

Epistemological Beliefs of Pre-service Teachers

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Abstract

Knowledge plays a vital role in all human strata. Hence, it enables individuals to think rationally, innovatively and even critically. Consequently, this manoeuvres to an investigation about its origin, nature, methods, and limits of human knowledge. This study was conducted to determine the epistemological beliefs of pre-service teachers in Northern Philippines along five dimensions namely the stability of knowledge, structure of knowledge, source of knowledge, ability to learn, and speed of learning. A descriptive-survey was utilized in this study with 181 respondents. The findings revealed that the pre-service teachers tend to be sophisticated and have a complex structure and reasoning along source of knowledge. In contrast, the pre-service teachers tend to be naïve along ability to learn, stability of knowledge, and speed of learning. Finally, pre-service teachers' epistemological beliefs vary along their sex, program specialization, and ethnicity

Keywords

Pre-service Teachers, Epistemological Beliefs, Knowledge, Teacher Education

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1. Introduction

Teachers play a significant role in the development and progress of every society. With this heavy task, Teacher Education Institutions (TEIs), then, are tasked to prepare pre-service teachers to become professional and intellectual educators and facilitators who are armed with appropriate knowledge, skills and competencies, and values to teach and to influence diverse learners. To ascertain that these TEIs are indeed producing quality and globally competent teachers, one must look into different factors related to pre-service teachers [1], such as their Epistemological beliefs [2, 3]. In this setting, the delineation of well-designed and high-calibre teacher education program is vivid through the lens of the pre-service teachers who greatly manifest strong indications of the yearning to learn and making others learn. The desire to learn in numerous methods is best understood under the concept of epistemological beliefs, which focus on the nature of knowledge and learning [1, 4-6].

Epistemological beliefs are used in education and educational psychology literature since late 1960s to define individuals' underlying beliefs about the nature of knowledge in terms of its certainty, structure, organization, sources, and how manageable it could be [7]. There are five dimensions of epistemological beliefs which are structure of knowledge, stability of knowledge, source of knowledge, ability to learn, and speed of learning [8].

Previous literature and studies have shown that epistemological beliefs have strong influences on pre-service teachers' thoughts and behaviours especially in education and instruction [9-12]. Further, understanding pre-service teachers' epistemological beliefs have a very important implication in teacher education preparations such as their pedagogical competencies and teaching styles. However, it is also essential to note that studies on epistemological beliefs are being recommended by previous researchers to be conducted since a substantial number of studies revealed

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confusing results and conclusion [13-18]. Further, an important gap in literature also stressed that studies on epistemological beliefs are mostly conducted in public and government owned Higher Educational Institutions [2, 19]. Limited literature would actually reveal the epistemological beliefs of pre-service teachers registered in a different scholarly environment such as in Catholic Schools and even in private non-sectarian institutions [2, 4, 20, 21].

With the different gaps on literature presented above, it is then necessary to conduct a study to determine the epistemological beliefs of pre-service teachers in a Catholic Educational institution and also in a Private non-sectarian institution. Hence, this study was conducted. This study then, aimed to determine the epistemological beliefs of Pre-service teachers by looking through the profile of the pre-service teachers, the epistemological beliefs of pre-service teachers along the five dimensions which include structure of knowledge, stability of knowledge, source of knowledge, ability to learn, and speed of learning; and also to look on significant difference on the epistemological beliefs of pre-service teachers when grouped according to their profile variables.

Conceptual Framework

This study is anchored on the theory of System of Independent Beliefs developed by Schommer (1990). The appeal of this perspective is that it places epistemological beliefs into a multi-dimensional view, which means that such beliefs have several different dimensions that develop independently of each other and may not build up in synchrony and in uniform or precision over time. The system includes beliefs about the structure, stability, source, ability and speed of knowledge. Individual beliefs as well as unique combinations of beliefs may have various effects on knowledge and performance.

Table 1. Five Dimensions of Epistemological Beliefs of Schommer (1990).

Epistemological Beliefs	Naïve	Sophisticated
Structure of Knowledge	Simple	Complex
Stability of knowledge	Certain	Tentative
Source of Knowledge	Authority	Reason
Ability to Learn	Innate	Acquired
Speed of Learning	Quick	Gradual

2. Methods

This study utilized a quantitative type of research specifically the descriptive survey method to describe the epistemological beliefs of the pre-service teachers. This study was conducted in two higher private educational institutions in Northern Philippines offering Teacher Education program. Both institutions hold a university status as awarded by the Commission on Higher Education (CHED). The respondents

of the study were the 181 Pre-Service Teachers of the two higher education institutions in Northern Philippines who were enrolled in school year 2016-2017. Total enumeration was utilized in the study.

Structured questionnaire with two parts were utilized in the study. The first part of the questionnaire consists of items to determine the profile of the respondents. The second part is lifted from the questionnaire developed by Schommer (1990) about the general domain of the epistemological beliefs of the pre-service teachers. This questionnaire contains 63 items which include structure of knowledge (1-19), stability of knowledge (20-30), source of knowledge (31-40), ability to learn (41-53), and speed of learning (54-63). Reliability test was conducted to determine the validity and appropriateness of the questionnaire to the respondents. The test revealed the following reliability values: 0.85 for the structure of knowledge; 0.81 for the stability of knowledge; 0.82 for the source of knowledge; 0.81 for the ability to learn; and finally, 0.82 for the speed of learning. Hence, the reliability values revealed that the questionnaire is valid and suitable.

The data were analyzed using the frequency counts and percentage to describe the profile of the respondents, weighted mean and median to identify the epistemological beliefs of the respondents, and independent sample t-test and one way analysis of variance (ANOVA) to determine significant differences on the epistemological beliefs of the pre-service teachers when grouped according to their profile variables.

3. Results

Table 2. Profile Variables of Pre-service Teachers.

Profile variables	Frequency	Percentage
Sex		
Male	43	23.80
Female	138	76.20
Program Specialization		
Secondary Education	135	74.60
Elementary Education	46	25.40
Field of Specialization		
English	54	29.80
Mathematics	27	14.90
Filipino	14	7.70
General Science	11	6.10
MAPEH	11	6.10
Social Studies	22	12.20
General Education	42	23.20
Ethnicity		
Itawes	53	29.30
Ilocano	88	46.60
Tagalog	17	9.40
Kalinga	8	4.40
Isneg	4	2.20
Ibanag	7	3.90
Malaweg	2	1.10
Igorot	2	1.10

Table 2 shows the profile of the pre-service students of two

higher teacher education institutions in Northern Luzon, Philippines in terms of Sex, Program of Specialization, Field of Specialization/Major, Ethnicity, Academic Standing, Living Condition, and High School they graduated from. It was shown in the table that majority of the Teacher Education students were females and were enrolled in the

Secondary Education Program with specialization in English. Majority of the pre-service teachers are Ilocanos and have a regular academic standing. Lastly, most of them lived in boarding houses and they graduated from public or government school.

Table 3. Epistemological Beliefs of Pre-Service Teachers.

Dimension	Median	Mean	Type	Description
Structure of knowledge	57.00	66.55	Sophisticated	Complex
Stability of knowledge	33.00	30.05	Naïve	Certain
Source of knowledge	32.00	37.29	Sophisticated	Reasoning
Ability to learn	29.00	28.75	Naïve	Innate
Speed of learning	31.50	28.81	Naïve	Quick

Table 3 presents that the student teachers were naïve in their epistemological beliefs in terms of ability to learn (innate), stability of knowledge (certain), and speed of learning (quick) and have sophisticated epistemological beliefs in terms of structure of knowledge (complex) and source of knowledge (reasoning).

Furthermore, the findings have shown that the pre-service teachers have sophisticated epistemological beliefs in terms of structure of their knowledge. Specifically, they are sophisticated with the following indicators: (1) the ability to learn is innate; (2) The only thing that is certain is uncertainty itself; (3) Genius is 10% ability and 90% hard work; (4) They try their best to combine information across chapters or even across classes; (5) If scientists try hard enough, they can find truth about almost everything; (6) When they study, they look for specific facts; (7) Truth is unchanging; (8) If pre-service teachers get time to reread a textbook chapter, they get a lot more out of it the second time; (9) The most essential part of scientific work is original thinking; thus knowledge is always changing; (10) It is annoying to listen to a lecturer who cannot seem to make up his concentration as to what they believe; and (11) If they able to comprehend something, it will make sense to them the first time they hear it;

Moreover, the results revealed that the pre-service teachers have naïve epistemological beliefs in terms of stability of their knowledge. Specifically, they are naïve with the following indicators: (1) Reading a hard textbook chapter usually will not support you in understanding it; and (2) To be prosperous in school, it is best not to ask too many questions.

In addition to that, the results revealed that the pre-service teachers have sophisticated epistemological beliefs in terms of their source of knowledge. Specifically, they are sophisticated in the following indicators: (1) They find it refreshing to think about issues that authorities cannot agree on; (2) Everyone needs to learn how to learn; (3) A sentence

has little meaning unless they know the situation in which it is spoken; (4) Wisdom is not knowing the answers, but knowing how to find the answers; (5) If a person forgot details but was able to come up with new ideas from a text, they would think they were intelligent; and (6) If a person cannot understand something in a short time, they should keep trying.

Meanwhile, the results revealed that the pre-service teachers have naïve epistemological beliefs in terms of their ability to learn. Specifically, they are naïve with the following indicators: (1) Sometimes they have to admit teachers' answers although they do not understand them; (2) They do not like movies that do not have an ending; (3) Getting ahead takes a lot of work; (4) It is a waste of time to work on problems that have no possibility of coming out with a clear-cut and unambiguous answer; (5) Some people are born worthy learners; others are stuck with limited ability; (6) Nothing is certain but death and taxes; (7) The really smart students do not have to work hard to do well in school; (8) If a person attempts too hard to comprehend and a problem, they will most likely just end up being confused; and (9) they will get almost all the information you can learn from a textbook during the first reading.

Lastly, the results revealed that the pre-service teachers have naïve epistemological beliefs in terms of their speed of learning. Specifically, they are naïve with the following indicators: (1) Students who are average in school will remain average for the rest of their lives; (2) A tidy mind is an empty mind; (3) The best thing about science courses is that most problems have one right answer; (4) Learning is a sluggish process of constructing knowledge; (5) Self-help books are not much help; (6) They will just get confused if you try to incorporate new ideas in a textbook with knowledge you already have about a topic; and (7) If instructors would stick to the facts and theorize less, one could get more out of college.

Table 4. Significant Difference on the Epistemological Beliefs of Pre-service Teachers When Grouped According to Sex.

Epistemological Beliefs	Sex	Mean	df	t-value	p-value
Structure of knowledge	Male	62.13	179	2.97	0.04*
	Female	67.83			
Stability of knowledge	Male	38.94	179	1.67	0.098
	Female	40.37			
Source of knowledge	Male	36.40	179	1.46	0.148
	Female	37.50			
Ability to learn	Male	49.01	179	2.80	0.007*
	Female	41.08			
Speed of learning	Male	27.40	179	1.29	0.162
	Female	29.20			

*Significant at .05 level

Table 4 presents the significant difference on the Epistemological Beliefs of Pre-service teachers of the two higher education institutions when grouped according to their sex. The results revealed that there is no significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to sex in terms of their stability of knowledge, source of knowledge, and speed of learning. Furthermore, the findings revealed that there is a significant difference in the Epistemological Beliefs of Pre-

service teachers when grouped according to sex in terms of the Structure of Knowledge and Ability to Learn since the p-value is lower than 0.05. Hence, the hypothesis is rejected. The findings imply that female pre-service teachers are more sophisticated than male pre-service teachers in terms of structure of knowledge. Moreover, male pre-service teachers are more sophisticated than female pre-service teachers in terms of their ability to learn.

Table 5. Significant Difference on the Epistemological Beliefs of Pre-service Teachers When Grouped According to their Program of Specialization.

Epistemological Beliefs	Program	Mean	df	t-value	p-value
Structure of knowledge	BSEd	66.12	178	-0.781	0.436
	BEEd	67.45			
Stability of knowledge	BSEd	39.71	178	1.230	0.220
	BEEd	40.81			
Source of knowledge	BSEd	36.80	178	2.279	0.024*
	BEEd	35.60			
Ability to learn	BSEd	39.91	178	-0.101	0.920
	BEEd	40.04			
Speed of learning	BSEd	28.50	178	0.923	0.357
	BEEd	29.00			

*significant at .05 level

Furthermore, table 5 presents the significant difference on the Epistemological Beliefs of Pre-service teachers of the two higher education institutions when grouped according to their program of specialization. The findings revealed that there is no significant difference in the Epistemological Beliefs of Pre-service teachers when grouped according to Program of Specialization in terms of their structure of knowledge, stability of knowledge, ability to learn, and speed of learning since the probability value is higher than 0.05. Hence, the null hypothesis is accepted. Meanwhile, the findings have

shown that there is a significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to program of specialization along the source of knowledge since the probability value is lower than 0.05. Hence, the null hypothesis is rejected. This implies that BSED pre-service teachers are more sophisticated than BEED pre-service teachers in terms of their source of knowledge wherein pre-service teachers used their reasoning skills to arrive with a vivid idea.

Table 6. Significant Difference on the Epistemological Belief of Pre-service Teachers When Grouped According to Field of Specialization.

Epistemological Beliefs	df	f-value	p-value
Structure of knowledge	6	1.626	0.143
Stability of knowledge	6	0.669	0.675
Source of knowledge	6	1.510	0.177
Ability to learn	6	0.288	0.942
Speed of learning	6	0.969	0.447

*significant at .05 level

Also, table 6 presents the significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to their Field of Specialization. It was shown in the table that there is no significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to their Field of Specialization specifically in the five dimensions; namely: the structure of knowledge, stability of knowledge, source of knowledge, ability to learn, and speed of learning.

Table 7. Significant Difference on the Epistemological Beliefs of Pre-service Teachers when Grouped According to Ethnicity.

Epistemological Beliefs	df	f-value	p-value
Structure of knowledge	7	2.214	0.035
Stability of knowledge	7	0.530	0.811
Source of knowledge	7	1.173	0.321
Ability to learn	7	1.296	0.255
Speed of learning	7	2.457	0.020

*significant at .05 level

Table 8. Post Hoc Test Analysis on Significant Difference of Pre-service Teachers When Grouped According to their Ethnicity (structure of knowledge).

Epistemological Beliefs	Mean	Itawes	Ilocano	Tagalog	Kalinga	Isneg	Ibang	Malaueg	Igorot
Itawes	68.97	1	0.069	0.082	0.025*	0.121	0.205	0.195	0.114
Ilocano	65.93		1	0.523	0.144	0.338	0.036*	0.387	0.249
Tagalog	64.22			1	0.385	0.56	0.027*	0.547	0.380
Kalinga	60.61				1	0.933	0.009*	0.922	0.719
Isneg	61.18					1	0.037*	0.072	0.040*
Ibanag	73.91						1	0.072	0.040*
Malaueg	59.85							1	0.836
Igorot	57.95								1

*significant at 0.05 level

Table 8 presents the post hoc analysis on the significant difference of Pre-service teachers when grouped according to their Ethnicity in terms of the Structure of Knowledge. It was shown in the table that there is a significant difference in

In addition, table 7 presents the significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to their Ethnicity. It was shown in the table that there is no significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to their Ethnicity in terms of the Stability of Knowledge, Source of Knowledge and Ability to Learn since the probability value is higher than 0.05. Hence, the null hypothesis is accepted. Meanwhile, along the Structure of Knowledge and Speed of Learning, there is a significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to their Ethnicity since the probability value is lower than 0.05 level of significance. Hence, the null hypothesis is rejected. This implies that Ethnicity plays a vital role in the Epistemological beliefs of Pre-service teachers specifically in their structure of knowledge and speed of learning.

terms of Ethnicity between Itawes and Kalinga; Ilokano and Ibanag; Tagalog and Ibanag; Kalinga, Itawes and Ibanag; Isneg, Ibanag, and Igorot; Ibanag, Ilokano, Tagalog, Kalinga, Isneg, and Igorot; Igorot and Ibanag.

Table 9. Post Hoc Test Analysis on Significant Difference of Pre-service Teachers When Grouped According to their Ethnicity (Speed of Learning).

Epistemological Beliefs	Mean	Itawes	Ilocano	Tagalog	Kalinga	Isneg	Ibanag	Malaueg	Igorot
Itawes	30.40	1	0.034*	0.700	0.042*	0.806	0.060	0.061	0.303
Ilocano	27.70		1	0.323	0.271	0.636	0.004*	0.168	0.602
Tagalog	29.60			1	0.120	0.971	0.054	0.996	0.396
Kalinga	24.70				1	0.290	0.003*	0.463	0.966
Isneg	29.50					1	0.158	0.157	0.478
Ibanag	36.00						1	0.009*	0.062
Malaueg	20.50							1	0.539
Igorot	25.00								1

*significant at .05 level

Table 9 presents the post hoc analysis on the significant difference of Pre-service Teachers when grouped according to their Ethnicity in terms of the Speed of Learning. It was shown in the table that there is a significant difference in terms of Ethnicity between Itawes, Ilokano, and Kalinga; Ilokano and Ibanag; Kalinga, Itawes and Ibanag; Ibanag, Ilokano, and Malaueg; and Malaueg and Ibanag.

4. Discussion

Epistemological Beliefs of Pre-service Teachers

This study intended to determine the epistemological beliefs of pre-service teachers of the two higher education institutions in Northern Philippines. The results revealed that

pre-service teachers hold a naïve epistemological belief in terms of the stability of knowledge. They most likely believed that knowledge is absolute or certain and unchangeable. This dimension pertains to whether knowledge is certain, or permanent at one extreme and knowledge is ever-changing or evolving at the other extreme point [22]. The findings imply that the pre-service teachers dominantly believe that knowledge is neither tentative nor ever-changing but rather it is absolute. The study negates the findings of previous studies that the pre-service teachers are not disposed to reflect that knowledge is fixed or unchanging. The findings imply that pre-service teachers can be able to develop a sophisticated knowledge [23-24].

Meanwhile, it was shown that pre-service teachers hold a sophisticated epistemological belief when it comes to their structure of the knowledge for the reason of believing that knowledge is complex rather than simple. The findings imply that the pre-service teachers view knowledge as capable of getting deeper than the surface level. Pre-service teachers who hold sophisticated epistemological beliefs have the ability to perceive and to critically apply a diversity of processes [2],[8]. Moreover, they are capable of performing well on the level of constructivist approach of teaching and learning. Hence, pre-service teachers are multifaceted in their knowledge for they do not restrict themselves to what they know rather they go deeper and magnify their horizon.

Furthermore, it was revealed that pre-service teachers incur sophisticated beliefs on the dimension of source of knowledge. This implies that pre-service teachers' knowledge is derived from one's own experience and judgment rather than taking all pieces of information and believe in everything the authorities will tell; thus knowledge is obtained from an authority. In addition, they discern that not all authorities and experts are always precise. Pre-service teachers tend not to believe that knowledge is handed down by authorities or experts, but rather from personal experience [25-26]. Furthermore, pre-service teachers tend to evaluate the information that is said by the expert and authorities before they would consider as valid and reliable information [5, 17, 25, 26]. The study contradicts the findings of previous study that pre-service teachers most likely view experts' assessment as being correct [27]. This may mean that despite being aware of the advancement of knowledge, pre-service teachers acknowledge that the advancement of knowledge belongs to the experts and authorities. Hence, pre-service teachers tend not to believe to what others know rather they use their reasoning skill for them to reason out and to come up with a brilliant idea.

Also, in terms of ability to learn, it was shown that pre-service teachers hold naïve epistemological beliefs. Consequently, they most likely believe that their capability to

learn is innate or fixed. Likewise, their outlook towards learning is based on their fixed capability. This implies that pre-service teachers tend to limit themselves to what they know. In extreme cases, when one perceives his ability to learn is permanent - innate, it inhibits the person to work hard to learn and declines in progress. Further, it was emphasized that students hold beliefs about ability to learn and those beliefs affect their performance during the learning task [5, 12, 18]. Learners who think that their ability to learn is restricted tend to exert less effort for learning since their ability cannot accommodate difficult tasks whereas students who believe that their ability to learn can be honed mostly likely become diligent and excel.

Lastly, the results revealed that the speed of learning of the pre-service teachers hold a naïve belief for the reason of believing that the development of acquiring of knowledge is quick. This implies that they tend to believe easily through knowing that in attaining a holistic and a wider perspective of knowledge requires a gradual process. In order to be successful in learning, one should be generous in giving time to study or learn concepts at one extreme point, while the other extreme point is not giving much time for studying or not giving much priority for learning [21, 28]. Further, the belief in quick learning suggests that persons are generally born with a stable quantity of a trait, math ability for instance, and that individuals who are proficient in math learn it quickly and do not have to work arduously [24].

Significant Difference on the Epistemological Beliefs of Pre-service teachers when grouped according to their Profile Variables

This study intended to determine the significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to their profile variables. It was shown that there is a significant difference on the Epistemological Beliefs of Pre-service teachers when grouped according to sex. The findings have shown that female pre-service teachers are more sophisticated in their epistemological belief than male pre-service teachers when it comes to their structure of knowledge. The findings imply that female pre-service teachers uphold a wider perspective of knowledge than male pre-service teachers. On the other hand, male pre-service teachers are more sophisticated in their epistemological belief in terms of their ability to learn. Nevertheless, female pre-service teachers are innate in their knowledge while male pre-service teachers use their reasoning to obtain knowledge. The findings imply that male pre-service teachers can enrich the knowledge that they have. A substantial number of studies stipulated that sex has a significant difference on the epistemological beliefs of student teachers [29-31]. Females were found to have more sophisticated epistemological beliefs than males [32-35].

However, the result of the study refutes the findings of other studies which extrapolated that there are many studies that find no gender difference on the epistemological beliefs of pre-service teachers [36-37].

Furthermore, it was shown that there is a significant difference on the Epistemological Beliefs of pre-service teachers when grouped according to Program of Specialization. The study revealed that Elementary pre-service teachers are more naïve in their epistemological beliefs than Secondary pre-service teachers in terms of the source of knowledge. This implies that Secondary pre-service teachers mostly rely their source of knowledge as basis of their reason [38-39] and it may mean that these students believed that knowledge is tentative and dynamic, unlike Elementary pre-service teachers who based their knowledge on authority and experts [23, 25, 26]. Since the nature of their work is to offer knowledge to their pupils, they image themselves as the source of knowledge; thus, children believe on what their teachers tell. Whereas Secondary pre-service teachers serve as facilitators, no longer spoon feeding their learners; so, their role is most likely to guide them and let them discover new concepts and new learnings [2, 3, 40, 41]. This also means that Secondary pre-service teachers are no longer teaching pupils so they should exert more effort because the minds of the learners are developing. Further, many studies concluded that program specialization has a significant difference on the epistemological beliefs of pre-service teachers [20-30].

Lastly, it was shown that there is significant difference on the Epistemological Beliefs of pre-service teachers when grouped according to Ethnicity. The findings revealed that in terms of their structure of knowledge: Itawes and Ibanag pre-service teachers hold a sophisticated epistemological belief. On the other hand, Ilokano, Tagalog, Kalinga, Isneg, Malaueg and Igorot pre-service teachers hold naïve Epistemological beliefs. Furthermore, in terms of their speed of learning, Itawes, Tagalog, Isneg, and Ibanag pre-service teachers hold a sophisticated epistemological belief. Hence, Ilokano, Kalinga, Malaueg, and Igorot pre-service teachers hold a naïve epistemological belief. This implies that ethnicity is a factor that influences the epistemological beliefs of pre-service teachers since most of the pre-service teachers are Ibanags and Itawes. A substantial number of studies conducted affirmed that ethnicity plays a vital role in the epistemological beliefs of pre-service teachers [42-45].

5. Conclusion

The study extrapolated that the pre-service teachers of both institutions in the Northern Philippines have most likely gained naïve epistemic beliefs in the three dimensions

particularly on the stability of knowledge, source of knowledge, and speed of learning. Moreover, pre-service teachers are sophisticated in their epistemological beliefs when it comes to their structure of knowledge and ability to learn. Lastly, pre-service teachers' Epistemological beliefs varies along sex, program specialization, and ethnicity.

6. Recommendations and Implications for Further Research

Teacher Education Department should come up with an intervention program to transform the naïve epistemological beliefs of pre-service teachers to sophisticated epistemological beliefs.

A possible extension of this activity is to look into other factors that may affect the epistemological beliefs of pre-service teachers.

A follow-up study may also be conducted looking on the epistemological beliefs of the respondents when they become professional teachers and already immersed into real classrooms.

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