

Exploring the Relationship between Epistemological Beliefs and Self-Determination

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Abstract

The present study investigated whether epistemological beliefs (i.e. learners' beliefs in acquiring knowledge and knowledge itself) can significantly predict self-determination (i.e. drive that comes primarily from the self which pushes an individual to engage in a task) among Filipino preservice teachers. Specifically, the study aimed to determine whether each subscale of epistemological belief (i.e. Complexity of Learning and Structure of Learning) was correlated and would significantly predict self-determination (i.e. Perceived Choice and Awareness of Self). There were 310 preservice teachers in the undergraduate level from different colleges and universities in the Greater Metro Manila area who were asked to complete two measures: Schommer Epistemological Beliefs Questionnaire derived by Bernardo (2008) and Self-Determination Scale. The average age of the participants was 19.16 years (SD = 1.63). Correlation and multiple regressions conducted in the study revealed that only complexity of learning significantly increased with each subscale of self-determination.

Keywords: Epistemological beliefs, self-determination

Introduction

Our beliefs influence our performance and engagement in a task. These beliefs are important in the processes involved as well as how an individual views and creates sense of the information. Epistemological belief is defined as the learner's system of beliefs about the nature of knowledge and learning (Schommer, 1990). A learner's epistemological belief can affect the learner's cognitive processes, performance, feelings of competence, liking for school, metacognition, monitoring, learning strategies, persistence, confidence, and achievement as shown by different studies (Schommer 1990, 1993; Schommer, Mau, Brookhart, & Hutter, 2000; Qian & Alvermann, 2000; Schommer, Calvert, Gariglietti, & Bajaj, 1997; Youn, Yang, & Choi, 2000). Moreover, epistemological beliefs also influence our motivational beliefs, such as our effective use of learning strategies, academic performance, engagement, and persistence behaviors in self-regulatory and achievement-oriented processes (Shell & Husman, 2008). For instance, if the learners believe that learning is a fixed ability, that is, being smart or intelligent is an inborn trait, hard work does not lead to success, and learning occurs immediately, then the learners would tend to display behaviors of helplessness and lack of persistence when faced with challenging tasks. Seeing hard work as unrelated to success may also hinder them from performing well and exerting effort to achieve on a task. In another instance,

if the learner sees knowledge directly coming from knowledgeable sources and authorities such as parents and teachers, they would be more likely to depend on these “sources” as information-givers and refer themselves as merely “information-receivers”. For this type of learner, his/ her beliefs may lead to a lack of initiative to discover and explore independently, and develop passivity in taking in information. Questioning may also be thwarted because of the belief that the sources and authorities are always right and should not be questioned or contradicted. With these, learners may develop passive, dependent, unreflective, close-minded behaviors, lack of critical thinking, and may tend to reject new ideas. By being aware of how we view the nature of knowledge and learning, we also deepen our understanding of how we become driven to seek knowledge.

The present study also focused on self-determination. By the term self-determination, it emphasizes the learner's role in the learning process. The initiative to acquire knowledge and explore should originate from the learner and the intent is triggered primarily from their beliefs, rather than brought about by external factors like rewards and punishment (Reeve, Nix, & Hamm, 2003; Ryan & Deci, 2000). Further, how the learner perceives control in learning, autonomy-support from the environment, and self-competence to do the task plays an important role in self-determination in the learning process. Learners who seem to feel in control and receive adequate autonomy-support from the environment are more likely to display greater levels of self-determination, and internalize the learning process (Ryan & Deci, 2000). Thus, self-determination in learning becomes more evident through active engagement and commitment to acquire knowledge.

The connection of self-determination with epistemological beliefs is rooted on the impact of motivational beliefs on the learner's self-regulatory strategies, which involves metacognition, effective plan in learning, and drive to learn (Paulsen & Feldman, 1999). Learner's perceptions on the nature of knowledge and learning also relates as to how they maintain the use of cognitive strategies and learning outcomes (Schommer, 1990; Hofer & Pintrich, 1997). Studies of epistemological beliefs generally emphasize that learners who have complicated view on learning and knowledge are more effective to plan, reflect, and persist through challenges, and engage actively in the learning process. These outcomes hint that one's epistemological beliefs influence self-determination.

The present study used the two-factor model of Bernardo (2008) involving complexity of learning and structure of learning as subscales of epistemological beliefs. In addition, the study attempted to explore if these two subscales of epistemological beliefs significantly predicts self-determination among Filipino preservice teachers.

Epistemological Beliefs

An individual's epistemological belief is shaped by surroundings and experiences, such as educational and personal experiences, as well as culture and age (Schommer, 1990; Youn, Yang, & Choi, 2001; Chan & Elliot, 2000). The early beginnings of investigating epistemological beliefs started from the developmental conception of Perry (Schommer, 1990). He posits that an individual goes through a series of sequential "positions" in developing epistemological beliefs, from being dualist, recognizing multiplicity, relativist, to commitment within relativism. He suggested that individuals see knowledge in a dualistic and absolutist perspective in the early phase. Being dualistic, knowledge is perceived as either right or wrong. In this stage, authorities are also seen as the omniscient information-giver. From a dualist perspective, the individual emerges to multiplicity stage wherein knowledge is seen as diverse and uncertain, yet can still be discerned. Eventually, learners will develop relative perspective in their beliefs, whereby knowledge becomes contextual and utilized in varying and novel situations. Lastly, learners are able to expand the relativist viewpoint of their knowledge towards different life contexts, such as career, interpersonal relationships, and identity. Although according to Schommer (1990), Perry did not explore the relationship of his epistemological theory with student learning, he however suggested that his theory is fundamental to learner's cognition, learning strategies and development (Hofer & Pintrich, 1997). Ryan (1984) further explored on epistemological theory and used the scale of Perry to assess the stage of epistemological belief that they learner is experiencing. In addition, learners who portray dualist perspectives use knowledge standards in learning, specifically in monitoring text comprehension (Ryan, 1984). Dualist learners tend to memorize specific details and facts, focus more on surface learning and lower level of thinking skills such as remembering details from the text. More so, dualist learners were also noted to have poorer grades. On the other hand, relativists applied their prior knowledge to match a new set of information or context. They implemented comprehension and application standard, wherein deeper learning and higher level of cognitive thinking is exhibited through paraphrasing, knowledge integration, and reflection and assessment of performance and effort. Not surprisingly, their performance was better showed by gaining higher course grades than dualist learners. By observing the differences from these two groups of learners, we can consider epistemological beliefs as a factor for developing standards for cognitive processes, evaluating effective learning strategies, academic performance, and achievement. These findings by Ryan (1984) also suggest that superficial perspective on knowledge and learning brings about a

negative impact on how the learner structures, organizes and understands the information, as well as how the learner performs and evaluates the learning. Thus, we can say that as the learner gains deeper and broader view of what knowledge and learning is all about, awareness and appreciation in the course and system of learning is also heightened. This better understanding of knowledge and learning results to more effective learning process, more structured and meaningful organization of knowledge, keener observation and evaluation of the learner's cognition and performance of the tasks.

Schommer (1990) restructured this one-dimensional perspective of epistemological beliefs and realized the great extent of its scope. She further defined epistemological beliefs as a "system of more or less independent dimensions" (Schommer, 1990, p. 498). Considering it as a system points to the continuum or various domains of beliefs which are involved. While the dimensions are characterized as relatively independent suggesting that beliefs in knowledge and learning among learners do not follow a developmental stage or a pattern, and that individuals can hold multiple and varying degrees of the epistemological domains. Furthermore, epistemological beliefs about knowledge are categorized into its structure, stability, and source. In these domains of epistemological beliefs, knowledge may be seen in the naïve perspective as unrelated and individual pieces of information, absolute, and directly based from an omniscient source. Mean while, perceptions of learning can be classified according to learner's malleability and speed. In these domains, learner from an immature phase see learning as genetically set, and processed quickly.

The study of Schommer (1990) enumerated and characterized five dimensions of belief:

(1) Epistemological Beliefs on Knowledge:

(1.1) Structure of Knowledge. Knowledge is seen to be simple or complex. Subset dimension includes seek single answers, and avoid integration.

(1.2) Stability of Knowledge. Knowledge is viewed as either permanent or tentative. Subset dimension includes avoid ambiguity, and knowledge is certain.

(1.3) Source of Knowledge. Knowledge may be perceived as handed down by authority versus learner's construction of knowledge through reason. Subset dimension includes don't criticize authority and depend on authority.

(2) Epistemological Beliefs on Learning:

(2.1) Malleability of Learning. Learning is believed to be innate or gradually develops with experience. Can't learn how to learn, success is unrelated to hard work, ability to learn is innate.

(2.2) Speed of Learning. Learning may be thought of as quick or not-at-all. The first three domains refer to the nature of knowledge while the last two relates to the nature of knowing. Subset dimension includes Learning is quick, learn first time, concentrated effort is a waste of time.

Beliefs about knowledge and learning have a great deal of influence with the learner's approach in dealing with and constructing information. The domains of epistemological beliefs were classified by Schommer (1990) as either involving naïve or mature, sophisticated approach. In the naïve perspective, knowledge is seen to be simple, isolated pieces of information, absolute, inborn, quickly learned, and unchangeable "truth" from the authority. Learners who have these beliefs towards knowledge and learning tend to be close-minded, hesitant to new ideas, passive, and uncritical to information. Furthermore, they are more likely to develop maladaptive patterns portrayed by sense of helplessness and quick withdrawal from challenges and complex information, oversimplification of conclusions and poor metacognition. (Qian & Alvermann, 2000; Dweck, 1986; Youn, Yang, & Choi, 2001). Furthermore, performance-goal oriented learners, base their success on positive judgments from other people. Performance-goal oriented learners usually deem exertion of effort as a sign of lack of ability and intelligence, as well as failure (Dweck, 1986). On the other hand, a more complex view on learning is related to adaptive motivation patterns and learning-goal orientation, in which effort expended, is perceived to accumulate towards success, and is a sign of high ability (Dweck, 1986). Individuals who are learning-goal oriented tend to have more effective and higher learning processes, and a wide array of positive attitudes towards learning (e.g. critical thinking, activeness, independence, persistence, flexibility, and open-mindedness) (Chan & Elliot, 2000; Qian & Alvermann, 2000; Youn, Yang & Choi, 2001).

Models of Epistemological Beliefs

Several studies have further investigated the components of epistemological beliefs. Although there are multiple domains composing epistemological beliefs, not all seem to be apparent. Therefore, it is necessary to consider the weight of each domain or subscale in relation to other variables and in varying contexts. The Structural Equation Modeling (SEM) technique is often utilized in establishing factors of epistemological beliefs. In addition, factor analysis is also used to determine the subscales included in the structured model (Schommer et al., 2000; Bernardo, 2008). Confirmatory Factor Analysis (CFA) is used to verify the domains of epistemological beliefs included in the hypothesized and preconceived model, as well as analyzing the significant factor loadings and fit indexes computed (Bernardo, 2008; Schommer 1993, 1998; Schommer et al., 1997; Schommer et al., 2000). Discussing the treatment of epistemological domains in studies, some were

added, extracted, simplified, altered or renamed. In most studies involving secondary and college students, only four subscales were found to be evident (Schommer 1990, 1993, 1998; Schommer et al., 1997). That is structure of knowledge, ability to learn, speed of learning, and stability of knowledge. In the initial study, Schommer (1990) used exploratory factor analysis in determining which among the subscales displayed significant loadings. The four-factor model was then replicated, analyzed, and developed through confirmatory factor analysis in several subsequent studies (Schommer 1993, 1998; Schommer et al., 1997; Schommer et al., 2000; Bernardo, 2008). Further, Schommer (2000) included only three subsets of epistemological beliefs: Ability to learn, speed of learning, and stability of knowledge. Structure of knowledge was eliminated, since it did not show substantial loading values. The explanation given for this was that middle students' domain of knowledge belief is not yet fully formed. As compared to high school and college students, middle school students' epistemological beliefs in general appear to be simpler, yet their conceptions about knowledge are more abstract (Schommer 1990, 1993, 1998; Schommer et al., 2000). Moreover, a three-factor model was also used in the study of Chan and Elliot (2000) wherein multiple domains were merged and made complex. Bernardo (2008) and Youn, Yang and Choi (2001) found only two but different factors of the epistemological beliefs to be explicit.

Youn, Yang and Choi (2001) employed a two-factor model, where integrated items from epistemological beliefs subscales of innate ability and quick learning were loaded. Again, items from various domains were incorporated. Although this model primarily showed two factors, it basically used all the five factors of epistemological beliefs. The five domains were only synthesized into two main subscales: (1) Innate ability, fused with certainty of knowledge, omniscient authority, orderly process (i.e. simple knowledge), and (2) Quick learning.

Two-Factor Model of Epistemological Beliefs on Learning

In Bernardo's (2008) study, only items from simple learning and structured learning subscales were included on the two-factor structure in examining Filipino preservice teachers' epistemological beliefs. This model was found to have suitable goodness-of-fit. However, some items from other excluded domains were integrated and utilized. In his study, Filipino preservice teachers' epistemological beliefs were investigated using two versions (i.e. Filipino and English version) of the Schommer Epistemological Questionnaire. Findings show that although Filipino preservice teachers are bilingual, their fluency and proficiency in both languages did not hold a significant difference in their epistemological beliefs. This signifies that multilingual people remain consistent in their epistemological beliefs whether tested from their native language or foreign language. Moreover, his

study found that Filipino preservice teachers are different in terms of how they see learning as a process. Some view learning as a simple yet unsystematic process; while some also believe that learning as a complicated yet orderly process wherein it involves creating a well-formed plan or structure. Bernardo (2008) explained that latter conception of learning process implies that although learning seems to involve complicated aspects, it could still be effectively deciphered by having an organized and systematic way of understanding one's knowledge and learning process.

On a follow-up study of Bernardo (2009) which dealt with the links of social axioms and epistemological beliefs, he used the two similar epistemological subscales, simple learning and structured learning. However, the first measure of epistemological belief was changed from simple learning to complex learning since most of the items express agreement towards learning as a complicated process. The finding that complex learning and structured learning were significantly correlated remained. The result suggests that Filipino preservice teachers believe that learning is a continually developing and a complicated process, and similarly they were less likely to believe that organization and accuracy is necessary in the learning process. Thus, both complexity and structure of learning are essential in the learning process.

The variation in the model structures and number of factors and items loaded in each study may be attributed to the diverse contexts, cultures, and age ranges that it involved. Also, the models that are used in the studies should prove to be a good fit according to the statistical index, and the variables should be significant or must have a heavy factor loading.

Epistemological beliefs were also explored through cross-cultural studies. Beliefs on the nature of knowledge and learning were argued to be culturally-specific, particularly comparing Western and Asian educational systems (Youn, Yang, & Choi, 2001; Bernardo, 2008; Chan & Elliot, 2004). Among Asian culture (i.e. South Korean and Chinese), omniscient were found to have significant influence in learning (Chan & Elliot, 2000). In cross-cultural comparisons based from study done by Youn, Yang, & Choi (2001) differences in deemed omniscient authorities, teaching methods influenced learner's development for beliefs. In America, for example, utilizing student-centered approach encourages students to question and criticize the information given by the teacher. As teacher-student relationship is more distant, students feel more comfortable giving criticisms, considering that their teachers take it constructively and as a part of stimulated learning. In this case, the learners develop open-mindedness, critical thinking, and involvement. On the other hand, Korea's teacher-centered setting inhibits questioning from the learners since teachers are considered all-knowing authority. This type of classroom setting tends to promote students to become passive and uncritical learners.

Self-Determination

Self-determination is basically a self-initiated drive or force that pushes a person to do or engage in a task (Reeve, Nix, & Hamm, 2003; Ryan & Deci, 2000). Differentiated from the broader concept of motivation, self-determination emphasizes that the self mainly instigates the action or task, rather than triggered by external factors. There might be a number of reasons why an individual wishes to perform a certain task. Tasks may be initiated out of a liking for an instant reward, or doing the action leads to another more gratifying result, or simply because the person finds enjoyment or interest in engaging in an activity. Reeve, Nix, and Hamm (2003) mentioned three characteristics that define self-determination, namely, perceived locus of causality, volition, and perceived choice. First, self-determination entails oneself as the source of action, thus reflecting internal locus of causality. However, external pressures may hinder the individual from maintaining engagement in the task. Second, self-determined actions portray volition, wherein the person intends to act freely and performing a task based on one's integrated sense of self (Reeve, Nix, & Hamm, 2003; Deci & Ryan, 2000). Lastly, the person should have the opportunity to choose and freely decide to demonstrate perceived choice. Perceived choice is not only contained with the individual having options over actions, but it also pays essential attention that the person has the preference whether to do or not to do a particular task.. These three qualities of self-determination are joined up into a single concept referred to as autonomy (Reeve, Nix, and Hamm, 2003). By having autonomy, it means that the person acts within his/ her full consent and that the choice is decided upon according his/her own values and beliefs, and not necessarily disengaging or being absolutely independent from external factors (Ricoeur, 1966, as cited in Ryan and Deci, 2006). Moreover, autonomy should not be opposed to the idea of relatedness since self-determination theory expresses that "the issue of autonomy concerns the extent to which one fully accepts, endorses, or stands behind one's actions" (Chirkov, Ryan, Kim, & Kaplan, 2003, p. 99, as cited in Bao & Lam, 2008). An individual's sense of autonomy would still be preserved as long as the person freely agrees to follow the choice; the decision is in congruence with one's values, and that the act is fully endorsed by the self, thus enforcing self-determination (Ricoeur, 1966, as cited in Ryan & Deci, 2006). This also provides explanation that the three psychological needs can be fulfilled harmoniously without one opposing the significance of the other.

Characteristics demonstrated by a highly self-determined individual are similarly exhibited by a person who has a high level of autonomy, basically holding an internal locus of control, a high sense of volition and perceived choice. From here, we can take note that autonomy takes in a central role in the definition of self-determination, where both highlights one's initiative and willingness to perform or engage in a task. Thus, the

present research takes self-determination as equivalent with human autonomy, as did Ryan and Deci (2006). But then throughout the research, self-determination will be maintained to refer to autonomy.

According to the self-determination theory, there are three significant psychological needs (i.e. autonomy, competence, and relatedness) that should be maintained to continually exhibit motivation. Autonomy is the need for sense of volition and willingness to do the task. External distractions such as pressures, demands, deadlines, and threats can reduce the sense of learner's autonomy (Deci, Vallerand, Pelletier, & Ryan, 1991). Competence is the sense the learner feels that the activity is challenging and that the learner is capable of accomplishing the task. Lastly, relatedness is represented by the learner's sense of belongingness and connectedness. It is asserted from the theory that the degree of motivation gets closer to intrinsic when the learner's sense of autonomy and level of engagement is heightened. The theory generally emphasizes that satisfaction of the three psychological needs is essential in stimulating one's self-determination (Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000). However, among these three psychological needs, autonomy seems to have the greatest need for fulfillment to encompass self-determination. While fulfillment for competency and relatedness may lead one to be motivated, satisfaction for autonomy is essential in directing the individual to willingly set off the task and be intrinsically-driven all throughout the activity (Deci and Ryan, 2000; Deci, Vallerand, Pelletier, & Ryan, 1991). For example, a basketball player may feel competent to play in the finals game or a teacher feels related to his/her class. But without the sense of autonomy, the basketball player might feel pressured to play hard by his coach or teammates, and the teacher might feel that being warm to her students will earn her the endorsement of the principal. From these instances, we can note that a satisfied sense of competence, or for the other case, one's fulfilled sense relatedness may facilitate action; however an individual takes absolute preference and intent of the action or simply said characterizes self-determination, when there is autonomy. Not only does autonomy instigate action, self-determination also results to one's optimal engagement, including high performance, persistence, and psychological well-being as seen in contentment and pleasing affects (Sheldon, Ryan, & Reis, 1996; Deci & Ryan, 2000; Ryan and Deci, 2000, Guay Ratelle, & Chanall, 2008).

Maintaining the contention to essentially meet the three psychological needs, a self-determined individual primarily exhibits self-initiation or intrinsically driven interest (autonomy), incorporated with a sense of capability to accomplish (competence), and a sense of security in relationships (relatedness) (Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2006, 2000; Deci and Ryan, 2000).

Having autonomy as the central aspect of self-determination, the research focused on the subscales, perceived choice and awareness of self.

These two are measures of autonomy, wherein Sheldon and Deci (1993) defined perceived choice as the individual's preference for and over the action or behavior, and awareness of self as an individual's familiarity over his/her feelings or sense of self. "Providing choice and acknowledging feeling can enhance the sense of self-initiation – of being an origin (De Charms, 1968), thus providing satisfaction for the need for autonomy and resulting in more positive outcomes, including enhanced intrinsic motivation and increased self-confidence" (Deci & Ryan, 2000, p. 234). From here we can see that answering one's needs for autonomy, through providing choices and knowing oneself, facilitate initiative to perform a task but also lead to a more holistic personal development.

Perceived Choice

Perceived choice is characterized by the individual's sense of choice with regards to his/ her behavior (Sheldon & Deci, 1993). It is one of the mentioned characteristics of self-determination (Reeve, Nix, & Hamm, 2003). As an element of autonomy, having the sense to freely choose, or choice in itself reciprocally strengthens autonomy, as autonomy allows one to choose and likewise, being able to choose indicates autonomy, which basically autonomy is joint with choice (Dan-Cohen, 1992). This implies that as one perceives the existence of alternatives and the capacity to choose, then the action is more likely to be initiated by oneself since the choice is freely decided upon and endorsed by one's sense of self. The presence of alternatives and having the opportunity to select among these options mainly supports an individual's sense of choice, and consequently self-determination (Reeve, Nix, & Hamm, 2003). One's capability to freely decide among pleasant options, and not experiencing pressure and demand, assists the individual to exhibit better performance and progressive well-being (Deci and Ryan, 2000). Although an individual may not always have the opportunity to lead in choosing, instead following a choice, one's autonomy would still remain if the person willingly concurs with the choice, and decides according to his/her values and interests (Ricoeur, 1966, as cited in Ryan and Deci, 2006). This suggest that perceived choice does not merely focus on availability of choices and capability to choose, but more importantly being able to integrate one's beliefs, values, and interests with the choices made.

Awareness of Self

Awareness of self refers to the individual's sense of awareness with regard to his/ her feelings and sense of self. In particular, self-awareness means that a person becomes of his/ her personhood or characteristics such as values, attitudes, beliefs, feelings, personal motives and needs, competencies, skills and limitation (Cook, 1999). In the self-determination, the three

psychological needs involve feelings or sense: feeling of autonomy, sense of competence, and feeling of relatedness, wherein the fulfillment of these needs of senses or feelings are essential for a person to be self-driven and remain persistent in a task. Awareness of self is an important function of autonomy since the individual's action should emanate from one's sense of self (Ryan and Deci, 2000) which involves consideration of one's values, beliefs, and interests.

In relation to perceived choice and autonomy, awareness of self is important when the person decides to concur or not with other people's choice. Although decision-making entails choices, values and beliefs are taken into consideration in evaluating available options.

Relating Epistemological Beliefs and Self-determination

Learner's epistemological beliefs and self-determination play an important role in the learning process. This study explored on the relationships of epistemological beliefs and self-determination. In addition, it dealt with how the beliefs of learners on the nature of knowledge and learning were connected with their self-determination in the learning process.

Schommer's theory of epistemology served as a foundation in assessing the learner's beliefs about nature of knowledge and learning. However, Bernardo's (2009) two-factor model was utilized for the present study. From his previous study (Bernardo, 2008), he developed the structure by evaluating the goodness of fit and the weight of the two subscales (i.e. Complex learning and structured learning) loaded. This meant that the two factors in the model of epistemological beliefs were more appropriate for the Filipino context since the level of goodness of fit was found sufficient. Also, the previous study (Bernardo, 2008) and the present study similarly involved Filipino preservice teachers. For this reason, the two-model factor derived by Bernardo (2008) was more apt to use than including all the five domains listed by Schommer (1991).

Complex learning is the individual's belief that learning is a complex process. Specifically, learning can be evaluated and developed. Complexity of learning is combined from the subscales of fixed ability (i.e. can't learn how to learn, ability to learn is innate, success is unrelated to hard work, and learn the first time) and quick learning domains (i.e. don't criticize authority, and learning is quick).

Meanwhile, structure of learning is the learner's belief that organization and accuracy are important in the learning process. Structure of learning is a combination from the subscales of simple learning domain (i.e. seek single answers, avoid integration, and concentrated effort is waste of time).

Bernardo's (2009) two-factor model will be used primarily because of its statistical significance and because similar sample is investigated, which is Filipino preservice teachers.

Another theory for the foundation of the present research is self-determination theory. This theory asserts that an act should be initiated by oneself's volition and interest to act and not merely by external factors such as demands, pressures, and reinforcements (Reeve, Nix, & Hamm, 2003; Ryan & Deci, 2000). The concept of self-determination highlights one's autonomy or having the self-initiative, choice, and volition to do a particular task. In measuring autonomy, perceived choice and awareness of self will be employed as autonomy requires deciding over and among options inner values and beliefs as primary considerations.

In the conceptual framework, the general hypothesis was that the two factors of epistemological beliefs (complex learning and structure of learning) were significantly related and serve as predictors for the learner's self-determination. Specifically, when the learner believes in complex learning, the first specific hypothesis states that the individual's self-determination also increases. With this kind of belief, the learner think that understanding one's way of learning can develop how he/she is able to form and absorb knowledge. And that learning can be improved gradually through self-initiated exploration, increased effort and persistence.

Similarly, if the learner believes in structure of learning, the second specific hypothesis asserts that the individual's self-determination also increases. Learners who believe that organization and accuracy is important in the learning process stress the necessity to meticulously follow procedures, and ensure the accuracy of information and methods used. By having a belief that structure of knowledge contributes to effective learning process, the learner strives for accuracy and organization of information.

Purpose of the Study

The present study aims to explore on the relationship of epistemological beliefs with self-determination. This is in response to a number of studies which discuss the two factors separately. Discussing how these two factors are linked will contribute to further understanding how one's beliefs on the nature of learning and knowledge can influence one's drive to learn and understand how to learn.

Method

Participants

The research involved 310 (61 males and 249 females) preservice teachers in the undergraduate level from different colleges and universities in the Greater Metro Manila area in the Philippines. All participants were

students from the college of education, with ages ranging from 16-24 years with a mean age of 19.16 years ($SD = 1.63$). All participants were asked to complete the survey as part of a class requirement.

The participants were decided to be preservice teachers since programs for education students mainly employ and instruct using different techniques, and entail several class immersions which serve as preparation for teaching in real classroom set-up. With this formation for professional practice, it was anticipated that preservice teachers have been acquainted with complex views on learning and utilize the experience in their own learning process and teaching practice (Ravindran, Green, & DeBacker, 2005).

Instruments

Epistemological Beliefs. The study utilized the questionnaire used by Bernardo (2008), which was derived from Schommer's Epistemological Questionnaire (SEQ). The instrument is a 17-item Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The items in the first subscale, Complex learning, constitutes items from fixed ability (i.e. can't learn how to learn, ability to learn is innate, success is unrelated to hard work, and learn the first time) and quick learning domains (i.e. don't criticize authority, and learning is quick). Meanwhile, the second subscale involves items from the structured learning subscale (i.e. seek single answers, avoid integration, and concentrated effort is waste of time). These items were found to have significant weight in the factor loading and suitable goodness-of-fit (Bernardo, 2008). Inter-item reliabilities for each factor ranges from .63 to .85 (Schommer, 1993). The two-factor model displayed a good fit based on Confirmatory Factor Analysis (CFA): $\chi^2/df = 1.67$; RNI = .90, TLI = .90, RMSEA = .04. Test-retest reliability is .74. In scoring the scale, a higher score in the complexity of learning denotes a belief for learning as a complex process, while a lower score denotes a belief for learning as simple or uncomplicated process. For scoring structure of learning, a higher score implies a belief for organized and accurate learning while a lower score implies a belief for unpredictable and irregular system of learning (Bernardo, 2009).

Self-Determination. For assessing self-determination, the Self-Determination Scale (Sheldon & Deci, 1993) was utilized. There were 10 items to be answered with a 5-point Likert Scale ranging from 1 (Only statement A feels true) to 5 (Only statement B feels true). There were two subscales measured: Perception of Choice (the individual's sense of choice with regards to his/her behavior; "I always feel like I choose the things I do") and awareness of self (the individual's sense of awareness with regards to their feelings and sense of self; "When I accomplish something, I often feel it

wasn't really me who did it"). Sheldon and Ryan (1996) reported that the scale's internal consistency is considered good, having alphas ranging from .85 to .93 in numerous samples. Also the test-retest reliability is sufficient having $r = .77$, over an 8-week period.

Procedure

During the administration of the questionnaire, the participants were instructed to answer the two questionnaires. They were reminded to maintain an orderly environment while answering the scale. The questionnaires were administered collectively during one of their classes. Participants were given around 45 minutes to answer the two questionnaires. They were also informed that there was no right or wrong answers. Participants were assured that their responses were kept within strict confidentiality and solely used for the purpose of the study. Clarifications were also entertained if there are vague parts in the questionnaire or in the instructions. Debriefing also took place at the end, after all participants were finished answering the questionnaires.

Data Analysis

The mean and standard deviation for each of the subscales of epistemological beliefs (i.e. complexity of learning and structure of learning) and self-determination (i.e. perception of choice and awareness of self) were obtained. The computed Pearson (r) correlation coefficient were used to determine whether there is a significant relationship among the subscales of epistemological beliefs and the self-determination. Further, two sets of multiple regression were conducted to analyze if the two measures of epistemological beliefs, particularly complexity of learning and structure of learning can significantly predict self-determination. Beta weight (β), multiple correlation coefficient (R), Squared correlation coefficient (R^2) and Adjusted R^2 were also computed in the multiple regression.

Results

The descriptive statistics, intercorrelations, and regression analysis of the epistemological beliefs and self-determination factors were obtained. There are two sets of multiple regression conducted to determine which between the two epistemological beliefs (complexity of learning and structure of learning) can significantly predict each self-determination (perceived choice and self-awareness).

Table 1
Descriptive Statistics for the Factors of Epistemological Beliefs and Self-Determination

	<i>N</i>	<i>M</i>	Minimum	Maximum	<i>SD</i>	Cronbach Alpha
Complexity of Learning	310	4.13	1.40	5.00	0.39	.63
Structure of Learning	310	3.43	1.29	4.43	0.46	.50
Perceived Choice	310	3.43	1.40	5.00	0.73	.66
Self-Awareness	310	3.66	1.00	5.00	0.78	.67

Table 1 presents the mean scores of the 310 preservice teachers on their epistemological beliefs and self-determination. The dispersion of the scores on the epistemological beliefs is considerably close. The highest possible score for all the variables was five, indicating that the mean for complexity was higher than the rest of the factors. Meanwhile, the scores on both measures of self-determination, perceived choice and self-awareness were also relatively close ($M = 3.43$ and $M = 3.66$, respectively). Comparing the values of standard deviation of the two factors shows that the epistemological beliefs scores ($SD=0.39$ and $SD=0.46$) are less scattered than self-determination scores ($SD=0.73$ and $SD=0.78$)

Table 2
Intercorrelations of the Factors of Epistemological Beliefs and Self-Determination

	Complexity of Learning	Structure of Learning	Perceived Choice	Self-Awareness
Complexity of Learning	---			
Structure of Learning	.27*	---		
Perceived Choice	.15*	.02	---	
Self-Awareness	.13*	.07	.29*	---

* $p < .05$

Table 2 displays the intercorrelations of each of the factors of epistemological beliefs and self-determination. Complexity of learning resulted to a significant correlation among all the other three factors. The link between complexity of learning and structure of learning shows a significantly positive pattern ($r = .27$, $p < .05$). Meanwhile, there are significantly positive correlations between complexity of learning and the two measures of self-determination, perceived choice ($r = .15$, $p < .05$) and self-

awareness ($r=.13, p<.05$). Structure of learning did not show any significant correlation with both measures of self-determination. In addition, there is also a significant link between the two measures of self-determination ($r=.29, p<.05$).

In analyzing the two measures of epistemological beliefs as predictors for self-determination, two sets of multiple regression were conducted. The first multiple regression used perceived choice as the dependent variable predicted by complexity of learning and structure of learning. While the second multiple regression used awareness of self as the dependent variable predicted by complexity of learning and structure of learning.

Table 3
Multiple Regression Model Predicting Perceived Choice

	<i>Beta</i>	<i>SE</i> Unstandardized	<i>B</i>	<i>SE</i> Standardized	<i>t</i> (287)	<i>p</i>
Complexity of Learning	0.16*	0.06*	0.30*	0.11*	2.69*	0.00*
Structure of Learning	-0.02	0.06	-0.04	0.09	-0.42	0.67

* $p<.05$

Note. $R= .15$ $R^2= .02$ *Adjusted R*² $= .017$ $F(2,307) =3.68$ $p=0.02$

The data was analyzed using multiple regression, using complexity of learning and structure of learning as regressors. The regression was a rather poor fit ($R^2_{adj} = 1.70\%$), but the overall relationship was significant, $F(2,307) =3.68, p < 0.05$. With other variables held constant, complexity of learning scores were positively related to perceived choice, increasing by 0.15 for every extra complexity. Only the complexity of learning was significant, $t(307) = 2.70, p < 0.05$.

Table 4
Multiple Regression Model Predicting for Awareness of Self

	<i>Beta</i>	<i>SE</i> Unstandardized	<i>B</i>	<i>SE</i> Standardized	<i>t</i> (287)	<i>p</i>
Complexity of Learning	0.12*	0.06*	0.25*	0.12*	2.11*	0.04*
Structure of Learning	0.03	0.06	0.06	0.10	0.58	0.56

* $p<.05$

Note. $R= .14$ $R^2= .019$ *Adjusted R*² $= .012$ $F(2,307) =2.93$ $p=0.05$

The data were analyzed by multiple regression, using complexity of learning and structure of learning as regressors. The regression was a rather poor fit ($R^2_{adj} = 1.23\%$), but the overall relationship was significant, $F(2,307)$

=2.93, $p < 0.05$. With other variables held constant, complexity of learning scores were positively related to awareness of self, increasing by 0.12 for every extra complexity. Only the complexity of learning was significant, $t(307) = 2.10$, $p < 0.05$.

Discussion

It was hypothesized in the study that epistemological beliefs can significantly predict self-determination among Filipino preservice teachers. However, findings show that only one measure of epistemological belief, which is complexity of learning, significantly predicted the two subscales of self-determination: Perceived choice and awareness of self. Meanwhile, structure of learning did not show any significance in predicting self-determination. The difference in the effects of complex and structure of learning is attributed to the fact that educational system, which influences learner's epistemological beliefs, varies from culture to culture (Bernardo, 2009). For instance, the cross-cultural study of Youn, Yang, and Choi (2001) found that Americans implement student-centered learning where they appreciate and entertain criticisms from students, and consider these as part of interactive and stimulated learning. In contrast, South Koreans and Chinese observe teacher-centered practices where teachers are considered incontestable masters of the subject. Studies on epistemological beliefs of Chinese also denote that Chinese students were also found to strongly believe in omniscient authorities because Chinese culture emphasizes respect for the elderly and the authority (Chan & Elliot, 2000, 2004). With these disparities in culture and educational systems, American students develop active and open-mindedness, while Koreans and Chinese learners tend to be more passive learners (Youn, Yang, & Choi, 2001; Chan & Elliot, 2000, 2004). By noting the differences in educational system among the three cultures, we can see how a particular classroom setting can affect the learner's behavior and participation in the learning process.

The findings from the present study indicates that Filipino preservice teachers believe that learning can be reviewed, further developed, and expanded because their educational system is patterned from the Americans (Agbayani-Siewert, 2004). They have acquired this belief the over the years because the teacher education curriculum has focused on contemporary perspectives and more liberal ideals on teaching and learning. Education systems in the Philippines practice constructivism where learners are encourage being active and learning by doing. In the Korean setting though, they still follow the traditional teacher-centered approach wherein, learning and knowledge is controlled by the teacher, and the teacher is seen as all-knowing and unquestionable. South Korean educational system remains parallel with traditional teacher-centered setting since they have limited access on studies regarding teaching and learning. Also, most research

studies are written in the English language, which is different from their native language.

The epistemology of learning is basically guided by how educators teach subjects in school. Filipino instructors were said to create simple lesson plans and teach with minimal effort by employing simple, light forms of classroom discussion and activities (Bernardo, Limjap, Roleda, & Prudente, 2005, as cited in Bernardo, 2008). For example, science subjects involve scientific method and evaluation of theories and phenomena. It also requires reflective inquiry wherein students should be capable of accepting new ideas or knowledge which may be contradictory to what they already know. Students who believe that science is merely about facts and fixed knowledge are more likely to experience more difficulty in conceptual learning (Qian & Alvermann, 2000). In the Philippine education system, most teachers teach science concepts and principles based on book, and mostly discuss about terminologies and its definition. Activities for science usually consist of manual-guided laboratory experiments and field trips. Meanwhile, a study exploring epistemological beliefs in math reveals that most students hold a belief that mathematics is merely about memorizing facts and formula, following procedures from the book, rather than a collectively theoretical discipline, as well as being good in math is an inborn trait (Garofalo, 1989 and Schoenfield, 1989, as cited in Muis, 2004). As most students think of math as a subject understood by only “mathematically-gifted” individuals and a subject which does not require higher cognitive engagement, the more they experience difficulty grasping over mathematically abstract concepts. More so, they are more likely to withdraw from solving complicated math problems. When solving problems for math and science, Filipino teachers typically introduce only one standard formula and strategy for answering. And most of the time, topic integration and applications of the lesson are rarely tackled. That is why most students do not see the relevance of solving math and science problems in the practical context, which also affects how they push themselves to learn more and strive for solving challenging math and science problems.

While teachers are said to be more effective in simple-thinking tasks (Wong-Fernandez, & Reyes, 2003, as cited in Bernardo, 2008), findings in this study reveal that they still regard learning as a complicated process. This may be due to the fact that Filipino preservice teachers acknowledge that learning involves constant development, and that learning is a lifelong process. On the other hand, preservice teachers experience difficulty in shifting to and implementing complex learning in their classroom practices since they have always been exposed to Philippine educational system concentrating on simple learning (Bernardo, 2008). In addition, they have been more familiar with tasks which mostly are cognitively-undemanding that is why they also assign simple tasks to their students.

Furthermore, the results of this study show that Filipino preservice teachers' scores on complex learning consistently increases their self-determination on both perceived choice and self-awareness. This may be attributed to the fact that learners who seem to feel in control with their learning environment are more likely to demonstrate higher levels of self-determination (Ryan and Deci, 2000). Individuals who perceive learning as a complicated system recognize that learning continually develops, and needs to be further understood and improved. This belief encourages individual to gain deeper appreciation on how to learn effectively and understand the practice of the knowledge-seeking process. The finding might be due to the fact that Filipino preservice teachers recognize activities which require more complex tasks and effortful thinking, however, the delivery of complex learning inside the classroom remains a challenge since they have been taught and used to creating traditionally low-order thinking based lesson plans and classroom activities (Bernardo, Limjap, Roleda, & Prudente, 2005, as cited in Bernardo, 2008). This finding also implies that preservice teachers remain highly self-determined as they realize that learning is a complex process. While complexity of learning laid emphasis on the learners' initiative to engage in tasks, self-determination similarly underscores individuals' interest to engage and pursue in the task. For instance, when teachers have difficulty introducing a problematic topic or lesson to the students, the teacher stays earnest to teach them and is able to understand that some students may also encounter difficulty in comprehending the lesson. Also, the teacher is able to handle criticisms and is willing to improve on his/her manner of teaching. By this finding, it implies that teachers are able to create their choices freely and decide upon their learning environments since they believe that learning entails a lot of facets to be considered. By having a sense of control, Filipino preservice teachers are able to perceive choices and experience volition in the classroom activities that they set for their students, such as exploring and examining their knowledge, capabilities, and learning.

Complexity of learning also responds to another essential psychological need of self determination which is competence. As a preservice teacher appreciates that learning can be improved and explored, the individual take a lead in understanding more about how to find knowledge and answers, not merely depending on books and authorities but through observing and dealing with the environment. The individual takes the risks of facing challenges to better his/ her learning and knowledge. As preservice teachers, they understand that they are instrumental in developing a learner's discovery of knowledge and learning. Likewise, the manner by which they teach and set tasks and activities for their class reflects how they see the nature of knowledge and learning.

Contrastingly, structure of learning did not significantly predict the two measures of self-determination. Learner's belief on the necessity for organization and precision in learning process does not necessarily influence

their self-determination. Comparing the questionnaire items in the two measures of epistemological beliefs, one can note that items from the complexity of learning emphasize self-determination because it addresses autonomy and pursuance of action regardless of challenges. For example the statement, "If a person can't understand something within a short amount of time, they should keep on trying." suggests that a learner should remain motivated even if time is limited. It also encourages the learner to persist and not to lose hope despite troubles in learning. The statement further establishes that learning does not happen in a quick or constricted span of time, instead learning happens gradually. Meanwhile, questionnaire items from the structure of learning only stresses on following standards and procedures, precision, and details. For example, the statement, "The best thing about science courses is that most problems have only one right answer." means that the learner should be contented with finding a single answer to a problem or question, and that after obtaining a single resolution, the learner does not need to further probe. The statement also promotes that science can be learned through rote memorization, and requires less effort. Science subject actually intends the learner to explore and discover, instead of sticking to information by the book. Also, studying science concepts, theories and principles involves reasoning and sometimes needs conceptual change (Qian & Alvermann, 2000). Like before, Pluto was considered to be a planet in the solar system. However, further investigations have verified that Pluto does not meet the criteria of a planet. With these comparisons from the statements of two epistemological beliefs, we can say that self-determination is evident or related to complexity of learning and not in structure of learning. This is why high-scorers on complexity of learning uphold to increased level of self-determination, and structure of learning did not render association with self-determination.

Another finding of the present study revealed that as preservice teachers believe in complex learning, they are also more likely to believe in structured learning. It implied that as an individual highly believes that learning involves numerous phases and complicated process, his/ her belief of the importance of organization and structure in learning also follows. Complexity of learning and structure of learning may emphasize different aspects of learning; however, both are essential in appreciating the value of the learning process. By having a complex view of learning, the individual realizes that there are multiple considerations for learning, and structure of learning builds and organization and system to this wide array of aspects so that it may be fully understood and seen as a complete and orderly picture. In the context of the preservice teachers, although they appreciate complex and structured view of learning, the effects seem to be different as it dealt with their self-determination.

Another key finding depicted a positively connection between the two subscales of self-determination, wherein as preservice teachers perceive

opportunities for decision-making, it is also more likely that incorporate or check their ideals, emotions, and beliefs. As explained in the review of literature, autonomy both emphasizes availability of choice and one's awareness of beliefs and personhood. With this in mind, it means that Filipino preservice teachers take into consideration their beliefs, values, and feelings as they see evaluate which option will bring an optimal outcome.

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