

# Adaptation of School Engagement Measurement-MacArthur (SEM) Indonesian Version in the Context of Distance Learning

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## Abstract

Student engagement greatly influences education, especially during Distance Learning (PJJ), such as during the covid-19 pandemic. To find out the student engagement of students undergoing PJJ, it is necessary to measure student engagement. A measuring tool that provides comprehensive and standardized information and is also widely adopted in several countries is the SEM-MacArthur measuring instrument. SEM-MacArthur is a measuring tool that measures student engagement based on student engagement theory from J. A. Fredricks & Paris (2005). Adaptation is carried out based on the guidelines for adaptation of measuring instruments from the International Test Commission (ITC), which includes a forward-backward translation process, followed by an expert review to test language and conceptual equivalence. The validation process tests content validity through the Content Validity Index (CVI) and constructs validity using Confirmatory Factor Analysis (CFA). The trial was conducted on 233 high school students in Bandung who were between grades X to XII with ages ranging from 14 to 18 years. Based on this trial process, it is known that each indicator, dimension, and construct meets all the criteria for Goodness of Fit (RMSEA < 0.08; CFI > 0.9). In addition, the value of Construct Reliability (CR) > 0.70 and CFA > 0.40 was also obtained. Thus, the Indonesian version of the SEM-MacArthur measuring instrument in the context of PJJ can be used as a valid and reliable measuring tool.

## Keywords

school engagement measurement-macarthur (sem); student engagement; distance learning (PJJ)

## Abstrak

*Student engagement* memiliki pengaruh yang besar dalam dunia pendidikan khususnya saat Pembelajaran Jarak Jauh (PJJ) seperti saat pandemi covid-19 ini. Untuk mengetahui *student engagement* yang dimiliki oleh siswa yang sedang menjalani PJJ, perlu dilakukan sebuah pengukuran mengenai *student engagement*. Adapun sebuah alat ukur yang memberikan informasi secara komprehensif dan terstandarisasi dan juga banyak diadaptasi di beberapa negara adalah alat ukur SEM-MacArthur. SEM-MacArthur merupakan alat ukur yang mengukur *student engagement* yang berlandaskan teori *student engagement* dari J. A. Fredricks & Paris (2005). Adaptasi dilakukan berdasarkan pedoman adaptasi alat ukur dari *International Test Commission* (ITC), yang meliputi proses *forward-backward translation*, dilanjutkan dengan *expert review* untuk menguji ekuivalensi bahasa dan konseptual. Adapun proses validasi dilakukan dengan menguji validitas isi, melalui *Content Validity Index* (CVI), dan validitas konstruk,

menggunakan *Confirmatory Factor Analysis* (CFA). Uji coba dilakukan kepada 233 siswa SMA di Kota Bandung yang berada antara kelas X hingga XII dengan usia berkisar antara 14 hingga 18 tahun. Berdasarkan proses uji coba ini, diketahui bahwa setiap indikator, dimensi, dan konstruk memenuhi semua kriteria *Goodness of Fit* (RMSEA < 0,08; CFI > 0,9). Di samping itu, diperoleh juga nilai *Construct Reliability* (CR) > 0,70 dan CFA > 0,40. Dengan demikian, alat ukur SEM-MacArthur versi Bahasa Indonesia konteks PJJ dapat digunakan sebagai alat ukur yang valid dan reliabel.

### Kata kunci

*school engagement measurement-macarthur* (sem); *student engagement*; pembelajaran jarak jauh (PJJ)

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## INTRODUCTION

*Student engagement* significantly influences education, especially during distance learning (PJJ), during this covid-19 pandemic. Distance learning (PJJ) aims to meet educational standards by utilizing information technology by using computers or gadgets interconnected between students and teachers and between students and lecturers. The use of technology in teaching and learning can still be carried out correctly (Pakpahan & Fitriani, 2020). However, the research findings show that the implementation of PJJ does not always run smoothly and effectively (Mailizar et al., 2020). One of the goals of education is to achieve effective learning to increase student success (Gunuc, 2014).

Research from (Cohen, 2017; Jordan, 2014) stated that the primary failure of students that often occurs when participating in PJJ is due to lack of student engagement. *Student engagement* becomes especially important during PJJ due to the covid 19 pandemic (Chu, 2020). *Student engagement* is the active involvement of students both cognitively, emotionally, and behaviorally (JA Fredricks et al., 2004). The concept of student engagement was developed to improve low levels of academic achievement, levels of boredom, student dissatisfaction, and dropout rates. Student engagement has significantly contributed to academic achievement and school graduation rates (JA Fredricks & Paris, 2005). Student engagement is also the leading solution to the problems of student isolation, dropout, retention, and graduation rates in the PJJ process (Banna et al., 2015). Engaged students are more likely to study, seek experiences that benefit them, graduate, and continue their education to a higher level (Mark, 2000). There has been an increasing awareness of student engagement for learning and achievement (Newmann,

1992; Steinberg et al., 1996). To find out student engagement and it is necessary to measure student engagement. The measurements made must be valid and reliable. Valid and reliable measurements can be obtained when the presentation of the measuring instrument is carried out in a standardized manner and the measuring instrument has good psychometric properties (Azwar, 2010). So far, the measurement of student engagement itself uses various measuring tools. Measuring instruments must be valid and reliable by looking at psychometric properties such as reliability and validity on measuring instrument items.

A measuring tool that provides comprehensive and standardized information and is also widely adopted in several countries is the SEM-MacArthur measuring tool. SEM-MacArthur is a measuring tool that measures student engagement based on student engagement theory (JA Fredricks & Paris, 2005). This measuring instrument was developed by Blumenfeld and Fredricks (2005) to measure student involvement in school. Blumenfeld and Fredricks (J. Fredricks et al., 2011; J.A. Fredricks & Paris, 2005) have used this measuring tool in grade 3 to 5 elementary school students. Then, this measuring tool is used for students with a higher school level than elementary school, namely, junior high school, high school, and college. The measuring instrument scale is a student self-report with 19 items (five behavioral dimension items, six emotional dimension items, eight cognitive dimension items).

*Behavioral engagement* refers to active participation in activities inside and outside the school. Emotional engagement refers to the feelings and emotions of students towards teachers or teachers, friends, and the school in general. Cognitive engagement refers to student's efforts in the learning process. Because the SEM-MacArthur is comprehensive in measuring student engagement, several studies adapting this scale have been carried out. Some of these studies include research conducted (Bernet et al., 2014). In Indonesia, this measuring tool has not been adapted. Thus, this study aims to adapt SEM-MacArthur into the Indonesian version and the context of PJJ. This adaptation will later produce a comprehensive and well-tested student engagement measurement tool, both valid and reliable.

## METHOD

### Research Instruments

Blumenfeld and Fredricks developed SEM-MacArthur (2005) to measure student involvement in school. Blumenfeld and Fredricks (J. Fredricks et al., 2011; J.A. Fredricks & Paris, 2005) have used this measuring tool in grade 3 to 5 elementary school students. Then, this measuring tool is used for students with a higher school level than elementary school, namely, junior high school, high school, and college.

The measuring instrument scale is a student self-report which has 19 items (5 behavioral dimension items, six emotional dimension items, eight cognitive dimension items), with a 5-point Likert scale (1: never, 2: rarely, 3: sometimes, 4: often, 5: always). SEM consists of 3 dimensions and several constituent indicators as scattered as in Table 1.

Table 1. Student Engagement Dimensions and Indicators

Dimension	Definition	Indicator
<i>Behavioral Engagement</i>	Participation of participants in various activities related to activities at school, such as in learning, completing assignments, attention, attendance, the time when collecting assignments, preparation for class, concentration, effort, persistence, and doing risky behavior (truant).	<ul style="list-style-type: none"> <li>- Obey the rules at school.</li> <li>- Follow the teaching and learning process seriously.</li> <li>- Doing assignments given from school.</li> </ul>
<i>Emotional engagement</i>	Participation of participants in the feelings that arise during learning, such as boredom, frustration, expressing interest, and pleasure. Furthermore, feeling safe, having supportive parents, having positive relationships with friends, expressing feelings of belonging to the school, and having values towards the school.	<ul style="list-style-type: none"> <li>- Feeling positive emotions when going through school activities</li> </ul>
<i>Cognitive engagement</i>	Participation of participants in their efforts to understand what is being taught in cognitive processes, for example, self-regulation, cognitive strategies in learning, and strategies to remember and understand learning material.	<ul style="list-style-type: none"> <li>- Ensuring the activities carried out for the school are as good as possible.</li> <li>- Make sure you can understand what you get in learning activities at school.</li> <li>- Trying other ways to understand what he gets in learning activities at school.</li> </ul>

### Research procedure

Process scale adaptation SEM-MacArthur into Indonesian following the ITC guidelines (Gudmundsson, 2009). There are eight stages during the adaptation process: 1) Selecting a qualified translator, 2) Determining the translation method (forward-backward translation), 3) Selecting qualified experts in the subject matter of the instrument, 4) Revision of measuring instruments, 5) Testing items, measuring the reliability and validity of the item, 6) Revising the measuring instrument, 7) Retrieving the actual adaptation data, 8) Testing the reliability and validity of the item. In the process, to make it easier for experts to make assessments, researchers used rating scales from Jeanie & Bertrand (1999) as well as Sperber (2004), as suggested in Bartram et al. (2018).

The reliability and validity test of the measuring instrument was carried out by researchers using two kinds of methods that mutually reinforce and complement each other's limitations, namely the Cronbach alpha test method and the confirmatory analysis test (CFA). Cronbach alpha test is used to predict the internal consistency of the measuring instrument as a whole based on its respective dimensions and constituent items. If the test results of the measuring instrument find the Cronbach alpha value above or equal to 0.70, it means that the measuring instrument is reliable, and vice versa (Kaplan & Saccuzzo,

2017). Meanwhile, suppose it contains a statement item with a correlation coefficient value below 0.30 (Azwar, 1999). In that case, it can be considered for elimination with other supporting criteria, which in this study was supported based on the data loading factor test confirmatory analysis.

While the confirmatory test used by researchers is used to test the construct validity of the SEM measuring instrument by confirming the extent to which the statement items in it do measure/provide information about one thing, namely the construct to be measured. (Umar & Nisa, 2020), in this case is student engagement. According to the confirmatory analysis test, the measuring instrument model must meet the fit criteria listed in table 2.

Table 2. Criteria for Goodness of Fit

<b>Goodness of Fit Index</b>	<b>Cut Off Value</b>	<b>Criteria</b>
RMSEA (Ferdinand, 2005)	$\leq 0.08$	<i>Goodness of Fit</i>
	0.08 – 0.10	<i>Marginal Fit</i>
NFI (Ferdinand, 2005)	$\geq 0.90$	<i>Goodness of Fit</i>
	0.80 – 0.89	<i>Marginal Fit</i>
NNFI (Ferdinand, 2005)	$\geq 0.90$	<i>Goodness of Fit</i>
	0.80 – 0.89	<i>Marginal Fit</i>
CFI (Ferdinand, 2005)	$\geq 0.90$	<i>Goodness of Fit</i>
	0.80 – 0.89	<i>Marginal Fit</i>
Chi-square (Umar, 2012)	$P < 0.05$	Hypothesis accepted
Factor Loading (fields, 2013)	$x > 0.40$	Good correlation

### Research subject

The subjects of this study were high school students in Bandung who were between class XuntilXII. Subjects ranged in age from 14 to 18 years. The sampling technique used in this study is probability sampling, which means that each member of the population has the same opportunity to be selected as a sample. In the use of the probability sampling technique, the heterogeneity of the sample characteristics in the population is not a particular concern, so the sampling of research from the population is objective. Data collection is done online using the Google Form page. The total number of participants who took part in the study in adapting this measuring instrument was 233.

## RESULT AND DISCUSSION

The measuring tool adapted in this study is the School Engagement Measurement (SEM-MacArthur) in the form of a questionnaire consisting of 19 items of statements of subordinates' assessment of their leaders using a Likert scale with an answer range of 1-5, consisting of 5 behavioral dimension items, six dimension items emotional, and eight cognitive dimension items. Starting on a scale of 1 = never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = always. Scoring for reversed unfavorable items starting 1 for the "Always" option to a score of 5 for the "Never" option. The final score is obtained by adding the overall scores from the three dimensions. The assessment is carried out by calculating the average response for each engagement dimension (JA Fredricks et al., 2004).

### **Cronbach Alpha Internal Internal Consistency Test**

The results of statistical tests on the SE measuring instrument with the Cronbach alpha test method through its internal consistency obtained the SE reliability coefficient of 0.886. It shows that almost 89% of the observed variance is the actual score variance. The remaining 11% is the error variance caused by content sampling error, with the Cronbach alpha value referring to the criteria (Hair et al., 2006). It was found that the results of the adaptation of the SE measuring instrument had a high internal consistency.

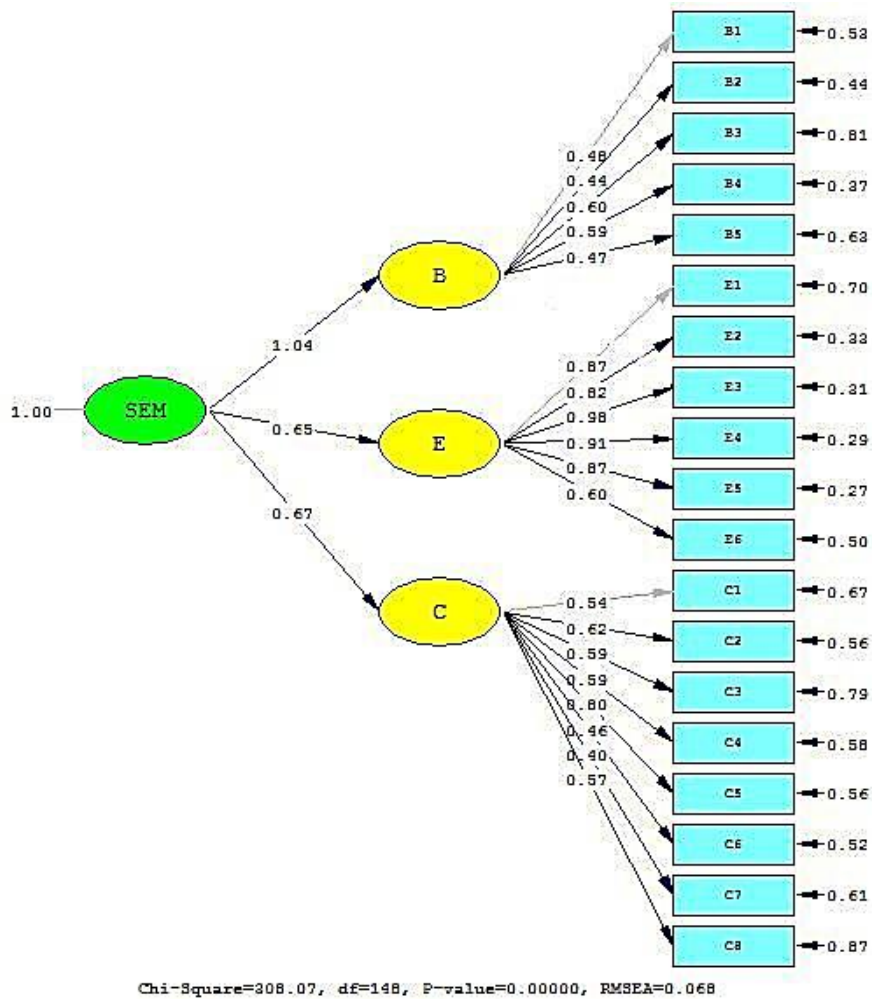
In the next stage, the researchers tested the validity of the SE measuring instrument adapted through the item validity test, and it is analyzed through the corrected-item total correlation coefficient. Based on this test, data obtained that the corrected-item total correlation coefficient in the 19 statement items that compose the questionnaire is worth between 0.335-0.713. When compared with the minimum criteria of correlation coefficient according to Azwar (1999), i.e., 0.30, then the discriminating power of the measuring instrument is considered satisfactory. Therefore, the corrected-item total correlation coefficient value on the SE measuring instrument is 0.335-0.713. The entire item consisting of 19 statements is included in the satisfactory correlation coefficient criteria.

### **Confirmatory Analysis Test**

The researchers analyzed factor loading items (FL) with a confirmatory factor analysis (CFA) test to produce a more in-depth analysis. Minimum criteria for FL value which refers to criteria fields (2013), the item can be said to be good if it has an FL value of more than 0.40. Through tests carried out with the Lisrel software, the FL value of 19 statement items is in the range of values from 0.40 to 0.98. When compared with the Field criteria (2013), it was found that the 19 statement items that compose the SE construct had good FL values.

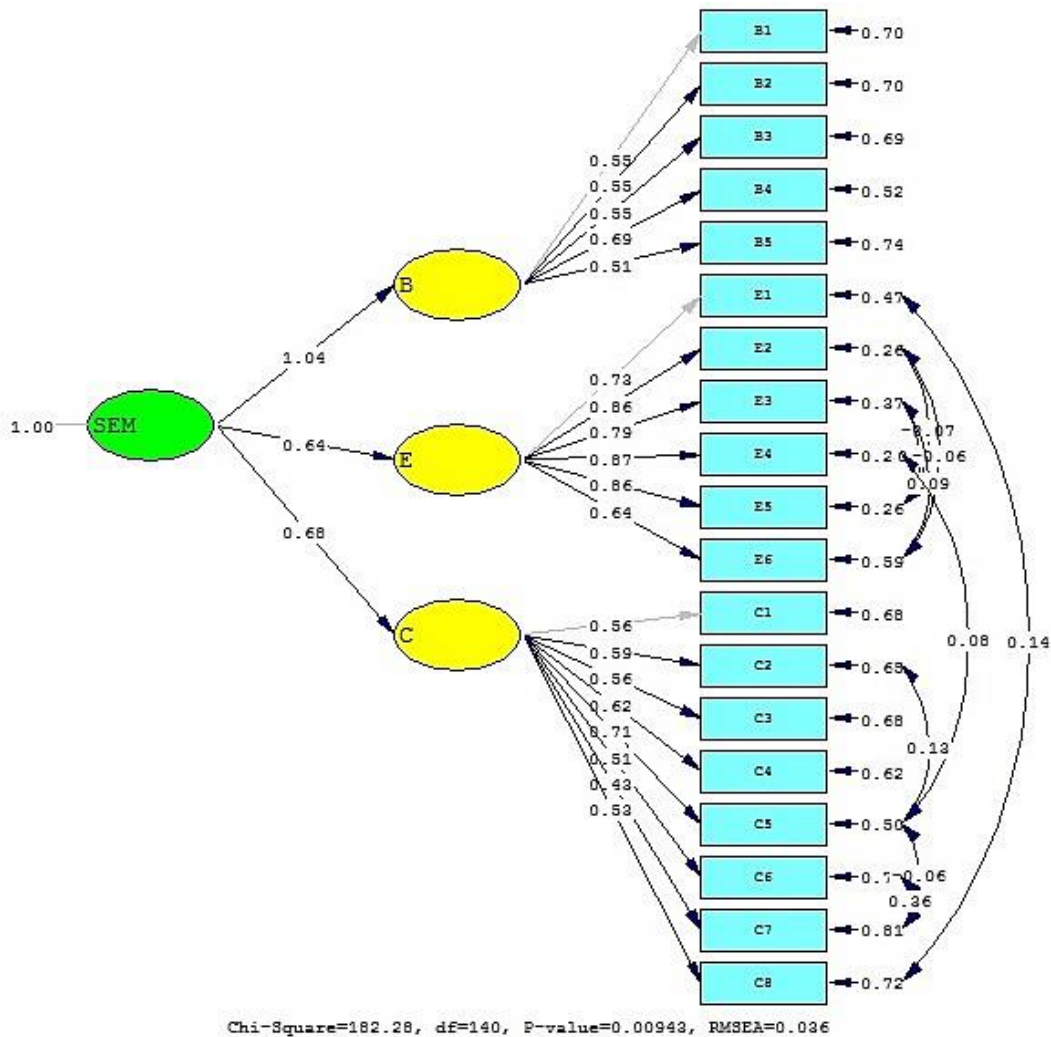
Although the 19 statement items that compose the SE have good FL values, the goodness of fit criterion value obtained from the adaptation of the SE measuring instrument has not been met, namely the goodness of fit criterion value obtained in the results of the first phase of the CFA test. The RSMEA value is 0.068, a p-value is 0.00, CFI is 0.96, NFI is 0.92, NNFI is 0.95, and IFI is 0.96 with the diagram as shown in Figure 1.

Figure 1. Results of the Confirmatory Analysis Model of the SEM Measuring Tool



Based on the SEM measuring instrument model results that did not fit. The researchers modified the items on the measuring instrument by correlating the statement items that were interconnected due to ambiguous statements measuring the same thing or overlapping with each other to get the RSMEA criteria that fit according to the modification suggestions provided by the Lisrel software. The results of modifying the measuring instrument to achieve the fit criteria are illustrated in Figure 2.

Figure 2. Results of the First Modification of the Confirmatory Analysis Model of the SEM Measuring Tool



Following the one-time modification of the measuring instrument, the criteria for measuring instruments that meet the goodness of fit criteria are obtained. It shows that the SEM measuring instrument has met the requirements that the dimensions and statement items in it measure a construct that you want to measure in the form of student engagement. This study aims to adapt the SEM measuring tool developed by J.A. According to the culture in Indonesia, Fredricks & Paris (2005) are following the PJJ situation due to the Covid-19 Pandemic. Researchers have considered the suitability of the measuring instrument based on the criteria for the types of respondents in Indonesia. It is done by carrying out several stages of the adaptation process, which ends with testing the overall internal consistency of the construct with the Cronbach Alpha Test and is equipped with a confirmatory test of the student engagement construct.

After analyzing the student engagement measurement tool, it was found that the Cronbach Alpha value was included in the high-reliability category or based on the criteria according to Kaplan & Saccuzzo (2017). This measuring tool is reliable. It shows that the

quality of the constituent statement items is excellent and correct in measuring the student engagement construct as expected by the researcher, supported by the correlation coefficient value, which all of them also fall into the criteria for a reliable item.

Based on the test results, there is no indication of statement items that need to be considered for elimination. Test results have also been carried out to strengthen the assumption based on the confirmatory analysis. It is also found that the 19 statement items that make up the SEM measuring instrument have an excellent factor loading value, so this strengthens that there is no need for an eliminated statement item. However, based on the initial path diagram of the CFA test, the criteria for the fit of the measuring instrument were in the marginal category, so the researchers made modifications to obtain the criteria for the fit of the measuring instrument model that was good optimal. By modifying the measuring instrument model on several items that are thought to be correlated or can measure the same indicator, the measurement tool model that fits optimally is obtained.

## CONCLUSION

SEM measuring instrument scale is an instrument that can be used to determine the extent of student involvement. By considering their participation in activities inside and outside the school. As well as emotions and feelings towards teachers, friends, and school. Moreover, students' efforts to be involved in the learning process. With a comprehensive measurement to describe school students' engagement, the researchers adapted it from the theory (JA Fredricks & Paris, 2005) to be developed in Indonesia according to the PJJ situation due to the Covid-19 pandemic. Based on the results of the Cronbach Alpha internal consistency test and confirmatory analysis, and according to the process of adapting. The measuring instrument suggested by the ITC found that the SEM measuring instrument scale can be relied upon as a reliable, valid, and good instrument for research or applications other academic needs.

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