The sampling technique in this study uses Proportional Random Sampling techniques by lottery. In random sampling each class in the population has the opportunity to be sampled. The proportion used to determine the number of samples in each class is 10% of the total number of students of the PIAUD study program. The number of samples obtained was 129 students. The sample distribution using Proportional Random Sampling in each batch can be seen in Table 1.

**Table 1. Distribution of Samples**

Semester (Admission Year)	Number of Students	Female	Male	Sample
1 (2016)	52	52	0	26
3 (2015)	70	70	0	36
5 (2014)	64	62	2	33
7 (2013)	66	65	1	34
<b>Total</b>	<b>252</b>	<b>249</b>	<b>3</b>	<b>129</b>

### Research Instruments

The method used to obtain data in this study is a questionnaire or questionnaire, a method based on self-report knowledge in personal beliefs. There are three types of scales,

namely the epistemological trust scale, the scale of dependent learning styles and the scale of independent learning styles. Epistemic belief in this research is divided into two components of belief, that are the belief in knowledge and belief in learning. The belief in knowledge (BK) is the individual's belief in the nature of knowledge which includes aspects, such as; (1) knowledge comes from an expert/knowledge expert, (2) certain knowledge, and (3) orderly process.

Field-dependent learning style (FD) is a certain pattern that is stable when the individual accepts, interacts, absorbs, stores, organizes, and processes information with the individual's tendency to look at something globally, makes wide concept distinctions, shows social orientation and sets goals and reinforcement. This variable is expressed using the scale of the field-dependent learning style with the components as characterized by Witkin *et al.* (1971). Furthermore, individuals with a field-independent learning style (FI) have a tendency to look at things analytically, to make certain concepts distinct, to show an impersonal orientation and have their own designed goals. This variable is expressed using a field-independent learning style scale with components as characterized by Witkin *et al.* (1971). The example of item lattice for each variable can be seen in Table 2.

**Table 2. Item Grids**

Variable	Indicator	Example Item Grids
Belief about knowledge	Certain knowledge	I like classes where the lecturer sets the lecture program before teaching
	Omniscient	The answers in the reference book are helpful as I am not sure of my own solutions
	Simple knowledge	I feel comfortable when faced with uncertain learning conditions
Belief about learning	Innate ability	Students who have moderate achievement during high school will remain the same and have moderate achievements when they become students in Higher Education
	Quick learning	If I can not understand something quickly, I usually have difficulty in learning it as a whole
Field dependent learning style	Viewing matters globally	I don't mind reading or listening without understanding each word as long as I can take the main idea
	Creating wide concept differences	When I study, I prefer simple and general material
	Showing social orientation	I enjoy studying together with friends
Field independent learning style	Determine goals and improvements	I need a calm atmosphere in order to concentrate well
	Viewing matters analytically	If I study, I understand the material in great detail (meticulously to the small things).
	Creating particular concept differences	I have to understand every word of what I hear and read
	Showing impersonal orientation	I like studying alone
	Possessing self designed goals	I finished my job as well as I could before I moved on to finish another task

### Data Analysis Technique

The technique used to analyze data in this research was Structural Equation Models or also called Structural Equation Model. As for the needs of analysis, the software program Analysis of Moment Structures (AMOS) was used.

## FINDINGS AND DISCUSSION

### Findings

The age characteristics of respondents selected as samples of this study ranged from 18 to 26 years old. Almost all respondents were women. The majority of respondents aged between 18-20 years with a total of 91 people or 70.54%. In terms of the semester level, sampling is quite even at all levels of lecture (see Table 3).

**Table 3. Respondent Characteristics**

Characteristics	Frequency	Percent
<i>Gender</i>		
Female	127	98.45
Male	2	1.55
<i>Age</i>		
18-20	91	70.54
21-25	24	18.60
>26	14	10.85

Descriptive statistics reveals the values of minimum, maximum, and mean and standard deviations for each question item. The mean value for each item ranged in the range of 2.33-3.05, indicating the medium tendency of the sample in the item in question (see Table 4).

**Table 4. Descriptive Statistics**

Construct	Min	Max	Mean	Std. Dev
<i>Belief in knowledge (BK)</i>				
BK1	1	4	2.65	.669
BK2	1	4	2.71	.687
BK3	1	4	2.83	.601
<i>Belief in learning (BL)</i>				
BL1	1	4	2.40	.701
BL2	1	3	2.33	.700
<i>Field-dependent (FD)</i>				
FD1	1	4	2.81	.808
FD2	1	4	2.84	.755
FD3	1	4	2.52	.708
FD4	1	4	2.81	.751
<i>Field-independent (FI)</i>				
FI1	1	4	2.34	.815
FI2	1	4	3.05	.759
FI3	1	4	2.78	.763
FI4	1	4	2.88	.725

Furthermore, to show how strong the influence between variables is, the correlation test with Pearson technique is done. Pearson correlation test results showed that out of 6 correlations, there were 3 significant correlational relationships between variables. Field-Dependent learning style (FD) is proven statistically to have negative and significant relation with belief in learning (BL) (FD-BL, -.213, significant at .015). The results also show that the Field-Independent Learning variable has a positive and significant correlation in the two exogen constructs of belief in knowledge (FI-BL, .247; .005), and from belief in Learning (FI-BL, .320; .00) (see Table 5).

**Table 5. Correlation Matrix of Variables**

Parameters	BK	BL	FD	FI
BK	1.00			
BL	.053 (.554)	1.00		
FD	-.088 (.320)	-.213* (.015)	1.00	
FI	.247** (.005)	.328** (.000)	.081 (.359)	1.00

\*\*. Correlation is significant at the .01 level (2-tailed);  
\*.05 level (2-tailed).

Testing with SEM requires a confirmatory test as a means to validate the measurement model of latent constructs (Awang, 2012). The results of the validity test showed that all items had a standardized loading score above .7 as a validity standard. Therefore, all items are declared valid. Moreover, the results of the reliability calculation of the FD learning style scale obtained a value of .71, while the FI learning style gained a reliability score of .74. The results of the reliability of BK gained .91, while BL gained a score of .81. Thus, the entire variables obtain good reliability scores above .70. Thus, all the variables used have met reliability requirements (see Table 6).

Ghozali (2008) and Setiyowati, Pali, Wiyono & Triyono (2019), before the analysis of the model of structural equation as a whole is done, a unidimensionality test on each construct is done with confirmatory factor analysis. This unidimensionality test is conducted to determine whether the constructor measurement indicators have provided reliable results. Unidimensionality test of this research is done by seeing whether



the grain discrimination power (total grain correlation) of construct indicator in this research is significant. The test is also done by looking at the convergent validity or loading factor value of each indicator. Confirmatory analysis is performed between exogenous variables and between endogenous variables. In this model, there are exogenous variables that are epistemic beliefs that consist of belief in knowledge and belief in learning. The endogenous variables consist of two kinds of learning style that is field-

dependent and field-independent. The results of confirmatory analysis between exogenous and endogenous variables indicate that the value of fit criteria has been achieved well. Similarly, the significance value of standardized loading parameter estimation is all above .05, so it can be said fit. After several proposed conditions are met, the next step is to test the hypothesis of testing theoretical model data with the overall empirical data.

**Table 6. Standardized Loading and Reliability**

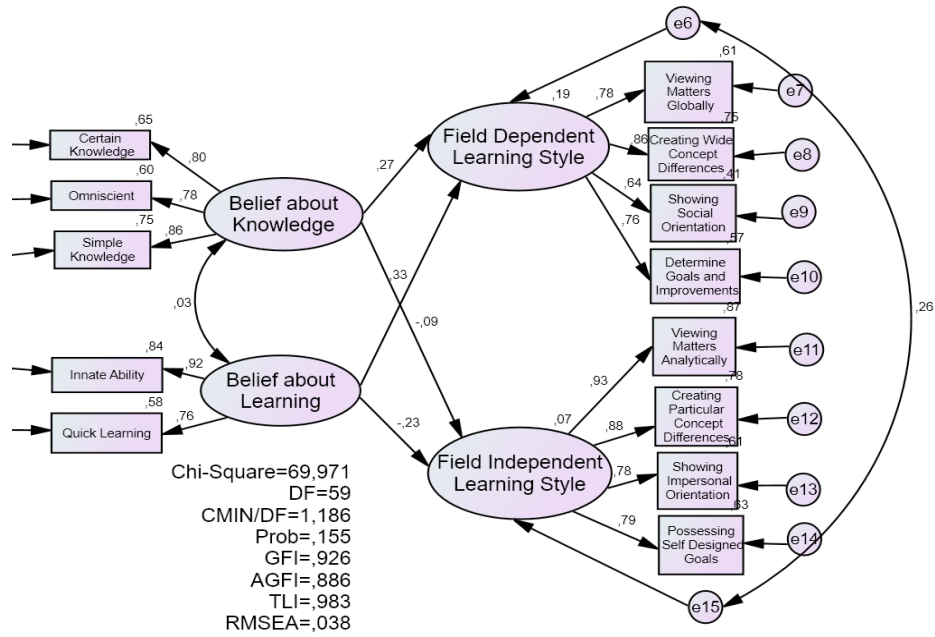
Variable	Loading Factor	Reliability
<i>Belief about knowledge</i>		.91
Certain knowledge	.81	
Omniscient	.77	
Simple knowledge	.86	
<i>Belief about learning</i>		.81
Innate ability	.94	
Quick learning	.74	
<i>Field dependent learning style</i>		.71
Viewing matters globally	.76	
Creating wide concept differences	.87	
Showing social orientation	.63	
Determine goals and improvements	.75	
<i>Field independent learning style</i>		.74
Viewing matters analytically	.93	
Creating particular concept differences	.88	
Showing impersonal orientation	.77	
Possessing self designed goals	.79	

The results of analysis of full model on stage 1 the initial structural model analysis showed that Chi-Square 76.527 (DF = 60.  $p = .074$ ), CMIN/DF = 1.275, GFI = .918, AGFI = .875, TLI = .975 and RMSEA = .046. That the criteria of acceptance requirements of the model can be fulfilled. Based on the result of the significance analysis  $p = .074$  and yet it will try to re-estimate to get better result again. The re-estimation of the model in this study through model modification. Of course modification of the model can still be done provided that the fit model was not found in accordance with empirical data, and as long as it does not deviate from the proposed theory. Modification of the model can be done by modifying the direction of the relationship between variables that already exist in the model, adding or reducing latent variables or observation variables as far as still in

the frame of conceptual research support model.

As for model modification analysis in this study is to see the output on Modification Indices (MI) on AMOS 16 analysis that has been done. The output of Modification Indices recommends about the error variables that must be done further to be modified is to connect, e1 with e7, e3 with e6 and e9 with e12. After that the retesting process is done, the results of this re-analysis show an improvement for the Goodness of Fit criteria (see Figure 1).

Based on the retesting process it was found that the criterion requirement improved as the probability result from  $p = .074$  to .155, the GFI value from .918 rose to .926, the AGFI from .875 to .886, the TLI from .975 to .983 and the RMSEA decreased from .046 to .038.



**Figure 1. Results of the Modified Indices (MI) Analysis**

Thus, the relationship model undergoes improvement (see Figure 1). Thus, it can be stated that the proposed model design does not differ significantly from empirical data. Based on these results then the researchers no longer need to modify the model, so the model can be used in this study. This means the hypothesis that there is a corresponding theoretical model with

empirical data is acceptable.

Hypothesis testing is based on the value of estimated loading which is the evaluation of regression weight between latent variables and degree of freedom (*df*), and the critical ratio (C.R) value or t-arithmetic with probability value (*p*) of .05 for the belief level of 95% (Table 7).

**Table 7. Regression Weights of the Causality Test**

Hypothesis	Sign	Estimate	S.E.	C.R.	P	Evaluation
FD ← BK	+ (< .05)	.252	.96	2.617	.009	Accepted
FI BK	- (< .05)	-.119	.124	-.964	.335	Rejected
FD ← BL	+ (< .05)	.267	.105	2.542	.011	Accepted
FI ← BL	- (< .05)	-.259	.107	-2.416	.016	Accepted

Statistical test results show that the belief in knowledge has a positive and significant effect on the field-dependence learning styles, which is indicated by estimate (*r*) .252 C.R value of 2.617 and a significance value (*p*) of .009 < .05. Accordingly, the first hypothesis is accepted. These results reveal that the higher belief in knowledge is more likely to increase learner dependence on the environment. In a related context, these results suggest the possibility that the high level of belief in knowledge will more likely to increase students' interpersonal abilities and improve the capacity of participation in teams and involvement in problem solving.

The next hypothesis attempts to examine the effect of the variable of belief in knowledge on field-independence learning styles. The test results showed *r* = -.964 and C.R value of -.964 with a significance value (*p*) .335 > .05. This means that the variable belief in knowledge has a negative effect on field-independence learning styles. Thus, the second hypothesis is rejected. In the affirmative question model, by analyzing the influence of epistemic beliefs on learning styles chosen by students, negative and insignificant results from the variables of belief in knowledge of field-independence learning styles reinforced that students with a high degree

of belief in knowledge were more likely to have field-dependence learning styles as shown by the acceptance of first hypothesis.

The third test is to analyze the influence of belief in learning on field-dependence learning styles. Statistical test results show that belief in learning has a positive and significant effect on the field-dependence learning style, which is indicated by the value of C.R 2.542 and  $p$  value .011. Then, the third hypothesis is accepted. These results reveal that high belief in learning will tend to make students have a field-dependence learning style. In other words, students will be more intensive in interpersonal relationships and team involvement, compared to solely relying on themselves which is a special characteristic of field-independence learning styles in the learning process.

The next test examined the fourth hypothesis that belief in learning had a negative and significant influence on field-independence learning styles. The test results reveal the value of C.R -2.416 and a significance value of .016. These results demonstrate that students' belief in the importance of learning is negatively related to the likelihood of them choosing the field-dependence learning style. Thus, the fourth hypothesis is accepted. These results affirmatively also confirm the third hypothesis, expressing the tendency of students to become more actively involved in the team and other people, and consider environmental factors, as they increasingly believe in the importance of learning. This is because students are considered to have only one rational choice of the learning style, either field-independence or dependence field. This entire test confirms that students' high belief in the importance of knowledge and intensive learning will be proportionally related to their awareness to involve the environment, peers, and groups, to support the success of their studies.

## Discussion

The study showed empirical evidence that the proposed model design does not differ significantly from empirical data. This means the corresponding theoretical model with empirical data is acceptable. The belief in knowledge has a positive and significant effect on the field-dependence learning styles and the variable belief in knowledge has a negative effect on

field-independence learning styles but rejected. Statistical test results show that belief in learning has a positive and significant effect on the field-dependence learning style. The belief in learning had a negative and significant influence on field-independence learning styles.

Each individual has its own uniqueness and never two people have the exact same life experience, it is almost certain that the learning style of each person is different from one another. Two individuals who grow up in the same conditions and environment and even though they receive the same treatment will not necessarily have the same understanding of thoughts and views of the world around them. Each has his own perspective on every event he saw and experienced. Learning styles have an important role in the educational process.

Montgomery & Groat (1998) stated that there are several reasons why learning styles need to be noticed in the teaching process. It refers to the process to make the learning process more dialogical, to understand students more differently by adjusting the knowledge base of the learner, the suitability of the task, the main areas, and the careers to suit the personality functions, talents, and to make the teaching process more appreciative of what students already have.

It is called individuals with field dependence learning styles when individuals perceive themselves to be controlled by the environment. As for individuals who have a field independence learning style is when individuals perceive themselves that most behaviors are not influenced by the environment. Some typical characteristics possessed by individuals with field dependence learning styles, are that these individuals have extroverted traits, tend to be motivated from the outside and much influenced by community groups or learning and authority figures, experiencing more global events (Witkin *et al.*, 1971). Individuals with field dependence learning styles like the approach of an 'audience approach' when learning. As for individuals with field independence learning styles have an introverted nature, tend to be motivated from within or self (for example, self-study) and are less affected by social reinforcement, like competition, choose activities, and work structurally and Field-independent personalities have a social orientation lower, compared to field-dependent personalities. Individuals with



field independence learning styles like learning that has clear goals and gives them more freedom of learning (Witkin *et al.*, 1971).

Hofer (2002) assert that epistemological beliefs are related to personality. Likewise, Wood & Kardash (2002); Wood, Kitchener, & Jensen (2002) also say that epistemological beliefs are related to personality components, while learning styles are part of personality. According to Garland (1993), the position of epistemological belief determines differences in learning styles such as analytical/serial/field independent/left brained vs. global/holistic/field dependent/right brained learning styles.

Hashim *et al.* (2009) who conducted research on the relationship between personal epistemology and learning styles mediated by self-efficacy which the results showed that personal belief has a positive and direct effect on learning style. An empirical examination from Günes *et al.* (2017) on epistemic views with learning styles in the preparatory program shows that pre-service teachers adopt philosophical skepticism and tends to favor an active learning style, and there is a significant relationship between learning styles and the pre-service teacher's epistemic outlook. The results of this study are also in accordance with Tümkaya (2012) conducted to 246 women and 242 men, a total of 488 students with the results showing that most students have learning styles of assimilation and converging. Moreover, there is no meaningful difference in the sub-dimension of beliefs about learning depends on effort in determining individual learning styles. On the other hand, it shows that in the sub-dimension of belief about learning depends on ability there is one unchanging assumption that is determined by diverging learning style.

Understanding the role of belief in knowledge is important in assisting learners in using effective learning strategies to achieve academic goals. Bråten & Strømsø (2005) find in students, who believe that knowledge is stable and can only be obtained through the teacher's authority, will be less goal-oriented and more oriented to memorizing. Students with low belief or even doubt in knowledge structures such as simple structured knowledge. They will have little or no intrinsic learning orientation, no respect for learning activities, no control over learning and feeling that they can carry out a

learning task. Similarly, students' beliefs in the stability of knowledge such as absolute, tentative or transient knowledge and students' beliefs in the source of knowledge that knowledge comes from a more knowledgeable person, from the experience of an authority to convey knowledge or derive from his own thoughts followed by various evidence.

From the results, this study highlights some noticeable findings regarding knowledge, learning style and epistemic beliefs. Knowledge is attributed as certain, absolute, unchanged, and not tentative. Students who have epistemic beliefs with field-dependent learning style tend to believe that knowledge is tentative and unpredictable, and does not believe that knowledge is fixed and immutable (Jehng, Johnson, & Anderson, 1993). Furthermore, knowledge is believed to come from more knowledgeable or authority or expert with superior knowledge such as lecturers or reference books, compared to individual logic and thought. In this dimension, the student does not have a knowledge perspective, thus believing that the information from the reference book is true, and that the teacher must convey the material in the learning process (Jehng *et al.*, 1993; Schommer, 1990; 1994).

This is different for students who have more sophisticated epistemic beliefs with field-independent learning style, which emphasize more on the notion that knowledge comes from the constructs of their own thinking. According to Marchant (1992), students are inclined to accept what is delivered by the lecturer. Thus, this condition causes the individual to be very dependent on the environment and in learning to show field-independence. In terms of the orderly process as a construct for epistemic belief, Jehng *et al.* (1993) explained that the dimensions of a regular process, or so-called rigid learning is the belief dimension of whether learning is a process that the individual passively receives the finished knowledge, or the process of formulating facts in which individuals independently build their ideas. In this dimension, the students' perspective prefers learning by taking the material exactly or in the same way as what they read in reference books and tend to follow what is written there from beginning to end (Jehng *et al.*, 1993).

Theoretically, the results of this study are insightful in understanding the influence of epistemic beliefs on knowledge and learning on

learning styles that are very likely to be chosen by students. A high level of belief in learning and learning has a significant relationship with field-dependent learning styles. This implies that students are more likely to involve themselves in the team, discuss learning problems and tasks with partners and teachers, and have more interpersonal relationships with the surrounding context as a result of the increased belief in knowledge and learning. Furthermore, as a consequence of contingency logic, students with field-dependent learning styles are also more likely to reduce or negate the level of belief that knowledge and learning can be obtained from their own abilities.

Empirically, this is evidenced by the negative results and significant influence of beliefs on learning in field-independent learning styles. Practically, this study is useful for teachers and educators in designing learning models, where learning based on individual abilities such as reading and writing will make students more likely be field-independent learners, because of the lack of need for interaction with peers in learning activities. Furthermore, high student belief that academic abilities can only be achieved with the involvement of the surrounding environment will enable them to be active in groups. In this context, learning materials such as discussions and joint assignments will be able to encourage them to strive academically according to their epistemic beliefs.

## CONCLUSION

Based on the results of the data analysis and discussion above, the conclusions that can be taken in this study are as follows. 1) That the proposed model design does not differ significantly from empirical data. This means the corresponding theoretical model with empirical data is acceptable. 2) Statistical examination shows the positive and significant effect of exogenous variable in the form of variable of belief in knowledge on field-dependent learning style. However, this variable has no effect on field-independence learning style. 3) The belief in learning had a significant positive effect on the field-dependent learning style and a negative and significant influence on the field-independent learning style. Based on the results of this study it is suggested that educational institutions need to provide and enrich the development of

epistemological beliefs in students in order to open opportunities for them to reflect not only on their learning style tendencies, but also about how and why certain learning styles are formed, and more specifically helps them to 'learn how to learn'.

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