

Role of Self-determination related Needs and Academic Locus of Control in Academic Achievement (GPA) among University Students

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The cross-sectional study was carried out to explore the role of academic locus of control learning as an explanatory mechanism between the relationships of self-determination-based needs and GPA. The sample comprised 279 (male $n=128$; female $n=151$) students of Quaid-i-Azam University from different departments, Pakistan. Basic Psychological Needs Scale (Guardia et al., 2000), Academic Locus of Control Scale (Trice, 1985) and last semester GPA as an indicator of academic achievement were used in the study. The reliabilities of the questionnaire were satisfactory. Self-determination related needs were positively related internal locus of control. The strongest predictors were autonomy, relatedness and academic locus of control in predicting GPA. Academic locus of control was non-significant mediator for autonomy and relatedness in predicting GPA, but it played mediating role for competence in predicting GPA. The findings provided the better understanding of role of satisfaction of self-determination related needs and academic locus of control in academic achievement among university students.

Keyword: Locus of control, self-determination related needs, autonomy, competence, relatedness, self-determination theory

Self-determination theory evaluates the internal motivation and discovers three main internal psychological needs that engage in self-determination: (a) need for autonomy, (b) need for competence, and (c) need for relatedness (Deci et al., 2017). *Competence* refers to the knowledge of a sense of efficacy and abilities to interacting in one's environment (Bao & Lam, 2020). The need for competence is like self-efficacy, which is defined as the inner belief in one's own abilities to complete a task (Meece et al., 2019). *Relatedness* satisfaction is defined as the experience of care, love and belongingness by significant people in one's life (Bao & Lam, 2020). Relatedness is a psychosocial variable refers to social belongingness, not a formal relationship and membership of group but, being valued and respected by others (Deci & Ryan, 2017). Finally, *autonomy*, the most important component of self-determination theory defined as the experience of self-enrollment and personal choices in one's activity (Bao & Lam, 2020). The need for autonomy refers to one's behavior is based on his/her own willingness and desire to do (Deci & Ryan, 2017).

The findings of growing body of studies among adolescents revealed that there is positive relationship between satisfaction of basic self-determination related needs and general subjective well-being (Eryilmaz, 2012). Tian et al. (2014) found that in adolescence self-determination related needs, may provide healthy self-based processes for youth and feelings of autonomy, competence and relatedness play an important, in fact major role in "*healthy psychological functioning*" for youth (Roeser et al., 2001, p. 133). Furthermore, research has claimed that at the onset of adolescence, the dissatisfaction of basic psychological needs decreases the motivation level among students (Eccles, & Roeser, 2011).

There are some research studies have supported the importance of self-determination based basic needs and their fundamental role in education domain. When self-determination

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theory (Deci et al., 1991) is applied in educational domain, the satisfaction of basic psychological needs (autonomy, competence & relatedness) predominantly promotes the student's interest toward valuing of education, developing a confidence in their abilities, attributes and motivation toward learning. The findings of research by Hui et al. (2019) revealed that these three psychological needs satisfaction are significantly positively correlated with academic motivation globally. Sawyer (2006), who found that there is significant relationship between satisfaction of basic psychological needs and the Grade Point Averages (GPA) among university students. In current study self-determination is measured by the satisfaction of three basic psychological needs, autonomy, competence and relatedness as defined by self-determination theory. It will provide a great insight in academic achievement among Pakistani students.

A study in Pakistan by Tariq et al. (2013) suggests that satisfaction of need for autonomy is positively correlated with academic outcomes. Furthermore, autonomous behaviours are positively correlated with wellbeing, enhanced academic performance, better determination (Sebire et al., 2018), and improved and modification of health-related behavior (Pelletier et al., 2014). In educational domain, research findings revealed that there is positive relationship between self-regulated learning strategies, educational outcomes and satisfaction of basic psychological needs (Elst et al., 2019).

Locus of control significant predictor of procrastination, and grade in educational domain (Carden, et al., 2004). Locus of control is a belief about outcomes whether they are based on one's actions or behaviours or based on external control/ external events (Zimbardo, 1985). It is defined as "*The aspects of an individual that contribute in his/her failures and successes*" (Forte, 2005, p. 65).

There are two types of locus of control: *Internal* represents "*people who have internal locus of control have belief about outcomes of their actions are controlled by their own decisions and efforts*" (p. 78). *External* represents "*people who have external locus of control have belief about outcomes of their behaviours are based on external control, environment and by chance (fate, luck, and so on)*" (Jatkevicius, 2010, p. 78). Those who have high level of internal locus of control show more interested to perform well in school and hunt high level of achievement (Sidelinger, 2010), as compared to those who give up easily and spend their time on externals factors, have external locus of control (Blanchard & Henle, 2018; Wang, 2019). A study showed that high degree of self-motivation, high degree of self-determination and high level of social maturity are significantly positively correlated with internal locus of control. Academic achievement is also associated with internal locus of control (Nelson & Mathias, 1995).

Many educational theorists and psychologists have explored a number of factors that effecting the student's learning performance, these factors have both academic and non-academic related components. A growing body of studies including the external and internal locus of control that influence the student's learning and educational outcomes for instance, those with internal locus of control believe that the outcome of their learning is based on their own efforts even as those with external locus of control believe that the outcomes of their learning is based on other's power and luck (Dollinger, 2010). Some psychological studies found correlation between internal locus of control and learning skills that is intellectually mature, independent, hard-working, responsible, problem-solving skills, etc. (Eachus, & Cassidy, 2010; Keith et al., 2018).

Number of studies found the relationship between academic locus of control and academic achievements. Particularly, high educational level leads to increases in internal locus of control (Slagsvold & Sorenson, 2018, p. 30). Students who receive better grades

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typically possess an internal locus of control. A research study by Kirkpatrick et al. (2018) revealed that students who have internal locus of control have high academic achievement (GPA) than those students who have external locus of control. There is a positive relationship between internal locus of control and success (Wise, 1999). Shepherd et al. (2006) concluded in their research that the students with high internal locus of control improve their performance daily.

Another study revealed that most talented students and higher achievers had significantly more internal locus of causality as compared to those who are underachievers and less talented (Laffoon et al., 1989). Recent research found significant results between internal locus of control and academic grades. Students who have internal locus of control are more adjusted in classroom and college life, and have high grades in academic performance than those students who have external locus of control toward their behaviors (Kirkpatrick et al., 2018). Generally academic achievements are significantly associated with internal locus of control (Carden et al., 2004).

A study showed that locus of control is predicted by self-determination (Reeve et al., 2013). Most important principle of self-determination theory is that the fulfillment of need of autonomy, need for competence and need for relatedness predicts internalization of behavior and internal locus of causality (Ryan & Deci, 2002). These findings are supported by Tian et al. (2014) who found that self-determination skills are significantly related with internal locus of control in predicting self-regulated learning. High scores on autonomy are positively related with competency, internal locus of control and internal motivation. They all are also predictors of academic achievement.

Research by Prociuk and Breen (2016) found that internal locus of locus is positively correlated with learning skills and academic achievement among college students. The idea of autonomy supportive environment illustrates a social climate where encouragement, acknowledgement of one's ideas and responsibility such as for learning, opportunities to make decisions and goals related information are available by authority figures (parents and teachers). Encouraging student's achievement, promote questioning, giving significant and reasonable answers to questions, and nonparticipation in arguments are fundamental aspects of autonomy-supportive interactions. So, the minimal burden, criticism, arguments, and power are determinants of autonomy support (Williams et al., 2002).

The teachers who provision students with organized material and guidance be likely to have a more autonomy and independence-supportive style (Sierens et al., 2009). There are some research studies found that student's self-determination, engagement in tasks and student's adjustment in educational environment is positively correlated with teacher's autonomy support (Soenens & Vansteenkiste, 2005). As autonomy supported by parents contributing student's self-determination, teachers' autonomy support for example providing choices, foundation for choices, relating with student's aspects, and reducing the usage of controlling language in the classroom context, play an important role in enhancing student's self-determination (Sierens et.al., 2009). The student's motivation to achieve personal goals, interest toward participation in task and the needs of autonomy and competence are satisfied by teacher-supportive practices in classroom (Reeve & Halusic, 2019). Moreover, the student's competency, interest, satisfaction and enjoyment toward task developed by autonomy supportive environment in classroom context (Black & Deci, 2000). The students who have low level of autonomy may improve their learning performance mainly in an autonomy-supportive environment (Reeve & Halusic, 2019). In the light of above-mentioned discussion following hypotheses were made: there is likely to be a positive relationship between self-determination needs (autonomy, competence, & relatedness) with internal and

negative with external locus of control. Self-determination related needs (autonomy, competence, & relatedness) and internal locus of control are positively predictors of GPA. Academic locus of control is mediating the relationship of self-determination related needs (autonomy, competence & relatedness) and GPA.

Method

Research Design

The present study is correlational cross-sectional research. Survey method is used for data collection and analyses are quantitative in nature.

Participants

Data of the study was collected by using convenient sampling technique. Sample for the study involved university students, both Males and Females ($n = 279$; male $n = 128$; female $n = 151$) from different socio-economic-status and different educational level. Age of the respondent's range between 17 years to 35 years.

Instruments

Following measures were used in the current study:

Demographic Sheet

In this study, the participants' age, gender, department, semester, birth order, SES, GPA their resident place either day scholar or hostilities and how much time they concern to library books and internet for study purpose in a week and other information that also effect on their leaning for example parents support and teacher support to make decisions, no. of friends were asked in demographic sheet, before they proceed to actual instrument.

Basic Psychological Needs Scale (BPNS)

The central concept of self-determination theory is the basic psychological needs (autonomy, competence & relatedness) that are universal and natural needs for human being. Self-determination theory postulates that for the development of healthy personality and wellbeing, the satisfaction of basic needs; need for autonomy, need for competence and need of relatedness is essential (Deci & Ryan, 2017). General scale of BPNS address the need satisfaction or frustration in general in one's life, others scales developed from general scale measure the satisfaction or frustration of needs in specific domain e.g Basic Psychological Needs in Exercise Scale. The general scale had 21 items concerning the three needs for Autonomy (7 items; 1, 4, 8, 14, 17, 20), Competence (6 items; 3, 5, 10, 13, 15, 19), and Relatedness (8 items; 2, 6, 7, 9, 12, 16, 18, 21). The items have unbalance distributed in basic psychological needs scale on the basis of negatively and positively worded. Reverse score items are 4, 11, 20, 3, 15, 19, 7, 16, 18. To reverse score an item 1 would be converted to a 7 and so on. Score range of BPNS is based on three needs autonomy (7 - 49), competence (6 - 42) and relatedness (8 - 56). Internal consistency for the subscales ranged from acceptable to good (Autonomy $\alpha = .65$; Competence $\alpha = .72$; Relatedness $\alpha = .82$; Guardia et al., 2000). Participants were instructed to respond on a scale of 1 (Not at all true) to 7 (Very true), how truly they feel for each statement and high scores indicate the high level of needs satisfaction.

Trice Academic Locus of Control Scale

It is used to measure the internal and external academic locus of control developed by Trice (1985). This scale measures the locus of control in academic settings. It consists of 28 items. Responses are based on two-point scale true or false. The range of scores is 0-28. Low scores indicate internal locus of control (0-14). Sample item is "College grades most often

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reflect the effort you put into classes”. Administration and scoring of the scale take not more than 20 minutes. The test- retest reliability for students was .90 and Kuder Richardson internal consistency was .50.

Procedure

The main study was done on 279 university students to measure the role of self-determination-based variables in academic locus of control and self-regulated learning. Permission from the authors of scales for the study was acquired. Data were collected from the different departments (natural, social, & biological sciences) of Qauid-i-Azam University, Islamabad, Pakistan. Permission was acquired through administration of institutions. Respondents were verbally informed about the purpose and nature of the study. Participants were assured anonymity and confidentiality regarding the information which they would provide. There was no right and wrong answer on these questionnaires and no time limit was given to the participants. Three questionnaires were used at the same time, and the re-shifting of these questionnaires was done by this, it will not have an effect on the research. Written informed form was taken from participants that were attached at the front of all questionnaires. Demographic information was taken before they proceeded to actual measures. Participants were right to leave study any time with no cost and no harm. Participants were asked to respond as honestly as possible. Respondents were also acknowledged for their cooperation. After the collection of data, scoring was done according to the key and analysis done through SPSS-21.

Results

The present study aims to explore the role of self-determination related needs and academic locus of control in academic achievement GPA among University Students. The internal consistency of the scales was determined by Cronbach’s alpha reliability coefficient. Pearson Product Moment Correlations were calculated to determine the relationship between the study variables and relationship of demographic variables with study variables of the current study. Stepwise regression analysis was used to find out the significant predictors of GPA. Hierarchical regression analysis was used to study mediation. The tabulated results are reported below.

Cronbach’s alpha reliability coefficients were computed for every scale to measure the internal consistency to established the applicability of the scales on the sample ($N = 279$) and descriptive analyses were computed to check mean, standard deviation and skewness and kurtosis were computed to ascertain normality. Transformed scores of raw scores were also calculated to interpret mean and standard deviation.

Table 1

Cronbach Alpha and Descriptive Statistics for Scales and Subscales ($N = 279$)

Variables	No. of items	α	Raw scores	Transformed	Range		Sk	K
			$M(SD)$	$M(SD)$	Potential	Actual		
ALOC	28	.75	12.00(4.38)	.35(.15)	0-1	.00-.93	-.44	.33
BPNS								
Auto	7	.65	36.57(6.54)	3.65(.93)	1-7	2.14-6.57	.62	-.54
Comp	6	.78	26.75(5.68)	4.22(.94)	1-7	1.67-6.67	.37	-.43
Related	8	.82	37.69(7.00)	4.71(.87)	1-7	2.25-6.50	.04	-.73

Note. ALOC = Academic Locus of Control; BPNS = Basic Psychological Needs Scale; Auto = Autonomy; Comp = Competency; Related = Relatedness.

Table 1, showed all scale have satisfactory reliabilities. The mean value for Academic Locus of Control shows that sample was more inclined towards internal locus of control in academic setting. The values of self-determination related variables showed that participants were more confident to engage in social relatedness and overall sample showed high level of social relatedness as compared to autonomy and competence. SD values indicated that responses are spread out over a large range of values from the mean. The values of skewness and kurtosis indicated that scores are normally distributed because the values are between -1 to +1 (George, & Mallery, 2010).

Pearson Product Moment Correlation was computed to study the relationship, its intensity, and direction of relationship between academic locus of control and self-determination related needs that are autonomy, competence and relatedness (see Table 2).

Table 2

Correlation between Self-determination related Needs (autonomy, competence and relatedness) and Academic Locus of Control (N = 279)

Variables	1	2	3	4
1. ALOC	-			
2. Auto	-.46**	-		
3. Comp	-.32**	.66**	-	
4. Related	-.55**	.56**	.48**	-

Note. ALOC = Academic Locus of Control; Auto = Autonomy; Comp = Competency; Related = Relatedness.

* $p < .05$. ** $p < .01$.

As shown in the Table 2, the scales with their subscales were significantly correlated with each other as well as with other variables. The correlations between autonomy, competence and relatedness and academic locus of control were statistically negatively significant. Its means that if self-determination related needs (autonomy, competence, & relatedness) dissatisfied, external locus of control increased. These results confirmed the first hypothesis of this study.

Pearson Product Moment Correlation was computed to determine relationship of demographic variables that are, age, library concern, no. of friends, internet concern, parental support and teacher support with student's GPA also along with self-determination-based needs and academic locus of control.

Table 3

Correlation of Demographic Variables with student's GPA also along with self-determination-based needs and academic locus of control (N = 279)

Variables	GPA	Variables	GPA
ALOC	-.09**	Parents support	.01
SD		Teacher's support	.12*
Auto	.11*	No. of friends	-.06
Comp	.13*	Age	-.05
Related	-.005	No. of siblings	-.01
Consult with Library	.08	Birth order	-.04

Note. ALOC = Academic Locus of Control; SD = Self-determination; Auto = Autonomy; Comp = Competency; Related = Relatedness.

* $p < .05$. ** $p < .01$.

As shown in the Table 3, there was positive correlation between GPA, academic locus of control, autonomy, and competence. It means students who reported more autonomy, competency and internal locus of control had better GPA than those who reported low level

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of autonomy, competency and external locus of control. GPA was significantly positively correlated with teacher's support. It was found that with increasing teacher support, student's grade increase.

Stepwise regressions analysis was computed to check the combined predictive role of self-determination related needs that are autonomy, competence, relatedness and academic locus of control for self-regulated learning. In Step 1 control variables that are gender and age were added to see their effects. In next step II, self-determination related variables were added and in Step III, ALOC was added. Total three models were generated. Here only final model is reported that shows all as significant predictors for GPA in order. There separate variables are reported in text.

Table 4

Stepwise Regression Analysis showing the Effect of Self-determination related Needs and Academic Locus of Control on the Prediction of GPA (N = 279)

Variables	B	β	R^2	ΔR^2	F	95% CI	
						LL	UL
Constant	2.75					.36	27.01
Age	-.01	-.05	.018			-.13	.87
Gender	.14	.15	.025	.007	3.55*	-3.08	1.07
Locus of Control	.01	.12	.031	.005	1.42	-.80	-.32
Autonomy	.002	.02	.039	.08		.34	.76
Competence	.01	.20	.062	.023		.43	.91
Relatedness	-.002	-.03	.068	.06	3.58**	.00	.35

Note. CI = Confidence Interval; LL = lower limit; UL = Upper limit.

* $p < .05$ ** $p < .01$

Table 4 shows that age and gender accounted .25% of the variance in GPA together, form which gender has contributed .07% variance. Locus of control in predicting GPA, explaining .31% of variance in combined role with age and gender and individually it has contributed .06% of additional variance to the outcome. Furthermore, self-determination related variables (autonomy, competence, relatedness) were also significant predictors of GPA. In combined role with age, gender, and locus of control, these variables explained .68% of variance and individually autonomy explained .8% of variance, competence explained .23% variance, and relatedness explained .6% variance in the outcome. In total % of the variance in the GPA have been explained by the predictors mentioned in Table 4.

Mediation analysis was conducted to see the mediating role of academic locus of control for autonomy, competence and relatedness in predicting GPA while, taking gender as control variables. In order to confirm the mediating role of locus of control sobel t-test was performed. Sobel test value was non-significant for autonomy ($z = .07$) and for relatedness ($z = .15$). For competence it was significant.

Table 5*Mediating Role of Academic Locus of Control for Competence in Predicting GPA (N = 279)*

Variables	GPA		
	Model 1 <i>B</i>	Model 2 <i>B</i>	95% <i>CL</i>
Constant	2.67	2.43	[-2.03_2.83]
Gender (control variable)	.16**	.15**	[-.04_.27]
Competence (IV)	.01**	.01*	[-.007_.029]
Locus of control (mediator)		-.01*	[-.002_-.02]
R ²	.04**	.06**	
ΔR ²		.02	
F	7.02**	6.36**	
ΔF		.66	

Note. *B* = Un-standardized regression Coefficient.

***p* < .01. **p* < .05.

Table 5 showed significantly positive prediction of competence for GPA explained 4% of the variance in Model 1. Once the locus of control was entered in Model 2 the competence did not totally loose significant ($B = .01^*$), while locus of control was significant ($B = -.01$, $p < .05$). Sobel test ($z = -1.97$, $p < .05$) reflected that the locus of control was a partial mediator for competence in predicting GPA. Student who reported more competence, had external locus of control that results into more GPA. Indirect effect of competence for GPA in context of locus of control was ($\beta = -.003$).

Discussion

The nature of the present study has been primarily aimed toward application of self-determination theory (autonomy, competence & relatedness) in academic locus of control and self-regulated learning of university students. Role of demographic variables in the relationship of variables was also explored. Results from analyses on these variables found that there was meaningful relationship between these variables among university students.

The satisfactory consistency range of measures is between .60 to .90 (Bland, & Altman, 1997), so alpha coefficient for all scale in this study were satisfactory. Overall reliabilities of scales and sub-scales indicated that scales are reliable and acceptable for satisfactory internal consistency. The value of mean on each scale and subscale represented the participant's average scores. The values of standard deviation indicated that responses were scattered from the mean of each variable. Higher the mean scores, greater the perceived it. So, means value indicated that overall sample of current study showed satisfaction of needs for relatedness, autonomy, and competence. The reason behind this, university students receive more autonomy support from teachers as well as parents, as a result, they feel more capable to analyze new things and make social relations, that's promote better academic performance among them. At university level, cognitive development of students includes logical or rational thinking conceptual understanding and decision making (Iran, 1990).

Among descriptive statistics, the scales and subscales have skewness values less than 1 representing that distribution lies inside it (Miles & Shevlin, 2001). Skewness values that are positive show that tail present on the right side that's shows existence of higher values. Although negative values of skewness show that tail present on left side that's demonstrate the existence of lower values. Normally, distributed scores indicated by values of kurtosis (Kim, 2013).

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Pearson Product Movement correlation was conducted to study the relationship among study variables. The findings of this study found that external locus of control was negative and significantly correlated with autonomy, competence and relatedness. These results are consistent with the previous studies by (Barbuto & Story, 2008; Burden, 2008; Laptosky, 2002; Lebedina, 2004; Moore, 2007; Reeve, et al., 2013; Siegle, et al., 2010) showed that there was negative relationship between self-determination (basic needs satisfaction) and external locus of control and positive relationship between self-determination (basic needs satisfaction) and internal locus of control. Researchers revealed that self-determination predict the internal locus of control (Reeve, et al., 2013). High achievers and talented students tend to consider they have more power over their coursework that they could manage their struggle they put in to their work and gain credit on the basis of their effort (Nokelainen, et al., 2007). Furthermore, students feel more confident toward their capabilities and more likely to have an internal perceived locus of causality when they have choices to explore new material (Ryan & Connell, 1989).

Results with demographics revealed that GPA was significantly positively correlated with self-regulated learning; internal locus of control and self-determination-based needs. So, the reason behind it may be that students, who receive autonomy, feel more responsible and motivated to achieving high GPA (Ryan & Deci, 2002). Moreover, student's attributions toward their effort motivate them to do hardworking and achieve their goals (Schunk & Meece, 2006). The students with high internal locus of causality show more attention to perform well and gain higher achievements than those who show less attention toward their work (Reeve, 2012). Locus of control explained .06% of additional variance in predicting GPA. Furthermore, self-determination related variables (autonomy, competence, relatedness) were also significant predictors of GPA, these variables explained .68% of variance and individually autonomy explained .8% of variance, competence explained .23% variance, and relatedness explained .6% variance in predicting GPA. So, by promoting self-determination needs in students can improve their GPA and academic performance.

Results of present study showed ALOC was non-significant mediator for autonomy and relatedness but, ALOC was partial mediator for competence in predicting GPA. These findings are consistent with past literature (Assouline, et al., 2006; Siegle, et al., 2010). Some studies found positive relationship between internal locus of control and grade points (Gifford, et al., 2006; Shepherd, et al., 2006). The reason is that with increasing age, students gain more autonomy support, make more social relations and tend to belief on their efforts that improve their academic achievements and internal locus of causality (Ryan, et al., 1988)

Conclusion

The current study found that self-determination theory is applicable in Pakistani context among university students. Finding showed that academic locus of control was mediator for autonomy, competence and relatedness in predicting GPA. So, by promoting self-determination related needs, internal locus of control increases that improve academic performance and GPA among university students.

Limitations and Recommendations

There are also some limitations of this study and some suggestions for future studies to improve, continue and develop further information in this domain. By using convenient sampling techniques, participants of the study were selected from different departments of Quaid-e-Azam University. Because of this sampling technique, most of the sample of this

study belong to middle socio economic-status. So, the findings of the study would not be generalized to all level of socio-economic status across Pakistan. For better generalization of results, collect data should be collected from large number of participants from different universities and equal number of participants from different level of socio-economic status. The correlational method was used in this study that not provides cause and effect relationship between study variables. So, it can affect the prediction values of results. Because to use of self-report measure, the chances of bias responses are high, as socially acceptable style. So, it suggests to future researchers, use longitudinal method to explore factors that contributing in GPA among university students. The current study uses only one mini theory (basic needs theory) of self-determination theory so, it ignored many others factors that contribute in GPA for example, self-concept, self-esteem, life satisfaction and how environmental factors enhance self-determination related needs. So, it suggests to future researchers, use other mini-theory like Organismic integration theory that concerns different dimensions of external motivation with their factors, valuable effects and their outcomes. This theory explains the types of self-regulation and degree of motivation. OIT concerned how social environment and interaction affect the motivation level, belief system and self-determination level and what type of factors enhance the one's autonomy. Organismic integration theory explains the degree of self-determination from non-self-determined to fully self-determine. OIT predominantly point out that one's internalization is affected by relatedness and autonomy. Train teachers, to promote these needs in class among all students without discriminating age, gender and educational level.

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