

Learning Approach as Predictor of Students' Epistemological Development in the Framework of Self-Authorship Theory

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Abstract

Past studies have found that an individual's epistemological development is predicted from learning that is meaningful to the learner. The current research aims to address whether deep learning style is able to predict students' epistemological ability (self-authorship, which is defined as the internal capacity to construct and evaluate knowledge claims, to comprehend the nature of contextual knowledge, and to have independence in the acquisition of knowledge). The researchers hypothesized that the deeper the learning approaches adopted by students, the higher their self-authorship. Conversely, the more students utilize a surface approach to learning, the lower their self-authorship. A total of 346 students enrolled in a university in Indonesia participated in the study. The results showed support for both hypotheses, and we discussed the role of cognitive dispositions in the development of epistemological ability.

Pendekatan Belajar sebagai Prediktor Perkembangan Epistemologis Mahasiswa pada Kerangka Teori *Self-Authorship*

Abstrak

Studi terdahulu telah menemukan bahwa perkembangan epistemologis individu dapat diketahui melalui pembelajaran yang melibatkan pemaknaan siswa. Penelitian ini memiliki tujuan untuk mengetahui apakah pendekatan belajar mendalam dapat memprediksi perkembangan epistemologis (*self-authorship*, yang didefinisikan sebagai kapasitas internal untuk mengkonstruksi dan mengevaluasi klaim pengetahuan, memahami hakikat pengetahuan yang kontekstual, dan memiliki kemandirian dalam pencarian pengetahuan). Peneliti memiliki hipotesis bahwa semakin siswa memiliki pendekatan belajar yang mendalam, semakin siswa memiliki *self-authorship* yang tinggi. Sebaliknya, semakin mahasiswa menggunakan pendekatan belajar permukaan, semakin rendah *self-authorship*-nya. Sebanyak 346 mahasiswa di Indonesia berpartisipasi dalam studi. Hasil mengkonfirmasi dua hipotesis peneliti. Diskusi penelitian ini membahas peranan disposisi kognitif dalam kemampuan perkembangan epistemologis mahasiswa.

Keywords: Development Epistemological, Learning Approach, Self-Authorship, Student

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1. Introduction

The essence of higher education is to create 'thinkers', defined as those who possess self-reliance in thinking and a commitment to the search for truth of knowledge (see Hedges, 2009). Being self-sufficient in producing knowledge is believed to be a common goal that individuals must possess upon college graduation in the 21st century (Baxter Magolda, 2004b, 2004c, 2010; Meszaros, 2007). However, students' dependence on

authority in the context of the search for knowledge has become a common phenomenon in universities in Indonesia. Students' progression from absolute dependence on authority figures to gaining independence in constructing knowledge has been extensively studied within the framework of self-authorship theory (see Baxter Magolda, 2001b; King, 2010; Kegan, 1994), wherein such progression has been investigated since Perry's (1970) study of epistemological development and its various trajectories. Self-authorship is a term used to

label an adult's stage of accomplishment at the peak of epistemological development (see Pizzolato, Hicklen, Brown, & Chaudhari, 2009).

Students with a more advanced epistemological development are objective, have more elaborate reading comprehension, are skilled information seekers, have a disposition for seeking the truth, and possess academic honesty (Valanides & Angeli, 2008; Bråten, 2008; Bråten & Strømsø, & Samuelstuen, 2005). They are able to think critically, to review theories, and to evaluate arguments (Kuhn, 1991; Kuhn, Cheney, & Weinstock, 2000). It is only natural, then, that self-authorship is recognized as a benchmark of student achievement that has been shown to correspond to high academic achievement in a sample of students in America and Africa (Strayhorn, 2014; Pizzolato, et al., 2009).

The question is: in what way do students learn in order to achieve this peak of epistemological development? Most of the theories in the research of epistemological development state that meaning-making process (a contemplative reflection that challenges what students believe) is a crucial component in the progression of epistemological development (see *provocative moment* and *dissonance*; Pizzolato, 2005; Pizzolato et al., 2009; Baxter Magolda, 1999b; Bekken & Marie, 2007). The experience of dissonance in the meaning-making process encourages students to rethink the way they interpret the knowledge that they have accumulated, ultimately transitioning from a simplistic view of knowledge to being able to construct knowledge independently (Bekken & Marie, 2007). As an epistemological development, self-authorship emphasizes the meaning-making process occurring in students (see King, 2010; Baxter Magolda, 2001b). When students engage in an intensive meaning-making process, they are able to progress faster in the trajectory of epistemological development (LPM; Baxter Magolda; 2001b).

Literature from studies of learning approaches (Learning Process Complex; Biggs, 1987) reveals that students are able to use a combination of various strategies and motives when learning, whether it involves involve interpretation (deep approach) or not (surface approach) (see Biggs, 1987; Bowden & Marton, 1998; Entwisle, 2009). Students who study in-depth utilize strategies to "interpret", namely by expanding the scope of their reading and connecting new knowledge to any relevant past knowledge. Such students are usually driven by intrinsic motivation, being compelled to actualize their interests and to become competent in specific academic subjects (see Biggs, 1987; Bowden & Marton, 1998; Entwisle, 2009). Considering the close relationship between deep learning approach and the progression of epistemological

development, the present study will focus on learning approach as a predictor variable for epistemological development, more particularly within the framework of self-authorship theory. Therefore, the research question is as follows: Can a deep learning approach that involves meaning-making predict the achievement of a more advanced epistemological development (i.e., self-authorship)?

Despite the close connection to learning outcomes, explanations of how other related variables like student learning approaches may support the progression of self-authorship have not been described in the empirical-scientific literature. To date, almost all of the literature in self-authorship have attempted to conceptualize self-authorship as discussed in the context of developmental stages (see Kegan, 1982, 1994; Baxter Magolda, 1999a, 1999c, 2000, 2001b, 2008; Pizzolato, 2005a). Empirically, other constructs directly associated with self-authorship have yet to be widely recognized (Pizzolato, 2005b), studied, and directly substantiated. Therefore, Magolda (2004a) stated that there is a need to identify the factors that influence students' progression in achieving self-authorship.

This study aims to explain the role of learning approach as a predictor of self-authorship epistemological development. Through this research, we attempt to explain why some students can achieve independence in the search for knowledge, displaying the tendency not to choose to rely on authority as the determinant of truth.

Self-authorship is defined as the internal capacity to construct and evaluate knowledge claims, to comprehend the nature of contextual knowledge, and to have independence in the acquisition of knowledge (Baxter Magolda, 2008; Pizzolato, 2007) in the context of higher education (Meszaros, 2007). It is a major theory explaining individual development independent of absolute reliance on authority to achieve internal maturity (Kegan, 1982). Moreover, the theory became increasingly complex upon Kegan (1994) and Baxter Magolda's (1999a, 1999c, 2000, 2001b) identification of three main dimensions of self-authorship, namely the epistemological, intrapersonal, and interpersonal dimensions. In this decade, discourses on whether there exists a dominant dimension and whether the dimensions are intertwined have been much debated (see Baxter Magolda et al., 2010). This debate renders the claim of self-authorship as the representation of epistemological development less clear and precise in its measurement, due to the simultaneous measurement of other constructs (i.e., interpersonal and intrapersonal dimensions) in the same bundle of measurement.

One argument maintains that epistemological dimension is the basic and core representation of the attainment of self-authorship (King, 2010) that emphasizes the

development of an individual's ability to evaluate knowledge claims and belief systems in constructing knowledge (Baxter Magolda, 2001b). King (2010) states that epistemological development is the foundation that serves as a prerequisite of interpersonal and intrapersonal development, therefore it needs to be prioritized (becoming "first among equals") compared to other dimensions. Furthermore, by the same argument, an individual's lack of epistemological development guarantees low intrapersonal and interpersonal development. King (2010) suggests that individuals need to first possess a sophisticated thought complexity (epistemological) as a requirement for the ability to self-reflect (intrapersonal) and to understand how to meet the expectations of others (interpersonal).

In addition, the measurement of self-authorship as an epistemological development has been performed in Pizzolato et al.'s (2009) study, in which self-authorship was conceptualized as a representation of epistemological development. In light of this, in the present study we view self-authorship as a representation of epistemological development. To stay consistent with King's (2010) assertion, we also plan to re-test the construct validity of self-authorship against the epistemological attribute constructs that are closely linked to thought complexity, such as Epistemological Beliefs Inventory (EBI; Schraw, Bendixen, & Dunkle, 2002), Need for Cognition Scale (NCS; see Cacioppo, Petty, & Kao, 1984), Epistemic Curiosity: Feeling of Deprivation (FOD) & Feeling of Interest Scale (FOI; Litman, 2008), and Skepticism (Fighting Against Myth/Psychological Knowledge/10-Myths about Psychology; see Renken, McMahan, & Nitkova, 2015; Lilienfeld, Lynn, Ruscio, & Beyerstein, 2010).

Research about student learning process is discussed in studies of learning approach (learning process complex) (see Biggs, 1987). In short, in his theory, Biggs (1987, 1999, 2001, 2012) explains that learning process consists of a combination of different learning motives and strategies, or different 'learning approaches', including (1) deep learning (combination of deep information processing and intrinsic motivation) and (2) surface learning (combination of shallow information processing and extrinsic motivation). Furthermore, Biggs, Kember, and Leung (2001) claim that psychometrically, the components of motivation and strategy can be adequately explained through the two aforementioned learning approach constructs without the need to involve achieving approach. This is because students who use achieving approach can use either deep or surface approach, depending on the demands of the task (Wilding & Andrews, 2006; Evans, Kirby, & Fabrigar, 2003). Based on the suggestion of the argument, achieving approach is not measured in the current research.

Students with deep learning approach focus on learning outcome and attach meaning to learning (Bowden & Marton, 1998; Entwisle, 2009), have no motive for finding shortcuts when faced with a task (Biggs, 2012), learn for the sake of learning ("learning for its own sake"), and are able to deal with uncertain information in the era of globalization (Barros, Monteiro, Nejmedinne, & Moreira, 2013). In contrast, students with surface learning approach tend to use formulas they do not understand when solving problems (Bowden & Marton, 1998). Such students cannot deal with ambiguous information (Barros et al., 2013). They also learn for the mere sake of graduating, investing the minimal time and effort needed to learn (Yonker, 2011; Biggs, Kember, & Leung, 2001, Biggs, 1999).

The dynamics of the relationship between learning approach and self-authorship epistemological development originate from several prior research results that have found that certain learning approaches tend to lead students to become independent, separating themselves from reliance on authority. Such results are implicit, in that the term 'epistemological development' was not expressed directly in the research results. Baeten, Dochy, Struyven, Parmentier, and Vanderbruggen's (2015) study on learning approach and instructional preference found that students who use deep learning tend to have a student-centered instructional preference and choose to actively construct knowledge independently through elaboration and cooperation. Conversely, students with a surface learning approach tend to opt for teacher-centered learning; they are passive and prefer to be guided by the instructor when learning. The results implicitly indicate that students with a deep learning approach are independent learners, while students who adopt a surface learning approach are more dependent upon authority.

Further, Bliuc, Ellis, Goodyear, and Hendres (2011) revealed that students who engage in deep learning are highly involved in the learning communities of their universities. On the other hand, those with a surface learning approach demonstrate low participation in learning communities. Student involvement in active learning in an informal environment indicates that students with deep learning approach are more likely to be active in the pursuit of knowledge and have more independence in learning.

The relationship between learning approach and self-authorship can also be determined from indicator similarities within learning. Students who use a deep learning approach and who attain an advanced level of self-authorship development have a common indicator, namely having faith in their ability to reach their goals (goal-oriented) (Pizzolato, 2007; Pizzolato et al., 2009; Cazal & Indreica, 2014; Strayhorn, 2014). Students who

achieve self-authorship and those who use deep learning approach are equally driven by intrinsic motivation in their learning (see Biggs, 2001; Cazan & Indreica, 2014; Pizzolato et al., 2009). Reflective thought processes in which students are aware of how their minds work is also a common indicator shared among students who attain self-authorship and those who adopt deep learning approach (Baxter Magolda; 2008; Cazan & Indreica, 2014). Lastly, students with deep learning approach focus on the meaning of what has been learned (Bowden & Marton, 1998; Entwisle, 2009). Self-authorship, in this case, centers on how students are able to attach meaning to what has been learned and to integrate knowledge with the internal self (Baxter Magolda, 2004b, 2007). It can be concluded that the more students use a deep learning approach, the more likely they are to exhibit indicators common to self-authorship, such as reflective thinking, the ability to self-regulate, high self-efficacy, being driven by intrinsic motivation, and focusing learning on the meaning-making process. Therefore, we hypothesized that: Deep learning approach is a positive predictor of self-authorship and surface study approach is a negative predictor of self-authorship.

2. Methods

Participants and Procedures. The study sample was comprised of 220 actively enrolled Psychology students, excluding new students. The researchers undertook some preparations prior to data collection, including adapting the instruments, preparing informed consent forms, conducting a readability assessment for the instruments, making copies of the questionnaires, recruiting field researchers for data collection, and selecting e-books to present to participants as reward for participation. A total of 500 questionnaire forms were distributed to active students in the Faculty of Psychology in one of the top universities in Indonesia. Out of the 346 questionnaires that were returned, 126 were excluded from the analysis because 96 were not thoroughly completed while 30 questionnaires were discarded because participants were observed to interact with other people during the survey period.

Materials. Self-authorship. Defined as the internal capacity to construct and evaluate knowledge claims, to understand the nature of contextual knowledge, and to be independent in the acquisition of knowledge. Self-authorship is measured from the total score of all self-authorship subscales contained in the Self Authorship Survey (SAS) instrument. Self-Authorship Survey (SAS) was originally developed by Pizzolato (2005b, 2007). SAS was used in previous research to measure individual epistemological development within an educational context (Pizzolato et al., 2009). Four subscales are measured in the instrument. First, 9 items of Capacity for Autonomous Actions (items 1 - 9)

measure the extent to which students feel they are not dependent upon others, such as not feeling pressured to do what others are doing. 6 items of Problem Solving Orientation (items 10 - 15) assess whether students are capable of making a decision based on their own values and their orientation to solve problems. 6 items of Perceptions of Volitional Competence (items 16 - 21) evaluate how confident students are in planning their targets and in solving problems. 6 items of Self-Regulation in Challenging Situations (items 22 - 27) quantify proficiency in self-regulation and persistence in achieving objectives when the unexpected happens. Each subscale of the instrument assesses one or more dimensions of self-authorship. Participants are asked to indicate, on a 5-point Likert scale ranging from 1 (disagree) to 5 (agree), the degree to which they agree with each item. In general, SAS has good internal consistency (Pizzolato, 2005b, 2007). In the current study, SAS is adapted into the Indonesian language. The reliability of the Indonesian version of SAS is .83. The higher the SAS score, the higher the epistemological capacity of self-authorship. To test the construct validity of SAS, tests for convergence were performed by correlating total SAS score with each of the total scores of epistemological attribute variables in the study, which include Epistemological Beliefs Inventory (EBI; Schraw et al., 2002), Need for Cognition Scale (NCS; see Cacioppo et al., 1984), Epistemic Curiosity: Feeling of Deprivation (FOD) & Feeling of Interest Scale (FOI; Litman, 2008), and Skepticism (Fighting Against Myth/Psychological Knowledge/10-Myths about Psychology; see Renken et al., 2015; Lilienfeld et al., 2010).

Learning approach. Defined as students' tendency to learn deeply or on the surface (Biggs, 2012). The Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) is a self-report used to measure deep learning approach and surface learning approach (Biggs et al., 2001). A total of 20 items are included in the R-SPQ-2F. 10 items are subscales measuring surface approach and 10 other items are subscales that measure deep approach. Participants are asked to indicate the extent to which they agree with each item in the inventory. Responses to items are measured on a 5-point Likert scale (1=Disagree; 2=Somewhat Disagree; 3=Neutral; 4=Somewhat Agree; 5=Agree). The Cronbach alpha coefficients for the deep learning approach and the surface learning approach subscales are .78 and .74, respectively, suggesting that the Indonesian adaptation of R-SPQ-2F has good internal consistency.

3. Results

Description of Participants. Participants (N = 220) were active students enrolled in the Faculty of Psychology at Universitas Indonesia, comprising 92 (41.8%) second-year students, 72 (32.7%) third-year

Table 1. Interrelations Among Cognitive-Epistemological Variables and Self-Authorship (N = 220, M = 3.30, SD = .48)

	M(SD)	n Item	α	Self-authorship (Cronbach $\alpha=.83$)
Epistemic Curiosity (FOI & FOD)		25		
Interest-Type	2.78(0.47)	10	0.89	0.30**
Deprivation-Type	2.73(0.41)	15	0.87	0.17**
Thinking Trait (NCS)		18		
Need for Cognition	2.58(0.43)		0.90	0.53**
Epistemological Beliefs (EBI)		23	0.83	
Certain Knowledge	2.56(0.45)	6	-	-0.12*
Quick Learning	1.78(0.38)	6	-	-0.08
Fixed Knowledge	2.86(0.52)	5	-	-0.06
Simple Knowledge	2.07(0.36)	6	-	-0.12*
Skepticism	5.52 (1.95)	10	-	0.20**

**significant at $p < 0.01$; *significant at $p < 0.05$

Table 2. Correlations (zero-order correlations) between Learning Approach and Self-Authorship (N = 220)

	Self-Authorship Survey (SAS)				
	Capacity for Autonomous Action	Problem Solving Orientation	Perception of Volitional Competence	Self-Regulation in Challenging Situations	SAS Total
Learning Approach (R-SPQ-2F)					
Deep Approach	0.09	0.42**	0.34**	0.09	0.28**
Surface Approach	-0.37**	-0.28**	-0.06	-0.32**	-0.38**

**significant at $p < 0.01$; *significant at $p < 0.05$

students, and 56 (25.5%) fourth-year students. The study sample consisted of 161 (73.2%) females and 59 (26.8%) males, with ages that ranged from 17 to 30 years ($M = 20.58$, $SD = 1.82$).

Table 1 shows that the instrument for self-authorship has good internal consistency (Cronbach $\alpha = 0.83$). Self-authorship has significant positive correlations with epistemic curiosity; i-type ($r = 0.303$, $p < 0.01$) & d-type ($r = 0.17$, $p < 0.01$), need for cognition ($r = 0.53$, $p < 0.01$), and skepticism ($r = 0.20$, $p < 0.01$). The dimensions of certain knowledge and simple knowledge from EBI have significant negative correlations with self-authorship ($r = -0.12$, $p < 0.05$; $r = -0.12$, $p < 0.05$). Generally, the results demonstrate that self-authorship is a valid construct for measuring students' epistemological aspect. The more developed a student's epistemological aspect (self-authorship score), the more the student possesses a great sense of curiosity towards

knowledge (FOD & FOI), enjoys thinking (NCS), is skeptical towards myths in popular psychology (skepticism), and tends to hold the belief that knowledge is relative rather than certain (certain knowledge) and that knowledge is complex rather than simple (simple knowledge).

Hypothesis Testing. To test the predicted relationship between learning approach and self-authorship, we first performed a zero-order correlation analysis. The results confirmed the prediction that deep learning approach is significantly correlated with self-authorship ($r = 0.28$, $p < 0.01$) (Table 2). Students who learn deeply and attach meaning to learning tend to be oriented towards problem solving (problem solving orientation, $r = 0.42$, $p < 0.01$) and confident in their ability to reach their target objective through the planning that they have set (perception of volitional competence; $r = .34$, $p < 0.01$).

Table 3. Multiple Regression (Forced Entry) : Learning Approach as Total Predictor of Self-Authorship

	b (CI 95%)	SE	β	p
Constant	86.38 (74.34, 98.40)	6.10		p = 0.000
Deep Approach	0.42 (0.16, 0.67)	0.13	0.20	p = 0.000
Surface Approach	-0.65 (-0.90, -0.40)	0.12	-0.33	p = 0.000

$R^2 = .18$. b = unstandardized regression coefficient; SE = standard error estimation for unstandardized regression coefficient; β = standardized regression coefficient

Surface learning approach was found to be negatively correlated with self-authorship ($r = -0.38$, $p < 0.01$). That is, students who learn 'on the mere surface' tend to be dependent on others in determining decisions/confidence (capacity for autonomous action; $r = -0.37$, $p < 0.01$), not be oriented towards problem-solving (problem solving orientation; $R = -0.28$, $p < 0.01$), and unable to self-regulate when faced with unexpected situations (self-regulation in challenging situations; $r = -0.32$, $p < 0.01$). A negative correlation between deep approach and surface approach was additionally discovered ($r = -0.23$, $p < 0.01$).

A zero-order correlation coefficient only explains the strength of relationship between two variables without thoroughly conveying the magnitude of variance contribution from several variables in self-authorship. The analysis also does not explain how some predictors are able to account for a higher variance of the outcome compared to other predictors.

To overcome the above limitation of the analysis, a multiple regression was performed. The results of the multiple regression with forced entry method are presented in Table 3. As predicted, deep learning approach is a significant positive predictor of self-authorship ($\beta = 0.20$, $p < 0.000$), while surface study approach is a significant negative predictor of self-authorship ($\beta = -0.33$, $p < 0.000$). Taken together, learning approach has a positive relationship ($R = 0.43$) with self-authorship, wherein the contribution in variance from the predictor towards self-authorship is 18.3% ($F(2,19) = 24.28$, $p < 0.001$. $Adj R^2 = 0.17$).

4. Discussion

This study aims to explain the role of learning approach type as predictor of the achievement of self-authorship epistemological development. Learning approach consists of two types, namely deep approach and surface approach (Biggs, 2012). Epistemological development is explained using the theoretical

framework of self-authorship epistemological development, which describes individual progression in achieving independence in learning and knowledge construction (Baxter Magolda, 2008; Pizzolato; 2007). We hypothesized that The more students attach meaning to their learning process, the more likely they are to reach the peak of epistemological development. The results supported our hypothesis, as deep learning approach and surface learning approach were shown to be significant predictors of self-authorship.

Deep learning approach was indeed found to be a positive predictor of self-authorship. The more students use a deep learning approach, the higher their self-authorship. That is, individuals who attach meaning to learning, who learn for the sake of learning, and who pursue knowledge for the sake of knowledge itself characterize students who reach maturity in the construction of knowledge. This result is a novel discovery and conforms to the prediction of the researchers. The findings also support King's (2010) argument that self-authorship progresses in accordance with the complexity of the meaning-making process that occurs within an individual.

There exist several limitations to the study, the first of which is in reference to the issue of the measurement of deep learning approach. Firstly, there is evidence that deep learning approach has a weak negative correlation with classroom learning behavior, while surface learning approach is strongly negatively correlated with classroom learning behavior (Choy, O'Grady, & Rotgans, 2011). In the aforementioned study's discussion, it is stated that items in the deep approach subscale of R-SPQ-2F are too "philosophical in nature" and are therefore difficult to observe from classroom learning behavior, which contrasts with items in the surface approach subscale that directly measure classroom behavior as they are more "behavioral in nature". Henceforth, researchers of the current study suggest that the measurement of learning approach be changed to the level of actual behaviors exhibited by

students while learning in the classroom, so as to obtain a more coherent picture of the relationship between learning approach and self-authorship. Secondly, in the current study, the 'learning approach' construct is a combination of students' learning 'motivation' and 'strategy'. The combined measurement of motivation and strategy implies that the two constructs are not measured separately and are instead measured through a single composite 'approach' score. It has been argued that students can use either deep learning approach or surface learning approach depending on task demands and time management (Wilding & Andrews, 2006; Evans, Kirby, & Fabrigar, 2003). Measuring motivation and strategy independently is assumed to allow for a more detailed alternative explanation regarding the role of learning approach as predictor of self-authorship. Subsequent studies should therefore operationalize learning approach by separating motivation and strategy as independent constructs, while at the same time controlling the level of task demand and time management for students.

In the validation test of the Self-Authorship Survey (SAS) instrument, need for cognition was found to be the epistemological attribute variable that has the strongest correlation with self-authorship. Need for cognition is an individual's dispositional trait to like thinking activities and to enjoy complex thinking tasks. This is consistent with the claims of past studies that need for cognition is positively correlated with academic success (Cacioppo & Petty, 1984; Olson, Camp, & Fuller, 1984; Petty & Jarvis, 1996; Tolentino, Curry, & Leak, 1990; Waters & Zakrajsek, 1990). Need for cognition is closely related to academic self-efficacy (Elias & Loomis, 2002), wherein academic self-efficacy is the strongest non-cognitive predictor of academic achievement (Richardson et al., 2012). Self-authorship has also been shown to have a strong relationship with academic self-efficacy (Strayhorn, 2014). Individuals who seek complex cognitive tasks seemingly have confidence in their ability (efficacy) to complete the sought tasks. The relationship between self-authorship and need for cognition has never been discussed in prior research. Individuals with a thinking trait and who enjoy thinking activities tend to progress in a more advanced manner towards the peak of epistemological development. This result is consistent with the argument proposed by King (2010), which states that cognitive complexity is a fundamental dimension of self-authorship epistemological development. Future studies attempting to predict the progression of self-authorship need to control thinking disposition (need for cognition) due to the possibility that students with a natural inclination to enjoy thinking efforts are capable of reaching a higher thinking complexity (i.e., they have a high thinking complexity to begin with).

Self-authorship has been established as a benchmark for student outcome (Baxter Magolda, 2004b, 2007;

Meszáros, 2007), such as academic success (GPA) (Strayhorn, 2014; Pizzolato et al., 2009). Deep learning approach has also been claimed as the primary goal of higher education institutions (Biggs, 1999), where meta-analysis Richardson et al. (2012) have been demonstrated that learning approach is consistently predict academic success (GPA). Thus, claims of the objectives of higher education (i.e., attainment of self-authorship and the use of deep learning approach) are shown to be in accordance with degree of academic success (GPA). Yet several studies in other countries have yielded inconsistent findings with regard to the relationship between deep learning approach and academic success. In Australia, Zeegers (2001) discovered that students are not compelled to use deep learning approach in the classroom. Similarly, Diseth and Martinsen (2003) found that learning approach failed to predict the academic achievement of Psychology students in Norway. Groves (2005) revealed that first-year students taught with a Problem-Based Learning (PBL) curriculum experienced a shift from deep learning approach to surface learning approach throughout the duration of their study in an institution. In the current research, academic success as indicated by GPA was not included. In Indonesian universities, the nature of how learning approach and self-authorship relate to academic success (GPA) remains to be seen. Therefore, future research needs to further clarify how the relationship between learning approach and self-authorship is associated with academic success in Indonesia.

5. Conclusion

The present study fills in the gap in the research on higher education, more particularly pertaining to the relationship between learning approach and self-authorship. This research is the first to propose a structural model of self-authorship epistemological development with various epistemological attributes and cognitive dispositions taken into account, more specifically among students in Indonesian universities. In particular, the current study provides evidence that the use of deep learning approach and avoidance of the use of surface learning approach is a process experienced by students who attain the peak of self-authorship epistemological development.

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