## Social Scientists - Review Sessions

Laura S. Quintero, Science Teacher

## Introduction

In this investigation, we will look into the efficacy of teacher-led versus student-led review sessions focusing on themes from the science curriculum. The primary objective is to discern which approach—teacher-led or student-led—yields superior outcomes regarding session effectiveness, information retention, and thematic clarity. Teacher-led review sessions are structured around giving knowledge and guiding discussions, ensuring students grasp fundamental concepts through structured explanations based on the main struggles voiced by students. On the other hand, student-led sessions empower them to take ownership of their understanding, often encouraging collaborative environments where students discuss, debate, and explain concepts. By comparing these methodologies, we aim to measure their respective impacts on student learning outcomes. Metrics such as post-session assessments, retention rates of key information, and student feedback on clarity of thematic understanding will guide our analysis.

## Hypothesis

Teacher-led review sessions will result in greater information retention and enhanced thematic clarity compared to student-led review sessions. This hypothesis is based on the assumption that structured guidance and expert explanations provided by teachers facilitate a more comprehensive understanding of complex scientific concepts, thereby improving learning outcomes.

## Method

### Teacher-led review session

This session will start by asking the students about the topics and concepts that require further explanation or clarification, topics will include those seen during the school year. Once students have voiced the topics they consider require further explanation, the mentor will prepare a review session consisting of different approaches to fulfill the student's needs. Review sessions will be organized in three stages:

- General and adjacent concepts explanation from the mentor.
- Student-specific questions.
- Student explanation of the concepts seen in the review to assess understanding.

The third stage will compile the first metric to assess the student which will be student feedback on the clarity of the topic understanding. Small assessments that require a direct or indirect understanding of the topic, like applied knowledge in a quiz, situational case studies, or video discussions, will help estimate their information retention and internalization of the subject.

### Student-led review sessions

This session will commence by asking the students about the topics and concepts that require further explanation or clarification. After the discussion, the mentor will encourage students who feel confident on those topics to take the leadership in conducting the session. To organize the space, there will be different stations based on the student who will take responsibility for the topic while other students rotate through the topics they need reinforcement in. At the end of the session, data will be collected through student feedback on their topic leaders and their clarification of the topics explained. Small assessments like applied knowledge in a quiz, situational case studies, or video discussions, will help estimate their information retention and internalization of the subject.

## Results

### Teacher-led review session

Students chose between 5-7 topics that needed clarification, these included specific concepts that were taught in class, as well as adjacent information that was talked about during different classes but was not deepened since it was not the main objective of the lesson.

*Stages:*

- During the first stage of the review, students who asked for the topics to be clarified were paying attention to the explanation made by the mentor, as well as reviewing their notebooks to check on their notes and complement the insight gathered from the explanation. Those students also made small self-clarifying questions to make sure they understood with their own words the topics that were viewed. Certain students who did not ask about the topics that were being explained struggled with maintaining attention and engaging with the other students. These kids caused small disruptions and distractions in the space, instead of contributing to the discussion with their acquired knowledge.
- The second stage included several questions from students, as well as some hesitation to ask questions that could be seen as too obvious or regarding basic knowledge, however after encouraging the students they managed to gather the confidence to ask about their doubts. This stage was very dynamic and some questions led others who were not actively engaged and participating in the first stage to ask their own and contribute to the discussion.
- The third stage of the session was characterized by active participation from most of the students, as they built their explanations of the concepts from the review together, clarifying if anyone made a mistake or confused themselves with their descriptions and definitions.

*Assessments of Information Retention:*

After the review session, two assessment activities were conducted, one regarding a board

explanation of combined knowledge from topics of the first unit and second unit, as well as a video analysis of the topic that was being taught in the week. In the first activity students who actively participated in the review were more confident and quick to identify the answers and provide detailed explanations of their choices than their other peers. The second activity was permeated with applied knowledge from the specific concepts reviewed, and autonomous connection to the topics seen in the video, as they showed deeper and clearer explanations and justifications in their analysis.

**Student-led review sessions**

*Engagement and Participation*:
During the session, students actively engaged in discussions, debates, and explanations of the selected topics. The collaborative environment favored peer-to-peer learning, with students taking turns to clarify concepts and answer questions. This approach allowed for multiple perspectives and diverse explanations, enhancing the depth of understanding among participants. However, some students reported feeling unsure about the accuracy of their peers' explanations, leading to occasional confusion and the need for additional clarification.

*Student Feedback on Topic Leaders:*
Feedback collected from students indicated mixed satisfaction with their peer leaders. While many students appreciated the opportunity to learn from their classmates, noting that the explanations were relatable and easier to understand, others felt that their peers lacked the necessary expertise to provide clear and accurate explanations. This led to some inconsistencies in understanding and gaps in knowledge.

*Assessments of Information Retention:*
Following the review session, students undertook two assessment activities: an applied knowledge quiz and a situational case study analysis. In the quiz, students demonstrated good retention of the key concepts reviewed during the session. While some students were able to recall details discussed by their peers, others struggled with inconsistencies and gaps in their understanding, reflecting the variability in the quality of peer-led explanations.

The situational case study analysis highlighted some challenges with the student-led approach. Although students were able to apply their knowledge to real-world scenarios, their analyses were less thorough and well-justified compared to the teacher-led sessions. This indicated a less robust internalization of the subject matter, likely due to the varying quality of peer explanations. The lack of a single authoritative source of information sometimes resulted in fragmented understanding and less cohesive thematic clarity.

## Analysis

The investigation compared the efficacy of teacher-led versus student-led review sessions in a science curriculum, aiming to determine which approach yields superior outcomes in session effectiveness, information retention, and thematic clarity. The hypothesis argued that teacher-led sessions would result in better retention and clarity due to structured guidance and expert explanations.

Teacher-led sessions were marked by active student engagement, particularly from those seeking clarifications. The structured format allowed for detailed explanations, dynamic questioning, and collaborative discussions. However, a lack of engagement from certain students hindered the smoothness of the lesson, causing repeatedness and frustration from those asking for the review. Assessments indicated that students who participated in these sessions displayed higher confidence, quicker identification of correct answers, and a deeper understanding of applied knowledge activities. The structured approach facilitated a comprehensive understanding and retention of complex and abstract concepts.

Student-led sessions fostered peer-to-peer learning and active participation. However, the variability in peer explanations led to mixed feedback. Some students appreciated relatable explanations, while others experienced confusion due to inconsistent information. Assessments revealed that while students demonstrated good retention, their understanding was less thorough compared to teacher-led sessions. The situational case studies highlighted the fragmented understanding resulting from the lack of scholarly guidance.