Shaping Minds Together: Experiences of Junior High School Students in Learning Science in a Constructivist Learning Environment

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ABSTRACT

A low constructivist learning environment in science classrooms remains a significant concern. This phenomenological study explored the experiences of ten Grade 9 students in Davao Oriental, focusing on how they construct understanding through schema development, assimilation, and accommodation. Interviews and focus group discussions revealed three emerging subthemes under the modified schema: adaptive cognition, reflective learning, and teacher-facilitated learning. Future research may employ mediation analysis to examine schema changes within constructivist learning environments and develop questionnaires through exploratory factor analysis using the subthemes as indicators. The study recommends forming professional learning groups and institutional programs to help teachers apply constructivist principles.

Keywords: Shaping minds together, experiences of junior high school students in learning science, constructivist learning environment

INTRODUCTION

Across the global educational landscape, we noticed that the persistence of a low constructivist learning environment continues to pose a significant classroom-level challenge. As we reflected on recent studies, we observed that classrooms dominated by passive student behavior and minimal interaction limit collaborative opportunities and hinder student agency (Precellas & Napil, 2024).

In Vietnam, we found that constructivist practices remain inconsistently implemented, leaving many learners with limited opportunities for inquiry and shared meaning-making (Doan et al., 2025). Similarly, in Indonesia, such environments continue to characterize many TEFL classrooms, reflecting sustained classroom-level concerns (Azizah et al., 2025). In Ethiopia, we also noticed that low constructivist learning conditions prevail, restricting active engagement and reflective participation (Tegegne et al., 2025).

As we examined these patterns across contexts, we realized that the issue was not isolated to one region. In the Philippine setting, we observed that many local classrooms still reflect limited collaboration, restricted student voice, and minimal hands-on engagement (de Mesa & de Guzman, 2023).

From our perspective, when students are rarely given opportunities to interact meaningfully with content, their ability to construct knowledge actively may remain underdeveloped. We sensed that under such conditions, learner agency, reflective thinking, and collaborative competence may not fully flourish (Mekonnen et al., 2025). These realizations prompted us to explore how students actually experience a constructivist science classroom when such an environment is intentionally implemented.

Significance of the Study

This study is significant because it explores how junior high school learners experience and develop understanding in a constructivist learning environment that emphasizes active, experiential, and meaningful learning. By examining these lived experiences, we aim to contribute insights that support Holy Cross of

Davao College's mission of promoting critical thinking, independence, and holistic development through learner-centered and values-oriented education. The findings may also guide educators in strengthening constructivist practices in science classrooms.

Statement of the Problem

In this study, we aimed to explore the experiences of students in a constructivist learning environment in science. Specifically, we sought to answer the following questions:

1. What were the previous experiences of students in a constructivist learning environment?
2. What occurred in the minds (schema) of the students while experiencing a constructivist learning environment?
3. What were the experiences of students as they underwent the processes of assimilation and accommodation while interacting with new concepts in a constructivist learning environment?
4. What were the modified schemas regarding a constructivist learning environment as experienced by the students?

Assumption

This study is guided by the assumption that learning science in a constructivist environment enables students to actively construct understanding through experience and social interaction rather than passively receiving information. We assume that collaboration, negotiation of ideas, and hands-on activities help students build knowledge, deepen curiosity, and take ownership of their learning (Cetín-Dindar, 2016; Moos, 2002).

THEORETICAL FRAMEWORK

This study is grounded in Jean Piaget's Theory of Constructivism (1964). As we reflected on this theory, we recognized that it emphasizes learners as active constructors of knowledge who continuously organize experiences into mental structures called schemas. Through the processes of assimilation and accommodation, learners modify their existing schemas in response to new experiences. Cognitive development, driven by equilibration, occurs as learners resolve cognitive conflict and strive for balance.

Figure 1. Conceptual Framework of the study

METHOD

We employed a qualitative phenomenological research design to explore junior high school students' lived experiences in a constructivist science classroom. Phenomenology was appropriate because it seeks to understand how participants make meaning of their experiences from their own perspectives. As Creswell and

Poth (2018) explained, phenomenology focuses on describing the common essence of shared experiences. Through in-depth interviews and rich narrative descriptions, we examined how students perceived collaboration, inquiry, shared control, personal relevance, and schema development within a constructivist learning environment.

The study was conducted in a national high school in Davao Oriental. The province, known as the "Coconut Capital of the Philippines" (Arado, 2017), is divided into two districts and is geographically positioned between the Philippine Sea to the east and the Davao Gulf to the west. Its contextual setting provided a meaningful backdrop for exploring students' classroom experiences in science learning.

We used purposive sampling to select participants who had direct experience with a constructivist learning environment. Purposive sampling is appropriate in phenomenological research because it intentionally selects individuals who can provide rich and relevant insights into the phenomenon under investigation (Creswell & Poth, 2018). Five Grade 9 students enrolled during the 2022–2023 school year participated in in-depth interviews. Additionally, five other junior high school students participated in a focus group discussion (FGD) to provide varied perspectives and deepen the data collected.

We developed a semi-structured interview guide aligned with the objectives of the study. The guide, validated by experts, consisted of open-ended questions designed to encourage students to reflect on their engagement, collaboration, meaning-making, and cognitive processes. The questions also explored how their understanding evolved through assimilation and accommodation of new scientific concepts within a constructivist learning environment.

In conducting the study, we served as primary researchers and interviewers. We secured informed consent and assent from participants prior to data collection. A supportive and non-threatening atmosphere was established to encourage honest and reflective responses. Follow-up and probing questions were used to deepen participants' insights. All interviews were transcribed verbatim. Responses expressed in the local language were carefully translated into English while preserving their original meaning and ensuring confidentiality.

We followed systematic procedures in gathering data. First, approval was obtained from the Research Ethics Committee, the Division Office, and the school administration. Second, after explaining the purpose of the study, informed consent and assent were secured. Third, face-to-face interviews were conducted with five in-depth interview (IDI) participants and five FGD participants using the validated interview guide. Fourth, audio recordings and transcripts were securely stored in a password-protected folder to maintain confidentiality. Finally, the collected data were then subjected to qualitative analysis.

For data analysis, we transcribed audio and video recordings to ensure accuracy, including relevant non-verbal cues when necessary. We employed thematic analysis by first familiarizing ourselves with the data, coding significant statements, and clustering related codes into emerging themes. The themes were reviewed, refined, and clearly defined to capture their core meanings. This procedure aligns with the thematic analysis framework of Braun and Clarke (2006), which emphasizes systematic coding, pattern recognition, and meaning construction across qualitative data. Findings were presented using thematic diagram and followed by supporting excerpts to ensure clarity and authenticity.

The researchers' data was the cornerstone of research excellence. In this study, Stumpfegger (2017) cited Lincoln and Guba (1985) for creating a set of criteria for trustworthiness in qualitative research: credibility, transferability, dependability, and confirmability, to provide a different set of criteria for assessing the quality of the study.

Credibility. We ensured credibility by gathering rich and detailed data through in-depth interviews and focus group discussions. We encouraged participants to share their experiences openly and used probing questions to clarify meanings and deepen responses. Prolonged engagement with the data and careful transcription further strengthened the accuracy and authenticity of the findings.

Transferability. We enhanced transferability by providing thick and detailed descriptions of the research setting, participants, procedures, and context of the constructivist science classroom. By clearly describing these elements, we enabled readers to determine whether the findings may be relevant or applicable to similar educational contexts.

Dependability. We ensured dependability by thoroughly documenting all research procedures, methodological decisions, and analytical steps. By maintaining clear records of how data were collected, coded, and interpreted, we allowed the study to be reviewed, audited, or potentially replicated by other researchers.

Confirmability. We achieved confirmability through reflexivity, transparent documentation of analytical decisions, and member checking. Participants were given opportunities to review and validate the interpretations of their responses, ensuring that the conclusions accurately reflected their intended meanings.

RESULTS AND FINDINGS

This chapter presents the results of the study on students' experiences and schema development in a constructivist science classroom, interpreting the modified paradigm and key themes—activating previous experiences, thinking the constructivist way, assimilating previous thoughts, accommodating new thoughts, and constructing new understanding.

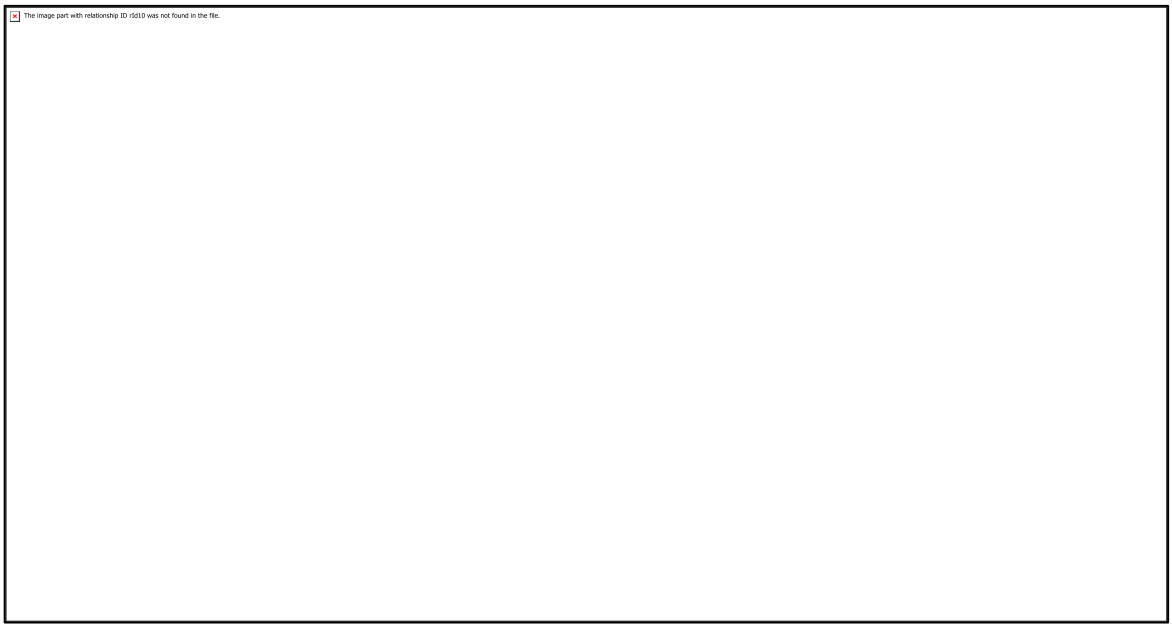

Figure 2. Modified Paradigm of the Study

Activating Previous Experiences: Students' Learning in a Constructivist Environment

While reviewing our participants' responses, we recognized the importance of students' prior experiences in shaping learning in a constructivist classroom. This process does not happen automatically or like magic; instead, it unfolds through meaningful engagement, and collaboration. Through this process, a significant outcome emerged—the activation of previous experiences. This activation is characterized by active and experiential learning, collaborative engagement, enjoyment of lessons, and constructive challenges that together support meaningful knowledge construction.

Active and Experiential Learning. Active and experiential learning engages students in hands-on tasks and real-world applications, strengthening conceptual understanding and critical thinking. One participant mentioned,

…Kuna ma'am…ngawng…yang lesson nato is…instead na ipamemorized, ikanta then kuan ma'am instead na…magkuan yaghimo kita ng vol…vocan ayy amanang model ng volcanic eruption..gamit yang kuan ngawng mga locust materials tapos maghimo scrapbook.IDI; p2, Lines 76-79

The time when our lesson was all about volcanoes, instead of memorizing, we sang it and we also created miniature volcanoes and conducted an experiment on the mechanism of eruption using low cost materials and we also made scrapbook.IDI; p2; Lines 76–79

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As reflected in this response, we realized that active involvement encourages meaningful participation and helps students construct knowledge that lasts.

*Collaborative Learning.*Collaborative learning strengthens understanding through peer interaction, idea-sharing, and group problem-solving. One participant shared,

Para kanak ma'am kay…favorite ko gihapon na activities na grouping gihapon kay adto ko gayud maenhance yang kanak kuan katigaman mas mashare ko kanilan, mas masayud esb ako kung tama esb yang kanang kuan…tapos awn esb ,alearn kanak miyembro.Kuan esb ma'am…mag ask gihapon sang mga klasmyt ko ma'am tapos sang maestra kung musugot esb silan na mag… example maggroupings kami or kuan himoon nami na activities ug willing esb silan. FGD4; p1; Lines 36–38

For me Ma'am, group task will always be my favorite. It enhances my knowledge, and I am able to impart it to the rest of the members and vice versa. But of course, we also ask consent from the teacher and to the whole class if they are willing to do this by group or what. FGD4; p1; Lines 36–38

Based on this response, we recognized that collaboration not only completes tasks but also creates a supportive learning environment where students learn together and enhance one another's knowledge.

Enjoyable Learning. Students' enjoyment and creativity in learning activities were evident, highlighting the importance of engaging approaches. One participant emphasized:

Kuan ma'am..Ah…kinang….Rymming gud…for example…ngiyang ang topic is about respiratory system the mag composed ug kuan….ahmmmm..kanta, gamit ang isa ka kuan sa kuan music para….mas ma rhyme sya ug mas maging….ano…….maging fun yang learning." IDI lines. 135–138; P5

For example, the topic is all about respiratory system, then our task is to compose a song using the existing music so, to make our retention strong we make use of rhymes that way we learn better.IDI lines. 135–138; P5

From this response, we recognized that integrating music and creative approaches enhances students' engagement, motivation, and enjoyment. Learning becomes more meaningful when students can connect concepts to fun, hands-on, and imaginative activities.

Challenging in Learning. Challenges in learning often arise from group dynamics, where students may experience frustration due to uncooperative peers. As shared by one participant:

Ahmmm…para kanak yang mga challenge pag ngiyang…awn activities kay ngiyang…sang groupmates na di mag…di magcooperate tungod kay wa sila ganahi sian na suggestion tapos…mag…balewalaon yang kanmo opinion di nilan gusto panalingahan kay dili nilan gusto.IDI lines. 145–148; P6

For me one of the challenges we usually encounter during activities is the lack of members cooperation due to differing ideas and they tend to stick on their own opinion and would not entertain other's suggestions. IDI lines. 145–148; P6

Based on the response, we gained insight that challenges in learning often stem from group interactions. Frustration arises when some members are uncooperative, emphasizing that effective teamwork depends not only on knowledge and skill but also on attitude and communication. Successful collaboration can be difficult but is essential for meaningful learning.

Thinking the Constructivist Way

We recognized that students' experiences in a constructivist learning environment demonstrated how they used prior knowledge to make sense of new concepts. Working with peers allowed them to share ideas, build understanding, and develop teamwork skills. They also described how problem-solving and reflection helped them adapt and deepen their learning. Through this process, an important outcome emerged—enhanced schema development in a constructivist learning environment, characterized by social cooperation, problem solving, and metacognition.

Social Cooperation. Participating in group activities strengthened students' ability to share ideas, support peers, and collaborate effectively. Tools like group discussions and cooperative tasks encouraged students to actively engage, clarify understanding, and assist one another, making learning more meaningful and inclusive. As expressed by one participant,

"Para kanak ma'am kay…favorite ko gihapon na activities na groupings gihapon kay adto ko gayud maenhance yang kanak kuan katigaman mas mashare ko kanilan, mas masayud esb ako kung tama esb yang kanang kuan…tapos awn esb, alearn kanak miyembro. Kuan esb ma'am…mag ask gihapon sang mga klasmyt ko ma'am tapos sang maestra kung musugot esb silan na mag… example maggroupings kami or kuan himoon nami na activities ug willing esb silan." FGD; P1; Lines 36–38

For me Ma'am, group task will always be my favorite. It enhances my knowledge, and I am able to impart it to the rest of the members and vice versa. But of course, we also ask consent from the teacher and to the whole class if they are willing to do this by group or what. FGD; P1; Lines 36–38

We realized that collaborative learning goes beyond completing tasks; it fosters idea-sharing, peer support, and collective growth, making learning more meaningful and inclusive.

Active Engagement. Allowing students to express their ideas during classroom activities fosters a sense of relief and gratitude, promoting active participation and ownership of learning. A specific study participant asserted,

Kuan ma'am yang ginabuhat nami sa una…sa una o doon ma'am kay magsuggest, halimbawa mag kuan kami ma'am, ma'am "pwede mag amasian kita ma'am ganahan kami sian para dali kami makakat on dili gayud kami ng unan. Di kami masipog kanmo ma'am kay frenny lang and then daw unan man esb suggestion name ginatake mo esb. IDI; P1; Lines 12–16

*One thing that we usually do before is we give suggestions, for example we ask the teacher if we could do this activity because we learn best through it. And another thing is we are not afraid to speak our minds because our teacher is very approachable and whatever suggestions we have she would also take it into consideration.*IDI; P1; Lines 12–16

This experience revealed that students grow when they are given opportunities to contribute ideas and influence classroom activities. Learning becomes more meaningful when students feel valued, respected, and actively involved.

*Metacognition.*Developing students' metacognitive skills encourages thoughtful reflection and active monitoring of their own learning. In the words of one participant,

Para kuan esb ma'am…yang…yang dili lang makalearn as a whole esb gayud makalearn na madetremine nato if aw gayud masabtan o wala kay kung dili gayud silan interesado saan na topic way malearnnilan and if magsuggest kaw is aka activities na mo agree gayud tanan mallearn gayud nato as a whole. FGD; p2; Lines 69–73

For me, ma'am… it's not just about learning individually; the whole class really learns when we can determine if everyone understands or not. If they are not interested in the topic, they won't learn anything. But if you suggest an activity that everyone agrees on, then the whole class really learns together. FGD; p2; Lines 69–73

Listening to this conversation, we realized that students' metacognitive awareness and reflective engagement allow them to take ownership of their learning, identify gaps in understanding, and actively work toward improving their outcomes.

Assimilating Previous Thoughts: While listening to our participants' reflections, we recognized how students actively assimilate new information into their existing knowledge structures. This process does not happen automatically; rather, it unfolds through meaningful interactions with peers, discussions, and idea-sharing. Through these experiences, an important outcome emerged—the assimilation of previous thoughts. This

assimilation is characterized by stronger connections between new and prior knowledge, enhanced understanding of concepts, increased engagement through collaborative learning, and motivation supported by emotional investment in the learning process.

Peer Interaction. Participants' response reflected care and collaboration, suggesting a positive emotional connection to group learning. Peer interaction made learning more meaningful as students contributed ideas, assisted classmates, and developed empathy and teamwork. A specific study participant asserted,

Kuan ma'am..yang kanak kay groupings kay magkahiusa sagud kami maam na magsuggest suggest…na bawat isa kanami ma'am unan mga pasabot taos awn esb iban na kuan…para esb awn katabangan name na mga…awn katabangan name na mga …parang laong pa nilan mga mahina pa na mga students. FGD; p4; Lines 36–38

In order for the whole class to understand the lesson and see if they haven't learnt something because they are not interested to the topic. That's why we need to agree on it and so we can learn as a whole. FGD; p4; Lines 36–38

Based on this response, we realized that peer interaction encourages teamwork, empathy, and active contribution, making learning more meaningful and socially engaging.

Interest. Engaging and attractive lessons capture students' attention, fostering participation and deeper understanding. According to one participant,

For me ma'am, gusto ko magsuggest sang kanak teacher para… when… magdiscuss yaan amsian na certain na topic is mocooperate yang tanan maminaw kay if dili attractive yang…or eye-catching kanaan itopic makatog yang iban or yang iban di maminaw which is way learning name tanan, so if mag…suggest na certain activities na maybe yang iban mo agree then kami hurot awn learnings saan na topic. FGD; p5; Lines 154–161

I personally liked the motion that a certain topic like nervous system should be discussed by means of reporting for my classmates including myself to fully grasp what nervous system is all about. FGD; p5; Lines 154–161

As reflected in the response, we realized that students' interest in lessons motivates them to actively participate, engage with the content, and achieve meaningful learning outcomes.

Emotional and Motivational Alignment. Students' excitement and eagerness during learning activities highlighted how emotions and motivation strengthen confidence and skill development. As expressed by one participant,

Ngawn kuan ma'am…ngawng..yag…ngawng yagkanta gani…Ahmm…pwede esb para ma…ma improve yang kuan…yang….yang maimprove yang confidence para kuan…yang pwede esb boses. IDI; p2; Lines 54–61

*The time when we sang a song. It such a good activity to muster our confidence and also improve our voices.*IDI; p2; Lines 54–61

From this response, we realized that activities that allow students to express themselves, such as singing, enhance their emotional engagement and motivation. This, in turn, builds self-confidence and reinforces their willingness to participate actively in learning.

Accommodating New Thoughts. We recognized the significance of students' experiences in adjusting their prior knowledge to accommodate new ideas. This process does not happen automatically; instead, it involves deliberate engagement in hands-on activities, collaboration, and constructive feedback. Through this process, an important outcome emerged cognitive accommodation enabling students to integrate new concepts effectively while building confidence and collaborative skills. This accommodation is characterized by active participation, peer support, and adaptability in learning.

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Active Participation. Engaging students in hands-on activities deepens their understanding and makes learning meaningful. Activities such as step-by-step experiments allow learners to explore concepts actively, fostering curiosity and excitement. As expressed by one participant,

Kuan…ma'am ngawng… ngawng garde 9 gani ma'am, na kuan na gapa…na gusto name mag experiment sang kanmo subject gayud gani ma'am sa volcanic eruption para masayud kami daw uno-uno naan…pagkuan pagkahimo like…yang pagka experiment then para matun an name daw uno-uno name paghimo. FGD; p2; Lines 21–22

In Grade 9 we were able to create a miniature volcano in our Science subject, and we also conducted an experiment to see how volcanic eruption works. FGD; p2; Lines 36–38

This experience revealed that hands-on participation allows students to engage directly with the material, supporting deeper comprehension and sustained interest in the topic.

Collaboration. Participating in decision-making and classroom activities fosters shared understanding, meaningful contribution, and collective learning. Students develop communication, teamwork, and problem-solving skills when collaboration is encouraged. As expressed by one participant,

Ma'am..kuan ma'am..ngening…ang kuan ma'am… pag…pangutana sang klasmyts ma'am or maestra ma'am if kuan…kung sin o gusto na…gusto esb na mangian na activities kuan ma'am para sang kuan…para esb kanami ma'am maghimo kami amanang ng botohan ma'am na para kung kuan…kung sin o gayud yang gusto or yang dili gusto sian na activities. FGD; p1; Lines 12–16

We help our teacher decides what activity to do by means of a poll. We laid down various activities and identify whom from our classmates are inclined of doing it or the other options. FGD; p1; Lines 12–16

This demonstrates that collaboration strengthens learning by allowing students to contribute ideas, negotiate decisions, and engage collectively in meaningful tasks.

Confidence Building. Participating in decision-making and classroom activities fosters shared understanding, meaningful contribution, and collective learning. Students develop communication, teamwork, and problem-solving skills when collaboration is encouraged. In the words of one participant,

Para kuan…ning para ma...ma enjoy ko esb..tapos ngening ganahan esb ako..ahmm….para esb matudloan yang mga kuan…iban na mga students…para esb ma'am yang gani…..ma…boost yang confidence ma'am…tapos ma…ma…..makatuon kaw sian na activities. gayud yang gusto or yang dili gusto sian na actvities. FGD-p1; Lines 36–38

In order for me to enjoy and keep my drive in learning and also, I can share my knowledge to other students hoping it would boost their confidence and learn about the topic at the same time.FGD-p1; Lines 36–38

Listening to this conversation, we realized that students' confidence and learning improve when they are given opportunities to participate, contribute, and support one another. They become more engaged, take ownership of tasks, and develop self-assurance in their abilities.

Constructing New Understanding. While listening to our participants' responses, we recognized how students continuously expand their understanding by actively engaging with new concepts, collaborating with peers, and reflecting on their learning. This process does not happen automatically; instead, it involves deliberate interactions, critical thinking, and teacher guidance. Through this process, a significant outcome emerged the construction of new understanding. This newly constructed understanding is characterized by deeper comprehension of concepts, improved ability to integrate prior knowledge with new ideas, enhanced collaboration and communication skills, and greater flexibility in thinking.

Active and Experiential Learning. Active and experiential learning actively engages students through hands-on, creative, and participatory tasks, leading to deeper understanding and meaningful learning. One participant mentioned,

Kuan ma'am…ngawng…yang lesson nato is…instead na ipamemorized, ikanta then kuan ma'am instead na…magkuan yaghimo kita ng vol…volcan ayy amanang model ng volcanic eruption..gamit yang kuan ngawng mga locust materials tapos maghimo scrapbook. FGD; p1; Lines 9-13

The time when our lesson was all about volcanoes, instead of memorizing, we sang it and we also created miniature volcanoes and conducted an experiment on the mechanism of eruption using low cost materials and we also made scrapbook. FGD; p1; Lines 9-13

As reflected in the response, we realized that hands-on activities like singing, building models, and making scrapbooks not only make lessons more enjoyable but also enhance students' understanding and retention of concepts.

Collaborative Learning. Collaborative learning promotes active idea-sharing, mutual support, and collective understanding, enhancing students' knowledge construction. According to one participant,

Para kanak ma'am kay…favourite ko gihapon na activities na groupings gihapon kay adto ko gayud maenhance yang kanak kuan katigaman mas mashare ko kanilan, mas masayud esb ako kung tama esb yang kanang kuan…tapos awn esb ,alearn kanak miyembro.Kuan esb ma'am..mag ask gihapon sang mga klasmyt ko ma'am tapos sang maestra kung musugot esb silan na mag… example maggroupings kami or kuan himoon nami na activities ug willing esb silan. FGD4; p4; Lines 36–38

For me Ma'am, group task will always be my favorite. It enhances my knowledge, and I am able to impart it to the rest of the members and vice versa. But of course, we also ask consent from the teacher and to the whole class if they are willing to do this by group or what.FGD4; p4; Lines 36–38

As indicated in the response, we realized that collaborative group activities not only help students share ideas and support each other but also make learning more engaging, enjoyable, and meaningful. Students actively participate, work together, and deepen their understanding through peer interaction, which strengthens both knowledge and skills.

Reflective Learning. Students' reflective practices help them recognize their preferences, strengths, and challenges, which guides their learning choices and strategy evaluation. As shared by one participant,

Usahay ma'am gayud…kay…halimbawa sang science ma'am… usahay diko sa gud na….maiisip na…uan kaha pwede doon buhaton kay…halimbawa yang science gayud medyo dili ko kuan na sunject.Usahay di ako makaisip daw unounohon pag enjoy sid i na kuan…kay sang kuan…adoyyy…usahay mabored da esb ako sid I da esb…pero ngawn na mga kuan ma'am…feeling ko na isa na maglisud ako ma'am. pag sometimes yang sarili ko mismo wakasayud daw uno unohon pag enjiy yang science. Hearing ko ma'am pag… halimbawa yakakita da yang kuan…yang mga klasmyts ko na…hala yang enjoyan sila ta s ako ngani….while ako ngani kay wada…wa ako kay….mahiligay ako matog ma'am during science time, pero Makita ko yang mga klasmyts ko na… ay yag enjoy silan. Bisan unpo-uno kaliod maka ka catch up dayon ako esb. Yang challenge ko gayud ma'am usahay wa ako sang mood para magsuggest. IDI;lines. 42–51; P1

There are times, that I cannot think of better things to do in Science subject. Admittingly, Science is not my forte, I get bored easily, and I don't know of ways I can enjoy learning it. I sometimes resort to sleeping because I don't feel like listening to the discussion but whenever I see my classmates enjoying the activity or lesson, no matter how it is, I can catch up easily. The only challenge is when I'm not in the mood to suggest or take part. IDI lines. 42–51; P1

Based on this response, we realized that encouraging reflective learning allows students to evaluate their own thinking, identify challenges, and make deliberate choices, which leads to deeper understanding and more meaningful learning experiences.

Adaptive Cognition. Students demonstrated flexibility in their learning by adjusting strategies based on experience and recognizing what works best for them. As expressed by one participant,

Instead na ipamemorized, ikanta…maghimo kita ng model ng volcanic eruption…fun na malearn nato sang kanato activity… IDI; p2; Lines 76–79

The time when our lesson was all about volcanoes, instead of memorizing, we sang it and we also created miniature volcanoes and conducted an experiment on the mechanism of eruption using low cost materials and we also made scrapbook.IDI; p2; Lines 76–79

We realized that allowing students to engage in hands-on, creative tasks helps them adapt their learning strategies, making learning more meaningful, enjoyable, and effective.

Teacher Facilitated Learning.Teacher guidance and interactive lesson delivery enhance clarity, engagement, and participation in the classroom. A specific study participant shared,

Ako ma'am kay…yang ag ako magsuggest kang ma'am na amasian yang kanami mahimo…maglaong kami kang ma'am na amasian lang kanmi himoon ma'am para esb magkasinabot kami tapos…sa sunod na lesson masayud da kami kung unan dayon kanami himoon ansian kay makaprepare da kami. FGD; p4; Lines 200–206

For me ma'am, in our group, I will just inform the teacher on what we decided to do, and what my groupmates can only give, just to be clear and so for the next activity we have now the idea how to do it and we can also prepare for it. FGD; p4; Lines 200–206

As reflected in the response, we realized that teacher-facilitated learning fosters collaboration, builds student confidence, and helps learners take responsibility for their preparation and participation, making lessons more meaningful and engaging.

DISCUSSIONS

In this chapter, we discussed the core findings of my study. From this, we assumed that meaningful learning in a constructivist science classroom occurs when students are actively engaged, socially connected, and guided by a facilitator.

With our interest in understanding how constructivist principles manifest in learning, we confirmed that students do not simply follow instructions—they actively participate, collaborate, reflect, and adapt their thinking. Nevertheless, several mechanisms facilitate this process, namely, active learning, collaborative learning, reflective learning, adaptive cognition, and teacher-facilitated guidance.

Active Learning.

We review the study by Miller et al. (2025), which found that students navigating project-based science activities rethink their strategies and discover new ways to solve complex problems. This finding is supported by our study on constructivist learning, where we observed that students actively engage in collaboration, problem-solving, and authentic tasks, allowing them to reorganize their thinking and develop adaptive cognition.

Suartama et al. (2025) reported that when students use constructivist-oriented mobile learning tools, they go beyond following instructions—they actively experiment, adapt ideas, and cultivate creativity. Our findings align with this assertion, showing that adaptive cognition emerges when students are supported in constructivist learning environments.

Conversely, She, Liang, Jiang, and Xing (2023) suggested that adaptive cognition does not automatically develop in constructivist settings. Similarly, our study supports prior findings, but further shows that students demonstrated adaptive cognition during constructivist learning activities, underscoring the importance of intentional facilitation and supportive classroom design.

Reflective Learning as an Experience within Constructivist Environment

Our findings on reflective learning in constructivist environments affirm the study by Jadmiko, Mustika, and Bashiruddin (2024), which reported that students actively reflect on their clinical experiences, connecting theory to practice and gaining deeper self-awareness through reflective journal writing. Similarly, Le and Nguyen (2024) found that students engaging in constructivist-oriented reading and discussion tasks do more than follow instructions—they evaluate their understanding, adjust strategies, and develop critical thinking. My study supports these assertions, showing that reflective learning emerges as an integral part of constructivist classrooms, allowing students to internalize and interpret knowledge.

Archambault et al. (2022), suggested that reflective learning is not an auto-response in a constructivist learning environment, but can be further enriched as students in our study engaged in reflective practices.

Teacher-Facilitated Learning as Experienced in Constructivist Environments

We reviewed the study by Harputra and Tambunan (2024), which found that teachers guiding students through collaborative projects, prompting questions, and scaffolding understanding allows learners to explore and construct knowledge. This finding is supported by our study on teacher-facilitated learning, where we observed that guiding discussions, offering feedback, and encouraging active participation enabled students to engage deeply, take ownership of their learning, and develop autonomy.

Similarly, Didik Cahyono and Nastiar (2025) reported that when teachers act as facilitators in constructivist-oriented classrooms, students interact, experiment, and make decisions, cultivating critical thinking. Our findings align with this assertion, showing that teacher facilitation actively supports engagement and meaningful learning.

Gautam and Agarwal (2024) suggested that teacher facilitation alone does not guarantee full engagement, as learners' motivation and readiness are critical for self-directed learning. Our study supports the notion under certain conditions. For the class to be interactive, supportive, and empowering it must be thoughtfully facilitated and effectively implemented.

Viewpoint and Standpoint

Drawing on our experiences in the constructivist science classroom, facilitating learning through listening, guiding, and co-constructing knowledge with students is essential for meaningful learning. For us, when students are actively engaged, socially connected, emotionally supported, and intellectually challenged, they develop deeper understanding and agency. These experiences suggest that creating a classroom environment that values students' experiences, encourages collaboration, designs engaging tasks, and fosters a safe, flexible space enables students to express ideas, reflect, adapt, and build knowledge continuously.

Future Directions

Future research could explore the mediating effect of assimilation and accommodation on the relationship between students' prior schemas and their modified understanding, using the sub-themes from our study as indicators of these variables.

Further study could examine how refined questionnaires, informed by exploratory factor analysis, can measure these relationships within a constructivist learning environment.

Implication for Practice

Based on these findings, schools play a crucial role in supporting teachers' purposeful implementation of constructivist principles. Schools may create an environment that provides opportunities for professional learning groups, enabling teachers to share experiences, refine strategies, and confidently facilitate students' thinking and understanding in constructivist learning environments.

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