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An Exploratory Factor Analysis On Sustainability Governance Of Higher Education Institutions (HEIS) In Sulu

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Abstract: *The study was conducted to develop valid and reliable instruments through exploratory factor analysis (EFA) on sustainability governance of Higher Education Institutions (HEIs) in Sulu. It utilized a quantitative, descriptive method with cross-sectional survey design. A total of 120 respondents from six different HEIs in Sulu were taken through purposive sampling utilizing a modified questionnaire. EFA and reliability analysis were performed in deriving underlying factors for the constructs of peace dimensions for HEIs sustainability (PDS); cultural dimensions for HEIs sustainability governance (CDSG); and institutional sustainability governance dimensions (ISG). On the status of sustainability governance implementation of HEIs in Sulu, the percentage scores, and range were utilized. The ANOVA at p-value <0.05 in determining significant difference in the status of their implementation in terms of institutional characteristics and the Pearson Product Moment Correlation at p-value <0.01 and <0.05 in determining the strength of association between the derived factor scores and the status of sustainability governance implementation were utilized. EFA findings provided valid and reliable evidence for the three constructs with underlying factors on sustainability governance of HEIs such as PDS; CDSG; and ISG. Furthermore, it was found that among HEIs in Sulu, only NDJC had implemented and integrated into its operation all the dimensions of sustainability governance such as a) sustainability mechanisms (sustainability committee, office and sustainability officer), and b) sustainability integration principles (environmental sustainability, waste reduction policies, recycling policies, food sustainability, water sustainability, declaration of green building and biodiversity and ecological campus), however, there were HEIs who were yet to implement these, and also implemented only some dimensions that were doable given their organizational capacity. There was significant difference in the sustainability governance implementation of HEIs in Sulu in terms of their institutional characteristics. Moreover, there were dimensions of the derived factors that were positively and significantly associated to the dimensions of sustainability governance implementation of HEIs in Sulu, most significantly the attribution of responsibility for sustainable development (under CDSG) and the quality of teaching and learning (under ISG) can explain the variance specifically in the sustainability integration principles. The results have the implications that HEIs in Sulu may recalibrate and rationalize their structure, improve their budget allocation to ensure mobilization and cost-effectiveness of their overall sustainability governance implementation and performance, and may improve sustainability integration principles by prioritizing these key factors. Based from the results of the study, specific policies, program actions, and research agenda were recommended.*
Keywords*: Exploratory Factor Analysis, Sustainability Governance, Implementation, Higher Education Institutions (HEIs), Sulu*

INTRODUCTION

In the past, higher education institutions (HEIs) essentially referred to the traditional research universities. This picture is entirely different today where it is characterized by massive expansion; emergence of new players; internationalization, competition and signaling mechanisms; growing pressures on costs and new forms of financing; new modes and roles of governance, including increasing emphasis on performance, quality and accountability (OECD, 2012).

According to OECD (2012), there is no exhaustive register of HEIs worldwide, new providers are being established almost on a weekly basis, and the non-university sector is far from being homogenous. The latest estimates of the UNESCO-affiliated International Association of Universities (IAU) list over 17,000 HEIs worldwide (OECD, 2012).

In the Philippines, there are 1,963 total number of HEIs (excluding SUCs Sattelite campuses) and 2,393 (including SUCs Sattelite campuses) in academic year (AY) 2018-2019, 242 public and 1,721 private (Commission on Higher Education (CHED), 2019), which raised in 2019-2020 to 1,975 (excluding

Sattelite campuses) in total, 246 public (12 are located in the Bangsamoro Autonomous Region in Muslim Mindanao-BARMM), and 1,729 private (85 in BARMM) (CHED, 2020). In AY 2018-2019, a total of 701 HEIs with accredited programs, account to 29.29% from the total HEIs has been reported. According to Sison (2016), in terms of number of HEIs visited by CHED through institutional sustainability assessment (ISA) in AY 2014-2016 by region, there are 6 (Region 1), 1 (Region 2), 5 (Region 3), 1 (Region 4), 6 (Region 6), 5 (Region 7), 1 (Region 9), 3 (Region 10), 1 (Caraga Administrative Region), and 8 (National Capital Region) HEIs, but none in Autonomous Region in Muslim Mindanao (ARMM), currently the BARMM. Gleaned from the findings of factual indicators, it is of great interest to note that HEIs in the Philippines are striving towards sustainability, however, BARMM region warrants sustainability governance to address gaps and issues.

In Sulu, though some HEIs have undergone accreditation and evaluation in compliance to the CHED requirements towards quality education, no existing researches conducted so far in the arena of assessing the sustainability governance of HEIs. The study interests the researcher in attempt to contribute to the knowledge base and practice by further exploring factors on the sustainability governance of HEIs, looking into the different key dimensions as well as their status of implementation.

METHODS

Research Design

The study was conducted to develop valid and reliable instruments through exploratory factor analysis (EFA) on sustainability governance of Higher Education Institutions (HEIs) in Sulu. This study employed a quantitative, descriptive research approach utilizing a cross-sectional survey design to achieve the following objectives:

1. To determine the socio-demographic characteristics of HEIs in Sulu in terms of a) financial source, b) type of institution, c) number of years of existence, and d) number of programs offered;
2. To determine the underlying factors that could be considered separate in the following constructs: a) peace for HEIs sustainability, b) cultural dimension for HEIs sustainability governance, and c) institutional sustainability governance dimensions;
3. To determine the internal consistency of the peace dimensions for HEIs sustainability, cultural dimensions for HEIs sustainability governance and institutional sustainability governance dimensions;
4. To determine the status of sustainability governance implementation of Higher Education Institutions in Sulu focusing on two dimensions: a) sustainability mechanisms and b) sustainability integration principles;
5. To determine if the status of implementation of sustainability governance of Higher Education Institutions in Sulu differs in terms of their institutional characteristics; and
6. To assess the strength of association between the derived factor scores and the status of sustainability governance implementation.

Based from the objectives of the study, there are eight null hypotheses (H_{01}-H_{08}) formulated.

Research Respondents/Locale

A total of one hundred twenty (120) respondents were taken from six different HEIs in Sulu through purposive sampling. The researcher utilized a modified survey questionnaire from assembles of instrument components found in the related literature. It consisted of five parts (5) parts.

Sampling Design

This study utilized a nonprobability sampling where the researcher selected elements by nonrandom method, specifically, purposive sampling technique was applied. Purposive sampling or judgmental sampling is based on the belief that researchers' knowledge about the population can be used to hand-pick sample members. Researchers might decide purposely to select subjects who are judged to be typical of the population or particularly knowledgeable about the issues under study (Polit & Beck, 2010). In this regard, since the focused of the study was on sustainability governance, it was on this basis that the sample taken from those who are involved in governing in Higher Education Institutions (HEIs). There

are only six (6) HEIs in Sulu. The researcher included all of these HEIs, where a total sample of one-hundred-twenty (120) was taken from different levels such as: five (5) respondents from administrative level which consisted already of the heads, deans, and chairmen, five (5) from regular faculty, five (5) from regular staff, five (5) from student officers. Actual data collection done between October-December 2021, school Year 2021-2022.

Data Gathering Instrument

The researcher utilized a modified survey questionnaire from assembles of instrument components found in the related literature. It consisted of five parts (5) parts.

The first part consisted of the items about salient demographic characteristics of HEIs in Sulu in terms of financial source, type of institution, number of years of existence, and number of programs offered.

The second part consisted of underlying factors or items for the construct of peace of HEIs sustaianbility that included institutional, relational and personal elements that were based from the ground-breaking work of Mac Ginty and Firchow (2014) on Everyday Peace in School Indicators (EPSIs). Relevant inputs were also taken from Bevington's (2020) application of the EPSIs methodology in his current work. To fit to the context of HEIs is Sulu, a total of 20 items were reworded while retaining the main variable of each item.

The third part consisted the cultural dimensions of sustainability governance of HEIs in Sulu that were developed from the outcome of a qualitative study on cultures of sustainability governance in HEIs of Niedlich et al. (2019). The results of the study summarized the themes for two ideal type of schools as attribution of responsibility for sustainable development, purpose of HEI, conception of sustainability and relevance and scope of organizational change.

The fourth part consisted of institutional sustainability governance (ISG) questionnaire items that were culled from institutional sustainability assessment (ISA) self-evaluation document (SED) of the Commission on Higher Education as an internal quality assurance tool for HEIs in the country (CHED, 2017). The ISA-SED contains 5 key results areas (KRAs) that are used as the dimension's names and the criteria are used as items for each indicator in a given dimension. In order to make suitable for a questionnaire format, some items were reworded, refined and/or renamed. These KRAs were aligned to the dimensions of transparency & accountability, politics, profession, organization, knowledge, and visibility. The five-point Likert scale was utilized throughout part 2-4 of the questionnaire.

The fifth part dealt with the status of sustainability governance implementation questionnaire items consisted of the mechanisms for sustainability and sustainability integration principles constructs that were extracted from the study of Salvioni et al. (2017) on "Sustainability in the Higher Education System: An Opportunity to Improve Quality and Image". The mechanisms for sustainability subsumed the dimensions of sustainability committee, office and sustainability officer. The sustainability integration principles constituted the dimensions on environmental sustainability, waste reduction policies, recycling policies, food sustainability, water sustainability, declaration of green building and biodiversity and ecological campus. The respondents were asked to identify the status by answering a categorical scale 1 as No item is never been considered in our institution; and 2 as Yes, item is performed and done with careful review and evaluation in our respective institution. A "No" answer was further interpreted as "not implemented", and a "Yes" one was interpreted as "implemented".

Statistical Analysis /Treatment

This study utilized a descriptive statistical treatment. The statistical tool used in the study was on the basis of the research objectives of the study. In determining demographic characteristics of HEIs in Sulu, frequency and percentages were utilized. To determine the underlying factors that could be considered separate in the following constructs: peace dimension for HEIs sustainability; cultural and institutional dimensions for HEIs sustainability governance, several descriptive statistical analyses were initially performed such as skewness and kurtosis, initial item scale reliability, inter-item correlational analysis and assessment of assumptions. Thereafter, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Barlett's Test of Sphericity were done to determine construct validity and to confirm that the data for an extraction factor analysis (EFA) were suitable or appropriate. Having all the required assumptions

for analysis were met, an EFA with determination of Cronbach's Alpha was executed. To assess the status of sustaianbility governance implementation, the percentage scores of each dimension were determined using the crosstabulation procedures and range was then determined to create an interval for descriptive interpretation of implementation. The ANOVA at $p<0.05$ level of significance was used to analyze the significant difference in the status of sustainability governance implementation of HEIs in Sulu in terms of institutional characteristics. Finally, the Pearson Product Moment Correlation at $p<0.01$ and $p<0.05$ level of significance were utilized to determine the strength of association between the derived factor scores and the status of sustainability governance implementation.

RESULTS & DISCUSSION

Demographic Characteristics of the Respondents

The demographic characteristics are saliently divided into the personal characteristics and the institutional characteristics of the HEIs. Tables 1 and 2 summarize the statistical data that characterized the respondents.

Personal characteristics of the respondents.

The survey respondents have an equal representation from students, staff, faculty members and administration (25% apiece). No missing data are observed from the data set. Forty percent of the respondents are between 20 to 30 years old, 23% are between 41 to 50 years old, 19% belong to the 31 to 40 years old category, and the remaining respondents (18%) are above 50 years old. In terms of education level, 52% are undergraduate, 27% are graduate or masteral level, and 21% have post-graduate or doctoral education.

Table 1: Frequency Distribution of Position, Age and Education Level of Respondents (n=120)

Characteristics	F	%
Respondent's Position		
Student	30	25.0
Staff	30	25.0
Faculty	30	25.0
Administration	30	25.0
Total	**120**	**100.0**
Age	F	%
20-30 years old	48	40.0
31-40 years old	23	19.2
41-50 years old	27	22.5
Above 50 years old	22	18.3
Total	**120**	**100.0**
Education Level	F	%
Undergraduate	63	52.5
Graduate/Masteral	32	26.7
Post-Graduate	25	20.8
Total	**120**	**100.0**

Institutional Characteristics of HEIS in Sulu

The HEIs respondents include both private and state-owned universities and colleges (SUCs) in the province of Sulu. There are three private schools and three SUCs each with equal respondents' representation to the survey. As regards the financial source, 50% of the respondents reported that they relied on internally generated income to sustain their operation, 33% said their schools are subsidized by the government and about 17% reported that their schools relied on both government subsidy and internally generated income. In terms of the number of years of existence, 67% of them claimed that their HEIs existed for more than 30 years, 17% existed between 1 to 10 years and between 21 to 30 years respectively. For the number of programs offered, 50% of the respondents reported that their HEIs have

offered more than 11 programs, 33% offered between 1 to 5 programs, and the remaining 17% of the HEIs offered between 6 to 10 programs (see Table 2).

Table 2: Frequency Distribution of HEIs, Financial Source, Years of Operation, and No. of Programs Offered
(n=120)

Characteristics	**F**	%
Type of HEIs in Sulu		
NDJC (private)	20	16.7
MSU (public)	20	16.7
SSC (public)	20	16.7
ISMII (private)	20	16.7
SCT (private)	20	16.7
HBSAT (public)	20	16.7
Total	**120**	**100.0**
Financial source		
Government Subsidy (GS)	40	33.3
Internally Generated Income (IGI)	60	50.0
Both GS and IGI	20	16.7
Total	**120**	**100.0**
Number of years of existence		
1-10 years	20	16.7
21-30 years	20	16.7
Above 30 years	80	66.7
Total	**120**	**100.0**
No. of programs offered		
1-5 programs	40	33.3
6-10 program	20	16.7
> 11 programs	60	50.0
Total	**120**	**100.0**

Underlying factors that could be considered separate in the following constructs: a) Peace for HEIs sustainability; b) Cultural dimension for HEIs sustainability governance; and c) Institutional sustainability governance dimensions

In determining the factors that could be considered in the study constructs, data cleansing and assessment of parametric properties of the items are performed. Further, several data analyses are conducted prior to the exploratory factor analysis procedures, however, the results are not anymore presented here.

A) Exploratory Factor Analysis of Peace Instrument for HEIs Sustainability: The items that are used to develop the peace instrument for HEIs sustainability are based from the ground-breaking work of Mac Ginty and Firchow (2014) on Everyday Peace in School Indicators (EPSIs). Relevant inputs are also taken from Bevington's (2020) application of the EPSIs methodology in his current work. To fit to the context of HEIs is Sulu, a total of 20 items are reworded, while retaining the main variable of each item. From the stand point of content validity, the instrument may have the content validity as items are "developed from existing theories about the concept" (Sekaran, 1992).

Factor theme assignment. After the removal of the cross-loadings, each factor is named with its umbrella theme following the EPSIs dimensions capturing all the items or variables that belong to it as shown in Table 3. Factor 1 represents the institutional peace (IP) with 7 items, factor 2 represents the relational peace (RP) with 4 items, and factor 3 represents the personal peace (PP) with 6 items. Therefore, there are underlying factors that emerged after the EFA, hence, H_{01}: "No simple structure will emerge after the exploratory factor analysis of the peace for HEIs sustainability instrument" is rejected.

Table 3: Dimensions of Peace for Sulu's HEIs Sustainability and Reliabilities

Items	Factor			*α
	IP	RP	PP	
Institutional Peace (IP)				**.892**
1. I feel safe in and around the school campus.	0.54			
2. I can say there teachers are engaged in teaching-learning in the school campus.	0.83			
3. I can say students are engaged in lesson and productive learning in the school campus.	0.62			
4. I can say that teachers care in the school campus.	0.83			
5. I can say teachers handle situations calmly in the school campus.	0.75			
6. I can say there is cooperation and harmony between staff and students of different departments and levels in the school campus.	0.41			
7. I have clean and tidy school environment.	0.44			
Relational Peace				**.875**
8. I am encouraged to talk about my concerns and differences in the school campus.		0.60		
9. I feel confident to challenge when something's not right in the school campus.		0.61		
10. I can say students and staff have their voices heard here.		0.80		
11. I can say restorative meetings are used to deal with conflicts.		0.49		
Personal Peace (PP)				**.866**
12. I do the right things in the school campus because I want to and not for rating points.			0.50	
13. I have friend or someone to turn to in the school campus.			0.72	
14. I listen to others with tolerance and compassion in the school campus.			0.93	
15. I used respectful language even when I disagree in the school campus.			0.67	
16. I can say there is absence of physical or direct violence/conflict here.			0.50	
17. I uphold departmental and institutional order or rule of laws here.			0.53	

*α - *Cronbach's Alpha*

B) Analysis of the Underlying Factors of the Cultural Dimension of Sustainability Governance (CDSG) of HEIs in Sulu. The cultural dimensions of sustainability governance of HEIs in Sulu are developed from the outcome of a qualitative study on cultures of sustainability governance in HEIs of Niedlich et al. (2019). The results of the study summarize the themes for two ideal type of schools as attribution of responsibility for sustainable development, purpose of HEI, conception of sustainability and relevance and scope of organizational change.

In this study, the themes that depict the common characteristics of HEIs in Sulu are considered. For the attribution of responsibility for sustainable development, the ideal type A school descriptions are taken; for the purpose of HEIs dimension, both ideal types A and B are considered; for the conception of sustainability dimension, the ideal type A school description are included; and for scope and relevance of organizational change, the ideal types A and B of schools' descriptions are included. The descriptions for each ideal type of school are turned into indicators that measure the corresponding dimensions. Some items are revised and a few items are added. The total number of items for CDSG instrument is 25.

Factor theme assignment. Prior to the theme assignment on factors, items with cross-loadings in two or more dimensions are removed. The reliability for each dimension was also computed. Then, the items are re-arranged. The final results of the EFA for CDSG instrument are presented in Table 4.

Following the dimensions' name of Niedlich et al. (2019) as shown in Table 4, factor 1 is named the purpose of HEI with 9 items and a reliability of .956; factor 2 is the conception of sustainable development with 5 items and a reliability of .969; factor 3 is relevance and scope of organizational change with 5 items and reliability of .935; and factor 4 is the attribution of responsibility for sustainable development with 3 items and a reliability of .937. In general, the results suggest that there are underlying factors for CDSG, therefore, the null hypotheses H_{02}: "No simple structure will emerge after the exploratory factor analysis for cultural dimensions of sustainability governance for HEIs" is rejected.

Table 4: Cultural Dimensions of Sustainability Governance and Reliabilities

Items	Factor				*α
	1	2	3	4	
Attribution of Responsibility for Sustainable Development (Factor 4)					**.937**
1. Centralized decision-making and goal formulation				0.88	
2. Centralized controlling and enforcement of implementation				0.88	
3. Establish linkages within and outside the institution via central actors.	0.46			0.68	
Purpose of Higher Education Institution (Factor 1)					**.956**
4. Traditional mission such as teaching, basic research, and technology transfer.	0.71			0.35	
5. An institution as value-neutral authority and objectivity	0.76			0.35	
6. Focuses on established criteria of academic excellence or strong disciplinary boundaries.	0.69			0.35	
7. Transfer of knowledge from institution to society/economy in a unidirectional manner.	0.60		0.37		
8. An added to its basic mission is a co-creation for sustainability.	0.83				
9. Institution as an agent of societal change.	0.75	0.36			
10. Transdisciplinary view on sustainability.	0.76		0.36		
11. Knowledge creation and transfer as complex and multidirectional process.	0.69		0.42		
12. Close ties to broad range of actors including civil society.	0.68		0.38		
Conception of Sustainable Development (Factor 2)					**.969**
13. Integrated that focuses on environmental, economic, and social dimensions of sustainability, simultaneously in teaching.	0.39	0.77			
14. Integrated in Research.		0.82			
15. Integrated in campus management.		0.80			
16. Integrated throughout the whole institution.	0.40	0.74	0.37		
17. Integrated in cross-cutting issues or all aspects of the institutional program.	0.40	0.76	0.35		
Relevance and Scope of Organization Change (Factor 3)				**.935**	
18. Initiatives focused on single area of activity in teaching, research, and campus management.			0.72		

19. Different areas are addressed independently.		0.36	0.74		
20. Sustainability as reform perspective for the whole institution.	0.43	0.37	0.70		
21. Creation of bodies for cross-sectional and departmental decision-making and realization.	0.44	0.40	0.60		
22. Overarching coordination of the sustainability process.	0.39	0.35	0.73		

**** Blank cells represent loadings with less .35;***

α - Cronbach's Alpha

C) Analysis of the Underlying Factors of the Institutional Sus-tainability Governance (ISG) Dimensions of HEIs in Sulu. The ISG questionnaire items are culled from institutional sustainability assessment (ISA) self-evaluation document (SED) of the Commission on Higher Education as an internal quality assurance tool for HEIs in the country (CHED, 2017). The ISA-SED contains 5 key results areas. The KRAs are used as the dimension's names and the criteria are used as items for each indicator in a given dimension. Some items are reworded, refined and/or renamed to make it suitable for a questionnaire format. At the initial phase of the questionnaire development, all items are named ISG1 to ISG25, for a total of 25 items. Once again, the procedures of Mvududu and Sink (2013) are used for the EFA of ISG questionnaire.

Factor assignment. After the removal of factors that cannot be assigned to any factor, the EFA is rerun. The final factor items are arranged to a factor name based on the KRAs name of ISA-SED. It should be noted that some items are grouped together to a factor. Table 5 shows the final items that are grouped to a dimension of the ISG questionnaire. Factor 1 contains the criteria of governance and management (8 items), factor 2 contains the criteria of quality of teaching and learning (6 items), and factor 3 combines the criteria of quality of professional exposure, research, creative work; support for students; and relation with community (7 items). The results clearly demonstrate that there are separate factors in the ISG questionnaire, therefore, the hypothesis H_{03}: "No simple structure will emerge after the exploratory factor analysis for sustainability governance dimensions" is rejected.

Table 5: Institutional Sustainability Governance and Reliabilities

Items		Factor			*α
		1	2	3	
Politics (Governance and management) – Factor 1					**.964**
ISGD1	1. Probity and integrity	0.50			
ISGD2	2. Strategic vision	0.78			
ISGD3	3. Awareness and Management of risk	0.85			
ISGD4	1. Effective monitoring of performance	0.72			
ISGD5	2. Management of operations	0.70			
ISGD6	3. Financial control	0.93			
ISGD7	4. Quality assurance arrangements	0.95			
ISGD8	5. Improve management of operation, quality, and development thru the use of ICT and viable and sustainable resource generation	0.54			
Quality of teaching and learning – Factor 2					**.939**
ISGD9	6. Aligned to the HEI's VMG as expressed in the desired competencies for its graduates.		0.46		
ISGD10	7. Considers the risks related to needed resources, potential market, etc.		0.60		
ISGD11	8. Effectively implemented to achieve the intended outcomes.		0.54		

ISGD12	9. Contributes to the development needs of the region/country.		0.68		
ISGD13	10. Effective arrangements for monitoring and reviewing contribute to the effectiveness of its programs.		0.54		
ISGD16	11. Use of resources such as ICT, libraries and laboratories to enhance student's learning and performance.		0.52		
Professional exposure, research, creative work, support for students and relations with community – Factor 3					**.919**
ISGD17	12. Admission, recruitment and academic support for indigenous, low income, and other special groups (e.g. rebel returnees)			0.70	
ISGD18	13. Scholarships for deserving students e.g. institutional, LGU scholarships, alumni, etc.			0.78	
ISGD19	14. Has programs for student services, to support the non-academic needs of the students.			0.86	
ISGD20	15. Student's learned competencies are applied through entrepreneurship, OJT, RLE, etc.			0.64	
ISGD21	16. Our institution's produces relevant research and other advanced scholarly activity.			0.62	
ISGD22	17. Our institution produces creative work and/or innovation in Arts and humanities, science and tech., social and management sciences.			0.81	
ISGD24	18. Our institution is valued as a partner by other higher education institutions and other institutions (locally & internationally).			0.57	

**Cronbach's Alpha*

Analysis of Internal Consistency on the Peace Dimensions for HEIs Sustainability, Cultural Dimension for HEIs Sustainability Governance and Institutional Sustainability Governance Dimensions

After exploratory factor analysis (EFA) procedures are rigorously conducted, reliability tests for the constructs under study are also explicitly determined and computed using the Cronbach's Alpha. Schwarz (2014) and Mvududu & Sink (2013) recommend a Cronbach's Alpha of .70 as acceptable threshold value. Further, the summary results of the analysis for reliabilities are reflected in Table 6, however, the items under each factor are not anymore displayed here.

Peace dimensions for HEIs sustainability. The results of the data analysis as shown in Table 6 revealed 3 factors for peace dimension. Factor 1 constitutes the institutional peace with a reliability of α=.892, factor 2 constitutes the relational peace with a reliability of α=.875, and factor 3 constitutes the personal peace with reliability of α=.866. The results indicate that the factors of peace dimension in general obtained Cronbach's Alpha values that are well above the .70 threshold. Therefore, the peace for HEIs sustainability instrument exhibits an internal consistency for the derived factors, hence, H_{04}: "The derived factors of the peace for HEIs sustainability do not exhibit internal consistency" is rejected.

Cultural dimensions for HEIs sustainability governance. The results of data analysis revealed that there underlying construct of cultural dimensions for HEIs sustainability governance with 4 factors determined. The factor 1 constitutes the purpose of HEI with a reliability of α=.956; factor 2, the conception of sustainable development with a reliability of α=.969; factor 3, relevance and scope of organizational change with a reliability of α=.935; and factor 4, the attribution of responsibility for sustainable development with a reliability of α=.937. Further, the results indicate that all factors in the dimension reliabilities are in the meritorious category, therefore, $H_{05:}$ "The derived factors for cultural dimension of sustainability governance of HEIs do not exhibit internal consistency" is rejected.

Institutional sustainability governance dimensions. Similarly, the results of the data analysis reveal 3 factors for this construct. Factor 1 contains the criteria of governance and management with a reliability of α=.964, factor 2 contains the criteria of quality of teaching and learning with a reliability of α=.939, and factor 3 combines the criteria of quality of professional exposure, research, creative work; support for students; and relation with community with a reliability of α=.919. Moreover, the results indicate that all factors in the dimension have reliabilities that are in the meritorious category, therefore, $H_{06:}$ "The derived factors for sustainability governance dimension of HEIs do not exhibit internal consistency" is rejected.

Overall, the results of the study indicate that the peace dimensions for HEIs sustainability, cultural dimensions for HEIs sustainability governance and institutional sustainability governance dimensions therefore, possess an internal consistencies, which imply that these constructs are reliable. This means that these can be applied in research and in practice in considering the multidimensional nature of sustainability governance.

Table 6: Summary of Reliabilities of Peace Dimensions for HEIs Sustainability, Cultural Dimensions for HEIs Sustainability Governance and Institutional Sustainability Governance Dimensions

Construct	***α**
Peace for HEIs Sustainability	
Institutional Peace (IP) – Factor 1	**.892**
Relational Peace (RP) – Factor 2	**.875**
Personal Peace (PP) – Factor 3	**.866**
Cultural dimension for HEIs sustainability governance	
Purpose of Higher Education Institution - Factor 1	**.956**
Conception of Sustainable Development - Factor 2	**.969**
Relevance and Scope of Organization Change - Factor 3	**.935**
Attribution of Responsibility for Sustainable Development - Factor 4	**.937**
Institutional sustainability governance dimensions	
Politics (Governance and management) – Factor 1	**.964**
Quality of teaching and learning – Factor 2	**.939**
Professional exposure, research, creative work, support for students and relations with community – Factor 3	**.919**

*α - *Cronbach's Alpha*

Status of Sustainability Governance Implementation of Higher Education Institutions (HEIs) in Sulu

The results on the status of sustainability governance implementation of HEIs in Sulu are reflected in Table 7. The results further showed that NDJC has obtained percentage scores ranging from 80 to 95% indicating that all dimensions of sustainability governance are implemented. Moreover, SSC has implemented all of the three mechanisms for sustainability (75 to 90%) and 4 dimensions in the sustainability integration principles (75 to 90%), while the 3 remaining dimensions (waste reduction and recycling policies and declaration of green building) are at the moment partially implemented (60 to 65%). For ISMII, 2 out of the 3 dimensions of mechanisms for sustainability are partially implemented (70%), while sustainability officer dimension is implemented (75%); and for sustainability integration principles, environmental and water sustainability (75% apiece) are implemented. The remaining dimensions (50 to 60%) are partially implemented except for declaration of green building (40%), which at this time not yet being considered for implementation. Furthermore, MSU has partially implemented

all the dimensions of mechanisms for sustainability (60 to 70%), while 5 dimensions (50 to 70%) in the sustainability integration principles are partially implemented and food sustainability and declaration of green building (45% apiece) are currently not being considered for implementation. SCT, on the other hand, has implemented a sustainability committee and office (75 and 85%), while the sustainability officer is partially implemented (65%). Under sustainability integration principles, SCT has implemented water sustainability (90%), while environmental sustainability (65%) and recycling policies (50%) are partially implemented and the rest of the dimensions are not yet being considered for implementation. Finally, HBSAT has consistently not considered all the dimensions (30 to 40%) of mechanisms for sustainability to be implemented for the time being. However, HBSAT has implemented water sustainability (100%) and partially implemented environmental sustainability (70%) and the remaining dimensions are not yet being considered for implementation (20 to 30%).

Overall, the results revealed that of HEIs in Sulu, only NDJC has implemented all the dimensions of both the sustainability mechanisms and sustainability integration principles. Other HEIs, however, have yet to implement all the dimensions of sustainability governance. The results further point out that other HEIs have implemented some dimensions that were doable given their organizational capacity.

Leal Filho et al. (2018) concluded in their study that despite all the positive examples of best practices, there are still various challenges seen in addressing the many unsustainable trends seen at the local level, among which mention may be made to the poor handling of wastes, sub-optimal uses of energy and other similar problems. They added that, it seems that the nature of the needs is quite wide, which offers ample scope for cooperation between universities and communities across a range of areas. Moreover, the results of the study are supported by UNESCO (2013), which posited that transforming universities into more sustainable institutions necessitates rethinking of what we are doing on essentially four key university functional and interlinked constituencies: a) curriculum, teaching and learning; b) research and development; c) institutional/administrative operations; and d) partnerships and outreach driven by the three realms of sustainable development: social and economic justice; ecological integrity and the well-being of all living systems on the planet through an integrative and cross-cutting manner (Kostoulas-Makrakis & Makrakis, 2012, cited in UNESCO, 2013).

Table 7: Status of Sustainability Governance Implementation of HEIs in Sulu
(n=120)

Dimensions	**Status of SG Implementation of HEIs**											
	1	**VI**	2	**VI**	3	**VI**	4	**VI**	5	**VI**	6	**VI**
Sustainability Mechanisms												
Sustainability Committee	80	**I**	70	**PI**	75	**I**	70	**PI**	85	**I**	40	**NYC**
Sustainability Office	80	**I**	65	**PI**	90	**I**	70	**PI**	75	**I**	35	**NYC**
Sustainability Officer	80	**I**	60	**PI**	75	**I**	75	**I**	65	**PI**	30	**NYC**
Sustainability Integration Principles												
Environmental Sustainability	95	**I**	70	**PI**	80	**I**	75	**I**	65	**PI**	70	**PI**
Waste Reduction Policies	95	**I**	50	**PI**	60	**PI**	55	**PI**	40	**NYC**	30	**NYC**
Recycling Policies	90	**I**	50	**PI**	65	**PI**	55	**PI**	50	**PI**	30	**NYC**

Food Sustainability	90	**I**	45	**NYC**	75	**I**	60	**PI**	45	**NYC**	60	**PI**
Water Sustainability	95	**I**	55	**PI**	90	**I**	75	**I**	90	**I**	100	**I**
Declaration of Green Building	90	**I**	45	**NYC**	65	**PI**	40	**NYC**	40	**NYC**	30	**NYC**
Biodiversity and EcoCampus	80	**I**	60	**PI**	90	**I**	50	**PI**	40	**NYC**	20	**NYC**

Legend: 1-NDJC; 2-MSU; 3-SSC; 4-ISMII; 5-SCT; 6-HBSAT

Verbal Interpretation (VI) Scale: 20 - 46 = Not Yet Considered (NYC);

47 - 73 = Partially Implemented (PI); 74 - 100 = Implemented (I)

Analysis of Difference in the Status of Sustainability Governance Implementation amongst HEIs in Sulu in terms of their Institutional Characteristics

A one-way between-subject ANOVA was conducted to determine whether the financial source, number of years of existence, and the number of programs offered differ in relation to the implementation of sustainability governance among HEIs in Sulu. The results of the analysis are presented in **Table 8**. The results in Table 8 indicate that the implementation of sustainability governance differs significantly with the financial source (GS, IG, GS/IG) of the HEIs, $F(2, 117) = 5.853$, $p=.004$. The effect size ($\eta = .09$) implies 9% of the variance in the implementation of sustainable governance can be explained by the financial source of the HEIs. To evaluate which financial sources were significantly different, Tukey honest significant difference (HSD) post hoc comparisons are conducted. The results indicate that HEIs with government subsidy (M=5.08) are statistically significantly lower than those HEIs with internally generated income (M=6.98) and with both government subsidy and internally generated income (M=7.65). However, the internally generated income financial source and both (IGS and GS) do not differ significantly. The results suggest that HEIs with government subsidies have lower status of sustainability governance implementation than those HEIs with financial source coming from internally generated income or both (GS and IGI). The results further indicate that those HEIs with financial source from the government subsidy may consider exerting maximum efforts and strategies to improve the manifestation of their sustainability governance implementation.

However, the implementation of sustainability governance with the number of years of existence of the HEIs has no significant difference, $F(2, 117) = 1.102$, $p > .05$.

Moreover, based on the results, the implementation of sustainability governance differs significantly with the number of programs offered (1-5, 6-10, > 10 programs) of the HEIs, $F(2, 117) = 4.929$, $p=.009$. The effect size ($\eta=.078$) implies that about 8% of the variance in the implementation of sustainable governance can be explained by the number of programs offered. To evaluate which number of programs were significantly different, Tukey HSD post hoc comparisons were conducted. The results indicate that HEIs with programs offered from 1 to 5 (M=5.35) were statistically significantly lower than those HEIs with more than 10 programs offered (M=7.37). However, HEIs with programs offered from 6 to 10 and with more than 11 programs did not differ significantly. The results imply that HEIs with fewer than 6 programs offered have lower status of sustainability governance implementation than those HEIs with more than 10 programs offered.

Overall, the findings revealed that the null hypothesis 7 (H_{07}) is rejected. Thus, there is a significant difference in the implementation of sustainability governance when HEIs are grouped according to the institutional characteristics.

The results of the study are in conformity with the findings of the K12 Academics (2022a) that posited the second issue that the Philippine educational system faces is the budget for education. Although it has been mandated by the Philippine Constitution for the government to allocate the highest proportion of its government to education, the Philippines remains to have one of the lowest budget allocations to education among ASEAN countries (K12 Academics, 2022a). According to Pimpong & Laryea (2016),

budgets should be set to a standard that is quite challenging for employees to achieve, obtaining a high standard set goal creates a sense of efficiency and this will bring about yearn to achieve more. Moreover, Naser and Mokhtar (2004, in Pimpong & Laryea, 2016), argued that high performance reflects management effectiveness and efficiency in making use of a company's resources. Additionally, financial performance has also been the primary concern of business practitioners in all types of organizations since it has implications on an organization's health and ultimately its survival (Onduso, 2013, in Pimpong & Laryea, 2016). Further, it is a fact that local universities and colleges (LUCs), in the Philippines, have less stringent requirements than private HEIs where they are only required to operate at least five undergraduate programs—as opposed to eight for private universities—and two graduate-level programs (K12 Academics, 2022b).

Table 8: Comparison of the Status of SGI in terms of Financial Source, No. of Years of Existence and No. of Programs Offered
(n=120)

Variable	Status of SGI					Tukey HSD Comparison
	M	SD	df1/df2	F-test	*P*	
Financial Source						
Government Subsidy (GS)	5.08	3.24	2/117	5.853	**.004**	**Both>IGI>GS**
Internally Generated (IGI)	6.98	3.51				
Both	7.65	3.35				
No. of Years of Existence						
1 – 10 yrs.	5.95	3.44	2/117	1.102	.336 ns	~
11 – 20 yrs.	~	~				
21 – 30 yrs.	5.70	3.34				
> 30 yrs.	6.78	3.33				
No. of Programs Offered						
1 – 5 Programs	5.35	3.59	2/117	4.929	**.009**	1-5<11
6 – 10 Programs	5.95	3.44				
11 & Above Programs	7.37	2.92				

***Note**: Post hoc comparisons were made using the Tukey HSD procedure. Tukey comparisons that were significant are indicated using a < symbol, ns for non-significant and ~ for no comparison. *p<.001 and **p<.05.*

Analysis of Correlation between the Derived Factor Scores and Status of Sustainability Governance Implementation of HEIs in Sulu

To assess whether there are significant associations between the derived factor scores and the status of sustainability governance implementation that constitutes two dimensions (sustainability mechanisms and sustainability integration of principles), the Pearson Product Moment of Correlation is conducted. In this analysis, the derived factors serve as the independent variables and the dimensions of sustainability governance implementation serve as the dependent variables. The results are presented in Table 9.

Relationship between the derived factors and sustainability mechanisms. Except for the two dimensions of PSG, all other dimensions of the derived factors are positively and significantly associated at 0.01 and 0.05 levels of significance, one-tailed and two-tailed respectively. The range of the correlation coefficient (r) is between .21 to .30 and the range of variance (r^2) than can be explained by the derived factors to the mechanisms for sustainability governance implementation varies across 4.5% to 9% (Table 9). The positive direction of the correlations indicates that further enhancements of the dimensions of the derived factors, HEIs in Sulu are likely to improve the implementation of the different mechanisms for sustainability governance in their operation.

Relationship between the derived factors and sustainability integration principles. As shown in Table 9, all dimensions of the derived factors are positively and significantly associated to the sustainability

integration principles at 0.01 and 0.05 levels of significance, one-tailed and two-tailed respectively. The range of the correlation coefficient (r) is across .27 to .45 suggest a moderate to large effect size. The range of variance (r^2) than can be explained by the derived factors to the implementation of sustainability integration principles varies across 7% to 23%. The results indicate that the attribution of responsibility (under CDSG) and the quality of teaching and learning (under ISG) can explain 23 and 20% respectively to the variance in the sustainability integration principles. The positive direction of the correlation indicates that when the dimensions of the derived factors are aggressively improved, the HEIs in Sulu are more likely encouraged to implement the sustainability integration principles into their operation.

Taken together, there are dimensions of the derived factors that are significantly associated to the dimensions of sustainability governance implementation. Therefore, H_{08} is rejected.

The results of the study are also supported by the findings of the studies of Bauer et al (2020), Niedlich et al. (2020), and Salvioni et al. 2017. Based from the findings of their study, Bauer et al. (2020) stated that an HEI's organizational culture is highly likely to affect its approach to SD governance in crucial ways. More significantly, Niedlich et al (2020) discuss in their study findings that the dimensions of politics, profession, organization, knowledge, and the public are functional requirements that sustainability governance needs to address to work effectively. They posited that framing these requirements, as governance equalizer, suggests that that HEIs can influence –'turn up' or 'turn down' – the level of each dimension in their institution—and that, accordingly, turning up one or more dimensions will increase the chances of successful sustaianbility process. They concluded that attaining sustainable development is desirable and that, in order to do so, organizational boundaries need to be bridged, perspectives aligned, overarching coordination ensured, and so on. Another findings from the study of Leal Filho et al. (2015, as cited in Abdelhadi et al. (2019), provided two case studies at the Hamburg University in Germany and Bournemouth University in the UK to discuss the changes and properties toward transferring education of sustainability into practice in an integrative approach. The two cases demonstrate that most challenges come from the lack of resources, weakness in the incentives process, demerit in the written policy and producers, availability of discipline culture and the decentralized budgeting process.

The results of the findings indicate that HEIs in Sulu must take into considerations a reflection of the derived factors of peace for sustainability, cultural and institutional sustainability governance to improve and maximize their sustainability governance implementations. Additionally, these indicate indeed, that the success articulation and implementation of sustainability governance entails a holistic and integrative approach from both internal and external stakeholders.

Table 9: Correlation between the Derived Factor Scores and Status of Sustainability Governance Implementation (SGI) of HEIs in Sulu

IV\DV	**Dimensions of SGI**			
	Sustainability Mechanisms		Sustainability Integration Principles	
	R	**r^2**	**R**	**r^2**
Peace for Sustainability Governance (PSG)				
Institutional Peace	**.227***	0.052	**.429****	0.184
Relational Peace	0.178	~	**.318****	0.101
Personal Peace	0.092	~	**.272****	0.074
Cultural Dimension of Sustainability Governance (CDSG)				
Attribution of Responsibility	**.211***	0.045	**.480****	0.230
Purpose of HEI	**.229***	0.052	**.358****	0.128
Conception of Sustainability	**.239****	0.057	**.368****	0.135
Relevance and Scope of Org'nal Change	**.224***	0.050	**.389****	0.151

Institutional Governance Sustainability (ISG)				
Governance and Management	**.301****	0.091	**.429****	0.184
Quality of Teaching and Learning	**.253****	0.064	**.449****	0.202
Professional Exposure, Student Support and	**.244****	0.060	**.400****	0.160

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2 tailed).

CONCLUSION

In conclusion, the study provided suggestions that there were underlying factors with evidence of validity and internal consistencies for instruments of the peace dimensions for HEIs sustainability, the cultural dimensions for HEIs sustainability governance, and the institutional sustainability governance dimensions. It also provided inputs that among HEIs in Sulu, only NDJC had implemented and integrated into its operation all the dimensions of sustainability governance, however, there were HEIs who were yet to implement these, and also implemented only some dimensions that were doable given their organizational capacity. HEIs in Sulu differed in their institutional characteristics significantly in terms of financial source and number of program offered. There were dimensions of the derived factors that were positively and significantly associated to the dimensions of sustainability governance implementation of HEIs in Sulu. The attribution of responsibility for sustainable development (under CDSG) and the quality of teaching and learning (under ISG) can explain the variance to the status of HEIs sustainability implementation, specifically in the sustainability integration principles of SGI.

RECOMMENDATIONS

HEIs may consider to recalibrate and rationalize their structure and may further improve their budget allocation to ensure mobilization and cost-effectiveness of their overall sustainability governance implementation and performance. Further, it is recommended that all HEIs may consider ensuring consistent engagement in sustainability governance implementation with monitoring and assessment from all stakeholders.

Due to the limitation of the study, conducting a mixed study on factors influencing sustainability governance implementation among HEIs in BARMM, and as also a study on the extent of sustainability knowledge and integration among faculty and students of HEIs in Sulu, and in BARMM in general, are recommended.

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