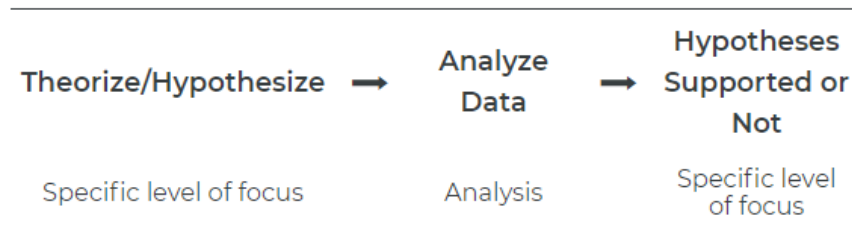


CHAPTER 3
OBJECT AND RESEARCH METHODOLOGY

3.1. Object of the research

This study will employ a Deductive Research Approach (Figure 3.1.) to examine the international students' E-satisfaction amid COVID-19. This approach refers to the research process, that includes analyzing existing theories and testing hypotheses that emerge from those theories (Sheppard, 2020), that will be done in this research.



(adopted from Sheppard, 2020)

Figure 3.1. Deductive process in research approach

The object of research as an independent variable in this study are:

1. Interaction (X_1) which consists of 1) learner – learner interaction (X_{1_1}), 2) learner - instructor interaction (X_{1_2}), 3) learner – content interaction (X_{1_3}), 4) learner – management interaction (X_{1_4}) (Moore, 1989; Ghazal, Al-Samarraie & Aldowah, 2018; Ferri, Grifoni & Guzzo, 2020);
2. E- learning quality (X_2) which consists of Technological characteristics (X_{2_1}) and Instructors' Characteristics (X_{2_2}).
3. The dependent variable in this study is E- Learning satisfaction (Y).

3.2. Research Method

3.2.1. Type of Research and Method

The study will employ a quantitative research approach to examine the international students' satisfaction amid COVID-19 at UPI. Quantitative research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations (Bhandari, 2020).

There are different types of quantitative research, such as descriptive, correlational and experimental researches. The correlational research, that refers to

investigation of relationships between study variables (Bhandari, 2020), will be used in this study.

The reason for choosing the quantitative method approach is based on the belief that the researcher wants to determine the relationship between the variables which are interaction dimension, e-learning quality dimension and e-learning satisfaction.

3.2.2. Operational variables

Operational variables are the process of changing or decomposing concepts or constructs into measurable variables suitable for testing (Cooper & Schindler, 2014). This study consists of the independent variables Interaction dimension (X_1) and E- learning quality dimension (X_2) and the dependent variable, namely e-learning satisfaction (Y) (Table 3.1.).

Table 3.1.
Operational variables

Variable	Dimensions	Concept	Indicator	Size	Scale	No. Item
Interaction (X_1)	"Reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another" (Cao, Lin, Burgoon & Crews, 2005)					
	Learner – learner interaction	Dimension that refers to interaction between learners	Perceived utility	The level of helpfulness of interaction	Interval	1
				The level of friendliness of interaction	Interval	2
	Learner - instructor interaction	Dimension that refers to interaction between learner and instructor	Perceived utility	The level of availability for interaction	Interval	3
				The level of helpfulness	Interval	4
	Learner – content interaction	Dimension that refers to usability of perceived content	Information quality	The level of completeness of content	Interval	5
				The level of effectiveness of content	Interval	6
				The level of compliance learner's expectations	Interval	7
	Learner – management interaction	Dimension that refers to interaction between learner and management stuff	Perceived utility	The level of availability for interaction	Interval	8
				The level of helpfulness	Interval	9
Speed level in handling learner demand				Interval	10	
E - learning quality (X_2)	The concept, that is combined with two characteristics: technological and instructors' and adapted to the situation of COVID- 19.					

Variable	Dimensions	Concept	Indicator	Size	Scale	No. Item
	Technological characteristics	Dimension that refers to technological characteristics of E-learning	Ease of use	The level of ease to use of E-learning platforms, used in learning processes	Interval	11
				The level of ease to use of online platforms for applying for courses	Interval	12
				The level of ease to use of online platforms for obtaining learning materials from instructors	Interval	13
			Internet connection	The availability of internet for learner	Interval	14
				The stability of internet of instructor	Interval	15
			Instructor's characteristics	Dimension that refers to instructor's characteristics of E-learning	Professional qualities of an instructor	The clarity of instructor's explanation of material
	Instructor attitude towards e-learning	Interval				17
	Instructor ability to motivate students	Interval				18
	Personality traits of instructor	Instructor friendliness towards students			Interval	19
	E-learning satisfaction (Z)	The perception of learners towards the online learning and e-learning system (Chena, Lin & Kinshuk, 2004).				
			Ease of use	The level of flexibility	Interval	20
				The level of usability	Interval	21
			Perceived satisfaction	The effectiveness of E-learning	Interval	22
				The attitude of learner towards E-Learning	Interval	23

3.2.3. Types and Sources of Data

For the purposes of this research, will be used two groups of sources of data, namely:

1. Primary Data – data obtained through a questionnaire distributed to a number of respondents according to the target which is considered to represent the entire population of research (Cooper & Schindler, 2014). As primary data this

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research considers the results of questionnaire that will be given to international students at UPI.

2. Secondary Data - data that is collected in the form of variables, symbols or concepts that can assume one of a set of values (Cooper & Schindler, 2014). Sources of secondary data in this study are literature data, articles, journals, websites, and various other sources of information.

3.2.4. Population

Activities in collecting and analyzing data, in conducting research, are an important step to determine the characteristics of the population which are elements in the object of research.

A population is the set of all the individuals of interest in a particular study (Sekaran & Bougie, 2016). In this study, the target population will include undergraduate and postgraduate international students in UPI that experienced E-learning amid COVID-19. It will include all international students studied at UPI in the period 2020 -2022 academic years. The researcher believes that this population possesses unique and common features related to the research problem.

The size of population was calculated based on a data provided by Directorate of International Affairs (DIA) UPI. It says that in period of 2020-2022 online courses in a form of short courses and degree programs were taken by 188 international students. However, the programs taken by international students have significant differences. The measurement of international students who has taken internship programs and short courses can be irrelevant due to short duration of a program, as Bastien, Seifen-Adkins & Johnson (2018) found out that the longer international students' study in a university abroad, the better their academic adjustment, that includes quality and effectiveness of studying and communication with lecturers.

Based on the given above, this research will consider as population students who has taken a degree program. The population in this case will be considered as 43, because it is a number of international students who has studied at UPI in a degree program during COVID-19. The full information regarding international students studying at UPI who represent the population is given in Appendix 1.

3.2.5. Sample and Sampling Technique

A sample is a set of individuals selected from a population, usually intended to represent the population in a research study. Sampling is the process of selecting the right number of elements from the population to create sample and an understanding of the traits or characteristics to generalize for these traits or characteristics to population elements (Sekaran & Bougie, 2016).

There are several different sampling techniques available, and that can be into two groups: probability sampling and non-probability sampling. This research will adopt probability (random) sampling, that allows to start with a complete sampling frame of all eligible individuals from which sample can be selected. This research will use simple random sampling: in this case each individual is chosen entirely by chance and each member of the population has an equal chance, or probability, of being selected (Sekaran & Bougie, 2016).

The precise size of sample will be calculated by using Slovin's formula for Minimum Sample:

$$n = \frac{N}{NE^2 + 1}$$

(adopted from Susanti, Soemitro, Suprayitno, & Ratnasari, 2019)

Figure 3.2. The Slovin's formula

Note:

n – Sample size

N - Total populations

E - Error margin / Margin of error

This research adopts ($\pm 5\%$) as a margin error as the researchers believes that this is the range in which the true value of the population is estimated to be and 95% level of confidence will be adopted because the researcher assumes that 95 out of 100 samples will have the true population value within the range of precision (Israel, 2012).

Based on the Slovin's formula above, the number of samples can be obtained as follows:

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

$$n = \frac{43}{1 + 43 * (0,05)^2}$$

$$n = 38.8261851$$

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From the results of these calculations, a sample size of 38,82 was obtained. To facilitate the calculation, the author will round it up to 39. So, the sample size in this study is 39 international students who has studied at UPI in a period of pandemic.

3.2.6. Data Collection

Data collection techniques are a way of collecting data needed to answer the formulation of research problems. According to Sekaran & Bougie (2016), data collection decision, which involves the selection of the method of obtaining the information needed, is essential part of research process. Therefore, the choice of method depends on the objective of the study, the research questions, and the research strategy.

This study uses quantitative data. Quantitative data is numerical in nature, that can be mathematically computed and uses different scales for measuring, while secondary data refers to data collected from a source that has already been published in any form (Kabir, 2016).

Quantitative data collection methods like surveys and questionnaires and secondary data from different sources, for instance official records and previous studies will be employed.

The data collection techniques used by the author in this study are:

- 1) Closed-ended questionnaires. The researcher opts to use this tool because much information from a large sample of the respondent will be collected within a short time with fewer costs. Also, more information will be obtained because respondents will be free to fill in the information at their convenient time and place. Therefore, online questionnaire using Google -Forms will be delivered to respondents;
- 2) Documentary Analysis. This refers to reviews of different related documents that are associated with the research study. The document review will be used purposefully in collecting secondary data through reading various documents from different sources.

3.2.7. Validity and Reliability Testing

Data testing is needed to get good quality. In order to test the appropriateness of the research instrument distributed to respondents, two stages of testing will be

carried out, namely the validity and reliability tests. These two tests will indicate how well a method, technique or test measure data. Reliability will test the consistency of a measure, and validity is about the accuracy of a measure (Middleton, 2021).

This study uses interval data that shows the distance from one another and has the same weight. Validity and reliability tests in this study will be carried out using software tools or the IBM Statistical Product for Service Solutions (SPSS) computer program version 25.0 for Window.

3.2.8. Validity Testing

Validity of data in this research is tested using Pearson Correlation. This is done by correlating every indicator's score to the total score, the significance level is 0.05 or less then it is considered valid (Schober, Boer & Schwarte, 2018).

Table 3.2.
Validity Results

ITEMS	SIG. LEVEL (2-TAILED)	INFORMATION
Q1	< 0,01	VALID
Q2	< 0,01	VALID
Q3	< 0,01	VALID
Q4	< 0,01	VALID
Q5	< 0,01	VALID
Q6	< 0,01	VALID
Q7	< 0,01	VALID
Q8	< 0,01	VALID
Q9	< 0,01	VALID
Q10	< 0,01	VALID
Q11	< 0,01	VALID
Q12	< 0,01	VALID
Q13	< 0,01	VALID
Q14	< 0,01	VALID
Q15	< 0,01	VALID
Q16	< 0,01	VALID
Q17	< 0,01	VALID
Q18	< 0,01	VALID
Q19	< 0,01	VALID
Q20	< 0,01	VALID
Q21	< 0,01	VALID
Q22	< 0,01	VALID
Q23	< 0,01	VALID

Source: Processed Data (2022)

As it can be seen on Table 3.2, the results of each variable have been tested using Pearson Correlation and the significance level for each variable is less than

0,05. It allows to declare that the data is valid and can be used as research instruments.

3.2.9. Reliability Testing

Reliability of data in this study will be tested using the alpha formula of Cronbach's alpha (α) because the questionnaire question instrument used was a range between several values, in this case using a Likert scale of 1 to 5.

$$r_{11} = \left[\frac{k}{(k-1)} \right] \left[1 - \frac{\sum \sigma b^2}{\sigma t^2} \right]$$

(adopted from Sekaran & Bougie, 2016)

Figure 3.3. The Formula of Cronbach's alpha (α)

Note:

r_{11} - instrument reliability

k - number of question items

σt^2 - the total variance

$\sum \sigma b^2$ - the number of item variances per question

According to Bonett (2014) a group of items in a dimension is declared reliable if the reliability coefficient is higher than 0.70. The following is the calculation of the reliability test in this study.

The reliability of data in this study used IBM SPSS Statistics 25 software for Windows. The proceedings of the data are given in Figure 3.4 and in Table 3.3.

Case Processing Summary

		N	%
Cases	Valid	39	100.0
	Excluded ^a	0	.0
	Total	39	100.0

a. Listwise deletion based on all variables in the procedure.

(adopted from Data Proceeding, 2022)

Figure 3.4. Case Processing Summary

**Table 3.3.
Reliability Results**

No of items	Cronbach's Alpha	Critical Point	Information
23	0,950	0,70	RELIABLE

Source: Processed Data (2022)

Based on Figure 3.4 and in Table 3.3, it can be seen that the alpha value of all items is greater than the critical point limit of 0.7. So, this shows to declare that all variables are to be reliable and can be used in research.

3.2.10. Data Analysis Techniques

Data analysis is a systematic process that involves working with data, organizing them into manageable units, and synthesizing them, such as patterns, discovering what is important and what to tell others (Sekaran & Bougie, 2016).

This study examines the level of international students' E-satisfaction by measuring the influence of interaction dimension and E-learning quality dimension on E-learning satisfaction.

Likert scales will be used in this study, as techniques that is usually used for measuring opinions and attitudes (Sekaran & Bougie, 2016). It measures the extent to which participants agree or disagree with a given statement, and typically range from 1 (strongly disagree) to 5 (strongly agree) with a neutral point in the middle.

Table 3.4.
Alternative Score

Alternative answers	Very unhelpful Very unfriendly Never available Very slow Absolutely no Very incomplete Very unuseful Very hard to use Very hard Very bad Very unclear Very demotivational Not satisfied	Answer Range	Very helpful Very friendly Always available Very fast Absolutely no Very complete Very useful Very easy to use Very easy Very good Very clear Very motivational Highly satisfied
	Negative	1 2 3 4 5	Positive

Source: Modifications from Sekaran and Bougie (2016)

Based on Table 3.4, it can be assumed that if the respondent tends to be negative or not good – he/she will choose score 1 or 2. Meanwhile, if the respondent answers on a scale of 4-5 respondents tend to be positive or tend to be good. If the respondent chooses a scale of 3, the respondent answers neutrally (Sekaran & Bougie, 2016).

The data will be edited, coded and analyzed by using statistical package for social science (SPSS Version 21) computer software to obtain descriptive statistics for the major variable which are interaction dimension, E-learning quality

dimension and E-learning satisfaction. Microsoft Excel version 2019 will be used to add value to the SPSS data produced.

The data will be categorized and tabulated according to the concepts to address the purpose of the study. Tables, Pie charts, and bar charts will be used for result presentation.

3.3. Data Analysis Techniques

Descriptive analysis is an analysis used to analyze data by describing data that has been collected as it is, without intending to make conclusions that apply to the public or generalizations (Sugiyono, 2016).

In order to verify that there is certain influence between independent variables and dependent variables, this relationship should be tested by regression analysis (Frost, 2020). This study uses multiple regression analysis.

Multiple regression, also known as Multiple linear regression (MLR), Multiple regression is a statistical technique that can be used to analyze whether there is a relationship between a single dependent variable and several independent variables (Moore, Anderson, Das & Wong, 2006). The objective of multiple regression analysis is to use the independent variables whose values are known to predict the value of the single dependent value (Frost, 2020).

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i$$

(adopted from Moore, Anderson, Das & Wong, 2006)

Figure 3.5. The multiple regression equation

Note:

y = dependent variable

x_i = explanatory variables

β₀ = y-intercept (constant term)

β_n = slope coefficients for each explanatory variable

ε = the model's error term (also known as the residuals)

Each predictor value has a weight, that shows their relative contribution to the overall prediction, as it can be seen in Figure 3.4. This approach has been chosen because it is applicable for analyzing the data when one of the variables is dependent on a set of other variables (Moore, Anderson, Das & Wong, 2006).

The research uses Skewness and Kurtosis to measure the normal distribution of the data stability of the data results (Field, 2013). The data is considered normal if the skewness and kurtosis coefficients are equal to 0.

3.4. Hypothesis Testing

To test the relationship between each independent variable and dependent variable a correlation analysis will be used, that provides information on the strength and direction of the linear relationship between two variables (Pearson Correlation and Linear Regression, 2022). Linear regression analysis will be used to predict the value of a dependent variable based on the value of each independent variable (Pearson Correlation and Linear Regression, 2022).

To test hypothesis of this study two testing techniques will be used:

- 1) The One Sample t-Test will be used to test the hypothesizes. This technique determines whether the sample mean is statistically different from a known or hypothesized population mean. One-sample t-test is used to compare the mean of one sample to a known standard (or theoretical/hypothetical) mean (μ) (NCSS, 2021).
- 2) F-test - Simultaneous regression test (F test) is a test used to determine whether there is influence shared between the independent variables toward the dependent variables. F-test can be obtained with a significant level of 5%. According to Ghazali (2013), the criteria of F-test is as follow:
 - a) If the P-value $\leq 5\%$, the hypothesis is accepted, it means that there is a simultaneous effect of independent variables on the dependent variable.
 - b) If the P-value $> 5\%$, the hypothesis is rejected, it means that there is no effect of independent variables on the dependent variable.

3.5. Hypothesis Verification

Statistically, the hypothesis must be tested to decide whether to accept or reject the hypothesis. The hypothesis of this research can be tested as follows:

H1: $H_0: p > 0.05$ means, there is no effect of Interaction and E-learning quality on E- learning satisfaction

$H_a: p < 0.05$ means, there is positive effect of Interaction on E-learning satisfaction

H2: $H_0: p > 0.05$ means, there is no effect of Interaction on E-learning satisfaction

Ha: $\rho < 0.05$ means, there is positive effect of Interaction on E-learning satisfaction

H3: H0: $\rho > 0.05$ means, there is no effect of E-Learning quality on E-Learning satisfaction

Ha: $\rho < 0.05$ means, there is a positive effect of E-Learning quality on E-Learning Satisfaction