

# Navigating Acculturation Instruments Through Confirmatory Factor Analysis (CFA)

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**Abstract.** An individual's acculturation will have an impact on their academic progress in school. To address this issue, application-based acculturation technologies need to be created. Using the ADDIE model, the Research and Development (RnD) technique was used to conduct the study. Information was gathered. Two methods were used to analyze the structural equation modeling (SEM) data: the first was the Confirmatory Factor Analysis (CFA) method, which was used to test the measurement model; the second method was the Partial Least Square (PLS) method, which was performed with the assistance of the SmartPLS-3 software. Based on the load value, the research findings demonstrate that the external load test has all values greater than 0.4, indicating that the validity standards have been satisfied. Additionally, a validation test using the average variance extracted (AVE) value was conducted.

**Keywords:** Navigating, Acculturation Instrument, CFA

## 1 Introduction

Students from outside the area will find it challenging to interact with their classmates because of cultural differences. Relationships with people from different cultures are known as acculturation. Academic performance on campus will be impacted by issues with acculturation. Students who struggle with acculturation as a result of parental and educational pressure are not always forced to give up on the strain of acculturation.

Rather, they attempt to fit in with friends from other ethnic backgrounds at school in order to be accepted there and fulfill their parentally-imposed cultural norms. Students exhibit a desire to fit in and get along with peers in a variety of ways while they are in an educational setting. Students' actions demonstrate their attempts to blend in with different culture. Ward[1] describes this conduct as an attempt to fit into a culture that is distinct from their own, where they live and interact. This idea is often used to relate the relocation of people from their native country to another country and learning to live with another culture. Acculturation is the term for a process known as adaption. The process of adjusting to a culture other than one in which one lives and interacts with others is known as acculturation. The idea is typically applied to the idea of someone relocating from their own country to another and acclimating to a new culture [2]. Acculturation is the process of cultural and psychological change that occurs as a result of contact between two or more cultural groups and their individual members. Immigrants are typically the ones who start the process of acculturation in a new nation. A group that has undergone continuous acculturation develops distinct attitudes, customs, and ways of living [3].

The attitudes that people exhibit in their social surroundings are a reflection of their efforts and desire to interact and participate in the cultural group in which they reside. While some students may not adhere to their cultural norms strictly, they still make a concerted effort to participate and interact with the society in which they reside. Some students work very hard to preserve their cultural customs in addition to their efforts to interact and participate in other cultural activities. On the other hand, some teenagers make an effort to preserve the culture they have been following, but they lack the motivation or drive to contact with people from different cultures[4].

According to Sam[4], acculturation is the process through which newcomers become accustomed to and learn about the local way of life, culminating in integration.

Presenting the definition of assimilation clarifies the significance and place of acculturation in the framework of interethnic relations. According to Park and Burgess, assimilation is a fusion and interpretation process. Through this process people and groups absorb the memories, sentiments, and attitudes of other people or groups, with varied experiences and histories, joining them in a common cultural life [5]. Additionally, according to, acculturation is the outcome of contact between members of two or more cultural groups and a series of cultural and psychological changes. Acculturation at the collective level entails modifications to institutions and social systems. On the other hand, acculturation results in behavioral modifications at the individual level highlights two key insights about the idea of acculturation[6].

First, there is the idea of acculturation, which aims to explain the range of phenomena that arises when individuals from different cultural backgrounds enter a new culture and modify their own cultural patterns. This idea allows for the differentiation of acculturation from both assimilation and cultural transformation [6]. The idea of cultural change is understood to include acculturation. Second, the link between two or more cultural systems is where the idea of acculturation starts. Acculturative change is interpreted here as a result of cultural transformation. It could be the outcome of non-cultural factors like demographic or ecological shifts. This idea suggests that acculturation include things like ecological concerns that might not be directly tied to cultural difficulties .

A sample of the population and research on the individuals engaged in the acculturation process are necessary for identifying such changes. These modifications may take the shape of a sequence of simple adjustments to speech, attire, or diet, or they may take the form of a troublesome pattern of series that lead to acculturative stress and manifest as worry, depressive symptoms, or doubt. In addition to internal or psychological adaptation, the process of adaptation can also take the shape of socio-cultural adaptation.

However, as Ward[1]clarifies, acculturation is about the changes that emerge from ongoing interpersonal interaction between individuals of diverse cultural backgrounds. The process of acculturation in individual phenomena has recently piqued the interest of psychology. Originally, anthropology and sociology focused on acculturation as it related to group phenomena.

The process of acculturation between two or more different cultures that results in unique peer interaction patterns in an educational setting without disregarding the customs that originate from their culture is known as acculturation, according to the information presented above [4].

Acculturation is defined as the idea that comprises ideas or values, attitudes, and actions that change as a result of encounter with another culture[7]. A two-dimensional identification model known as the "acculturation model" was described by Phinney [8], who also conceptually and empirically compared it to two other two-dimensional acculturation models. In general,

immigrant cultural groups have the flexibility to preserve, explore, reinvent, or reject their ethnic identity, which will ultimately change, even though they can acculturate to a certain extent, i.e., become somewhat competent with the local culture.

Numerous earlier academics have studied acculturation and linked it to other variables. The study's findings will be explained as follows: The relationship between acculturation and ethnic identity and the psychological well-being of adult and elderly Mexican Americans is covered by Rivera[9]. investigated the connection between ethnic identification and acculturation, two variables that involve different and discrete processes[10]. It was discovered that there is a positive and negative link between the two variables, suggesting that there is a correlation between an individual's ethnic identity and their amount of acculturation [6].

Phinney[8]conducted a review of the literature on acculturation and found that both variables' measurements contained identical items. Understanding both ideas requires an awareness of changes to and from the native and local cultures. Additionally, because both ideas are multifaceted, it is vital to discern which aspects of ethnic identity and acculturation are measured and researched[9].

The majority of the acculturation research that was previously evaluated addresses the dynamics of acculturation in relation to foreign cultures. The acculturation discussed is done holistically and does not seem based on categories [11]. On the other hand, this study will create an acculturation tool based on categories and findings from research on various acculturation patterns among students at Medan State University.

The knowledge presented above motivates scholars to investigate the acculturation tendencies among Medan State University students. Sam & Berry[4] defined acculturation as a change in beliefs/values, attitudes, and behavior that results from an individual's encounter with two or more cultures. Two continuum questions were given, one based on Berry's concept of acculturation. 1) Is it crucial to protect, preserve, and advance your distinct cultural heritage? 2) Is it crucial to engage, associate, and participate with people from different cultural backgrounds? There are four acculturation strategies that arise from the "yes" and "no" responses to both questions. Of the four (four) acculturation strategies—marginalization, assimilation, separation, and integration—that [6] advocated. This leads the researcher to conclude that the creation of application-based acculturation tools that may be utilized to assess students at Medan State University for acculturation is the main topic of discussion in this study.

The tool for acculturation development of students in the faculty of education (FIP UNIMED) was developed based on the notion of acculturation proposed by berry[12]. The aforementioned description highlights how crucial it is to build tools for student acculturation. To find the best tool for revealing student acculturation, one is required. The methodical steps of instrument development are essential to producing a high-quality instrument. Researchers are interested in creating an application-based acculturation tool for Medan State University students that follows standardized and procedural phases in an effort to create a high-quality instrument [3].

According to Fitriani[13], there are two categories of instrument forms: test instruments and non-test instruments. While responses to non-test instruments are not reviewed for accuracy, test instrument respondents' responses to pre-existing questions are evaluated depending on how correctly they answered the questions with both positive and negative roots. Not only is it not high or low, but it is also aware of the true circumstances. A collection of written statements or questions with written responses is called an instrument [14]. The questionnaire's objective is to gather data from responders. According to Bisri [15], the data in question is in line with the variables or data objectives that desire to be investigated from respondents.

Firmansyah[16] states that non-test procedures are typically implemented through systematic distribution of questionnaires, observations, interviews, and evaluations of pre-existing materials. In accordance with learning outcomes pertaining to soft skills—particularly those that have to do with what students can do or accomplish are typically measured using non-test evaluation techniques. This can be acquired from the results of the understanding they get during the learning process. Put differently, this tool is based on performance that is witnessed, not on knowledge or other mental functions that are not visible to the five senses.

The test form methodology and this non-test data collection method are diametrically opposed. This type of non-test assessment is typically conducted in a non-threatening environment, just as test form evaluations [17]. Evaluation can track both the process and the learning outcomes simultaneously in non-test situations if tests only require a single response to view the results. Consequently, non-testing is incorporated into the learning process and will allow for a thorough assessment of students' learning processes and outcomes. Since the focus of modern education is on the development of competencies, there are many opportunities for genuine non-test modes of assessment, including portfolios and observation, to be used [17].

## **2 Methods of Research**

"Develop an Application-Based Acculturation Instrument for Medan State University Students" was the stated goal of this project. Using the ADDIE paradigm (Analysis, Design, Development, Implementation, Evaluation), the research employed the Research and Development (RnD) technique. The development phase is broken down into three phases: 1) gathering the instrument type, 2) expert validation, and 3) small-scale experiment. 4) a large-scale trial; and 5) the use of the product, which takes the shape of an approved acculturation questionnaire. The State University of Medan's Faculty of Education is where the research was carried out. Students from the State University of Medan's Faculty of Education served as the study's subjects. Up to 506 even semester (IV) students from the 2023–2024 academic year made up the sample. A Likert scale-formatted online questionnaire was used to gather the research data. Using two methods—testing the measurement model through Confirmatory Factor Analysis (CFA) analysis techniques and testing the structural model through Partial Least Square (PLS) analysis techniques with support from the SmartPLS-3 software program—the obtained data is analyzed using Structural Equation Modeling (SEM).

## **3 Results and Discussion**

This chapter includes an overview of the research subjects, respondent characteristics, and the findings of testing the measurement model using confirmatory factor analysis (CFA). It also tests the validity and reliability of items, both overall and per dimension, using a structural model with the SEM-PLS technique, with assistance from the SmartPLS 3 application. Additionally, it discusses each hypothesis and provides a general discussion. The data management processes include testing the measurement model, which includes validity, reliability, and goodness of fit model testing. The purpose of validity and reliability testing is to determine whether the variables based on the dimensions used are truly significant in terms of reflecting construct or latent variables (convergent validity properties). Some of the measures that will be tested are as follows.

- a. Validity of Outer Loading
- b. Validity of Average Variance Extracted (AVE)
- c. Reliability Composite Reliability (CR)
- d. Cronbach's Alpha (CA) Reliability
- e. Discriminant Validity with the Heterotrait-Monotrait Ratio (HTMT) Approach

Validity of Outer Loading for the overall Acculturation Dimension

Testing on the overall acculturation variable is with the aim of seeing various measurement results as follows.

### 3.1 Validity of Outer Loading

Based on the results of testing outer loading, it can be seen that all outer loading values  $> 0.70$ , which means that it has met the validity requirements based on the loading value. The results of validation testing based on outer loading can be seen in the table below.

**Table 1.** Validity Testing Based on Outer Loading

Item Code	Loading Value	Critical Point	Description
<b>Dimensions of Integration</b>			
IM1	0.749	0.70	Valid
IM2	0.755	0.70	Valid
IM3	0.644	0.70	Not Valid
IM4	0.618	0.70	Not Valid
IM5	0.791	0.70	Valid
IB1	0.762	0.70	Valid
IB2	0.751	0.70	Valid
IB3	0.704	0.70	Valid
IB4	0.722	0.70	Valid
IB5	0.647	0.70	Not Valid
<b>Separation Dimension</b>			
SM1	0.480	0.70	Not Valid
SM2	0.287	0.70	Not Valid
SM3	0.078	0.70	Valid
SM4	0.204	0.70	Not Valid
SM5	0.653	0.70	Not Valid
SB1	0.728	0.70	Valid
SB2	0.722	0.70	Valid
SB3	0.537	0.70	Not Valid
SB4	0.816	0.70	Valid
SB5	0.791	0.70	Valid
<b>Dimensions of Assimilation</b>			
AM1	0.784	0.70	Valid
AM2	0.729	0.70	Valid
AM3	0.712	0.70	Valid
AM4	0.771	0.70	Valid
AM5	0.713	0.70	Valid
AB1	0.717	0.70	Valid
AB2	0.524	0.70	Not Valid
AB3	0.712	0.70	Valid
AB4	0.333	0.70	Not Valid

AB5	0.472	0.70	Not Valid
<b>Marginal Dimension</b>			
MM1	0.821	0.70	Valid
MM2	0.822	0.70	Valid
MM3	0.849	0.70	Valid
MM4	0.893	0.70	Valid
MM5	0.815	0.70	Valid
MB1	0.868	0.70	Valid
MB2	0.808	0.70	Valid
MB3	0.862	0.70	Valid
MB4	0.879	0.70	Valid
MB5	0.793	0.70	Valid

### 3.2 Validity *Average Variance Extracted (AVE)*

All of the AVE values, as determined by the Average Variance Extracted (AVE) validity test, are 0.50, indicating that the validity standards based on AVE have been satisfied. Additionally, the table below displays the findings of the Average Variance Extracted (AVE)-based validity testing.

**Table 2.** Validity Testing Average Variance Extracted (AVE)

Indicator	Average Variance Extracted (AVE)	Critical Point	Description
Integration	0.513	0.50	Valid
Separation	0.342	0.50	Not Valid
Assimilation	0.503	0.50	Valid
Marginal	0.708	0.50	Valid

### 3.3 Reliability *Cronbach's Alpha (CA)*

All of the Cronbach's Alpha (CA) values are more than 0.70, indicating that the reliability standards based on Cronbach's alpha have been met, according to the results of the reliability measurement. The table below shows the outcomes of reliability testing using Cronbach's Alpha.

**Table 3.** Reliability Testing based on Cronbach's Alpha (CA)

Indicator	Cronbach's Alpha (CA)	Critical Point	Description
Integration	0.894	0.70	Reliable
Separation	0.755	0.70	Reliable
Assimilation	0.850	0.70	Reliable
Marginal	0.954	0.70	Reliable

### 3.4 Reliability *Composite Reliability (CR)*

All of the Composite Reliability (CR) values are more than 0.70, indicating that the reliability standards based on CR have been satisfied. This is evident from the measurement results. Additionally, the table below displays the outcomes of the composite reliability (CR)-based reliability testing.

**Table 4.** Composite Reliability (CR) Testing

Indicator	Composite Reliability (CR)	Critical Point	Description
Integration	0.902	0.70	Reliable
Separation	0.826	0.70	Reliable
Assimilation	0.874	0.70	Reliable
Marginal	0.955	0.70	Reliable

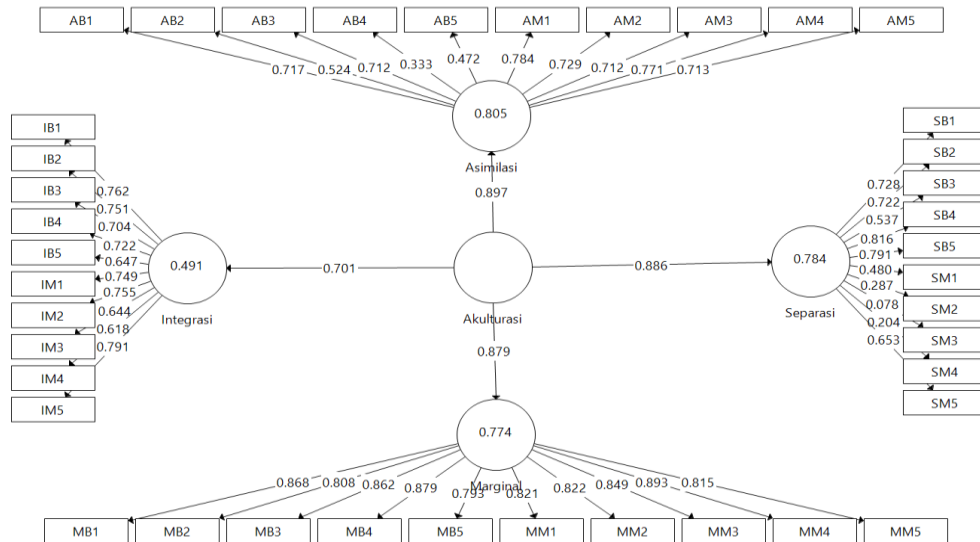
### 3.5 Discriminant Validity with the Heterotrait-Monotrait Ratio (HTMT) Approach

It is known from the results of the HTMT approach's test of discriminant validity that all values are less than 0.90, indicating that the approach satisfies the criteria for discriminant validity. The developed items are found to be both valid and reliable based on the outcomes of the validity and reliability testing that was done. The table below displays the findings from the HTMT approach's test of discriminant validity.

**Table 6.** Heterotrait-Monotrait Ratio (HTMT) Discriminant Validity Testing

	Acculturation	Assimilation	Integration	Marginal	Separation
Acculturation	0.595				
Assimilation	0.897	0.662			
Integration	0.701	0.561	0.716		
Marginal	0.879	0.723	0.369	0.842	
Separation	0.886	0.750	0.584	0.719	0.585

The direct impact of acculturation on integration, separation, assimilation, and marginalization is demonstrated to have a positive and significant effect, according to the results of the acculturation model test, which is the basis for the connection pattern that will be discussed in this session. Additionally, evaluating every item reveals many invalid items in every dimension, as seen in Figure 1 below.



**Fig. 1.** Model of the Influence of Acculturation Variables on the four dimensions of integration, separation, assimilation, and marginalization.

The findings indicate that acculturation has an impact on the four aspects of integration, separation, assimilation, and marginalization based on the structural model mentioned above.

## 4 Conclusion

Based on the results of the analysis and discussion in this study, the following conclusions can be drawn. The Confirmatory Factor Analysis (CFA), conducted using SmartPLS software, indicated that all outer loading values were greater than 0.4, thereby meeting the validity requirements according to the outer loading criteria. Furthermore, the validity assessment based on the Average Variance Extracted (AVE) showed that all AVE values exceeded 0.5, indicating that the constructs met the validity requirements according to AVE standards. Reliability testing based on Composite Reliability (CR) revealed that all CR values were above 0.7, confirming that the constructs met the reliability threshold according to CR. Additionally, reliability was further evaluated through Cronbach's Alpha (CA), with all CA values surpassing 0.7, which signifies that the constructs also met the reliability standards according to Cronbach's Alpha. Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT) approach, with all HTMT values found to be below 0.9, thus fulfilling the criteria for discriminant validity based on the HTMT approach. Overall, the results of the validity and reliability testing conducted through CFA analysis indicate that the developed items are considered fit for the measurement model.



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