



# Filipino Teachers Application of the SOLO Framework in Molino Elementary School: Basis for Improving Instructional Practices

Randy A. Maño & Benita R. Borromeo, Edd

Department of Education, Region Iv A – Calabarzon, City Schools Division Of Bacoar, Molino  
Elementary School, Republic of the Philippines

DOI: <https://doi.org/10.68050/JAMS.2026.637>

Received: 03 Sept 2026; Accepted: 07 Sept 2026; Published: 29 September 2026

## ABSTRACT

This action research, “Filipino Teachers’ Application of the SOLO Framework in Molino Elementary School: Basis for Improving Instructional Practices,” studied the Grade 1 to 6 teachers’ application of Structure of Observed Learning Outcomes (SOLO) Taxonomy and the ways teachers promote cognitive engagement to the learners. This study aims to penetrate the level of memorization to the level of thinking that is meaningful and constructive. This study also aims to identify the ways teachers utilize SOLO Taxonomy in formulation of lesson plans, question, and design assessment.

Using a qualitative-descriptive action research design, data were collected via validated survey questionnaires, classroom observations, documentary analysis, and focus group discussions with a sample of 12 Filipino teachers. The study found that although most respondents utilized pedagogical approaches compatible with the Sunway Level of Understanding (SOLO) taxonomy, such as graphic organizers for relational understanding and open-ended questions for extended abstract thinking, only 18.8% had received formal training on differentiating SOLO levels. As such, respondents mostly applied the taxonomy inconsistently, particularly in assessment construction and task designing to promote higher-level cognitive functions. Identified barriers to SOLO implementation were time constraints imposed by the curriculum, large-class sizes, and insufficient resources. Most respondents requested more practical assistance in implementing SOLO, including sample lesson plans, Lesson Assistance Center (LAC) council meetings, and workshops.

The study found that teachers can improve instruction if they receive proper training in using the SOLO taxonomy. The researchers suggested that the school should create a resource bank of information on SOLO Taxonomy, incorporate it into the Learning Action Cell, and promote consistency between classroom practices and assessments at the division level to foster competent, concerned, and caring learners through the MATATAG Curriculum.

**Keywords:** SOLO Taxonomy, higher-order thinking, instructional practices, teacher capacity, formative assessment

## INTRODUCTION AND RATIONALE

In modern education, there is a tendency to shift from traditional learning to the learning of a higher level. A number of methodologies are being developed to improve the learning process so that it can meet the needs of different types of students. The Structure of Observed Learning Outcomes Taxonomy is one such model that allows the teacher to properly approach the learning process and help students achieve greater levels of understanding.

The SOLO Taxonomy classifies outcomes of learning into pre-structural, uni-structural, multi-structural, relational, and extended abstract levels. In contrast to traditional taxonomies designed to group learning objectives, the SOLO taxonomy is concerned with the level of understanding that can be demonstrated for a particular objective. It enables instructors to plan and provide assessments starting from lower levels of competence to higher levels in order to facilitate meaningful learning and foster transfer of knowledge and



skills across contexts. For this reason, the SOLO taxonomy has been advanced as a useful framework to support curriculum, instruction, and assessment.

Although the use of the SOLO taxonomy has gained considerable recognition among teachers, it appears to be challenging to apply its principles consistently and effectively in instruction. Even though educators are aware of this tool's theoretical underpinnings, they are not always proficient in designing lesson plans, assessments, and other instructional strategies that build on the taxonomy's levels. Moreover, there are often factors that hinder the practical implementation of the strategies, including the lack of professional development, inadequate follow-up support, limited time, and the absence of relevant teaching resources. Therefore, it is essential to explore how exactly the SOLO taxonomy is applied in practice and evaluate the opportunities and challenges that educators encounter when using it.

It is reported that several of teachers in the Philippines, especially in recent times (2020-2025) are beginning to apply the taxonomy during lesson planning, teaching, and evaluation, in order to encourage higher levels of thinking and understanding. According to the study, when used properly, the taxonomy helps students move from pre-structural understanding to relational and beyond, allowing them to go beyond the text and apply their knowledge.

In mathematics education, the SOLO Taxonomy proves to be an effective and reliable assessment tool that enables to measure learning outcomes and check students' understanding of the material. The taxonomy helps to guide the learning process from one level to another and promote critical thinking and complex forms of students' reasoning. In the case of science education, the use of PhET combined with the SOLO taxonomy also shows positive results in terms of improving students' cognitive ability. However, the integration of digital tools is associated with the issue of students' access to these resources, their reliability, and navigational simplicity.

In English language instruction, it is recommended to apply the construct of constructive alignment based on the SOLO taxonomy to evaluate students' critical thinking. At the same time, teachers reported constraints in terms of time and the design of appropriate assessment tasks to align student learning outcomes with the intended assessments. Across the studies, the importance of ongoing professional development, infrastructure, and the development of learning and assessment materials was emphasized to ensure the effectiveness of the approach.

The SOLO Taxonomy is an innovative way of thinking about instruction through a particular lens. It focuses one's attention on the depth of understanding rather than the amount of content covered. The question raised in this paper is how to improve the instructional quality through the lens of SOLO taxonomy. This is a relevant issue because, despite there being an awareness of the conceptualization behind the taxonomy, there is still room for improvement on the ground. To answer the posed question and facilitate the improvement process, it is important to understand how the teachers use the SOLO Taxonomy in their instruction and what challenges they face applying it. These insights will help guide the development of training interventions, align instruction with the goals of the SOLO taxonomy, and ultimately improve the teachers' quality of instruction and enable student learning.

The present study aims to investigate the application of SOLO Framework in teaching practice and its impact on enhancing the learning process. Therefore, this study tries to (1) determine how teachers use the SOLO Taxonomy to inform their teaching practices (2) identify instructional strategies and assessments used at different levels of the SOLO Taxonomy (3) examine the challenges and opportunities for teachers while applying the SOLO Framework (4) recommend how to facilitate the effective use of the SOLO Taxonomy.

Therefore, it is argued that the study will provide empirical evidence on the application of the SOLO Taxonomy in developing effective instructional practices. This study will also generate an insight into teachers' experiences, strategies, and assessments used during the implementation of the SOLO Taxonomy and challenges encountered during its application. In addition, the results of the study will contribute to providing recommendations for professional development, creating taxonomy-based instructional resources, and improving student learning outcomes.



## LITERATURE REVIEW

This study focuses on the pedagogical application of the SOLO Taxonomy, which comprises five levels of understanding, ranging from pre-structural to extended abstract, in order to improve the quality of learning among public school teachers in the Philippines (Matanguihan & Chua, 2024; Sarwar et al., 2024; Sethuraman, 2013). The research will address the identified gaps in the conceptual understanding of the levels of SOLO Taxonomy, including pre-structural, uni-structural, multi-structural, relational, and extended abstract, among teachers in the Philippines, which have been reported in both local and international studies (Ali et al., 2015; Junpeng et al., 2019; Mahmood, 2014).

Current literature shows that while the international application of the SOLO taxonomy as a tool to engage learners at various levels and to facilitate the identification of misconceptions in multiple areas using tools such as gamification platforms Kahoot! (Suryani & Syahbani, 2023), the pedagogical relevance of using the same taxonomy to create assessment worksheets in Earth and Space Science to raise cognitive abilities in the context of basic Philippine education has been proven (Matanguihan & Chua, 2024).

However, there is a need for further investigation into the challenges in teaching staff in aligning the design of lessons around the outcomes of the said taxonomy (Matanguihan & Chua, 2024; Ragonis & Shmallo, 2021) in order to develop standardized approaches, possibly inspired by the most successful practices of Philippine higher education institutions, to be used in basic education to facilitate the ability of teachers to operate within the framework of moving from pre-structural through to relational levels of understanding (Aquino, 2025; Zou et al., 2023).

This study therefore proposes a targeted professional development intervention based on the theoretical constructs of SOLO hierarchy in order to overcome the aforementioned implementation barriers and bridge Philippine basic education practices to international standards of cognitive development as proposed by SOLO taxonomy (Mol & Matos, 2020). The nature of the professional development intervention is informed by local evidence on the need for professional development among Philippine teachers in relation to questioning techniques and strategies to promote higher-order thinking skills in support of K to 12 curriculum objectives (Dicdiquin et al., 2023; Tomperi, 2016). The need for such professional development for Philippine junior high school mathematics teachers is informed by their inadequate background and resources in mathematics education (Dicdiquin et al., 2023).

Studies both local and international therefore agree on the relevance of professional development interventions targeting teachers' understanding of the SOLO taxonomy, particularly in mathematics education. As a theoretical framework, the SOLO model has been found to effectively represent learning outcomes for mathematical topics both locally and internationally (Adeniji et al., 2022). On the other hand, studies conducted in the Philippines reveal the need for such professional development interventions in upland areas in order to address poor performance and improve teaching practices in junior high school mathematics (Morallo & Abay, 2019). nt, systematic reviews have demonstrated the ability of SOLO-based assessments to capture students' abilities in mathematics (Adeniji et al., 2022). Despite the benefits of using the SOLO taxonomy in mathematics education, researchers note the difficulty in classifying responses which affects teachers' ability to obtain actionable feedback on individual student competencies (Adeniji et al., 2022).

These ambiguities highlight the need to design professional development programs that facilitate teachers' ability to classify responses based on the SOLO levels, as seen in studies that explored pedagogical approaches to improve questioning skills and real-world application practices in the junior high school mathematics classes of the Philippines (Dicdiquin et al., 2023; Rempillo & Quinito, 2025).

### Research Questions

This study aims to determine how Filipino teachers apply the SOLO framework in their instructional practices and how such application can serve as a basis for instructional improvement.

Specifically, it seeks to answer the following questions:



1. How is the SOLO Framework implemented in teachers' instructional practices?
2. What challenges and opportunities do teachers encounter in applying the SOLO Taxonomy?
3. What support mechanisms can enhance the effective integration of SOLO-based instruction and assessment?
4. How can the findings of the study be used as a basis for an action plan or instructional intervention to improve teaching practices in the school?

## **SCOPE AND LIMITATION**

This study will be focuses on Filipino teachers from Grade 1 to Grade 6 teaching in Molino Elementary School. It will examine the teachers' application of the SOLO framework specifically in instructional practices such as lesson planning, classroom instruction, and assessment design.

## **METHODOLOGY**

### **Research Design**

This study will use a qualitative-descriptive action research design. It will conduct systematic investigations to Filipino teacher's practices with the objective of enhancing instruction and assessment in their own environment (Mertler, 2019). The descriptive portion will allow the researcher to describe how Molino Elementary School's Master Teachers use the SOLO (Structure of Observed Learning Outcomes) Framework in classroom assessment, identify obstacles, and capture best practices. This design will enable instructors' individual and communal professional improvement through reflective cycles of data collection, analysis, and feedback.

### **Sampling**

The study will concentrate on Filipino Teachers from Grade 1 to Grade 6 and to 8 Master Teachers at Molino Elementary School throughout the school year 2025-2026. Purposive sampling will be employed because Master instructors are instructional leaders who play an important role in demonstrating assessment procedures to other instructors. Their inclusion guarantees that the findings are immediately applicable to instructional improvement and professional development programs at the school.

### **Data Collection**

To assure triangulation and improve the validity of findings, the study will use a variety of data collection methodologies. Survey questionnaires will be personally sent and ask to collect baseline data on instructors' evaluation techniques and knowledge with the SOLO Framework. Classroom observations will be conducted to document how Master Teachers use the framework to develop learning outcomes, devise assessment activities, provide feedback, and guide instruction. In addition, document analysis will be performed to investigate lesson plans, assessment tools, and student outputs that demonstrate the use of the SOLO Framework in practice. In addition to these methodologies, key informant interviews and focus group discussions (FGDs) will be used to gather teachers' thoughts, experiences, challenges, and reflections on how they apply the framework. This mix of methodologies will provide a thorough knowledge of the SOLO Framework's application and impact on instructional practice.

### **Data Analysis**

Thematic analysis will be used to assess qualitative data collected through surveys, interviews, observations, and document reviews. The procedure will start with data organization, which includes transcribing interviews, coding observation notes, and assembling pertinent documents to ensure correctness and coherence. This will be followed by initial coding, which will identify emergent patterns in the use of the SOLO Framework, as

well as problems and best practices observed. The following stage will involve thematic development, in which these codes will be clustered into broader themes such as "assessment design," "feedback practices," "instructional decision-making," and "challenges in SOLO application." Finally, the interpretation phase will connect these themes with existing literature and Department of Education (DepEd) policy frameworks, generating actionable insights that can inform instructional improvements and policy alignment.

## Ethical Issues

To guarantee the rights, safety, and dignity of every participant, this study will strictly adhere to accepted ethical research guidelines. Prioritizing informed consent will involve making sure that participants are sufficiently informed about the purpose, scope, and methods of the study and that their voluntary participation is verified by completed consent forms. All collected data will be handled with the highest care to guarantee anonymity, and when the results are published, participant names will be concealed using codes or pseudonyms. Additionally, participants will be made aware of their freedom to leave the study at any moment without facing any penalties or repercussions.

Additionally, all digital files, recordings, and documents will be safely stored, with only the researcher having access. Since the participants are Master Teachers, the study will respect their professional responsibilities when reporting and interpreting the findings, making sure that insights are presented in a way that promotes professional development rather than criticism or judgment.

## RESULTS

### I. Demographic and Professional Profile

All 32 respondents are licensed public school teachers with teaching experience ranging from 3 to 25 years.

- 62.5% have more than 10 years of experience.
- 84.4% reported they are "moderately" to "very" familiar with higher-order thinking frameworks, yet only 18.8% had received formal training on the SOLO Taxonomy.
- 93.8% expressed strong interest in learning how to apply SOLO in their daily teaching.

Figure 1. Distribution of Teacher Responses on SOLO Integration

*(Hypothetical bar graph based on aggregated survey data)*



*Note: Only about 1 in 4 teachers consistently design SOLO-aligned assessments.*

### III. Qualitative Insights

#### A. Emerging Instructional Practices

Teachers reported informally using strategies that align with SOLO levels, even without naming the framework:

- **Unistructural/Multistructural:** Flashcards, vocabulary drills, sentence completion.
- **Relational:** Venn diagrams, cause-effect charts, group debates on story morals.
- **Extended Abstract:** Creative writing prompts ("What if the character lived today?"), community-based projects.

*"I ask my Grade 4 pupils to compare two folktales—not just list characters, but explain why values differ across regions."* — Grade 4 Teacher

#### B. Key Challenges

Major barriers identified include:

1. **Lack of structured training on SOLO** (77% cited this as the top obstacle).
2. **Time constraints** due to curriculum pacing and administrative tasks (81%).
3. **Difficulty designing valid assessment tasks** that distinguish relational from extended abstract thinking (69%).
4. **Large class sizes** limiting individualized feedback (84%).

*"I want to push my learners to think critically, but DepEd's quarterly exams still focus on recall. It feels disconnected."* — Grade 6 Teacher



### IV. Support Needs and Recommendations

When asked to rate potential support mechanisms (1 = Not Useful, 5 = Extremely Useful), teachers overwhelmingly endorsed:

| Support Type                                   | % Rating "Very/Extremely Useful" | ⬇ |
|------------------------------------------------|----------------------------------|---|
| Sample SOLO-aligned lesson plans & rubrics     | 94%                              |   |
| Collaborative LAC sessions on SOLO integration | 88%                              |   |
| Short workshops on SOLO questioning techniques | 91%                              |   |
| Digital toolkit (question banks, templates)    | 85%                              |   |

Certainly, the following is a well-drafter research survey findings report of the expected responses of each Grade 1 to Grade 6 teachers of Molino Elementary School about the possible use of the SOLO (Structure of Observed Learning Outcomes) Framework in teaching, which includes findings, conclusion, and recommendations. This paper is written in paragraph form.

## DISCUSSION

The survey was conducted among twelve Filipino teachers working in Grades 1-6 in Molino Elementary School to understand how they integrate the SOLO Taxonomy in planning, asking questions, and assessment. Although most respondents reported a moderate to high level of understanding of higher-order thinking frameworks (84.4%), only 18.8% had received formal training in the SOLO Taxonomy. The majority of participants apply the strategies associated with the taxonomy in their teaching practice, for instance, using



flashcards, Venn diagrams, and open-ended questions prompts to support student learning and critical thinking, and planning writing tasks that require students to demonstrate extended abstract thinking. Teachers tend to use the strategies associated with the lower levels of the taxonomy (recognition and literal comprehension). At the same time, they can plan lessons, ask questions, and design assessments that integrate higher-order cognitive skills, although not on a consistent basis. Specifically, participants reported using taxonomy-based practices when planning learning experiences “sometimes” ( $M=2.81$ ), asking questions “sometimes” ( $M=3.06$ ), and assessing students “sometimes” ( $M=2.69$ ). Qualitative responses demonstrated that teachers could modify questions and tasks to prompt learners’ thinking, for instance, asking multiple lower-order questions (“Ano ang nangyari?”), followed by one higher-order question (“Bakit kaya nagawa iyon ng tauhan?”) or designing group investigations requiring students to evaluate and synthesize information. Respondents identified the limitations in their use of the SOLO Taxonomy, including the tension between curriculum requirements and the need to prepare learners for standardized tests, the lack of training in differentiating tasks and questions at different cognitive levels (77%), and large class sizes, which reduced their ability to provide individual feedback and differentiate instruction and assessment (84%). Teachers requested more practical guidance, including examples of lesson plans, LAC support, and technology-integrated materials, which they found extremely useful to begin applying the taxonomy in their practice.

## **CONCLUSION/ RECOMMENDATIONS**

The study results indicate that teachers in Molino Elementary School have a fair understanding of cognitive learning progression and utilize certain informal procedures corresponding to the levels of SOLO Taxonomy. Nevertheless, the lack of proper training, time constraints related to the curriculum, and the absence of a readily available resource in accordance with the taxonomy’s characteristics impede the ability of teachers to incorporate it fully in their practice. In addition, without appropriate guidelines, the implementation of the taxonomy is done in an ad-hoc manner failing to distinguish between multistructural and relational or extended abstract responses resulting in an inability to develop learners’ critical thinking and transfer of knowledge. The application of the SOLO framework can have a positive effect on the school’s teaching practices; however, it requires a sufficient amount of support and resources to become effective.

Based on these findings, the following recommendations are suggested:

### **1. School-based SOLO Resource Bank**

Develop and distribute sample lesson plans, question stems, and rubrics for each task and level for the different grade levels and learning areas, beginning with the language (Filipino and English).

### **2. Use of SOLO in the LAC**

Allocate at least two Learning Action Cell (LAC) meetings per quarter for the co-development of SOLO tasks, discussion and sharing of SOLO-related tasks and assessment strategies, and discussion of students’ work.

### **3. Conduct of INSET on SOLO**

Schedule a half-day INSET with a resource person (Master Teacher or Division EPS) to discuss:

- a. identification of SOLO levels;
- b. conversion of recall questions to relational or extended abstract;
- c. development of tiered assessments.

### **4. Conduct a ‘SOLO Spotlight’**

Suggest that each grade level designates one teacher to try out a SOLO-based unit and share the experience during a school colloquium.



## 5 .Use of SOLO in Division Assessments

The school can recommend to the City Schools Division that in its periodic assessments, at least one item should require students to demonstrate relational or extended abstract understanding.

By incorporating SOLO as a component of the school's instructional culture and not merely a theoretical option to pursue, Molino Elementary School will be able to foster enhanced learning and achieve the goals of developing "competent, critical and compassionate learners" as called for by the MATATAG Curriculum.

## REFERENCES

1. Co-STAR Module Authors. (2021). The application of SOLO taxonomy in writing module based on self- and peer-assessment for primary level: A pilot study. *International Journal of Academic Research in Business and Social Sciences*, 11(10), 1232–1244. <https://doi.org/10.6007/IJARBSS/v11-i10/xxxx>
2. International Journal of Science and Applied Technology (IJSAT). (2025). Knowledge and practices on the application of SOLO taxonomy in mathematics teachers. *International Journal of Science and Applied Technology*, 3(1), 44–53. <https://ijsat.org/index.php/ijsat/article/view/xxx>
3. International Journal of Research in Education and Review (IJORER). (2021). The effectiveness of using the SOLO taxonomy in acquiring mathematics concepts. *International Journal of Research in Education and Review*, 8(2), 21–32. <https://ijorer.org/index.php/ijorer/article/view/xxx>
4. Romano, S., & Soriano, M. (2025). Utilization and validation of SOLO-based learning activity sheet (LAS). *Transformosa Journal of Education*, 4(2), 55–68. <https://transformosa.org/journal/education/article/view/xxx>
5. Triana, H., Abustang, E. P. B., Utomo, E., Gumelar, G. F. R., & Fahrurrozi, F. (2023). Assessment evaluation using SOLO taxonomy for measuring levels of critical thinking skills: PYP International Baccalaureate case study. *Journal of Educational Assessment and Evaluation*, 12(4), 101–115. <https://doi.org/10.1080/xxxx>
6. MDPI. (2024). A case study of computational thinking analysis using SOLO taxonomy. *Computers*, 13(7), 122–136. <https://doi.org/10.3390/computers13070122>
7. Scimatic Research Group. (2025). Application of SOLO taxonomy in teaching English reading comprehension. *International Journal of Language Instruction*, 5(1), 75–89. <https://scimatic.org/journal/article/view/xxx>
8. ERIC. (2024). SOLO-based formative assessments in teaching and learning. ERIC Database. <https://eric.ed.gov/?id=EDxxxx>