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Research Article

Contribution of Physical Education in Achieving the Sustainable Development Goals Agenda 2030: A Scoping Review

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ABSTRACT

Agenda 2030 serves as a global call to action, aiming to transform lives worldwide. This study summarized literature about PE and Agenda 2030 with the use of a scoping review. The Scopus database was used as the only source of data to identify relevant papers. There was a total of 169 articles extracted, narrowed to 6 relevant studies with the use of PRISMA and PICOS framework. Based on the review, significant findings were revealed that will contribute in the field. The results showed that four various dimensions of PE contribute to SDG 3, (i.e., Creation of Varied Physical Activities Meeting the Learning Standards, Establishment of Holistic Physical and Health Education Programs, Engagement of PE Experts and Stakeholders in Attaining SDG 3 and 4, Empowerment of Stakeholders to Long-Term Benefits of Health and Fitness Engagement). On the other hand, four barriers to PE in terms of pedagogical action toward attaining SDG 4 were identified, (i.e., No Clear Policy Attainment of SDG 4, The Direction of SDG 4 Lacks Teachers' Understanding of the SDG). Lastly, there were three ways PE contributes to attaining SDG 4, (i.e., Adaptation of the Curriculum to Environmental and Societal Changes, Establish Long-Term Goal towards Agenda 2030, Adaptation and Continuous Learning for PE Teachers, Promote Educational Values). The findings of this paper will significantly help stakeholders in the field of PE to strengthen the relationship between PE and SDGs. The general recommendation of this paper is that future work should cover all 17 SDGs to gain more ideas and concepts on how PE can contribute to achieving Agenda 2030.

Keywords: *Quality education, Good health and well-being, Sustainable development goals*

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Introduction

In today's generation, the world's population is continuously increasing. The World Population Review estimates that as of 2023, there were eight billion people on the planet, with an estimated 117 million people living in the Philippines. Because of a lack of sustainability, countries face several global issues that could negatively impact everyone's future, resulting in an alarming situation where a balance between resources and the needs of future generations is quite challenging.

The United Nations (UN) and other international organizations intend to set specific goals to avert issues, guarantee equal access, and provide solutions that humans may encounter. As stated by the Sustainable Development Goals Fund, in September 2000, the Millennium Development Goals (MDG) were signed and became effective. It aims to target eight specific and measurable goals in 2015, such as helping low-income families to overcome poverty. A new set of objectives, the Sustainable Development Agenda 2030, was unveiled in 2015 and was adopted by all 193 UN member states. The 17 Sustainable Development Goals (SDGs) are a collection of global objectives to resolve the world's increasing challenges. It was founded to assist people by developing and transforming the globe through 17 worldwide goals. To create a better, more equitable, and more sustainable world by 2030, nations, organizations, and individuals must work together through the SDG Agenda 2030, which offers a comprehensive and inclusive framework to address some of the most pressing global challenges (United Nations, 2015).

The Sustainable Development Goals (SDGs) contribute to global progress, recognizing the role of tertiary education and universities in fulfilling sustainable development. Since educators guide students toward achieving the Sustainable Development Goals (UNESCO, 2017), they must also be flexible and innovative in their approach to learning because global issues are constantly expanding, affecting everyone around the globe. People may learn and make contributions to the world's progress through education. It may be utilized to accomplish the SDGs' specific goals since it can influence people and bring about positive

changes. In particular, the SDG 4 targets and prioritizes quality education (Baena-Morales et al., 2021). Additionally, it introduced the idea of Education for Sustainable Development (ESD), whose goal is to teach students the skills to make responsible decisions so that the SDGs can be achieved for both the current and future generations. On the other hand, the SDG 3 emphasizes each person's health and well-being. This needs to be prioritized to reduce the death rate, prevent the development of infectious diseases, and establish a joyful and healthy environment for everybody.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) included this facet as part of the SDG regarding the rising importance of health and wellness. In line with this, the provision and strengthening of different programs were conducted, such as the conduct of physical education classes in the curricula. Physical education (PE) is a subject that should be successfully integrated into school curricula worldwide and emphasize physical exercise, sports, health, and lifestyle choices; it plays a vital role in the holistic development of students (Fröberg & Lundvall, 2021). It is an essential element of the educational system that can help accomplish several Sustainable Development Goals. In addition, PE promotes sustainability, gender equality, health, and well-being. Educational institutions may recognize physical education as a tool and source of assistance in creating a more sustainable society by recognizing its role in the SDGs.

Literature Review

Sustainable Development Goals (SDGs)

The researchers viewed that the Sustainable Development Goals (SDGs) are universal, indicators, and targets, wherein every country is encouraged to implement Agenda 2030 to make global progress (Allen et al., 2016; Aguiar et al., 2020; Van Vuuren et al., 2020). In addition, it is an international fundamental development framework for post-2015 countries, having effective strategies for social and environmental implications. The United Nations (UN) states to use their policies, expanding on the Millennium Development Goals (MDGs) ending in 2015. The target of the 2030 agenda is a vital aspect of sustainable development,

which needs an accurate, rounded, evidence-based approach wherein the environment, economy, and society, three-dimensional instincts are the basis to ensure that every decision made by every community aligns with the paradigm in the interest of human development to measure the development in areas such as health and education (Halişçelik & Soytaş, 2019; Mensah, 2019). Consequently, various viewpoints and a wide range of indicators including culture, human development, food, and biodiversity are important in identifying the global targets that coordinate from the MDG to the SDGs (Aly et al., 2022; Hák et al., 2016).

Role of Higher Education in Achieving Sustainable Development Goals

Previous studies have considered that higher education is one of the essential factors in achieving the Sustainable Development Goals (SDGs) (Chaleta et al., 2021; Franco et al., 2018; Franco & McCowan, 2020; Fuertes-Camacho et al., 2019). Relative to this, higher education institutions (HEIs) are crucial in addressing societal concerns and other issues like reducing poverty, gender equality, reduced inequalities, decent work, economic growth, justice, peace, ensuring livelihoods, and protecting the natural environment. Chaleta et al. (2021) facilitated a curricular mapping of the SDGs across the different undergraduate programs of a university in Portugal. The curriculum design and the instructor's emphasis was on unemployment and economic crises which may impact the targeted goals. Meanwhile, a study conducted by Fuertes-Camacho et al. (2019) highlighted an investigation utilizing degree-specific competency, which involves evaluating, contemplating, and developing viewpoints regarding the teaching profession. Professional development is supported by sustainability competency education.

Citing the work of Hernandez et al. (2018), they explored the development of Higher Education for Sustainable Development, comparing Educational Sustainable Development (ESD) processes in eight higher education institutions that aim to develop strategies for adoption and sustainable culture in higher education. Díaz-Iso et al. (2019) further emphasized

the importance of guiding students' beliefs, attitudes, and behaviors for greater sustainability awareness. In consonance with Gamage et al. (2022), they reviewed approaches to embed various approaches in STEM programs and investigated university actions to integrate sustainability into learning pedagogies. In line with this, Franco et al. (2018) stated that the global sustainability agenda shapes higher education for sustainable development, with many institutions implementing SDGs through isolated initiatives. However, these efforts lack strategic support and coordination, widening the gap between policy, curriculum, and practice. A study analyzing student perceptions of sustainable development training found that comparing fourth-year students' perceptions to first-year students can help improve sustainability learning (Sánchez-Carracedo et al., 2021).

Health and Well-being in Sustainable Development (SDG 3: Good Health and Well-being)

Good health and well-being are important in every individual as they affect daily progress. Prior research has examined the implementation of the SDGs with a focus on SDG 3 and one of its targets (Budhathoki et al., 2017; Cerf, 2019; Macassa, 2021; Manandhar et al., 2018). In light of this, SDG 3 addresses a health and wellness collaboration that integrates physical education in line with the Sustainable Development Goals (SDGs). The studies highlight how crucial a strong environmental relationship is to accomplishing the SDGs. Macassa (2021) highlights sustainable health behaviors, including a sustainable diet and regular physical activity, can reduce greenhouse gases and contribute to climate change. However, environmental attitudes and lifestyles can hinder the long-term sustainability of development. In the work of Manandhar et al. (2018), he investigated gender refers to the social relationships between males and females based on roles, behaviors, activities, attributes, and opportunities, distinct from biological sex categories. Additionally, health literacy is crucial for achieving the World Health Organization's Sustainable Development Goals. Still, its status in low-income countries like Nepal remains underexplored despite its prevalence of communicable

and non-communicable diseases (Budhathoki et al., 2017).

Education in Sustainable Development (SDG 4: Quality Education)

Research practitioners view education as vital in achieving all the Sustainable Development Goals (SDGs) (Abera, 2023; Giangrande et al., 2019; Nazar et al., 2018). If all the countries invest in quality education, the goals of Agenda 2030 will manifest in time. In connection, education plays an essential role in promoting global sustainability goals as education for sustainable development (ESD) has the potential to achieve the 17 SDGs by localizing it in a way that widens the knowledge and awareness of learners, raising the critical understanding of the SDGs and taking actions to accomplish it (Abera, 2023; Giangrande et al., 2019).

The power of quality education in attaining the 17 SDG goals is highly emphasized. Accordingly, educational institutions must have a framework that aids the process of sustainability transformation to produce education that aligns in achieving the SDG goals and fills the gap between the unsustainable state happening in the present (Ferrer-Esteves & Chalmeta et al., 2021; Kioupi & Voulvoulis, 2019). In the context of quality education, experts explored the role of quality education in SDGs, specifically on how SDG 4 can be achieved (Nazar et al., 2018; Rulandari, 2021). In SDGs, quality education will nurture a more agile environment, which improves the quality, speed of decision-making, and intuitive thinking of learners. Teachers who offer quality education are critical factors in supplementing the rampant unsustainable practices within society. Therefore, educators must be reoriented or take necessary actions to align their professional education, approach, and strategies regarding ESD.

Reoriented educators toward ESD should encourage individuals to suppress social issues and dare to acquire the needed competencies for ESD (Cebrian et al., 2020; Glavic, 2020; Shumba, 2018). In agreement with Otiendo (2018), he facilitated effective curriculum development, which can help educators in their professional education, approach, and strategies in terms of ESD. The author explored the different processes to develop an effective ESD

curriculum, such as doing cyclical processes, evaluating the existing curriculum, and designing an improved curriculum up to the actual implementation of the new curriculum for ESD. In addition, integrating traditional media, formal education, and extracurricular activities can be a pathway for spreading information about SDGs (Yuan et al., 2021).

PE in the Context of Sustainable Development Goals Agenda 2030

In the field of research, physical education (PE) is one of the crucial elements that can attain the SDGs. Several studies emphasize the application of PE and its significance in implementing steps that align with Agenda 2030's target goal through student education. Physical education is a specialized field that may inspire students to work for and accomplish Agenda 2030. Physical education (PE) creates an environment that supports the development of co-education, respect, cooperation, and entrepreneurship behind the healthy perspective of exercise and physical activity, which in turn creates a connection to the advancement of the SDGs (Baena-Morales et al., 2021).

Furthermore, concerted action that considers every person's opportunity and circumstance is crucial if the SDGs are to be achieved. The sustainability concept—which encompasses ecological, economic, social, and political aspects—was included in the Physical Education (PE) and PE teachers' investigation by Lohman and Goller (2023), leading to consideration and prioritization of the measures necessary to implement the Sustainable Development (SD) approach. According to the quest of Baena-Morales et al. (2021), they concluded that not all SDGs' goals can be implemented in PE based on the study's initial objective offer. Moreover, Lohman and Goller (2023) add ESD's instrumental and emancipatory aspects, exposing a wide range of subjective sustainability concepts about ESD.

The United Nations (2015) stated that exercise and physical activity were instruments for maintaining good health and fitness. The existing perspective on fitness, physical activity, and exercise contribution has transferred from fierce and exhaustive strong exercise to a wide scale promoting physical activities. Baena-

Morales et al. (2021) have demonstrated how three official legal documents relate physical education and sport to specific SDGs. Well-planned, organized actions tailored to each particular's needs are crucial to achieving the SDGs. Furthermore, a few uncommon publications have suggested how Physical Education can present the view to start Agenda 2030. In the subject of PE, Agenda 2030 is a topic that is frequently overlooked, and further investigation is required to determine how sustainability may be interpreted, presented, and incorporated with PE (Fröberg & Lundvall, 2021).

Implication of Scoping Review in Mapping Literatures

A scoping review locates the highlights and importance of a particular topic, creating another vision that passes through an organized process. This is usually used to review and explore various studies' boundaries, limitations, and gaps that produce a more complex review of results and evidence (Mak & Thomas, 2022). Moreover, scoping reviews provide a broad overview of evidence on a topic, identifying emerging areas, clarifying key concepts, and identifying gaps. In addition, a scoping study approach was employed to analyze, reflect, and identify research gaps in occupational balance (Munn et al., 2018). It can identify a topic area for a future systematic review. Since 2012, the number of scoping reviews has increased, indicating a need for improvements in reporting and conduct (Tricco et al., 2018).

A scoping review is a method that was used in various areas of specialization such as in the study conducted in the field of medicine, where it uses scoping review in a way of following the PRISMA-ScR (Referred Reporting Item For Systematic Review and Meta-Analyses Extension for Scoping review) as well as collecting all the related studies and literature, including journal articles published within a particular year were retrieved using well-aligned search technique towards the major electronic databases which is the: Pubmed, Scopus, and Clarivate Analytics' Web of Science. To assess the eligible articles that can be included in this study, Thomson Endnote (Clarivate Analytics, Inc) was used (Smits et al., 2022; Yao et al., 2022). Meanwhile,

a scoping review was used in the field of social impact to explore what knowledge and gaps already exist about the said field by performing the following process: defining the search string and eligibility criteria, carrying out the search, checking the corpus for comprehensiveness, confirmation of search string and lastly, the final corpus (Vanhuysse et al., 2021). While most of the literature indicated that Physical Education is helpful and has multiple roles in the Agenda 2030, there is still a knowledge gap in the area of interest where Physical Education is seen as a contributing factor to achieving the SDG Agenda 2030. Agenda 2030 is still a wide and obscure area that needs further research to understand its scope in different fields better. It is in this light that this study aimed to know the different contributions that Physical Education has that can be used to promote further and achieve Agenda 2030. Moreover, it targeted the highlight of these SDGs namely, the health and well-being (SDG 3) and quality education (SDG 4) in Physical Education.

The crucial connection between physical activity and health outcomes, along with Physical Education's role in developing education outcomes, make these the most helpful areas for evaluating the success of PE programs. Supporting and strengthening these areas directly supports broader development goals, as healthier and more educated people contribute positively to many parts of society. With that, this study highlighted SDGs 3 and 4 which are relevant to explore the core areas where Physical Education takes part in achieving Agenda 2030. Specifically, the study attempted to examine the key aspects of the contribution of Physical Education in achieving sustainable development goals through a scoping review. The findings of this research would significantly contribute to government and educational institutions as they can craft and apply to improve plans and strategies aligned to achieve the targets of Agenda 2030. In addition, it would assist the teachers and students in increasing their knowledge about the SDGs and how Physical Education might help in achieving Agenda 2030.

Methods

This section describes the method employed in the study with strict compliance with the framework proposed by Arksey and O'Malley (2005) in conducting a scoping review.

Research Design

This study employed a scoping review of relevant literature about the contribution of Physical Education in SDG. The scoping study is an advanced kind of literature review and tends to focus on a direct, wide topic where many different research designs could be useful. A systematic review typically focuses on a precise, specific question and appropriate research design that can be determined in progress. Further, although a scoping study is legitimate to go extensively into a particular re-

search subject, a systematic review aims to provide answers to questions that fairly attain the fundamental value of the study (Badger et al., 2010). Highlighting the discussion applied in various studies could strengthen the findings, making them effective for policymakers, practitioners, and service users.

Research practitioners acknowledge both the strengths and limitations of the technique while emphasizing how scoping review plays a vital role in terms of comprehensive argument rather than other types of systematic review (Arksey & O'Malley, 2005). With this, it allowed the researchers to identify and map all the possible contributions of Physical Education towards Agenda 2030 by examining and summarizing all the existing bodies of literature in the Scopus database.

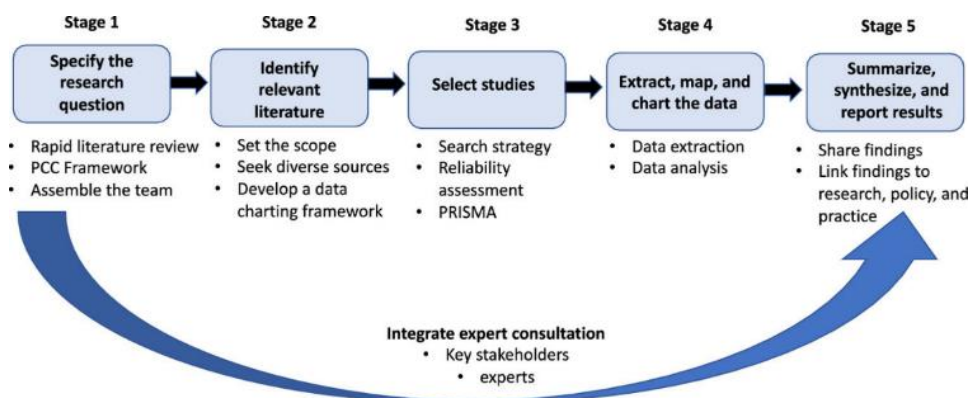


Figure 1. Scoping Review Framework from Arksey & O'Malley (2005)

The specific process that was implemented in the study includes the following: (1) specify the research question, (2) identify relevant literature, (3) select studies, (4) extract, map, and chart the data, and (5) summarize, synthesize, and report results.

In line with the scoping review, research questions served as guide towards building a search strategy. Secondly, identifying relevant literature aimed to comprehensively answer the central research questions. Next, in selecting the studies, the inclusion and exclusion criteria were considered in the study. Afterwards, the data extraction process where narrative synthesis and meta-analysis was performed. Lastly, the analyzed data were collated, summarized, and reported (Arksey & O'Malley, 2005). Similarly, the search strategy comprised a combination of keywords related to "Physical Education," "Sustainable

Development," and other relevant terms were used to search for related studies within the context of the present study. Boolean operators (AND, OR) were also used to provide a refined search of the articles. For the study selection, the researchers acted as independent reviewers who conducted the initial screening of titles and abstracts to verify the eligibility of the studies. Subsequently, full-text reviews were performed to assess the authenticity of the eligibility anchored on the established inclusion and exclusion criteria. The scope of the data was both from local and international sources. A standardized data extraction was carried out regarding the data collection procedure. For the data items, an extraction information sheet, and a tabular form, were utilized to organize the studies as to the author(s), publication year, study design, participants/respondents, intervention details (if

applicable), outcomes or results, and key findings (Büchter et al. 2020).

Stage 1: Defining the Research Questions

This section addressed three questions to describe the contribution of Physical Education to achieving sustainable development goals through a scoping review.

1. What specific dimension related to PE can contribute to attaining SDG 3: Good Health and Well-Being?
2. What are the challenges and limitations of physical education in terms of pedagogical action toward attaining SDG 4: Quality Education?
3. In what way does physical education contribute to attaining SDG 4: Quality Education?

Stage 2: Identifying Relevant Literature Sources of Data

This study used the Scopus database as a source of data, to gather information from different studies targeted by the contribution of PE in Agenda 2030. More than 20,000 peer-reviewed journals from 5000 publishers and 1200 open-access journals make up the amount of journals available on Scopus (Tober, 2011). In like manner, the greatest abstract and citation database of peer-reviewed literature across a variety of topics is acknowledged to be Scopus (Mercuri et al., 2016). It is relevant, accessible, up-to-date, and also linked to many documents and journal articles which is why it is widely used by experts and researchers (Pranckutė, 2021; Schotten et al., 2017; Zhang, 2014). With that being said, Scopus will be a suitable source of data for collecting literature.

This study classified all the related literature/studies published between 2016-

2024. The search for the relevant literature/studies was conducted using the Scopus database, which has a broad coverage of the topics in this field of study. The researchers used various key terms such as Agenda 2030, PE, Education, Good Health and Well-being, and Quality education (see Table 1). These keywords searched for a wider source of related articles that have significant connections or align with this field of study. After the results were released and exported to Microsoft Excel, the researchers investigated those potential articles to see if they met the inclusion criteria. Two authors of this study were assigned to select and extract each article by reading the titles and abstracts. If the title and abstract met the inclusion criteria, they were colored green while for those articles that failed to meet the inclusion criteria, they were colored red. After selecting and extracting all the articles, those marked color green underwent full-text screening further to investigate their relevance to the aims of this study (i.e. trends in physical education research that align with the principles of SDGs, specific perspective related to PE can contribute to attaining SDG 3, competencies under physical education are needed to attain SDG 3, challenges and limitations of physical education in terms of pedagogical action toward attaining SDG 4, way does physical education contribute to attaining SDG 4).

To ensure consistency and minimize the bias in selecting the articles, two independent reviewers screened the titles, abstract, and full texts based on the predefined inclusion and exclusion criteria. In cases where discrepancies were encountered, these were resolved through discussion and consultation with the third reviewer.

Table 1. Key Search Terms

Search Terms
“Sustainable Development Goals” OR “Agenda 2030”
“SDG 3” OR “Health and Well-being” OR “Health”
“SDG 4” OR “Quality Education”
“Physical Education” OR “PE”

Eligibility Criteria

The eligibility criteria were established by determining the studies to be included (Moher et al., 2015; Tricco et al., 2018; Rethlefsen & Kirtley, 2021). The inclusion criteria were defined using the Population, Intervention, Context, Outcome, and Study Design (PICOS) framework (see Table 2). On a detailed note, the following were the employed criteria on this study (a) the population of the studies covers articles that have been conducted or involved in any level of formal education such as elementary, high school, and tertiary level; (b) for the intervention, the researchers selected

papers that justify ideas, address issues, and concerns, and provide insights, in line with the significant role of PE in the context of Agenda 2030, to be specific SDG 3 and 4; (c) the context that was set is Physical Education. The researchers selected papers with PE and SDG or Agenda 2030 in the title and abstract. The outcomes of the selected papers must discuss ideas concerning the significant role of PE towards SDGs 3 and 4, and (e) the study design should include peer-reviewed articles, conference proceedings, and grey literature from the Scopus database (Amir-Benghadami & Janati, 2020).

Table 2. PICOS Framework

P	I	C	O	S
Population	Intervention	Context	Outcome	Study Design
Articles that include Sustainable Development Goals in connection to Physical Education	Contribution of physical education to achieve the Agenda 2030	Physical Education	Highlighting PE that contributes to achieving the Agenda 2030 (SDG 3: Health and Well-being, and SDG 4: Quality Education)	Experimental, Quantitative, Document Analysis, Qualitative, and Quasi-experimental

Stage 3: Article Selection/Study Selection

The scoping review followed the PRISMA-SR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Systematic Reviews) guidelines to record all the possible included articles, using this framework all the collected articles underwent three stages. This method was selected as it is the most appropriate and effective approach to map and identify the gaps and locate evidence from previous studies. The PRISMA provides a checklist and a flow diagram to help researchers improve the reporting of covered studies (see Figure 2). In terms of the exclusion criteria, non-English language publications, studies that do not directly address the contribution of PE to the SDGs, and inadequate data or methodological inconsistencies were excluded (see Table 3). Regarding the information source, Scopus was the database used considering that it is the world's largest and most comprehensive research indexing site. The first stage is the Identification that was applied after searching articles in Scopus Database using the key words connected to the topic

of interest (i.e., "PE" "Sustainability" "SDG" or "Agenda 2030"). In the second stage, the two members of the research team screened and reviewed the recorded articles by scanning their titles and abstract and kept the articles that address ideas, issues, insights, PE, SDGs, Agenda 2030 and other term that are relevant to the proposed research question like perspective, ways and barriers, etc. For the last stage, it is known as the full text screening of the retained articles to ensure that the all articles meet the inclusion criteria upon full text screening the following criteria were being considered: Population of the studies covers articles that have been conducted or involved in any level of formal education such as elementary, high school, and tertiary level; papers that justify ideas, address issues, and concerns, and provide insights, in line with the significant role of Physical Education in the context of Agenda 2030, to be specific SDG 3 and 4; papers must discuss ideas concerning the significant role of Physical Education towards SDGs 3 and 4; and

the study design should include peer-reviewed articles, conference proceedings. All the articles that met the inclusion criteria became the final data set that underwent data charting.

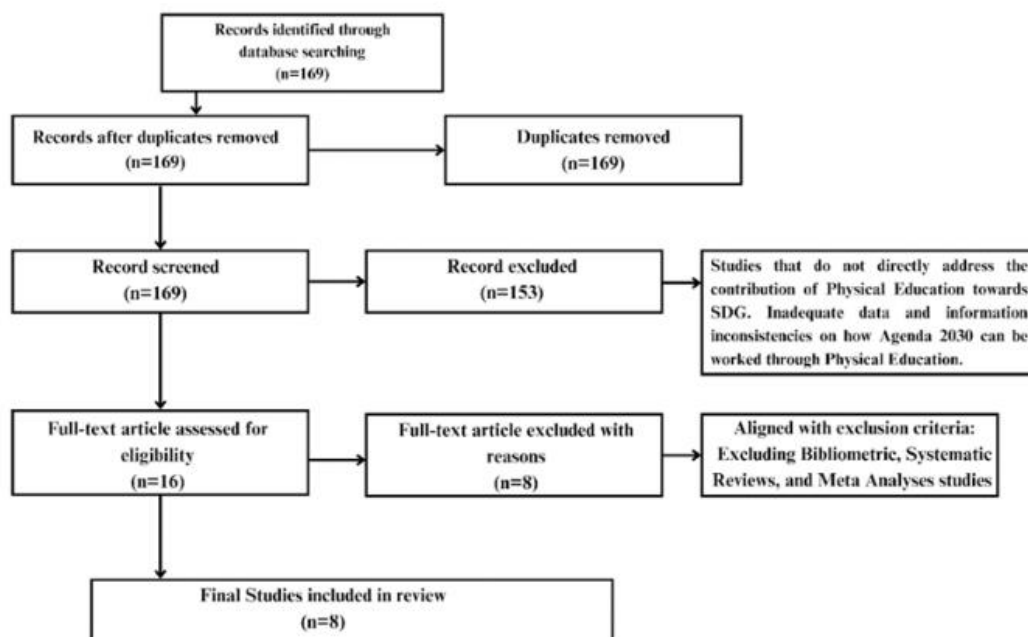


Figure 2. Embedded PICOS to PRISMA Framework

Table 3. Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Time	2016 - 2024	Articles that were published before 2016.
Language	English	Non-English studies
Type of article	Peer-reviewed articles, conference proceedings, and grey literature from the Scopus database.	Articles that are not peer-reviewed, conference proceedings, and grey literature from the Scopus database.
Study Focus	Studies that address the direct contribution of physical education towards achieving the SDG and studies that provide enough data on how the 2030 Agenda can be worked through physical education are also important.	Studies that do not directly address the contribution of Physical Education towards SDG. Inadequate data and information inconsistencies on how Agenda 2030 can be worked through Physical Education.

Stage 4: Data Charting

A summary of the selected articles/studies is shown in Table 4. It provided the details of the articles included that are eligible for this study. Data charting was formulated considering the following information: (a) Study number, (b) Title and Year, (c) Author/s, (d)

Location, (e) Aim of the Study, (f) Study design, and (g) Outcomes. Moreover, the data items that show direct connections to the proposed research questions were also included in the extraction process. The researchers identified the answers to the given research questions via content analysis.

Table 4. Article Profiling

Study Number	Title	PICOS
1	A new vision of mindfulness in physical education. Contributing to the social dimension of sustainable development (2022)	This study focuses on yoga as an effective PE curriculum content to raise awareness on learners about the SDGs. Using experimental design, it was revealed that the application of yoga in classrooms improves learners' participation and contributes in engagement to physical activity. In addition, this also develops the mental health that helps in understanding what healthy life means to students. The involvement of students in the experiment gained benefit in achieving the targets of SDG 3 and 4 as it is integrated in achieving quality education while promoting the health and well-being aspect.
2	Education for Sustainable Development Understanding by Physical Education and Sports Specialists (2023)	Investigation to the PE and sports specialists in Ukraine knowledge and understanding was the aim of the study. Main respondents of the study were the representatives from general secondary institutions as they are the expert and considered professional in the field of sports and PE. This quantitative study incorporated surveying followed by analysis of gathered information, and processed the information mathematically. With the results, it was discovered that PE and sports specialists connect PE and sports in SDG 3, 4, and 5 as these are the goals that can be integrated in educational activities and competencies under PE and sports.
3	Unveiling Connections: A Thorough Analysis of Sustainable Development Goals Integration within the Spanish Physical Education Curriculum (2024)	The connection between Spanish PE secondary education and the SDGs are still not clearly evident that is why this study utilized document analysis with the use of PE curriculum documents to analyze the contents and details of the course. The analyzation shows that PE is one of the essential aspects that should be considered and developed in order to present and promote sustainability in learning. In conclusion, PE have connection to several SDGs, especially with SDG 3, 4, and 5 as these goals are the one aligned with the objectives of Spanish PE curriculum.
4	Educating Teachers for Sustainability and Social Justice: A Service-Learning Project in Physical Education Initial Teacher Education (2023)	This study took place during the school placement curricular unit of a master's programme in the Physical Education Teacher Education programme. By utilizing qualitative research, the study claimed that service learning (SL) is thought to be one successful initiative for developing and strengthening a student's intellectual capacity, such as ability to understand and compromise in the context of the

Study Number	Title	PICOS
		SDGs. The Pre-Service Teachers encountered some challenges, including adapting to the needs and regulations of the organizations involved, structuring the reflection process, and monitoring the learning of both their students and themselves. In order to guarantee that future educators understand the significance of the teaching-learning process, the Sustained Olympic Project (SOP) was designed to provide an educational space in higher education for teachers and to enhance Preservice Teachers' (PST). Moreover, this also helps and allows teachers to advance towards a more sustainable future.
5	Future physical education teachers' perceptions of sustainability (2023)	The study employed qualitative research to fully capture and thoroughly examine preservice teachers' viewpoints regarding sustainability. This study wants to further explore and investigate the preservice PE teachers' understanding and opinions in relation to the contribution of PE to attain the SDGs. Preservice PE teachers find sustainability in achieving the SDGs from a broad viewpoint, which led to unclear and ineffective application of SDG competencies in teaching methods. It was discovered in this study that PE teachers simply view sustainability as a profoundly environmental necessity. For teaching faculty to comprehend the role that PE plays in advancing sustainability in society and education, they must adopt a pedagogical approach that requires training.
6	Towards Sustainable Early Education Practices: A Quasi-Experimental Study on the Effects of Kindergarten Physical Education Programs on Fundamental Movement Skills and Self-Regulation in Haikou City, China (2024)	This quasi-experimental study investigated the impact of various kindergarten PE programs on fundamental movement skills (FMS) and self-regulation using a pre/post-test control design. This study also examined how children's motor skills and development of self-regulation were affected by two distinct types of PE programs, structured movement classes and unstructured outdoor play. The study emphasizes the potential benefits of kindergarten PE programs in identifying potential and helping kindergarten pupils achieve SDGs, particularly in health and well-being. It underscores the importance of early childhood development, its holistic contribution to child development, and its alignment with sustainability.

Stage 5: Summarize, Synthesize, and Report Results

In this stage, the researchers summarized and collated the outcomes or results and key

findings of all eligible articles regarding the contribution of physical education towards achieving sustainable development goals (SDG). The researchers examined the evidence

through full-text screening of each article and integrated the findings with the research questions proposed by the researchers.

Findings and Discussion

A total of 169 research articles were collected through Scopus. In this section, the researchers analyzed the outcomes, results, and key findings of all eligible articles regarding the Contribution of Physical Education toward achieving Agenda 2030. The analysis revealed two themes on how Physical Education can contribute to achieving the Sustainable Development Goal (SDG). These themes were addressed as: (I) Health Promotion - Multiple studies emphasized the role of Physical Education in promoting holistically healthy individuals, which is aligned with SDG 3 (Good Health and Well-being); and (II) Education - PE Teachers provide a quality education that targets SDG 4 (Quality Education).

Around 169 papers published on Scopus between 2016 to 2024 were extracted as the first dataset. The first data set went through screening with the use of reading and analyzing the abstract and title of each study. While screening the pieces of literature, a criterion was used for the inclusion and exclusion of paper. After examining the first datasets, the 16 papers were set to be the records included and that have undergone full-text review. This is to analyze each paper and finalize the number of studies to be included in the final dataset. Before this, six papers were included as the final dataset for the data charting following the last stage of the scoping review. Consequently, the six included papers provided further information to understand the contribution of PE to Agenda 2030. This review only included six articles for the final data set, mainly only these six articles met the inclusion criteria. The recorded six articles were mainly selected based on their methodology in which only standard type of research has been selected, then systematic types of research were excluded as they are the only secondary source of data. Consequently, the robustness of the findings was considered a major factor, which is why the researchers came up with these six articles to make sure that these articles possessed a strong foundation in answering the research questions.

To start with the result, there were different dimensions of Physical Education on how it can contribute towards SDG 3: Good Health and Well-being, which includes Creation of Varied Physical Activities Meeting the Learning Standards, Establishment of Holistic Physical and Health Education Programs, Engagement of the PE Experts and Stakeholders in Attaining SDG 3 and 4, Empowerment of Stakeholders to the Long-Term Benefits of Health and Fitness Engagement. On the other hand, there were different challenges and limitations of Physical Education in terms of pedagogical actions toward attaining SDG 4: Quality Education which consisted of No Clear Policy or Mapping in the Attainment of SDG 4, and The Direction of SDG 4 is Vague and it Lacks Teachers Comprehensive Understanding of the SDG. In line with this, there were various contributions of Physical Education in attaining SDG 4: Quality Education in particular, to Adaptation of the Curriculum to Environmental and Societal Changes, Establish Long-Term Goal towards Agenda 2030, Adaptation and Continuous Learning for PE Teachers, Research Enhancement for Professional Growth, and Promote Educational Values. To ensure the accuracy of this result, the researchers looked for an expert in the field of Physical Education and then sought validation confirming that the identified themes were targeting the essence of each research question.

Specific dimension of PE that can contribute to attaining SDG 3: Good Health and Well-being

There were various dimensions of Physical Education that contribute significantly to achieving SDG 3. Physical Education elevated efficient physical activity, encompassing components that introduce healthy living choices, all of which led to improved and enhanced overall health and impact a person's general quality of life. In addition, assuring good health and stimulating well-being throughout the life cycle is essential for sustainable development. While significant progress has been made in recent years to face persistent global health issues, eliminating a wide range of diseases, and promoting a healthy lifestyle (Babu & Srivastava, 2024). The following were the specific dimensions in the PE discipline that contribute

in one way or another to SDG 3: Good health and well-being.

Quality of Support for the Offering of Physical Education and Sports

Creation of Varied Physical Activities Meeting the Learning Standards

Introducing yoga into the school classroom and as part of the curriculum has a pivotal role in targeting the objective of SDGs 3 and 4 (Colón-Calvo et al., 2022). As it is believed to be effective in improving the mental stability of students and establishing their perceptions regarding what a healthy life means as an individual. Furthermore, the integration of Yoga into the curriculum is viewed as a manifestation of fostering concentration, replacing negative behavior with positive one, builds self-confidence and a level of relaxation which helps students manage stressful situations in class (Butzer et al., 2015; Chen & Pauwels, 2014). A mindfulness-based activity such as yoga can bring a conducive learning environment inside the classroom as well as assist the students through their learning process. Students also perceived a more easy and calm way of paying attention during class in such a way as completing their task with high quality work. Through the implementation of this mindfulness-based activity students tend to be more conscious when it comes to their bodies and on how they can manage to enjoy themselves while taking care of their body (Eggleston, 2015; Nanthakumar, 2018).

Establishment of Holistic Physical and Health Education Programs

Integrating skill-based programs like ball games, or games that involve movement, and motor skills among students can offer strategic opportunities for holistic development and foster self-regulation skills among students. As stated by Wu et. al. (2024), ball games in PE programs play a vital role in nurturing the Holistic development of students compared to those plays that are unstructured. In addition, applying motor skill activity in various settings and coming up with an effective framework can give significant insights. Consequently, integrating a play-based teaching strategy may nurture the holistic development of a young

child which is an ideal stage of instilling a holistic body in a student. Playing is very attractive to every child. Therefore, by teaching strategies that are used playing games, children will be able to develop their physical, cognitive and emotional growth. By integrating gamified teaching strategy educators create not just enjoyable classes but also create the learning environment more conducive and make students embrace the art of learning (Edwards, 2017; Lunga et al., 2022).

Creation of Physical Education Mapping of the Experts in the Offering of Physical and Health Education

Engagement of the PE Experts and Stakeholders in Attaining SDG 3 and 4

Knowledge and skills of PE experts and stakeholders contribute to targeting competencies to promote and effectively implement the target of the SDGs. The relationship between physical culture and sports and SDGs are clearly evident, specifically in SDG 3: Good Health and Well-being, and SDG 4: Quality Education (Tsyhura et al., 2023). PE teachers as professionals in the education field acts as the designer and implementer of strengthening the knowledge, skills, and values of learners' in accordance with the target goals of SDG 3 and 4 because the significant role of PE and sports is highly recognized especially in education to build awareness and develop understanding of educational stakeholders that improve the goals of Agenda 2030 directly (Abass & Angba, 2020; García-Rico et al., 2021).

Empowerment of Stakeholders to the Long-Term Benefits of Health and Fitness Engagement

PE experts and teachers provide knowledge and in-depth understanding about health which is beneficial in fostering SDG 3: Good Health and Well-being (Tsyhura et al., 2023). Recognition to SDG 3 can contribute in a transformative process of introducing physical activity as teaching feature that allows the professionals to strengthen the relation of PE towards sustainability (Merma-Molina et al., 2023). With the increasing number of cases related to health problems like lack of engagement in PA and poor diet, there are contents from PE that

are applied and developed. These contents address various barriers that aim to achieving a healthy lifestyle (Da Silva Bandeira et al., 2022). Haycock et al. (2020) also highlighted the impact of PE as a subject that helps to strengthen learners' development through the use of flexible teaching approaches like making use of sports to make the students engaged and feel the joy while learning. A healthy lifestyle can be associated with the application of various learning activities that targets mental health and emotional well-being.

Challenges and limitations of physical education in terms of pedagogical action toward attaining SDG 4: Quality Education

SDG 4 aims to provide an inclusive and quality education for all in such a way that every learner has the opportunity to go to school and gain quality knowledge. The following challenges and limitations highlighted the critical areas that need improvement and offer insights into how PE can more effectively contribute to attaining SDG 4: Quality Education as it is being proved by the collected articles on this study.

Barriers to the Attainment of SDG 4: Quality Education

No Clear Policy or Mapping in the Attainment of SDG

Most physical culture and sports experts, as observed by Tsyhura et al. (2023), are unfamiliar with the SDGs; they have only emphasized gender equality, good health and well-being, and quality education. Other SDGs are not highlighted because of the experts' insufficient knowledge, which leads to a limited understanding of the connection of physical culture and sports to the SDGs (Ribeiro-Silva et al., 2023). PE pre-service teachers recognize sustainability in attaining SDGs from a broad perspective that may lead to crafting confusing or ineffective strategies in teaching (Merma-Molina et al., 2023). Furthermore, the process of acquiring knowledge has both barriers and enhancers such as lack of resources for practical work, teachers are unfamiliar with the SDGs, and students are unable to access library books for academic purposes (Chapungu & Nhamo,

2023; Zickafoose et al., 2024). Elevating citizen's understanding of SDGs generally comes down to education. Therefore, it is important to merge and incorporate training aligned with the Agenda 2030 into teacher preparedness programs for them to further understand sustainability, its role and importance in education (Puertas-Aguilar et al., 2021).

The Direction of SDG 4 is Vague and Lacks Teachers Comprehensive Understanding of the SDG

Teaching faculties need to adopt a pedagogical approach that requires training for them to understand the role of PE in promoting sustainability in education, the economy, and society (Merma-Molina et al., 2023). The quality of education is still a complex problem that needs to be addressed that includes lack of awareness and class-driven structural barriers as the main factors in the ineffective implementation of ESD. Thus, the curriculum should focus on improving strategies to assist educational stakeholders in achieving SDG 4 (Goshu & Woldeamanuel, 2019; Kang, 2019). Different issues, particularly a crowded curriculum, insufficient resources and teacher engagement, are understandably limiting factors, while initiatives from schools, and technology that involve teachers in decision making procedures are certainly supporting and facilitating elements. In order to implement sustainability education in schools and promote the development of sustainability competencies among school administrators and training opportunities are required (Cebrian et al., 2020).

Ways on how physical education contributes to attaining SDG 4: Quality Education

Physical Education is a subject where its competencies and programs can be used in developing holistic wellness. On the other hand, its implementation in line with the curriculum also targets in achieving quality education, to ensure that inclusive and quality education is offered and given to every learner. In accordance with the outcomes of several collected studies, there were various ways discovered on how PE significantly contributes to attaining SDG 4: Quality Education.

Reengineering of PE Curriculum Adaptation of the Curriculum to Environmental and Societal Changes

Physical Education plays a vital role in fostering transformative change, ensuring all students are included in improving competencies and learning in the educational system with the help of activities offered and implemented in PE, such as games and sports, which help in building inclusivity and knowledge opportunities to form a competitive approach that is beneficial in obtaining quality education (Marín-Suelves & Ramón-Llin, 2021). Early Education practices highlight the skills that kindergarten students can learn and manifest throughout the learning process, and involving PE programs contribute to holistic child development (Wu et al., 2024). In the study of Vaghari Zamharir et al. (2023), they mentioned that with the various challenges experienced in PE curriculum, development of curriculum design and implementation can solve and prevent possible barriers that educational institutions and stakeholders may face.

Realization of the Learning Standards in PE towards SDG

Establish Long-Term Goal towards Agenda 2030

PE focuses on key competencies that create an environment for students to engage in understanding SDGs. Motor skills competencies that support the promotion of obtaining the sustainable vision of SDG 4: Quality education that does not only focus on learning but also makes every individual an active contributor to society, like helping people and shaping the mindset of people to appreciate the importance of sustainability which can transform the world people live in into a better place (Boned-Gómez et al., 2023; Merma-Molina et al., 2023). Moreover, UNESCO's education for sustainable development aims to empower students to make responsible decisions in society, economic, and environmental integrity for the present and the future. Learning pedagogies can help in crafting strategies to provide quality education and foster holistic development aligned with the goals of the Agenda 2030 while integrating ESD in teaching will make transformative learning to

further recognize and promote the SDGs as establishing competencies and giving emphasis on Educational for Sustainable Development (ESD) can enhance students' knowledge, for them to explore and further comprehend the Agenda 2030 (Dlouhá et al., 2019; Giangrande et al., 2019).

Development of Grass Roots Competencies of PE Teachers

Adaptation and Continuous Learning for PE Teachers

Pre-service teachers' perspectives on sustainability are not precisely aligned with the goal of Agenda 2030, and most of them view sustainability from an environmental dimension (Merma-Molina et al., 2023). As specified in the study conducted by García-González et al. (2020), there are also a number of factors to be considered and learned by PE teachers that is why mandatory training for teachers regarding SDGs should be implemented to ensure the effectiveness and quality of learning. Modifying the pedagogical approach of teachers is also important especially in methods, strategies, and disciplines to further promote sustainability in the learning process (Hodge et al., 2017; Parsons et al., 2017). In addition, the continuous development and constant change of curricula should also reflect on the adjustments in teaching, to provide and shape the learners' capabilities (Jovanović & Minić, 2019).

Research Enhancement for Professional Growth

A demand for boosting the support and resources for educational stakeholders is seen to be needed to take action, to enhance and adapt to new changes, and effectively integrate policies in education in the context of teaching strategies. Likewise, it is captivating to compare this concept in the existing trend nowadays to the other differences of educational context. Implementation of such projects or programs like raising awareness, crafted and aligned to the curriculum with the essence of SDGs (Boned-Gómez et al., 2023). To achieve this, a multi-stakeholder collaboration is seen to be the best strategy that can be incorporated, which has the potential of increasing the re-

sources as well as expertise that nurture collaboration and increase the accountability (Rachmawati et al., 2024). Moreover, strengthening the scientific component is crucial for improving the efficiency of training future specialists, particularly teachers by developing their knowledge in research, skills, abilities, and competencies (Fomin, 2023).

Promote Educational Values

As stated by Pnevmatikos et al. (2019), education is essential not only in terms of imparting knowledge but also instilling values in adult students, as it equips them with the necessary skills and competencies to contribute effectively towards social progress. Also, PE has developed over the years, focusing on personal and social responsibility, autonomy, motivation, self-concept and classroom social climate. It has been applied in various educational content and settings, improving coexistence and reducing violence (Jiménez-Parra et al., 2022). Moreover, "Active Values" is an educational program that promotes healthy lifestyle habits through physical sports activity, cultivating education in values and promoting a positive outlook (Jiménez-Parra et al., 2022). Similarly, student engagement is a crucial concept that involves the interaction of students and institutions to optimize the students' experience which involves the development of behavioral, emotional, and cognitive characteristics (Fomin, 2023).

Conclusion

This study's primary objective was to identify the role of Physical Education (PE) in achieving the 2030 Agenda using studies published in Scopus as its primary source. PE is recognized as a subject for its contribution to the holistic development of students. However, its connection to SDG 3: Good Health and Well-being and SDG 4: Quality Education remains broadly defined. The curriculum content of PE, along with its application in learning significantly contributes to the development of learners and education, considering several perspectives encompassing from fundamental to complex skills.

While the eligible articles acknowledge PE's potential contribution on the SDGs, many lack

detailed insights into how these goals can be directly attained through PE. Moreover, the researchers' extracted articles that target the PE and Agenda 2030 as the first dataset while there were articles excluded because of their focus to other fields (e.g. the use and application of the Agenda 2030 in various fields such as tourism, politics, poverty, economy, and other fields.) On the other hand, fifteen studies were chosen by the researchers focusing on the abstract and title. To further explore and identify the eligibility of each paper, it underwent a full-text review to ensure that every article is aligned with this study. After the full-text review, eight (8) studies became the final data set used in the data charting, providing significant insights into PE's role in sustainability and its contribution to educational development.

Limitations

This study explored the contribution of Physical Education in achieving Agenda 2030, focusing on SDG 3: Good Health and Well-being, and SDG 4: Quality Education. With that, the scope of this review was limited where only two among the 17 SDGs of the Agenda 2030 were being covered that led to the exclusion of articles that were not supporting and connecting to SDG 3 and 4 in the field of PE. This include studies that discuss the role of Physical Education towards other SDGs like SDG 5: Gender Equality instead of solely focusing on the SDG 3 and 4, including related literatures that were not in the context of PE. In addition, only eight articles were seen as sources of information in answering the questions using Scopus. The most frequent limitation reported in the reviews was the possibility that the review may have missed some relevant studies. This limitation was frequently attributed to database selection and exclusion using the crafted criteria. The researchers selected papers that utilized English language on the documents published in peer-reviewed journals. This possibly led to a language bias, as upon clearing the first dataset there were papers that discussed PE in the context of Agenda 2030 and its SDG written in other language which were excluded. Another methodological limitation realized was as upon the selection of articles, most studies stated that the contribution of PE towards SDGs

were systematic reviews which are being excluded as they served as secondary sources of information and as it is based solely on pieces of literature.

Recommendations

The Agenda 2030 remains relatively unknown worldwide, highlighting the need for broader awareness and dissemination of information to foster a positive vision towards achieving the Agenda 2030. On the other hand, this study focused on the role of PE to SDG 3: Good Health and Well-being, and SDG 4: Quality Education. Other SDGs can be further explored in the context of PE, as there were many studies integrating the subject into multiple SDGs. Literature on Agenda 2030 predominantly originates from Western countries, highlighting the need for Eastern nations' perspective to invest in developing research about SDGs to recognize their distinct applications and use its relevance to their societal development.

On the other hand, as this study used a scoping review, researchers may use other research designs to further explore the contribution of PE in achieving the Agenda 2030. Expanding the use of electronic databases other than Scopus could also enhance the scope and diversity of findings, supporting curriculum developers, educational stakeholders, and academic institutions to plan, design, and refine curricula in achieving the SDGs of Agenda 2030.

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