



## **Exploring Life Science Teachers' Views on Integrating Students' Funds of Knowledge in the Teaching Process**

**Aris A. Lapada**

Eastern Samar State University, Philippines, [aris.lapada@essu.edu.ph](mailto:aris.lapada@essu.edu.ph)

Every learner's learning is enriched by their cultural practices, lived experiences, and practical skills. This concept, called Funds of Knowledge (FoK), explores how students' FoK is integrated into the teaching and learning of science concepts by life science teachers. This was examined in this Interpretative Phenomenological Analysis study. The data were obtained from video transcripts of three different focus group discussions (FGDs), which were analyzed using thematic analysis. Students' Funds of Knowledge (FoK), as perceived by Life Science teachers, can facilitate learning engagement and deepen conceptual understanding, since these teachers believe that students' FoK are derived from their own experiences and cultural practices. The findings also revealed that certain strategies, such as background checking, home visits, and idea sharing, are key to identifying or capturing students' FoK. Moreover, integrating FoK into Life Science concepts benefits the teaching and learning process by improving conceptual understanding, enhancing student engagement, and sustaining cultural identity. However, several challenges were also identified, including the time-consuming nature of developing FoK-based teaching methods, the lack of localized instructional materials, and the limited applicability of FoK to certain Life Science topics. Thus, this study recommends a grounded science education that is culturally inclusive and responsive to students' needs.

**Keywords:** funds of knowledge, lived experiences, cultural practices, teaching process, science teachers, integrating students

### **INTRODUCTION**

Science Education presents a flourishing holistic approach in terms of culturally diverse setting by incorporating learners FOK in the teaching pedagogy (Ali & Hashim, 2022; Mosqueda, 2024). Influences in various family cultures, practices, language, and related experiences is what covers the scope of FOK (Moll et al., 1992; Gonzalez et al., 2005; Llopart & Esteban-Guitart, 2016). The convergence of these ideas such as scientific theories and philosophies as well as the learners' experiential backgrounds makes it crucial for the educators to design an interactive environment through the integration of these FOK (Cowie et al., 2011; McLaughlin & Calabrese-Barton, 2013). A culturally sustaining teaching pedagogy connects to a particular instructional strategy, and it

**Citation:** Lapada, A. (2026). Exploring life science teachers' views on integrating students' funds of knowledge in the teaching process. *International Journal of Instruction*, 19(2), 147-162. <https://doi.org/10.29333/iji.2026.1928a>

acknowledges individual narratives in terms of cultural understanding to the landscape of knowledge acquisition (Civil, 2016; McLaughlin & Calabrese-Barton, 2013).

Further studies on the possibilities to incorporate FOK in the field of science instruction still posits existing deficiencies. Several literature reviews find this method in universal teaching principles or in quantitative courses, it vacates research inadequacies on how this approach of FOK could possibly enhance science teaching (Llopart & Esteban-Guitart, 2016; Cowie et al., 2011; Civil, 2016). The undifferentiated emphasis on science education shows constraints to generally explore FOK in utilizing investigative science reasoning as well as problem-based learning in multitudes of classroom setting (McLaughlin & Calabrese Barton, 2013; Cowie et al., 2011). Extensive approaches in linking students' cultural backgrounds with scientific understanding still exist in deprivation even though research in connection with STEM instruction have been ventured into (Cowie et al., 2011; McLaughlin & Calabrese-Barton, 2012).

In addition, there is scarce empirical evidences that details the benefits present in the application of FOK in teaching science (Calabrese-Barton & Tan, 2009; t' Gilde, & Volman, 2021). Educators personal accounts do suggest certain positive outcomes such as the mentioned student engagement and deeper understanding, there is still a gap in data driven research (Llopart & Esteban-Guitart, 2018; Civil, 2016). This gap has proven it difficult to measure the general impact of applying FOK to a students' learning within the context of science classrooms. Due to the absence of measurable outcomes, educators and policy makers find it hard to invest in the training and make reforms within the curriculum that is centered in this method research (Llopart & Esteban-Guitart, 2016; McLaughlin & Calabrese-Barton, 2013; Civil, 2016).

Teachers may find it challenging to capture a students' FOK it is necessary to gain context of a students' community lives, family practices and cultural backgrounds (Moll et al., 1992; Gonzales, Moll & Amante., 2005). In addition, when students share personal or cultural knowledge, they might hesitate or feel reluctant specially in classrooms with diverse cultural differences can result to development of stereotypes or cause misunderstanding (Gonzales, Moll & Alamte, 2005; McLaughlin & Calabrese-Barton, 2013). Educators that may unintentionally reinforce stereotypes or misrepresent cultural practices is a risk that is present when integration is only superficial or not handled cautiously (Llopart & Esteban-Guitart, 2016; Butler & Miretzky, 2020). Therefore, it is crucial to display sensitivity, trust-building, and considerable effort from educators so as to capture meaningful and relevant FOK science education.

Teaching of Science asserts a convoluted interplay along with the inclusion of FOK (Hedges, 2012). It could be a challenging process for teachers to coherently tailor content that draws on cultural context with the ideal curriculum and evaluation in teaching science (Cowie et al., 2011; McLaughlin & Calabrese-Barton, 2013). If the alignment is improperly conducted, it could possibly proliferate certain vulnerabilities to educators that they may inadvertently perpetuate biases and convey mismatch to cultural conventions (Llopart & Esteban-Guitart, 2016). Teachers might have a hard time creating varied science instruction that links the cultural and scientific nuances,

demanding extensive professional upskilling and assistive initiatives (Civil, 2016; McLaughlin & Calabrese-Barton, 2013).

Albeit the presence of the challenges, the promising nature for integrating funds of knowledge into science education is important. If done properly, it can foster a deeper understanding of science concepts, enhancing student engagement by creating more equitable educational experiences (Civil, 2016). On top of that celebrating cultural diversity of students as well as promoting scientific inquiry that is relevant to their experiences going hand in hand is an opportunity that is present with this approach. (McLaughlin & Calabrese-Barton, 2013; Llopart & Esteban-Guitart, 2016). Therefore, the integration of FOK into science education does not only become a pedagogical strategy but also a tool for societal transformation and educational equity (Yosso, 2005).

Additionally, though FOK possess a promising nature in its integration, the challenges that it presents must still be addressed. Struggles such as the lack of clear evidence on benefits, difficulties in capturing students' FOK and the complex nature of curriculum integration requires focus (Llopart & Esteban-Guitart, 2016; Civil, 2016; McLaughlin & Calabrese Barton, 2013). To achieve a more inclusive and engaging science instruction, further research must be conducted towards this approach as well as enhanced professional development for educators (Cowie et al., 2011; McLaughlin & Calabrese-Barton, 2013; Llopart & Esteban-Guitart, 2016). The potential for science education to bridge the gap of students' and their lived experiences along with formal scientific knowledge is present if there are consistent efforts to push this. But, with the scarcity of existing literature pertaining to techniques that capture students' FOK that can be implemented into Life Science concepts coupled with the benefits and challenges of utilizing this as a source of knowledge for learners. Thus, this study aims to answer the following questions:

1. How do Life Science teachers understand the students' FOK?"?
2. How do Life Science teachers capture the students' FOK?
3. What are the benefits of integrating students' FOK in teaching Life Science concepts?
4. What are the challenges of integrating students' FOK in teaching Life Science concepts?

## **METHOD**

An Interpretative Phenomenological Analysis (IPA) is a type of phenomenological research, and it uses qualitative approach that delves to figure out individual viewpoints and firsthand accounts, most specifically towards well-being, mental disposition, and school instruction (Smith, Flowers, & Larkin, 2022). This becomes beneficial to the researchers to provide an opportunity to converse about cognitive processing and understanding of the participants, this is to aid out in reflecting of how a person encounters specific occurrences to their day-to-day living. The use of IPA is undeniably paramount in scrutinizing the implicit and shifting facets on the tapestry of human experiences (Smith, Flowers, & Larkin, 2022). This approach is ideal to this study as it

ascertain multiple perspectives on the integration of FOK in science concepts for a reason that it permits an overview of inquiry of teachers' demeanour and disposition using qualitative evidence through FGD to navigate specific explanations on the teachers' perceptions to supply in-depth concepts.

This research was administered in the province of Eastern Samar. The eastern province of the Samar islands is evidently prominent in multitudes of experiences which comprises societal customs, religious notions, and roots of ancestral inheritance. To boost collaborative participation and student motivation, teachers make use of FOK to their pedagogy and link it to their lesson (Lapada, 2022).

Educators from the field of Life Sciences are among the participants in this study alongside with their respective levels of instruction. This study puts an emphasis to those teachers who are inclined in merging students lived circumstances to their instruction. Participants in this study comprises 15 Life Sciences teachers, evenly collected to five participants from differentiated levels in elementary, secondary, and tertiary teachers.

The inclusion criteria used in this study are: (a) the teacher must be currently teaching Life Science in Elementary/Highschool/Tertiary (b) The Life Science teacher must have at least five years of experience in teaching Life Science (c) should have identified themselves that they experience integrating students' FOK in their teaching method. To engage participants to think more about the questions FGD was used. Individuals involved with the FGD prompt their insights when they hear experiences of other interviewees; this results to them sharing more idea and gain more data saturation. In addition, measuring their reactions rather than emotions is effectively executed in FGDs while also saving time and effort (Binns, 2023). About 10 FGD questions have been formulated to achieve the study's objectives. However, expert validators have lumped some of the questions leading to a yield of only 6 questions.

A letter of invitation and permission was handed over to the potential selected participants in the study. Teachers from the field of Life Sciences was requested to participate virtually in a focused group discussion determined by the participants' preferred modality of FGD. With the five Life Science Teachers for each FGD, three FGD's was successfully accomplished. Participants in the study were clustered based on the degree they are practicing their instruction. Through this, they were able to showcase their lived narratives and events that Life Sciences teachers could discuss together.

Table 1  
Number of participants per FGD

FGD	Code	Sex	Highest Educational Attainment	Number of years Teaching Science	Rank/ Position
FGD 1 (Elementary Life Science Teachers)	ET1	Female	BS	20 years	Teacher III
	ET2	Male	BS	18 years	Teacher III
	ET3	Female	BS	7 years	Teacher I
	ET4	Female	MAED	15 years	Master Teacher I
	ET5	Male	BS	28 years	Teacher III
FGD 1 (High School Life Science Teachers)	HST1	Male	BS	10 years	Teacher II
	HST2	Female	MAED	15 years	Master Teacher I
	HST3	Female	MAED	32 years	Master Teacher II
	HST4	Female	BS	25 years	Teacher III
	HST5	Female	MAED	14 years	Master Teacher I
FGD 1 (College Life Science Teachers)	CT1	Male	EdD	10 years	Associate Prof I
	CT2	Male	PhD	15 years	Assistant Prof II
	CT3	Male	MAED	30 years	Associate Prof V
	CT4	Female	EdD	28 years	Associate Prof V
	CT5	Female	PhD	25 years	Full Professor II

To assure the attainment of data saturation follow up questions were given. The FGD sessions took about 45 minutes to 1 hour. the video recordings of the FGDs were transcribed to retrieve themes for each objective of the study. By the end of thematic analysis, participants are presented with the study results to verify if the answers align with their lived experiences.

A consent form was signed by the participants who are involved in this study. In addition, all informants have the freedom to neither stop nor withdraw their involvement in the study at any given time. This data collection method is done with absolute confidentiality; the specific background and responses of the participants are protected at all costs within the study.

Thematic analysis was used to analyze the transcripts of the FGDs. The Braun and Clarke (2013) protocol was used to analyze themes from participants. This protocol undergoes these steps: (a) familiarizing with the data, (b) composing initial codes, (c) looking for themes, (d) reexamining themes, (e) defining and identifying themes and (f) making the report.

## FINDINGS

This section depicts the key results of the thematic analysis of the three FGD with Life Science Teachers involved in the study. The findings below emphasize the life science teachers' views on FOK, their techniques in capturing students' FOK to be integrated in the lesson, its perceived benefits and the challenges they usually encounter. The themes

are backed up by informants' insights, providing a complete understanding of how FOK is utilized in the context of teaching Life Science.

### ***Life Science Teachers' Views on FOK***

Table 2 depicts the understanding of Life Science Teachers on FOK. Two themes emerged on the Life Science teacher's understanding on FOK. "Students Own Experience" and "Cultural Practices" were identified as themes.

The first category identified for "Students' Own Experience" is the "Relevance to Personal Identity", this refers to relating students' experiences in the teaching process. By integrating students' experiences, they feel more connected to the lesson. Moreover, "Individual Preferences" is also a category as Life Science teachers believed that student interest help facilitates understanding science concepts.

[ET 1] *"Parang mga experiences ma it hit tawo hit usa nga kumunidad, sugad hit adlaw-adlaw nga hitabo hit usa na tawo nga puyde gamiton hit pagtotdo hin concept ha science"* (It is like the experiences of an individual within his community, for example, a person's day by day experiences can be used as learning material for teaching science concept)"

Under the theme "Cultural Practices" are the categories "Indigenous Knowledge Integration and "Story Telling as a Cultural Tool". The use of herbal medicine and Traditional farming are just two of many examples mentioned by Life Science Teachers as good resources of FOK, this knowledge is under the category "Indigenous Knowledge". Moreover, the use of local proverbs and stories can also help teachers introduce a science lesson to the students, and this is under "Story Telling as a Cultural Tool".

[CT 3] *"The funds of knowledge pertains to the knowledge of a person or a group (of persons) that embodies the cultural practices within a community. Sugad hit pag tanom nga pwede naton magamit pagtutdo hit aton mga kabataan."* (Such as planting rice that can be used as a resource material for teaching our students)

Table 2  
Life Science Teachers' Views on FOK

Codes	Categories	Themes
Students relate better when lessons include their personal experiences Learners establish better connections when lessons are linked to their lived experiences	Relevance to personal identity	Student's Experience
They're more engaged when topics reflect their daily lives They become socially immersed when concepts relate to their day-to-day lives		
Students' interests shape how they understand science concepts Learners' pursuits outline to how they grasp and comprehend science lessons		
Traditional farming techniques can explain ecological concepts <i>Conventional strategies to farming can provide explanation to ecological concepts</i>	Indigenous knowledge integration	Cultural Practices
Students know herbal medicine from elders—helps when teaching botany <i>Students' knowledge regarding herbal medicine from seniors-aids in teaching botany</i>		
Use local stories or proverbs to introduce science ideas <i>Utilizing local narratives in introducing science ideas</i>	Storytelling as a cultural tool	

### Techniques in Capturing FOK

Table 3 shows three key themes in capturing students' FOK. The first identified theme is "Idea Sharing", followed by "Background Checking", and the last is "Home Visits".

Under the "Idea Sharing", storytelling sessions and peer discussion are identified as categories or key strategies. This includes activities such as *brainstorming in small groups*, *sharing ideas through peer discussions*, and *encouraging students to share stories*, which promote cooperative learning and let students to convey their experiences related to science concepts.

[HST3] "*Sharing ideas, nababatasan na it nam nga kumustahay hit ak mga studyante. Before or after class kinukumusta ko hira, it maupay la kay nakakasagap ak hin mga kaganapan hit era kinabuhi nga pwede ko mgamit hit ak klase* (the sharing of ideas, we often do this before and after class to get an update with my students. the advantage of doing this is I get some information from my students that I can use as resources for my lessons).

Under the "Background Checking" emerged from learning about students' "Cultural and Ethnic Background" and "Family Education Background. It includes *understanding parents' education levels*, *asking about home languages*, *identifying the family's economic situation*, and *learning about cultural backgrounds*. These provide

understanding into students' learning environment and facilitate customized instruction to be more meaningful and inclusive.

[ET 2] “*Nag babackground check ako hit ak mga studenyante, kinukulawan ko ira mga records tas nagpapakiana ako hit ak mga co-teachers hiunong hit behaviour ngan mga experiences hit mga bata.*” (I do background checking of my students, I analyze their student records and ask my co-teachers regarding the students' behavior and experiences.)

And lastly, the “Home Visits”. This encloses techniques such as “Observation of Home Setting and “Community Context”. These techniques allow teachers to see the students' environmental experiences and integrate non-learning into formal science teaching.

[HST 1] “*Nag ka-conduct ako hin home visitation mga once a month hit ak mga studyante. Maupay ko hiya kay nakikita ko it mga butang nga meada ha era panimalay nga pwede ko magamit nga mga examples hit ak mga lessons* (I conduct home visitation once a month to my students. I like this activity because I can see things in their respective houses that can be used as examples to my lesson).

Table 3  
Techniques on how to capture students' FOK

Codes	Category	Theme
Sharing ideas through peer talks Exchange of Ideas through peer conversation	Peer discussion	Idea Sharing
Brainstorming in small groups Group Sharing with close peers		
Encouraging students to share stories Motivate students to share narratives	Storytelling sessions	
Learning about cultural backgrounds Gaining knowledge about cultural backgrounds	Cultural and ethnic background	
Understanding parents' education levels Acknowledge parents' educational attainment	Family education background	Background Checking
Asking about languages spoken at home Inquiring about mother tongue used		
Identifying family's economic situation Recognizing family's economic status		
Observing the learning space at home Discerning the learning environment within the household	Observation of home setting	
Checking for books or materials at home Inquiring for books or learning materials within the household		Home Visits
Mapping the student's neighborhood familiarizing the students' neighborhood	Community context	
Identifying skills learned informally in the community Recognizing informally acquired skills from the community		

### Benefits of Integrating Students' FOK in Teaching and Learning Science Concepts

The interpretation of the table recognized key benefits with the integration of student' FOK with science education, grouped within three major themes: FOK can increase

students' conceptual understanding, FOK boosts students' engagement, and FOK sustains students' culture.

Within the theme of FOK can increase students conceptual understanding, techniques related to contextual learning and existing knowledge integration was given focus. Codes such as connecting lived experiences within the house to science concepts, utilizing local cultural practices to define science, and connecting science topics to real-life contexts reveal how making science personally relatable strengthen students grasp of concepts. In connection to this, adding on everyday problem-solving skills can aid in providing connection to new information with current understanding

[ET 5] *“Everytime nga nag i-integrate ak hin students’ funds of knowledge hit ak lesson, napapansin ko nga hagtaas it scores hit kabataan. Bisan an mga kabataan nga mag absenon in nanmamasar hit akon quiz.”* (Every time I integrate students' funds of knowledge in my lesson, I noticed that my students' scores are increased even those students who are fond of absences got passing scores).

The theme of FOK boosts students' engagement is seen in categories such as student voice and ownership and working together and collaborating with peers. Strategies like boosting students' confidence to share their personal experiences, identifying student contributions and encouraging collaboration with peers will empower students to ramp up their class participation and motivation within science classes.

[CT 4] *“Students’ funds of knowledge help me boost the engagement of my students during /the teaching and learning process. In fact, they become more attentive and participative whenever I connect their culture or experiences in their community to our lesson. Example, in discussing climate change, I usually use the coastal areas in Maypangdan (A coastal barangay in Borongan City and is accessible to everyone since it can be found along the national highway) for my example of rising of sea-level due to melting of icebergs. In this case, I let them analyse the sea-level in the coastal barangay”*

Lastly, categories such as cultural assertion, language incorporation, cross generational learning showed that FOK sustains students' culture. Codes like integrating cultural traditions into lessons, emphasizing bilingual/multilingual expression, and incorporating family and community knowledge highlight the importance of asserting students' cultural identities in the process of learning

[HST 4] *“Maupay ko it pag na integrate it culture hit kabataan hit akon lesson kay it ak mga kabataan nakaka identify hit ira mga practices ha ira mga barangay. Nakakabulig liwat ini hit kabataan para maging proud hit aton mga unique traditions and cultural practices.”* (The integration of students' culture in my lesson helps them to identify their unique practices in their barangay. This also helps the students to feel proud of their unique traditions and cultural practices)

In total, the use of FOK into science teaching develops conceptual understanding, raise engagement, and encourages cultural relevance—leading to a more comprehensive, successful and relatable science education

Table 4  
Benefits of integrating students' fok in teaching and learning science concepts

Codes	Category	Theme
Linking home experiences to science concepts. Connecting household activities to scientific understanding	Contextual learning	FoK can increase students' conceptual understanding
Using local cultural practices to explain science Utilization of culturally situated customs to scientific concepts		
Relating science topics to students' real-life contexts Anchoring science lessons to relevant practical contexts		
Building on students' everyday problem-solving skills Drawing upon students problem-solving abilities	Prior knowledge integration	
Simplifying abstract science concepts Explicating complex scientific ideas	Concept simplification	
Encouraging students to share personal experiences Supporting students to express their lived narratives	Student voice and ownership	FoK boosts students' engagement
Recognizing and valuing student contributions in class Acknowledging and honoring student inputs during instruction		
Promoting group work and peer collaboration Fostering interactive activities and group assignments	Peer interaction and motivation	
Incorporating cultural traditions into science lessons Integrating social customs and heritage into scientific concepts	Cultural affirmation	FoK sustains students' culture
Connecting students' heritage to scientific knowledge Relating students cultural roots to scientific principles		
Supporting bilingual and multilingual expression Cultivating the use of multiple languages	Language inclusion	
Integrating family and community knowledge in lessons Embedding proximate social knowledge in instruction	Intergenerational learning	

### Teaching Challenges Using FOK

The results of the various challenges faced by teachers when they integrate a students' FoK into teaching of science. These challenges have been grouped into three main themes: FoK can be time consuming, the lack of local materials, and incompatible to some lessons in life science.

Within the theme FoK are time-consuming, teachers have note certain issues like it takes too much time to plan, having to adjusts lessons often, and the dreary process of gathering background knowledge. These fall under categories such as time constraints, excessive workload, and labor-intensive processes, respectively. The data reveals that although FoK integration is important. It often demands great preparation and effort from educators.

[CT 5] *“Contextualizing lessons take more time than the conventional teaching because it needs a thorough planning in determining the local materials that are suited to use in a specific lesson”*

The next theme, Unavailability of local materials, reveals that there is difficulty in gathering culturally and contextually relevant resources for teaching. Local materials are not easily found, lack of tools for community-based activities and limited financial capacity are codes that lead to resource and teaching aid restrictions that delays the success of utilizing FoK

[ET 4] *“Sometimes, the materials or activities that are needed for teaching a lesson is not available due to inevitable circumstances. For example, I was about to bring my students to Ando Island for an immersion and to search for some crustaceans to be used in our class; however, I was not allowed by our principal even though it is just a 15-minute boat ride from our school.”*

Finally, not applicable to all lessons in Life Science is a team that shows the limitations of FoK conceptually. Some lessons do not connect well with everyday experiences as expressed by teachers, as well as it is hard to relate abstract concepts like cellular respiration with students. Such concerns, under the category, limited applicability and conceptual mismatch, reveal that FoK might not seamlessly connect with every science topic, especially those that are highly complex

[HST 4] *“Contextualization for me is not applicable to all topics specially, if the lesson is very technical such as DNA and RNA”*

Entirely speaking, the data shows that Fok provides many opportunities for meaningful and contextual learning, its applicability in science education, especially with life sciences, is challenged by practical conceptual challenges.

Table 5  
Teaching challenges using FOK

Codes	Categories	Themes
Takes too much planning time Time consuming to plan	Time constraints	Funds of knowledge are time consuming
Adjust my lesson every time Re-aligning my lessons every time	Extra workload	
Collecting background knowledge is tedious Gathering background knowledge is laborious	Effort-intensive process	Unavailability of local materials
Local materials are not easily found Materials are not easily sourced	Resource limitations	
Don't have the tools for community-based activities Lack of tools to be used for community-based activities	Lack of teaching aids	
The school can't afford the materials needed The school lacks the financial capability to access the materials needed		
Some lessons don't connect with everyday experiences There are lessons that cannot easily be related to everyday experiences	Limited applicability of FoK	Not applicable to all lessons in Life Science
Hard to link abstract concepts like cellular respiration to daily life difficulty in connecting complex concepts like cellular respirations	Conceptual mismatch	
Students' experiences don't always relate to the topic Students' experience usually don't apply to the topic		

## DISCUSSION

One of the major transitions in science instruction is the inception of FOK to the teaching-learning process, it addresses multiple lapses to reinforce the correlation of home-based experiences and conventional homeroom lectures (Garin, 2017; Mosqueda, 2024; Toxtle-Colotl, Castro-Fernández, & Juárez-López, 2025). Essentially, the term FOK comprises a culturally rooted and historically ingrained abilities and knowledge which is necessary for the welfare of an individual and its environment (Moll et al., 1992; t' Gilde & Volman, 2021).). To establish an inclusive learning environment, it is crucial for teachers to recognize and honor cultural differences as well as acknowledging unique student backgrounds (Esteban-Guitart & Moll, 2014; Pawilen, 2021).

With the integration of FOK in teaching science it weaves such students' prior knowledge and cultural experiences, and learning becomes more relevant especially when they connect scientific principles to their lived experiences (Lapada, 2022; Reyes, et al, 2019). This becomes an interplay between student collaboration and their assimilation of core concepts (Butler & Miretzky, 2020; Tamerat, 2020). It increases their engagement to learning whenever they relate intertwining concepts between the scientific realm and theories and social environment (Barton & Tan, 2009; Boned-Ribas et al, 2024). In addition, positive self-image and emotional stability in the educational environment accumulates with the integration of FOK in the science curricula (Volman & t' Gilde, 2021).

Apart from its advantages, it also establishes a fair share of complexities that hampers the functional success of FoK integration in science instruction. Teachers experience time-intensive gathering and collecting students' FoK considering knowledge acquisition tailored with instructional contents which leads them to invest extra effort in developing appropriate learning resources accordingly (Llopart & Esteban-Guitart, 2018; Banegas, 2020). Furthermore, the scarcity of locally sourced materials builds up the obstruction to suit both the curricula demands and students' cultural setting, making it hard for experiential learning to progress (Denton & Borrego, 2020).

For the FoK to be successfully incorporated in the science instruction, it is vital for teachers to engage in continuous professional learning to recognize and distinguish the learners' existing knowledge in the classroom (Hogg & Volman, 2020). Getting in touch with multiple social environments in curriculum integration, assures that instructional resources is responsive in sociocultural context and resonant to student lives (Samaupan, 2019). Science education welcomes varied teaching methods and varieties in ways of knowledge acquisition, its emergence would lead to an inclusive science learning environment and better learning outcomes (Esteban-Guitart & Moll, 2014).

Considering some of its complexities, the utilization of students' FOK is a worthwhile pedagogical method as it aids out to improve and boost learning activity while creating a culturally inclusive classroom setting (Ali & Hashim, 2022; Gaete et al., 2023). By integrating specific solutions to address hurdles, it results to a fair and productive science instruction (Esteban-Guitart, Iglesias, Serra & Subero, 2023). When the teachers

develop their ability to acknowledge and appreciate cultural roots and wealth their students bring into the classroom, it becomes a breakthrough to educational transcendence making it more openly diverse and interactive (Moll et al., 1992; LoSasso, 202; Nevado-Luna, Del Valle Díaz, Sánchez Sánchez, & Rodríguez-Gómez, 2025).

### CONCLUSION

Connecting science content to the learners' FoK offers a wide range of approach to link their knowledge into their grounded realities. Varied strategic tools such as background checking, home visits and idea sharing aid the teachers to unravel and integrate students' FOK into teaching. These techniques enhance deep discernment to multiple concepts and interactive inclination, apart from this it also champions inclusivity by acknowledging various backgrounds each student possess, hence; students' FoK as viewed by teachers can facilitate learning engagement and can deepen conceptual understanding. However, with the issues and setbacks such as it consumes more time of developing FOK-based teaching methods, lack of localized materials to be used in teaching and the limited applicability of FoK into certain Science topics, there are still ways to develop a solution in addressing these pressing deficits; it includes collaborative partnership with stakeholders, creating systematic plan, and culturally-relevant teaching strategies. By effectively applying these methods to integrate students' FOK we will be able to augment an equitable, knowledge-driven, and comprehensive instruction that not only empowers the learners but also honors their individual experiences and culture. Thus, a grounded science education that is culturally inclusive and responsive to students needs is recommended by this study.

### DECLARATION OF CONFLICTING INTEREST

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### FUNDING

The author received funding from Eastern Samar State University.

### REFERENCES

- Ali, M. N., & Hashim, H. (2022). The role of funds of knowledge in culturally responsive science pedagogy. In *Culturally responsive teaching in science education* (pp. 123-145). Routledge.
- Banegas, D. L. (2020). Teacher educators' funds of knowledge for the preparation of future teachers. *RELC Journal*, 53(3), 686–702. <https://doi.org/10.1177/0033688220973083>
- Barton, A. C., & Tan, E. (2009). Funds of knowledge and discourses and hybrid space. *Journal of Research in Science Teaching*, 46(1), 50–73. <https://doi.org/10.1002/tea.20269>

- Binns, R. (2023, July 14). *Focus group advantages and disadvantages*. Expert Market. <https://www.expertmarket.com/uk/market-research/focus-groups-advantages-disadvantages>
- Boned-Ribas, P., Iglesias-Vidal, E., Sierralta-Covarrubias, A., & Esteban-Guitart, M. (2024). Building a socio-educational ecosystem from the community funds of knowledge and identity approach: An illustrative example in Catalonia, Spain. *Acta Psychologica*, 249, 104449. <https://doi.org/10.1016/j.actpsy.2024.104449>
- Butler, A., & Miretzky, D. (2020). Funds of knowledge and early literacy: A mixed methods study. *Mid-Western Educational Researcher*, 32(3), Article 6. <https://scholarworks.bgsu.edu/mwer/vol32/iss3/6>
- Calabrese-Barton, A., & Tan, E. (2009). Funds of knowledge and discourses and hybrid space. *Journal of Research in Science Teaching*, 46(1), 50–73. <https://doi.org/10.1002/tea.20269>
- Civil, M. (2016). STEM learning research through a funds of knowledge lens. *Cultural Studies of Science Education*, 11(1), 41–59. <https://doi.org/10.1007/s11422-014-9648-2>
- Cowie, B., Jones, A., & Otrell-Cass, K. (2011). Re-engaging students in science: Issues of assessment, funds of knowledge, and sites for learning. *International Journal of Science and Mathematics Education*, 9(2), 347–366. <https://doi.org/10.1007/s10763-010-9229-0>
- Denton, M., & Borrego, M. (2020). Funds of knowledge in STEM education: A scoping review. *Studies in Engineering Education*, 1(2), 71–92. <https://doi.org/10.21061/see.19>
- Esteban-Guitart, M., & Moll, L. C. (2014). Funds of identity: A new concept based on the Funds of Knowledge approach. *Culture & Psychology*, 20(1), 31–48. <https://doi.org/10.1177/1354067X13515934>
- Esteban-Guitart, M., Iglesias, E., Serra, J.M. and Subero, D. (2023), Community Funds of Knowledge and Identity: A Mesogenetic Approach to Education. *Anthropology & Education Quarterly*, 0 (2022).1-10 <https://doi.org/10.1111/aeq.12451>
- Gaete, A., Luna, L., Silva-Peña, I., & Guerrero, P. (2023). The quest for justice in education: Capital and funds of knowledge. *Frontiers in Education*, 8, Article 1157709. <https://doi.org/10.3389/feduc.2023.1157709>
- Garin, R., Reyes, R., Domantay G., & Rosals, J (2017). Contextualized and localized teaching as a technique in teaching Basic Statistics. *Asia Pacific Journal of Education, Arts and Sciences*, 4 (1), 62-67. <http://apjeas.apjmr.com/wp-content/uploads/2017/05/APJEAS2017.4.1.2.08.pdf>
- Gonzalez, N., Moll, L. C., & Amanti, C. (Eds.). (2005). *Funds of knowledge: Theorizing practices in households, communities, and classrooms*. Lawrence Erlbaum Associates Publishers.

- Hedges, H. (2012). Teachers' funds of knowledge: A challenge to evidence-based practice. *Teachers and Teaching: Theory and Practice*, 18(1), 7-24. <https://doi.org/10.1080/13540602.2011.622548>
- Hogg, L., & Volman, M. (2020). Funds of knowledge and identity in education: A literature review. *Review of Education*, 8(2), 451-473. <https://doi.org/10.1002/rev3.3197>
- Lapada, A. A. (2022). Contextualized self-regulated learning materials in life science anchored on students' funds of knowledge. Retrieved from [https://animorepository.dlsu.edu.ph/etdd\\_scied/13](https://animorepository.dlsu.edu.ph/etdd_scied/13)
- Llopart, M., & Esteban-Guitart, M. (2016). Funds of knowledge in 21st century societies: Inclusive educational practices for under-represented students. *Journal of Curriculum Studies*, 50(2), 145-161. <https://doi.org/10.1080/00220272.2016.1247913>
- Llopart, M., & Esteban-Guitart, M. (2018). Funds of knowledge in 21st-century societies: Inclusive educational practices for under-represented students. *Journal of Curriculum Studies*, 50(2), 145-161. <https://doi.org/10.1080/00220272.2016.1247913>
- LoSasso, S. L. (2021). *Integrating the funds of knowledge to impact the literacy learning experience for students with disabilities* (Master's thesis). Rowan University. <https://rdw.rowan.edu/etd/2954>
- McLaughlin, D. S., & Calabrese-Barton, A. (2012). Preservice teachers' uptake and understanding of funds of knowledge in elementary science. *Journal of Science Teacher Education*, 24(1), 13-36. <https://doi.org/10.1007/s10972-012-9284-1>
- Moll, L., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using qualitative approach to connect homes and classrooms: *Theory into practice*, pp 31,132-142.
- Pawilen, G. (2021). Integrating indigenous knowledge in the Philippine elementary science curriculum. *International Journal of Curriculum and Instruction*, 13(2) 1148-1160.
- Mosqueda, H. C. (2024). Exploring the significance of teachers' funds of knowledge in language teacher learning. *Language Teaching Research Quarterly*, 42, 109-125. <https://doi.org/10.32038/ltrq.2024.42.07>
- Nevado-Luna, J. M., Del Valle Díaz, S., Sánchez Sánchez, F., & Rodríguez-Gómez, I. (2025). Key competences that allow excellence in teaching practice. *International Journal of Instruction*, 18(3), 1-18. <https://doi.org/10.29333/iji.2025.1831a>
- Reyes, J., Insorio, A, Ingreso, M. L., Hilario, F. & Gutierrez, C. (2019). Conception and application of contextualization in Mathematics education. *International Journal of Educational Studies in Mathematics*, 2019, 6(1), 1-18
- Samaupan, M. (2019). Integration of Cultural practices in teaching mathematics. *The Asian Conference on Education & International Development 2019*. (pp: 165-182)

IAFOR. Retrieved from [http://papers.iafor.org/wp-content/uploads/conference-proceedings/ACEID/ACEID2019\\_proceedings.pdf](http://papers.iafor.org/wp-content/uploads/conference-proceedings/ACEID/ACEID2019_proceedings.pdf)

Smith, J. A., Flowers, P., & Larkin, M. (2022). *Interpretative phenomenological analysis: Theory, method and research* (2nd ed.). SAGE Publications.

t' Gilde, J., & Volman, M. (2021). Finding and using students' funds of knowledge and identity in superdiverse primary schools: A collaborative action research project. *Cambridge Journal of Education*, 51(6), 673–692. <https://doi.org/10.1080/0305764X.2021.1906845>

Tamerat, J. (2020). Funds of knowledge and global competence in urban middle schools. *Middle Grades Review*, 6(3). <https://scholarworks.uvm.edu/mgreview/vol6/iss3/5>

Toxtle-Colotl, A., Castro-Fernández, F., & Juárez-López, J. A. (2025). A systematic literature review on affective factors of parents and children in mathematics home-based tasks. *International Journal of Instruction*, 18(3), 561–576. <https://doi.org/10.29333/iji.2025.18329a>

Volman, M., & t'Gilde, J. (2021). The effects of using students' funds of knowledge on educational outcomes in the social and personal domain. *Learning, Culture & Social Interaction*, 28 (2021), 1-14. <https://doi.org/10.1016/j.lcsi.2020.100472>

Yosso, T. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race Ethnicity and Education*, 8(1), 69–91. <https://doi.org/10.1080/1361332052000341006>