

**EPISTEMOLOGICAL BELIEFS, ACADEMIC PERFORMANCE AND
TEACHING COMPETENCE OF PRE-SERVICE TEACHERS: INPUT FOR A
PROGRAM FRAMEWORK FOR TEACHER EDUCATION INSTITUTIONS**

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ABSTRACT

Objectives. This study examined the interplay of epistemological beliefs, academic performance and teaching competence of pre-service teachers. Specifically, it determined the pre-service teachers' beliefs on the nature of knowledge and learning, their academic performance along general education, professional education and major subjects, and their teaching competence along the domains of the National Competency-Based Teacher Standards.

Method. The study employed descriptive-correlational design. Participants were 232 pre-service teachers from one public and one private Teacher Education Institutions together with the 232 cooperating teachers of the pre-service teachers. Schommer's Epistemological Beliefs Questionnaire and the National Competency-Based Teacher Standards were the main data gathering instruments. Data were analyzed using frequency counts and percent, mean, median, t-test, one-way ANOVA, Pearson Product-Moment Correlation and Multiple Regression Analysis.

Results. The study revealed that the pre-service teachers hold mature epistemological beliefs, have satisfactory academic performance, and are competent in teaching. Specialization of pre-service teachers spells out differences in epistemological beliefs and academic performance and significant variations in their academic performance were also attributed to their program. Correlations indicated that pre-service teachers with mature epistemological beliefs have better academic performance and regression showed that factors of epistemological beliefs, except for quick learning, predict, though at a minimum level, the academic performance and teaching competence of pre-service teachers.

Conclusion. Individual's belief system on the nature of knowledge and learning significantly influence learning performance. Pre-service teachers who hold mature epistemological beliefs have better academic performance and these developed beliefs predict their teaching competence at minimum level. Congruently, they possess the necessary mental construct, attributes and competencies that are essential in the teaching profession. Moreover, the epistemological maturity of pre-service teachers

does not happen at the same rate. It develops asynchronously at various stages; thus, it proves the multi-dimensionality of Schommer's epistemological beliefs. In this context, an understanding of pre-service teachers' epistemological beliefs vis-à-vis academic performance and teaching competence helps the teacher education institutions design effective teaching and learning framework. This is in line with the idea of increasing awareness and insights on how prospective teachers can become active participants in creating epistemologically conducive learning atmosphere. Essentially, a program framework was formulated for adoption by Teacher Education Institutions with the end in view of producing quality teachers.

Keywords: epistemological beliefs, academic performance, teaching competence, pre-service teachers, Teacher Education Institutions

INTRODUCTION

Background of the Study

All efforts to improve the quality of education in the Philippines are dependent on the service of teachers who are fully equipped to undertake the many-sided functions of educating the citizens. Subsequently, the Teacher Education Institutions (TEIs) in the Philippines are mandated to provide quality and relevant experience to prospective teachers. The Commission on Higher Education (CHED) accentuates, "Quality pre-service teacher education is the key factor in Philippine education" (CHED Memorandum 30, Series of 2004). Teacher education programs are expected to ensure that the training tailors to the pressing needs of the Filipino learners and the demands of society in general; hence, proper preparation of pre-service teachers is a defining component of quality Philippine education (Diaz, 2015).

In this context, the delineation of a well-designed and high-quality teacher education program is evident 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 various ways is best understood under the concept of epistemological beliefs, which focus on the nature of knowledge and learning (e.g., Brownlee, 2001; Hofer & Pintrich, 2002; Schommer, 2004; So, et.al, 2010). Epistemological beliefs significantly frame learners' performance. Furthermore, individual's beliefs on knowledge, learning and teaching are highly interdependent and they are connected to actions in the classroom (Fang, 1996; Stuart & Sturlow, 2000; Bay et.al, 2015). Studies also reported that beliefs could interact and affect teachers' practice and learning (Chai, 2010; Abdelraheem, 2004; Yilmaz & Sahin, 2011) and pedagogical decision making (Nailon, 2015). Besides, going directly

through the process of learning is clearly understood through the analysis of academic performance because students' learning goals are regularly a result of academic progress (March, 2010) and making others learn is the true test of teaching competence as teachers make connections to the knowledge of students that contribute to a more holistic view of teaching (Luft & Roehrig, 2007). In essence, uncovering those characteristics associated with epistemological beliefs, academic performance and teaching competence may help teacher education faculty proactively address instructional issues and create sound pedagogical decisions to define and characterize a proficient, effective, and efficient pre-service teacher.

The three highlighted concepts, which refer to epistemological beliefs, academic performance and teaching competence, are believed to be the discrete points that need to be intelligibly investigated to come up with a clear understanding vis-a-vis pre-service teachers' education. A number of studies revealed the interplay among them. There have been findings that affirm the existence of positive relationship between epistemological beliefs and academic performance (Garcia, 2005; Arslantaş, 2015 & Schommer-Aikins & Easter, 2006); however, March (2010) claims that there is insignificant relationship between epistemological beliefs and the grade point average, which is an index in describing academic progress. On one hand, studies on epistemological beliefs and teaching competence disclosed opposing views; a study found that there was a favorable relationship between them (Chai et. al, 2009), but others declared there was none (So et.al, 2010; Manu, 2014). Between academic performance and teaching competence variables, it was found out that there is significant correlation between grade point average and teaching performance (Pagaduan, 2009 & Hall, 2011) but Zumwalt & Craig (2005) cite that there is no correlation between mean grade and teacher effectiveness and grades are not reliable indicators of performance. Based on these assertions, it can be noted that there is no existing research involving a blend of all these three variables; thus, there is a conclusive need for one to determine the areas that are not yet scrutinized and are neglected.

To further analyze and exhaustively discuss the epistemological beliefs, academic performance and teaching competence, it is considered imperative to explore certain profile variables such as sex, program, specialization and ethnicity where there are identified conflicting findings. Along sex, some studies show that it is a significant factor in epistemological beliefs (Schommer, 2003 & Er, 2013), academic performance (Isiksal, 2005) and teaching competence (Isiksal & Cakiroglu, 2005); nonetheless, there are researches that point to the contrary: Chan (2007) & Tümkaya (2012) on epistemological beliefs; Ali (2013) on academic

performance and Oluwatayo & Adebule (2012) on teaching competence of pre-service teachers. As regards ethnicity, studies show that epistemological beliefs (Ismail et.al, 2013) and academic performance (McCoy, 2005) differ on it respectively but in the research of Camargo, (2011), he argued that no significant differences between ethnicities were found for the relationships examined such as in academic success. In terms of program, it is seen as a significant influence on epistemological beliefs (Arslantaş, 2015 & Tümkaya, 2012) and teaching competence (Pagaduan, 2009 & Oluwatayo & Adebule, 2012) but it is not a significant factor in academic performance among teacher education students (Pascua et.al, 2009). Consequently, the present study serves as an avenue to clarify the contradictions considering the context of Filipino pre-service teachers.

In sum, the results of the previously conducted studies bare the affirmation of existing relationships, contradictions, as well as gray areas; hence there is a need to undertake an in-depth research to explore further the variables by putting together epistemological beliefs, academic performance and teaching competence. Moreover, in the Philippine context, there are only few researches on epistemological beliefs among pre-service teachers (e.g. Bernardo, 2008; Magno, 2010) and only few studies considered the National Competency-Based Teacher Standards as framework in determining Filipino pre-service teachers' competence. Also, there is no identified study yet that explores the relationship between epistemological beliefs and teaching competence, which uses the domains of the National Competency-Based Teacher Standards. Predominantly, the researcher being a teacher, is intrinsically motivated to deliberately explore these concepts to assist in the identification of appropriate strategies congruent with the beliefs of pre-service teachers to gradually give rise to a transformed teacher education framework anchored on the interests, needs and exigencies of all concerned in the educative community; thus, this study came into conception.

Statement of the Problem and Research Questions

The study investigated the relationship among epistemological beliefs, academic performance and teaching competence of pre-service teachers. Specifically, it answered the following questions:

1. What is the profile of the pre-service teacher-respondents in terms of sex, program, specialization and ethnicity?
2. What are the epistemological beliefs of the pre-service teachers as revealed by Schommer-Aikins' instrument?
3. What is the level of academic performance of the pre-service teachers in their general education, professional education and content areas and/or major subjects?
4. What is the level of teaching competence of the pre-service teachers along the seven domains of the National Competency-Based Teacher Standards (NCBTS) as assessed by their cooperating teachers?
5. Is there a significant difference in the epistemological beliefs, academic performance and teaching competence of the pre-service teachers when grouped according to their profile variables?
6. Is there a significant relationship between and among epistemological beliefs, academic performance and teaching competence of the pre-service teachers?
7. Which factors of epistemological beliefs will predict better academic performance and teaching competence of the pre-service teachers?

Hypotheses

1. There is no significant difference in the epistemological beliefs, academic performance and teaching competence of pre-service teachers when grouped according to profile variables.
2. There is no significant relationship between and among epistemological beliefs, academic performance and teaching competence.
3. There are no factors of epistemological beliefs that can predict better academic performance and teaching competence of pre-service teachers.

Significance of the Study

The present research is hoped to be a significant endeavor in response to the indispensable appeal for reappraisal, understanding, and enhancement of teacher education, particularly in the area of pre-service teaching, through specific highlight on the interplay of pre-service teachers' epistemological beliefs, academic performance and teaching competence anchored along the domains of the National Competency-Based Teacher Standards. Moreover, the study will address issues recently identified as research gaps in need of further investigation that will give empirical evidence on which aspects necessitate improvement and intervention in order to familiarize the teacher training faculty with this study's

highlighted concepts in response to instructional practices and to support desirable changes in teacher education. In essence, the results of this study will be used to develop a program framework that may specifically guide the Teacher Education Institutions in their curriculum development and policy-making that gear toward quality instruction.

Underpinning Theory

The study is anchored on the theory of System of Independent Beliefs developed by Schommer. 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, certainty, source, control and speed of knowledge. Individual beliefs as well as unique combinations of beliefs may have different effects on learning and performance. According to Schommer (1990 & 1993), learners who hold naïve epistemological beliefs deal with knowledge and learning in a simplistic and passive manner whereas those who have mature or sophisticated beliefs appear to have constructive learning strategies and independent reasoning abilities that can positively influence scholastic achievement. In essence, an understanding of students' epistemological beliefs can provide the opportunity to gain insights of students' performance that can help design effective teaching-learning strategies and framework.

Literature Review

Understanding Studies on Epistemological Beliefs

Indoubtably, beliefs powerfully affect teaching and learning. They can influence teaching philosophies (Aldemir, 2007), teaching perspectives (Pop, 2008), teaching performance (Charalambous, 2008), teaching methods (Xue-mei, 2007), instructional context (White & Chant, 2014), affective dispositions (Wall, 2010), learning theories (Chiang, 2010), learning styles (Dandy & Bendersky, 2014), language learning (Tercanlioglu, 2005 & Mori, 1997) and links between theories and practice (CotaGrijalva & Barajas, 2013). On a practical note, it is necessary to be aware of the learners' beliefs to facilitate better understanding of and to use them to prompt learners to challenge and to redefine their learning in a new way (Meger, 2014).

Among the beliefs on teaching and learning, epistemological beliefs have been the center of educational researches. Shaver (1992) defines epistemology as the division of philosophy that investigates the nature and origin of knowledge. More specifically, epistemology is concerned with either the development of common bodies of knowledge or the establishment of personal knowledge. Interestingly, epistemological perspectives relate to learning in various ways, create repercussions in the pedagogical context, and influence reasoning and judgment throughout people's lives (Hofer & Pintrich, 2002).

The groundwork of epistemological studies was initially established by William Perry Jr. (1968). His findings revealed that many first-year students believed that knowledge is simple, certain, and handed down by omniscient authority. He theorized that students went through nine epistemic positions that eventually led to a considerable number of fourth-year students believing that knowledge is complex, tentative, and derived through reason and empirical evidence (Schommer & Hutter, 2002).

Several studies were also undertaken to explore epistemological beliefs and other variables associated to them. Brownlee (2001; 2001 & 2003) describes changes in epistemological beliefs of teacher education graduates. She found out that the students held range of epistemological beliefs. Besides, students' beliefs about knowing ranged from a focus on knowledge as "absolute and received" to a view that knowledge was "constructed and reasoned" whereas in another context, there is an increased focus on relativistic beliefs about knowing and teaching. Wong et.al (2009) cite that students tended to believe that knowledge is constructed during the learning process as a result of effort, that knowledge is not handed down by authority figures or limited by innate ability, and that knowledge is tentative and changing. In the study of Yilmaz & Sahin (2011), they show that epistemological beliefs correlated to pre-service teachers' preference on constructivist teaching views more than traditional teaching views. Moreover, Chan (2004) reveals that there is a significant relation between epistemological beliefs and conceptions about teaching and learning. Lastly, Magno (2010) claims that both complexity and structured belief about learning significantly predicted valuing one's education and higher expectation for achievement, filial piety, and emotional restraint were also significant.

Epistemological Beliefs: A Schommer's Perspective

Schommer (1990) synthesized various epistemological researches from 1968 to 1988 and after almost two decades, she came up with another epistemic direction

beyond Perry's work. She proposed the idea of a multidimensional epistemological belief system, which means that beliefs do not necessarily mature at the same rate. An individual could believe knowledge is highly complex. At the same time, the person could hold the belief that either knowledge is certain or knowledge is uncertain. A set of different beliefs could capture the intricacy of epistemological beliefs. These include stability of knowledge, structure of knowledge, speed of learning, and ability to learn (Schommer-Aikins et.al, 2003). Subsequently, researchers continue to seek for significant relationships between epistemological beliefs and different aspects of learning.

In addition, Schommer developed the Epistemological Beliefs Questionnaire (SEQ) that is composed of 63 short statements. The statements express beliefs with the use of 5-point Likert scale. Bernardo (2008) shares that Schommer categorized the 63 items into 12 subsets and these were reduced to the four factors using factor analytic procedures. The four factors are as follow: (a) "Certain Knowledge" ranges from the belief that knowledge is absolute and never changing to the belief that knowledge is tentative and evolving or changing; (b) "Simple Knowledge" ranges from the belief that knowledge comprises isolated, unambiguous bits of information to the belief that knowledge is composed of highly interrelated concepts. The subsets are Avoid Ambiguity, Seek Single Answers, and Avoid Integration; (c) "Quick Learning" ranges from the belief that learning is quick and all-or-none to the belief that learning is gradual; and (d) "Fixed Ability" ranges from the belief that the ability to learn is fixed at birth to the belief that learning improves over time with experience. Can't Learn How to Learn, Success is Unrelated to Hard Work, Learn the First Time, and Ability to Learn is Innate are the subsets.

Pre-service Teachers' Epistemological Beliefs in Schommer's Lens

In a European setting, Braten and Stromso (2005) studied the epistemological beliefs of Norwegian business administration and teacher education students using the SEQ. Their principal components analysis yielded four factors related to (a) Speed of Knowledge Acquisition, (b) Knowledge Construction and Modification, (c) Certainty of Knowledge, and (d) Control of Knowledge Acquisition.

Moreover, Tanriverdi (2012) surveyed Turkish pre-service teachers and concluded that students who believe that learning depends on innate ability were likely to be surface motivated and may utilize a surface strategy in their studying while students who believe that learning is dependent on effort were deep-motivated and may adopt a deep study strategy. Another Turkish study conducted by Er (2013)

concluded that prospective teachers believed that learning is more dependent on ability rather than effort and epistemological beliefs of teacher candidates were moderately developed.

A study in Hong Kong showed significant relations between pre-service teachers' epistemological beliefs and conceptions about teaching and learning (Chan, 2004). Furthermore, Cheng et.al, (2009) found out that most of the student-teachers strongly believed that learning effort was more important than innate ability, knowledge changes, and authority of knowledge is questionable.

In the Philippine context, Bernardo (2008) studied the structure of the Filipino prospective teachers' epistemological beliefs using a confirmatory factor analysis (CFA). The results revealed Simple Learning and Structured Learning. The same factors were found using the Filipino and English versions of the questionnaire.

Pre-service Teachers' Academic Performance

Academic performance is a highlighted variable in the study of pre-service teachers. It is seen to be affected by and is related to a number of factors such as intrinsic motivation (Eymur, 2011); critical disposition (Demirham, 2011); regulation learning construct (Anane, 2014) and classroom climate (Falsario et.al, 2014). Furthermore, it is basically explored and described through grades. Falsario et.al (2014) cite that pre-service teachers have very good academic performance based on their grades in The Teaching Profession subject while in the study of Pagaduan (2009), the pre-service teachers have average academic performance in terms of their grades in Field Study courses. Nonetheless, the challenge remains among scholars wherein there are claims that grades are not valid indicators of academic performance (Allen, 2005).

Academic Performance and Epistemological Beliefs

Findings of several studies disclosed the positive significant relationship between epistemological beliefs and academic performance. Belief in quick learning predicted oversimplified conclusions, poor performance on the mastery test, and overconfidence in test performance; belief in certain knowledge predicted inappropriately absolute conclusions; and belief in the speed of learning mediated the effects of ways of knowing on academic performance (Schommer, 1990;

Schommer-Aikins & Easter, 2006). Moreover, Garcia (2005) reveals that beliefs on Fixed Ability and Certain Knowledge affected the reading and mathematics performance and Arslantaş (2015) asserts that there is a statistically significant relationship between the belief of learning depending on talent and academic achievement and the less students believed in quick learning, the higher the grade point average they earned (Schommer, 1993). On the contrary, a study shows that there is insignificant relationship between epistemological beliefs and grade point average, one of the indicators of measuring academic progress (March, 2010).

Teaching Competence in the Philippine Setting: The NCBTS Framework

Suciu and Mata (2011) define pedagogical or teaching competence as the “minimum professional standard, often specified by law, which should raise a person in fulfilling a particular role of the teaching profession”. This implies that the competence is attributed to the ability of the teachers to demonstrate the specific performance indicators set for the practice of teaching. Furthermore, it should be “understood in its sense as integrated qualities that delineate the capacity to find answers to arising pedagogical issues by creatively using one’s knowledge, personal and professional experiences, values and talents that lead to proper and desirable outcomes”.

In the Philippines, essentially, the National Competency-Based Teacher Standards (NCBTS) is the heart of the Teacher Education and Development Program (TEDP) that is mandated by CHED Memo 52, series of 2007. Borabo (2009) shares that NCBTS is a framework that defines the diverse dimensions of teaching, which is defined in terms of actual competencies associated with features of teaching in high learning classrooms. It reflects the blueprint of the synergized efforts of various government agencies that seek to improve the training of future teachers and to intensify a teachers’ career path that begins from pre-service and ends in retirement (Teacher Education Council (TEC) - Department of Education (DepEd), 2009). It is composed of seven domains namely: (a) Social Regard for Learning, (b) Learning Environment, (c) Diversity of Learners, (d) Curriculum, (e) Planning, Assessing and Reporting, (f) Community Linkages, and (g) Personal Growth and Professional Development. Del Corro-Tiangco (2014) points out that NCBTS serves as a “guide for teachers in their commitment and their accountability to provide classroom instruction resulting to good student learning outcomes”. The Department of Education Order Number 32, series of 2009 laid the legal foundation for the “National Adoption and Implementation of NCBTS-TSNA in the Overall Program for Continuing Teacher Capacity Building”.

A number of studies utilized the NCBTS as their framework to expound and to explore on the teaching competence of teachers and pre-service teachers. In the study of Alderite et.al (2008), they reveal that the teachers considered their strengths to be along curriculum, diversity of learning, and learning environment. On the contrary, their weaknesses revolve around the four domains referring to planning, assessing and reporting; community linkages; personal growth and professional development; and social regard for learning. Among pre-service teachers, Somblingo (2014) found out that they developed high level of competencies along the seven domains of the NCBTS after taking their field study courses as assessed by themselves and their Field Study teachers; however, on the side of their cooperating teachers, prospective teachers' competencies were assessed as average level. In addition, Biong (2014) compared the NCBTS level of competence between the graduating students and graduates of the College of Education in a university in Mindanao. Results showed that the graduating and graduates had acquired high level of competence as assessed by the student respondents themselves, teachers and administrators. In detail, the graduates demonstrated better performance than the graduating students probably because they had been hired already as teachers and have applied the theories they have learned in their pre-service education.

Teaching Competence and Epistemological Beliefs

Indirectly, the results of the study of Chai et.al (2009) indicate that somehow, pre-service teachers' relativistic epistemological beliefs have impact on their teaching performance. The findings revealed that pre-service teachers were inclined to believe in constructivism. These further suggest that pre-service teachers hold beliefs that are congruent to the educational reform effort from their respective countries. In addition, Manu (2014) found out that source of knowledge, justification for knowing and attainment of truth of in-service teachers had insignificant negative correlation with instructional practice. This meant that where these three dimensions of epistemological beliefs of the in-service teachers did not develop; they were still likely to use more constructivist instructional practice. Nevertheless, So, et.al (2010) cite that teaching-related factors are not statistically significant to the epistemological beliefs.

Teaching Competence and Academic Performance

Conflicting researches exist regarding the predictive validity of undergraduate grade point average and teacher effectiveness (Davy et.al, 2007). There are

studies asserting that grades are biased and unreliable indicators of performance but there are findings that show favorable correlation between grade point average and teaching performance.

In the study of Pagaduan (2009), using grades as index of academic performance, the researcher found out that there is a significant correlation between academic performance and off-campus teaching competence. Hall & West (2011) affirm this by citing that grade point average correlated significantly and positively with final student teaching performance. Pre-service teachers with a greater sense of teaching efficacy in fact reported a high academic sense of intrinsic interest, task value, and control of time and study environment (Bembenutty, 2007).

In contrast, Kunter et.al (2013) uphold that teachers' general academic ability does not affect their instruction. In the research of Diaz (2015), the results indicate that there is a negligible link between the teaching performance and academic achievement. This is supported by Zumwalt & Craig (2005) showing that there is no correlation between grade point average and teacher effectiveness.

Epistemological Beliefs, Academic Performance and Teaching Competence: Sex, Program, Specialization and Ethnicity in Focus

As regards epistemological beliefs, there are divergent results of the studies. So et.al (2010) state that relationships among beliefs and other examined variables, sex appears to be a significant factor. Schommer (1993) claims that girls were less likely to believe in quick learning and fixed ability whereas male students, more than females, believed that learning is more dependent on effort rather than ability (Er, 2013). However, Chan (2004, 2007) and Tümkaya (2012) reveal that sex is not a significant factor of differences in epistemological beliefs. Conflicting findings also appear in terms of academic performance. Sex is a significant factor to academic performance according to Isiksal (2005) and Pascua et.al (2009) but according to Ali (2013) and Eren (2015), it is not in any way significantly related. Concerning teaching competence, Isiksal & Cakiroglu (2005) and Ekrem (2014) confirm that females were better than males. Oluwatayo (2012) and Eren et.al (2015) on the other hand, argues that there is no significant influence of sex on teaching performance.

According to Ismail et.al (2013), based on the ethnic variable, there is a significant difference among students' epistemological beliefs. Additionally, McCoy (2005) maintains that ethnicity is significantly contributory to student achievement,

although Camargo (2011) asserts that there is no significant difference between ethnicities with regard to academic performance. Arslantaş (2015) reveals that the teacher candidates' epistemological beliefs differed based on specialization. This is supported by Tümkaya (2012) citing that the students from the field of science-techniques were more developed or mature in the sub-dimension of the belief concerning "There is one unchanging truth". On one hand, correlations indicated that students' epistemological beliefs were similar for mathematics and social sciences, as well as for mathematics and business (Schommer-Aikins et.al, 2003).

In terms of teaching competence, Pagaduan (2009) bares that the BSED pre-service teachers majoring in English, Social Studies, Physical Education and General Science were more competent than BEED group on the aspect of questioning skills. Varank (2009) shows that students' competency levels in the elementary teaching programs were significantly higher than those in the other teaching programs, except the preschool teaching programs but Eren et.al (2015) claim that there are no significant differences observed in the competency levels of pre-service teachers depending on department. With respect to academic performance, Pascua et.al (2014) claim that program is not a significant factor.

Research Paradigm

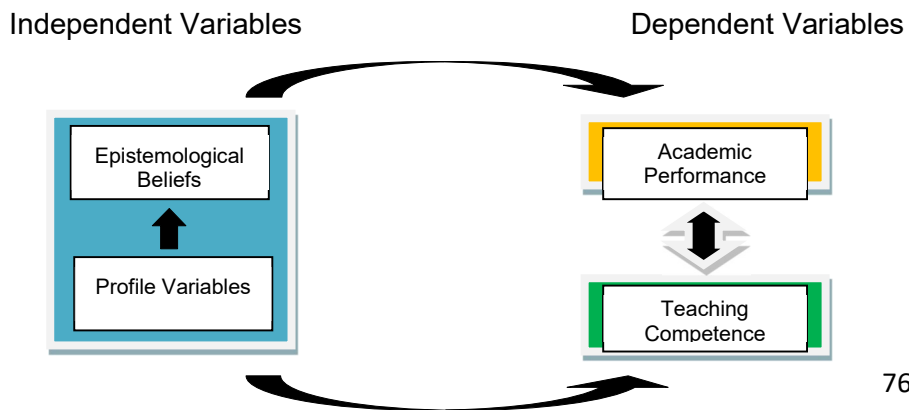


Figure 1. Research Paradigm

Figure 1 shows the research paradigm of the study. The pre-service teachers' epistemological beliefs (beliefs about the nature of knowledge and learning using Schommer's perspective) and their profile in terms of sex, program, specialization and ethnicity serve as independent variables. On the other hand, the academic performance and teaching competence of pre-service teachers are the dependent variables. The paradigm depicts that the epistemological beliefs of the pre-service teachers may influence and predict their academic performance and teaching competence, which may also be associated to each other. Also, the profile of the pre-service teachers may reveal any significant variations among the major variables under study.

METHODS

Research Design

The study used descriptive-correlational design since it determined primarily the relations among epistemological beliefs, academic performance and teaching competence of the pre-service teachers. It identified possible patterns of relationships that exist among variables and it measured the strength of such association.

Respondents of the Study

Program	Specialization	Pre-service Teachers' Population in CSU (N)	Percentage Distribution (%)	Pre-service Teachers' Sample Size in CSU (n)	Pre-service Teachers' Population in USL (N)	Percentage Distribution (%)	Pre-service Teachers' Sample Size in USL (n)	Total Pre-service Teachers' Sample Size (n)	Cooperating Teachers' Sample Size (n)
BEED	Generalist	186	25.16	53	13	15.85	4	57	57
	Preschool	59	7.98	17	0	0	0	17	17

	Educational								
BSED	Biological Science	50	6.76	14	10	12.19	3	17	17
	Physical Science	35	4.73	10	0	0	0	10	10
	Mathematics	85	11.50	24	6	7.32	2	26	26
	English	113	15.29	32	19	23.17	5	37	37
	Filipino	43	5.82	12	15	18.29	4	16	16
	Social Science	116	15.69	32	5	6.09	1	33	33
	Technology and Livelihood Education	52	7.03	15	0	0	0	15	15
	MAPEH	0	0	0	14	17.07	4	4	4
Total		739	100	209	82	100	23	232	232

The first group of respondents of the study was the pre-service teachers of Cagayan State University (Andrews Campus) and University of Saint Louis Tuguegarao with a total sample of 232 respondents. The Bachelor of Elementary Education (BEED) and Bachelor of Secondary Education (BSED) pre-service teachers were enrolled in their Practice Teaching for the second semester of the School Year 2015-2016 and were deployed in the Divisions of Cagayan and Tuguegarao. They were identified through stratified random sampling.

The second group of the respondents was the 232 cooperating teachers of the pre-service teachers. They were selected through purposive sampling. They gave their assessment as regards the teaching competence of the pre-service teachers assigned them along the seven domains of the NCBTS.

In totality, there were 464 respondents coming from the first and second groups. The sample size is broken down as follows:

Research Instruments

The researcher utilized two sets of questionnaire. The first questionnaire included the profile of the pre-service teacher respondents and the 63-item Epistemological Beliefs Scale that was developed by Dr. Marlene Schommer-Aikins (with written permission). The Epistemological Beliefs Scale consisted of short statements covering various beliefs about knowledge and learning, which are further categorized into 12 subsets loaded into four factors, namely Factor 1 (Simple Knowledge), Factor 2(Fixed Ability), Factor 3(Quick Learning) and Factor 4 (Certain Knowledge). The pre-service teacher respondents were asked to answer on a Five-point Likert Type Scale (Strongly Agree-5, Agree-4, Neutral-3, Disagree-2, Strongly Disagree-1). The items were written in the naïve direction, which means that if the mean score is greater than the median, the less mature are the beliefs. The second questionnaire elicited the assessment of the cooperating teachers on the teaching competence of the pre-service teachers assigned to them. It was composed of performance indicators along the seven domains of NCBTS, which was developed by the TEC, DepEd and CHED. The cooperating teachers had to answer on a Four- Point Rating Scale (Very Competent- 4, Competent- 3, Incompetent- 2, and Very Incompetent- 1).

The mean grade of the pre- service teachers along their general education, professional education, and major subjects or content areas gauged their academic performance. This was obtained from their permanent record in the Registrar's Office of Cagayan State University and University of Saint Louis respectively. It was interpreted using the following scale: Excellent (95-100), Very Satisfactory (90-94.99), Satisfactory (85-89.99), Fair (80-84.99), and Poor (75-79.99).

Research Procedure

Foremost, the researcher sought approval from the Cagayan State University, University of Saint Louis and Department of Education authorities for the conduct of the study. Prior and informed consent were accomplished by the respondents to ensure compliance to ethical standards. After which, the researcher personally floated the first set of questionnaire to the pre-service teachers to determine their profile and epistemological beliefs. Two weeks before the end of practice teaching, the researcher floated the second set of questionnaire to the cooperating teachers of the pre-service teachers to ascertain the latter's teaching competence. Moreover, the academic performance of the pre-service teachers along general

education, professional education and content areas or major subjects was taken from the official data of the registrars of Cagayan State University and University of Saint Louis. Due permission was sought from the concerned offices.

Data Analysis

Descriptive statistics such as frequency counts and percent were used to treat the profile variables. Mean score and median were used to describe the epistemological beliefs of the respondents. If the mean is less than the median, the data are interpreted to be 'less likely to believe'; hence, the beliefs are mature. On one hand, if the mean is more than the median, the data are interpreted to be 'more likely to believe'; hence, the beliefs are naïve. Frequency counts, percent and mean were utilized to describe academic performance whereas weighted mean was used to determine the level of pre-service teachers' teaching competence. Inferential statistics such as t- test was employed to find out if there is significant difference among epistemological beliefs, academic performance and teaching competence when grouped according to sex and program whereas one-way ANOVA was utilized to compare the variables in terms of specialization and ethnicity. Pearson Product Moment of Correlation Coefficient or Pearson- r was used to ascertain if there is a significant relationship between and among the pre-service teachers' epistemological beliefs, academic performance and teaching competence. Multiple Regression Analysis was used to identify which among the different factors of the epistemological beliefs can predict better academic performance and teaching competence of the pre-service teachers.

RESULTS

In this section, the salient findings of the study on the epistemological beliefs, academic performance and teaching competence of pre-service teachers are presented and interpreted in tabular and textual forms as take off point for comprehensive discussion.

Profile of the Pre-service Teachers

Table 1. Profile of Pre-Service Teachers

Variable	Frequency	Percent
Sex		
Male	44	18.97
Female	188	81.03

Program		
Bachelor of Elementary Education (BEEEd)	74	31.9
Bachelor of Secondary Education (BSEd)	158	68.1
Specialization		
Generalist	57	24.6
Pre-school Education	17	7.3
Biological Science	17	7.3
Physical Science	10	4.3
English	37	15.9
Mathematics	26	11.2
Technology and Livelihood Education	15	6.5
Music, Arts, Physical Education and Health	4	1.7
Social Science	33	14.2
Filipino	16	6.9
Ethnicity		
Ilokano	123	53.0
Ibanag	10	4.3
Kalinga	4	1.7
Itawes	83	35.8
Malaueg	2	.9
Tagalog	10	4.3

It is shown in Table 1 that pre-service teachers are generally female and majority are Bachelor of Secondary Education (BSEd) students. This suggests that in terms of enrollment, teacher education institutions are female-dominated (Higher Education Statistical Bulletin Academic Year 2012-2013) and BSEd is the preferred program. As regards specialization, majority are English majors in the BSEd program whereas in the BEEEd program, most of the respondents are Generalist.

The data further show that most of the pre-service teachers are Ilocanos. This is in congruence with the existing status of the Ilocanos as the mainstream cultural group in Northern Luzon and the third largest ethnolinguistic group in the Philippines (National Statistics Office, 2014).

Epistemological Beliefs of the Pre-service Teachers

Table 2. Summary of Epistemological Beliefs of Pre-Service Teachers

Statement	Mean Score	Median	Descriptive Value
1. Simple Knowledge			
Avoid Ambiguity	16.70	15	More likely to believe
Seek Single Answers	35.95	33	More likely to believe
Avoid Integration	22.80	24	Less likely to believe
Depend on Authority	12.84	12	More likely to believe
Overall	88.29	84	More likely to believe
2. Fixed Ability			
Can't Learn How to Learn	10.09	15	Less likely to believe
Success Unrelated to Hard Work	8.47	12	Less likely to believe
Learn the First Time	8.05	9	Less likely to believe
Innate Ability	12.71	12	More likely to believe
Concentrated Effort is a Waste of Time	4.97	6	Less likely to believe
Overall	44.30	54	Less Likely to believe
3. Quick Learning			
Quick Learning	14.61	15	Less likely to believe
Don't Criticize Authority	15.89	18	Less likely to believe
Overall	30.50	33	Less likely to believe
4. Certain Knowledge			
Certain Knowledge	18.62	18	More likely to believe
Overall Epistemological Belief	181.72	189	Less likely to believe

*Note: If Mean < Median = Less likely to believe; hence, mature
If Mean > Median = More likely to believe; hence, naive

Table 2 reveals that overall, the pre-service teachers less likely to believe in the statements on epistemological beliefs. The data plainly imply that the pre-service teachers have mature beliefs on the nature of knowledge and learning.

Specifically, they less likely to believe in Fixed Ability and Quick Learning but they more likely to believe in Simple Knowledge and Certain Knowledge. This indicates that the pre-service teachers hold beliefs that knowledge is acquired and the rate of learning is gradual. Furthermore, they believe that knowledge is simple and unchanging.

Academic Performance of the Pre-service Teachers

Table 3. Academic Performance of Pre-Service Teachers

Grade	Descriptive Value	General Education		Professional Education		Major	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
75.00 –99.99	Poor	2	.9	1	.4	2	.9

80.00 – 84.99	Fair	83	35.8	60	25.9	71	30.6
85.00 – 89.99	Satisfactory	125	53.9	140	60.3	135	58.2
90.00 – 94.99	Very Satisfactory	20	8.6	31	13.4	24	10.3
≥95.00	Excellent	2	.9				
Mean Grade		86.20		86.73		86.42	
Overall Mean Grade =		86.45					

It can be gleaned from Table 3 that majority of the pre-service teachers have satisfactory academic performance along general education, professional education and major subjects. It is interesting to note that it is in professional education that they earned the highest mean grade. On the contrary, they obtained the lowest mean grade in general education.

Teaching Competence of the Pre-service Teachers

From the data shown in Table 4, the overall mean basically suggests that the pre-service teachers are competent along the seven (7) domains of the National Competency-Based Teacher Standards based on the assessment of their cooperating teachers during the practice teaching experience. The finding further illustrates that the pre-service teaching competence meets the required set of national standards observed in the Department of Education and as indicated in CHED Memo No. 52, Series of 2007.

Table 4. Summary of the Level of Teaching Competence of Pre-Service Teachers along the Seven Domains of National Competency-Based Teacher Standards

Domain	Mean	Descriptive Value
Social Regard for Learning	3.56	Very Competent
Learning Environment	3.34	Competent
Diversity of Learners	3.24	Competent
Curriculum	3.36	Competent
Planning, Assessing, and Reporting	3.28	Competent
Community Linkages	3.22	Competent
Personal Growth and Professional Development	3.45	Competent
Overall Level of Competence	3.35	Competent

Legend: 3.50 - 4.00 - Very Competent
 2.50 - 3.49 - Competent
 1.50 - 2.49 - Incompetent
 1.00 - 1.49 - Very Incompetent

Interestingly, in particular, the pre-service teachers obtained the highest rating along the Social Regard for Learning. This can be directly linked to the idea that they are “very competent” in serving as positive and powerful role models of the value in the pursuit of different efforts to learn, that are demonstrated through actions, statements, and social interactions with learners (Teacher Education Council-DepEd, 2009).

Difference in the Epistemological Beliefs, Academic Performance and Teaching Competence of the Pre-service Teachers When Grouped According to Profile Variables

Table 5 discloses that there is no statistically significant difference in the epistemological beliefs, academic performance, and teaching competence of pre-service teachers when grouped by sex. In other words, responses to these variables do not significantly vary whether the pre-service teachers are males or females.

Table 5. Difference in the Epistemological Beliefs, Academic Performance, and Teaching Competence of Pre-Service Teachers When Grouped by Sex

Variables	Sex	N	Mean	t-value	p-value	Interpretation
Epistemological Beliefs	Male	44	179.39	-	0.156	Not Significant
	Female	188	182.26	1.422		
Academic Performance	Male	44	86.9020	1.331	0.185	Not Significant
	Female	188	86.3462			
Teaching Competence	Male	44	248.02	-.620	0.536	Not Significant
	Female	188	251.44			

Table 6. Difference in the Epistemological Beliefs, Academic Performance, and Teaching Competence of Pre-Service Teachers When Grouped by Program

Variables	Course	N	Mean	t-value	p-value	Interpretation
Epistemological Beliefs	BEED	74	181.23	-0.418	0.676	Not Significant
	BSED	158	181.94			
Academic Performance	BEED	74	85.8169	-2.684	0.008*	Significant
	BSED	158	86.7489			
Teaching Competence	BEED	74	248.54	-0.713	0.477	Not Significant
	BSED	158	251.85			

**Significant at the 0.01 level

As indicated in Table 6, there is a statistically significant difference in the academic performance of pre-service teachers when grouped by program. The BSEd pre-service teachers performed better academically than their BEEd counterparts. The data confirm that the variations in the academic performance may be attributed to the nature of the program.

As seen from Table 7, there is a statistically significant difference in the epistemological beliefs as well as academic performance of pre-service teachers when grouped by specialization. Further analysis using post hoc test bares that English group more likely to believe in the factors of epistemological as compared to Generalist, Physical Science, Mathematics, and Technology Livelihood Education groups. For the academic performance, Mathematics majors had higher mean grade as compared to the Generalist and Technology and Livelihood Education groups

Table 7. Difference in the Epistemological Beliefs, Academic Performance, and Teaching Competence of Pre-Service Teachers When Grouped by Specialization

Variables	Specialization	N	Mean	F-value	p-value	Interpretation
Epistemological Beliefs	Generalist	57	180.75	4.021	0.000**	Significant
	Psed	17	182.82			
	Biosci	17	183.47			
	Physci	10	171.00			
	English	37	189.78			
	Math	26	179.04			
	Tle	15	184.93			
	Mapeh	4	177.75			

	Socsci	33	177.27			
	Filipino	16	181.63			
Academic Performance	Generalist	57	85.7472	3.761	0.000**	Significant
	Psed	17	86.0506			
	Biosci	17	85.4041			
	Physci	10	86.0590			
	English	37	87.2589			
	Math	26	87.6638			
	Tle	15	84.9920			
	Mapeh	4	84.4850			
	Socsci	33	87.3364			
	Filipino	16	86.9444			
	Teaching Competencies	Generalist	57			
Psed		17	258.65			
Biosci		17	252.82			
Physci		10	235.20			
English		37	263.32			
Math		26	244.42			
Tle		15	254.40			
Mapeh		4	244.00			
Socsci		33	246.91			
Filipino		16	256.50			

** Significant at the 0.01 level

Table 8. Difference in the Epistemological Beliefs, Academic Performance, and Teaching Competence of Pre-Service Teachers When Grouped by Ethnicity

Variables	Ethnicity	N	Mean	F-value	p-value	Interpretation
Epistemological Beliefs	Ilokano	123	181.67	1.080	0.372	Not significant
	Ibanag	10	177.40			
	Kalinga	4	171.75			
	Itawis	83	182.87			
	Malaueg	2	175.00			
	Tagalog	10	182.40			
Academic Performance	Ilokano	123	86.3998	0.265	0.932	Not Significant
	Ibanag	10	86.5390			
	Kalinga	4	86.2050			

	Itawis	83	86.5424			
	Malaueg	2	84.6600			
	Tagalog	10	86.7050			
Teaching Competence	Ilokano	123	247.75	0.783	0.563	Not Significant
	Ibanag	10	257.50			
	Kalinga	4	252.00			
	Itawis	83	252.55			
	Malaueg	2	251.50			
	Tagalog	10	266.30			

As observed from the data in Table 8, there is no statistically significant difference in the epistemological beliefs, academic performance, and teaching competence of pre-service teachers when grouped by ethnicity. This means that cultural orientation of pre-service teachers does not show considerable variations in the three major variables of the study.

Relationship among Epistemological Beliefs, Academic Performance and Teaching Competence of the Pre-service Teachers

Table 9 unveils a significant negative relationship between epistemological beliefs and academic performance. The data connote that the less likely the pre-service teachers believe in the factors of epistemological beliefs, the higher are their grades. In other words, pre-service teachers who hold more mature epistemological beliefs have better academic performance.

It is noteworthy to mention that in a detailed analysis (see **Appendix I**), among the factors of epistemological beliefs, it is the Certainty of Knowledge that shows a negative significant correlation to their grades particularly in general education, professional education, major subjects including the general grade point average. This denotes that the more the pre-service teachers are inclined to believe that knowledge is tentative, the better is their academic performance.

Table 9. Relationship Between and Among Epistemological Beliefs, Academic Performance, and Teaching Competence of Pre-Service Teachers

Variables	Epistemological Beliefs	Academic Performance	Teaching Competence
Epistemological Belief	1	-.166*	.050
Academic Performance	-.166*	1	.043

Teaching Competence	.050	.043	1
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* Correlation is significant at the 0.05 level (2-tailed).

Moreover, the pre-service teachers who believe more likely in Simple Knowledge (avoidance of integration and ambiguity, seeking of single answers and reliance on authority) have lower academic performance. However, they have better teaching competence particularly along Learning Environment, and Personal Growth and Professional Development.

On one hand, the pre-service teachers who more likely to believe in Fixed Knowledge have lower grade in professional education and major subjects including the grade point average. This mainly indicates that the more the pre-service teachers believe that knowledge is acquired, the better is their academic performance. Noticeably, only the belief on Quick Learning is not significantly correlated to any components of academic performance and domains of teaching competence.

Factors of Epistemological Beliefs that Can Predict Better Academic Performance and Teaching Competence of the Pre-service Teachers

As disclosed in Table 10, Fixed Ability and Certain Knowledge can predict academic performance which account for 1.6% and 2.7% respectively on the total variance, while Simple Knowledge can predict teaching competence which accounts 1.9% of the total variance. The finding asserts that epistemological beliefs factors, except for Quick Learning, can predict, at a minimum level, the academic performance and teaching competence of pre-service teachers. This implies that other factors or variables, aside from the beliefs on the nature of knowledge and learning, can notably account for the academic performance and teaching competence of the pre-service teachers.

Table 10. Factors of Epistemological Beliefs that Can Predict Better Academic Performance and Teaching Competence of the Pre-service Teachers

Epistemological Beliefs	Academic Performance			Teaching Competencies		
	R ²	Adjusted R ²	p-value	R ²	Adjusted R ²	p-value
Simple Knowledge	0.011	0.007	0.112	0.023	0.019	0.019
Fixed Ability	0.020	0.016	0.032	0.004	0.000	0.342

Quick Learning	0.002	-0.002	0.490	0.002	-0.003	0.528
Certain Knowledge	0.031	0.027	0.007	0.005	0.001	0.276

DISCUSSION

The significant findings of this study are discussed with existing literature on epistemological beliefs, academic performance and teaching competence of pre-service teachers as basis in the formulation of the conclusion of this study.

Epistemological Beliefs of the Pre-service Teachers

Results of the study show that the pre-service teachers have mature epistemological beliefs in as much as they less likely to believe in Schommer's epistemological beliefs factors. This means that generally, the pre-service teachers have sophisticated beliefs that appear to make it possible for them to have positive learning approaches and independent reasoning abilities that are indispensable for their academic success (Schommer, 1990). This further implies that pre-service teachers who have mature epistemological beliefs are capable of performing well on the level of constructivist approach of teaching and learning (Brownlee, 2001) and they have the ability to discern and to critically apply a variety of processes (Hofer, 2002), which in the long run tailor to the tenets of contemporary education advocating the use of prior knowledge, student-centered pedagogy and curriculum, facilitating learning approaches, and authentic assessment.

It is interesting to point out that in a research conducted in Singapore by Chai, et.al. (2006), it revealed that pre-service teachers were fairly homogenous as they are likely to be naïve in their epistemological beliefs; hence, it suggested that it may be necessary for Singapore teacher educators to foster more mature epistemological outlooks among their pre-service teachers. On one hand, this study undertaken in the Philippine setting, shows that the pre-service teachers are inclined to manifest mature epistemological beliefs. This simply reinforces the idea that epistemological beliefs vary across individuals and contexts (Hofer 2001; Green & Hood, 2013).

In an elaborate discussion, the mature epistemological beliefs of the pre-service teachers reveal that knowledge is acquired. This can be manifested by the pre-service teachers' positive beliefs on metacognition, hard work and

concentrated effort. They believe that knowledge acquisition is attributed to hard work and active participation in the learning process in order to carry out effectively the academic tasks. This substantiates the findings of Wong, et.al (2009) citing that pre-service teachers tend to believe that knowledge is constructed during the learning process as a result of effort. Students who believe that learning is dependent on effort are deep-motivated and may adopt a deep study strategy while those who believe that learning depends on innate ability are likely to be surface-motivated and may utilize a surface strategy in studying (Tanriverdi, 2012).

Moreover, the mature epistemological beliefs of the pre-service teachers convey a gradual and deliberate acquisition of knowledge and the openness to challenge authority of knowledge. In other words, the pre-service teachers prefer to learn in a step-by-step scheme. They subscribe to the principle that “learning is an evolutionary process that requires time and patience” (Corpuz & Slandanan, 2007). Besides, the pre-service teachers are not just teacher-directed in attaining knowledge. In the Asian context, this is supported by the findings of Cheng, et.al. (2009) that among the teacher education students, most of them believe that authority of knowledge is questionable. To put it simply, knowledge is not merely handed down by authority but must be deliberately analyzed and criticized. This is basically consistent with the K to 12 pedagogical framework stressing less teacher’s talk and more on students’ activities.

On the contrary, the likelihood of the pre-service teachers to believe in Simple Knowledge conveys their epistemological naivety as they deal with knowledge to be separate and isolated pieces of information rather than a network of interrelated concepts. This is congruent with the findings of Bernardo (2008) about the structure of the Filipino prospective teachers’ epistemological beliefs. He found out that Filipino pre-service teachers believe in Simple Learning, indicating that learning is bare, basic and uncomplicated process. This further supports the recommendation of Mohamed & El-Habbal (2013) that calls for an emphasis on integrative education combining skills, information and values rather than focusing on compartmentalized information.

Furthermore, the naïve beliefs of pre-service teachers on the certainty of knowledge imply that “Truth is unchanging”. In other words, they primarily consider that knowledge is inflexible, absolute and never-changing. The data contradict the findings of Chai, et.al (2006) and Cheng, et.al, (2009) asserting that pre-service teachers in the Asian setting, specifically in Singapore and Hongkong, are inclined to believe that knowledge is evolving.

On the whole, this study done in Philippine setting affirms Schommer's theory of System of Independent Beliefs highlighting the multi-dimensionality of beliefs about the nature of knowledge and learning. Schommer-Aikins (2004) asserts that people may not be necessarily mature or naive in all beliefs and in this study, the pre-service teachers showed epistemological naivety on Simple Knowledge and Certainty of Knowledge but they manifest epistemological maturity on Fixed Ability and Quick Learning. A variety of beliefs may influence learning and people may hold several epistemological beliefs, but some will be more central than others. It is further explicated that beliefs do not develop in synchrony and that the synchrony or asynchrony of beliefs is dependent on the developmental level of the individual (Schommer-Aikins, 2002).

Academic Performance of the Pre-service Teachers

The BEEd and BSEd pre-service teachers performed satisfactorily in their academics. The finding gives a clear picture that at least, the kind of teacher education students today is not necessarily weak or poor. In the past, according to Acedo (1999), intakes into teacher education had low quality because students with impressive scholastic ratings chose other career paths. Nonetheless, the apparent change in the academic performance of pre-service teachers may be attributed to the Revised Policies and Standards for Teacher Education (CMO 52, Series of 2007) set by the Commission on Higher Education as regards the adoption and implementation of a system of selective admission and minimum retention requirements to select academically fit students.

Among the components of academic performance, the pre-service teachers had the highest mean grade in professional education subjects. This finding confirms that the pre-service teachers satisfactorily possess the range of knowledge and skills needed in the practice of the teaching profession. Such is supported by Pagaduan (2009) citing that the pre-service teachers had good grades in their Field Study courses. Similarly, in the research of Falsario, et.al (2014), they found out that pre-service teachers have good academic standing in The Teaching Profession subject.

Despite the fact that the pre-service teachers have satisfactorily performed in their academics, the present study implies that there is a need to improve the level of performance in their general education, professional education and major subjects. This is to bolster their competitiveness and to increase their chances of passing the board examination. Previous studies reveal that teacher education graduates who had higher grades in their college academic subjects had higher

overall rating in the Licensure Examination for Teachers (Junio – Pachejo & Allaga, 2013; Esmeralda & Perez-Espinosa; 2015).

Teaching Competence of the Pre-service Teachers

The BEEd and BSEd pre-service teachers are competent in teaching along the seven domains of the NCBTS as framework of evaluation. This finding is akin to the results of previous studies (Somblingo, 2014; Biong, 2014) implying that pre-service teachers have adequately achieved the expected performance level set by the Department of Education. Corroboratively, according to Abao (2013), the intensive training of the pre-service teachers during their practicum provides an avenue for the interplay of theories and practice that facilitated the pre-service teachers to acquire the fundamental aspects of teaching and to be immersed to the realities of the teaching profession.

Moreover, the competent teaching performance of the pre-service teachers reflects the quality of training that they have attained from their TEIs. This fulfills the standard policy formulated by CHED and practiced in the TEIs, which helped in establishing commitment and desirable attitude among pre-service teachers for an effective and competent teaching performance (Conejar, 2014). Significantly, the teacher education programs of the respondent TEIs are compliant to CHED policies and standards. In essence, this goes with the notion of Savellano (1999) that the main concern of TEIs should not be just having the students meet the required units in education but equipping them with the necessary competencies to teach.

In addition, the highest rating on the Social Regard for Learning of the pre-service teachers connotes that they are seen to be very competent in “acting as role models, through actions and statements, for the learners to appreciate the importance of learning and exerting effort to learn” (Teacher Education Council-DepEd, 2009). As models, teachers must consistently show good behavior, inculcate right attitudes and exemplify honesty, trust, fairness, respect and responsibility (Corpuz & Salandanan, 2007; Acero, et.al. 2007; Lumpkin, 2008).

In general, the findings disclose that the pre-service teachers, though assessed to be competent, have not yet reached the highest level of teaching competence along all the domains of NCBTS. With the pressing and continuous demand for educational excellence and competitiveness both locally and globally, this scenario highlights the need to strengthen further the teaching performance of the pre-service teachers so that they could attain the required “very competent”

level. In this way, they certainly fit in the teaching profession in preparation for and in conformity with the ASEAN integration.

Significant Difference in the Epistemological Beliefs, Academic Performance and Teaching Competence of the Pre-service Teachers When Grouped According to Sex, Program, Specialization and Ethnicity

Literature has conflicting views as to whether epistemological beliefs, academic performance and teaching competence of pre-service teachers significantly differ according to sex. The result of this study reveals that despite the dominance of females in teacher education, the epistemological beliefs, academic performance and teaching competence of pre-service teachers do not significantly vary for males and females. This concurs with the findings of previous studies (Chan, 2004 & 2007; Tümkaya, 2012; Ali, 2013; Oluwatayo & Adebule, 2012; Eren, 2015) highlighting the lack of variations in these variables for both sexes.

Furthermore, the study reveals that there exists a significant difference in the academic performance of pre-service teachers when grouped by course, which basically contradicts the findings of Pascua, et.al (2014) who claimed otherwise. Specifically, the study unveils that the BSEd pre-service teachers performed better than their BEEd counterparts. According to Acedo (1999), students consider BEEd an easier and cheaper option than BSEd, so students with lower preparation and motivation tend to be attracted to the BEEd program. On one hand, Aquino & Balilla (2015) attribute this to the general perception that the courses in BSEd program are more difficult than those of the BEEd programs hence BSEd students might have put more effort in studying. They further posit the reason that because the BEEd curriculum is a combination of many general education courses, it is difficult for the BEEd students to have mastery of all these courses and their grades are affected.

Another important finding of this study is the significant difference in the epistemological beliefs of pre-service teachers in terms of specialization. This is parallel to the results of the studies of Arslantaş (2015), Tümkaya (2012) and Paulsen & Wells (1998) concluding that “students’ beliefs about the nature of knowledge and learning are related to the disciplinary contexts in which students select and experience their specialized coursework”. In line with this, Conole (2004) and Hofer (2000) assert that every discipline has its own epistemological beliefs and associated cultures and this may greatly influence learners’ perspective on how knowledge is subsequently gained (Chai et.al, 2006).

Aside from epistemological beliefs, there is also significant difference in academic performance of pre-service teachers when grouped by specialization. It was found out that the Mathematics group obtained the highest mean grade. One likely explanation is that BSEd pre-service teachers who specialized in Mathematics have established better study habits than their counterparts. Marpa's (2013) study revealed that Mathematics major students have an average level of time management and good study habits that positively influence their academic achievement.

Finally, the present study highlights that the epistemological beliefs, academic performance and teaching competence of pre-service teachers do not significantly differ in terms of ethnicity. This is consistent with the findings of Camargo (2011) asserting that academic achievement of the learners did not suggest significant variation with regard to cultural orientation. On the other hand, this contradicts the findings of previous studies that epistemological beliefs (Ismail et.al, 2013) and academic performance of students (McCoy, 2005) show significant difference when grouped by ethnicity.

Relationship between and among Epistemological Beliefs, Academic Performance and Teaching Competence of Pre-service Teachers

Several studies of leading researchers displayed that epistemological beliefs are significantly related to various aspects of academic performance (Schommer, 1990 & 1993; Garcia, 2005; Schommer-Aikins & Easter, 2006; Arslantaş; 2015). An individual's belief system has a bearing on how a person learns and the associated learning outcomes (Chai, et.al, 2006). The current study concurs with these aforementioned studies as it reveals that pre-service teachers who have mature epistemological beliefs have better academic performance. This confirms Schommer's theory that mature or sophisticated beliefs appear to facilitate positive learning strategies and foster students' independent reasoning abilities and thus significantly impact academic performance (Schommer, 1990; 1993).

Corollarily, Muis & Franco (2009) found out that more sophisticated epistemological beliefs were associated with higher course grade and this relationship was mediated by both achievement goals and learning strategies. In the study of Cano (2005), it was shown that epistemological beliefs influenced academic achievement directly and also indirectly via students' learning approaches.

Among the factors of epistemological beliefs, the study underscores that Certainty of Knowledge was negatively correlated to all components of academic performance as well as the grade point average. In short, the pre-service teachers perform better academically as they more likely to believe in the tentativeness of knowledge. This is affirmed by Hofer (2000) in her study done with 326 first year college students that learners with lower certainty scores had higher academic standing. Likewise, Trautwein and Lüdtke (2007) found out that higher Certainty of Knowledge beliefs in fourth year secondary students were associated with lower grades. However, in the study of Schommer (1993), Certain Knowledge as a factor did not significantly correlate to students' grade point average.

It can be highlighted from the given assertions that epistemological beliefs of pre-service teachers are significantly associated to their academic performance. Pre-service teachers who have more sophisticated beliefs on the nature of knowledge and learning tend to have higher academic achievement. As Chai, et.al (2006) posit, having an understanding of this relationship calls for educators to help students to move towards and to sustain more mature epistemological perspectives that may eventually redound to positive learning performance.

Epistemological Beliefs Predict Better Academic Performance and Teaching Competence of the Pre-service Teachers

Result of this present study discloses that epistemological beliefs predict, though at a minimum level, the academic performance and teaching competence of pre-service teachers. Various researches likewise support this finding. Phan (2008) and Kadivar, et.al. (2011) both investigated the effect of epistemological beliefs, learning approach, and reflective thinking on academic achievement of tertiary students. They found out that epistemological beliefs predicted learning approach and academic performance. Additionally, using path analysis, it was suggested that both general and domain-specific epistemological beliefs predicted academic performance as measured by overall grade point average (Schommer-Aikins et. al., 2005). Besides, Lodewyk, (2007) affirmed that epistemological beliefs, particularly the belief on simple knowledge, significantly predicted overall performance and reflective judgment scores on the ill-structured tasks of the students.

Clearly, epistemological beliefs are viewed as a vital construct to predict students' academic achievement (Hofer & Pintrich, 1997; Hofer, 2000; Cano, 2005). In this line, Chai, et.al (2006) state that understanding epistemological

beliefs held by the pre-service teachers could give a framework on how teacher educators view students' learning context. Eventually, this may have significant impact on the pre-service teachers' overall academic success and teaching competence.

CONCLUSION

Individual's belief system on the nature of knowledge and learning significantly influence learning performance. Pre-service teachers who hold mature epistemological beliefs have better academic performance and these developed beliefs predict their teaching competence at minimum level. Congruently, they possess the necessary mental construct, attributes and competencies that are essential in the teaching profession. Moreover, the epistemological maturity of pre-service teachers does not happen at the same rate. It develops asynchronously at various stages; thus, it proves the multi-dimensionality of Schommer's epistemological beliefs. In this context, an understanding of pre-service teachers' epistemological beliefs vis-à-vis academic performance and teaching competence helps the teacher education institutions design effective teaching and learning framework. This is with the end view of increasing awareness and insights on how prospective teachers can become active participants in creating epistemologically conducive learning atmosphere.

On the basis of the findings and conclusions of the study, the following program framework is proposed for adoption of private and public Teacher Education Institutions. In order for pre-service teachers to transcend from naïve epistemological beliefs along Simple Knowledge and Certainty of Knowledge, it is necessary to create sustained and viable avenues for the pre-service teachers to be exposed to and to internalize the integrative teaching-learning framework (i.e. multidisciplinary, interdisciplinary and team teaching approaches) constructivist learning strategies, independent reasoning abilities, and research-based courses and skills that can facilitate in the development of epistemologically mature beliefs.

To elevate the satisfactory academic performance of pre-service teachers, instructional programs such as reviews, remediation, tutorials and independent learning sessions may be consistently undertaken to empower the pre-service teachers in improving their learning styles, developing good study habits and possessing the right attitude towards their studies. On the policy level, setting of high standards through stringent and progressive retention scheme may increase the chances of TEIs to retain academically fit students.

Furthermore, to reinforce teaching competence that is focused on NCBTS, the TEIs may conduct sustainable in-campus training sessions along NCBTS and intensive integration of NCBTS competencies on the various professional education courses. These interventions may strengthen the training of the pre-service teachers geared toward a very competent level of teaching performance.

In essence, the mature epistemological beliefs, improved academic performance and strengthened teaching competence focused on NCBTS are deemed indispensable in enhancing the teacher education program. The interplay of these in the curriculum, instruction and assessment in TEIs may eventually produce quality teachers who are fit to teach in the K to 12 program and who are prepared to face the challenges and pressing demands of ASEAN integration.

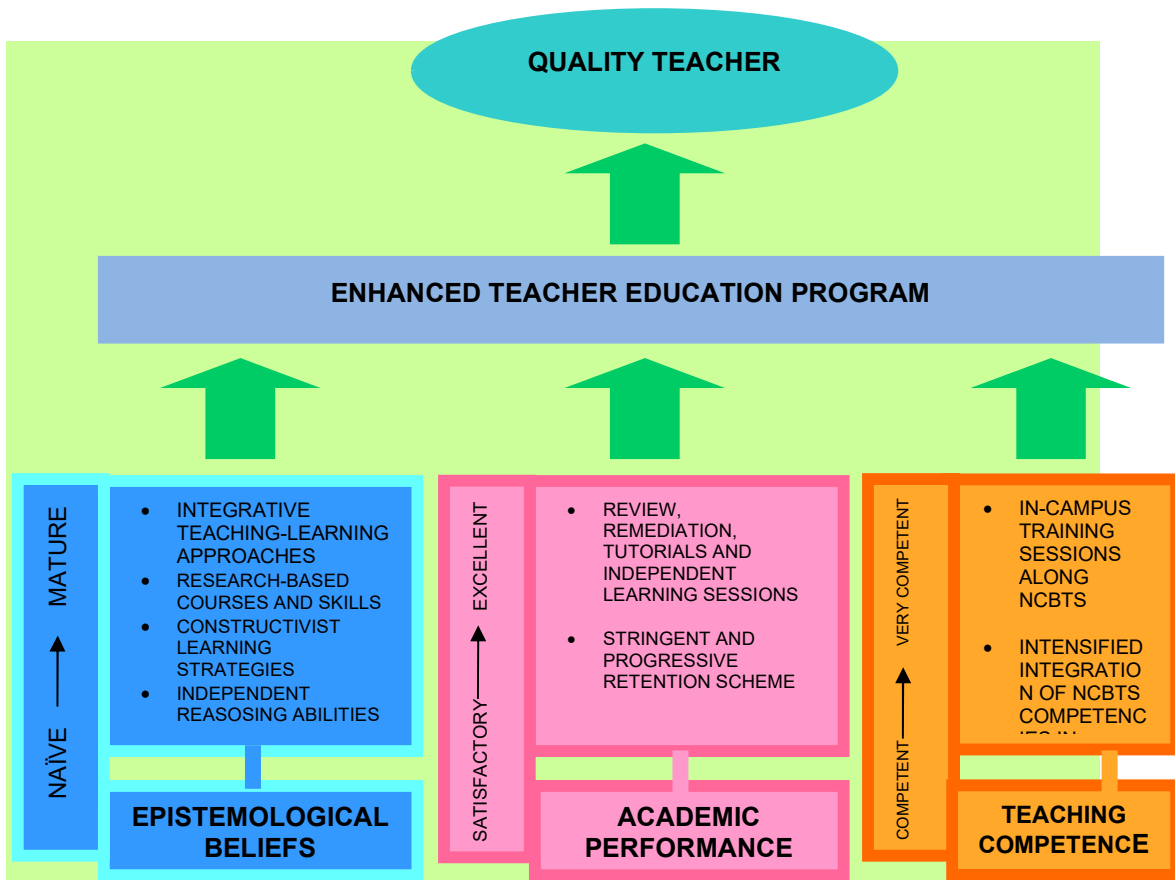


Figure 2. Program Framework for Teacher Education Institutions

RECOMMENDATION

A proposed program framework is recommended for adoption of Teacher Education Institutions to enhance further the teacher education programs aimed at producing quality teachers. In addition, a further analysis of pre-service teaching competence may be done by future researchers using Confirmatory Factor Analysis to determine the factors along NCBTS performance indicators that are appropriate to the context of pre-service teachers. A parallel study may also be conducted with the inclusion of religious worldview and familial background as profile variables and educational philosophies as dependent variable.

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