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INVESTIGATION OF THE EXTENT TO WHICH METACOGNITION AND EPISTEMOLOGICAL BELIEFS PREDICT PROSPECTIVE TEACHERS' ENTREPRENEURIAL DISPOSITIONS

Research article

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INVESTIGATION OF THE EXTENT TO WHICH METACOGNITION AND EPISTEMOLOGICAL BELIEFS PREDICT PROSPECTIVE TEACHERS' ENTREPRENEURIAL DISPOSITIONS

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Abstract

Learning is a process of thinking in which the most significant construct is individuals' awareness of their own learning and their own learning process, in other words, of their own metacognition capacity. This prediction study aimed at identifying the relationship between entrepreneurial dispositions and metacognition, and epistemological beliefs that teachers should possess. In line with this, the study focused on the extent to which pre-service teachers' entrepreneurial dispositions were predicted by the variables of metacognition and epistemological beliefs. The participants comprised 516 prospective teachers in a public university in Turkey. The study adopted the correlational research design, and utilised linear regression analyses for the data collected via Metacognition, Epistemological Beliefs, and Entrepreneurial Dispositions Scales. The results of the analyses indicated that "*planning"* sub-dimension of the metacognition scale and *"Learning depends on ability"* and *"Learning depends on effort"* sub-dimensions of the epistemological beliefs scale predicted entrepreneurial dispositions, positively and significantly. On the other hand, neither "*organization"* sub-dimension of the former nor *"There is only one unchanging truth"* sub-dimension of the latter scale was not able to predict entrepreneurial dispositions.

Keywords: Lifelong learning, metacognition, self-regulated learning, social intelligence, entrepreneurship

1. Introduction

1.1. Metacognition

Learning is a life-long process. In fact, it is a process of thinking in which the most significant construct is an individual's awareness of their own learning and the learning process, in other words, their metacognition. Metacognition refers to thinking about thinking. An individual's control or self-regulation over their thinking as well as learning processes and products are enabled via metacognitive awareness (Hartman, 2001). The importance of metacognition raises from the fact that it does not only affect acquisition, comprehension, retention and application of what is learned, but also learning efficiency, critical thinking and problem solving (Flavell, 1979). By reflecting on their thinking processes and evaluating such processes, individuals gain better control over their thinking and feelings. Kluwe (1982 as cited in Louca 2003) defines metacognitive awareness activities as activities in which an individual acquires knowledge regarding their own and others' thinking, controls their thinking processes and regulates them. In such a construct, individuals who possess metacognitive awareness skills can self-motivate themselves to solve a problem or complete a task, develop rigor and a positive attitude that they can complete the task. Achieving these, however, requires individuals to possess knowledge about themselves and the ability to self-monitor. Another dimension of

metacognition is knowledge and control of processes. In relation to this, individuals first evaluate what they know and what they should know, thereby, understand where they stand and start to plan what they should do in order to reach the goals they set. They review the strategies that they have developed based on their plan and decide on whether those strategies are relevant to achieve their goals. If those strategies are not relevant then they adopt new strategies, become more aware of their own thinking processes and develop those processes.

Various information such as declarative (what), procedural (how), and conditional (why and when) are part of metacognitive knowledge (Zohar & Barzilai, 2013). As a macro thinking process, metacognition comprises critical thinking, creative and reflective thinking, and problem-solving. And metacognitive skills are part this process along with metacognitive knowledge. Sub-dimensions of metacognitive skilfulness include; orientation activities, systematic orderliness, evaluation, and elaboration activities (Prins, Veenman & Elshout, 2006).

Metacognitive processes and skills are part of problem solving processes along with skills of planning, organization, and evaluation. The present study adopted Semerari et al. (2003) model and methods of metacognition in which the concept has been specified as a spectrum of mental activities enabling individuals to form integrated ideas regarding their own minds as well as those of others, and utilize such information to respond to the challenges of life. Problem solving skills are an important part of raising entrepreneurs; and planning, organization, and evaluation sub-dimensions of metacognition are part of this process. Social interactions of an individual play an important role in the development of a thinking culture. In fact, social awareness intercedes in the process of learning to learn which results in understanding other people's opinions, becoming aware of others' emotions, and ongoing adaptation of one's self in social interactions. Not only discrete but also more synthetic activities -which enable individuals to make sense of their mind as well as consolidate pieces of experiences in order to create a coherent and cohesive account of one's self across time- are parts of metacognition (Dimaggio et al., 2017). It is worth noting that those processes take place within the flow of life and can be affected by a number of social motives (e.g. social rank, peer cooperation, autonomy).

1.2. Epistemological Beliefs

As part of metacognitive processes, independent learners believe that learning can evolve in time, there could be multiple truths in life, and there is a unique or unchanging truth. This requires constructing a perception which enables the development of positive epistemological beliefs towards learning.

Epistemological beliefs play an important role in teacher competencies and professional development. The meaning a teacher attributes to their professional value is shaped by the positive epistemological belief that knowledge can be gained through learning. Various development models have been proposed for the epistemological development of individuals in such processes. One such example is Perry's (1970 as cited in Roberts et al., 2016) Scheme of Intellectual and Ethical Development where he investigated the changes in students' beliefs regarding knowledge. In his research, Perry found that when they started their university tuition, students held the belief that knowledge is absolute and precise (either right or wrong), simple and easy to understand, has a construct which consists of independent parts, and is an entity that is constructed by an expert to be transmitted to students. However, as they progressed in their degree programs, students' beliefs started to change and they started believing that knowledge is not absolute or precise -that is to say it can change from one context to another-, it has a construct which consists of multiple parts that are associated to one another, and it is produced by individuals based on reasoning or experimental evidence. Based on his research, Perry (1970) identified four primary positions in relation to an individual's intellectual and

ethical development: (a) dualism, (b) multiplism, (c) relativism, and (d) relativism commitment (as cited in Roberts et al., 2016: 174).

Shommer (1990) noted that addressing epistemological beliefs in a way that will only encapsulate beliefs regarding knowledge would be a limited approach and claimed that those beliefs were not unidimensional but rather multidimensional. Shommer (1990) added that epistemological beliefs do not only encapsulate beliefs regarding knowledge but also beliefs regarding the ability to learn and teach (intelligence) which are used in processes relating to knowledge acquisition (as cited in Schommer- Aikins & Hutter, 2002). Thus, he concluded that epistemological beliefs should be considered as a system.

The analysis of various models available indicates a close relationship between learning and epistemological beliefs. Research in recent years has focused on understanding the effects of students' beliefs regarding the nature of knowledge and cognition as well as learning processes and their results. An important theoretical assumption in the present study is that epistemological beliefs evolve from being simple and plain towards being multifaceted and complex. What is meant with *simple* is that an individual believes knowledge is absolute. However, through learning, people start understanding that knowledge is more complex and relative. Thus, they become more aware that evaluating different ideas requires focusing (e.g. King & Kitchener, 2002 as cited in Pieschl et al., 2008). People who have *multifaceted* perspectives, on the other hand, believe that knowledge is a complex network, relative and contextual. They consider that the truth is not absolute, it can change, and it is constructed rather than being transmitted. Epistemological beliefs encapsulate various dimensions in relation to presenting the trueness of information claims, in other words, they relate to each probability of truth. The multiple perspective approach includes beliefs about the accurateness, source, structure, and confirmation of knowledge (Pieschl et al., 2008).

One of the models developed focusing on the relationship between epistemological beliefs and learning is Winne & Hadwin's (1998) COPES model. COPES model places epistemological beliefs within metacognition which includes self-regulation.

1.3. Entrepreneurial Dispositions

Higher order thinking skills and processes are among the fundamental characteristics that entrepreneurs should possess. Those processes include metacognition, critical thinking, creative and reflective thinking, and problem solving which play a significant role in an individual's adaptation to new circumstances. During such processes, individuals -who actively seek to gain experiences, create their own learning circles, and develop alternative solution proposals- also become successful independent learners in their lives. Raising entrepreneurs who possesses positive epistemological beliefs and metacognition's planning, organization, and evaluation sub-skills are shared characteristics of learners at universal level. In line with this, while Cantillon defined entrepreneurs as people who set up a business and take risks in order to make a profit (Hébert, 1985), Mueller & Thomas (2001) define entrepreneurship as an activity in which an individual predicts an opportunity and creates an organization to seize the opportunity.

Additionally, during start up procedures, entrepreneurial actions such as launching a venture are characterized by their casualness, infinite energy, use of accessible resources and time, and risk taking potential. Newly established ventures will be lacking in key resources and the chances are slim that there will be specialists (i.e. those with technical skills) among those working in such ventures. Moreover, such ventures are likely to possess a highly informal work culture which is mainly based on interpersonal skills, charisma, and energy of the founder, the entrepreneur (Cowdean et al., 2019). In fact, there is a linear relationship between

entrepreneurship and creative thinking skills and processes. The European Commission (2006) defines entrepreneurship as "an individual's ability to turn ideas into action" (p. 4). Creativity, innovation, risk taking, and the ability to plan and manage projects with the objective of achieving set goals are included in entrepreneurship. Those aspects shape entrepreneurs and the one characteristic that is deemed absolutely necessary for an entrepreneur to have is creativity (Zhao et al., 2010).

Other characteristics that entrepreneurs have include; the need for achievement, locus of control, tendency to take risks, tolerance for ambiguities, innovation, and self-confidence. One of the factors that affect an entrepreneur's behaviour is the need for achievement. In line with this, the need for achievement includes successfully completing various difficult tasks. In fact, individuals whose motivation to succeed is high are more ready to accept responsibility and face consequences of their performance as well as uncertainties (Sagie & Elizur 1999: 376). The need for achievement is highlighted as another characteristic that entrepreneurs should possess.

Another important factor relating to entrepreneurial behaviour is locus of control. Locus of control is about individuals' perceptions of whether a certain incident is within or outside their control. As such, individuals and organizations who have locus of control can both evaluate their activities as well as others' performances. Those who have internal locus of control consider that they control the processes taking place in their lives as well as the consequences (Hansemark, 1998). Moreover, such individuals are goal-driven and better motivated to achieve their objectives. They are more active in learning and higher order thinking processes when compared to those with external locus of control.

Being able to take risks is an important component of entrepreneurship Sitkin & Pablo (1992) underline three fundamental and indispensable components of risk which are; outcome uncertainty, outcome expectations, and outcome potential. During such processes, being able to make appropriate decisions in various circumstances, organize self-behaviour accordingly, and focus on previously set objectives using creativity and potential is important for an individual. Similarly, investment theory underlines the close relationship between creativity and risk-taking personality (Sternberg et al., 1997). It is expected that people and organizations who undertake entrepreneurial activities will have creative proposals and take risks.

In line with Chaos Theory where everything is meaningful thanks to their opposites, tolerance towards ambiguities is another component that should be paid attention to. In relation to this, Chye Koh (1996) noted that without sufficient information, a situation cannot be contextualized which renders it as an ambiguous situation. An individual's tolerance of ambiguity is reflected in the way they perceive ambiguous situations as well as planning how to tackle them. Striving to perform well, people with high tolerance of ambiguity perceive ambiguous situations to be challenging and endeavour to prevail in unstable and uncertain situations (15). Entrepreneurs are individuals who have tolerance for ambiguity when faced with ambiguous situations and they endeavour to overcome ambiguities. Moreover, an entrepreneur should first believe that they would be successful if they want to achieve their objectives.

1.4. Metacognition, Epistemological Beliefs and Entrepreneurial Dispositions

Self-regulation is an important component of metacognition. As such, possessing self-regulation skills plays a significant role in entrepreneurs' success and reaching their goals. In fact, recent research suggested the application of self-efficacy to entrepreneurship models (Hmieleski & Baron, 2009; Krueger & Brazeal, 1994). Self-efficacy is considered to be among the leading factors which can predict the outcomes of entrepreneurial endeavours. Self-efficacy

is also related with motivation and those who do not have self-efficacy are likely to lack in the motivation necessary to get involved in entrepreneurial activity (Markman et al., 2002). Thus, along with motivation, self-efficacy -which also is an important dimension of Metacognition is accepted as one of the fundamental characteristics of entrepreneurs.

Among knowledge categories, metacognition plays an important role during the process of social entrepreneurship. The underlying structure of social entrepreneurship requires individuals; a) to be bold to achieve vision when doubted, b) to have the commitment to achieve goals, c) to be resilient to see failure as valuable feedback, d) to be innovative to connect the patterns for new projects, e) to be empathetic to take into consideration others' viewpoints, and f) to connect and build strong relationships (A*kt;* Al-Buainain 2017: 49). Self-regulation and performance, which are included in entrepreneurship, are directly related to organization and constructing dimensions of metacognition. Additionally, people's knowledge and control of the self-lead to achievement-oriented performances and enable them to become individuals who learn to learn. In line with this, beliefs that there is not just one unchanging truth and that learning depends on effort -which are parts of the positive beliefs within epistemological beliefs- are determinants of individual performance towards achievement.

There is a functional relationship between social mind and entrepreneurial skills. Entrepreneurial activities are shaped by successful performances, analytical work, creativity, and social activities. More specifically, planning, organization, and evaluation skills within metacognition are helpful for entrepreneurs since such skills facilitate the process of adaptation to new situations. The use of such skills which bring along cognitive flexibility makes it easier to adapt to new situations. In recent years, researchers have started to pay more attention to this process in terms of organizational (Mabert et al., 2003) and entrepreneurial outcomes (Haynie & Shepherd, 2009). Parallel to this, researchers developed various frameworks one of which is Ardichvili et al.'s (2003 as cited in Cox, 2016) *Entrepreneurial Alertness, Opportunity Identification and Metacognitive Knowledge* model. Research, action, and management are considered as entrepreneurial components in that model, and those components affect development, innovation, and value adding processes. In addition, metacognitive knowledge is evaluated as a significant component that affects entrepreneurial actions and research (Cox, 2016: 59).

Metacognitive processes and skills contribute to entrepreneurs' development of positive beliefs towards science. In addition, there is a functional relationship between epistemological beliefs and learning. In line with this theoretical framework, COPES model explains the effects of the relationship between epistemological beliefs and metacognition on learning processes. According to COPES model, self-regulated learning comprises of four consecutive stages that are recursive (Winne & Hadwin, 1998). Those are; task definition, goal setting and planning, enacting strategies and tactics, and adaptation (Pieschl et al., 2008). Those stages correspond to entrepreneurs' characteristics such as the need for achievement, locus of control, risk-taking tendencies, tolerance for ambiguities, being innovative, and self-confidence.

Purpose of the Study

Education plays an important role in bringing up independent learners and entrepreneurs. Teachers help their students to attain necessary knowledge and skills to increase their competencies through their guidance and teaching activities. Determining prospective teachers' metacognition, epistemological beliefs, and entrepreneurial dispositions and investigating the relationship among those variables can provide valuable feedback for increasing the quality of the training they receive. In line with this, the main aim of the present study is to investigate the relationship between prospective teachers' entrepreneurial dispositions and metacognitive skills and epistemological beliefs. In the study, the answers to the following research questions

were sought:

1. Do metacognitive skills and epistemological beliefs variables significantly predict pre-service teachers' perceptions of entrepreneurial dispositions?

2. Which of the following variables better predict pre-service teachers' perceptions of entrepreneurial dispositions? Metacognitive skills or epistemological beliefs?

2. Method

2.1. Research Design

The present prediction study was based on a correlational research design. Prediction studies provide us with three types of information: (1) information which can predict the behavioural patterns being measured, (2) information regarding the determinants of the behavioural pattern being measured, and (3) the predictive validity of the test(s) in relation to the behavioural patterns being measured (Borg & Gall, 1989). In the present study, behavioural patterns regarding perceptions of entrepreneurial dispositions were identified as the dependent variable and metacognition and epistemological beliefs as predictive variables.

2.2. Participants

The participants in this study were composed of prospective teachers in Education Faculties of public universities in Turkey in the 2018-2019 academic year. The participants were 516 prospective teachers selected from various departments using cluster sampling strategy model (non-probability sampling). Of those participants 314 (60,9 %) were female and 198 (38,4 %) were male, and 4 participants (0,8 %) did not specify their gender. 232 participants (45 %) studied in Psychological Counselling and Guidance Department, 95 (18,4 %) in Primary Education Department, 36 (7 %) in Primary Mathematics Education Department, 94 (18,2 %) in Social Science Teaching Department, and 59 did not specify their departments.

2.3. Data Collection and Process

To begin with, *"Personal Information Form"* was utilized in order to gather data about the participants. In addition, *"Entrepreneurial Dispositions Scale (EDS)"* was utilized to identify lifelong learning dispositions of pre-service teachers, *"Metacognition Scale (MS)"* was used to measure metacognitive skills of the participants, and *"Epistemological Beliefs Scale (EBS)"* was used.

Personal Information Form was used to gather data in relation to independent variables of the scale and describe the study sample in terms of their personal characteristics. The form included parts to collate information regarding participants' gender, age, year of study, parents' education, family's income levels, high school graduation, and whether training on scientific skills and processes was received.

Entrepreneurial Dispositions Scale (EDS) has been developed by İşcan and Kaygın in 2011 to identify university students' entrepreneurial dispositions. The scale consists of 28 items and 6 factors, and explains 51,75 % of total variance. Cronbach's Alpha reliability coefficients of the factors were as following; self-confidence .73, innovation .78, need for achievement .68, locus of control .73, risk taking .73, and tolerance for ambiguities .60.

The reliability analyses for the administration of the scale in the present study showed that the Cronbach Alpha level for the whole scale was .83. The sub-components' alpha coefficients were measured as .67 for self-confidence, .66 for innovation, .65 for the need for achievement, .53 for locus of control, .65 for risk taking, and .59 for tolerance for ambiguities.

Metacognition Scale (MS) has been developed by Demir (2013) to measure pre-service teachers' metacognitive skill levels. It has three sub-components; planning, organization, and evaluation. Cronbach's Alpha reliability coefficient for the whole scale is .89. Alpha coefficient for the planning component of the scale is .70, .65 for the organization component, and .87 for the evaluation component. Those three components explain 53.07 % of the total variance. Confirmatory Factor Analysis results indicate a good model fit: $\chi 2$=151.90; sd=74, p<.01; ($\chi 2$/sd)=2.05; RMSEA=0.064; RMR=0.045; GFI=0.92; AGFI=0.89; NNFI=0.91; NFI=0.87; and CFI=0.93.

The reliability analyses conducted in the present study showed that Cronbach's Alpha reliability coefficient for the whole scale was .89; and .78 for the planning dimension, .66 for the organization dimension, and .82 for the evaluation dimension.

Epistemological Beliefs Scale (EBS) which has been developed by Kop & Demir (2017) consists of 15 items and three factors. Reliability analyses indicate Cronbach's Alpha coefficient for the whole scale is .71; and .78 for the "Learning depends on effort" belief, .69 for the "Learning depends on ability" belief, and .51 for the "There is only one unchanging truth" belief. Those beliefs explain 47.783 % of total variance. Model fit indicies in Confirmatory Factor Analysis indicated a good model fit: KMO=0.784; Bartlett Sphericity test $\chi 2$ =610.108; $\chi 2$=122.03; sd=87, p<.01; RMSEA=0.048; $\chi 2$/df=1.402; RMR=0.055; STRMR=0.066; GFI=0.91; AGFI=0.88; NFI=0.81; NNFI=0.92; CFI=0.93; IFI=0.93).

Cronbach's Alpha coefficient during the reliability analyses in the present study was found to be .78 for the whole scale; and .88 for the "Learning depends on effort" belief, .71 for the "Learning depends on ability" belief, and .58 for the "There is only one unchanging truth" belief.

2.4. Data Analysis

Prior to data analysis, the dataset was checked for missing and miscoded data. Following this the dataset was analysed for outliers in order to confirm whether the assumptions of regression analysis were met, and data whose Mahalonobis distances were large were not included in the analysis. Afterwards, multicollinearity among the variables, variance inflation factor (VIF), and tolerance values were analysed. There was not any data which met the following criteria; to have a tolerance value close to zero, a VIF value higher than five, or condition indices higher than 30 whilst including two variances bigger than 0.50. Following those checks, the final dataset included the data of 443 participants. Multiple Linear Regression analyses were conducted to predict dependent variables. The dependent variable in the present study was the scores candidate teachers achieved in the *Entrepreneurial Dispositions Scale* and the independent variables were the scores candidate teachers achieved in the sub-dimensions of the *MS* and *EBS* scales.

Multi Linear Regression analyses were conducted to identify the extent to which planning, organization, and evaluation sub-dimensions of the *MS*, and the sub-components of the *EBS*. The order in which independent variables are included in the equation during such analyses are based on statistical criteria. Each independent variable is determined based on what has been added into the equation in terms of the addition order (Tabachnick & Fidell 2001). The significance value during the analyses was accepted as .05 and the data was interpreted based on this criterion.

3. Findings

Multi Linear Regression analyses were conducted in order to identify the variable which can predict pre-service teachers' entrepreneurial dispositions. Table 1 includes details of the dataset such as the mean, standard deviation, and correlation levels among the variables. This

section initially provides descriptive information (i.e. mean, standard deviation, and correlation matrix) in relation to the dependent and predictor variables and then presents the results of regression analyses.

3.1. Correlations among variables

Table 1 presents information regarding the variables investigated in the present study (i.e. mean, standard deviation, and correlation matrix).

Table 1. *Mean Scores, Standard Deviation, and Correlation Matrix in Relation to EDS, MS, and EBS' Sub-scales*

Variable	X	Ss	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.EDS total	66,20	7,81	1	,683**	,787**	,683**	,701**	,712**	,390**	,366**	,323**	,273**	,365**	,255**	,199**	,225**	,332**
2.Self-confidence	10,03	1,63		1	,546**	,341**	,437**	,320**	,128**	,313**	,293**	,222**	,294**	,219**	,127**	,185**	,262**
3.Innovation	14,45	2,30			1	,397**	,447**	,441**	,207**	,340**	,296**	,232**	,363**	,243**	,139**	,192**	,284**
4.Need for achievement	11,72	2,16				1	,411**	,342**	,131**	,254**	,213**	,237**	,234**	,183**	,185**	,239**	,290**
5.Locus of control	15,30	1,88					1	,382**	,086*	,355**	,321**	,270**	,337**	,328**	,053	,199**	,298**
6. Risk taking	11,63	2,19						1	,275**	,173**	,159**	,096*	,190**	,141**	,066	,069	,141**
7.Tolerance for ambiguities	3,04	1,30							1	-,030	-,043	,002	-,024	-,192**	,290**	-,025	,008
Predictor (independent) Variables																	
8.MS	65,65	9,87								1	,938**	,815**	,851**	,335**	,069	,299**	,351**
9. Evaluation	33,37	5,32									1	,666**	,682**	,321**	,042	,262**	,315**
10.Organization	14,04	2,61										1	,586**	,267**	,095*	,305**	,325**
11.Planning	18,23	3,25											1	,280**	,065	,234**	,290**
12.Learning depends on effort	29,91	4,78												1	-,035	,488**	,771**
13.Learning depends on ability	10,93	3,68													1	,176**	,503**
14.There is one unchanging truth	14,97	3,39														1	,779**
15.EBS	55,80	8,17															1

** P<.001 *P<.005

As can be seen in Table 1, the mean of dependent variables ranged between 3.04 and 66.2, and the standard deviation values were between 1.30 and 7.81. Considering that dependent variables were measured using a six-point scale, it is worth noting that the mean scores pre-service teachers achieved were moderate. Independent (predictor) variables' mean, on the other hand, ranged between 10.09 and 65.65, and the standard deviations were found to be in the range of 2.61 and 9.87. The mean for independent variables, which were measured using five- and three-point scales, was also found to be at moderate levels.

Statistics presented in Table 1 indicate that most of the predictor variables had moderately meaningful correlations with dependent variables. The correlations among predictor variables were also moderate, but not high enough that it would cause multicollinearity. On the other hand, *locus of control* sub-dimension of the EDS did not have a significant correlation with the *"Learning depends on ability"* belief of the EBS. Moreover, *risk taking* sub-dimension of EDS did not have a significant correlation with *"Learning depends on ability"* or *"There is one unchanging truth"* beliefs of the EBS. *Tolerance for ambiguities* sub-dimension of the *MS* was found to be negatively correlated with *Total Metacognition Scores,* and *evaluation* and *planning* sub-dimensions of MS, and *"There is one unchanging truth"* belief of the EBS. *Tolerance for ambiguities* sub-dimension was not significantly correlated with either *organization* sub-dimension or *Total Epistemological Beliefs Scores*. In addition, while *tolerance for ambiguities* sub-dimension was negatively correlated with *"Learning depends of effort"* belief, it was positively correlated with *"Learning depends on ability"* belief at a moderate level.

3.2 MS and EBS sub-dimensions' power of predicting total EDS scores

The first multi regression analysis in the present study was conducted on the predictive power of *Metacognition* and *Epistemological Belief* sub-dimensions on total *Entrepreneurial Dispositions* scores. The results of this analysis are presented in Table 2.

Table 2. *Multi Regression Analysis Results for EDS Total Scores and Predictor Variables*

Variables	B	Standard Error B	B	T	P	Pair r	Partial R
Constant	38,511	2,613		14,739	,000		
Evaluation (MS)	,139	,090	,095	1,547	,122	,323	,068
Organization (MS)	,011	,167	,004	,064	,949	,273	,003
Planning (MS)	,568	,135	,236	4,218	,000	,365	,184
"Learning depends of effort" Belief (EBS)	,233	,077	,143	3,026	,003	,255	,133
"Learning depends on ability" Belief (EBS)	,374	,086	,177	4,333	,000	,199	,189
"There is one unchanging truth" Belief (EBS)	,098	,109	,043	,899	,369	,225	,040

$R=0.446$; $R^2=0.199$; Corrected $R^2=0.190$; $F_{(6,509)}= 21,094$; $p=.000$

As can be seen in Table 2, predictor variables, altogether, significantly predicted 19 % of the variance in EDS total scores (R=.446, R^2= .199, $F_{(6,509)}$= 21,094, p<.001). Standardized regression coefficients (β) indicated the following significance order among variables: *planning* (.236), *"Learning depends on ability"* belief (.177), *"Learning depends on effort"* belief (.143), *evaluation* (.095), *"There is one unchanging truth"* belief (.043), and *organization* (.004).

The analysis of *t-test* results conducted to evaluate the significance of regression coefficients indicated that *planning, "Learning depends on ability"* belief, and *"Learning depends on effort"* belief sub-dimensions significantly predicted EDS total scores. However, *evaluation, organization,* and *"There is one unchanging truth"* belief sub-dimensions were not found to significantly predict *entrepreneurial dispositions*.

3.3. MS and EBS sub-dimensions' power of predicting self-confidence scores of EDS

The second multi regression analysis in the present study was conducted to investigate the predictive power of MS and EBS sub-dimensions on *self-confidence* sub-dimension of the Entrepreneurial Dispositions Scale. Analysis results are presented in Table 3.

Table 3. *Multi Regression Analysis Results for Self-confidence Sub-dimension of EDS and Predictor Variables*

Variable	B	Standard Error B	B	T	P	Pair r	Partial R
Constant	5,247	,570		9,198	,000		
Evaluation (MS)	,046	,020	,148	2,318	,021	,293	,102
Organization (MS)	-,014	,036	-,023	-,390	,696	,222	-,017
Planning (MS)	,079	,029	,157	2,692	,007	,294	,118
"Learning depends of effort" Belief (EBS)	,040	,017	,118	2,395	,017	,219	,106
"Learning depends on ability" Belief (EBS)	,049	,019	,110	2,598	,010	,127	,114
"There is one unchanging truth" Belief (EBS)	,019	,024	,039	,795	,427	,185	,035

$R=0.363$; $R^2=0.132$; Corrected $R^2=0.121$; $F_{(6,509)}= 12,86$; $p=.000$

The results presented in Table 3 indicate that predictor variables, altogether, predicted 13 % of the variance in *self-confidence* sub-scale of EDS (R=.363, R^2= .132, $F_{(6,509)}$= 12,86, p<.001). In line with standardized regression coefficients (β), the following order of significance was observed: *planning* (.157), *evaluation* (.148), *"Learning depends on effort"* belief (.118), *"Learning depends on ability"* belief (.110), *"There is one unchanging truth"* belief (.039), and *organization* (.023).

The analysis of *t-test* results conducted to evaluate the significance of regression coefficients indicated that *evaluation* and *planning* sub-dimensions significantly predicted *self-confidence*

scores in EDS. On the other hand, *"Learning depends on effort"* belief, *Learning depends on ability"* belief, *"There is one unchanging truth"* belief, and organization sub-dimensions were not found to be able to meaningfully predict *self-confidence* scores

3.4. MS and EBS sub-dimensions' power of predicting innovation scores of EDS

The third multi regression analysis was conducted to find out the predictive power of MS and EBS sub-dimensions on *innovation* sub-dimension of EDS. Multi regression analysis results for this equation are presented in Table 4.

Table 4. Multi Regression Analysis Results for Innovation Sub-dimension of EDS and Predictor Variables

Variable	B	Standard Error B	B	T	P	Pair r	Partial R
Constant	7,082	,786		9,010	,000		
Evaluation (MS)	,031	,027	,071	1,141	,255	,296	,050
Organization (MS)	-,035	,050	-,040	-,700	,484	,232	-,031
Planning (MS)	,201	,041	,283	4,972	,000	,363	,215
"Learning depends of effort" Belief (EBS)	,069	,023	,142	2,960	,003	,243	,130
"Learning depends on ability" Belief (EBS)	,076	,026	,121	2,922	,004	,139	,128
"There is one unchanging truth" Belief (EBS)	,019	,033	,028	,580	,562	,192	,026

$R=0.414$; $R^2=0.172$; Corrected $R^2=0.162$; $F_{(6,509)}= 17,571$; $p=.000$

It is observed in Table 4 that predictor variables, altogether, predicted 17 % of the variance in *innovation* scores within EDS (R=.414, R^2= .172, $F_{(6,509)}$= 17,571, p<.001). Standardized regression coefficients (β) indicated the following significance order among variables: *planning* (.283), *"Learning depends on effort"* belief (.142), *"Learning depends on ability"* belief (.121), *evaluation* (.071), *organization* (.040), and *"There is one unchanging truth"* belief (.028).

T-test results conducted to evaluate the significance of regression coefficients indicated that *planning, "Learning depends on effort"* belief, and *"Learning depends on ability"* belief sub-dimensions significantly predicted *innovation* scores. On the other hand, *evaluation, "There is one unchanging truth"* belief, and *evaluation* sub-dimensions were not found to significantly predict *innovation* scores.

3.5 MS and EBS sub-dimensions' power of predicting the need for achievement scores of EDS

The predictive power of MS and EBS sub-dimensions on *the need for achievement* sub-dimension of the Entrepreneurial Dispositions Scale was investigated through the fourth multi regression analysis (see Table 5).

Table 5. *Multi Regression Analysis Results for the Need for Achievement Sub-dimension of EDS and Predictor Variables*

Variable	B	Standard Error B	β	T	P	Pair r	Partial R
Constant	6,037	,759		7,954	,000		
Evaluation (MS)	,006	,026	,015	,232	,816	,213	,010
Organization (MS)	,076	,049	,092	1,572	,117	,237	,070
Planning (MS)	,075	,039	,113	1,919	,055	,234	,085
"Learning depends of effort" Belief (EBS)	,031	,022	,069	1,387	,166	,183	,061
"Learning depends on ability" Belief (EBS)	,087	,025	,149	3,483	,001	,185	,153
"There is one unchanging truth" Belief (EBS)	,077	,032	,121	2,438	,015	,239	,107

$R=0.347$; $R^2=0.120$; Corrected $R^2=0.110$; $F_{(6,509)}= 11,616$; $p=.000$

Statistics presented in Table 5 indicate that predictor variables, as a whole, predict 12 % of the variance in *the need for achievement* sub-dimension of EDS (R=.347, R^2= .120, $F_{(6,509)}$= 11,616, p<.001). In line with standardized regression coefficients (β), the following order of significance was observed: *"Learning depends on ability"* belief (.149), *"There is one unchanging truth"* belief (.121), *planning* (.113), *organization* (.092), *"Learning depends on effort"* belief (.069), and *evaluation* (.015).

The analysis of *t-test* outcomes conducted to evaluate the significance of regression coefficients indicated that only *"Learning depends on ability"* belief significantly predicted *the need for achievement* scores of EDS. The remaining variables were not found to be able to meaningfully predict *the need for achievement* scores.

3.6. MS and EBS sub-dimensions' power of predicting locus of control scores of EDS

As for the sixth multi regression analysis, it was conducted to find out the predictive power of *MS* and *EBS* sub-dimensions on *locus of control* sub-dimension of EDS. The results of the analysis are presented in Table 6.

Table 6. *Multi Regression Analysis Results for Locus of Control Sub-dimension of EDS and Predictor Variables*

Variable	B	Standard Error B	β	T	P	Pair r	Partial R
Constant	8,863	,637		13,919	,000		
Evaluation (MS)	,035	,022	,099	1,598	,111	,321	,071
Organization (MS)	,021	,041	,029	,522	,602	,270	,023
Planning (MS)	,106	,033	,182	3,221	,001	,337	,141
"Learning depends of effort" Belief (EBS)	,095	,019	,241	5,038	,000	,328	,218
"Learning depends on ability" Belief (EBS)	,022	,021	,043	1,040	,299	,053	,046
"There is one unchanging truth" Belief (EBS)	-,002	,027	-,003	-,067	,946	,199	-,003

$R=0.426$; $R^2=0.182$; Corrected $R^2=0.172$; $F_{(6,509)}= 18,858$; $p=.000$

It can be observed in Table 6 that all predictive variables, as a whole, predicted 18 % of the variance in *locus of control* sub-dimension of *EDS* (R=.426, R^2= .182, $F_{(6,509)}$= 18,858, p<.001). Standardized regression coefficients (β) indicated the following significance order among variables: *"Learning depends on effort"* belief (.241), *planning* (.182), *evaluation* (.099), *"Learning depends on ability"* belief (.043), *organization* (.029), and *"There is one unchanging truth"* belief (-.003).

Based on *t-test* results which evaluated the significance of regression coefficients, *"Learning depends on effort"* belief and *planning* sub-dimensions were found to significantly predict *locus of control* scores. However, "*Learning depends on ability"* belief, *evaluation, "There is one unchanging truth"* belief, and *organization* sub-dimensions were not found to meaningfully or significantly predict *locus of control* scores.

3.7. MS and EBS sub-dimensions' power of predicting risk taking scores of EDS

The seventh regression analysis in the present study was conducted to find out the predictive power of MS and EBS sub-dimensions on *risk taking* sub-dimension of EDS, the results of which are presented in Table 7.

Table 7. *Multi Regression Analysis Results for Risk Taking Sub-dimension of EDS and Predictor Variables*

Variable	B	Standard Error B	B	T	P	Pair r	Partial R
Constant	7,912	,800		9,888	,000		
Evaluation (MS)	,027	,028	,066	,986	,324	,159	,044
Organization (MS)	-,056	,051	-,066	-1,092	,275	,096	-,048
Planning (MS)	,106	,041	,156	2,559	,011	,190	,113
"Learning depends of effort" Belief (EBS)	,051	,024	,112	2,171	,030	,141	,096
"Learning depends on ability" Belief (EBS)	,041	,026	,069	1,562	,119	,066	,069
"There is one unchanging truth" Belief (EBS)	-,021	,033	-,032	-,615	,539	,069	-,027

$R=0.228$; $R^2=0.052$; Corrected $R^2=0.41$; $F_{(6,509)}= 4,653$; $p=.000$

Statistics presented in Table 7 indicate that predictor variables, as a whole, predict 18 % of the variance in *risk taking* sub-dimension of EDS (R=.228, R^2= .052, $F_{(6,509)}$= 4,653, p<.001). In line with standardized regression coefficients (β), the following order of significance was observed: *planning* (.156), *"Learning depends on effort"* belief (.112), *"Learning depends on ability"* belief (.069), *evaluation* (.066), *organization* (-.066), and *"There is one unchanging truth"* belief (-.032)

The analysis of *t-test* outcomes conducted to evaluate the significance of regression coefficients indicated that none of the variables were able to significantly or meaningfully predict *risk taking* scores.

3.8. MS and EBS sub-dimensions' power of predicting tolerance for ambiguities scores of EDS

As for the seventh multi regression analysis, it was conducted to find out the predictive power of MS and EBS sub-dimensions on *tolerance for ambiguities* sub-dimension of EDS. The results of the analysis are presented in Table 8.

Table 8. *Multi Regression Analysis Results for Tolerance for ambiguities Sub-dimension of EDS and Predictor Variables*

Variable	B	Standard Error B	β	T	P	Pair r	Partial R
Constant	3,370	,460		7,327	,000		
Evaluation (MS)	-,005	,016	-,022	-,347	,729	-,043	-,015
Organization (MS)	,018	,029	,037	,625	,532	,002	,028
Planning (MS)	,001	,024	,003	,046	,963	-,024	,002
"Learning depends of effort" Belief (EBS)	-,053	,014	-,192	-3,880	,000	-,192	-,170
"Learning depends on ability" Belief (EBS)	,099	,015	,278	6,496	,000	,290	,277
"There is one unchanging truth" Belief (EBS)	,005	,019	,014	,273	,785	-,025	,012

$R=0.334$; $R^2=0.118$; Corrected $R^2=0.108$; $F_{(6,509)}= 11,379$; $p=.000$

Statistics presented in Table 8 suggest that predictive variables, altogether, predicted 12 % of the variance in *tolerance for ambiguities* sub-dimension of EDS (R=.334, R^2= .331, $F_{(6,509)}$= 11,379, p<.001). Standardized regression coefficients (β) indicated the following significance order among variables: *"Learning depends on ability"* belief (.278), *"There is one unchanging truth"* belief (.014), *organization* (.037), *planning* (.003), *evaluation* (-.022), *"Learning depends on effort"* belief (-.192).

Based on *t-test* results which evaluated the significance of regression coefficients, *"Learning depends on effort"* and "*Learning depends on ability"* beliefs were found to significantly predict *tolerance for ambiguities* scores. However, *evaluation, organization, planning,* and "*There is one unchanging truth"* belief sub-dimensions were not found to meaningfully or significantly predict *tolerance for ambiguities* scores.

4. Discussion, Conclusion and Suggestions

The present study has found that *planning* dimension of the metacognition scale is able to significantly predict total scores in entrepreneurial dispositions scale. This suggests individuals who effectively plan their learning and activities can better adapt themselves to innovative and entrepreneurial activities. Metacognitive knowledge and reflection skills play an important role during entrepreneurial processes. Independent learners who plan their learning and activities during the learning process can develop as entrepreneurs. In fact, entrepreneurship has been proposed to be among the key competencies necessary for lifelong learning (European Commission/EACEA/ Eurydice, 2016). As such, lifelong learning indicates that possessing planning skills and being engaged in entrepreneurial activities results in societal development. The European Commission (2006) defined entrepreneurship as the ability to transform ideas into action. It is noted that abilities such as creativity, innovation, and risk taking as well as the

ability to plan and manage projects are parts of entrepreneurship. Considering this, it is possible to argue that metacognition, as a framework, is naturally suited to study entrepreneurial behaviours of individuals while they strive to reach their goals. In line with uncertainties and dynamism inherent in entrepreneurship, entrepreneurial contexts can vary significantly from one another which makes it difficult to study entrepreneurial behaviours. Nevertheless, metacognition can help researchers unfold how entrepreneurs cognitively adapt to the events taking place in their surrounding (Haynıe, 2005). Individuals who use planning skills (sub-domain of metacognition), for example, will be better prepared to adapt to novelties which support the findings in the present study. As such, metacognitive awareness allows entrepreneurs to decide on which metacognitive resources they need and the extent of utilizing resources in order to complete a task at hand (Haynie et al., 2010). Likewise, the fact that *planning* sub-dimension investigated in the present study was able to predict total entrepreneurial disposition scores indicate the significance of *planning* in entrepreneurial dispositions. In line with our findings, Pihie et al. (2013) also highlighted the positive relationship between entrepreneurship and *planning*. Additionally, training programs designed for entrepreneurs treat *planning* as one of the basic skills for action learning (Rasmussen and Sørheim, 2006; Kakouris, 2015). On the other hand, the present research found that scores achieved in the *evaluation* and *organization* sub-dimensions of metacognition did not predict participants' entrepreneurial disposition total scores. It is expected that individuals who organize their learning and learning processes will better organize their entrepreneurial activities. In fact, Haynie et al. (2010) found that *organization* and *evaluation* sub-dimensions of metacognition were positively correlated with entrepreneurial skills. In contrast, the findings in the present study showed that scores participants achieved in the *organization* and *evaluation* sub-dimensions of metacognition did not predict entrepreneurial disposition scores. It is possible prospective teachers in the present study did not possess sufficient knowledge, skills, or attitudes necessary to be able to use metacognitive skills which might explain the findings achieved. Therefore, additional training programs can be planned in order to increase pre-service teachers' metacognitive awareness and entrepreneurial skills.

Positive beliefs that science will continue to develop are one of the fundamental qualities that entrepreneurs should possess. The results in this research indicated that *"Learning depends on effort"* and *"Learning depends on ability"* belief scores that participants had significantly and positively predicted their scores in the entrepreneurship disposition scale. Learning is a process that is completed after the following steps; knowing, applying, remembering, and re-applying what has been previously learned. In line with this, it is expected that entrepreneurs would possess the awareness of utilizing knowledge and information that is beneficial to not only themselves but also the society. As such, we can regard epistemology as "an interdisciplinary perspective of critical and especially social analysis that allows processes study of knowledge production, legitimation and reproduction" (Machín Suárez, 2010; as cited in Reyes 2015: 25). From a pragmatic perspective, the value of knowledge and truth is measured with the extent to which they are useful to the entrepreneur (Rodríguez & Opazo, 2009; as cited in Reyes, 2015: 25). Additionally, the belief *"Learning depends on effort"* indicates that the individual seeking to learn new information should be active and aim to keep themselves updated. An entrepreneur is someone who is an active participant seeking to learn new information and develops themselves. Teachers who go through the process of learning to learn and develop themselves would also provide support to their students in becoming independent learners. Likewise, one can argue that both entrepreneurship training and learning should be processes focusing on action, experiences from the real world, and reflection since such processes mirror the processes entrepreneurs go through in real life (Kassean et al., 2015). Such a process, undeniably, requires effort on the learners' side. And it is commonly accepted that entrepreneurship requires effort both at individual and organizational levels. On the other

hand, the scores participants achieved in the *"There is one unchanging truth"* sub-dimension of epistemological beliefs was not found to predict their scores in the entrepreneurial dispositions scale. In fact, this was an expected outcome. This can be explained as following; individuals who believe that there is one unchanging truth would perceive events unidimensional and not be open to different truths or realities. Individuals who are open to alternative facts, truths and realities –on the other hand- have the potential to become entrepreneurs who innovate which is a quality necessary for the society. In their study, Baron et al. (2012) highlighted the positive impacts entrepreneurs make in the business world since such individuals are more competent in developing alternative solutions. This positive educational outcome has been noted to contribute to people's success in their careers and development of high quality social relationships.

Scores achieved in *planning* and *evaluation* sub-dimensions of metacognition have been found to significantly predict scores in *self-confidence* sub-dimension of entrepreneurial dispositions scale. Planning and evaluating self-learning can positively contribute to an individual's self-confidence during the process of learning to think. Individuals who possess planning and evaluating skills are more likely to be self-confident in lifelong learning processes. For example, in their study focusing on problem and project based learning, Lanthony et al. (2018) underlined the positive relationship they found between self-confidences and planning and evaluation skills. Furthermore, the fact that French professional engineers were actively involved in problem-solving processes contributed towards building their autonomy and evaluating themselves. And this situation played a key role in building students' confidence in overcoming problems. This example provides support to the relationship found between *self-confidence* and *planning* and *evaluation*. On a different note, no significant relationship was found between prospective teachers' scores in the *organization* sub-dimension of metacognition and *self-confidence* sub-dimension of entrepreneurial dispositions scale. This outcome might have resulted from the fact that pre-service teachers did not have sufficient awareness in terms of organizing their learning processes which might have directly affected their self-confidence.

Participant scores in *"Learning depends on ability"* and *"Learning depends on effort"* sub-dimensions of epistemological beliefs scale were not found to significantly predict their self-confidence scores within entrepreneurial dispositions scale. Similarly, Künkül (2008) has highlighted individuals who are active and make effort during learning will also be more self-confident. Furthermore, a positive relationship has been found between students' classroom participation levels and classroom atmosphere. On the other hand, Shommer-Aikins & Hutter. (2002) underlined that learning is not an innate ability and it takes place over a long period of time. As such, they considered effort to be a fundamental aspect of entrepreneurial dispositions. However, research to date has yet to document such a relationship among teacher candidates.

The fact that participant scores in *"There is one unchanging truth"* belief sub-dimension did not predict *self-confidence* sub-dimension scores supports entrepreneurial dispositions. This is because entrepreneurs are expected to approach knowledge not as a single and unchanging entity but rather are expected to believe and construct knowledge considering that there could be more than one truth Brownlee (2001) administered a one-year program aimed at developing pre-service teachers' epistemological beliefs in Australia. It has been found that beliefs of teacher candidates enrolled in the program matured and they started accepting that learning takes time to be realized and knowledge is not necessarily absolute. Our findings are in line with Brownlee (2001) findings.

Scores in the *planning* sub-dimension of metacognition was found to significantly predict *innovation* scores within the entrepreneurial dispositions scale. Individuals who plan their

actions during the process of learning to learn are open to novelties and developments. As such, innovation is an important aspect of entrepreneurial disposition and there are two main features of it. The first one is the formation of creative ideas to provide services, produce goods, or develop strategies and/or processes; the second is implementation which involves the realization and practice of creative ideas (Yuan & Woodman, 2010). Starting an entrepreneurial activity by planning is important in terms of functionality and generating creative and innovative ideas. Likewise, the results of the present study support this claim. On the other hand, *organization* and *evaluation* sub-dimensions of metacognition were not found to predict *innovation* sub-dimension of entrepreneurship. Learners who organize and evaluate their learning are expected to be more open to novelties and innovations since such a quality will positively impact on lifelong learning. Nevertheless, such a relationship was not observed in the data collected from pre-service teachers in this study. One of the reasons for this outcome could be the fact that higher order thinking skills and processes are not sufficiently included in teacher training programs within education faculties in Turkey which might have prevented the development of a thinking culture.

Participant scores in *"Learning depends on effort"* and *"Learning depends on ability"* sub-dimensions of the epistemological beliefs scale were found to meaningfully predict scores in the *innovation* sub-dimension of the entrepreneurial dispositions scale. This outcome is in line with the lifelong learning cycle of entrepreneurship. To give an example, two separate studies conducted by Chan (2003) in Hong Kong compared university students' epistemological beliefs and learning approaches. The study found that students who possessed developed epistemological beliefs were more deeply engaged in learning activities and exerted more efforts and this situation enabled students to become more open to novelties and innovations. Our findings in this study are in line with those of Chan's (2003). Parallel to that, it was also found that scores pre-service teachers achieved in *"There is one unchanging truth"* sub-dimension of the epistemological beliefs scale were not able to predict their scores in the *innovation* sub-dimension of entrepreneurial dispositions scale. Being able to perceive that multiple truths exist and regulate one's dispositions and behaviour accordingly is closely associated with entrepreneurship and being able to follow innovations. In fact, epistemological beliefs refer to an individual's belief with regards to nature and how individuals learn (Brownlee, 2004). And such beliefs are necessary to be able to approach topics with a multidimensional perspective and follow innovations which our findings in this study support.

"Learning depends on ability" sub-dimension of epistemological beliefs scale predicted *the need for achievement* sub-dimension of entrepreneurial dispositions scale. The process of learning starts with birth and learning is an ability that keeps developing. In such processes, considering each learning experience will lead to another one, teacher candidates should experience *the need for achievement* and, in line with this, should continuously strive to update themselves. The fact that a significant correlation was found between the ability to learn and *the need for achievement* supports this assertion. On a different not scores for the *"There is one unchanging truth"* sub-dimension did not predict scores in *the need for achievement* sub-dimension. Being open to multiple truths and realities can positively impact on pre-service teachers' success in life. Likewise, Dawson et al. (2013) underlined individuals who become successful in life are those who are open to multiple realities and update themselves. Our findings provide support to this claim. Nevertheless, it should be noted that scores in the *"Learning depends on effort"* sub-domain did not predict scores in *the need for achievement* sub-domain.

Another finding worth noting in the present research is that there was not a significant relationship between *planning, organization,* and, *evaluation* dimensions of metacognition and *the need for achievement*. Pre-service teachers who are actively engaged in the process of

learning to think should continuously experience *the need for achievement*. This is because such needs render learners active during entrepreneurial activities. Nevertheless, our findings did not support this assumption. One possible explanation for this outcome could be that prospective teachers did not sufficiently take part in hidden curriculum activities as part of lifelong learning. Therefore, including more hidden curriculum activities in relation to entrepreneurship within teacher training programs in education faculties in Turkey can be useful.

Scores in *planning* sub-dimension of metacognition and *"Learning depends on effort"* sub-dimension of epistemological beliefs predicted scores in *locus of control* sub-dimension of entrepreneurial dispositions scale. Being able to plan an activity in detail and starting the activity requires *locus of control*. Similarly, it has been highlighted that controlled regulation of entrepreneurial activities includes planning processes and skills (Hrbáčková et al., 2012) which support findings of the present study. The learning process is shaped by individual effort and action. Therefore, an individual who is engaged in learning should have control over their actions. Consequently, it was an expected outcome that scores in the *locus of control* dimension of entrepreneurial dispositions would be predicted by scores in *"Learning depends on effort"* dimension of epistemological beliefs.

"Learning depends on ability" and *"There is one unchanging truth"* dimensions of epistemological beliefs scale were not successful in predicting outcomes in *locus of control* dimension of entrepreneurial dispositions scale. It is expected that entrepreneurs who have *locus of control* would be more open to multiple truths rather than accepting that there is one unchanging truth. As such, individuals who accept multiple truths exist are more likely to have locus of control in their life and our findings support this assertion. On the other hand, *evaluation* and *organization* dimensions of metacognition were not found to predict outcomes in *locus of control* dimension of entrepreneurial dispositions. Normally, it is expected that entrepreneurs who have *locus of control* will have *organization* and *evaluation* skills that can be utilized during the process of learning. For example, Fayolle & Degeorge (2006) noted that individuals who possessed *organization* and *evaluation* skills had *locus of control* in relation to their actions during learning processes. This, however, was not supported by the data collected in this study.

None of the sub-dimensions within the metacognition and epistemological beliefs scales were able to predict outcomes in *risk taking* sub-dimension of entrepreneurial dispositions. Entrepreneurs are expected to be not afraid of risk taking in life which is closely associated with *planning, organization,* and *evaluation* sub-dimensions of metacognition. Individuals should not be afraid of taking risks during the process of thinking to think and exerting effort. On the other hand, Erbas & Bas (2015) have failed to document a significant relationship between *risk taking, creative skills,* and *metacognitive awareness skills*. Although their research findings support the findings in our study, studies are available in the literature which has found a positive relationship between *risk behaviours* and *metacognitive awareness skills*.

Scores in the *tolerance for ambiguities* sub-dimension of the entrepreneurial dispositions scale were predicted by participant scores in *"Learning depends on ability"* and *"Learning depends on effort"* dimensions of the epistemological beliefs scale. Epistemological beliefs include positive and matured beliefs towards science which allow entrepreneurs to tolerate uncertainties and adapt to the changing world around them. It should not be forgotten that the only thing that does not change is change itself. Such a process requires individuals to be tolerant whilst organizing their actions. In line with this, Butler, Doktor & Lins (2010) found positive correlations between *"Learning depends on effort"* and *"Learning depends on ability"* dimensions and *tolerance for ambiguities* skills. Our findings provide support for theirs.

Additionally, scores in *"There is one unchanging truth"* dimension were not found to predict scores in *tolerance for ambiguities* dimension. Entrepreneurs should always be open to multiple truths and consider alternative possibilities in life. And this is closely associated with the belief that there is not one unchanging truth and uncertainties are continuous. Our findings, in this sense, support this assumption. Likewise, in their research McMullen & Shepherd (2006) highlighted the positive relationship between individuals' perceptions of multiple truths in life and their tolerance for ambiguities.

Scores in *tolerance for ambiguities* were not predicted by scores in *planning, organization,* or *evaluation* dimensions of metacognition scale. This was not an expected outcome. For example, in their study Kertz & Woodruff-Borden (2013) found that individuals who possess metacognitive awareness skills were able to better adapt to unexpected situations. In fact, individuals who *plan, organize*, and *evaluate* their actions can adapt to new circumstances when faced with uncertainties. One of the reasons for this outcome could be that prospective teachers in the present study did not have sufficient learning/teaching experiences with regards to metacognition and entrepreneurial skills.

It is expected that prospective teachers would possess entrepreneurial skills, matured epistemological beliefs, and metacognitive skills in order to be successful in life. Teachers who possess those characteristics will become independent learners who continuously update themselves. The present study documented significant correlations between different sub-dimensions that were investigated. In line with the results of the study, training programs in which pre-service teachers can develop their metacognitive awareness skills to develop entrepreneurial dispositions can be offered to them. Additionally, entrepreneurial activities where teachers are tasked with responsibilities can be organized in order to develop pre-service teachers' epistemological beliefs.

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