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### Multilevel analysis of entrepreneurial intention of engineering graduating students in Ethiopia

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#### ABSTRACT

Recently, entrepreneurship has been given serious devotion due to its importance on economic growth, job creation, sources of innovation and productivity. So, this paper aims to identify the determinants of entrepreneurial intention of engineering graduating students in Ethiopia. Stratified sampling technique was employed and data were collected via questionnaire from 921 students from the target population. The study utilized regression statistics to analyze the data. The data used for this study is hierarchally structured and hence multilevel binary logistic model was used to identify the relationship between predictor and outcome variables by taking into account both level-1 (students' characteristics) and level-2 (universities characteristics) in regression relationships. The model result founds that personal attitude, perceived educational and relational support are the significant predictors of entrepreneurial intention of students at 5% level. The policymakers should facilitate entrepreneurship trainings to change attitude of students and strength the cooperation between students and fund raisers.

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#### **KEYWORDS**

Multilevel analysis: rearession models: entrepreneurial intention; cluster data; students

#### 1. Introduction

Recently, entrepreneurship has been given serious devotion due to its importance on economic growth, job creation, sources of innovation and productivity (Urbano & Aparicio, 2015). It has captured the attention of both scholars and policy makers during the last decades. The main reason of this concern is the growing need for entrepreneurs who accelerate economic development through generating new ideas and converting them into profitable ventures. Entrepreneurial activities are not only the incubators of technological innovation; they also provide employment opportunity and increase competitiveness. Thus, developing countries like Ethiopia encourages students to be involved in entrepreneurship and consider entrepreneurship as a career choice. Because entrepreneurship is important to economic advancement, employment as well as a solution to the excessive number of university graduates and social problems.

Many studies on college students' intention to become entrepreneur have been conducted. Students may have different attitude and can react differently on the expected entrepreneurial behavior. Perhaps they can exhibit positive or negative attitude toward

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entrepreneurship depending on their background and other traits. If the students have positive attitudes toward entrepreneurship, it is likely that after graduation they will start their own business. Conversely, if they form negative attitude, likely they will not become self-employed. In general, individuals desiring more income, more independence, and more net perquisites have high tendency to engage in entrepreneurship (Fitzsimmons & Douglass, 2005). Scholars are trying to identify the contributing risk factors of student's entrepreneurial intention for their future career. The willingness in becoming entrepreneurship is determined by some other factors such as family, motivation, risk taking propensity or the courage to take a risk, and self-concept as individual factor (Belas & Kljucnikov, 2016; Herdjiono, Puspa, Maulany, & Aldy, 2017; Tyszka, Cieślik, Domurat, & Macko, 2011). Family environment and all conditions within its family including how parents educate, family member's relation, house condition, family's financial condition, parents understanding, and cultural background will support, guide, and encourage children to their future life. This is consistent with a research done by Lindquist, Sol, and Van Praag (2015), Fatoki (2014) whom states that family environment gives positive influence on the willingness in entrepreneurship. Social factors have also an encouraging or impeding effect on the intention of individuals for entrepreneurial career. Family background, education, previous work experience, risk attitude, over-optimism, preference for independence, and the norms and values of a society influence the choice of individual's life careers, i.e., entrepreneurship or salaried employment (Sanditov & Verspagen, 2011).

Unemployment occurs due to many factors, one of them is because of the limitation of job opportunities. Nowadays, many college graduates prefer to work as employee in a company or becoming government employee. It means that they are a job seeker instead of a job creator. Only few of them think to create self-employment or become entrepreneur due to lack of confidence in their skill and capital (Herdjiono et al., 2017). Other researchers pointed out that an individual with higher tolerance for risk and less aversion to work effort should be expected to be more likely to engage in entrepreneurial behavior (Ayalew & Zeleke, 2018; Bezzina, 2010; Douglas & Shepherd, 2002). Nguyen (2017) also studied entrepreneurial intention among international business students in Vietnam. The result of the study confirms that attitude towards entrepreneurship and perceived behavior control is positively related to entrepreneurial intention.

Different scholars have shown the effect of student-related predictor variables on entrepreneurial intention using different models. But the entrepreneurial intention of student is not only affected by student-related variables but also affected by so many external factors. For instance, perceived structural support, business counseling, perceived educational support, perceived relational support, availability of funds by fund raisers, etc. can affect the entrepreneurial intention of students. So, to know the contributing risk factors of entrepreneurial intention of students, this research work considers both student level-related variables and university-related variables. This implies the data we considered for this research work has a hierarchical structure, i.e., students are clustered within university. Traditional "single level" models used by previous scholars fail when data are hierarchically structured, because the assumption of independence of observations conditional on the explanatory variables is violated. The nested structure causes so called "intraclass dependency" among the observations within units at the higher level of the hierarchy. The multilevel binary logistic regression analysis considers the variations due to hierarchy structure in the data. It allows the simultaneous examination of the effects of group level and individual level variables on outcomes while accounting for the non-independence of observations within groups. Also, this analysis allows the examination of both between group and within group variability as well as how group level and individual level variables are related to variability at both levels.

Therefore, it is important to know the factors that influence students' intentions to launch a new start-up or entrepreneurship effort at student level characteristics and university level characteristics. There are still limited researches on this issue even though entrepreneurship has been viewed as essential to economic development and growth (Fayolle & Gailly, 2013; Karimi et al., 2014). In relation to this, there is a call to conduct a research to understand the determinants of students to involve in entrepreneurship and also to contribute to the development of understanding in this area. This study can help governmental institutions, agencies, academic, entrepreneurial educators, consultants, and advisors to find the appropriate solutions to foster entrepreneurship in universities and consequently in the society.

#### 2. Literature Review and hypotheses

#### 2.1. Perceived educational support and entrepreneurial intention

Perceived educational support has been recognized as a determinant of entrepreneurial intention. Previous researchers agree that entrepreneurial educational support through professional education in universities is an efficient method to equip the students with necessary knowledge about entrepreneurship (Ayalew & Zeleke, 2018, Mumtaz et al., 2012; Turker & Selcuk, 2009). Entrepreneurship education also influences students' career choice (Peterman & Kennedy, 2003). In order to survive in today's intensified business world, the university is required to play a key role in promoting entrepreneurship. A study conducted among university students in Turkey found that university education has a positive impact on entrepreneurial intention (Turker & Selcuk, 2009). Turker and Selcuk (2009) argue that entrepreneurship education is resourceful for acquiring knowledge on entrepreneurship. This is consistent with the cross-cultural study conducted by Moriano, Gorgievski, Laguna, Stephan, and Zarafshani (2012). Similar study has been conducted in Malaysia found that appropriate entrepreneurship education exposure will influence the students to be an entrepreneur (Mumtaz et al., 2012). The study by Autio, Keelyey, Klofsten, and Ulfstedt (1997) that investigated entrepreneurial intention of university students in various cultural contexts indicated also that the encouragement from university environment affects the entrepreneurial confidence of university students. This is supported by the study done by Wang and Wong (2004) who pointed out that entrepreneurial dreams of many students are hindered by inadequate preparation of the academic institution. The school and education system also play a critical role in identifying and shaping entrepreneurial traits (Ibrahim & Soufani, 2002). Other studies have pointed out that entrepreneurship education, especially education that provides technological training, is crucial to enhance entrepreneurs' innovation skills in an increasingly challenging environment (Kuratko, 2005; Galloway & Brown, 2002). They stated in their research as proper entrepreneurship education exposure will enables students to have positive attitudes towards choosing

entrepreneurship as a career. University education plays strong role in promoting entrepreneurship as a career choice by providing necessary exposure through theoretical and practical knowledge about entrepreneurship. Thus, it can be hypothesized that:

# Hypothesis 1: Perceived educational support has a positive impact on entrepreneurial intention.

#### 2.2. Personal attitude and entrepreneurial intention

It represents the person's way of evaluating and comparing an object against the available options with the basis of on an individual's thought (cognition), belief (values) and emotions (affection) towards the object (Hover & MacInnis, 2004). In the literature, some scholars have investigated the influence between entrepreneurial attitudes on students' entrepreneurial intentions. For instance, Nguyen (2017) has studied entrepreneurial intention among international business students in Vietnam. The result of the study confirms that attitude towards entrepreneurship and perceived behavior control is positively related to entrepreneurial intention. On the contrary, subjective norm fails to generate a significant impact on entrepreneurial intention. A research done by Kristiansen and Indarti (2004) also pointed out that access to information and finance are also an important element for the intention to establish a new business. This may be achieved through effective communication whereby information is captured properly and feedback is provided. High achievements on creativity and prior entrepreneurial experiences have also a direct relationship with entrepreneurial preferences, whereas perception of failure has an indirect influence (Davey, Plewa, & Struwig, 2011; Hamidi, Wennberg, & Berglund, 2008; Okpara, 2007). The approaches of entrepreneurial intention studies focus on personal characteristics (risk-taking, propensity, tolerance for ambiguity, internal locus of control, innovativeness and independence) and motivational factors (love for money, desire for security and desire for status), rather than the differences in contextual factors (Ang & Hong, 2000; Henderson & Robertson, 2000; Wang & Wong, 2004). Other researchers also pointed out that students who seek information and opportunity are more likely to be self-employed than non-seekers (Hamidi et al., 2008). Furthermore, creativity and problem-solving skills are also among the most important determinants of entrepreneurial intention among undergraduate university students. The finding of previous studies shows that students who have high level of creativity and problem-solving skills have the highest intention to be self-employed (Hamidi et al., 2008; Ismail, Jaffar, & Hooi, 2013; Okpara, 2007). The study of Turker, Onvural, Kursunluoglu & Pinar (2005) also considered the impacts of both internal factors (motivation and self-confidence) and external factors (perceived level of education, opportunities, and support) on entrepreneurial propensity of university students. The study found that two internal factors and perceived level of support were statistically significant factors. Thus, it leads to the following hypothesis:

Hypothesis 2: Personal attitudes has a positive impact on entrepreneurial intention.

- **Hypothesis 2a**: information and opportunity seeking ability has a positive impact on entrepreneurial intention.
- Hypothesis 2b: creativity and problem-solving skill has a positive impact on entrepreneurial intention.
- Hypothesis 2c: self-confidence and self-esteem has a positive impact on entrepreneurial intention.
- Hypothesis 2d: networking and professional contacts has a positive impact on entrepreneurial intention.
- Hypothesis 2e: goal setting has a positive impact on entrepreneurial intention.
- Hypothesis 2f: achievement and instrumental readiness has a positive impact on entrepreneurial intention.

#### 2.3. Perceived Relational support and entrepreneurial intention

Relational support refers to the approval and support from the family, friends, and others to involve in entrepreneurial activities (Turker & Selcuk, 2009). Family and friends are the person that have a great influence on individual career choice because they are considered as fund providers and role models. Therefore, the support of family and friends is likely to affect one's career selection. It is found in the literature that the role of friends and role models is prominent in influencing the decisions to become an entrepreneur (Nanda & Sorensen, 2010). The importance of the role models on the inclination towards entrepreneurship is widely discussed in the literature (e.g., Karimi et al., 2013; Kirkwood, 2007). This is due to the fact that the role models often provide the necessary information, guidance, set a good example, and support (Postigo, Iacobucci, & Tamborini, 2006). By having a good example and support, the students are more prone and confident to become an entrepreneur. This will also motivate and inspire the individual to become a successful entrepreneur. The study conducted among young Australians concluded that friends significantly influence their decision to start a business (Nanda & Sorensen, 2010; Sergeant & Crawford, 2001). It is also found that, the support from family, friends and close network among 425 Turkish university students were positively influenced their decision to become an entrepreneur (Yurtkoru, Kuşcu, & Doğanay, 2014). Similarly, Altinay, Madanoglu, Daniele, & Lashley (2012) in a study of university hospitality students in the UK found that, family entrepreneurial background positively related to entrepreneurial intention. Supporting these, Zapkau, Schwens, Steinmetz, and Kabst (2015) also found that the parental role models positively influence entrepreneurial intention. Students who came from businessowned family are more likely to have entrepreneurial intention compared to students who came from non-business-owned families (Ayalew & Zeleke, 2018). The reason might be that they may have prior business experience from families. The experience gained from their family member may influence the students' engagement in entrepreneurship. This is in agreement with the findings in other studies (Dohse & Walter, 2012; Fitzsimmons & Douglass, 2005; Robson, 2015; Sanditov & Verspagen, 2011). In addition, availability of finance/capital is also regarded as one of the common obstacle to establish a new business (Kristiansen & Indarti, 2004). Access to finance is the ability of the individuals to find financial support to establish a business since most of the investors and banks are not willing to make investments in new ventures. Family background is

also taken into account as a factor affecting entrepreneurial intention. For instance, the study of Henderson and Robertson (2000) showed that family was the second factor influencing career choice of respondents after their personal experience. Based on these findings, it can be hypothesized that:

# Hypothesis 3: Perceived relational support has a positive impact on entrepreneurial intention.

Hypothesis 3a: family business background has a positive impact on entrepreneurial intention.

Hypothesis 3b: business experience has a positive impact on entrepreneurial intention. Hypothesis 3 c: access to finance has positive impact on entrepreneurial intention.

#### 2.4. Socio- economic factors and entrepreneurial intention

Social factors have an encouraging or impeding effect on the intention of individuals for entrepreneurial career. Family background, education, previous work experience, risk attitude, over-optimism, preference for independence, and the norms and values of a society influence the choice of individual's life careers, i.e., entrepreneurship or salaried employment (Sanditov & Verspagen, 2011). In related study, other scholars also confirmed that family business background, subjective norm, and perceived behavioral control significantly predicts students' interest in entrepreneurship (Osakede, Lawanson, & Sobowale, 2017). Entrepreneurship is historically associated with risk taking. In the literature on entrepreneurship, thus, entrepreneurs are generally characterized as having a greater propensity to take risks than other groups (Cromie, 2000; Thomas & Mueller, 2000). Based on this finding, it can be hypothesized that:

## Hypothesis 4: socio-economic factors have a positive impact on entrepreneurial intention of students.

Hypothesis 4a: means of finance has an impact on entrepreneurial intention.

Hypothesis 4b: Risk taking commitment has an impact on entrepreneurial intention.

Hypothesis 4c: colleagues business background has an impact on entrepreneurial intention.

Hypothesis 4d: family occupation has an impact on entrepreneurial intention.

Hypothesis 4e: clear future business idea has an impact on entrepreneurial intention

**Hypothesis 4f**: discouragement by external environment has an impact on entrepreneurial intention.

#### 2.5. Demographic factors and entrepreneurial intention

Many scholars study the relationship between demographic factors such as gender, age, marital status, etc. and entrepreneurial intentions. Their studies have explained the variation in entrepreneurial activity across countries by using a variety of determinants, mainly individual and economic factors that have received greater attention in the entrepreneurship literature (Thornton, Ribeiro-Soriano, & Urbano, 2011). Thus, many empirical studies have found evidence of a significant relationship between the probability of being or becoming an entrepreneur and individual attributes such as age, gender and education. Thus, many empirical studies have found evidence of a significant relationship between the probability of being or becoming an entrepreneur and individual attributes such as age, gender and education. The effect of gender on the probability of becoming an entrepreneur is demonstrated in several previous studies which found that males show a higher level of interest than females in creating new businesses (Minniti, Bygrave, & Autio, 2005; Mueller, 2004). Thus, women are less attracted to entrepreneurial activity than men. Moreover, scholars indicate that gender influences both preference and actual engagement in entrepreneurial activity (Minniti et al., 2005; Reynolds, Bygrave, Autio, Cox, & Hay, 2002). More recently, Liang, Wang, and Lazear (2018) even confirmed an inverted U-shaped relationship between entrepreneurship and age due to the fact that in spite of business skills increasing with experience, creativity may decline with age. Their model also implies that older societies have lower rates of entrepreneurship at every age. Wang and Wong (2004) also explained entrepreneurial interest of students in Singapore based on personal background. The study reveals that gender, family business experience, and education level are significant factors in explaining entrepreneurial interest. The study of Henderson and Robertson (2000) also provided a useful insight into perception of young adult on entrepreneurship. The study shows that the respondents perceived entrepreneurs mostly with their innate characteristics. However, most of them thought that entrepreneurial traits should be nurtured by external factors.

Based on these findings, it can be hypothesized that:

#### Hypothesis 5: demographic factors are associated with entrepreneurial intention.

**Hypothesis 5a**: gender has an impact on entrepreneurial intention. **Hypothesis 5b**: age has an impact on entrepreneurial intention.

#### 2.6. Theoretical Framework

The purpose of this study is to identify the determinants of students' entrepreneurial intention to be an entrepreneur. In the light of the above literature review, the theoretical framework in this study depicted in Figure 1.



Figure 1. Theoretical framework.

#### 3. Methodology

#### 3.1. Research design

This study was carried out through a survey method, using questionnaires as the main instrument. The population for this study was final year undergraduate engineering students in Bahir Dar University (BDU), Debre Markos University (DMU) and University of Gondar (UoG) in Ethiopia in 2016/2017 academic session. These groups of students were chosen because they were suitable to conduct a research on entrepreneurial intention of students as they were facing important career decisions on completion of their studies, of which entrepreneurship could be one of them. Data were collected using a closed-ended self-administered questionnaire from a sample students selected from target population of final year undergraduate engineering students in the academic year 2016/2017. The sample size was determined using Yamen's formulae (Yamane, 1967) at a 5% level of precision. The formulae is given here below.

$$n = \frac{N}{1 + N(e)^2} \tag{1}$$

Where n is the required sample size, N is the total number students for each university, and e is the level of precision.

Concretely, 991 students in UOG, 908 students in DMU and 2428 students in BDU were actively enrolling in 2016/2017 academic session. Using the equ (1), the estimated sample size for each university was 285 for UoG, 278 for DMU, and 344 for BDU (total, 907).

A stratified sampling technique was employed to identify the final participant from their respective departments. Samples were grouped in terms of their department. With proportionate stratification, the required sample size for each department is also determined by Cochran's (1979) formulae at 5% level of precision. The equation is given here below.

$$n_i = n \cdot \frac{N_i}{N} \tag{2}$$

Where *n* represents total sample size,  $N_i$  represents population size of the i<sup>th</sup> strata and *N* represents the population size.

Accordingly, 287 Civil Engineering, 129 Electrical Engineering, 118 Mechanical Engineering, 176 Hydraulic and Water Resource Engineering, 14 Industrial Engineering, 77 Chemical Engineering, 30 Computer Engineering, 8 Food Technology and Process Engineering, 14 Architecture and 54 Construction Technology Management

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Engineering students were selected and participated in the study. The sample size required in this study was 907 students. However, this study involved 921 final year university students who were registered for various engineering degrees. The collected data were analysed through SPSS.

The response variable of this study was entrepreneurial intention of students and the independent variables are student-level variables (perceived educational support, perceived relational support, entrepreneurial attitudes, socio-economic characteristics and demographic factors) and university-level variables. For the purpose of this study, the dependent variable classified students as who have entrepreneurial intention and who do not have intention. The dependent variable (entrepreneurial intention) and the predictor variables, i.e., personal attitudes of respondents were measured by providing five -point Likert scale item, ranging from "1 = strongly disagree to 5 = strongly agree."

#### 3.2. Structural Model

The analytical method used in this research is multilevel binary logistic regression model with two levels. In this research, we considered three multilevel regression models.

#### 3.2.1. Empty model

The empty two-level model for a dichotomous outcome variable refers to a population of groups (level-two units, i.e., university)) and specifies the probability distribution for group-dependent probabilities without taking further explanatory variables into account. This model only contains random groups and random variation within groups. It can be expressed with logit link function as follows.

$$logit[Pr.(Y_{ij}=1)] = \beta_0 + \emptyset_{0j}$$
(3)

Where:  $\emptyset_{0j} \cap IID(0, \sigma_{\emptyset}^2)$ ,  $\sigma_{\emptyset}^2$  is the variance in the population distribution, and therefore the level of heterogeneity of observations in the data structure and  $\emptyset_{0j}$  is the random deviation from this average for group j. It means that the random effect of being in group j on its within observations (on the log-odds that Y = 1); also known as a level 2 residual.

#### 3.2.2. Fixed- effect model

The fixed effects binary logistic regression for two-level model for data obtained from N individuals (students), nested within J groups (universities), each containing  $N_J$  individuals, is specified as follows. For each group j (j = 1, 2...J), the Level-1 or withingroup model is given by:

$$logit[Pr.(Y_{ij}=1)] = X'\beta + \emptyset_{0j}$$
(4)

Where:  $\emptyset_{0j} \cap HD(0, \sigma_{\emptyset}^2)$ , Y is an N  $\times$  1 a vector of observations for the response variable, X is an N  $\times$  K matrix of fixed effect predictors,  $\beta$  is a K  $\times$  1 vector of fixed effect regression coefficients,  $\emptyset_{0j}$  is the effect of being in group j on the log-odds that Y = 1; also known as a level-2 residual,  $\sigma_{\emptyset}^2$  is the level-2 (residual) variance, or the between-group variance in the log-odds that Y = 1 after accounting for X.

#### 3.2.3. Random effect model

Let  $Y_{ij}$  denote the binary response variable measured on the i<sup>th</sup> subject within the j<sup>th</sup> cluster ( $i = 1 \dots N_{j}$ ;  $j = 1 \dots J$ ).  $Y_{ij} = 1$  denotes success or the occurrence of the event, while  $Y_{ij} = 0$  denotes failure or lack of occurrence of the event. Furthermore, let  $X_{1ij}$ , through  $X_{kij}$  denote the k fixed effect predictor or explanatory variables measured on this subject (i.e., students' characteristics). Finally, let  $Z_{1j}$ , through  $Z_{mj}$  denote the m random effect predictor variables measured on the j<sup>th</sup> cluster (i.e., university characteristics). Now, the model is specified as follows.

$$logit[Pr.(Y_{ij} = 1)] = X'\beta + Z'\alpha + \emptyset_{0j}$$
(5)

Where:  $\emptyset_{0j} \cap IID(0, \sigma_{\emptyset}^2)$ , Y is an N  $\times$  1 a vector of observations for the response variable, X is an N  $\times$  K matrix of fixed effect predictors,  $\beta$  is a K  $\times$  1 vector of fixed effect regression coefficients, Z is an N  $\times$  m matrix of random effect predictors,  $\alpha$  is an m  $\times$  1 vector of random effect regression coefficients and  $\emptyset_{0j}$  is an N  $\times$  1 vector of observation for random error terms.

#### 3.3. Estimation Techniques

In this paper, Maximum likelihood and Bayesian estimation methods are used for estimating the fixed components and variances of the random components in hierarchical models.

#### 3.3.1. Classical Approach

The likelihood of *n* independent measurements, given vectors of parameter  $\theta$  (unknown parameter  $\beta and \emptyset_{0i}$ ) and explanatory variables  $X_i$  is expressed generally as:

$$P(Y/\theta, X) = \prod_{i=1}^{n} \left( \frac{e^{X'\beta + \emptyset_{0j}}}{1 + e^{X'\beta + \emptyset_{0j}}} \right)^{y_i} \left( 1 - \frac{e^{X'\beta + \emptyset_{0j}}}{1 + e^{X'\beta + \emptyset_{0j}}} \right)^{(1-y_i)}$$
(6)

#### 3.3.2. Bayesian Approach

Mathematically, Bayesian inference was formulated as follows. The parameters  $\theta$  are unknown and thus have their own prior distribution, P ( $\theta$ ). The prior distribution is (Gelman et al., 2004) is defined as

$$P(\theta_j) = \frac{1}{\sqrt{2\pi\sigma_j^2}} exp\left\{\frac{-1}{2}\left(\frac{\theta_j - \mu_j}{\sigma_j}\right)^2\right\}$$
(7)

and the posterior distribution,  $P(\theta/Y)$ , can be obtained by mathematically combining the likelihood and prior with the use of Bayes' Theorem. The result is as follows.

$$P(\theta/y) \propto P(y/\theta) * P(\theta)$$

$$= \prod_{i=1}^{n} \left( \frac{e^{X'\beta + \emptyset_{0j}}}{1 + e^{X'\beta + \emptyset_{0j}}} \right)^{y_i} \left( 1 - \frac{e^{X'\beta + \emptyset_{0j}}}{1 + e^{X'\beta + \emptyset_{0j}}} \right)^{(1-y_i)} * \frac{1}{\sqrt{2\pi\sigma_j^2}} exp\left\{ \frac{-1}{2} \left( \frac{\theta_j - \mu_j}{\sigma_j} \right)^2 \right\}$$

$$\tag{8}$$

The parameters of the fixed and random components were estimated based on Markov Chain Monte Carlo (MCMC) simulation techniques using Random-walk Metropolis-Hastings sampling. Samples from the posterior distribution are repeatedly taken, creating a distribution of sampled values. The samples are then compiled into a distribution used as the posterior. The sampling process starts with a single value and iteratively converges to the posterior. Multiple starting values are used to produce separate "chains" of resampling. These chains are then combined after thousands of iterations. With enough samples the empirical posterior will approach the mathematical posterior. To determine if enough sampling has occurred, visually monitoring the chains for convergence is recommended. This is accomplished by plotting the sampled values of each chain. If all values fall within a consistent range, then convergence to the posterior distribution has been achieved. As a result of sampling variability within chains, parameter estimates for the exact same data may not be identical if the same analysis is conducted again. For each model, three chains of 12,500 iterations were set up in the software and 2,500 iterations were used in the burn-in step. Convergences of the models were checked by monitoring the MCMC trace plots (time series, Density, autocorrelation, Gelman Rubin) for the model parameters: if all values were within a zone without strong periodicities or tendencies, the model was considered convergent.

#### 4. Data Analysis and Results

#### 4.1. Descriptive results

As mentioned previously, this study involved 921 final year undergraduate university students who enrolled in various engineering programs. Table 1 presents the demographic characteristics of the respondents. The descriptive result revealed that about 57.4% of the students have an entrepreneurial intention while 42.6% do not have. The majority of the respondents about 56.94% of females and 59.07% of males do have entrepreneurial intention. In terms of entrepreneurship education, a majority of respondents who took entrepreneurship and business-related courses/training do have entrepreneurial intentions, 59.77%. Those respondents who made networks with entrepreneurs (61.81%) have intentions to start business in their future careers. The distribution of student's family occupation is also different in terms of entrepreneurial intention. That is, 63.54% of the students in which their families are governmental employee have an entrepreneurial intention. Most of the students do not have any exposure to business. 61.22% of the respondents who tried their own business before have an entrepreneurial intention. Similarly, 61.11% of the students who came from families who currently run their own business have an intention to engage in entrepreneurial activity. The respondents also breakdown in terms of whether or not they have capital access; 61.33% of the students who have access to finance have an intention to start business. The majority of students are risk takers. From this risk takers, 60.11% of them have an entrepreneurial intention. The majority of students who have clear ideas what kind of business they want to do in the future (61.64%) have entrepreneurial intention. Moreover, 61.33% of the respondents who gather information about business have an entrepreneurial intention. Lastly, higher percentage (64.8%) of respondents who know number of entrepreneurs have an intention to engage in entrepreneurial activity.

S. No.	Variables	Description of Variables	Code/level of Categories
	IOS	Information and Opportunity seeking factor score	None
	CPS	Creativity & problem-solving skill factor score	None
	AIR	Achievement and instrumental readiness factor score	None
	DEE	Discouragement by external environment factor score	None
	SCSE	Self-confidence and self-esteem factor score	None
	GS	Goal setting factor score	None
	SP	Systematic planning factor score	None
	BOF	Business owned family	1 = yes, 2 = no
	PBE	Previous business experience with family	1 = yes, $2 = no$
	BOC	Business owned colleague	1 = yes, $2 = no$
	AF	Access to finance/capitals	1 = yes, $2 = no$
	IG	Information gathering	1 = yes, 2 = no
	CFBI	Clear future business ideas	1 = yes, $2 = no$
	RTC	Risk taking commitment for a career decision	1 = yes, 2 = no
	N_E	Networking with entrepreneurs	1 = yes, 2 = no
	NERK	No. of Entrepreneurs respondents know	1 = not at all, $2 = $ less than 2, $3 = 2$ up to 4, $4 = $ above 4
	PO	Parent's occupation	1 = agriculture, 2 = gov't employee,3 = private business owned, 4 = others
	MFSB	Means of finance for a career business	1 = family, 2 = colleague, 3 = micro finance, 4 = inheritance, 5 = others
	EE	Entrepreneurship education/trainings	1 = yes, 2 = no
	BC	Business counselling	1 = yes, 2 = no
	SBIE	Sharing of business ideas and experiences by invited guests	1 = yes, 2 = no

Table 1. Description of predictor variables.

#### 4.2. Factor analysis and reliability analysis

A pilot study was carried out to revise the questionnaire and for item analysis. The validity and reliability of the questionnaire was measured. Exploratory factor analysis was performed to determine the underlying factorial structure of the scale. The eigenvalues greater than 1.0 was retained for the analysis. The internal consistencies or reliability of scale were assessed through computing Cronbach's alpha. The components of factor affecting entrepreneurial intention show the reliability value 0.917 and this is above the recommended threshold value 0.70 loadings. Implication from these values indicates that items used to represent construct have satisfactory internal consistency reliability.

In order to test the validity and adequacy of constructs of the questionnaire, Kaiser-Mayer-Olkin (KMO) and Bartlett's Test of Sphericity statistics are used. The result of the analysis shows all constructs have KMO value for the dimension of intention and attitude was 0.885 and 0.947 respectively, which demonstrates an adequate validity. A KMO value greater or equal to 0.70 is considered as adequate (Meyers et al., 2006). The Bartlett's Test of Sphericity for intention and attitude ( $x^2 = 2295.047$  and -13, 322.545 with p-value = 0.000) respectively was also significant at 5% level. Theses value of KMO and Bartlett's Test of Sphericity statistic shows us the appropriateness to apply exploratory factor analysis for the constructs or items of response variable and predictor variables.

#### 4.3. Assessment of Structural Model

#### 4.3.1. Null Model (Model 1)

We first fit a simple model with no predictors i.e., an intercept-only model that predicts the probability of students' entrepreneurial intention. The estimates of parameters and standard errors are presented in Table 2. The ML estimate from the standard logit model of the ratio of a student who have entrepreneurial intention to who don't have intention is exp (0.306) = 1.361, which is the same as the sample ratio of the number of students who have entrepreneurial intention to who don't have. It is in fact odds-ratio when no predictors have been considered in the model. In comparison, the same ratio is estimated to be exp (0.3295) = 1.39 and exp (0.3271) = 1.387 from the multilevel model by the ML (in Table 2a) and MCMC (in Table 2b) methods respectively.

A crude comparison has been made to understand the multilevel effects. Compared to the odds-ratios obtained by all multilevel methods the standard logistic model odds-ratio has underestimated. It is observed that there is a significant difference between the standard logistic estimate and the multilevel logistic estimate. Therefore, by failing to take into account the clustering within university (level 2), the standard logistic model has underestimated the odds-ratio by about 7% [(0.306–0.3295) \*100/0.3295] and 6.5% compared to multilevel model using by the corresponding methods ML and MCMC (see Table 2a and 2b).

In Table 2a, the estimated intercept was 0.3295, while the estimated variances of the random effect were 0.2929. Thus, at an average university (i.e., a university whose random effect was equal to zero on the logit scale), the probability of entrepreneurial intention was exp(0.3295)/[1 + exp(0.3295)] = 0.58. The 95% probability interval for the university-specific intercepts is (0.0949,0.4909) (i.e., 95% of university will have a random intercept that lies within this interval). The estimated variance (unobserved heterogeneity) of the random intercepts using ML and MCMC are 0.2929 (Std. Error 0.1010) (see in Table 2a) and 0.2809 (std. error 0.0975) (see in Table 2b) respectively. Both estimates are significantly different from zero and indicate considerable heterogeneity in entrepreneurial intention with respect to students and university that is unaccounted for by the predictor variables and should be adjusted for an adequate analysis.

(1) **Fixed Effect Model (Model 2)**: In this model, student level variables were included in the model to determine the effect of each predictor variables on students' entrepreneurial intention. The results were presented in Table 3.

(a). Using Classical approach						
Fixed Effect	Coef. (Std. Err.)	P≥ z	95% Coef. Interval	Length		
Intercept	0.3295(0.1208)	0.006	[0.0927, 0.5663]	0.4736		
Random Effect var(intercept)	0.2929(0.1010)		[0.0949,0.4909]	0.3960		
(b). Using Bayesia	an approach					
Fixed Effect	Mean (Std. dev.)	MCSE	Median	95% Cred. Interval	Length	
Intercept	0.3271(0.1148)	0.0205	0.3269	[0.1021, 0.5521]	0.4500	
Random Effect						
var(intercept)	0.2809(0.0975)	0.0096	0.2801	[0.0898,0.4720]	0.3822	

Table 2. Estimated regression coefficients and variance components for empty model (Model 1).

Tricket         Design (Sub. Err.)         FE/L         [FF/R]         [FF/R]         [FF/R]           Student-level chos         0         0         0.1203,03937         0.2734           SP         0.0333(00875)         0.703         [-0.138,0249]         0.3431           GS         0.05967(0.0948)         0         [0.4109,07244]         0.3715           SCSE         0.4190,07201         0         [0.623,05985]         0.3661           DEE         0.0700(0.0991)         0         [0.651,05376]         0.3721           IOS         1.3379(0.1203)         0         [1.1022,15737]         0.4715           RTC (1)         0.2499(0.2005)         0.898         [-0.052,0.7338]         0.786           IG(1)         0.4597(0.2379)         0.058         [-0.015,0.9180]         0.9325           -2         -0.384(0.9024)         0.704         [-0.252,0.6338]         1.1234           BOC (1)         0.0310(0.2005)         0.877         [-0.352,0.4240]         0.7859           PE (1)         0.3804(0.2751)         0.685         [-0.421,0.7455]         1.1661           -3         -0.3270(0.2627)         0.6842         [-0.791,0.6360]         1.4281           -3         0.0320(0.2680	(a). Using Classica	al approacn	D>I-I	[95% Conf Interval]	length	
Student-level chos         Intercept         0.2570(0.0697)         0         [0.1203,0.3937]         0.2734           SP         0.0331(0.0875)         0.703         [-0.138,0.2449]         0.3431           SCS         0.4596(0.00948)         0         [0.109,0.7824]         0.3715           SCSE         0.4590(0.096)         0.466         [-0.118,0.2582]         0.3764           AIR         0.8444(0.0991)         0         [0.655,0.5376]         0.3721           IOS         1.3379(0.1203)         0         [1.1022,1.5737]         0.4715           RTC (1)         0.2499(0.2005)         0.089         [-0.052,0.738]         0.786           CFB (1)         0.4499(0.2006)         0.089         [-0.052,0.738]         0.786           C1 (1)         0.4399(0.2004)         0.708         [-2.107,14302]         3.5372           -3         0.0564(0.2956)         0.849         [-0.523,0.6358]         1.589           C1 (1)         0.78014(1)         0.111121         0.1644(1.3917]         1.2234           BOC (1)         0.0310(0.2005)         0.877         [-0.326,0.4240]         0.755           PE (1)         0.3802(0.0273)         0.55         [-0.421,0.448]         1.031           -2	Fixed Ellect	Coel. (Stu. Ell.)	F≥ 2	[95% Com. interval]	length	
Intercept         0.2570(0.0697)         0         0.1203.03931         0.2734           GS         0.0330(0.0875)         0.703         [-0.138.02449]         0.33715           SCSE         0.04109.07244]         0.33715         0.3551           DEE         0.0700(0.096)         0.466         [-0.118.02582]         0.3651           DEE         0.0700(0.096)         0.466         [-0.118.02582]         0.3721           CPS         0.33515(0.0949)         0         [1.655.0.5376]         0.3721           IOS         1.3379(0.1203)         0         [1.102.15737]         0.4715           RTC (1)         0.2079(0.2383)         0.383         [-0.259.06750]         0.9942           CFBI (1)         0.4517(0.2379)         0.058         [-0.015.0180]         0.9326           MFSB (1)         1.1817(0.4168)         0.004         [0.3688]         [0.352]           -3         0.0564(0.2956)         0.877         [-0.352.0.4240]         0.785           PE (1)         0.3810(0.2005)         0.877         [-0.352.0.4240]         0.785           PE (1)         0.3800(0.1610         0.0500         0.556         0.556           DOT (1)         0.0870.32015         0.217         [.0.642	Student-level chy	(5				
SP         0.0331(0.0875)         0.703         [-0.138,0.2499]         0.3431           GS         0.0367(0.0948)         0         [0.109,0.7824]         0.3751           SCSE         0.4159(0.0931)         0         [0.2334,0.5985]         0.3361           DEE         0.0700(0.096)         0.466         [-0.118,0.2582]         0.3764           AIR         0.8484(0.0991)         0         [0.655,0.5376]         0.3385           [OS         1.3379(0.1203)         0         [1.1022,1.5737]         0.4715           [IO         0.2379(0.2083)         0.383         [-0.052,0.738]         0.786           [G 11)         0.4517(0.2379)         0.058         [-0.015,0.9180]         0.9326           M*58 (1)         1.1817(0.4188         0.004         [0.3668,1.9566]         1.6298           -3         0.0564(0.2056)         0.849         [-0.52,0.738]         1.1589           AF (1)         0.7801(0.3121)         0.012         [0.664,1.3917]         1.2234           DO(1)         0.0380(0.20550         0.849         [-0.52,0.738]         1.1661           -3         -0.057(0.2057)         0.525         [-0.448,0.6727]         0.1272           NERK (1)         -0.4634(0.0275)         0.585	Intercept	0.2570(0.0697)	0	[0.1203,0.3937]	0.2734	
CS         0.967(0.0948)         0         0.4109.07824          0.3715           SCSE         0.4159(0.0951)         0         0.234.0.5985         0.3661           DEE         0.0700(0.096)         0.466         [-0.118,0.2582]         0.3764           CPS         0.3315(0.0949)         0         [0.1655,0.5376]         0.3721           IOS         1.3379(0.103)         0         [1.1021,15737]         0.4715           RTC (1)         0.2079(0.2383)         0.383         [-0.0250,0750]         0.9342           CFB (1)         0.4349(0.2005)         0.089         [-0.0250,07538]         0.9342           -2         -0.384(0.9024)         0.058         [-0.015,0.9180]         0.9342           -3         0.0564(0.2956)         0.849         [-0.523,0.6388]         1.1589           AF (1)         0.78009024)         0.786         [-3.224]         0.1229           BOC (1)         0.0310(0.2005)         0.877         [-0.324,0420]         0.7859           BOF (1)         0.0380(0.3263)         0         [0.444,0745]         1.1661           -3         -0.325(0.2715)         0.281         [-0.4925,0.148]         1.03           -2         0.1624(0.2755)         0.585         [0.	SP	0.0333(0.0875)	0.703	[-0.138,0.2049]	0.3431	
SCSE         0.4159(0.0931)         0         [0.2334,0.3985]         0.3651           DEE         0.0700(00.66)         0.466         [-0.118,0.2582]         0.3764           AIR         0.8444(0.0991)         0         [0.655,0.376]         0.3721           IOS         1.3379(0.1203)         0         [1.1022,1.5737]         0.4715           IOS         1.3379(0.1203)         0         [1.1022,1.5737]         0.4715           IG(1)         0.3490(0.2005)         0.089         [-0.052,0.7338]         0.786           IG(1)         0.4390(0.2005)         0.089         [-0.052,0.7338]         1.1589           AF         1.1817(0.4158)         0.004         [0.03661,19966]         1.4298           O.354(0.02956)         0.249         [-0.523,0.6338]         1.1589           AF (1)         0.7801(0.3121)         0.012         [0.1684,13917]         1.2234           BOC (1)         0.0380(0.1416)         0.006         [0.1040,06600]         0.556           BOF (1)         0.3880(0.1416)         0.006         [0.1040,0560]         1.4281           -2         0.1624(0.2755)         0.231         [-0.857,0.2067]         1.0642           Varintercety         0.4226(0.00733)         0.0232	GS	0.5967(0.0948)	0	[0.4109,0.7824]	0.3715	
DEE         0.0700(0.096)         0.466         [−0.118,0.2582]         0.3764           AR         0.8484(0.0991)         0         [0.1655,0.376]         0.3721           CPS         0.3315(0.0949)         0         [0.1655,0.376]         0.3721           IOS         1.3379(0.203)         0         [1.1022,1.5737]         0.4715           RTC (1)         0.2079(0.2383)         0.383         [-0.259,0.6750]         0.9342           IG (1)         0.4517(0.2379)         0.058         [-0.052,0.738]         0.7766           IG (1)         0.4517(0.2379)         0.058         [-0.052,0.338]         1.1589           -2         -0.384(0.5024)         0.708         [-2.107,1.4302]         3.3372           -3         0.0564(0.2956)         0.849         [-0.523,0.6358]         1.1589           BOC (1)         0.0310(0.2005)         0.877         [-0.322,0.4240]         0.7859           DFE (1)         0.3803(0.1416)         0.066         [0.1040,0.6600]         0.556           BOT (1)         0.6088(0.3263)         0         [0.4443,0.6777]         1.013           -2         0.1624(0.2975)         0.585         [-0.421,0.7455]         1.1661           -3         -0.027(0.3669)	SCSE	0.4159(0.0931)	0	[0.2334,0.5985]	0.3651	
All         0.8484(0.0991)         0         [0.654], 1.0426[         0.3885           CPS         0.3315(0.0949)         0         [0.1655, 0.5376]         0.3721           IOS         1.3379(0.1203)         0         [1.1022, 1.5737]         0.4715           IOS         1.3379(0.1203)         0         [1.1022, 1.5737]         0.4715           IG         (1)         0.2499(0.2005)         0.089         [-0.052, 0.7338]         0.786           IG         (1)         0.4490(0.2005)         0.089         [-0.052, 0.7388]         1.1589           -2         -0.344(0.9024)         0.708         [-2.107, 1.4302]         3.3372           -3         0.0564(0.2956)         0.449         [-0.523, 0.6388]         1.1589           AF (1)         0.7801(0.3121)         0.012         [0.1664, 1.3977]         0.1279           NEK (1)         -0.4310(0.2563)         0         [0.4448, 0.6727]         0.1279           NEK (1)         -0.4310(0.2633)         0.231         [-0.457, 0.2067]         1.0642           -3         -0.325(0.2715)         0.231         [-0.457, 0.2067]         1.0642           N_E(1)         0.4943(0.0970)         0         [0.3023, 0.627]         0.3804           PO (1)	DEE	0.0700(0.096)	0.466	[-0.118,0.2582]	0.3764	
CPS         0.3315(0.0949)         0         [0.1655,0.3376]         0.3721           IOS         1.3379(0.203)         0         [1.1022,1.5737]         0.47115           RTC (1)         0.2079(0.2383)         0.383         [-0.259,0.6750]         0.9342           IG (1)         0.4517(0.2005)         0.088         [-0.052,0.738]         0.7766           IG (1)         0.4517(0.2379)         0.058         [-2.107,1.4302]         3.3372           -2         -0.384(0.9024)         0.708         [-2.107,1.4302]         3.3372           -3         0.0564(0.2956)         0.849         [-0.523,0.0388]         1.1589           AF (1)         0.7810(2.005)         0.877         [-0.362,0.4240]         0.7859           BOC (1)         0.0310(0.2005)         0.877         [-0.322,0.0271]         0.1279           NERK (1)         -0.410(0.2628)         0.119         [-0.925,0.1048]         1.061           -2         0.1624(0.2975)         0.238         [-0.935,0.3633]         1.2983           -3         -0.228(0.312)         0.388         [-0.935,0.3633]         1.2983           -2         0.1624(0.2975)         0.238         [-0.791,0.3669]         0.272           Varintercerby         0.2280(0.86	AIR	0.8484(0.0991)	0	[0.6541,1.0426]	0.3885	
IOS         1.3379(0.1203)         0         [1.1022,15/37]         0.4715           RTC (1)         0.2409(0.2005)         0.089         [-0.259,0.5750]         0.9342           CFB (1)         0.43409(0.2005)         0.068         [-0.015,0.9180]         0.9326           MFSB (1)         1.1817(0.4158)         0.004         [0.3668,19966]         1.6298           -2         -0.334(0.9024)         0.708         [-0.52,0.6358]         1.1589           AF (1)         0.7801(0.3121)         0.012         [0.1684,1.3917]         1.2234           BOC (1)         0.3380(0.1416)         0.006         [0.1040,0.6600]         0.555           BOF (1)         0.3380(0.1416)         0.006         [0.1040,0.6600]         0.555           PE (1)         0.3380(0.1416)         0.006         [0.4410,0.5623]         1.1661           -3         -0.325(0.2715)         0.231         [-0.421,0.4755]         1.1661           -3         -0.032(0.2715)         0.231         [-0.421,0.4755]         1.1661           -3         -0.032(0.2715)         0.231         [-0.421,0.4755]         1.1661           -3         -0.032(0.2763)         0.2822         [.04110,0.4639]         0.3382           PO (1)         -0.2802(	CPS	0.3515(0.0949)	0	[0.1655,0.5376]	0.3721	
RTC (1)       0.20/9(0.2383)       0.383       [-0.25,0,0550]       0.9342         CFB (1)       0.4517(0.2379)       0.058       [-0.05,0,733]       0.726         IG (1)       0.4517(0.2379)       0.058       [-0.05,0,733]       0.726         C1 (1)       0.4517(0.2379)       0.058       [-0.015,0,9180]       0.9326         -2       -0.384(0.9024)       0.708       [-2.107,14302]       3.5372         -3       0.0564(0.2956)       0.849       [-0.52,0,6358]       1.1589         AF (1)       0.7801(0.3121)       0.012       [0.1644,13917]       1.2234         BOC (1)       0.3800(0.1416)       0.006       [0.1040,0.600]       0.555         BOF (1)       0.6088(0.3263)       0       [0.5448,0.6727]       0.1279         DEK (1)       0.4648(0.02975)       0.231       [-0.457,0.2067]       1.0642         N_E (1)       0.4643(0.0970)       0       [0.3023,0.6627]       0.3804         PO (1)       -0.286(0.312)       0.381       [-0.494,0.3077]       1.4381         -3       -0.077(0.3639)       0.832       [-0.791,0.6360]       1.4265         Random Effect       Mean (5td Dev.)       MCSE       Median       [95% cred. Interval]       length     <	IOS	1.3379(0.1203)	0	[1.1022,1.5737]	0.4715	
CHB         (1)         0.43409(0.2005)         0.089         [-0.052,07338]         0.786           IG (1)         0.4517(0.2379)         0.058         [-0.015,0.9180]         0.9326           MFSB (1)         1.1817(0.4158)         0.004         [0.3668,19966]         1.6298           -2         -0.384(0.9024)         0.708         [-0.523,0.6358]         1.1589           AF (1)         0.7801(0.3121)         0.012         [0.1684,1.3917]         1.2234           DSO(1)         0.3380(0.1416)         0.006         [0.1040,0.6600]         0.556           DSF (1)         0.3380(0.1416)         0.006         [0.1040,0.6600]         0.557           DSF (1)         0.4380(0.2715)         0.585         [-0.421,0.7455]         1.1661           -3         -0.032(0.2715)         0.585         [-0.421,0.7455]         1.0642           N [C (1)         -0.4943(0.0970)         0         [0.3023,0.6827]         0.3804           PO (1)         -0.280(0.063312)         0.3382         [-0.791,0.6360]         1.4265           Random Effect           Var(intercept)         0.2802(0.0663)         0.0122         0.2558         [0.1149,0.3869]         0.272            0.097	RTC (1)	0.2079(0.2383)	0.383	[-0.259,0.6750]	0.9342	
Ib (1)       0.4517(0.2379)       0.058       [-0.015,0.9180]       0.9326         -2       -0.384(0.9024)       0.708       [-2.107,14302]       3.5372         -3       0.0564(0.2956)       0.849       [0.173,0388]       1.1589         AF (1)       0.7801(0.3121)       0.012       [0.1644,13917]       1.2234         BOC (1)       0.0310(0.2005)       0.877       [-0.362,0.4240]       0.7859         PBE (1)       0.3880(0.1416)       0.006       [0.10440,06600]       0.556         BOF (1)       0.6088(0.3263)       0       [0.5448,0.6727]       0.1279         NERK (1)       -0.410,02628)       0.119       [-0.425,0.1048]       1.033         -2       0.1624(0.2975)       0.585       [-0.421,0.7455]       1.1661         -3       -0.027(0.3639)       0.813       [-0.935,0.3633]       1.2983         -2       -0.087(0.3639)       0.832       [-0.791,0.6360]       1.4265         Random Effect         Variintercept       0.2802(0.0863)       0.0124       [-0.055,0.1619]       0.272         SP       0.018(0.0664)       0.0098       0.0124       [-0.055,0.1619]       0.272         SP       0.018(0.0664)       0.0098	CFBI (1)	0.3409(0.2005)	0.089	[-0.052,0.7338]	0.786	
MH-58 (1)         1.1817(0.4158)         0.004         [0.3668,19966]         1.6.298           -2         -0.384(0.9024)         0.708         [-1.107,14302]         3.5372           -3         0.0564(0.2956)         0.849         [-0.232,0.6358]         1.1589           BOC (1)         0.0310(0.2005)         0.877         [-0.362,0.4240]         0.7859           PBE (1)         0.3880(0.1416)         0.006         [0.1440,0.6727]         0.1279           NERK (1)         -0.410(0.2628)         0.119         [-0.925,0.1048]         1.03           -2         0.1624(0.2975)         0.231         [-0.471,0.7455]         1.1661           -3         -0.325(0.2715)         0.231         [-0.487,0.2667]         1.0642           N_E (1)         -0.494(0.3760)         0         [0.3023,0.6827]         0.3804           PO (1)         -0.286(0.312)         0.388         [-0.935,0.3633]         1.2983           -2         -0.067(0.3639)         0.813         [-0.930,0.3632]         1.4265            pprox         Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chx         Intercept         0.253(0.0703         0.0022	IG (1)	0.4517(0.2379)	0.058	[-0.015,0.9180]	0.9326	
-2         -0.384(0.9024)         0.708         [1.07,1.4302]         3.332/           -3         0.0564(0.2956)         0.849         [-0.523,05358]         1.1589           BOC (1)         0.7801(0.3121)         0.012         [0.1684,1.3917]         1.2234           BOC (1)         0.3880(0.1416)         0.006         [0.1040,06600]         0.556           BOF (1)         0.6088(0.3263)         0         [0.448,0.6727]         0.1279           NERK (1)         -0.410(0.2628)         0.119         [-0.925,0.1048]         1.03           -2         0.1624(0.2975)         0.585         [-0.427,0.1048]         1.03           -3         -0.325(0.2715)         0.231         [-0.857,0.2067]         1.0642           N_E (1)         0.4493(0.0970)         0         [0.3023,0.6827]         0.3804           PO (1)         -0.286(0.3122)         0.383         [-0.935,0.333]         1.2983           -2         -0.087(0.3669)         0.813         [-0.805,0.620]         1.4381           -3         -0.077(0.3639)         0.832         [-0.791,0.6360]         1.4265           Random Effect         Varintrecrept         0.2553(0.0703)         0.0022         0.2558         [0.1114,0.3869]         0.272	MFSB (1)	1.181/(0.4158)	0.004	[0.3668,1.9966]	1.6298	
-3         0.0564(0.2956)         0.849         [−0.23,0.6584]         1.1589           AF (1)         0.0310(0.2005)         0.877         [−0.362,0.4240]         0.7859           PBE (1)         0.3880(0.1416)         0.006         [0.1040,0.6600]         0.556           BOC (1)         0.6088(0.3263)         0         [0.5448,0.6727]         0.1279           NERK (1)         -0.410(0.2628)         0.119         [−0.421,0.7455]         1.1661           -3         -0.325(0.2715)         0.231         [−0.421,0.7455]         1.1661           -3         -0.327(0.2715)         0.231         [−0.430,0.7455]         1.1661           -3         -0.077(0.3639)         0.832         [−0.979,0.3633]         1.2983           -2         -0.087(0.3669)         0.813         [−0.806,0.6320]         1.4381           -3         -0.077(0.3639)         0.832         [−0.979,0.6360]         1.4265            E         Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach         Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level dxx         Intercept         0.2553(0.0703)<	-2	-0.384(0.9024)	0.708	[-2.10/,1.4302]	3.53/2	
AF (1)       0.7801(0.3121)       0.012       [0.1684,1.3917]       1.224         BOC (1)       0.3800(0.1416)       0.006       [0.1040,0.6600]       0.556         BDF (1)       0.3880(0.1416)       0.006       [0.1040,0.6600]       0.556         BDF (1)       0.3880(0.1416)       0.005       [0.1048,0.6727]       0.1279         NERK (1)       -0.410(0.2628)       0.119       [-0.925,0.1048]       1.03         -2       0.1624(0.2975)       0.585       [-0.421,0.7455]       1.1661         -3       -0.325(0.2715)       0.281       [-0.857,0.2067]       0.3804         PO (1)       -0.286(0.312)       0.388       [-0.935,0.3633]       1.2983         -2       -0.087(0.3669)       0.813       [-0.406,0.6320]       1.4381         -3       -0.077(0.3639)       0.832       [-0.791,0.6360]       1.4265         Random Effect       Varimtercept       0.2802(0.0863)       [0.1111,0.4493]       0.3382         (b) using Bayesian approach       [       [       [       [       [       0.6147(0.0718)       0.615       [       0.4729,0.7521       0.272       255         SS       0.0180       0.0197       0.3613       [       0.2216,0.5658]       0.3442<	-3	0.0564(0.2956)	0.849	[-0.523,0.6358]	1.1589	
BOC (1)         0.0310(0.2005)         0.87/         [-0.362,04.240]         0.7859           BOF (1)         0.3680(0.1416)         0.006         [0.1040,06600]         0.556           BOF (1)         -0.608(0.3263)         0         [0.5448,0.6727]         0.1279           NERK (1)         -0.410(0.2628)         0.119         [-0.421,0.7455]         1.1661           -3         -0.325(0.2715)         0.231         [-0.457,0.2067]         1.0642           PO (1)         -0.286(0.3312)         0.388         [-0.935,0.3633]         1.2983           -2         -0.087(0.3669)         0.813         [-0.406,0.6320]         1.4265           Random Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs         Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.05,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SVE         0.0180(0.0664)         0.0098         [0.0124]         [-0.05,0.1619]         0.267           GS	AF (1)	0./801(0.3121)	0.012	[0.1684,1.3917]	1.2234	
PBE (1)         0.3880(0.1416)         0.006         [0.1040,0.6600]         0.556           BOF (1)         0.6368(0.3263)         0         [0.5448,0.6727]         0.1279           NERK (1)         -0.410(0.2628)         0.119         [-0.925,0.1048]         1.03           -2         0.1624(0.2975)         0.585         [-0.421,0.7455]         1.1661           -3         -0.325(0.2715)         0.2381         [-0.857,0.2667]         0.3804           PO (1)         -0.286(0.3312)         0.388         [-0.935,0.3633]         1.2983           -2         -0.067(0.3639)         0.832         [-0.791,0.6360]         1.4265           Random Effect         Vari(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach         Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs         Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.5147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.272 <td>BOC (1)</td> <td>0.0310(0.2005)</td> <td>0.877</td> <td>[-0.362,0.4240]</td> <td>0.7859</td> <td></td>	BOC (1)	0.0310(0.2005)	0.877	[-0.362,0.4240]	0.7859	
BOF (1)         0.60688(0.3263)         0         [0.5448,0.6727]         0.1279           NERK (1)         -0.410(0.2628)         0.119         [-0.925,0.1048]         1.03           -2         0.1624(0.2975)         0.585         [-0.421,0.7455]         1.1661           -3         -0.325(0.2715)         0.231         [-0.857,0.2067]         0.3804           PO (1)         -0.286(0.3312)         0.388         [-0.935,0.3633]         1.2983           -2         -0.087(0.3669)         0.813         [-0.890,0.320]         1.4381           -3         -0.077(0.3639)         0.832         [-0.791,0.6360]         1.4265           Random Effect         Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach         Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs         Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SCSE         0.3684(0.0664)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0698)         0.0047         0.8473         [0.715,0.9934]         0.2742	PBE (1)	0.3880(0.1416)	0.006	[0.1040,0.6600]	0.556	
NERK (1)        0.410(0.2628)         0.119         [-0.925,0.1048]         1.03           -2         0.1624(0.2975)         0.585         [-0.421,0.7455]         1.1661           -3         -0.325(0.2715)         0.231         [-0.857,0.2667]         1.0642           N_E (1)         0.4943(0.0970)         0         [0.3023,0.6627]         0.3804           -2         -0.087(0.3669)         0.813         [-0.791,0.6360]         1.4265           Random Effect         Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach         Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs         Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.564(0.0858)         0.0197         0.3613         [0.2216,0.568]         0.3442           DEE         0.0584(0.0858)         0.0197         0.3613         [0.2260,0.503]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734	BOF (1)	0.6088(0.3263)	0	[0.5448,0.6/2/]	0.1279	
-2         0.1624(0.29/5)         0.285         [-0.42/1,0.745]         1.1661           -3         -0.325(0.2715)         0.231         [-0.367,0.2067]         1.0642           N_E (1)         0.4943(0.0970)         0         [0.3023,0.6827]         0.3804           PO (1)         -0.286(0.3312)         0.388         [-0.935,0.3633]         1.2983           -2         -0.087(0.3669)         0.813         [-0.791,0.6360]         1.4265           Random Effect         Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach         [         [         [         [         0.4803         [         0.2558         [         0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.364(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0047         0.8473         [0.7151,0.934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2209,0	NERK (1)	-0.410(0.2628)	0.119	[-0.925,0.1048]	1.03	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	-2	0.1624(0.2975)	0.585	[-0.421,0.7455]	1.1661	
N_E (1)         0.4943(0.0970)         0         [0.3023,0.827]         0.3804           PO (1)         -0.286(0.3312)         0.388         [-0.950,0.363]         1.2983           -2         -0.087(0.3669)         0.813         [-0.806,0.6320]         1.4381           -3         -0.077(0.3639)         0.832         [-0.791,0.6360]         1.4265           Random Effect         Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach         Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs           [-0.1149,0.3869]         0.272         S58         [0.1149,0.3869]         0.272         S58         [0.1149,0.3869]         0.272         S58         [0.4729,0.7521]         0.2792         S58         [0.3160,0664)         0.0098         0.0124         [-0.05,0.1619]         0.267         S58         0.34423         D2716,0.5568]         0.34423         D2740,0.5568]         0.34423         D2740,0.5568]         0.34423         D2783         D2783         D2783         D2783         D2783         D2783         D2783         D2783         D2616,0.5033]         D2424         D34442         D34442	-3	-0.325(0.2/15)	0.231	[-0.857,0.2067]	1.0642	
PO (1)       −0.286(0.3312)       0.388       [−0.935,0.3633]       1.2983         -2       −0.087(0.3669)       0.813       [−0.806,0.6320]       1.4381         -3       −0.077(0.3639)       0.832       [−0.791,0.6360]       1.4265         Random Effect       Var(intercept)       0.2802(0.0863)       [0.1111,0.4493]       0.3382         (b) using Bayesian approach       Fixed Effect       Mean (Std. Dev.)       MCSE       Median       [95% cred. Interval]       length         Student-level chxs       Intercept       0.2553(0.0703)       0.0022       0.2558       [0.1149,0.3869]       0.272         SP       0.018(0.0664)       0.0098       0.0124       [−0.105,0.1619]       0.267         GS       0.6147(0.0718)       0.0078       0.615       [0.4729,0.7521]       0.2792         SCSE       0.3684(0.0858)       0.0197       0.3613       [0.2716,0.5658]       0.3442         DEE       0.9957(0.086)       0.0047       0.8473       [0.750,0.2666]       0.3425         AIR       0.8483(0.0698)       0.0047       0.8473       [0.037,0.4566]       0.4195         CFS       0.3560(0.133)       0.217       0.3227       [0.0595,06.053]       0.5487         IG (1)       <	N_E (1)	0.4943(0.0970)	0	[0.3023,0.6827]	0.3804	
-2         −0.087(0.3669)         0.813         [−0.806,(0.320]         1.4381           -3         −0.077(0.3639)         0.832         [−0.791,0.6360]         1.4265           Random Effect         Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach         Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs         Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [−0.105,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2160,5658]         0.3442           DEE         0.0957(0.086)         0.0159         0.0968         [−0.076,0.2666]         0.3425           AIR         0.8483(0.0698)         0.0047         0.8473         [0.2050,0503]         0.2244           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)	PO (1)	-0.286(0.3312)	0.388	[-0.935,0.3633]	1.2983	
3         −0.07/(0.3639)         0.832         [−0.791,0.6360]         1.4265           Random Effect Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs         Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [−0.05,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0.5033]         0.2424           IOS         1.3673(0.114)         0.0216         1.337,0.4566         0.4195           CFBI (1)         0.3256(0.1393)         0.0217         0.3227         [0.0595,0.6053]         0.5487           G-11         0.43840         0.6155 <th< td=""><td>-2</td><td>-0.087(0.3669)</td><td>0.813</td><td>[-0.806,0.6320]</td><td>1.4381</td><td></td></th<>	-2	-0.087(0.3669)	0.813	[-0.806,0.6320]	1.4381	
Random Effect           Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs                 [htercept]         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2722           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0159         0.0968         [-0.076,0.2666]         0.3425           AIR         0.8438(0.0698)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0044         0.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0155         0.2617         [0.0370,4566]         0.4195           GFBI (1)	-3	-0.077(0.3639)	0.832	[-0.791,0.6360]	1.4265	
Var(intercept)         0.2802(0.0863)         [0.1111,0.4493]         0.3382           (b) using Bayesian approach Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs                 Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.272           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0159         0.0968         [-0.076,0.2666]         0.3422           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0155         0.2617         [0.037,0.4566]         0.4195           CFB1 (1)         0.3256(0.1339)         0.0217         0.3227         [0.9863,1.5150]         0.5287           -2         -0.338(0.174)         0.0103         -0.34	Random Effect					
(b) using Bayesian approach         MCSE         Median         [95% cred. Interval]         length           Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chx:         Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.2673           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0.503]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0217         0.3227         [0.0595,0.603]         0.5458           IG (1)         0.5487(0.1204)         0.0182         0.5442         [0.3144,0.7884]         0.474           MFSB (1)         1.2	Var(intercept)	0.2802(0.0863)		[0.1111,0.4493]	0.3382	
Fixed Effect         Mean (Std. Dev.)         MCSE         Median         [95% cred. Interval]         length           Student-level chxs         Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0159         0.0968         [-0.076,0.2666]         0.3425           AIR         0.8483(0.0698)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0503]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1933)         0.0217         0.3227         [0.0595,0.6053]         0.5458           IG (1)         0.5487(0.1204)         0.0182         0.5442         [0.3144,0.7884]         0.474           MFSB (1) <td< th=""><th></th><th></th><th></th><th></th><th></th><th></th></td<>						
Student-level chxs           Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0159         0.0968         [-0.076,0.2666]         0.3425           AIR         0.8483(0.0698)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0.503]         0.4244           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.3256(0.1393)         0.0217         0.3227         [0.0595,0.6053]         0.5458           IG (1)         0.5487(0.1204)         0.0182         0.5442         [0.3144,0.7884]         0.474           MFSB (1)         1.2457(0.1339)         0.015         1.2427         [0.9863,1.5150]         0.5287           -2<	(b) using Bayesia	n approach				
Intercept         0.2553(0.0703)         0.0022         0.2558         [0.1149,0.3869]         0.272           SP         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0159         0.0968         [-0.076,0.2666]         0.3425           AIR         0.8483(0.0698)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.069,0.5033]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0217         0.3227         [0.0595,0.6053]         0.5458           IG (1)         0.5487(0.1204)         0.0182         0.5442         [0.3144,0.7884]         0.474           MFSB (1)         1.2457(0.1339)         0.0185         1.2427         [0.9863,1.5150]         0.5287           -2         -0.033(0.1584)         0.0214	(b) using Bayesia Fixed Effect	n approach Mean (Std. Dev.)	MCSE	Median	[95% cred. Interval]	length
Intercept         0.2330(0.0664)         0.0092         0.2330         [0.1147)(0.3030)         0.277           GS         0.018(0.0664)         0.0098         0.0124         [-0.105,0.1619]         0.267           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0159         0.0968         [-0.076,0.2666]         0.3422           AIR         0.8483(0.0698)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0.503]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0217         0.3227         [0.0595,0.6053]         0.5458           IG (1)         0.5487(0.1204)         0.0185         1.2427         [0.9863,1.5150]         0.5287           -2         -0.338(0.174)         0.0103         -0.341         [-0.688-,0.0020]         0.6861           -3         -0.030(0.1584)         0.0214         <	(b) using Bayesia Fixed Effect	n approach Mean (Std. Dev.)	MCSE	Median	[95% cred. Interval]	length
A         0.010,00001         0.0000         0.0112         0.0112,01013         0.02792           GS         0.6147(0.0718)         0.0078         0.615         [0.4729,0.7521]         0.2792           SCSE         0.3684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0179         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0.5033]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0155         0.2617         [0.037,0.4566]         0.4195           CFBI (1)         0.3256(0.1393)         0.0217         0.3227         [0.0595,0.6053]         0.5458           IG (1)         0.5487(0.1204)         0.0182         0.5442         [0.3144,0.7884]         0.474           MFSB (1)         1.2457(0.1339)         0.0185         1.2427         [0.9863,1.5150]         0.5287           -2         -0.338(0.174)         0.0103         -0.341         [-0.688-0.0020]         0.6861           -3         -0.03(0.1584)         0.0214	(b) using Bayesia Fixed Effect Student-level cha	n approach Mean (Std. Dev.) (s 0.2553(0.0703)	<b>MCSE</b>	Median	[95% cred. Interval]	length
CSS         0.03684(0.0858)         0.0197         0.3613         [0.2216,0.5658]         0.3442           DEE         0.0957(0.086)         0.0159         0.0968         [-0.076,0.2666]         0.3425           AIR         0.8483(0.0698)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0.5033]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0217         0.3227         [0.037,0.4566]         0.4195           CFBI (1)         0.3256(0.1393)         0.0217         0.3227         [0.9863,1.5150]         0.5287           -2         -0.038(0.174)         0.0103         -0.341         [-0.688-,0.0020]         0.66861           -3         -0.03(0.1584)         0.0214         -0.035         [-0.343,02930]         0.6358           AF (1)         0.7969(0.0734)         0.009         0.7984         [0.6504,0.9413]         0.291           BOC (1)         0.0042(0.1429)         0.0318         0.0155         [-0.328,0.2483]         0.5371           PBE (1)         0.36087         0.0004	(b) using Bayesia Fixed Effect Student-level cha Intercept SP	n approach Mean (Std. Dev.) ss 0.2553(0.0703) 0.018(0.0664)	MCSE	<b>Median</b> 0.2558 0.0124	[95% cred. Interval] [0.1149,0.3869] [0.105.0.1619]	<b>length</b> 0.272 0.267
DEE         0.0957(0.086)         0.0157         0.0968         [-0.076,0.2666]         0.3425           AIR         0.8483(0.0698)         0.0047         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0.5033]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0155         0.2617         [0.037,0.4566]         0.4195           CFBI (1)         0.3256(0.1393)         0.0217         0.3227         [0.0595,0.6053]         0.5458           IG (1)         0.5487 (0.1204)         0.0182         0.5442         [0.3144,0.7884]         0.474           MFSB (1)         1.2457(0.1339)         0.0185         1.2427         [0.9863,1.5150]         0.5287           -2         -0.338(0.174)         0.0103         -0.341         [-0.688-,0.0020]         0.6861           -3         -0.03(0.1584)         0.0214         -0.035         [-0.289,0.2483]         0.5371           BOC (1)         0.0042(0.1429)         0.0318         0.0155         [-0.289,0.2483]         0.5371           BOF (1)         0.6087(0.0326)         0.0004	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS	n approach Mean (Std. Dev.) (S 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718)	MCSE 0.0022 0.0098 0.0078	<b>Median</b> 0.2558 0.0124 0.615	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729.0.7521]	0.272 0.267 0.2792
Dick         0.051(0.0698)         0.0197         0.8473         [0.7151,0.9934]         0.2783           CPS         0.3799(0.0618)         0.0084         0.378         [0.2609,0.5033]         0.2424           IOS         1.3673(0.114)         0.0206         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0155         0.2617         [0.037,0.4566]         0.4195           CFBI (1)         0.3256(0.1393)         0.0217         0.3227         [0.9863,1.5150]         0.5287           C-2         -0.338(0.174)         0.0103         -0.341         [-0.688-,0.0020]         0.6861           -3         -0.03(0.1584)         0.0214         -0.035         [-0.243,0.2930]         0.6358           AF (1)         0.7969(0.0734)         0.009         0.7984         [0.6504,0.9413]         0.291           BOC (1)         0.0042(0.1429)         0.0318         0.0155         [-0.289,0.2483]         0.5371           PBE (1)         0.389(0.1395)         0.0021         0         [0.1126,0.6593]         0.5467           BOF (1)         0.6087(0.0326)         0.0004         0.6087         [0.5450,0.6729]         0.1279           NERK (1)         -0.44(0.1023)         0.0173 <td>(b) using Bayesia Fixed Effect Student-level cha Intercept SP GS SCCF</td> <td>n approach Mean (Std. Dev.) (S 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858)</td> <td>MCSE 0.0022 0.0098 0.0078 0.0197</td> <td>Median 0.2558 0.0124 0.615 0.3613</td> <td>[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216.0.5658]</td> <td>0.272 0.267 0.2792 0.3442</td>	(b) using Bayesia Fixed Effect Student-level cha Intercept SP GS SCCF	n approach Mean (Std. Dev.) (S 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858)	MCSE 0.0022 0.0098 0.0078 0.0197	Median 0.2558 0.0124 0.615 0.3613	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216.0.5658]	0.272 0.267 0.2792 0.3442
Init         Init<         Init         Init <h< td=""><td>(b) using Bayesia Fixed Effect Student-level cha Intercept SP GS SCSE DEF</td><td>n approach Mean (Std. Dev.) (S 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086)</td><td>MCSE 0.0022 0.0098 0.0078 0.0197 0.0159</td><td>Median 0.2558 0.0124 0.615 0.3613 0.0968</td><td>[95% cred. Interval] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076.0.2666]</td><td>0.272 0.267 0.2792 0.3442 0.3425</td></h<>	(b) using Bayesia Fixed Effect Student-level cha Intercept SP GS SCSE DEF	n approach Mean (Std. Dev.) (S 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159	Median 0.2558 0.0124 0.615 0.3613 0.0968	[95% cred. Interval] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076.0.2666]	0.272 0.267 0.2792 0.3442 0.3425
IOS         1.3673(0.114)         0.0021         1.3729         [1.139,1.5734]         0.4344           RTC (1)         0.2546(0.1093)         0.0155         0.2617         [0.037,0.4566]         0.4195           CFBI (1)         0.3256(0.1393)         0.0217         0.3227         [0.0595,0.6053]         0.5458           IG (1)         0.5487(0.1204)         0.0182         0.5442         [0.3144,0.7884]         0.474           MFSB (1)         1.2457(0.1339)         0.0185         1.2427         [0.9863,1.5150]         0.5287           -2         -0.338(0.174)         0.0103         -0.341         [-0.688-,0.0020]         0.6861           -3         -0.03(0.1584)         0.0214         -0.035         [-0.343,0.2930]         0.6358           AF (1)         0.7969(0.0734)         0.009         0.7984         [0.6504,0.9413]         0.291           BOC (1)         0.0042(0.1429)         0.0318         0.0155         [-0.289,0.2483]         0.5371           PBE (1)         0.389(0.1395)         0.0021         0         [0.1126,0.6593]         0.5467           BOF (1)         0.6087(0.0326)         0.0004         0.6087         [0.5450,0.6729]         0.1279           NERK (1)         -0.443         [-0.638,	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR	n approach Mean (Std. Dev.) (S 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473	[95% cred. Interval] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151.0.9934]	0.272 0.267 0.2792 0.3442 0.3425 0.2783
RTC (1)       0.2546(0.1093)       0.0155       0.2617       [0.037,0.4566]       0.4195         CFBI (1)       0.3256(0.1393)       0.0217       0.3227       [0.0595,0.6053]       0.5458         IG (1)       0.5487(0.1204)       0.0182       0.5442       [0.3144,0.7884]       0.474         MFSB (1)       1.2457(0.1339)       0.0185       1.2427       [0.9863,1.5150]       0.5287         -2       -0.338(0.174)       0.0103       -0.341       [-0.688,0.0020]       0.6861         -3       -0.03(0.1584)       0.0214       -0.035       [-0.343,0.2930]       0.6358         AF (1)       0.7969(0.0734)       0.009       0.7984       [0.6504,0.9413]       0.291         BOC (1)       0.042(0.1429)       0.0318       0.0155       [-0.289,0.2483]       0.5371         PBE (1)       0.389(0.1395)       0.0021       0       [0.1126,0.6593]       0.5467         BOF (1)       0.6087(0.0326)       0.0004       0.6087       [0.5450,0.6729]       0.1279         NERK (1)       -0.44(0.1023)       0.0173       -0.443       [-0.638, -0.114]       0.5243         N_E (1)       0.4957(0.0967)       0.0009       0.4963       [0.3043,0.6835]       0.379         PO (1) <td>(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS</td> <td>n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618)</td> <td>MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084</td> <td>Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378</td> <td>[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609.0 5033]</td> <td>0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424</td>	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609.0 5033]	0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424
Internet       0.3255 (0.1393)       0.0217       0.3227       [0.0595,0.6053]       0.5458         IG (1)       0.5487 (0.1204)       0.0182       0.5442       [0.3144,0.7884]       0.474         MFSB (1)       1.2457 (0.1339)       0.0185       1.2427       [0.9863,1.5150]       0.5287         -2       -0.338 (0.174)       0.0103       -0.341       [-0.688-,0.0020]       0.6861         -3       -0.03 (0.1584)       0.0214       -0.035       [-0.343,0.2930]       0.6358         AF (1)       0.7969 (0.0734)       0.009       0.7984       [0.6504,0.9413]       0.291         BOC (1)       0.0042 (0.1429)       0.0318       0.0155       [-0.289,0.2483]       0.5371         PBE (1)       0.389 (0.1395)       0.0021       0       [0.1126,0.6593]       0.5467         BOF (1)       0.6087 (0.0326)       0.0004       0.6087       [0.5450,0.6729]       0.1279         NERK (1)       -0.44(0.1023)       0.0173       -0.4433       [-0.638, -0.233]       0.4017         -2       0.1204 (0.1411)       0.0223       0.1196       [-0.523,0.0237]       0.552         -3       -0.375 (0.1398)       0.0287       -0.369       [-0.638, -0.114]       0.5243         N_E	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1 139 1 5734]	0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344
IG (1)       0.5487(0.1204)       0.0182       0.5442       [0.3144,0.7884]       0.474         MFSB (1)       1.2457(0.1339)       0.0185       1.2427       [0.9863,1.5150]       0.5287         -2       -0.338(0.174)       0.0103       -0.341       [-0.688-,0.0020]       0.6861         -3       -0.03(0.1584)       0.0214       -0.035       [-0.343,0.2930]       0.6358         AF (1)       0.7969(0.0734)       0.009       0.7984       [0.6504,0.9413]       0.291         BOC (1)       0.0042(0.1429)       0.0318       0.0155       [-0.289,0.2483]       0.5371         PBE (1)       0.389(0.1395)       0.0021       0       [0.1126,0.6593]       0.5467         BOF (1)       0.6087(0.0326)       0.0004       0.6087       [0.5450,0.6729]       0.1279         NERK (1)       -0.44(0.1023)       0.0173       -0.443       [-0.638, -0.233]       0.4017         -2       0.1204(0.1411)       0.0223       0.1196       [-0.152,0.3997]       0.552         -3       -0.375(0.1398)       0.0287       -0.369       [-0.638, -0.114]       0.5243         N_E (1)       0.4957(0.0967)       0.0009       0.4963       [0.3043,0.6835]       0.379         PO (1)	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1)	n approach Mean (Std. Dev.) (5 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4344 0.4195
MFSB (1)       1.2457(0.1339)       0.0185       1.2427       [0.9863,1.5150]       0.5287         -2       -0.338(0.174)       0.0103       -0.341       [-0.688-,0.0020]       0.6861         -3       -0.03(0.1584)       0.0214       -0.035       [-0.343,0.2930]       0.6358         AF (1)       0.7969(0.0734)       0.009       0.7984       [0.6504,0.9413]       0.291         BOC (1)       0.0042(0.1429)       0.0318       0.0155       [-0.289,0.2483]       0.5371         PBE (1)       0.389(0.1395)       0.0021       0       [0.1126,0.6593]       0.5467         BOF (1)       0.6087(0.0326)       0.0004       0.6087       [0.5450,0.6729]       0.1279         NERK (1)       -0.44(0.1023)       0.0173       -0.443       [-0.638, -0.233]       0.4017         -2       0.1204(0.1411)       0.0223       0.1196       [-0.152,0.3997]       0.552         -3       -0.375(0.1398)       0.0287       -0.369       [-0.638, -0.114]       0.5243         N_E (1)       0.4957(0.0967)       0.0009       0.4963       [0.3043,0.6835]       0.379         PO (1)       -0.246(0.138)       0.0107       -0.244       [-0.523,0.0237]       0.5467         -2	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1)	n approach Mean (Std. Dev.) (S 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0155 0.0217	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1)	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204)	MCSE 0.0022 0.0098 0.0078 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4344 0.4344 0.4195 0.5458 0.474
-3         -0.03(0.1584)         0.0214         -0.035         [-0.343,0.2930]         0.6358           AF (1)         0.7969(0.0734)         0.009         0.7984         [0.6504,0.9413]         0.291           BOC (1)         0.0042(0.1429)         0.0318         0.0155         [-0.289,0.2483]         0.5371           PBE (1)         0.389(0.1395)         0.0021         0         [0.1126,0.6593]         0.5467           BOF (1)         0.6087(0.0326)         0.0004         0.6087         [0.5450,0.6729]         0.1279           NERK (1)         -0.44(0.1023)         0.0173         -0.443         [-0.635, -0.233]         0.4017           -2         0.1204(0.1411)         0.0223         0.1196         [-0.152,0.3997]         0.552           -3         -0.375(0.1398)         0.0287         -0.369         [-0.638, -0.114]         0.5243           N_E (1)         0.4957(0.0967)         0.0009         0.4963         [0.3043,0.6835]         0.379           PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MESB (1)	n approach Mean (Std. Dev.) (5 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339)	MCSE 0.0022 0.0098 0.0078 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4344 0.4344 0.5458 0.474 0.5287
AF (1)         0.7969(0.0734)         0.009         0.7984         [0.6504,0.9413]         0.291           BOC (1)         0.0042(0.1429)         0.0318         0.0155         [-0.289,0.2483]         0.5371           PBE (1)         0.389(0.1395)         0.0021         0         [0.1126,0.6593]         0.5467           BOF (1)         0.6087(0.0326)         0.0004         0.6087         [0.5450,0.6729]         0.1279           NERK (1)         -0.44(0.1023)         0.0173         -0.443         [-0.635, -0.233]         0.4017           -2         0.1204(0.1411)         0.0223         0.1196         [-0.152,0.3997]         0.552           -3         -0.375(0.1398)         0.0287         -0.369         [-0.638, -0.114]         0.5243           N_E (1)         0.4957(0.0967)         0.0009         0.4963         [0.3043,0.6835]         0.379           PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect         Var(intercept)         0.	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2	n approach Mean (Std. Dev.) (S 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174)	MCSE 0.0022 0.0098 0.0078 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-0.0020]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861
BOC (1)         0.0042(0.1429)         0.0318         0.0155         [-0.289,0.2483]         0.5371           PBE (1)         0.389(0.1395)         0.0021         0         [0.1126,0.6593]         0.5467           BOF (1)         0.6087(0.0326)         0.0004         0.6087         [0.5450,0.6729]         0.1279           NERK (1)         -0.44(0.1023)         0.0173         -0.443         [-0.635, -0.233]         0.4017           -2         0.1204(0.1411)         0.0223         0.1196         [-0.152,0.3997]         0.552           -3         -0.375(0.1398)         0.0287         -0.369         [-0.638, -0.114]         0.5243           N_E (1)         0.4957(0.0967)         0.0009         0.4963         [0.3043,0.6835]         0.379           PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect         Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.0020] [-0.343,0.2930]	length 0.272 0.267 0.2792 0.3442 0.3442 0.2783 0.2424 0.4344 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358
PBE (1)         0.389(0.1395)         0.0021         0         [0.1126,0.6593]         0.5467           BOF (1)         0.6087(0.0326)         0.0004         0.6087         [0.5450,0.6729]         0.1279           NERK (1)         -0.44(0.1023)         0.0173         -0.443         [-0.635, -0.233]         0.4017           -2         0.1204(0.1411)         0.0223         0.1196         [-0.152,0.3997]         0.552           -3         -0.375(0.1398)         0.0287         -0.369         [-0.638, -0.114]         0.5243           N_E (1)         0.4957(0.0967)         0.0009         0.4963         [0.3043, 0.6835]         0.379           PO (1)         -0.244(0.138)         0.0107         -0.244         [-0.523, 0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300, 0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279, 0.3536]         0.633           Random Effect         Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203, 0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1)	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.020] [-0.343,0.2930] [0.6504.0.9413]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291
BOF (1)         0.6087(0.0326)         0.0004         0.6087         [0.5450,0.6729]         0.1279           NERK (1)         -0.44(0.1023)         0.0173         -0.443         [-0.635, -0.233]         0.4017           -2         0.1204(0.1411)         0.0223         0.1196         [-0.152,0.3997]         0.552           -3         -0.375(0.1398)         0.0287         -0.369         [-0.638, -0.114]         0.5243           N_E (1)         0.4957(0.0967)         0.0009         0.49633         [0.3043,0.6835]         0.379           PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect         Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1)	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984 0.0155	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-0.0020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371
NERK (1)         -0.44(0.1023)         0.0173         -0.443         [-0.635, -0.233]         0.4017           -2         0.1204(0.1411)         0.0223         0.1196         [-0.152,0.3997]         0.552           -3         -0.375(0.1398)         0.0287         -0.369         [-0.638, -0.114]         0.5243           N_E (1)         0.4957(0.0967)         0.0009         0.4963         [0.3043,0.6835]         0.379           PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect         Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1)	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395)	MCSE 0.0022 0.0098 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318 0.0021	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984 0.0155 0	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688,0.0020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467
-2         0.1204(0.1411)         0.0223         0.1196         [-0.152,0.3997]         0.552           -3         -0.375(0.1398)         0.0287         -0.369         [-0.638, -0.114]         0.5243           N_E (1)         0.4957(0.0967)         0.0009         0.4963         [0.3043,0.6835]         0.379           PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect           Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1)	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318 0.0021 0.0004	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984 0.0155 0 0 0.6087	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688,0.0020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5371 0.5467 0.1279
-3         -0.375(0.1398)         0.0287         -0.369         [-0.638, -0.114]         0.5243           N_E (1)         0.4957(0.0967)         0.0009         0.4963         [0.3043,0.6835]         0.379           PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect           Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1) NERK (1)	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326) -0.44(0.1023)	MCSE 0.0022 0.0098 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0103 0.0214 0.009 0.0318 0.0021 0.0004 0.0173	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984 0.0155 0 0 0.6087 -0.443	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.0020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729] [-0.635, -0.233]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467 0.1279 0.4017
N_E (1)         0.4957(0.0967)         0.0009         0.4963         [0.3043,0.6835]         0.379           PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect         Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1) NERK (1) -2	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326) -0.44(0.1023) 0.1204(0.1411)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0103 0.0214 0.009 0.0318 0.0021 0.0021 0.0021 0.0023	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984 0.0155 0 0 0.6087 -0.443 0.1196	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.0020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729] [-0.635, -0.233] [-0.152,0.3997]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467 0.1279 0.4017 0.552
PO (1)         -0.246(0.138)         0.0107         -0.244         [-0.523,0.0237]         0.5467           -2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect         Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1) NERK (1) -2 -3 AF (1) -2 -3 AF (1) BOC (1) PBE (1) -2 -3 AF (1) BOC (1) -2 -3 -3 AF (1) -2 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326) -0.44(0.1023) 0.1204(0.1411) -0.375(0.1398)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318 0.0021 0.0024 0.0023 0.0223 0.0223 0.0287	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984 0.0155 0 0 0.6087 -0.443 0.1196 -0.369	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.0020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729] [-0.635, -0.233] [-0.152,0.3997] [-0.638, -0.114]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467 0.1279 0.4017 0.552 0.5243
-2         -0.071(0.1267)         0.0216         -0.074         [-0.300,0.1838]         0.4834           -3         0.0214(0.1629)         0.0182         0.018         [-0.279,0.3536]         0.633           Random Effect         Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1) NERK (1) -2 -3 N_E (1)	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1393) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326) -0.44(0.1023) 0.1204(0.1411) -0.375(0.1398) 0.4957(0.0967)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318 0.0021 0.0004 0.0173 0.0223 0.0287 0.0009	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984 0.0155 0 0.6087 -0.443 0.1196 -0.369 0.4963	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.0020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729] [-0.635, -0.233] [-0.152,0.3997] [-0.638, -0.114] [0.3043,0.6835]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467 0.1279 0.4017 0.552 0.5243 0.379
-3       0.0214(0.1629)       0.0182       0.018       [-0.279,0.3536]       0.633         Random Effect       Var(intercept)       0.2781(0.0805)       0.0053       0.28       [0.1203,0.4359]       0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1) NERK (1) -2 -3 N_E (1) PO (1)	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1393) 0.5487(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326) -0.44(0.1023) 0.1204(0.1411) -0.375(0.1398) 0.4957(0.0967) -0.246(0.138)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318 0.0021 0.0004 0.0173 0.0223 0.0287 0.0009 0.0107	Median 0.2558 0.0124 0.615 0.3613 0.0968 0.8473 0.378 1.3729 0.2617 0.3227 0.5442 1.2427 -0.341 -0.035 0.7984 0.0155 0 0 0.6087 -0.443 0.1196 -0.369 0.4963 -0.244	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.0020] [-0.638,-0.0230] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729] [-0.635, -0.233] [-0.152,0.3997] [-0.638, -0.114] [0.3043,0.6835] [-0.523,0.0237]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467 0.1279 0.4017 0.552 0.5243 0.379 0.5467
Random Effect         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1) NERK (1) -2 -3 N_E (1) PO (1) -2 -3	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326) -0.44(0.1023) 0.1204(0.1411) -0.375(0.1398) 0.4957(0.0967) -0.246(0.138) -0.071(0.1267)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318 0.0021 0.0004 0.0173 0.0287 0.0099 0.0107 0.0287	Median           0.2558           0.0124           0.615           0.3613           0.0968           0.8473           0.378           1.3729           0.2617           0.3227           0.5442           1.2427           -0.341           -0.035           0.7984           0.0155           0           0.6087           -0.443           0.1196           -0.369           0.4963           -0.244           -0.074	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.020] [-0.638,1.5150] [-0.688-,0.020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729] [-0.635, -0.233] [-0.152,0.3997] [-0.638, -0.114] [0.3043,0.6835] [-0.523,0.0237] [-0.530,0.237]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467 0.1279 0.4017 0.552 0.5243 0.379 0.5467 0.4834
Var(intercept)         0.2781(0.0805)         0.0053         0.28         [0.1203,0.4359]         0.3156	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1) NERK (1) -2 -3 N_E (1) PO (1) -2 -3	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326) -0.44(0.1023) 0.1204(0.1411) -0.375(0.1398) 0.4957(0.0967) -0.246(0.138) -0.071(0.1267) 0.0214(0.1629)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318 0.0021 0.0004 0.0173 0.0223 0.0287 0.0009 0.0107 0.0216 0.0182	Median           0.2558           0.0124           0.615           0.3613           0.0968           0.8473           0.378           1.3729           0.2617           0.3227           0.5442           1.2427           -0.341           -0.035           0.7984           0.0155           0           0.6087           -0.443           0.1196           -0.369           0.4963           -0.244           -0.074	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688-,0.020] [-0.343,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729] [-0.635, -0.233] [-0.152,0.3997] [-0.638, -0.114] [0.3043,0.6835] [-0.523,0.0237] [-0.300,0.1838] [-0.279,0.3536]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467 0.1279 0.4017 0.5523 0.379 0.5243 0.379 0.5467 0.4834 0.633
	(b) using Bayesia Fixed Effect Student-level chx Intercept SP GS SCSE DEE AIR CPS IOS RTC (1) CFBI (1) IG (1) MFSB (1) -2 -3 AF (1) BOC (1) PBE (1) BOF (1) NERK (1) -2 -3 N_E (1) PO (1) -2 -3 Random Effect	n approach Mean (Std. Dev.) (s 0.2553(0.0703) 0.018(0.0664) 0.6147(0.0718) 0.3684(0.0858) 0.0957(0.086) 0.8483(0.0698) 0.3799(0.0618) 1.3673(0.114) 0.2546(0.1093) 0.3256(0.1393) 0.5487(0.1204) 1.2457(0.1339) -0.338(0.174) -0.03(0.1584) 0.7969(0.0734) 0.0042(0.1429) 0.389(0.1395) 0.6087(0.0326) -0.44(0.1023) 0.1204(0.1411) -0.375(0.1398) 0.4957(0.0967) -0.246(0.138) -0.071(0.1267) 0.0214(0.1629)	MCSE 0.0022 0.0098 0.0078 0.0197 0.0159 0.0047 0.0084 0.0206 0.0155 0.0217 0.0182 0.0185 0.0103 0.0214 0.009 0.0318 0.0021 0.0004 0.0173 0.0223 0.0287 0.0009 0.0107 0.0216 0.0182	Median           0.2558           0.0124           0.615           0.3613           0.0968           0.8473           0.378           1.3729           0.2617           0.3227           0.5442           1.2427           -0.341           -0.035           0.7984           0.0155           0           0.6087           -0.443           0.1196           -0.369           0.4963           -0.244           -0.074           0.018	[95% cred. Interval] [0.1149,0.3869] [-0.105,0.1619] [0.4729,0.7521] [0.2216,0.5658] [-0.076,0.2666] [0.7151,0.9934] [0.2609,0.5033] [1.139,1.5734] [0.037,0.4566] [0.0595,0.6053] [0.3144,0.7884] [0.9863,1.5150] [-0.688,0.0020] [-0.638,1.5150] [-0.688,0.0020] [-0.634,0.2930] [0.6504,0.9413] [-0.289,0.2483] [0.1126,0.6593] [0.5450,0.6729] [-0.635, -0.233] [-0.152,0.3997] [-0.638, -0.114] [0.3043,0.6835] [-0.523,0.0237] [-0.530,01838] [-0.279,0.3536]	length 0.272 0.267 0.2792 0.3442 0.3425 0.2783 0.2424 0.4344 0.4195 0.5458 0.474 0.5287 0.6861 0.6358 0.291 0.5371 0.5467 0.1279 0.4017 0.552 0.5243 0.379 0.5467 0.4834 0.633

 Table 3. Estimated regression coefficients and variance components for fixed effect model (Model 2).

 (a). Using Classical approach

In the model consisting of student-level variables or characteristics (Model 2), 10 of the 18 student characteristics were significantly associated with the odds of their entrepreneurial intention (Table 3a and Table 3b). In the meanwhile, parents' occupation, systematic planning, colleagues' business background, means of finance, discouragement by external environment, risk taking commitment, number of entrepreneurs' respondents knows and clear future business idea are not significant predictors at 5% level of significance.

The intercept for this model was 0.2570. Thus, at an average university (i.e., a university whose random effect was equal to zero), the probability of entrepreneurial covariates intention for а student whose were equal to zero was expo(0.2570)/[1 + expo(0.2570)] = 0.564. In Table 3a, the variance component representing variation between university has decreased from 0.2929 in the empty model to 0.2802 in the fixed effect model and the significance of it indicates that there is a significant variation between student's entrepreneurial intention who placed in different university.

Table 3a and Table 3b shows us that there is clear difference between the values of  $\beta$  coefficients of covariates in the model which estimated by classical and Bayesian approach. When Bayesian multilevel effects have not been taken into consideration as compared to classical approach, the  $\beta$  coefficients have been underestimated or overestimated for the covariates. For instance, for the variables goal setting (GS) and information and opportunity seeking (IOS), the  $\beta$  coefficients of the multilevel model estimated by classical approach have been underestimated by almost 3% and 2% respectively. On the contrary, the  $\beta$  coefficients for the covariates, systematic planning (SP) and self-confidence and self-esteem (SCSE) factor score, the  $\beta$  coefficients of the multilevel model using classical approach has been overestimated by 85% and 13%, respectively. Hence,  $\beta$  coefficients are distorted somewhat in both directions either in over or under direction from the true value when Bayesian multilevel effects are not taken into consideration in modeling.

#### 4.3.2. Random Effect Model (Model 3)

Random effect model allows the effect that the coefficient of the explanatory variable to vary from cluster to cluster. In this model, we considered student level variables (at level 1) and university level variables (at level 2). In the model that included both student and university characteristics (Model 3), ten of the 18 student characteristics were significantly associated with the log-odds of entrepreneurial intention, while only one of the three university characteristics (Perceived entrepreneurial educational (EE) support) was significantly associated with the outcome (odds ratio = 0.9958, 95% CI = (0.8619, 1.1297) (Table 4a). Neither business counseling (odds ratio = 0.9958, 95% CI = (0.8619, 1.1297)) nor exchange of thoughts, ideas and experiences by invited guests (odds ratio = 1.0187, 95% CI = (0.8836, 1.1537)) was significantly associated with student's entrepreneurial intention. This means that there is no significance difference between students who enrolled in those university that provide business counseling service and those university that didn't provide this service in their entrepreneurial intention. Also, there is no significant difference between student's who enrolled in those university that shares or exchanges thoughts, ideas and experiences by invited guests and those university who did not invite any guests for business discourse in their entrepreneurial

(a). Using Classical approach					
Fixed Effect	Coef. (Std. Err.)	P > z	[95% Conf. Interval]	length	
Student-level chxs					
Intercept	0.2498(0.0690)	0.000	[0.1146, 0.3850]	0.2704	
SP	0.0322(0.0876)	0.713	[-0.1394.0.2039]	0.3432	
GS	0.5951(0.0948)	0.000	[0.4093,0.7810]	0.3716	
SCSE	0.4139(0.0933)	0.000	[0.2311,0.5967]	0.3656	
AIR	0.8472(0.0989)	0.000	[0.6532,1.0410]	0.3877	
CPS	0.3464(0.0950)	0.000	[0.1602, 0.5327]	0.3724	
IOS	1.3411(0.1203)	0.000	[1.1052,1.5769]	0.4717	
RTC (1)	0.2016(0.2381)	0.397	[-0.265,0.6682]	0.9332	
CFBI (1)	0.3502(0.2005)	0.081	[-0.0428, 0.7433]	0.7861	
IG (1)	0.4594(0.2376)	0.053	[-0.0063,0.9250]	0.9313	
MFSB (1)	1.1915(0.4159)	0.004	[0.3762,2.0068]	1.6305	
(2)	-0.2700(0.9143)	0.768	[-2.0616,1.5224]	3.5841	
(3)	0.0563(0.2955)	0.849	[-0.5229,0.6356]	1.1585	
AF (1)	0.7919(0.3114)	0.011	[0.1815,1.4022]	1.2207	
BOC (1)	0.0326(0.2008)	0.871	[-0.361,0.4262]	0.7872	
PBE (1)	0.3880(0.1416)	0.006	[0.1040,0.6600]	0.5560	
BOF (1)	0.6088(0.3263)	0.000	[0.5448,0.6727]	0.1279	
NERK (1)	-0.3500(0.2685)	0.192	[-0.8765,0.1760]	1.0526	
(2)	0.1893(0.2990)	0.527	[-0.3968,0.7753]	1.1721	
(3)	-0.291(0.2735)	0.288	[-0.8268,0.2451]	1.0720	
N_E (1)	0.4943(0.0970)	0.000	[0.3023,0.6827]	0.3804	
PO (1)	-0.267(0.3318)	0.421	[-0.9171,0.3835]	1.3007	
(2)	-0.050(0.3688)	0.893	[-0.7726,0.6731]	1.4456	
(3)	-0.035(0.3668)	0.923	[-0.7543,0.6834]	1.4377	
University-level chxs					
EE (1)	1.0426(0.2928)	0.000	[0.4687, 1.6165]	1.1478	
BC (1)	-0.0042(0.0683)	0.951	[-0.1380, 0.1296]	0.2676	
ETIG (1)	0.0185(0.0689)	0.788	[-0.1165, 0 .1536]	0.2701	
Random Effect					
Var (intercept)	0.2774(0.0796)		[0.1214, 0.4334]	0.3120	
Var (EE)	0.1273(0.0439)		[0.0413, 0.2133]	0.1720	

 Table 4a. Estimated regression coefficients and variance components for Random effect model (Model 3).

intention. The intercept for this model was 0.2498 (see in Table 4a). Thus, at an average university (i.e., a university whose random effect was equal to zero), the probability of entrepreneurial intention for a student whose covariates were equal to zero was expo(0.2498)/[1 + expo(0.2498)] = 0.562. The results of random effect model are shown in Table 4a and Table 4b.

In Table 4a, the value of Var (intercept) and Var (EE) are the estimated variance of random effect intercept and slope of perceived entrepreneurial educational (EE) support respectively. These estimated variances are significant suggesting that intercept and slope of EE vary significantly. So, there is a significant variation in the effect of EE across university in Ethiopia. The random intercept for j<sup>th</sup> university is 0.2498 (0.0690) +  $\emptyset_{0j}$  and their variance 0.2774 (Std. error = 0.0796) (see Table 4a). Thus, the value 0.2498 is the intercept for university j with  $\emptyset_{0j} = 0$  (i.e., the mean value of  $\emptyset_{0j}$ ). The between-university variance of slope of EE is estimated to be 0.1273 (std. error 0.0439) and the individual university slopes of EE vary about with this amount.

Fixed Effect	Mean (Std. Dev.)	MCSE	Median	[95% Cred. interval]	length
Student-level chxs					
Intercept	0.2451(0.0592)	0.0041	0.2459	[0.1291, 0.3611]	0.2320
SP	0.0375(0.0636)	0.0058	0.0404	[-0.0837,0.1594]	0.2432
GS	0.622(0.0727)	0.0093	0.619	[0.48602,0.7692]	0.2832
SCSE	0.401(0.0707)	0.0067	0.4004	[0.26941,0.5445]	0.2751
AIR	0.8487(0.0687)	0.0073	0.8469	[0.7211,0.9782]	0.2571
CPS	0.3873(0.0773)	0.01	0.3868	[0.2292,0.5327]	0.3035
IOS	1.3399(0.055)	0.0112	1.339	[1.2348,1.4469]	0.2122
RTC (1)	0.2229(0.1265)	0.0112	0.2283	[-0.0212,0.4651]	0.4863
CFBI (1)	0.3406(0.1114)	0.0158	0.3385	[0.1397,0.5605]	0.4208
IG (1)	0.4588(0.124)	0.0093	0.4617	[0.2077,0.7059]	0.4981
MFSB (1)	1.1868(0.1075)	0.0107	1.186	[0.9823,1.4027]	0.4204
(2)	-0.262(0.1398)	0.0263	-0.262	[-0.5344,0.0267]	0.5611
(3)	0.0585(0.1272)	0.0122	0.0502	[-0.1599,0.3254]	0.4854
AF (1)	0.8029(0.0789)	0.015	0.8024	[0.6377,0.9566]	0.3189
BOC (1)	0.0773(0.1175)	0.011	0.0707	[-0.1306,0.3188]	0.4493
PBE (1)	0.389(0.1395)	0.0021	0.000	[0.1126,0.6593]	0.5467
BOF (1)	0.6087(0.0326)	0.0004	0.6087	[0.5450,0.6729]	0.1279
NERK (1)	-0.354(0.084)	0.0132	-0.357	[-0.5166, -0.184]	0.3326
(2)	0.1477(0.1149)	0.0189	0.1481	[-0.0858,0.3738]	0.4596
(3)	-0.306(0.0952)	0.0174	-0.306	[-0.4999, -0.112]	0.3879
N_E (1)	0.4957(0.0967)	0.0009	0.4963	[0.3043, 0.6835]	0.3790
PO (1)	-0.25(0.0772)	0.0062	-0.253	[-0.3966, -0.1018]	0.2947
(2)	-0.014(0.1141)	0.0122	-0.011	[-0.2504, 0.1847]	0.4352
(3)	0.0189(0.0983)	0.0137	0.0199	[-0.1640, 0.2092]	0.3732
University-level chxs					
EE (1)	1.0209(0 .2822)	0 .0143	1.0094	[0.4943, 1.5903]	1.0960
BC (1)	-0.0034(0.0671)	0.0034	-0.0077	[-0.1349,0.1281]	0.2630
ETIG (1)	0.0183(0.0611)	0.0028	0.0173	[-0.1380,0.1015]	0.2395
Random Effect					
Var (intercept)	0.2703(0.0712)	0.0015	0.2700	[0.1307,0.4099]	0.2792
Var (EE)	0.1268(0.0407)	0.0396	0.1264	[0.0470,0.2066]	0.1596

**Table 4b.** Estimated regression coefficients and variance components for Random effect model (Model 3) (b). using Bayesian approach.

The result of Table 4b revealed lower standard errors of the estimated coefficients in the Bayesian logistic regression approach as compared to classical approach (Table 4a). Moreover, the results revealed that the length of the Bayesian credible interval is smaller than the length of the maximum likelihood confidence interval for all predictor variables.

#### 4.4. Model Diagnostic

Once the results of the model are computed, it is important to check for the convergence of Markov Chain Monte Carlo. Figure 2 illustrates the convergence of the Bayesian with non-informative prior using the Gelman-Rubin Convergence Diagnostic test. The histogram of MCMC residual is normal. The trace plot also indicates that convergence was achieved. Correlation becomes negligible after 10 periods. The algorithm converged after 100, 000 iterations. To remove the autocorrelation and burning periods, a lag of 20 was considered and the first 35, 000 iterations removed. The output of Gelman-Rubin convergence diagnostic test displays the red lines representing the  $\hat{R}$ . The graph shows that all the  $\hat{R} \rightarrow 1$ . Also, the blue and green lines which represent the within sample variance and the pooled posterior variance, are stationary. Thus, the Gelman-Rubin Convergence Diagnostic test suggests that the algorithm converges.



Figure 2. MCMC residual diagnostics for convergence.

Model	Classical	Bayesian Approach	
model	AIC	BIC	DIC
Empty model (Model 1)	1257.775	1267.426	1253.195
Fixed effect model (Model 2)	863.654	987.455	830.051
Random effect model (Model 3)	859.075	968.591	828.661

Table 5. Model comparison.

#### 4.5. Model comparison

Table 5 displays the AIC, BIC and DIC for classical approach and Bayesian approach for each model. The findings this research work indicates that random effect model (Model 3) is more plausible than Model 1 and Model 2. Bayesian approach is also more plausible than classical approach because DIC for Bayesian method demonstrated lowest value than AIC and BIC value for classical approach which denotes the better fits. This conclusion is similar with Pandey, Dwivedi, and Bandyopadhyay (2011), and Nasir and AI-Anber (2012) study in which the Bayesian method is superior compared to maximum likelihood estimation.

#### 5. Discussion and Conclusion

Finding of this study reveal that entrepreneurial attitude significantly influences students' entrepreneurial intentions. The results conform to the literature that entrepreneurial

attitude has a positive relationship with Entrepreneurial intentions (Ayalew & Zeleke, 2018; Kolvereid, 2016; Mahendra *et al.*, 2017; Soomro & Shah, 2015).

Entrepreneurship education improves motivation towards being entrepreneurial by inspiring students' personal attraction towards entrepreneurship and perceived behavioral control (Dugassa, 2012; Gemechis, 2007; Sanditov & Verspagen, 2011). In a similar study by Tshikovhi and Shambare (2015), they found that high level of entrepreneurship education was observed among South African students to create favorable attitudes towards entrepreneurship. Similar findings have been established by several scholars (e.g., Welsh, Tullar, and Nemati, 2016; Alharbi, Almahdi, & Mosbah, 2018; Byabashaija & Katono, 2011; Fayolle & Gailly, 2013; Hattab, 2014; Nabi & Holden, 2008; Nabi, Liñán, Fayolle, Krueger, & Walmsley, 2017). They conclude that entrepreneurial training significantly improves the attitudes of students towards a choice of entrepreneurial career. This implies that when students are equipped with the ability recognize business opportunities and business knowledge like marketing, this stimulates their positive towards entrepreneurship. This is consistent with our findings. The result of this research indicates that students who placed in university that delivers entrepreneurshiporiented courses were 5.493 (OR = 5.493) times higher than those students who placed in those university that didn't deliver entrepreneurship-oriented courses while controlling other variables. In conclusion, Hypothesis 1: Perceived educational support has a positive impact on entrepreneurial intention is supported.

Students who came from business-owned family are more likely to have entrepreneurial intention compared to students who came from non-business-owned families. Table 4a tells us that students who came from business-owned families were 25.4% (OR = 1.838) more likely to have entrepreneurial intention compared to students who came from non-business-owned families. The reason might be that they may have prior business experience from families. The experience gained from their family member may influence the students' engagement in entrepreneurship. This is in agreement with the findings in other studies (Dohse & Walter, 2012; Fitzsimmons & Douglass, 2005; Robson, 2015; Sanditov & Verspagen, 2011). Similarly, the odd of entrepreneurial intention of students who have prior business experience from their family was 47.6% more likely to have entrepreneurial intention than students who have no any prior business experience from their family controlling other variables.

In the literature, some scholars have investigated the influence between entrepreneurial attitudes on students' entrepreneurial intentions. For instance, Nguyen (2017) has studied entrepreneurial intention among international business students in Vietnam. The result of the study confirms that attitude towards entrepreneurship and perceived behavior control is positively related to entrepreneurial intention. The need of student on self-employment can be achieved through effective communication whereby information is captured properly and feedback is provided. This research comes up with the evidence that there is a significant difference in entrepreneurial intention status of students between information and opportunity seekers and non-seekers. The seekers have high intention (OR = 3.818) to be entrepreneurs than non-seekers. Other researchers also pointed out that students who seek information and opportunity are more likely to be self-employed than non-seekers (Hamidi et al., 2008). Furthermore, creativity and problem-solving skills are also among the most important determinants of entrepreneurial intention among undergraduate university students. According to this research findings, students who have high level of creativity and problem-solving skills are more likely to engage in entrepreneurship activity (OR = 1.472) than students who have low level of creativity and problem-solving skills. This finding is also in line with other previous studies (Hamidi et al., 2008; Ismail et al., 2013; Okpara, 2007). These show that students who have high level of creativity and problem-solving skills have the highest intention to be self-employed. Moreover, a student who sets meaningful and challenging goals for him/her has more likely to be entrepreneur than student who did not set goals. Some studies have also revealed that entrepreneurial intention increases if the individuals have high self-confidence and self-esteem (Ismail et al., 2013). Our findings are in agreement with this fact. Students who have high self-confidence and self-esteem are more likely (OR = 1.493) to engage in entrepreneurship than from less confident students. In analyzing the findings, this research found evidence that networking and professional contact and goal setting to their future career have positive contribution to the entrepreneurial intention of students. From the result of the study, a student who establishes relationship, professional contacts and networks with business person had higher probability (OR = 1.641) of being entrepreneurs than students who did not make any professional contacts and networks because an entrepreneur acts to develop and maintain business contacts by establishing good working relationship and uses deliberate strategies to influence others. The ability to establish and maintain positive relationship is crucial to the success of the students' business venture (Turkina, Assche, & Kali, 2016). In conclusion. Hypothesis 2: Personal attitudes has a positive impact on entrepreneurial intention is supported.

The effect of support from family and friends on entrepreneurial intention is studied by different scholars. For instance, the study conducted among young Australians concluded that friends significantly influence student decision to start a business (Nanda & Sorensen, 2010; Sergeant & Crawford, 2001). It is also found that, the support from family, friends and close network among Turkish university students were positively influenced their decision to become an entrepreneur (Yurtkoru et al., 2014). Similarly, Altinay et al. (2012) in a study of university hospitality students in the UK found that, family entrepreneurial background positively related to entrepreneurial intention. Supporting these, Zapkau et al. (2015) also found that the parental role models positively influence entrepreneurial intention. In addition, availability of finance/capital is also regarded as one of the common obstacle to establish a new business (Kristiansen & Indarti, 2004). Access to finance is the ability of the individuals to find financial support to establish a business since most of the investors and banks are not willing to make investments in new ventures. Family background is also taken into account as a factor affecting entrepreneurial intention. For instance, the study of Henderson and Robertson (2000) showed that family was the second factor influencing career choice of respondents after their personal experience. The finding of this research work is in line with the previous research works in such a way that family business background, business experience of students and access to finance are a contributing risk factor for student's entrepreneurial intention. The odd of entrepreneurial intention of students who have access to finance/capital was about 23.2% (OR = 2.232) times higher than the odd of entrepreneurial intention of students who do not have access to capitals controlling for other variables in the model. In conclusion, Hypothesis 3: Perceived relational support has a positive impact on entrepreneurial intention is supported.

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In the literature on entrepreneurship, thus, entrepreneurs are generally characterized as having a greater propensity to take risks than other groups (Cromie, 2000; Thomas & Mueller, 2000). Social factors have an encouraging or impeding effect on the intention of individuals for entrepreneurial career. Other scholars find an evidence that the norms and values of a society influence the choice of individual's life careers (Sanditov & Verspagen, 2011). The result of this research work is inconsistence with the result of previous researches. In conclusion, **Hypothesis 4: socio-economic factors have a positive impact on entrepreneurial intention of students is not supported.** 

The effect of gender on the probability of becoming an entrepreneur is demonstrated in several previous studies which found that males show a higher level of interest than females in creating new businesses (Minniti et al., 2005; Mueller, 2004; Reynolds et al., 2002). On the contrary, the result of this research revealed that gender doesn't influences both preference and actual engagement in entrepreneurial activity. More recently, Liang et al. (2018) even confirmed an inverted U-shaped relationship between entrepreneurship and age due to the fact that in spite of business skills increasing with experience, creativity may decline with age. Their model also implies that older societies have lower rates of entrepreneurship at every age. The finding of this research is in agreement with this fact. The reason may be the respondents in this research have the same age group, i.e., 18–25 years old. In conclusion, **Hypothesis 5: demographic factors are associated with entrepreneurial intention is not supported**.

From the above discussion, we conclude that perceived educational support, personal attitude and perceived relational support are the significant predictors of entrepreneurial intention of students at 5% level of significance. on the contrary, demographic variables (like gender and age) and socio-economic related variables (like means of finance, parents' occupation, risk taking commitment, colleagues business background, clear future business idea, discouragement by external environment, etc.) doesn't have any impact on their entrepreneurial intention at 5% level of significance. This research also compares the standard error and length of regression coefficients of ML estimation and Bayesian estimations. The results reveal that the Bayesian estimation approach provides lower standard errors of the regression coefficients as compared to classical approach. Moreover, the results also revealed that the length of the Bayesian credible interval is smaller than the length of the maximum likelihood confidence interval for all factors. In order to identify the most plausible method between Bayesian and ML estimation of the data, AIC, BIC and DIC were employed. The result of the study depicts that the Bayesian method performs better and more efficient than maximum likelihood estimation.

#### 6. Recommendation

Based on the finding of this research work, the following recommendation is proposed for the academic institutions, regulators and practitioners.

• The government as well as the university should design program that facilitate entrepreneurship trainings to change the mindset, attitude, and intention of those students who don't have an idea about entrepreneurship as a future career.

- The policy makers and educators should develop a strong culture and support system for entrepreneurship through offering public courses and training and removing the obstacles in the process of establishing new ventures specifically by university students.
- The government and university should maintain and strength the cooperation and contacts between students, fund raisers, and entrepreneurs.
- Educators should involve students in business plan writing, case studies and running a small new business rather than stressing only on entrepreneurship theories and traditional methods of teaching entrepreneurship.
- Universities and policy makers should encourage the development of creative ideas for being an entrepreneur, provide the necessary knowledge about entrepreneurship, and develop the entrepreneurial skills of the students.
- Educational and economic policymakers should design policies and programs like startup capital that are intended towards enabling graduates to realize their entrepreneurial intentions.
- Policy makers should give highest priority to the educational and perceived relational supports to students to generate the entrepreneurs of future.

#### **Limitations and Areas of Future Research**

The current study is subject to some limitations. The study employed a cross-sectional design. Firstly, similar to the previous studies in the literature, the study focuses on the intentionality. It is clear that intentions may not turn into actual behaviors in the future. Even if one respondent stated a high entrepreneurial intention in the survey, she/he might choose a completely different career path in the future. Therefore, future research could employ a longitudinal approach to determine whether entrepreneurial attitude and entrepreneurial intentions are maintained or change after graduating from university.

#### **Abbreviations**

AIC: Akaike Information Criteria, BIC: Schwartz Information Criteria, DIC: Deviance Information criteria, OR: Odd Ratio, MCMC: Markov chain Monte Carlo, ML: Maximum Likelihood

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#### **Availability of Data and Material**

Data and material are available at any time. There are no restrictions on the development of data materials.

#### **Author Contribution**

MMA did the major tasks of the work. He designed, innovated and developed the overall conceptual framework for the analysis and interpretation of the data for the work. The author read and approved the final manuscript.

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#### **Competing of Interests**

The author declares that there have no any competing interests.

#### **Disclosure statement**

No potential conflict of interest was reported by the author(s).

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#### **Notes on contributor**

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