

# Developing a Scale to Measure Student Quality of Life in an Online Learning Set Up in the Pandemic Context

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**Abstract**— The COVID-19 pandemic brought many challenges to the student's quality of life. The University of Mindanao should develop an intervention program anchored to the new dimensions of students' quality of life. This study aims to create a scale on students' quality of life. Using a mixed-method research design, the researchers interviewed 13 students about students quality of life. The output of the interview, as well as the readings of related literature, became the basis of the Item Pool Statements (IPS). The IPS was evaluated by ten experts using Lawshe's method of Content Validation. The researchers collected 595 observations for Exploratory Factor Analysis and 3978 observations for Confirmatory Factor Analysis. The exploratory factor analysis extracted five factors: life vitality, emotional well-being, academic struggles, learning environment, financial well-being, and learning modality. A confirmatory factor analysis was conducted to confirm further the measures of students' quality of life in the pandemic context. It was found that there is a significant relationship with the construct (factors). There is a high internal consistency and convergent validity of each construct. In addition, the  $\chi^2/df=2.087$ , CFI=.962, TLI = 0.970, and RMSEA=.048 (p close = 0.650) are fitted to the level of acceptance; thus the model is fit.

**Keywords:** Students' Quality of Life, Mixed Method Research, Exploratory Factor Analysis, Confirmatory Factor Analysis, Philippines.

## I. INTRODUCTION

The effect of a pandemic on social, technological, economic, and educational sectors has brought many changes in almost all areas of an individual's way of living [1,2]. It is not limited to daily survival but also includes struggles in coping with emotional and mental aspect [3]. Although many have found comfort in dealing with the new normal, difficulties and frustrations exist undeniably.

To be specific, students from colleges and universities are considered at risk from higher levels of depression and anxiety [4], stress [5], and eating disorders compared to the whole [6]. Hence, when the system of their education is disturbed by the pandemic, the burden of the psychological problems of this vulnerable population is amplified [7,8]. It is the priority of the teachers to help the students as they are the center of the educative process.

This pronouncement was manifested in the decreased number of students at the University of Mindanao. Implementing the purely online modality contributed to the students' anxiety, which was brought by various academic challenges such as poor internet

connection, lack of technological support, financial support, fear of being infected with the virus, and parental support. The University of Mindanao should find ways to help the students by developing an intervention program. However, with an empirical basis in the context of Filipino university students, helping them is more manageable.

Some scales will measure the quality of life like WHO's quality of life-BREF (WHOQoL-BREF) [9] and quality of life among nursing students [10] and quality of life among elementary students [11]. Further, several studies have been conducted to attempt to measure the student's quality of life among college students. Sirgy, Grzeskowiak, and Rahtz developed and validated the collegiate quality of life based on Maslow's Hierarchy of Needs [12]. The study resulted in item statements that measure the students' satisfaction with school facilities and services. The study by [13] measures the quality of life of medical students in China, which utilize a scale of WHOQOL-BREF.

The above research was conducted to measure the student's quality of life; however, none will measure the students' quality of life during the COVID-19 pandemic.

Further, these scales have yet to develop in the Philippine setting, which is crucial in creating a program for the students.

Thus, the researchers find it urgent to develop scale that will measure the students' quality of life during the pandemic. Specifically, it will determine the dimensions of the student's quality of life and its reliability coefficient and will determine if the data is the best fit for the extracted model. This endeavor will retrospect the factors affecting the student's quality of life by developing a questionnaire anchored to the current context. In addition, this questionnaire is seen as a valuable tool in developing an intervention program to help students in their academic life and their other needs like social, emotional, and mental aspects, among others.

## II. METHOD

### A. Research Respondents

Through the purposive sampling technique, the researchers interviewed 13 students from the various programs of the University of Mindanao. The targeted number of students for the qualitative part of the study is enough to saturate relevant information on students' quality of life [14]. The researcher used purposive sampling since the development of the scale of students' quality of life requires personal and actual experiences. The researcher used inclusion and exclusion such that the student experienced online classes for the school year 2020-2021.

The second part of the investigation requires a random selection of the research respondents. The students were given a link to the survey questionnaire at a specific time. There are 595 observations that were utilized in the exploratory factor analysis and 3,978 for the confirmatory factor analysis. This number of samples is enough to determine the dimensions of students' quality of life and its respective psychometrical properties [15].

### B. Research Instrument

This study collected two types of primary data: (a) data from one-on-one interviews with research participants and (b) from survey questionnaire responses. The students were interviewed in the first part of the study to determine the various item statements. In developing the item statements, a review of related literature was also considered. The formulated item statements were validated using Lawshe's content validity principles.

To achieve the research objectives, the researcher used two instruments to collect information on students' quality of life. The first research instrument is designed to collect data from research participants' responses via in-depth interviews (Appendix A). It led to the various item statements on students' quality of life. Experts reviewed the interview

guide questionnaire to ensure the questions were relevant to the study's objectives. Three validators were given a validation sheet to evaluate the items' relevance.

The summary of the data collection scheme is shown in Table 1 to ensure that the research objectives are aligned with the problem, possible data set, methods of data collection, and data analysis.

Table 1. Summary of the Data Collection Scheme

Problem	Data Set	Methods of Collection	Data Analysis
What is the student's view on Quality of Life?	1. Life Vitality 2. Financial 3. Academic Modality 4. Emotional 5. Academic Struggles	In-depth Interview	Colizzi's

The output of phase 1 of the study was the different item statements in the form of a survey. The responses of the research participants determine the dimensions of quality of life and item statements. The research instrument in survey form was subject to validation by the panel of experts. The ten expert experts will check if the item statements can measure the student's quality of life. This is in the form of Lawshe's content validity ratio. The validation sheet was in the form of a Likert scale, with five being specified as 'Excellent' and one as 'Poor.' After the exploratory factor analysis, college students from the University of Mindanao pilot-tested the questionnaire.

The final questionnaire of this study will use a five-point Likert-type attitudinal scale. The five-point Likert type was affixed between "Strongly Agree and Strongly Disagree." Table 2 shows the basis of the researchers in interpreting the responses of the students on students' quality of life.

Table 2. Seven-Point Likert Scale

Score	Range of Means	Description	Interpretation
5	4.20 – 5.00	Strongly Agree	The statement is interpreted as very high.
4	3.40 – 4.19	Agree	The statement is interpreted as high.
3	2.60 – 3.39	Neither	The statement is interpreted as average
2	1.80 – 2.59	Disagree	The statement is interpreted as moderately low.
1	1.00 – 1.79	Strongly Disagree	The statement is interpreted as very low.

**C. Design and Procedure**

An integrated research design was used in this study, with a focus on quantitative design. It was a method of investigation that combined the philosophy of post-positivism and constructivism [16]. Thus, it was more than just collecting and analyzing both types of data; it also entailed combining both approaches so that a study's overall strength was more significant than qualitative or quantitative research [17]. This design's pragmatic worldview was a sequential collection of students' experiences and responses to the survey questionnaire. The inquiry was anchored on the assumption that gathering information in the multifaced will give a better understanding of the research problem [18].

The study also included identifying the factors based on the interviews and available literature on students' quality of life. The qualitative phase of the research involved in-depth interviews about their experiences as students during the pandemic. These responses served as the foundation for the creation of the various item statements. The quantitative portion of the study involved analyzing the various item statements for construct validity. Internal consistency analysis was used to determine the instrument's reliability using the confirmatory factor analysis [17].

The analysis of the relevant literature on the quality of life of students serves as the study's springboard. The interview guide questionnaire was used by the researchers to collect relevant information on students' quality of life. The formulated questions were based on readings from various literature and quality-of-life theories. Participants in the study will be asked to provide informed consent. They were given an orientation to the study, which included information about the potential benefits of participating.

Zoom recording was used to transcribe the responses of the research participants. The responses of the research participants were carefully analyzed so that the meaning of the statements was fully captured. The output of the interviews and analysis of the different literature was the item statements that could measure the student's quality of life in the form of a Likert-type questionnaire.

The results of the interviews were used as item statements in the second phase, in which all college students will respond to each item using a Likert scale. Participants will be able to retrieve their responses at any time. All data from this study will be stored in the RPC and deleted one year after the final defense. The UM Ethics Committee will oversee the study's procedures. This paper's final product will be presented in the management office at an international forum and published.

The researcher used data analyses for qualitative and quantitative data. The researchers considered all statistical assumptions for quantitative data analysis. For the qualitative

data, the researcher applied Colizzi's technique to interpret the students' responses to questions about their quality of life. For the quantitative data, the researcher employed statistical tools such as EFA, Cronbach's Alpha, and Confirmatory Factor Analysis this study. The EFA will be used to investigate and assess the factors influencing students' quality of life.

Cattell's scree plot is another factor to consider. It will determine how many factors are discovered in the analysis. Cattell's scree plot will confirm that the data does not represent an identity matrix [19]. The item statement with the highest correlation (greater than 0.6) will be kept.

The internal consistency of the questionnaire was tested using Cronbach's Alpha [20]. It will determine whether the instrument is reliable. Confirmatory Factor Analysis (CFA) further validated the survey questionnaire. Further, it was used to determine if the data best fit the model. These criteria will be considered by the researcher when determining the model fit in Table 3.

Table 3. The three categories of model fit and their level of acceptance

Name of category	Name of Index	Level of Acceptance
1. Absolute fit	$\chi^2$	p-value > 0.05
	RMSEA	RMSEA < 0.08
	GFI	GFI > 0.95
2. Incremental fit	AGFI	AGFI > 0.95
	CFI	CFI > 0.95
	TLI	TLI > 0.95
	NFI	NFI > 0.95
3. Parsimonious fit	Approximate $\chi^2$	$\chi^2/df < 3.0$

The study's researchers follow ethical considerations in the conduct of the study. Participation is entirely voluntary. All research participants and respondents are not obliged to participate during the interview and distribution of the research questionnaire. They are free not to respond or participate in the conduct of the study. The respondents' information, such as name, age, and program, will be kept confidential. Informed consent was given to the respondents. This study did not get high-risk such as physical, psychological, or socioeconomic

**III. RESULTS AND DISCUSSIONS**

The determination of the item pool statements (IPS) representing the quality of students' life includes an interview and analysis of literature as the basis for the formulation of the item statements. This initial stage in developing a measure of a tool was anchored to these published journals [21,22,23].

Thus, there were ten (10) experts who have higher educational degrees reviewed the content of the Item Pool of Statements (IPS). In addition, these experts were chosen because of their diverse backgrounds in test development, research, education, psychology, and learning analytics. This was strengthened by Lawshe’s assertion that the content of the tool must be evaluated and reviewed by experts in the field. As a result, ten expert panels must agree on the validity of an item by at least 0.80, and the items that did not meet the minimum validity requirements were revised or removed [23].

**A. Sampling Adequacy and Suitability Test Results**

Presented in Table 4 is the test of sampling adequacy and suitability test results. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO=0.915) was used to assess the adequacy and suitability of the exploratory factor analysis involving 596 respondents. The results show that the data is appropriate for exploratory factor analysis because it exceeded the minimum requirement of 0.5. The discovery also indicates that the data is sufficient to identify a distinct factor [24]. Furthermore, Bartlett's sphericity test demonstrates that the R-matrix is not an identity matrix. This means that the analysis reveals more than one factor. It also demonstrates that there are patterned relationships between the variables ( $p < 0.01$ ).

Table 4. Factorability of the Exploratory Factor Analysis Data

Sampling Method	Approx. Chi-Square	df	KMO	Sig
Kaiser-Meyer-Olkin Measure of Sampling Adequacy			0.915	
Bartlett's Test of Sphericity	13204.461	946		0.00

**B. Rotated Component Matrix**

The factor loadings of the items after the exploratory factor analysis with 38 items clustered in the six factors or dimensions of the student's quality of life. An item with factor loadings less than 0.5 were removed. A factor loading value of 0.50 or higher is considered extremely strong and is thus kept.

Table 6 shows the thematic analysis of the items' statements of students' quality of life after the exploratory factor analysis. The first factor, which is *life vitality*, has obtained 16 item statements (36, 40, 9, 12, 5, 18, 23, 15, 25, 19, 16, 13, 20, 21, 22, 23, and 27). The second factor obtained 11 items (46, 28, 38, 11, 43, 53, 31, 39, 52, and 56). These items will measure the factor of emotional well-being. The third factor, which is academic struggles, has four items (42, 59, 62, and 50). The fourth factor has obtained three items (63, 37, and 1). These items will measure the learning environment. The fifth factor has two items (45 and 64). This will measure the factor of financial well-being. Finally, the first factor has accumulated two final items (30 and 29). These items will measure the learning modality.

**C. Latent Roots Criterion of the Extracted Factor**

Provided in Table 7 is the latent roots criterion of the extracted factors depicting the percentage of Variance. The first factor of students' quality of life has an initial eigenvalue of 10.029 and a variance of 22.793%. The second factor of students' quality of life has an initial eigenvalue of 7.655 and a variance of 17.397%. The third factor has an initial eigenvalue of 2.189 and a variance of 4.976%. The fourth factor has an initial eigenvalue of 1.593 and a variance of 3.62%. The fifth factor has an initial eigenvalue of 1.304 and a variance of 2.963%. The last factor of students' quality of life has an initial eigenvalue of 1.248 and a variance of 2.837%. The aggregate percentage of Variance suggested that the extracted factors can explain 54.585% of the overall variability of students' quality of life.

Table 6. Thematic Analysis of the Student Quality

Factor	Item Statements	Item Number
Life Vitality	I can manage my time in an online class.	36
	I have already adjusted myself in an online class.	40
	I am motivated to learn during this pandemic time.	9
	I am more focused on my study in an online class setting.	12
	I learned to be organized during this pandemic.	5
	I am motivated to study my lesson in advance.	18
	I always have my daily time schedule to set my priorities.	23
	I consider challenging school activities as a motivation.	15
	I am mentally and physically stable.	25
	I prepare for my exams ahead of time in an online class.	19
	The online class provides me with an opportunity to work at my own pace.	16

	I do not find any difficulties in my online class because I have all the resources.	13
	I can spend time with family in an online class setting.	20
	I actively engage in academic and non-academic organizations to stay connected with peers and friends.	21
	I spend time on self-reflection.	22
	I reaped recognition and awards because the university provided me with an opportunity to excel in the writing competition.	27
Emotional	It is an achievement that I am safe from health issues like the coronavirus.	54
	I will be happy if I have good grades in my subjects.	46
	I am very happy when I understand what I am reading.	28
	I am happy when my teacher is considerate in the submission of requirements.	38
	It is an achievement to finish my school requirements with quality.	11
	I understand that as a student, I will be facing many difficulties.	43
	It is comforting to know that the chances of employability are high after graduation.	53
	I am happy when the activity given is achievable and practical.	31
	I will be glad if the university will provide hotlines for my concern.	39
	It is fulfilling when you study in the program of your choice.	52
	I strive hard to finish my studies because my family expects me to graduate on time	56
Academic Struggles	I am stressed about my major courses.	42
	I am stressed by the requirements and deadlines of online classes.	59
	I lack sleep in keeping up with my academic requirements.	62
	Studying major subjects through online classes is stressful.	50
Learning Environment	My student life in the classroom is better than my student life online.	63
	I like the face-to-face class because I can socialize with my classmates.	37
	It is an achievement to finish my school requirements with quality.	1
Financial	I am worried right now because of the financial struggle due to the pandemic.	45
	I hardly pay my tuition fee.	64
Academic Modality	I enjoy attending my online class, especially when the teacher is cheerful and dynamic.	30
	I like to participate in class activities when my professor is lively.	29

Table 7. Latent roots criterion of the extracted factors

Factors	Initial Eigenvalue	% of Variance	Cumulative Variance %
Life Vitality	10.029	22.793	22.793
Emotional	7.655	17.397	40.189
Academic Struggles	2.189	4.976	45.165
Learning Environment	1.593	3.62	48.785
Financial	1.304	2.963	51.748
Academic Modality	1.248	2.837	54.585

A confirmatory factor analysis was conducted to further validate the measures of students' quality of life in the pandemic context. It was used to determine the relationship of the construct (factors). There was an assessment of the internal consistency and convergent validity of each construct. As shown in Table 8, all the item statements were significant measures of the different factors ( $p < 0.05$ ). Cronbach's alpha coefficients indicated adequate internal consistency of all of the indicators for each construct. The

result shows that all five constructs' of the scale of students' quality of life factors met the minimum Cronbach's coefficient reliability of 0.70. It means that the scale measuring Student Quality of Life in an online class has a satisfactory internal consistency

#### D. Results of composite reliability and convergent discriminant validity testing.

All the factors were assessed to evaluate the convergent validity of the questionnaire. As shown in Table 8, all latent constructs, such as life vitality, emotional well-being, academic struggle, financial well-being, and academic modality, were significant. This means that there is satisfactory convergent validity [25].

Table 8. Convergent discriminant validity

Factors			Intensive Validity			
			Estimate		SE	P-value
			B	B		
Life Vitality	<-->	Emotional	0.165	0.422	0.023	***

Life Vitality	<-->	Academic Struggles	-0.093	-0.216	0.023	***
Life Vitality	<-->	Financial	0.06	0.115	0.026	0.022
Life Vitality	<-->	Academic Modality	0.204	0.456	0.027	***
Emotional	<-->	Academic Struggles	0.118	0.298	0.022	***
Emotional	<-->	Financial	0.229	0.475	0.028	***
Emotional	<-->	Academic Modality	0.306	0.739	0.029	***
Academic Struggles	<-->	Financial	0.24	0.455	0.034	***
Academic Struggles	<-->	Academic Modality	0.084	0.186	0.024	***
Financial	<-->	Academic Modality	0.228	0.413	0.031	***

\*\*\* Significant at  $p < 0.05$

### E. Model of the Student Quality of Life in an Online Class

The Confirmatory Factor Analysis (CFA) was used as the statistical tool used in a deductive mode to test a hypothesis regarding unmeasured sources of variability responsible for the commonality of test scores in terms of construct relationships. Moreover, before the analysis, a number of factors and loading patterns were hypothesized, imposing numerous constraints on the solution [26]. Subsequently, if the model's constraints are inconsistent with the sample data, the statistical model fit results will indicate a poor fit, and the model will be rejected.

Initial analysis revealed some of the measures of good fit did not meet the modification index requirement that the researcher correlated with the error term. Thus, the researchers devised various trials in order to develop the best-fit model of teaching competence. The importance of determining the best-fit model for fitting the observed data collected ensures that the model accurately reflects the expected Student Quality of Life in an online class. The different model fit indices, such as the goodness of fit index (GFI) and the Root Mean Square Error of Approximation (RMSEA), guide the researcher's GFI ranges from 0 to 1.0 and indicates how much of the observed Variance and Covariance is accounted for by the model; values greater than 0.95 are considered a good fit [28]. The degree of discrepancy between the observed and implied covariance matrices per degree of freedom is indexed by RMSEA. The researcher used 0.05 as a value indicative of close fit, 0.08 as indicative of marginal fit, and 0.10 as indicative of poor fit of a model taking degrees of freedom into account [28]. Further, the researcher considered unidimensional that attained a single and acceptable construct. Thus, any item with a low factor loading of less than 0.7 was deleted to ensure the unidimensionality of a measurement model [26]. The error

terms of the same dimension as provided by the modifications index were correlated by the researchers. Confirmatory Factor Analysis entails some specification, which either frees fixed parameters or, less commonly, fixes free parameters in the originally specified model [29].

Figure 1 illustrates the final model exhibiting the suitable indices of the measures in its five-factor rotation. As a result, AMOS 8.0 software was utilized that obtained the following values of  $\chi^2/pdf = 2.087$ , CFI = 0.962, TLI = 0.970, RMSEA = 0.048, CLOSE = 0.650. As indicated in the result, all the coefficients of students' quality of life were fitted to the level of acceptance. Thus, the model is fit and accurate.

It can be observed in the final model that the interrelationships between latent factors are all significant ( $p < 0.05$ ). It implies that the factors in discriminant validity measure the same direction as the other latent variables. In addition, the analyses showed the extent to which factors in evaluating the student's quality of life are distinct and uncorrelated. The rule is that variables with a high correlation should correlate more strongly to their factor than others [26].

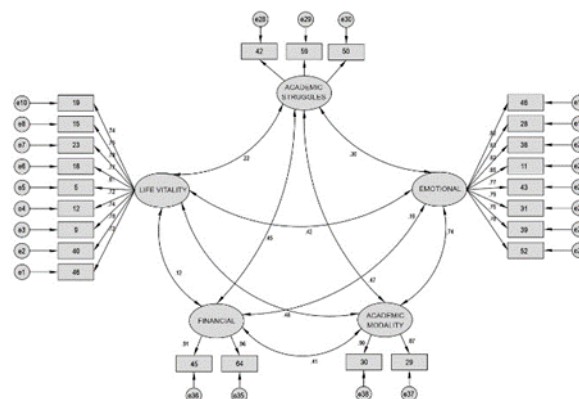


Figure 1. Measurement Model of Online Teaching Five Factors First Order

Students' quality of life in this time of pandemic means the actualization of students' dreams and goals. It talks about the happiness and struggles of the students while staying at the University of Mindanao. A student's quality of life is life vitality, academic work, emotional well-being, financial well-being, and academic modality.

Students who are vital have extremely high energy, stamina, and physical or mental vigor [30,31,32]. It is an important indicator of student motivation and well-being [33]. It is related to their ability to adapt to new situations [34]. The financial dimension of quality of life includes a variety of materialistic aspects such as expenses and income [35]. According to studies, people's economic resources are important determinants of well-being, with higher levels of personal or household income [36,27,38,39].

Academic struggles have been part of the journey of many university student [40] These struggles influence their overall well-being as a student, especially during the early stage of their academic development [41]. School-related factors (school climate, intelligence, assigning of ability at school, academic performance, and overall appraisals of one's satisfaction with school) are correlated with students' life [42]. Students' emotional well-being involves their short-term perceptions of satisfaction and happiness across multiple life domains, taking into account salient, psychosocial, and contextual factors, as well as personal meaning structures [43].

Students have a positive perception of life when they use a learning modality, and learner-instructor interaction and learner-content interaction combined with technology efficacy are valid indicators of students' positive perceptions [44]. Using a criterion approach, the positive course rating necessitates effective learner-instructor interaction [45].

#### IV. CONCLUSION

The findings of the study show that the measures of online student quality of life have the dimensions of *life vitality, emotional well-being, academic struggle, financial well-being, and academic modality*. The CVR ensures the content validity of the questionnaires. The CFA found out that the constructs of the scale for the student quality of life are significant, and there is a good internal consistency in the questionnaire. The presence of students' quality of life dimensions was revealed. However, other quality-of-life dimensions were not confirmed by utilizing the EFA and CFA statistical tools. Thus the resulting student quality-of-life measures are a unique paradigm of the University of Mindanao.

Furthermore, because this tool is only applicable to the University of Mindanao, assessment practitioners should exercise caution when interpreting the results. Other scales of students' quality of life that are relevant to the validity and reliability of the results must be used

The result illumined a significant proposition for institutional programs that will aid students' relative experiences. With this, the scale can be utilized by the University of Mindanao's guidance office to assess students' quality of life as a basis for the formulation of programs to strengthen student services and academic support. However, it is recommended that the scores of the tools be validated further by comparing them to the scores of other tools for validation.

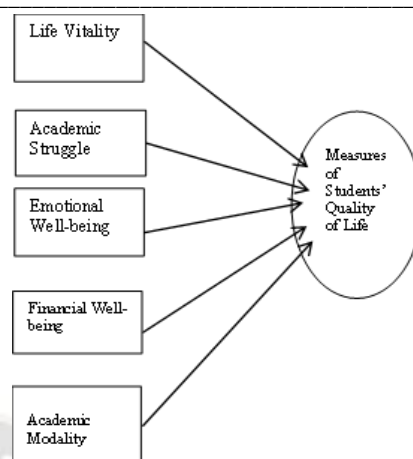


Figure 2. Final path diagram of the latent dimensions that measure the student's quality of life

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**Appendix A**  
**Interview Guide Questionnaire**

Main Question	Probing Questions
1. What is the student's view on Quality of Life?	<p>Actualization of Goals, needs, and wishes</p> <ol style="list-style-type: none"><li>1. What is your idea of quality of life?</li><li>2. What are your wishes in life as a student?</li><li>3. Among those wishes you have, how many of them have happened already?</li><li>4. Why do you say so?</li><li>5. What are the factors that contributed to the realization of your dreams?</li></ol> <p>Experiences of an online class during the pandemic</p> <ol style="list-style-type: none"><li>1. What are your experiences in an online class?</li><li>2. How satisfied are you with your experiences?</li><li>3. Can you tell me a picture of it?</li><li>4. What are the things that made you happy during online classes?</li><li>5. How do you cope with the challenges of online classes?</li></ol>
	<p>Satisfaction and Happiness</p> <ol style="list-style-type: none"><li>1. What makes you happy right now?</li><li>2. When can you say that you are satisfied and fulfilled?</li><li>3. Can you describe the instances that made you happy?</li><li>4. With that experience you have, how long does the feeling last?</li><li>5. Do you still wish to do or experience it again?</li></ol>