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Integration of Global Perspectives into Science Curriculum and Instruction Practices: A Science Teacher Perspectives Case Study

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ABSTRACT

This study addresses the gap in how science teachers can incorporate global perspectives into their curriculum and instructional practices. Additionally, it seeks to analyze how they can enhance the relevance and significance of learning for students by expanding their understanding of the world and establishing connections between school science topics and real-world global challenges. Through interviews with eight participants, a case study was taken on. The results show that the information gathered from interviews offers a comprehensive grasp of the practices, difficulties, and advantages that are currently thought to come with including global perspectives in science teaching. Through the following methods: (a) incorporating global issues and examples; (b) leveraging technology and online resources; (c) assessment strategies for global perspectives; and (d) professional development and diverse perspectives, teacher participants shared their understanding of how to integrate global perspectives into the science curriculum and instruction practices. Teachers emphasize the perceived benefits, challenges, and feedback in Integrating Global Perspectives into Science Curriculum and Instruction Practices from their supervisors, principal, students, and parents: Enhances understanding and Awareness, Enhances and enriching learning experiences, broadens knowledge and critical thinking, Cultural awareness and empathy, and prepares for the future. Teachers face challenges that they need to overcome in incorporating global perspectives into their curriculum and instructional practices: Limited Resources and Availability, Lack of Topic Knowledge and Continuous Learning, Time-Consuming Preparation, and Teacher Training and Support. A more complete and extended understanding of the effects of global education on teachers and students will be possible through extending research to other fields and involving repeated observation or examination.

INTRODUCTION

This study explores the perceptions of science educators when incorporating worldwide viewpoints in the development of science programs. The insights provided by science teachers shed light on the complexities surrounding the creation and execution of science curricula and instruction, which are influenced by the blending of various countries' values, objectives, cultures, and attitudes towards matters of personal interest as well as global significance.

Given this, there are ongoing efforts to rebuild science curricula and policies, along with standards for science education and teaching, to enhance science education and equip future scientists and citizens. Nevertheless, science educators encounter alarming challenges when integrating global perspectives into their curriculum requirements and educational objectives. Science and its applications serve as invaluable and potent instruments in tackling these challenges. The educators involved in this study exhibit diverse interpretations of key concepts pertinent to the subject at hand: global perspectives, global education, and global science. Their stances on the issues explored in the study are rooted in how a science instructor perceives and envisions scientific knowledge

and their readiness to function in a globalized society.

Addressing the learning course of science students with inquiries informed by their day-to-day experiences was not a component of the teaching framework nor the school ethos. The integration of global perspectives into science education curricula and instructional methodologies has emerged as a prominent focal point, both politically and substantively. The argument posited here is that combining local and global perspectives within science education and global education can aid students in reconstructing global science and cultivating diverse viewpoints on science-related societal matters.

Prior research has predominantly dug up negative attitudes among science educators towards the infusion of global education orientations into the science curriculum. This research centers on science teachers and rekindles the examination of teachers' attitudes towards, and comprehension of, the integration of global education into the science curriculum.

The value of global education is widely acknowledged, but there is a rising review that scientific curricula frequently disregard global contexts in favor of local or national challenges. Students who have this narrow-minded viewpoint may not have the information, abilities, and

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attitudes needed to take advantage of opportunities and challenges around the world. Educators who specialize in science, being important participants in the educational process, can effectively close this difference by integrating global viewpoints into their lesson plans and methods.

From the viewpoints of science instructors, this case study attempts to investigate how science curricula and teaching methods include global perspectives. This study aims to offer insights into how global awareness can be successfully integrated into science education, eventually improving students' readiness to flourish in an increasingly globalized world, by looking at the experiences, difficulties, and strategies of science teachers. The study reveals that during the implementation of the integrated science curriculum, the participants went through several changes in the following areas: (1) updating their knowledge of science content; (2) changing how they thought about teaching science; (3) building relationships with students; and (4) improving collegial interactions. This paper's final section examines these findings considering the body of research on science teacher development and integrated scientific curriculum (Wei, B. 2020).

The results imply that although practitioners had a favorable view toward global learning, its integration will remain up to chance unless it is specifically mentioned in curriculum guidelines. Rather than continuing to be a stationary body of knowledge, primary science education has the chance to become regarded as a dynamic process that supports sustainable development, thanks to this global learning approach. It makes the case that a primary scientific education that is more relevant and purposeful can be informed by teachers' expertise and their personal and professional commitment to global challenges, enabling them and the students they instruct to become change agents (Strachan, A., 2020).

It suggests that teaching and learning in primary science can become more engaging and purposeful beyond fulfilling an assessment framework by investigating the Sustainable Development Goals (SDGs) and their relationship to the English primary science curriculum, as well as developing a series of pedagogical strategies in line with global learning (Strachan, A., 2020).

The argument is on STEM education as a disciplinary or interdisciplinary approach that inspires national, international, and regional initiatives in teacher preparation program development and real-world classroom implementation. Next, highlighted how important it is to reevaluate and reorganize STEM education to support teachers' self-efficacy in integrating STEM as a method of teaching and learning science and giving students the tools they need to solve scientific problems in a procedural, conceptual, and applied way (Tairab, H.H., Belbase, S. 2023).

The findings reveal that instructors have a deep respect for and desire to implement internationally competent teaching. However, they also require guidance on how to do so effectively within the classroom. The data, to

varying extents, demonstrate each of the four pillars of the Global Teaching Model: international partnership for transformative action, critical and cultural consciousness-raising, integrated global learning, and situated relevant practice. This study emphasizes the critical role of internationalizing teacher education and provides evidence supporting the Global Teaching Model as a potential framework. Education leaders recommend that school curricula incorporate instruction on global competency, which encompasses the development of knowledge for global engagement and the adoption of a global citizenship mindset (Kerkhoff, S. N. *et al.* 2020). Instructors scored the highest on the situational practice subscale, which measures their ability to value diversity, dispel stereotypes, and so on. On the other hand, they received the lowest scores on transactional experiences that involve using technology for cross-cultural cooperation. Interestingly, neither traveling overseas nor having teaching experience seemed to be associated with the ability to teach with global competency (Kerkhoff, S. N. *et al.* 2019).

The findings revealed that neither the science instructors nor the students had any knowledge about SSIs. Since most teachers are unaware of SSIs and do not incorporate SSI-based lessons in their teaching, students have no exposure to SSIs. However, both educators and students surveyed believe that the development of SSI-based curriculum materials could improve the teaching and learning processes in scientific fields. This, in turn, could have a positive impact on students' understanding, scientific methods, and argumentation skills (Kolong *et al.* 2023). When it comes to incorporating global ideas into the curriculum and teaching methods, science teachers play an essential role. However, studies have shown that educators often lack knowledge about concepts like Socioscientific Issues (SSIs).

The study examines the implementation of the Open Science Schooling (OSS) method in science education, highlighting the important role of community involvement in developing science projects. The findings demonstrate the effectiveness of the OSS method in community-based science education, from the perspectives of both teachers and students. By collaborating with external stakeholders, this project aims to support schools in becoming change agents by incorporating contextualized learning experiences (Calkin *et al.* 2022).

Including community members in the creation of science missions through open science schooling (OSS) can improve instructors' and students' perspectives on teaching science with a global outlook. Therefore, fostering inclusive and culturally diverse scientific classrooms necessitates assisting educators in bridging the divide between traditional science instruction and global perspectives.

The findings indicate a need to redesign the ITPSE to better connect the subject matter with students' learning outcomes. As a result, the ITPSE overhaul includes a new task and an additional framework. Science teachers

in culturally diverse classrooms require support to establish an inclusive relationship between science epistemology and conventional epistemologies. This issue can be addressed by incorporating two Intercultural Teaching Practices for Science Education (ITPSE). The ITPSE teaching resources embody the “epistemological bridge,” which involves a pedagogic procedure where teachers assist students in generating explanations of a phenomenon using various epistemologies (Galvez 2023). Teachers and students alike noted that the context-based curriculum unit provided students with an opportunity to extend beyond the usual science teaching objectives and make a meaningful contribution to society. This shift away from a focus solely on topic knowledge towards the cultivation of broader skills is evident in the importance placed by both teachers and students on the development of abilities such as comparing, reasoning, evaluating pros and cons, and considering sustainable perspectives. The evaluation methods received mixed feedback from students, with some appreciating the oral test for its ability to showcase a deeper understanding that may not be evident in group presentations, while others held conflicting views (Kostøl, K.B, *et al.* 2022).

The study emphasizes the importance of making climate change lectures interesting and relevant for students, especially in secondary and tertiary education. It highlights the need for innovative teaching strategies that help students connect with the material and understand how climate change will impact their future. To enhance the teaching of climate change science, the article suggests involving professors from different academic disciplines, utilizing new resources such as institutional archives, and incorporating diverse perspectives (Sharitt, C. A. *et al.* 2023).

As discussed in the study of Ramiah (2019) proposed a theoretical framework for a cross-cultural foundational STEM unit. This unit aims to explore how a Eurocentric view impacts students from different cultures and languages who are exposed to the dominant Eurocentric culture and language in modern “universal science” at school. STEM educators’ goal is to create a STEM curriculum that acknowledges the foundations of humanity, which include the importance of empathy and respect for diverse perspectives. This can be achieved by critically analyzing and challenging existing constructs and reframing our beliefs (Ramiah, R. *et al.* 2019).

Globalization processes are leading to wide-ranging changes that impact education worldwide. However, it is expected that there will be an increasing alignment of global educational policies and practices, particularly among hyperglobalists. Different countries develop their national policies in response to the same global forces because global policies are influenced by diverse cultural and historical traditions at the country level. Moreover, there is a possibility that national policies will be interpreted based on the numerous cultural traditions within a country, as well as those from other countries (Ojo 2019).

The authors discuss the challenges of science education in the USA, the Republic of Korea, South Africa, Lebanon, and Catalonia. They also propose strategies for conducting science education research that is culturally and linguistically appropriate for diverse classrooms. To achieve this, the study recommends several strategies. These include reorienting research methods to prioritize equality, diversity, and social justice, actively participating in the development and implementation of educational policies and fostering productive and meaningful partnerships with all stakeholders (Espinet, *et al.* 2021). This work explores an integrated, perspective-driven, and practical approach to teaching the nature of science. As part of this approach, students explore both general and domain-specific aspects of acquiring knowledge. By leveraging domain-specific perspectives, students can generate questions, responses, and evaluation criteria that contribute to the construction of knowledge. This method is valuable because it offers instructors helpful design guidance to transform their traditional courses into integrative, perspective-based teachings using three heuristics (Janssen, *et al.* 2020).

The results show that while most people believe science to be a creative track, there is disagreement among educators on the relationship between science and creativity in teaching science in schools. The majority of those who disagreed were secondary science instructors from the United States, England, or Malta. It was found that there is disagreement on how scientific knowledge intersects with creativity in science education. This study examines educators’ viewpoints on the relationship between science and creativity in various national contexts in Europe and beyond. Many people consider creativity to be an essential skill in education, and science has the potential to foster it. Research suggests that interdisciplinary instruction and other forms of creative pedagogy can help spark children’s interest in science. Previous research on educators’ perspectives on science and creativity has primarily been conducted within national educational frameworks (Hetherington, 2019).

This study examines scientific teaching and learning strategies in a culturally diverse secondary science classroom. The classroom is taught by a carefully chosen Nepalese public science teacher who uses interactive, innovative, collaborative, and inclusive methods to teach science. However, in a classroom with a diverse student body, the strong focus on the national scientific curriculum is adversely affecting the teaching style of the teacher. This article advocates for women’s participation, the involvement of other school science teachers, and the inclusion of diverse cultural student voices in science education (Koirala. 2021).

Global Perspective is a brand-new online-only, peer-reviewed journal for the social sciences. It is interdisciplinary and transdisciplinary, utilizing multimedia publication options that are currently available to academic journals. The primary goal of Global Perspectives is to enhance current social scientific research and foster discussions

on concepts, theories, methods, and evidence bases. The journal focuses on the study of trends and advancements in various areas such as commerce and markets, security and conflicts, media and communication, legal systems and justice systems, governance and regulation, cultural domains, identities, and values, environmental concerns and sustainability, technology-society interfaces, and social structure and change (Anheier, 2020).

The results showed how teachers felt about incorporating AI into science classes, including how they saw the relationship between AI and science, what obstacles they faced while implementing the AI lesson package, and suggestions for improvement. Initially, the educators believed that while science and AI are compatible when it comes to solving scientific challenges, they differ when it comes to creating precise models with high-quality data and employing simplified reasoning. Secondly, teachers felt that the greatest obstacle to implementing the lesson plan was their lack of confidence in their ability to grasp the material and that it would be difficult to gain their support for curriculum customization and audience targeting. They suggested that teachers be provided with thorough AI materials considering these difficulties, while after-school scientific enrichment programs can make use of this software (Park *et al.* 2023).

The perspective that is used to view curriculum content is called global education. Instructors utilize certain techniques, described below, that allow students of any age to use this lens to shed light on any subject. Through constructive means of connecting with peers in poor nations and around the world, global education respects the demands of the environment, peace and justice, and human rights for all. It brings authenticity to any curriculum by focusing on the development of global citizens, transcending subject matter and age level (MacDonald, B. (n.d.).

Internationalization strategies implemented domestically also intentionally involve incoming international students. Teaching, specifically emphasizing international viewpoints and subjects in course instruction, is one of the most effective and straightforward ways to promote internationalization at home. This chapter compares survey data from academics' self-reported actions and perceptions to examine international elements in teaching and learning. The research indicates that there are significant regional and national variations in the ways that academics use global viewpoints or topics in their course instruction. Furthermore, it has been discovered that the presence of a clear internationalization policy and encouragement of recruiting foreign academics by their institutions has the biggest influence on academics' emphasis on international content in their teaching (Ho *et al.* 2022).

Self-efficacy emerged as a key factor explaining teachers' perceptions of and their lack of confidence in implementing ISE as well as their need for support. In addition, teachers regarded ISE as a relevant teaching method, but challenging to implement, and teachers

primarily applied integrated approaches irregularly and seldom. Furthermore, teachers' experiences with integrated activities and collaboration correlated with their views on integrated education and self-efficacy. These findings indicate teachers need support to better understand and implement ISE (Haatainen, *et al.* 2021). According to the study, there can be innovative practices created when GCE practice and formal education classes come together, but there are also conflicts that arise for both teachers and students. Furthermore, makes the case that interactive GCEs are a valuable counterbalance to traditional classroom experiences, which can provide students with life-changing opportunities. builds a typology of GCE practice based on facts, highlighting the significance of person, purpose, and pedagogy to the participative goal of GCE.

Additionally, the study demonstrates the importance and uniqueness of conversation for GCE instructors and students, but it also points to faulty interpretations that reduce the possibility of more crucial types of communication. The study's implications emphasize how urgent it is to provide teachers with continuing, relevant, and customized professional development that meets their requirements and builds on their current skills. Furthermore, it is critical to prioritize the needs of young people in GCE practice, research, and policy formulation. This will allow us to analyze and comprehend GCE as a conceptually grounded learning process that addresses cognitive and social development (Barry, M. 2020).

A potential approach to integrated science education, project-based learning (PBL) has gained traction in curriculum reforms and educational research, particularly as a means of fostering 21st-century skills and connected worldviews. PBL techniques that were collaborative, theme- and inquiry-based, and interesting to students were taken advantage of by the teachers. On deeper examination, however, disparities and flaws in the procedures were found, especially in the evaluation, which used a student-centered approach and reflection. Teachers also mentioned several difficulties they had implementing PBL. The findings show that while instructors believe PBL is good, they require assistance in putting it into practice. Collaborative learning—in which students, teachers, and other participants learn from one another—could enhance science teachers' pedagogical competency in PBL (Haatainen, *et al.* 2021).

Research GAP

This research aims to examine how science teachers can include worldwide perspectives in their curriculum and teaching methods. Moreover, it aims to understand how they can improve the importance and meaning of education for students by broadening their knowledge of the world and creating links between school science subjects and real-world global issues.

The research inquiries are as follows: (1) In what ways do science teachers integrate global perspectives into their science curriculum and instruction practices? (2)

What benefits and challenges do they perceive when implementing these practices in science classes?

MATERIALS AND METHODS

Design

The research employed a case study approach to explore how educators incorporate worldwide viewpoints into science curricula and teaching methods. This investigation centers on tackling the challenge of infusing global perspectives into science education. It is a pivotal case study, operating under the assumption that the educators involved in the study are eagerly interested in this subject matter.

Bounded System

The confined system for this study would encompass science educators who have embedded worldwide viewpoints into their science content and teaching methods. It would furthermore comprise the curriculum and teaching practices utilized to incorporate global perspectives, along with the outlooks and encounters of these educators concerning this integration. The focus of the examination would be to comprehend how these science educators combine global perspectives,

the curriculum, and teaching practices they utilize, and their outlooks on this integration. The examination would be restricted to this group of science educators, their curriculum and teaching practices associated with global perspectives, and their standpoints. Employing the examination methodology would enable an in-depth exploration of this confined system to acquire a comprehensive understanding of the integration of global perspectives from the science educators' viewpoints. Gathering data techniques such as educator interviews, and analysis of curriculum materials could supply the necessary data to formulate a detailed case portrayal and pinpoint common themes across various educators, thereby providing insights into the process and encounters of integrating global perspectives in science education.

Participants

The participants in this study were eight (8) science teachers with diverse backgrounds and experiences in teaching related to the science curriculum. Each participant brought a unique perspective to the integration of global perspectives into science education. Ten (10) interview questions were asked from these participants.

Table 1: Demographic Information

Participant	Gender	Age	Years of Teaching	Subject Specialization	Grade Level Taught
Teacher 1	Female	38	10	Aralin Panlipunan	Elementary
Teacher 2	Male	30	5	General Education	Elementary
Teacher 3	Female	29	5	General Education	Elementary
Teacher 4	Female	29	5	Science	High School
Teacher 5	Female	27	4	Aralin Panlipunan	High School
Teacher 6	Female	27	5	General Education	Elementary
Teacher 7	Male	42	12	Aralin Panlipunan	Elementary
Teacher 8	Female	45	12	Science	Elementary

Ethical Considerations

The power to investigate, participant safety, and well-being, study honesty and novelty, and information privacy were all discussed in this research. Participants will get a detailed informed permission form outlining the study's goal, techniques, dangers, advantages, and their rights, including the right to withdraw at any time without penalty. The form will be written in clear, understandable language, and verbal explanations will be provided as needed. Participation will be stressed as voluntary.

To protect participants' identities, pseudonyms or unique codes will be used, and identifiable information will be avoided unless necessary. Data will be stored securely

using password-protected files and encrypted storage solutions, accessible only to authorized personnel. Reporting will ensure participants' identities remain confidential. Participants will be informed about the process for withdrawing from the study at any time, and they will have the option to request the deletion of their data upon withdrawal. Findings will be shared in an accessible and understandable format to promote openness and trust. Data use will be limited to the stated research purposes, respecting participants' trust. Participants will receive insights or feedback beneficial for their professional development. The research aims to contribute to a broader understanding of integrating

global perspectives into science education, benefiting future educational practices.

Data Gathering Procedure

The researcher semi-structured interviews with chosen science educators who have familiarity with the science curriculum and its alignment with worldwide perspectives. Science educators were pinpointed and chosen based on their familiarity and willingness to join in, guaranteeing a varied example. The researcher contacted potential participants directly or via phone, offering a summary of the study and securing their informed agreement. The interviews were planned at convenient times for the participants and conducted in private and relaxing environments, either in-person or via video conferencing. The semi-organized interview guide eased conversations on topics such as the educators' comprehension of global perspectives in science education, their integration methods, faced challenges and advantages, and recommendations for enhancement. With the participants' agreement, the interviews were sound-recorded and transcribed verbatim, with all recognized information removed to uphold confidentiality. Following the interviews, the records were distributed to the participants for verification, ensuring accuracy and allowing for any required explanations. The information will then be analyzed to pinpoint mutual themes and insights. Participants will gain a summary of the discoveries and can provide extra feedback. This brief and organized approach will guarantee the gathering of dependable and valid data, aligning with the study's aims and ethical standards.

Reflexivity Statement

The researchers understand that being honest and trustworthy involves knowing oneself. Their knowledge and experience in creating science lessons have shaped how they see things and do their research. They are aware that they might have biases, especially when considering different viewpoints from around the world that could change their ideas or conclusions.

To prevent this, they stay open-minded when starting the project and ask for feedback from different teachers who are part of it. They also recognize that there might be differences in power between them and the people they are studying. So, they make sure to set up an interview setting that encourages honest answers. This means they create a comfortable environment for interviews where people can speak freely and openly.

Trustworthiness and Authenticity

To ensure the dependability as well as genuineness of this research, the investigators made use of different methods. The verification process where participants examined and verified the truthfulness of their interview transcripts increased trustworthiness. Evaluating interpretations was done too thus giving an impartial perspective on the matter at hand.

RESULTS AND DISCUSSION

In this section, we explore the results of a study on the inclusion of worldwide views in science teaching and curriculum implementation, as observed by science educators. The information gathered from discussions offers a comprehensive grasp of the existing techniques, obstacles, and perceived advantages linked to including global perspectives in science learning. The findings are categorized into themes that emphasize important observations and trends that surfaced during the evaluation. This thorough investigation seeks to explain the methods through which global perspectives are fused, evaluate the impact of these methods, and view the consequences for forthcoming curriculum enhancements and teaching approaches.

Teachers' Understanding of the Integration of Global Perspectives into Science Curriculum and Instruction Practices

Teacher participants were interviewed about their understanding of the integration of global perspectives into the science curriculum and instruction practices. Themes drawn from the analysis of transcripts are (a) Incorporating Global Issues and Examples, (b) Leveraging Technology and Online Resources, (c) Assessment Strategies for Global Perspectives, and (d) Professional Development and Diverse Perspectives.

Theme 1: Incorporating Global Issues and Examples.

Most of the participants incorporate global issues in teaching science and in their instruction practices. Teachers actively engage students in discussions about pressing global challenges, using examples that resonate beyond textbook theories. Real-world issues include climate patterns through El Niño or the impact of deforestation to help students connect theory to practical applications. They commented:

TP1: "I integrate global perspectives into my science curriculum content and instructional practices by incorporating global issues into science lessons it encourages students to think critically about the connections of the world. The global issues motivated me to incorporate global perspectives into teaching science, so the students have a broader understanding of the issues globally. One of my examples of how I integrate global perspectives into my science teaching is the discussion of global challenges for the students to be aware of what is happening globally like the discussion of climate change, pollution, and others."

TP4: "Some specific examples of how to incorporate global perspectives into science lesson plans and activities are case studies and current events analysis, which analyze current scientific issues or events from a global perspective."

TP5: "I incorporate global perspectives into my lesson plans or activities with the following examples: First example is, current event analysis, the students will analyze current events in the context of global science and technology or how the advancements impact our regions and cultures. Second, case studies, in a way that I will let

my students illustrate scientific concepts from different regions like discussing biodiversity conservation.” –

Theme 2: Leveraging Technology and Online Resources. Teachers used online platforms, virtual simulations, and interactive tools to allow students to explore global issues firsthand, providing exposure to global contexts like satellite data analysis on deforestation or participation in virtual climate conferences. The explained:

TP5: *“I utilize different sources as textbooks, educational websites, journals, news articles, and international videos regarding global issues. With these sources, it helps me provide a comprehensive understanding of scientific concepts within the global context.”-*

TP7: *“There are various resources available to support the integration of global perspectives into a science curriculum. Some of these are science textbooks and online resources from different websites.”-*

TP8: *“The resources I utilized are online, websites, videos, blogs, news articles, books, and YouTube.”-*

Theme 3: Assessment Strategies for Global Perspectives. Assessments focus on students’ ability to apply scientific concepts to global contexts, ensuring learning extends beyond memorization. Teachers used debates, discussions, and performance-based tasks to assess students’ understanding of global perspectives. These methods encourage critical thinking, empathy, and collaboration. Educators remain up to date on present worldwide concerns, concentrating on subjects with interesting societal and ecological consequences such as environmental decline, societal discrepancy, and health discrepancies. Themes are selected according to their correlation with educational goals, multidisciplinary methodology, and significance to both nearby and worldwide communities.

TP8: *“I assessed learning for my students through their performance tasks, projects, quizzes, and reflection journals. I let them perform, for me to see that they understand the topic. I select the global topics by looking at my student’s interests and the topics that are currently happening.”*

TP7: *“I assess student learning related to global perspectives in the science curriculum through, performance tasks, presentations, debates, reflection, and discussion. I select topics to integrate into a science curriculum through what is current events and trending issues, local context, and according to students’ interests and backgrounds.”*

TP6: *“I assess students’ learning by evaluating their understanding and through assessment strategies such as performance tasks to test the ability of students to apply their understanding to the real-world concepts of global challenges. Second, project-based assessment and peer review using a variety of assessments develop them to become*

responsible and culturally competent individuals.”-

TP5: *“I assess student learning related to global perspectives in the science curriculum through the first, Socratic method, where students can express and defend their viewpoints or ideas on scientific issues with global implications. Second, formative/summative assessments such as exams and quizzes. Third, projects or performance tasks. I assign projects that require students to research and present scientific topics from different cultural perspectives. Fourth, I will let my students present case studies or scenarios that involve real-world issues.”-*

TP1: *“For me to assess students learning related to global perspectives in the science curriculum is by giving interactive activities like debate in this way I can know if they understand our topic. To select the global issues in integration into my science class throughout the year by engaging students with the global challenges, presenting to them the global issues which include the topics that are trending these times.”*

Theme 4: Professional Development and Diverse Perspectives. Educators partake in ongoing personal development, looking for fresh tactics for including worldwide viewpoints and staying alongside worldwide scientific progress. Teachers let the students be exposed to diverse perspectives related to pressing global issues, enhancing their understanding of an interconnected world through examples from different cultures and environments.

TP3: *“I was motivated by the issues we are experiencing globally nowadays. I want to expose my students to diverse perspectives and by that, they can gain a more comprehensive understanding of scientific concepts and apply it to a real-world situation.”*

TP4: *“Through professional development, teachers learn new instructional strategies and approaches for incorporating global perspectives into their science curriculum.”*

TP5: *“I did not receive any formal training or professional development related to integrating global perspectives. I utilize different sources as textbooks, educational websites, journals, news articles, and international videos regarding global issues. With these sources, it helps me provide a comprehensive understanding of scientific concepts within the global context. My motivation to incorporate global perspectives into my teaching is the following: First, I want my students to foster an appreciation for different cultures and understand diverse perspectives. Second, to prepare my students to tackle complex global challenges collaboratively. Lastly, equips them with the skills needed for success in a diverse and interconnected world.”*

TP6: *“I haven’t received formal training in integrating global perspectives, but I start with self-education by familiarizing myself with global issues by reading books and online resources. My willingness to learn and adapt will ultimately benefit my students and help them become informed and responsible individuals. I am*

motivated to incorporate global perspectives because I want to develop an individual who has a sense of humanity toward our country. An individual that understands the diversity between their own lives and people throughout the world. For instance, I let students develop the ability to think critically to take constructive action for global problems.”

TP7: “I don’t receive formal training, but I do research, read books, studying other countries’ cultures to be informed and have a background of what will I teach to my students. Incorporating global perspectives into science education is motivated by a desire to provide students with a well-rounded education that prepares them to thrive in a diverse and interconnected world. Some specific examples of how to incorporate global perspectives into science lesson plans and activities like Case Studies, field trips, debates, and discussions.”

TP8: “I don’t receive any formal training, but I am trying my best to teach the topic well. I am motivated by my student’s interest because as I have observed they are proactive when it involves the trending issues that may apply in their own lives. They can think critically which makes their minds logically think of a solution to a certain problem.”

Theme 4: Teacher Training and Support: Preparing teachers with worldwide competence is crucial for the successful integration of global perspectives. Educators need continuous training and professional growth to improve their comprehension and implementation of global perspectives in science curriculum and instructional methods.

TP6: “It also offers several challenges such as language barriers which can hinder the integration because we have multiple languages spoken. Most importantly teachers training and support, the government may offer training and ongoing support to their teachers.”-

TP7: “If there are benefits, there are also challenges, the challenges were, lack of teacher training, resource availability, and time-consuming, which allowed more time to prepare instructional materials to be used in my teaching.”-

TP8: “The challenges I have encountered were the resources or the materials I have been using because it is hard to find and prepare those materials needed for my teaching, it consumes more time to work for it.”

Feedback and Impact
Positive Feedback

Educators are provided with favorable responses from their pupils, guardians, and school leaders, inspiring them to persist in incorporating worldwide viewpoints.

TP1: “Yes, I received feedback from my students, teachers, and principals regarding the incorporation of global perspectives it enhances students’ engagement, they actively participate during my class discussions, and they are now aware of what is happening globally.”

TP4: “Yes, there are some common responses like students often express appreciation for the relevance and real-world applicability of science context, parents may appreciate the emphasis on global citizenship and cultural competence, and administrators generally support efforts to enhance the relevance of the curriculum through the integration of global perspectives.”

TP7: “Students’ and administrators’ responses regarding this integration have had a great impact because it motivates me to do more integration of global perspectives, and it gained a positive review from these individuals. There is effective communication and collaboration among these people in our school.”

Student Engagement

Students display heightened involvement, resulting in improved achievement and admiration for studying global matters.

TP1: “Yes, I received feedback from my students, teachers, and principals regarding the incorporation of global perspectives it enhances students’ engagement, they actively participate during my class discussions, and they are now aware of what is happening globally.”

TP5: “I received feedback from my students. They often appreciate the opportunity to learn about global issues and find it interesting, engaging, and relevant to their lives.”

Teaching Enhancement

Incorporating worldwide viewpoints enriches instructional capabilities, with educational administration acknowledging and fostering these initiatives.

TP6: “Yes, these are some key points from our school principals’ thoughtful feedback: curriculum integration, teacher support and professional development, and community engagement.”

TP8: “Yes, I received positive feedback from my students, it increased their global awareness, and it enhanced my teaching ability and gained positive feedback from my principal.”

Discussion

Summary of findings

Methods for Including International Viewpoints

The educators who participated in the interviews demonstrated a range of approaches to integrating global perspectives into their science curricula and teaching strategies. Among these techniques were:

- Including Global Issues and Examples: Science teachings can be contextualized by referencing current global issues.
- Leveraging Technology and Online Resources: Gaining access to content from around the world by using digital tools and online platforms.
- Using assessment techniques that consider pupils’ knowledge of global issues, known as assessment strategies for global perspectives.
- Diverse perspectives and professional development:

Emphasizing the value of continuing professional development and exposure to a range of perspectives.

Advantages of Integration

Many benefits of merging international perspectives into science training were pointed out by educators, including:

- Enhanced Global Awareness and Cultural Understanding: Growing knowledge of diverse cultures and global matters.
- Generating more vibrant and pertinent lessons through real-life examples is one method to produce captivating and enriching learning encounters.
- Expanded Knowledge and Critical Thinking Skills: Inspiring students to participate in critical thinking about worldwide matters.
- Improved Cultural Awareness and Empathy: Urging students to cultivate empathy and comprehension for others.
- Superior Future Readiness: Equipping students with the resources they require to excel in an increasingly interconnected world.

Problems in integrating

Moreover, some other challenges faced by teachers whilst bringing global perspectives into their classrooms:

- Limited Materials and Resources: Not enough resources exist for promoting global education.
- Need for Continuous Learning: Teachers need to stay up to date on global issues regularly.
- Preparing Lessons with a Global Focus Takes More Time: Lesson preparation is time-consuming.
- The significance of teacher training and support lies in the requirement for thorough training and assistance to apply global perspectives efficient manner.

Response and Effect

To be general, the feedback from educators was that it was good to include science teaching instructions with global outlooks as they knew what mattered:

- Excellent comments. The amazing remarks that are received from parents, students, and administrators make teachers believe that there is a necessity for further adoption of global concepts through lessons for a long time.
- Student involvement. Results in better performance increased attention towards learning more about worldwide problems.
- Teaching enhancement takes place when school administration identifies and values the integration of international points of view to improve teacher's skills.

Comparing the Results of Previous Research

Methods for Including International Viewpoints:

Previous Research: Previous research has shown that it is common to use digital resources and real-world examples when integrating global perspectives. For instance, Park et al (2023) emphasized how teachers felt about incorporating AI into science classes, including how they saw the

relationship between AI and science, what obstacles they faced while implementing the AI lesson package, and suggestions for improvement. Initially, the educators believed that while science and AI are compatible when it comes to solving scientific challenges, they differ when it comes to creating precise models with high-quality data and employing simplified reasoning. Secondly, teachers felt that the greatest obstacle to implementing the lesson plan was their lack of confidence in their ability to grasp the material and that it would be difficult to gain their support for curriculum customization and audience targeting. They suggested that teachers be provided with thorough AI materials considering these difficulties, while after-school scientific enrichment programs can make use of this software.

Current Findings

The teachers in the current study also highlighted the use of technology and global challenges, which supports the idea that these approaches are effective in incorporating global viewpoints.

Benefits of Integration

Previous Research: Studies conducted by Janssen, et al (2020) have demonstrated that the advantages mentioned by the teachers in the current study are consistent with the findings of these studies, which showed that students grew more sympathetic and conscious of global challenges. This work explores an integrated, perspective-driven, and practical approach to teaching the nature of science. As part of this approach, students explore both general and domain-specific aspects of acquiring knowledge. By leveraging domain-specific perspectives, students can generate questions, responses, and evaluation criteria that contribute to the construction of knowledge. This method is valuable because it offers instructors helpful design guidance to transform their traditional courses into integrative and perspective-based ones.

Current Findings: Teachers confirmed these advantages, highlighting improved critical thinking abilities, cultural awareness, and preparedness for a globalized future. This consistency shows that the benefits of international education are widely recognized across various contexts and research projects.

Difficulties with Integration

Previous Research: Studies have already thoroughly documented the difficulties associated with continuous professional growth. Similar challenges were noted by Barry (2020), who emphasized that teachers urgently need to provide continuing, relevant, and customized professional development that meets their requirements and builds on their current skills. Furthermore, it is critical to prioritize the needs of young people in GCE practice, research, and policy formulation. This will allow us to analyze and comprehend GCE as a conceptually grounded learning process that addresses cognitive and social development.

Current Findings

The results of the current study support those of other studies, highlighting the importance of preparation, scarce resources, and the necessity for continuous learning. This ongoing problem shows how much more assistance, and resources are needed for teachers.

Response and Effect

Previous Research: Positive teacher evaluations regarding the impact of global perspectives in education have been observed in studies by Kostol (2022), according to this research, teachers and students alike noted that the context-based curriculum unit provided students with an opportunity to extend beyond the usual science teaching objectives and make a meaningful contribution to society. This shift away from a focus solely on topic knowledge towards the cultivation of broader skills is evident in the importance placed by both teachers and students on the development of abilities such as comparing, reasoning, evaluating pros and cons, and considering sustainable perspectives. The evaluation methods received mixed feedback from students, with some appreciating the oral test for its ability to showcase a deeper understanding that may not be evident in group presentations, while others held conflicting views.

Current Findings

Teachers in the current survey provided certain feedback and comprehended the importance of accelerating student engagement and preparing them for a worldwide scope environment. This shows that the benefit of global education is continuously recognized by teachers.

Implications of findings

Curriculum Development

The findings indicate that those who create school curriculums should focus first on including worldwide perspectives in science classes. They can make the curriculum more engaging and meaningful for students by using technology, incorporating examples and problems from different countries, and designing exams that show an understanding of global issues. This approach can help students become more aware of different cultures and global challenges.

Professional Development for Teachers

The study highlights both the benefits and challenges, which stress the importance of ongoing training for teachers. They need continuous support and education to effectively teach global perspectives. Schools and government decision-makers should fund professional development programs that focus on global education to equip teachers with the necessary skills and resources.

Resource Allocation

It was observed that a shortage of materials and resources is a significant challenge. Schools and educational systems need to spend more on getting and making resources that

support global education to tackle this issue. One way to do this is by investing in digital tools, online materials, and other tech tools that can help include global views.

Teacher Support and Collaboration

It's important to give teachers training and help, which shows how vital it is to create a cooperative setting where they can share ideas, strategies, and experiences. Schools should encourage collaborative professional learning groups, where educators can work together to plan and carry out global education strategies.

Better Outcomes for Students

Research shows that adding worldwide views to education helps students understand and care about different cultures, think deeply, and make good decisions. These skills are important for students to do well in our more connected world. People who make decisions about education should focus on how learning about the world helps students in their future jobs and as citizens of the world.

Leadership and Making Rules

People who lead schools and make laws should see the good things that come from teaching about the world. They should make rules that help include these lessons in what students learn. This could mean setting rules for teaching about other countries, giving money for teaching materials and teachers, and giving rewards to teachers and schools that teach about global issues.

Overcoming Challenges

The issues found, like having few resources and spending a lot of time on planning, show that we need organized solutions. This might include creating a single database for worldwide educational materials, finding fast ways to include global views, and making sure teachers have the right tools to manage these extra tasks along with their usual work.

Future Research

The results point to areas that need more study, such as finding the best ways to blend global perspectives into education, figuring out what extra training teachers need, and looking at how global education affects students' progress over time. Research in these areas can help improve global education methods and rules.

Strengths of the study

The study helps improve education in several ways. It collects information through detailed talks with teachers, giving important insights about the benefits and challenges of adding global views to science lessons. The results can be used in many different schools because the people in the study come from various backgrounds and have different educational experiences. The study shows both the good parts and the challenges, celebrating what works well while also noting where more help is

needed.

Stressing professional development reaffirms the need for structural support for educators, in line with research findings and reinforcing existing understanding of the advantages and difficulties of international education. The study's forward-looking suggestions, which promote continuing professional development, resource allocation, and governmental support, are realistic and feasible.

Finally, the advantages for students—such as improved empathy, critical thinking, and cultural awareness—highlight the need to include global viewpoints in the classroom.

Limitations and Recommendations

There are some limitations to the study that need to be noted.

Here are some ideas to help with these challenges. To help teachers learn how to include worldwide views in their teaching, we should make professional training programs better. It's important to focus on using online tools and teaching methods that respect different cultures.

To make global learning easier, schools should spend more on digital tools and tech. Creating groups of teachers who work together can make global learning plans more effective and give teachers a way to support each other.

By expanding research into other areas and conducting more studies, we can gain a deeper and longer-lasting understanding of how global education impacts both teachers and students. By using these findings, those involved in education can more effectively incorporate global perspectives and help students become more globally aware.

CONCLUSION

This research highlights the essential advantages of incorporating global perspectives into science instruction, emphasizing improved critical thinking abilities, cultural knowledge, and student involvement. Educators showcased a range of efficient techniques for integrating global curriculum, including but not limited to employing real-world examples, utilizing technology, and placing a strong emphasis on professional development. On the other hand, difficulties such as scarce resources, scheduling conflicts, and the requirement for ongoing assistance and education were also noted. The study's conclusions are consistent with other research, highlighting the importance of systemic support and reiterating the importance of global education.

To make the most of worldwide education, we need to spend money on training teachers, providing enough resources, and building networks of teachers who work together. By studying new topics and doing long-term research, we can better understand how education systems work together and their impact. By following these ideas, those who work in education can create a learning environment that is more aware of the world, friendly, and exciting, helping students prepare for a

world that is closely connected.

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