

The Quality of Lecturer-Student Interaction as Predictors of Academic Achievement and Perceived Learning with Emotional Engagement as Mediator

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Abstract. *This study aimed to examine the fitness of a model that proposes the relationship between the quality of student-teacher interaction as predictors of academic achievement and perceived learning with emotional engagement as a mediator. Lecture-student interactions as the exogenous variable were measured with the Lecturer-student Interaction (LSI) questionnaire that contains four aspects: autonomy support, emotional support, academic support, and the framework used to measure the quality of lecturer-student interaction. The emotional involvements of students during lectures as the endogenous variable are the emotions (pleasure, boredom, despair, anger, hope, anxiety) that are often expressed in the lecture process. Emotional engagement is considered as the mediator variable. Perceived learning as the dependent variable is related to the ability of lecturers to arouse students' curiosity about the lecture material. The second dependent variable is academic achievement which is determined by the cumulative index report (GPA) from the previous semester. 270 students from many universities in Indonesia filled out the questionnaire. The conceptual model proposed in this study is incompatible with empirical data in the field. In the first model, lecturer-student interaction influences perceived learning mediated by emotional engagement because lecturer-student interaction will only significantly influence perceived learning through emotional engagement (full mediation). Directly and through mediation of emotional involvement, the influence of lecturer-student interaction variables is not significant on academic achievement. In the modified model, lecturer-student interaction influences perceived learning with emotional engagement and also significantly influences perceived learning without emotional involvement variables (partial mediation). The dynamics of the lecturer-student interaction relationship, emotional engagement, and academic achievement in this modified model remain the same as the first model.*

Keywords: *Academic Achievement, Emotional Engagement, Lecturer-Student Interaction, Perceived Learning*

Abstrak. Penelitian ini bertujuan untuk menguji kesesuaian model yang mengusulkan hubungan antara kualitas interaksi siswa-guru sebagai prediktor prestasi akademik dan pembelajaran yang dirasakan dengan keterlibatan emosional sebagai mediator. Interaksi dosen-mahasiswa sebagai variabel eksogen diukur dengan kuesioner Interaksi Dosen-Mahasiswa (LSI) yang memuat empat aspek: dukungan otonomi, dukungan emosional, dukungan akademik, dan kerangka yang digunakan untuk mengukur kualitas interaksi dosen-mahasiswa. Keterlibatan emosional mahasiswa selama perkuliahan sebagai variabel endogen adalah emosi (senang, bosan, putus asa, marah, harap, cemas) yang sering diungkapkan dalam proses perkuliahan. Keterlibatan emosional dianggap sebagai variabel mediator. Persepsi pembelajaran sebagai variabel terikat berkaitan dengan kemampuan dosen membangkitkan rasa ingin tahu

mahasiswa terhadap materi perkuliahan. Variabel terikat kedua adalah prestasi akademik yang ditentukan oleh Indeks Prestasi Kumulatif (IPK) semester sebelumnya. 270 mahasiswa dari berbagai universitas di Indonesia mengisi kuesioner. Model konseptual yang diajukan dalam penelitian ini tidak sesuai dengan data empiris di lapangan. Pada model pertama, interaksi dosen-mahasiswa mempengaruhi persepsi pembelajaran yang dimediasi oleh emotional engagement karena interaksi dosen-mahasiswa hanya akan berpengaruh signifikan terhadap persepsi pembelajaran melalui emotional engagement (full mediation). Secara langsung dan melalui mediasi keterlibatan emosional, pengaruh variabel interaksi dosen-mahasiswa tidak signifikan terhadap prestasi belajar. Pada model yang dimodifikasi, interaksi dosen-mahasiswa mempengaruhi pembelajaran yang dirasakan dengan keterlibatan emosional dan juga secara signifikan mempengaruhi variabel pembelajaran yang dirasakan tanpa keterlibatan emosional (mediasi parsial). Dinamika hubungan interaksi dosen-mahasiswa, emosional engagement, dan prestasi akademik pada model modifikasi ini tetap sama dengan model pertama.

Kata kunci: Interaksi Dosen-Mahasiswa, Keterlibatan Emosional, Pembelajaran Yang Dirasakan, Prestasi Akademik

Engagement is often defined as "energy in action", energy, power, interest, or passion in action and performance (Appleton, Christenson, Kim, & Reschly, 2006) which reflects a relationship between an individual and the activities that a person is involved in (Ainley, 2004; Appleton et al., 2006). Research shows that engagement or emotional involvement is associated with positive academic performance (Appleton et al., 2006; Fredricks, Blumenfeld, & Paris, 2004) and provides advantages to one's psychosocial condition (Reddy, Rhodes, & Mulhall, 2003). Correspondingly, high involvement is associated with increasing achievement (Barkatsas, Kasimatis, & Gialamas, 2009; Wigfield & Eccles, 2000), effective learning, the level of absorption of knowledge and skills (Furlong et al., 2003; Ladd & Dinella, 2009) and emotions that

function better (E. Skinner, Furrer, Marchand, & Kindermann, 2008).

Previous study has investigated involvement as a multidimensional construct containing three substantial: behavioral involvement, emotional and cognitive involvement; each one has its own different stakes (Appleton et al., 2006; Jimerson, Campos, & Greif, 2003; Ladd & Dinella, 2009; Sinclair, Christenson, Lehr, & Anderson, 2003). Behavioral involvement aspects incorporate with class participation (Chapman, 2003; Jimerson et al., 2003) and the mobilization of efforts on assignments (E. Skinner et al., 2008); while cognitive involvement consists of self-regulation and learning methods or strategies (Chapman, 2003; Fredricks et al., 2004). Similarly, the involvement of emotion might be recognized through student identification

with the institutions (Sagayadevan & Jeyaraj, 2012) and expressions of affective reactions (for example, interests) inside the classes (Fredricks et al., 2004; E. Skinner et al., 2008). Emotional subtypes have obtained only a few notices compared to cognitive and behavioral aspects (Fredricks et al., 2004). It might be related to insufficient clarity of the concept that underlies the subtype (Fredricks et al., 2004). Another study considered using psychological involvement to investigate high school students' achievement despite many similarities to emotional involvement (Appleton et al., 2006).

In general, previous research has accommodated substantiation of the role of involvement in predisposing the outcome of academic aspects including learning and achievement (Handelsman, Briggs, Sullivan, & Towler, 2005; E. A. Skinner, Wellborn, & Connell, 1990; E. Skinner et al., 2008). Achievement, as an indicator of individual academic ability, is frequently measured through test scores during the teaching and learning process (Yamhill & McLean, 2001). Ladd & Dinella (2009) stated that affirmation is in accordance with emphasizing that the behavioral and cognitive elements are the significant factors that promote academic achievement. Higher

levels of independent and cooperative participation (ie, behavioral engagement) might predict children's higher achievement in kindergarten (Ladd, Birch, & Buhs, 1999). Some of the cognitive involvement elements (for example, self-regulation, perseverance, and effort) have also been examined to predict academic achievement both during and at the end of the learning process (Miller, Greene, Montalvo, Ravindran, & Nichols, 1996).

Several investigations have found that to determine student involvement factors, teacher-student interaction (also frequently studied as teacher support and teacher-student relations) has given significant support to be the strongest predictor of involvement and the most substantial contributor to the outcomes of academic achievement (Lam et al., 2012). Previous studies questioning various aspects of these relating factors have mostly identified that qualified interactions of teachers and students were characterized by the level of high emotions (Fraser & Fisher, 1982; Patrick, Ryan, & Kaplan, 2007), academic support, autonomy (E. Skinner et al., 1993) and structural provisions (Jang, Reeve, & Deci, 2010); which in turn leads to individual involvement. E. Skinner et al. (2008) figured out that teacher support (ie,

involvement, structure, autonomy support) predicts intensification in emotional involvement and decreased emotional dissatisfaction.

E. Skinner et al. (1993) noticed that teacher involvement (much the same as emotional support) can estimate the involvement of student emotion in elementary schools. However, this study was conducted on young children where teacher support is considered as the main and critical thing (Birch & Ladd, 1997). What's interesting is whether the same thing applies and plays an important role for older students, such as students.

Emotions are defined as affective reactions that are expressed (which in this case are also indicators of emotional involvement) such as anger, hope, and pleasure (Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011). Positive emotions such as pleasure are related positively to the Cumulative Achievement Index (GPA) of the undergraduate student from psychology department (Pekrun et al., 2011). Nevertheless, the associative quality of these findings is still unable to determine the role of emotional involvement as predictor of academic achievement. Other studies have confidently resulted in some evidence that implies that emotional involvement can fit

the role as a predictor of learning as contested to academic achievement. For example, Handelsman et al., (2005) broadened instruments for student involvement consisting of emotions, skills, performance, and participation or involvement. Those four subtypes are commonly related to academic achievement (for instance, assignments grades); but only skills (or cognitive involvement), performance, and participation/interaction involvement (some mentioned as behavioral engagement) seem to be significant predictors of this developmental study. On the other hand, emotional involvement is a prediction of intrinsic results related to learning (for example, assessing self-learning). Furthermore, Ainley & Ainley (2011) found students' scientific enjoyment (ie, emotional achievement) compared to other factors can positively project interest in learning more about science topics. This situation certainly describes a limited understanding of the emotional involvement role in calculating academic outcomes such as achievement and learning.

Interaction between lecturers-students is often defined (in studies) as a teacher-student (teacher-student or teacher-student relationship), also teacher or teacher support (Lam et al., 2012). Previous studies

propose the quality of a good relationship between teacher-student with several characteristics such as increasing levels of emotional (Fraser & Fisher, 1982; Patrick et al., 2007), academic support and autonomy (E. Skinner et al., 1993), and provisions of structure (Jang et al., 2010). The qualities of the relationship are positively related to individual involvement. E. Skinner et al. (2008) for example, figured out that teacher support (such as support for involvement, autonomy, and structure) can predict emotional involvement and reduce emotional dissatisfaction.

Skinner, et al. (2008) found that the relationship between engagement and student-teacher interaction such as academic outcomes provides a relevant theoretical framework for examining pathways that connect teaching interactions, interactions, and academic outcomes. In accordance with this model, features of a particular context (for example, the characteristics of teacher-student interaction) are undertaken to have influence over three basic individual psychological needs (ie, competency needs, autonomy, and linkages) (Ryan & Deci, 2018; E. Skinner et al., 2008). The extent to which these needs are met is in turn expected to predict the level of individual involvement, which then predicts their

academic outcomes (Skinner et al., 2008). In consonance with this, Hughes and Kwok (2007) discover that qualified student-teacher relationships indirectly predict mathematics and verbal scores of first-grade students through involvement. Similarly, Klem and Connell (2004) also found that teacher support statements (for example, structural provisions) bring about an indirect influent on scores of student achievement through involvement.

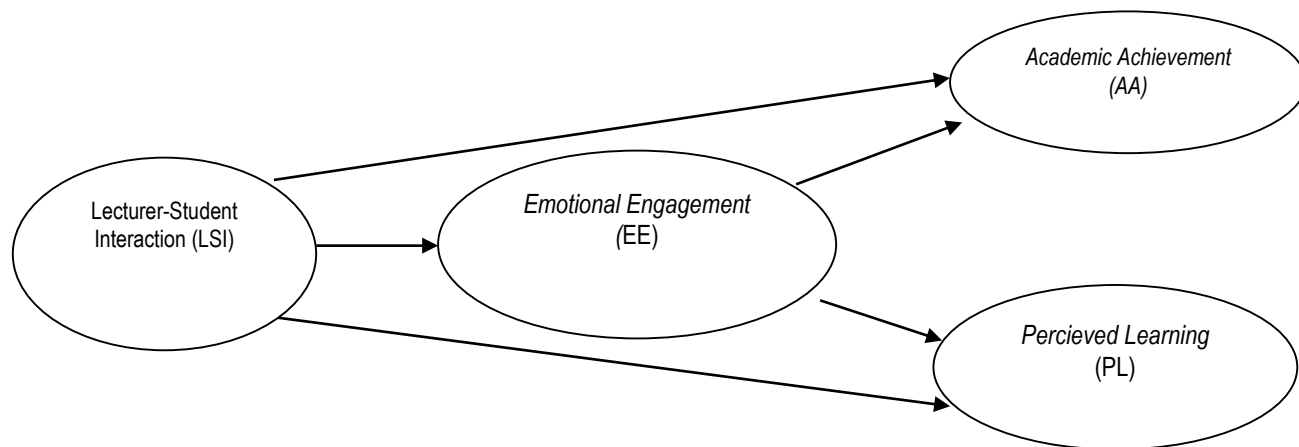
Perceived learning and academic achievement are both as logical consequences of a learning process. Academic achievement usually uses both the cumulative (IP) index of achievement (total semester results) and temporary (in one semester). Perceived learning or perceived learning according to Artino (2009) is the impression felt by students regarding the learning processes experienced, which are usually measured before, during, and after the learning process occurs.

Emotional involvement indeed needs to be further investigated in relation to academic achievement (Strauss & Volkwein, 2004). Experimental research from Sagayadevan & Jeyaraj (2012) investigates how the quality of lecturer-student interaction influences the quality of students' emotional involvement during

lectures and how that in turn has an impact on student achievement and learning in lectures by lecturers. His study discovers that students who have good interactions with their lecturers report meaningfully increasing levels of emotional involvement throughout lectures compared to those who share poor interactions. The result recommends some contribution to the theory from Skinner, namely the Self-System Model of Motivational Development. In accordance with the model, context situations (e.g. lecturer-student interaction characteristics) have an impact on three basic psychological needs of individuals (ie, autonomy, competency needs, and interconnectedness), which then supply to predict individual involvement (E. Skinner et al., 2008). The student-lecturer interaction measure administered in the current research accommodates four aspects of emotional, academic, autonomous, and structural support. Based on the results of (Hughes & Kwok, 2007) research, 'good' interactions have a higher probability to receive a higher level of support (as specified by four aspects of basic individual needs) compared to those in 'poor' interactional situations. In addition,

previous research has found that each of these four basic aspects has a role in fulfilling individual needs for, autonomy, interconnection, and competence (Jang et al., 2010; E. Skinner et al., 2008). The higher level of support experienced by individuals in conditions of 'good' interaction tends to have fulfilled the three basic needs of the individual to a greater level, which can then account for a higher level of emotional involvement. Lam et al. (2012) and Birch & Ladd (1997) research showed that supportive and non-conflictual relationships with teachers can influence individual academic achievement.

Based on the above considerations, this study takes the following research model:



The research questions are first, is the model designed based on theory related to the factors that influence academic achievement and learning that are felt to fit with the data in the field? Second, does the lecturer-student interaction and emotional engagement influence the perceived learning and academic achievement? The model is designed based on, first, the theory related to the factors that influence academic achievement and learning that are felt to fit with the data in the field. Second, lecturer-student interaction and emotional engagement influence perceived learning and academic achievement.

Method

Identification of Measurement

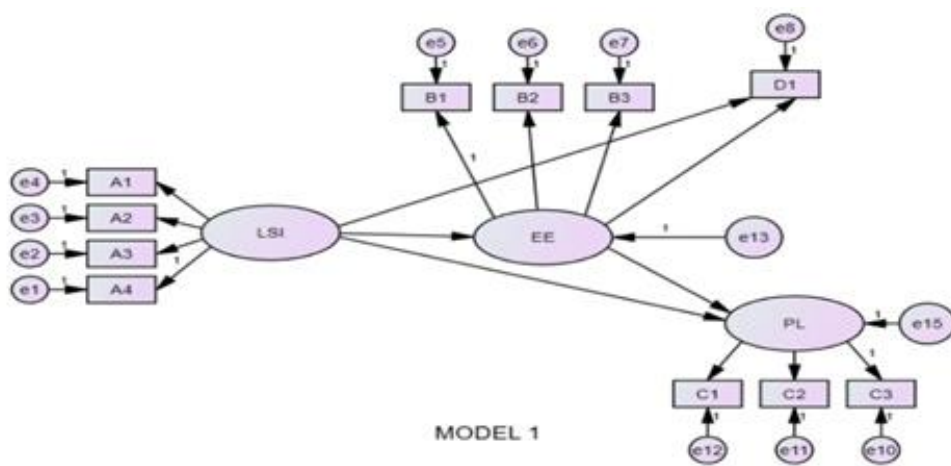
Lecture-student interactions as the exogenous variable were measured with the

Lecturer-student Interaction (LSI) questionnaire. The 4 item questionnaire covers four aspects of lecturer-student interaction: autonomy, emotional, academic support, and the provision of structures used to measure the quality of lecturer-student interaction. Lecture-student interactions are placed as an independent variable. The emotional involvements of students during lectures as the endogenous variable are the emotions (ie, pleasure, boredom, despair, anger, hope, anxiety) that are often expressed in the lecture process, namely before, during, and after lectures. Emotional involvement is considered as the mediator variable.

Perceived learning as the dependent variable is related to the ability of lecturers to arouse students' curiosity about lecture material, including the ability of lecturers to

explain the material by relating it to other subjects as well as their daily life experiences. The second dependent variable is academic achievement which is determined by the cumulative index report

(GPA) in the previous semester. The research model has been completed with indicators of each latent variable in Figure 2 below.



Data Analysis

All questions in the questionnaire are put together and distributed through the Google form format. 270 students from many universities in Indonesia filled out the online questionnaire. Methods and data analysis using Structural Equation Modeling (SEM) requires a minimum sample size for the application of the SEM model. Kelloway (1998) states that the sample size for the structural equation is at least 200 observations. Meanwhile, Hair, Aderson, Tatham, and Black in Kusnendi (2005) suggest that the minimum sample size for

SEM analysis is 100 to 200. Joreskog and Sorbom (1988) in Wijanto (2005) state that the relationship between the number of variables and the minimum sample size in the model structure is determined by the number of variables. for 3 to 10 variables, the minimum sample size is 200. The population in this study were students from the State Islamic University (UIN) in Java, namely Jakarta, Bandung, Surabaya, and Yogyakarta. The questionnaire was distributed online through research colleagues at the university. Data analysis using SEM requires more sample adequacy

based on the number of variables. When the sample has met the minimum criteria in terms of quantity, SEM analysis can be used.

The data in this study were analyzed using the structural equation model with the help of the AMOS 21 program. The criteria used to assess the suitability of the theoretical model and the data are based on the AMOS manual as revealed by Arbuckle (2007), namely:

1. Chi-Square. A good model has a small chi-square value with $p > 0.05$
2. Goodness of fit index (GFI). A good model has a GFI value > 0.9
3. Root Mean Square Error of Approximation (RMSEA). A good model is if the RMSEA value < 0.08
4. Adjusted Goodness of Fit Index (AGFI). A good model is if the AGFI value > 0.9

5. Tucker-Lewis Index (TLI). A good model if TLI value > 0.9

6. Normed Fit Index (NFI) A good model if the NFI value > 0.9

7. Comparative Fit Index (CFI). A good model if the CFI value > 0.95

The regression weights of each latent variable will also be analyzed. Regression weights with $p < 0.05$ indicate the influence of a latent variable on other latent variables. Constructive testing is also performed for each latent variable. Indicators that have a loading factor with $p < 0.05$ indicate that the indicator can explain the latent variable that it is constructing.

Result

a. Model Suitability Test Results

The output of the results of the research model can be seen in full in Figure 3 below:

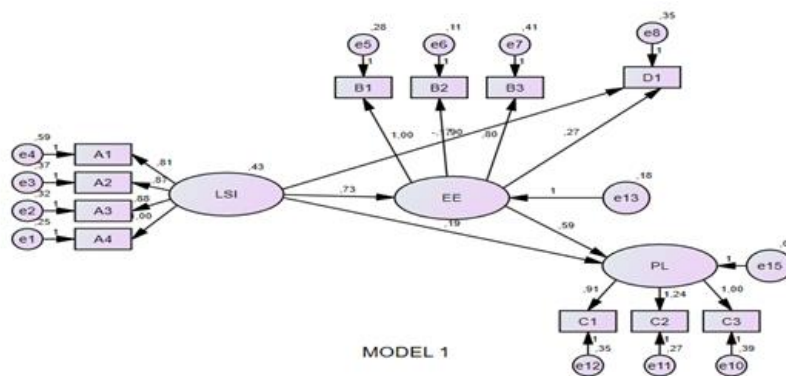


Figure 3. Output of the Complete Research Model

The following table is a summary of the model suitability test results shown in table 1

Table 1
 Goodness of fit criteria

Index	Cut off value	Result	information
Chi-Square	Small value, $p \geq 0.05$	82.904; $p = 0.000$	Not Fit
GFI	≥ 0.9	0.902	Good
RMSEA	≤ 0.08	0.089	Not good
AGFI	≥ 0.9	0.839	Not good
TLI	≥ 0.9	0.895	Not good
NFI	≥ 0.9	0.866	Not good
CFI	≥ 0.95	0.924	Not good

b. Test Results of Latent Variable Regression Weights

In the following table 2 is the latent variable regression weight

Latent variable	Estimate	S.E.	C.R.	P	Label
Emotional Engagement <-- Lecturer-Student Interaction	,731	,110	6,670	***	
Percieved Learning <-- Emotional Engagement	,592	,130	4,562	***	
Academic Achievement <-- Emotional Engagement	,266	,164	1,619	,106	
Academic Achievement <-- Lecturer-Student Interaction	-,171	,163	-1,050	,106	
Percieved Learning <-- Lecturer-Student Interaction	,194	,108	1,801	,072	

The latent variable regression weights show that:

1. Lecturer-student interaction influences emotional engagement ($p < 0.01$).

2. Emotional involvement (emotional engagement) affects perceived learning (perceived learning) ($p < 0.01$).
3. Emotional involvement (emotional engagement) does not affect academic achievement ($p > 0.05$).
4. Lecturer-student interaction does not affect academic achievement ($p > 0.05$).

The latent inter-variable effect is shown in table 3.

1. The lecturer-student interaction has a direct effect on emotional involvement of 0.751 and an indirect effect of 0,000.
2. The lecturer-student interaction has a direct effect on learning perceived by 0.255 and an indirect effect of 0.570.
3. The lecturer-student interaction has a direct effect on academic achievement of - 0.185 and an indirect effect of 0.210.
4. Emotional involvement has a direct effect on perceived learning of 0.760 and an indirect effect of 0,000.

5. Emotional involvement has a direct effect on academic achievement of 0.280 and an indirect effect of -0.030.

The magnitude of the contribution of latent variables to other latent variables can be seen in the following table 4:

In table 4 it can be seen that:

1. Lecturer-student interactions contribute F56% to emotional involvement.
2. Lecturer-student interaction and emotional involvement together contribute 93% to perceived learning.
3. Lecturer-student interaction and emotional involvement together contribute 3% to academic achievement.

c. Extract Test Results

The results of the test extract can be seen in Table 5 below:

	Estimate	S.E.	C.R.	P
A4 <--- Lecturer-Student Interaction (LSI)	1,000			
A3 <--- Lecturer-Student Interaction (LSI)	,876	,111	7,898	***
A2 <--- Lecturer-Student Interaction (LSI)	,873	,115	7,590	***
A1 <--- Lecturer-Student Interaction (LSI)	,809	,129	6,254	***
B1 <--- Emotional Involvement (EE)	1,000			
B2 <--- Emotional Involvement (EE)	,902	,091	9,895	***
B3 <--- Emotional Involvement (EE)	,799	,114	7,020	***

	Estimate	S.E.	C.R.	P
C3 <--- Perceived learning (PL)	1,000			
C2 <--- Perceived learning (PL)	1,245	,177	7,018	***
C1 <--- Perceived learning (PL)	,914	,155	5,902	***

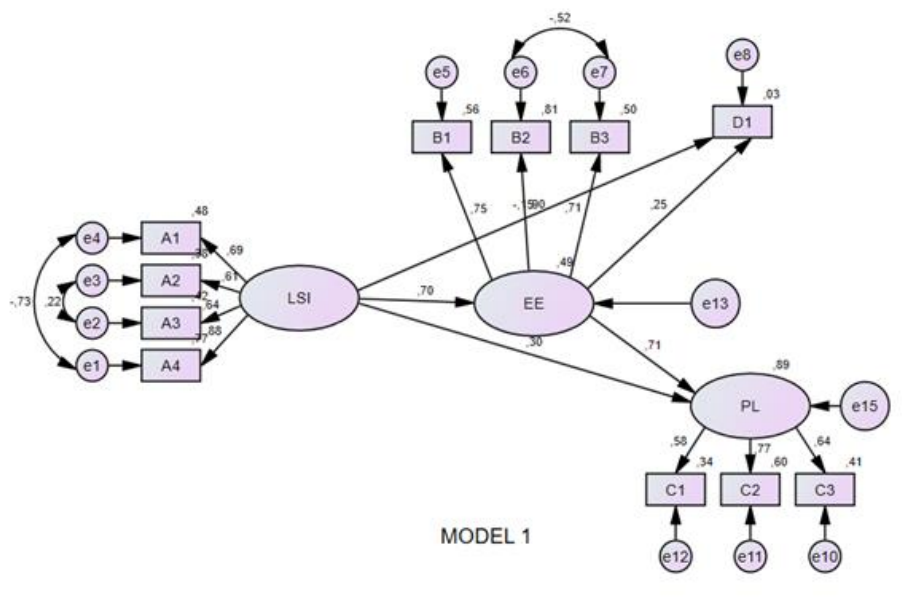
Based on table 5 it can be concluded that:

1. Indicators C1, C2, and C3 are good compilers of the learning construct that is felt because it has a loading factor with $p < 0.05$
2. Indicators B1, B2, and B3 are good compilers of the constituents of emotional involvement because they have a loading factor of $p < 0.05$.
3. Indicators A1, A2, A3, and A4 are good compilers of the lecturer-student interaction

construct because they have a loading factor of $p < 0.05$.

d. Model Modification

Modification of the model is done by making variations between e2 with e3, e6 with e7, and e1 with e4. This modification according to the author is the most logical according to the theory. The output of the model can be seen in Figure 4 below:



Model after Modification

Figure 4. Modified Output Model Output

A summary of the results of the model suitability test after modification is shown in table 6.

Table 6.

Goodness of fit criteria after model modification

Index	Cut off value	Result	Information
Chi-Square	Small value, $p \geq 0.05$	57.343; $p = 0.000$	Not Fit (decreasing number)
GFI	≥ 0.9	0.930	Good (increasing number)
RMSEA	≤ 0.08	0.064	Good (decreasing number)
AGFI	≥ 0.9	0.875	Good (increasing number)
TLI	≥ 0.9	0.946	Good (increasing number)
NFI	≥ 0.9	0.907	Good (increasing number)
CFI	≥ 0.95	0.964	Good (increasing number)

Discussion

In general, the conceptual model proposed in this study is incompatible with empirical data in the field. This can be seen from the 7 criteria of goodness of fit, only 1 criterion namely GFI which is above the minimum standard of a model can be said to be fit. Based on the condition of the existing data, the researchers made a process of modifying the model so that the model formed can be said to be quite fit with the data in the field. It can be seen from 7 goodness of fit criteria, that only 2 criteria, namely chi-square and AGFI which are

below the minimum standard of a model. are said to be fit.

In the first model, lecturer-student interaction influences perceived learning through full mediation by emotional engagement because lecturer-student interaction will only significantly influence perceived learning when through involvement variables emotion. Meanwhile both directly and through mediation of emotional involvement, the influence of lecturer-student interaction variables is not significant on academic achievement.

In the modified model, lecturer-student interaction influences perceived

learning with emotional engagement as a partial mediator. This is because lecturer-student interaction also significantly influences perceived learning without emotional involvement variables. Meanwhile, the dynamics of the lecturer-student interaction relationship, emotional involvement, and academic achievement in this modified model remain the same as in the first model.

According to (Hagenauer & Volet, 2014), the main dimensions that are usually used to describe student-lecturer relations in higher education, are (1) the affective dimension, which describes the bond established between students and lecturers that forms the basis of a safe relationship and is positively experienced in terms of affection. (2) The support dimensions, which describe the assistance that must be provided through student-lecturer relations for the success of students at the university. It can be said, the student-lecturer relation can not be conceptualized as a one-dimensional construction; but as multi-dimensional.

In higher education, TSR is formed between adults. Unlike the school context where relationships are formed between adults and children or adolescents. Teaching arrangements tend to be more fragmented in

universities with less frequent interactions between lecturers and students. Teaching is not the only one of the lecturers' scientific activities, even the recognition of quality research works is often greater than teaching activities. As mentioned before, in this research model testing, even the relation between emotional involvement has an effect on perceived learning, but without emotional involvement, as long as the lecturer can have a good relationship while teaching it also remains meaningful. This is also explained by (Ang, 2005), specific factors that can be reduced or increased over time. For example, the 'dependency' dimension applies to research in younger students (eg, kindergartens and primary schools), but loses importance as a student becomes a more independent learner. Researchers in secondary education has removed the dimension of dependence in the operationalization of student-lecturer relation (Ang, 2005). Therefore, besides its multi-dimensional nature, student-lecturer relation in higher education has an important characteristic that is context-dependency so it must be considered as a context-dependent construct.

The teacher-student relationship also varies not only between contexts but also within actors in different situations. For

example, Lindblom-Ylänne, Trigwell, Nevgi, and Ashwin (2006) found that the teaching practices of the same university lecturers could vary depending on the format of learning (eg. seminar). The opportunity to approach students and build relationships with them in seminars (workshops/tutorials) is more influential than in lectures. This might be the reason why emotional involvement does not have to be present in relationships when learning. Interesting and attractive teaching methods which remain fully present when teaching can also influence learning outcomes.

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