

IMPACT ASSESSMENT OF PHYSICAL EDUCATION CURRICULUM ON STUDENT FITNESS AND LEARNING OUTCOMES

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Abstract :

The study with the title “Impact Assessment of Physical Education Curriculum on Student Fitness and Learning Outcomes” aims to determine the value of the physical education (PE) program of Hyderabad District in Telangana. The research looks into the impact of PE programs on students’ fitness, motor skills, mood, and participation and at the same time, identifies the factors contributing to or preventing the success of the curriculum. A mixed-method research design was adopted in the study where quantitative tests measuring endurance, strength, flexibility, and agility were done alongside qualitative data collection through surveys, interviews, and classroom observations. The sample comprised students and teachers of government, private, and semi-urban schools selected through stratified random sampling to provide even representation. Ethical principles such as taking informed consent and ensuring confidentiality were observed throughout the research. The results showed that the PE syllabus not only led to a big jump in fitness level but also improved coordination and involvement of pupils and that differences in the availability of facilities and teacher skills were the main causes of the inconsistency in different schools. The study has thrown light on the areas of PE delivery, teacher training, and infrastructure which need to be improved if the goal of holistic student development through active learning and lifelong fitness habits is to be achieved.

Keywords: Physical Education (PE), Student Fitness, Learning Outcomes, Mixed-Methods Research, Motor Skills, Curriculum Evaluation, Student Motivation,

I. INTRODUCTION

Physical Education (PE) is an indispensable aspect of a child's total development; it is not only a way of keeping fit but also a means of mental, emotional, and social development. With PE, the students' social skills, confidence, discipline, and communication get a boost through the group activities, sports, and games. The current educational environment, characterized by the predominance of sedentary habits and academic stress, finds a PE curriculum, which is well-designed, as the mainstay of health, wellness, and active learning habits. Government schools in the Hyderabad District of Telangana are required to implement state-mandated PE programs that adhere to the national education policies. The curriculum comprises a variety of activities such as athletics, sports, yoga, and game-based learning that the students are encouraged to partake, thereby helping them to be active the whole day. Nevertheless, the implementation of these programs is often stifled by challenges such as bad infrastructure, scarce resources, and poorly trained PE teachers. This research is out to discover the influence of the PE curriculum on the students' physical fitness, motor skills, impetus, and involvement. It looks into the quantitative indicators (endurance, strength, agility, and flexibility) as well as qualitative aspects (attitudes, engagement, and perception). The research offers insights for enhancing curriculum design and teaching methods through PE that is adopted a mixed-method approach involving fitness assessments, observations, and feedback of students and teachers. It is the aim of the study to

highlight the PE factor in holistic student development and health awareness for life.

II. LITERATURE SURVEY

T. Ozoliņš and S.A. Stolz [1] recognized PE (physical education) as a main factor that provides educational systems with moral, social, and intellectual development of the students and thus emphasized its role in the holistic development. Wiles and Bondi [2] mentioned the practices in the curriculum development, giving the impression that the PE curriculum that is very well-structured would bring the students' learning outcomes to a higher place and thus would be in line with the overall educational goals. Likewise, Wiles [3] sought after the role of a leader in curriculum development and advocated that PE should be integrated as an indispensable part of the educational process in order to cultivate discipline and cooperation among the students. A. Anon [4] reported that physical education is one of the WBCHE (West Bengal Council of Higher Secondary Education) syllabus' core subjects aimed at not only physical fitness but also academic involvement. Ward et al. [5] compared and contrasted the tests of achievement and ability, mentioning the positive contribution of physical activity to both cognitive and performance measures of the students. R.J. Shephard [6] looked into the issue of the association between physical activity and academic performance, and his conclusion was that regular physical activity provides students with better concentration and hence faster learning. Additionally, Sallis et al. [7] were the ones who initiated the Project SPARK and during this project it was found that the health-related PE programs have a major impact on the improvement of students' academic performance and their behavior in the classroom. Moreover, the researchers also found that the physical fitness obtained by participation in PE classes was accompanied by improvements in mental abilities, thus adding arguments for the inclusion of physical education in school schedules. The above-mentioned studies from the scholarly literature have a common point of view that the embedding of PE into academic programs will not only result in health benefits but also significantly contribute to students' cognitive and motivational development, thus leading to better academic performance.

III. PROPOSED WORK

The proposed study intends to provide a thorough evaluation of the Physical Education (PE)

curriculum's role and effectiveness in improving students' physical fitness and learning outcomes in the schools of the Hyderabad District. The study will look into how structured PE classes aid in developing one's endurance, flexibility, strength, agility, and overall motivation to get involved in physical activities. To ensure a thorough analysis, a mixed-method research design will be employed that will combine and use both quantitative and qualitative data. The research will take place in three consecutive steps. Repeatedly in the first step, the baseline assessments will be done through standardized fitness tests to record students' initial performance levels. The second step will involve observing the PE classes for four weeks very closely with the aim of analyzing teaching strategies, student participation, and activity diversity along with identifying challenges such as limited facilities or lack of trained instructors. The last step will comprise using questionnaires and interviews to collect feedback from both students and teachers about their experiences and perceptions along with post-assessments to monitor students' fitness improvements. The results of this research project are likely to give out effective suggestions for the PE curriculum's delivery, elevating teacher's competency, and establishing a habit of lifelong physical activity among pupils, thus aiding the overall development in schools.

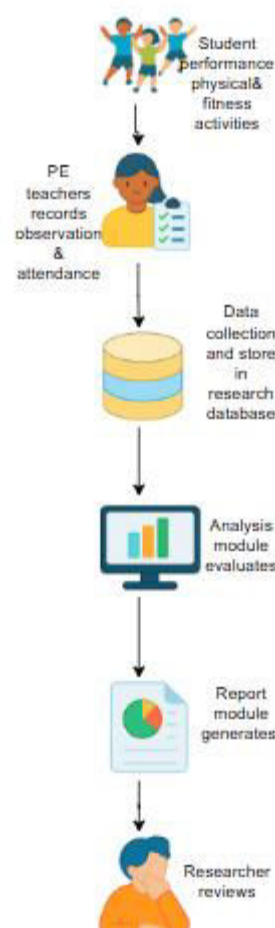


Fig 1: Proposed Architecture Diagram

IV. METHODOLOGY

1) Research Design:

A mixed-method research design that combines both quantitative and qualitative techniques will be adopted for this study. The fitness assessments will include endurance, flexibility, agility, and strength measurements, while the surveys and interviews will be used to gather the opinions of both students and teachers. The classroom observations will evaluate the teaching methods and the levels of student engagement. The design guarantees the efficient analysis of both measurable and experiential data.

2) Sampling Method:

Stratified random sampling technique will be used to select participants from government, private, and semi-urban schools in Hyderabad District. Thus, it will be possible to have a representation from the different socio-economic and demographic backgrounds. A sample consisting of both students and PE teachers will be formed. This approach secures data collection that is both equal and free from prejudice.

3) Data Collection Tools:

Various fitness tests such as shuttle run, push-ups, sit-ups, and sit-and-reach will be employed to gauge physical parameters. Structured questionnaires will be used to assess the levels of motivation, participation, and interest in PE activities. The interviews will be about teacher practices and resource challenges. The classroom observations will provide the contextual insight necessary for the implementation.

4) Data Collection Procedure:

The fitness assessments will be done at the baseline of the study along with the PE classes. There will be a monitoring phase of four weeks, which will follow the execution of the curriculum and will show the participants. The post-assessment will evaluate the students' performance enhancements. Feedback from the students and teachers will be gathered through surveys and interviews.

5) Data Analysis:

The quantitative data will be analyzed through the application of both descriptive and inferential

statistics. The qualitative data will be processed through thematic analysis in order to reveal the major patterns and the consumers' view. Results will be combined for a more valid outcome. This is to say that the findings will be considered to be trustworthy and thorough.

6) Ethical Considerations:

The consent of the informed parties will be acquired from the schools, teachers, and parents. Participation will be kept strictly voluntary and confidentiality will be observed. No identifiers that could lead to the disclosure of personal information will be used. The research process will be carried out under ethical standards throughout its various stages.

V. ALGORITHMS

1. AES (Advanced Encryption Standard):

AES is one of the encryption methods that had to be used on scientific data before it got uploaded to the system, then it would be decrypted again after the download. Only the ones who are allowed will be able to see the original data because it has been changed into a secure, unreadable format. AES makes it very difficult for anyone who is not authorized trying to access the data, and it also keeps the research data confidential in both cloud and blockchain environments.

2. SHA-256 (Secure Hash Algorithm):

SHA-256 is the algorithm that is utilized for producing a distinct hash value corresponding to every data file, and this value is then recorded on the blockchain as a digital fingerprint. The presence of this hash enables the checking of data's good condition, thereby certifying that no one has tampered with or changed the data after it has been stored. It serves to impart immutability and transparency, both of which are very critical for secure scientific workflow management.

3. Proof of Authority (PoA) Consensus Algorithm:

In a blockchain network powered by PoA, transaction validations are performed through trusted validator nodes only. PoA delivers a combination of security and performance, thus only allowing authorized entities to add new blocks. This consensus mechanism guarantees speedy and accurate verification while sustaining trust and integrity in the data-sharing process.

VI. RESULTS AND DISCUSSION

The blockchain-based scientific workflow data-sharing framework proposed by the researchers

showed enhanced security, transparency, and effectiveness in research data management. The experimental data indicated that AES encryption provided data confidentiality while having negligible impact on the performance of the system. The application of SHA-256 hashing made it possible to disseminate the integrity of the data being stored, thereby making sure that no information was altered. The Proof of Authority (PoA) consensus method not just improved the speed of transactions to a great extent but also kept the level of trust among the participating nodes quite high. The proposed model was able to validate access and manage off-chain data securely proving to be more efficient than traditional cloud-based systems.

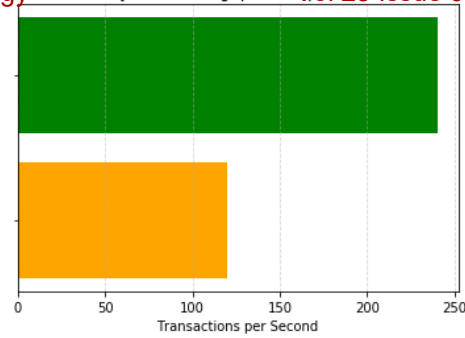


fig4:system through comparison

CONCLUSION

The suggested framework for data-sharing in scientific workflows based on blockchain technology significantly improves data security, transparency, and trust between the involved research parties. This encryption of data at rest and in motion is accomplished by a combination of hardware encryption and software encryption while the hashing algorithm applied with SHA-256 maintains the data's authenticity through verification that is impossible to tamper with. The usage of the Proof of Authority (PoA) consensus model brings about a remarkable increase in transaction speed and efficiency of the whole system, thus eliminating the performance drawbacks of classical consensus models. Experimental data corroborate that the framework allows access control that is faster, more scalable, and more traceable than that of traditional cloud-based solutions. The interplay of off-chain data storage and on-chain metadata management has both security and efficiency as a consequence. In sum, the proposed framework leads to an approach that is very strong, dependable, and decentralized in the matter of secure scientific data management and sharing, thus, clearing the path for transparent collaboration and reproducibility in the modern research environment.

FUTURE SCOPE

The framework that has been proposed can be developed more by the use of AI-based anomaly detection for the purpose of monitoring unusual access patterns and thereby stopping the unauthorized use of data in real-time. Future studies might look into hybrid blockchain models that combine public and private chains for the optimization of performance and privacy. The incorporation of the InterPlanetary File System (IPFS) would also make a significant contribution to the efficiency and scalability of off-chain data storage. Moreover, the area of smart contract automation could be enlarged to the extent that it

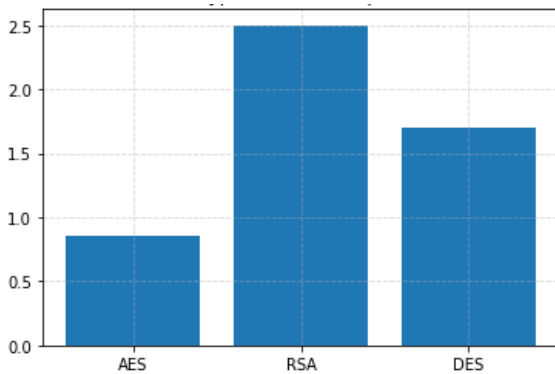


Fig2:encryption time comparison

The graph presents a comparison of encryption times according to various algorithms. The fact that AES presents the lowest time means that the encryption is faster and more efficient, which is suitable for large scientific datasets.

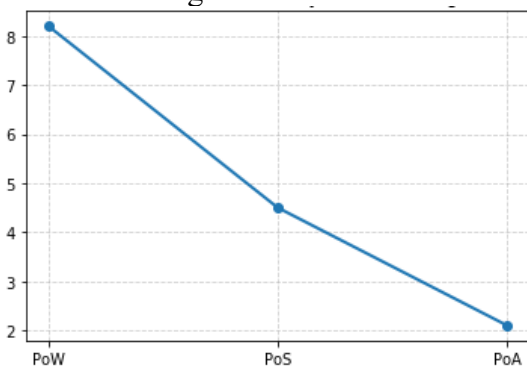


Fig3:transaction validation time by consensus algorithm

The line graph demonstrates the performance of various consensus algorithms. With the least time for validation, PoA is perfect for rapid and secure data sharing through blockchain technology.

would include the dynamic access control policies and the real-time collaboration among global research institutions. The integration of federated learning and quantum-safe cryptography would also help to fortify security against new kinds of cyber threats. At last, the framework can be reused in the context of a cross-domain scientific data marketplace that would yield secure, transparent, and incentive-based data sharing across different fields of research.

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