

A bibliometric analysis of adaptive physical education

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Abstract:

Research on Adaptive Physical Education (APE) has been carried out in many countries, but most has been performed in the United States. The topics studied in APE are very diverse and are aimed at various subjects, such as students, athletes, and others. Although many studies have been carried out, no literature review on APE has been published. It is necessary to map to provide an overview of APE research for future researchers. Therefore, this study was conducted to analyze research on the topic of APE. Through this bibliometric analysis, we aimed to map Adaptive Physical Education (APE) research. Visualization of the obtained data was analyzed using the VOS Viewer program. Based on the keyword document analysis collected from the Scopus database with the keywords "physical education adaptive" OR "sport adaptive" OR "adaptive physical education," 107 documents were obtained. Then, the limitations were carried out with document type article and conference paper, source type "journal" & "conference proceeding," and language "English"; then, there were 34 documents. APE publications have increased periodically, starting from 2019 to 2021. The Journal of Physical Education and Sport is a Q2 journal that publishes many articles on APE. The United States is a productive country that has published considerably in the field of APE. Grygus is a productive researcher who has published considerably on the topic. Based on network analysis, five clusters were obtained on APE. Through overlay visualization, APE has been often connected with special education topics, adaptive sports, exercise, and clinical articles in the last two years. The findings showed that research on APE is still limited and is predicted to grow in the coming year.

Keywords: Adaptive Physical Education; APE; Bibliometric Analysis; Disabilities; Special Needs

Introduction

The purpose of national education in formal education is not only related to the spiritual, but also related to the physical. therefore, the education curriculum in Indonesia includes subjects of Physical Education, Sports and Health. This education is an integral part of the overall education. Aspects of physical fitness, movement skills, critical thinking skills, social skills, reasoning, emotional stability, moral action, and aspects of a healthy lifestyle are the main focus of sports and health physical education. The process will provide opportunities for students to learn to understand physical growth and psychological development, as well as form a healthy and fit lifestyle throughout life. Those activities require students to be skilled at sports to form a culture of healthy living.

Actualizing sports and health physical education is not easy to do if in special conditions. The existence of obstacles and disturbances experienced by students with special needs makes them experience limitations and are not even able to participate in several learning activities, one of which is learning physical education, sports and health. So that in order to actualize the provision of educational services with the same quality to all students, in physical education for students with special needs it is necessary to make adjustments (adaptation). Adaptive physical education itself is physical, sports and health education which has been modified, both in terms of the form of sport, the tools, the learning plan, and even the curriculum.

Adaptive physical education (APE) is designed to improve and rehabilitate community life. APE is an individualized program consisting of fundamental motor skills and patterns, physical and motor fitness, dance and water sports skills, and individual or group games and sports designed to meet the individual's unique needs (Winnick & Porretta, 2016; Yun & Beamer, 2018). APE is part of the discipline of physical education, which is expected to provide a sense of security, cultivate personality, and provide a complete experience to students with special abilities (Horvat et al., 2019; Reina et al., 2019). Students with special needs, or those often referred to as persons with disabilities according to Law Number 8 of 2016 in Indonesia, are grouped into those with (1) mental and developmental disabilities, (2) intellectual disabilities, (3) physical disabilities, or (4) sensory disabilities. The purpose of APE is to correct deficiencies in behavior adjustment by building self-embodiment so that a person can develop optimally and contribute to society.

Each person with a disability has different characteristics and, of course, has different service needs. Many things need to be adjusted or adapted because of the limitations and obstacles experienced by people with disabilities. APE activities are for students with special needs in Special Schools (SS) and for School Inclusive Education Providers (SIEP); adjustments are needed according to the characteristics of students with special needs. When learning APE, one must identify the problems faced following the guidance of the learners, their sensory, motor, learning, and behavior limitations (Burhaein et al., 2021; Sato & Haegele, 2018). Survey results (Center for the Study of the Disabled, 2019) have illustrated that learning APE in Special Schools has not been optimally implemented. There are several causal factors, such as (1) limitations of the learner's ability, demanding that the teacher must provide various ways, such as directions with methods and language adapted to the characteristics of the learner; 2) limited media and learning facilities for APE that are following the conditions and characteristics of students; (3) reduced opportunities for learners to access, try, feel, and train in a particular sport due to limited facilities; (4) the teacher's lack of understanding of the characteristics of students with special needs; (5) incorporation of special disabilities into the disabilities of another person; (6) facilities and infrastructure that are not proportional to the number of students; and (7) lack of science and little research on APE.

Research on APE has been carried out in many countries, but most has been performed in the United States. The topics studied in APE are very diverse and are aimed at various subjects, such as students, athletes, and others (Roldan & Reina, 2021; Murata, 2018; Karpov, *et al.*, 2019). Nevertheless, to date, there is a not linked or unified gap of analyzed literature throughout the widely published scientific articles in the area of physical education and sports regarding Scopus database which is one of the indexing for reputable journal. It is necessary to map to provide an overview of APE research for future researchers. Therefore, this study was conducted to analyze research on the topic of APE. This will be described using bibliometric analysis. Some of the research questions in this study are: 1) How many publications on APE are published each year? 2) What are the ten most published sources on APE? 3) Who are the ten most productive countries that publish considerably on APE? 4) Who are the most influential authors in the field of APE? 5) Is the network and overlay visualization about APE based on co-occurrence?

Material & Methods

This study is a bibliometric analysis. Visualization of the obtained data was analyzed using the VOS Viewer program. The reference search was conducted on August 22, 2022. The bibliometric stages of the analysis performed are described in Figure 1.

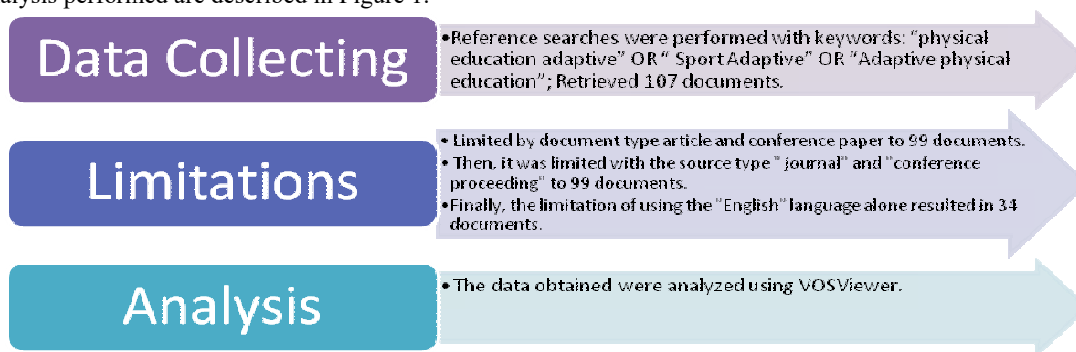


Figure 1. Stages of Bibliometric Analysis of APE

Results

Based on Scopus data for articles in international journals indexed by Scopus and proceedings indexed by Scopus, the number of publications each year is provided in Figure 2.

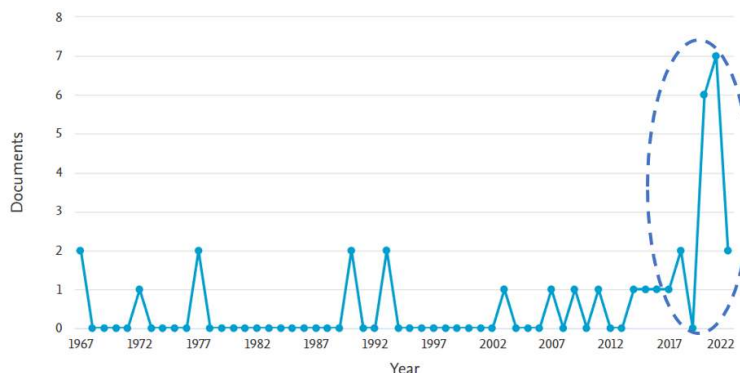


Figure 2. Number of publications on APE per year

The ten journals that have published the most articles on APE, sourced from journals and proceedings, are listed in Figure 3.

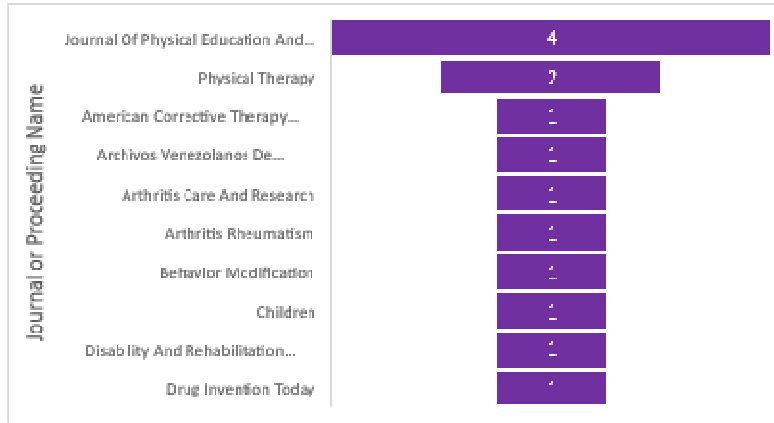


Figure 3. Top 10 journals that publish research on APE

Ten productive countries publish considerably on APE based on Scopus data, as presented in Figure 4.

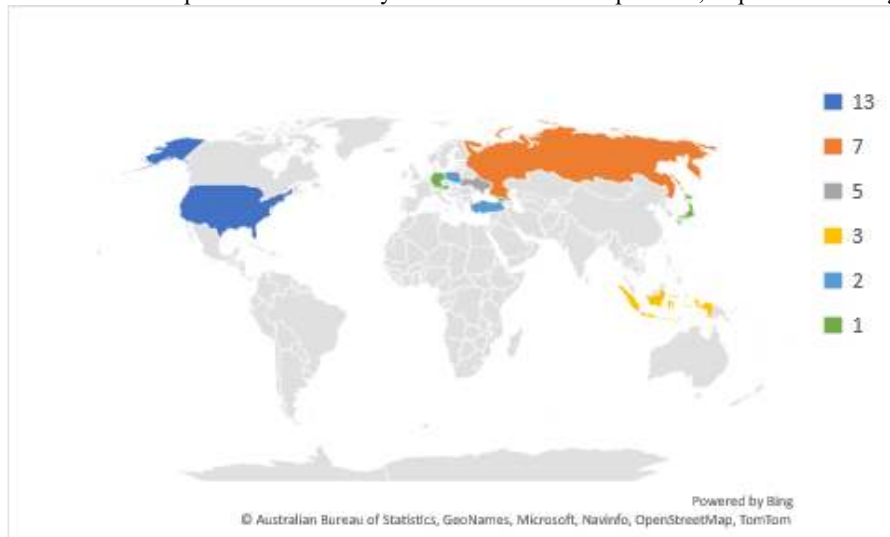


Figure 4. Ten productive countries publish considerable about APE

Influential authors in the field of APE are presented in Figure 5.

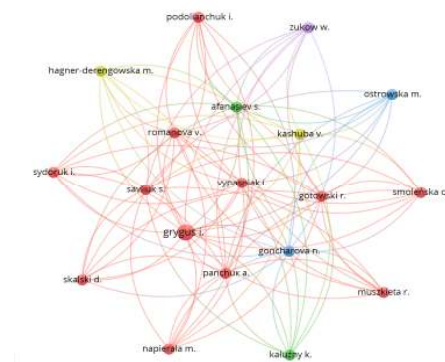


Figure 5. Influential authors in the field of APE

Figure 5 shows that the authors shown on the map influence research in the APE field. These researchers collaborate with each other. Thus, research in the field of APE can continue to grow in various areas. For example, the research that was conducted (Savliuk et al., 2020; Sydoruk et al., 2021) about APE on Down Syndrome and entitled "Implementation of the algorithm for corrective and preventive measures in the process of adaptive physical education of pupils with special needs" are references for other authors to perform and write other research in the field APE. The next results of the network and overlay on APE are presented in Figures 6 and 7.

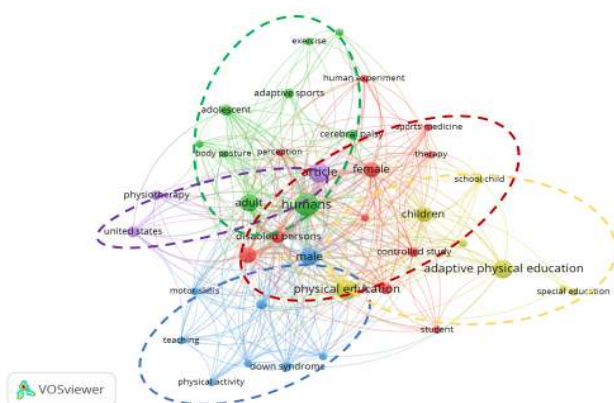


Figure 6. Network visualization for APE

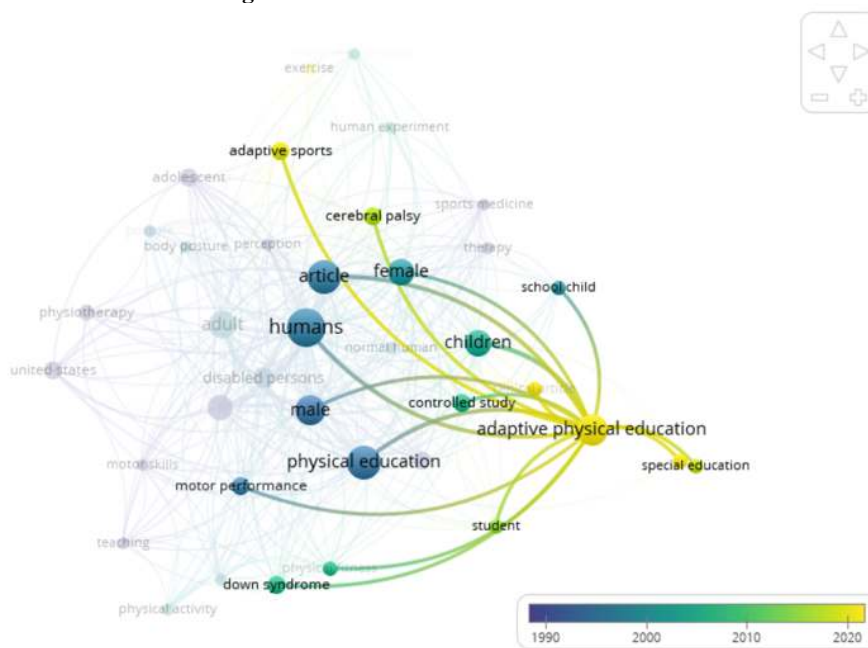


Figure 7. Overlay visualization for APE

Figure 6 shows five clusters characterized by blue, red, green, yellow, and purple. Each cluster shows the APE article numbers shown in Table 1.

Table 1. Research development for each cluster

| No | Cluster | Number of Keywords | Keywords |
|----|---------|--------------------|---|
| 1 | Red | 11 | controlled study, curriculum, disabled person, female, human experiment, normal human, perception, physical education and training, sports medicine, student, therapy |
| 2 | Green | 9 | Adaptive sports, adolescent, adult, body posture, cerebral palsy, exercise, humans, major clinical study, posture |
| 3 | Blue | 8 | down syndrome, education program, male, motor performance, motor skills, physical activity, physical fitness, teaching |
| 4 | Yellow | 7 | APE, children, clinical article, physical education, school child, special education, visual impairment |
| 5 | Purple | 3 | The article, physiotherapy, united states |

Discussions

Figure 2 shows that in the last three years, from 2019 to 2021, there has been a periodic increase in publications in this field. Publications in 2022 are likely to increase, considering that our results are as of August 2022. The increase that occurs every year also appeared in the bibliometric analysis of the publication activity of Russian scientific institutions in sports science from 2008 to 2018 (Smolina et al., 2020) and in bibliometric and authorship trends over a 30-year publication history in two representatives US sports medicine journals (Dynako et al., 2020).

As shown in Figure 3, most of the articles published in international journals indexed by Scopus for Quartile Q1 were obtained and Q2 (Sydoruk et al., 2021a) and Q4 (Kielevyainen, 2021a).

Figure 4 shows that the United States is the most productive country because it has published 13 articles. The Russian Federation then follows them with as many as seven articles, Ukraine has as many as five articles, Indonesia has as many as three documents, Poland and Turkey have as many as two articles each, and Austria, Georgia, Germany, and Japan have as many as one publication each. Some researchers from the US who have studied APE include Wei et al. (2014).

Figure 5 shows that the authors shown on the map influence research in the APE field. As shown, Grygus is a productive researcher who studies this topic, especially APE for children with Down Syndrome (Sydoruk et al., 2021b) and preventive and corrective measures of application of algorithms for the APE process for students with special needs (Savliuk et al., 2020a). Based on 34 articles obtained from Scopus, they were then analyzed using VOS Viewer.

Figure 6 shows that the topic of APE is divided into five clusters, where each cluster shows several keywords or items that appear, as shown in Table 1. The first cluster is centered on APE policy. In APE of schoolchildren, individual characteristics of the development of motor skills of students need to be considered (Khmelnitska et al., 2021). The second cluster is centered on the methods physical education for a student with special needs. This cluster explains that every sport can be used for special needs students but must be adapted. APE has many advantages, and in the third and fourth clusters, the advantages of APE are explained. APE is used in learning for students with Down Syndrome. The use of APE for children with Down syndrome can improve indicators of speed, strength, and scores in their stamina and coordination (Sydoruk et al., 2021b). The integration of gross and fine motor development based on APE and virtual reality technologies is very significant (Efendi et al., 2022). Motivational games that can be used during developmental and physical training sessions have a positive effect on the physical and emotional psychological state of mentally disabled children and can be applied in APE (Krutsevich et al., 2020). In addition, the existence of an APE course has a positive effect on the attitudes of prospective PE teachers towards individuals with physical disabilities. The last cluster focuses on APE in the US. Much research in the field APE has been conducted in the US. According to the visualization, research on APE should be conducted in other countries.

In Figure 7, we show that the last two years of APE are often associated with special topics of special education (Varfolomeeva, 2019; Perreault et al., 2020; Savliuk et al., 2020b; Phytanza et al., 2021; Sydoruk et al., 2021b), cerebral palsy (Umar et al., 2020; Kielevyainen, 2021b; Sugimoto et al., 2022), adaptive sports (Chichkova et al., 2018; Evseev, 2018), exercise Ryan et al., (2017), and clinical aspects (Madden et al., 2017; Piatt et al., 2018; Ahmadi et al., 2019; Franchin et al., 2019).

Conclusions

The findings show that research on APE is still limited and is predicted to grow in the coming year. This is supported by several results, including the following points. (1) APE publications have increased periodically starting from 2019 to 2021. (2) *The Journal of Physical Education and Sport* is a Q2 journal that publishes many articles on APE. (3) The United States is the most productive country in terms of publishing in the field of APE. (4) Grygus is the most productive researcher who has published considerably on this topic. (5) Based on network analysis, five clusters of APE were obtained. According to overlay visualization, the last two years of APE are often connected with special education topics, adaptive sports, exercise, and clinical aspects. The results obtained indicate that research in the field of adaptive physical education has its own uniqueness and selling points. The database of bibliometric analysis results provides an overview of the types of topics that can be selected related to adaptive physical education. If research in this field can continue to increase every year, it means that we support the implementation of inclusive education in the field of physical education, sports and health.

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