



## THE INDIGENOUS KNOWLEDGE SYSTEMS AND PRACTICES (IKSPS) AS INTEGRATED IN GRADE 7 MATHEMATICS (STATISTICS): A PILOT STUDY

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### ABSTRACT:

Responding to the growing needs of Integrating Indigenous Knowledge Systems and Practices (IKSP) in Mathematics has been a perennial challenge to the DepEd especially in consideration of the IPed schools.

This study which determined the effectiveness of IKSP as integrated in Math 7 (Statistics) in IPed schools, Lanuza District involved forty-three (43) IP Grade 7 learners and one (1) Mathematics teacher. Using the quantitative – correlational design, the study yielded the following results: the extent of effectiveness integrating IKSP on the Mathematics performance was to greater extent; students' academic performance was described highly proficient; there is significant relationship between IKSP integration and students' academic performance; and teachers greatly need basic training and seminars in crafting lesson guides in IKSPs integration.

Based on the results obtained, the district of Lanuza may consider facilitating and initiating regular monitoring and evaluation and provide support in pursuing developmental plans for IKSP integration, and that the proposed intervention program must be implemented to sustain the very goals of this educational program for Indigenous Peoples in Lanuza District.

The school-parent-community and the governing body of education must strengthen their cooperation in the attainment of the goals in implementing Indigenous People's Education and IKSP integration.

### KEYWORDS:

**INDIGENOUS PEOPLES, INDIGENOUS KNOWLEDGE SYSTEMS AND PRACTICES, INDIGENOUS PEOPLES EDUCATION.**

### I. INTRODUCTION

Indigenous Peoples (IPs), often referred to by various names such as First Peoples, First Nations, Aboriginal Peoples, Native Peoples, or Autochthonous Peoples, constitute culturally distinct ethnic groups with direct lineage to the earliest inhabitants of specific geographic regions. In the Philippines, particularly in Mindanao, IPs are recognized as Lumads, a term signifying their remote highland residence. Comprising more than eighteen ethnic groups, including Subanen, B'laan, Mandaya, Higaonon, and others, Lumads distinguish themselves from other settlers in Mindanao through Republic Act no. 6734 Article XIII section 8(2) under the Cory Administration.

In response to the diverse cultural needs of Lumads, educational initiatives, such as the School of Living Traditions (SLTs), have been established, supported by the National Commission for Culture and the Arts (NCCA). Within the Department of Education (DepEd), the Caraga Region, particularly Surigao del Sur Division, leads in implementing Indigenous Peoples Education (IPed), with Lanuza District hosting five IPed schools.

Despite these efforts, integrating Indigenous Knowledge Systems and Practices (IKSP) into subjects like Mathematics remains a persistent challenge. Factors such as cultural bias, language barriers, limited resources, pedagogical approaches, and resistance to change hinder

the seamless incorporation of IKSP into the curriculum. This study focuses on Lanuza District, exploring the effectiveness of integrating IKSP in seventh-grade Mathematics, specifically Statistics, within the context of IPed schools.

The study acknowledges the unique economic concerns of IP learners and aims to enhance their mathematical knowledge to improve their way of life. By examining the usefulness of IKSP in the context of Mathematics education, the research seeks to promote cultural relevance, inclusivity, and a deeper understanding of statistical concepts among IP learners. Recognizing the right of indigenous peoples to basic education, the study is driven by the motivation to assess how the integration of IKSPs contributes to providing IPs in Lanuza with essential knowledge, abilities, skills, and values under the K to 12 curricular programs.

### II. OBJECTIVES

The study was undertaken to determine the Mathematics (Statistics) performance integrating indigenous knowledge systems and practices (IKSP) in the K to 12 Grade 7 curriculum of the indigenous students in Pakwan Integrated School. The findings became the basis for the output which was proposed intervention plan to improve the integration of IKSP in Grade 7 Mathematics, the

Statistics.

THE STUDY SOUGHT TO ANSWER THE FOLLOWING SUB - PROBLEMS:

1. What is the status of the K to 12 Curriculum in Mathematics 7 (Statistics) during the fourth grading as to:
  - 1.1. Curriculum Content and Competencies;
  - 1.2. Learning Instruction, and
  - 1.3. Learning Facilities and Materials?
2. To what extent is the effectiveness of Integrating Indigenous Knowledge Systems and Practices (IKSP) in the Mathematics performance (Statistics) of the Grade 7 students?
3. What is the academic performance of the Grade 7 students in Mathematics (Statistics) during the fourth grading?
4. Is there a significant relationship between the K to 12 curriculum in mathematics during the fourth grading among grade 7 content and competencies in statistics and the extent of effectiveness of integrating indigenous knowledge systems and practices (IKSP) in the Mathematics performance of the Grade 7 students?
5. Is there a significant relationship between the status of Grade 7 Students' Mathematics

(Statistics) performance during the Fourth Grading and the extent of effectiveness of IKSP?

6. What problems are encountered by the students in Mathematics 7 (statistics) using the Integrated Indigenous Knowledge Systems and Practices (IKSP)?
7. What proposed intervention can be designed to improve the Mathematics (statistics) performance of Grade 7 students by integrating the IKSP?

**III. METHODOLOGY:**

This study used the quantitative – correlational design, since it measured numerically the mathematics performance of the Grade 7 indigenous students during the Fourth Grading in Pakwan Integrated School based on curriculum content and competencies, learning instruction, learning facilities and instructional materials. It also assessed the IKSP integration in Grade 7 Mathematics (Statistics) to enhance the learners' knowledge, skills, and values to improve their economic way of life. It determined the relationship of the variables whether significant or not to the study.

**IV. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA**

This chapter provides a comprehensive presentation, analysis, and interpretation of data pertaining to the identified problems in the study, organized according to the sequence of sub-problems.

**TABLE 1: SUMMARY TABLE ON THE STATUS OF THE K TO 12 CURRICULUM IN MATHEMATICS 7 (STATISTICS) DURING THE FOURTH GRADING**

Indicators	Average Weighted Mean	Description	Rank
Curriculum Content and Competencies	4.30	Very Much Proficient	2
Learning Instruction	4.39	Very Much Proficient	1
Learning Facilities and Materials	4.05	Much Adequate	3
<b>Total Average Mean</b>	<b>4.25</b>	<b>Very Much Proficient</b>	

**Sub-Problem 1: Status of K to 12 Curriculum in Mathematics 7 (Statistics) during the Fourth Grading**

*Indicator 1: Status of Curriculum Content and Competencies*

The curriculum content and competencies in Mathematics 7 (Statistics) during the fourth grading exhibit noteworthy proficiency. Students' use of realistic problems enhances learning, particularly in understanding measures of central tendency. While formulating simple statistical instruments ranks lower, it still indicates practical applications, such as using indigenous tools for measurements.

*Indicator 2: Status of Learning Instruction*

Learning instruction demonstrates a realistic and justifiable approach, emphasizing experiential learning. Teachers' constructive revision of students' output contributes to realistic and meaningful learnings,

showcasing the significance of indigenous learning resources.

*Indicator 3: Status of Learning Facilities and Materials*

Learning facilities and materials emphasize wonder and fascination, providing much-adequate support. However, there is room for improvement in developing creativity based on established ideas. Availability of these resources significantly impacts students' motivation and engagement.

**Sub-Problem 2: Effectiveness of Integrating IKSP in Math Performance of Grade 7 Students**

IKSP integration, specifically in Statistics, proves effective. Real-life experiences, such as understanding economic activities and pricing products, showcase the practicality of statistics in their daily lives.

**Sub-Problem 3: Academic Performance of Grade 7**

Students in Mathematics

**TABLE 2: GRADES IN MATHEMATICS 7 DURING FOURTH GRADING PERIOD**

GRADE 7												
SUBJECT	Quarterly Assessment FORMATIVE TEST		Quarterly Assessment WRITTEN TESTS		Quarterly Assessment PERFORMANCE TASKS		GPA	Quarterly Grades Proficiency Level				
	MPS	PL	MPS	PL	MPS	PL		Did Not Meet Expectation (70-74%)	Fairly Satisfactory (75-79%)	Satisfactory (80-84%)	Very Satisfactory (85-89%)	Outstanding (90-100%)
	Math	51.00	NP	50.00	P	94.00		HP	82	0	18	20

**Legend 1:** 90%-100%,O;85%-89%,VS;80%-84%,S;75%-79%,FS;70%-74%,DNE

**Legend 2:** 90-100,HP;75-89,P;50-74,NeP;25-49,LP;0-24,NP

Performance tasks, with an MPS of 94.00, demonstrate high proficiency, indicating that real-life problem-solving tasks contribute significantly to student learning. The overall GPA of 82.00 falls within the satisfactory level.

**Sub-Problem 4: Relationship between K to 12 Curriculums and IKSP Integration**

**TABLE 3: SIGNIFICANT RELATIONSHIP**

Source of Variances	p-value	Decision	Conclusion
K to 12 curriculum content and competencies in Mathematics 7 and the extent of effectiveness of integrating indigenous knowledge systems and practices (IKSP)	.001	Reject H <sub>0</sub>	Statistically Sig.

A statistically significant relationship is observed between the K to 12 curriculum content and competencies in Mathematics 7 and the extent of effectiveness of

integrating IKSP, emphasizing the impact of IKSP on mathematics performance.

**Sub-Problem 5: Relationship between Mathematics Performance and IKSP Effectiveness**

**TABLE 4: SIGNIFICANT RELATIONSHIP**

Source of Variances	p-value	Decision	Conclusion
Grade 7 Students' Mathematics performance during the Fourth Grading and the extent of effectiveness of IKSP.	.047	Reject H <sub>0</sub>	Statistically Sig.

A significant relationship is found between the status of grade 7 students' mathematics performance during the fourth grading period and the extent of effectiveness of IKSP. IKSP integration correlates with improved mathematics performance.

**Sub-Problem 6: Problems Encountered by Students in Math 7 Using IKSP**

Top-ranked problems, described as "very much serious," include misunderstandings of the emphasis on indigenous knowledge, insufficient budget for IKSP materials, inadequate teacher training, teachers' workload, and communication gaps between non-Manobo teachers and Manobo learners.

These problems underscore the challenges in effectively integrating IKSP in Mathematics 7 and call for targeted interventions, such as increased budget allocation, teacher training, and improved communication strategies. Addressing these issues is crucial for optimizing the

benefits of IKSP integration and enhancing the academic performance of grade 7 students in mathematics.

**Sub-Problem 7: Intervention Plan for Improving Mathematics Performance of Grade 7 Students through IKSP Integration**

Proposed Intervention Program

**RATIONALE:**

The success of learners depends significantly on the collaborative efforts of schools, teachers, indigenous peoples' organizations, parents, and communities. The decision-making process is crucial for achieving the goals and objectives of the organization. Hence, a comprehensive intervention plan that involves collaboration among various stakeholders is essential to enhance the academic performance of learners.

**GENERAL OBJECTIVES:**

Integrating indigenous knowledge systems and practices in mathematics education is essential for several reasons:

**Cultural Relevance and Holistic Learning:** Ensure cultural relevance, quality, and holistic learning to enhance conceptual understanding of cultural heritage, equity, and social justice.

**Strengthening Collaboration:** Strengthen collaboration and linkages among education stakeholders to provide technical and financial support to schools.

**Resource Allocation:** Provide all needed resources for a culturally sensitive community by incorporating indigenous perspectives, adopting a student-centered approach, and fostering pride and cultural identity.

**Preservation of Indigenous Knowledge:** Foster respect for diverse cultures and contribute to the preservation of indigenous knowledge for future generations.

### RECOMMENDED INTERVENTION PLAN

The intervention plan for the integration of Indigenous Knowledge Systems and Practices (IKSP) in Mathematics (Statistics) 7 for the academic year 2023-2024 is outlined. This plan includes specific strategies and activities aimed at achieving the general objectives and addressing the challenges identified in the study.

#### HIGHLIGHTED STRATEGIES:

**Curriculum Enhancement:** Develop and enhance the curriculum to integrate more practical applications of IKSP in Mathematics 7, emphasizing real-life scenarios that resonate with students' experiences.

**Teacher Training and Professional Development:** Conduct regular training sessions and professional development programs for teachers to equip them with the necessary knowledge and skills to effectively integrate IKSP in their teaching methods.

**Community Involvement:** Foster collaboration with indigenous peoples' organizations, parents, and communities to create a supportive learning environment. This includes organizing awareness campaigns, workshops, and community engagement programs.

**Resource Allocation:** Ensure adequate allocation of resources, both technical and financial, to support the integration of IKSP in mathematics education. This may involve procuring relevant teaching materials, updating infrastructure, and providing necessary tools for practical applications.

**Monitoring and Evaluation:** Establish a systematic monitoring and evaluation mechanism to assess the effectiveness of the intervention plan. Regular assessments and feedback loops will inform adjustments and improvements.

The proposed intervention plan aims to create a conducive learning environment that embraces indigenous knowledge, enhances cultural relevance, and improves the overall mathematics performance of Grade 7 students. Collaboration among stakeholders, ongoing training, and resource allocation are key components to ensure the success of the intervention program. This plan aligns with the broader goals of preserving cultural heritage, fostering

equity, and contributing to the holistic development of learners.

## V. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

### SUMMARY

The researcher determined the mathematics performance integrating indigenous knowledge systems and practices (IKSP) in the K to 12 grade 7 curriculum of the indigenous students in Pakwan Integrated School using standardized questionnaire.

The study involved a total of 44 respondents. Below are the findings that show the mathematics performance integrating indigenous knowledge systems and practices (IKSP) in the K to 12 grade 7 curriculum of the indigenous students in Pakwan Integrated School.

### FINDINGS

From the data gathered, the study revealed the following findings:

1. All respondents regarded the indicator six (6) "very much proficient" (Illustrates the measures of central tendency (mean, median, and mode) of a statistical data, and "much proficient" (formulates simple statistical instruments) under curriculum content and competencies.

Indicators under learning instruction, indicator (Teachers are realistic and justifiable in providing extra information to their students) rated "very much proficient" and "much proficient" (Teachers constructively revise versions of students output to improve them).

On other hand, all respondents rated indicators "very much proficient" (it emphasizes the wonder and fascination and mystique of surprising ideas and beliefs) under learning facilities and materials while indicator rated "much proficient" (it develops creativity, basing alternative and new ideas on established ones).

2. The extent of effectiveness of integrating IKSP on the mathematics performance of Grade 7 students was described "greater extent."
3. The academic performance of the grade 7 students in mathematics during the fourth grading period under quarterly assessment the performance tasks proficiency level was "highly proficient" with the MPS of 94.00. Written test proficiency level was "nearly proficient". The quarterly proficiency level of general percentage average (GPA) is "82.00, satisfactory".
4. There is a significant relationship between the k to 12 curriculum content and competencies in mathematics 7 and the extent of effectiveness of indigenous knowledge systems and practices (IKSP) in the mathematics performance of the grade 7 students.

5. There is significant relationship between the status of grade 7 students' mathematics performance during the fourth grading and the extent of effectiveness of IKSP integration.
6. Among the ten (10) problems encountered in Mathematics 7 using the integrated Indigenous Knowledge Systems and Practices (IKSP), most students misunderstood emphasis of the Indigenous Knowledge Systems and Practices as wonderful, insufficient for the procurement of IKSP materials and supplies, fascinated and mystical of surprising ideas and beliefs, most teachers struggle with a huge workload, which does not give them much time in crafting lesson guides and materials which IKSP is integrated, and communication gap between non-manobo teachers handling manobo learners were rated "very much serious" while seven (7) indicators were rated "much serious", inadequate trainings on IKSP among teachers, students' awareness in mathematical real-life problems is irrelevant to indigenous knowledge systems and practices, teachers are not yet trained in the crafting of IKSP integration in their subjects handled, non-appreciation of IKSP among teachers and learners, students' boredom in mathematics subjects is a huge problem faced by most teachers, and difference culture and beliefs system between non-manobo teachers and manobo learners.
7. Among all proposed intervention plan recommended in integrating indigenous knowledge systems and practices (IKSP) in mathematics 7, Review Policies on the Integration of IKSP in the Curriculum Development Conduct Research Studies/Seminars/Conferences/Workshops/SLAC on IKSP Related Topics and Issues, Fund the procurement/development of IKSP materials, Generate Reference Materials on IKS-related Topics, The elders are given a role in the planning of the curriculum as legitimate custodians of outstanding knowledge. In order to ensure that the concepts of the Indigenous Knowledge Systems and Practices (IKSPs) being utilized to relate to the topic are suitable while taking into account the various techniques, tactics, and learning competencies, teachers should continue to add more IKSPs to mathematics discussions were most recommended.
8. crafting lessons guides and exemplars in IKSP integration and become more facilitating and transpiring understanding about importance of Indigenous Knowledge Systems and Practices.
9. The DepEd authority adheres to in-depth research and monitoring the progress on the implementation IPed education curriculum and in the integration of IKSP in all subjects.
10. Students are important players in the realization of enriching and preserving the rich cultural heritage of the Indigenous Peoples.
11. Elders are given a role in the planning of the curriculum as legitimate custodians of outstanding knowledge.
12. A school needs to initiate programs, contests and other related activities and the like regarding the strengthened IKSP promotion and preservation.
13. Schools exist to protect the rich cultural heritage of the indigenous peoples on their customary beliefs and traditions.
14. Schools provide support to generate funds in the procurement of materials needed in teaching-learning process.
15. Parents are important players in their Childrens' education and their learning activities in support to IKSP.
16. Teachers, parents and the entire community are protectors of indigenous peoples right and IPed implementation.
17. Schools link to the NCIP, DILG, LGU, government agencies, alumni, and stakeholders that will help the school projects and programs towards provision of adequate learning facilities and materials, and teaching-learning instructions take in advance.

## RECOMMENDATIONS

Considering the research findings and conclusions, the following recommendations have been presented.

1. The school-parent-community and the governing body of education must strengthen their cooperation in the attainment of the goals in implementing Indigenous Peoples Education and IKSP integration.
2. The district of Lanuza may consider facilitating and initiating regular monitoring and evaluation and provide support in developmental plans for IKSP integration.
3. The District of Lanuza must consider the conduct of seminar and trainings or in service training (INSET) on the crafting and developing learning materials to be used by the teachers in IKSP integration.
4. Assistance and support of school authority and stake holders of the school should be instituted.

## CONCLUSIONS

Based on the findings of the study, the following conclusions have been drawn:

1. The Teachers as catalyst of learning will influence Students and community in their in-depth appreciation and involvement in school and outside school activities related to Indigenous Knowledge Systems and Practices (IKSP).
2. Teachers need basic training and seminars in

Those services will serve important steps resulting to effective and efficient collaboration to meet the goals for IPEd and IKSP implementation.

5. Linkages with the NCIP, DILG, LGU, government agencies, alumni, and stakeholders that will help the school projects and programs towards provision of adequate learning facilities and materials, and teaching-learning instructions have to be intensified.

6. The proposed intervention plan must be implemented in the IP schools of Lanuza District.

Future researchers should conduct studies on programs geared towards the strengthening of the indigenous knowledge systems and practices integration.

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