Journal of Engineering Education Transformations,
Volume No. 37, January 2024 Special Issue, eISSN 2394-1707

Physical Education and Sports for enhancing professional life of engineering students – An initiative towards implementing National Education Policy in Engineering Education.

Tara Singh Thakur[1], Divya Srivastava[2], Mahesh Chanda[3]
[1,2,3]Department of Physical Education, Anurag University, Hyderabad, Telangana- 500088, India
[1]tarathakur@anurag.edu.in [2]divyahs@anurag.edu.in [3]maheshsports@anurag.edu.in

Abstract: **Engineers today need not only intellectual abilities but also physical fitness and proper health which is defined by World Health Organization as the combination of Physical, Mental and Social Wellbeing. In this connection, we made an initiative of introducing Sports and Games as a mandatory course for students. The students of 3rd B.Tech have undergone the course for duration of 3 months and the outcomes of the course were assessed through a customized questionnaire which also accepted suggestions from the students for students pursuing engineering education. The experiment revealed fruitful outcomes in the form of benefits which the students gained by active participation in theory and practical classes. Qualities such as motivation, leadership, concentration, teamwork, relaxation, stress management etc. were found to be developed among the students and the students have expressed the support gained for their professional growth through this course. The academics of students were also taken into consideration which explained that the academics were nowhere disturbed due to participation in physical education and sports activities.**

Key Words: **Life skills, Virtues, extra-curricular, co-curricular.**

***JEET Category*—Practice**

I.INTRODUCTION

We believe that the youth are the future of the any nation. If you want the youth to really serve the world forever then they are to be physically fit and mentally strong. Every human being is aware of the saying that sound mind exists in a sound body. But today's youth are hardly concentrating on their physical fitness and mental will-being. Sports and games are one of the best and interesting modes of physical fitness and engaging in physical activity. This is the reason why the National education policy of India has begun introducing sports and games and many more extra-curricular and co-curricular activities with credits in the engineering and general education system. This has been concluded after lots of research being done by many researchers saying that the National education policy should encourage the participation of students in co-curricular and extra-curricular activities such as sports, arts, social service and cultural activities which actually determine the Heritage and Culture of the country.

The question which stands in front of everyone today is how many educational institutions today in India are practicing sports and extra-curricular activities to inculcate the virtues in students? We hardly come across the Institutions which have sufficient play area or the infrastructure and facilities to encourage students to take part in extra-curricular and co-curricular activities during the term of education. Physical Education is being practiced in schools from nursery to primary schools and later on it is observed that the students are being educated only in terms of Academics and with no importance to physical education, sports or other activities.

As the students move on to their higher education that is after their 10th grade, the students are only educated on the importance of Academics, competitive exams and are trained only to aim at higher salary packages of salaries but not about their physical and mental will being. Engineering education is one of the leading streams of education in India and in the globe. Millions of students are graduating in engineering education every year in India. But it is observed that not even 10% of the graduating students are active in physical activities, sports, games, co-curricular or extra-curricular activities. This scenario may be because of the lack of facilities, lack of infrastructure and the lack of trained physical educationists in the Institutions to take care of the physical and mental well-being of the students. There are many researches available saying that the students who are active in their schooling and throughout their education are also good at academics and achieving the targets.

This paper was submitted for review on 09, 10, 2023. It was accepted on 11, 15, 2023.
Corresponding author: Tara Singh Thakur, Department of Physical Education, Anurag University, Venkatapur V, Ghatkesar M, Hyderabad, Telangana, India-500088.
e-mail - tarathakur@anurag.edu.in

A. Purpose of the Study

This research has been designed to study the effect of sports and games activities on the student pursuing engineering education at The institution, Hyderabad. This was also a pilot study to introduce national sports organisation (NSO) as a subject in engineering education to provide credits as per the National education policy of India.

B. Sample for the study

The institution has been practicing national sports organisation (NSO) as an elective subject for engineering students to inculcate physical fitness and mental well-being among the students of engineering education since 2020. In order to carry out this research, 750 students pursuing B.Tech third year in different courses have been selected as the subjects and have been undergone the national sports organisation subject for a term of 3 months during their first semester.

II. REVIEW OF LITERATURE

Huiqiu Guoin in the study *"Effect of Curriculum Planning for Physical Education in Colleges on Innovation Ability"* concluded that with poor integrity and unclear goals, the curriculum planning for physical education (PE) in colleges cannot effectively promote the innovation ability of students. To solve the problem, they made an attempt to evaluate the effect of curriculum planning for college PE on the innovation ability of PE majors. Based on the defects of the current curriculum planning, the authors put forward several strategies and suggestions to enhance the promoting effect of college PE curriculum planning on innovation ability. Following the fuzzy theory, an index system and a fuzzy evaluation model were put forward to quantify the effect of college PE curriculum planning on innovation ability. The research results reflected great theoretical and practical significance.

"Benefits and Outcomes of Physical Education and Sport in Schools" by **Dr. Ashok Kumar et.al.** India - This paper explored the scientific evidence that has been gathered on the contributions and benefits of physical education and sport (PES) in schools for both children and for educational systems. Research evidence was presented in terms of children's development in a number of domains: physical, lifestyle, affective, social, and cognitive. The review suggests that PES have the potential to make significant and distinctive contributions to development in each of these domains. It is suggested that PES have the potential to make distinctive contributions to the development of children's fundamental movement skills and physical competences, which are necessary precursors of participation in later lifestyle and sporting physical activities.

Dr. Serhiy Kovalchuk et.al., University of Toronto in their study *"Transitioning from University to Employment in Engineering: The Role of Curricular and Co-curricular Activities"* concluded saying curricular and co-curricular activities contribute to endowments of educational, cultural, and social capital that engineering students can mobilize to make a successful transition from university to employment; thus, accessing economic capital. Each activity creates opportunities for gaining different knowledge, skills, and experience and plays a distinct role in the transition process. Thus, by engaging only in curricular activities, engineering students may disadvantage themselves during the transition process, as they might not be able to acquire aspects of cultural and social capital available to them primarily through co-curricular activities.

Chris Malm et.al. in their study entitled *"Physical Activity and Sports—Real Health Benefits: A Review with Insight into the Public Health of Sweden"* have concluded that sports can be evolving, if personal capacities, social situation, and biological and psychological maturation are taken into account.

"Effects of physical activity interventions on cognitive outcomes and academic performance in adolescents and young adults: A meta-analysis" was a study by Barbara Franca Haverkamp et.al. This study revealed that physical activity interventions might be a promising way to improve several cognitive outcomes and language skills in adolescents and young adults.

III. METHODOLOGY

In order to carry out this research the students were initially educated about the purpose of the study and the importance of the NSO subject being introduced in engineering education for their betterment and for their professional success.

The methodology for the research was very simple. The students were first explained about the syllabus which they will be studying and the practical which they will be getting exposed to during the course of study of national sports organisation. The course structure of NSO was designed as follows for the study

1) Unit-1 HEALTH AND WELLNESS

Dimensions of Health: Physical, Mental and Social. Objectives of Health Education. Definition and Dimensions of Wellness – Physical, Emotional, Social, Spiritual, Intellectual and Environmental Wellness. Achieving Wellness.

Practicals: Basketball, Cricket, Kho-Kho (Any Two) & Badminton (Mandatory)

Layout of Courts / Fields, Skills, Rules & Lead-up Games.

2) Unit-2 FITNESS AND BODY COMPOSITION

Physical Fitness Components: Body Composition, Muscular Endurance, Strength, Cardiovascular Fitness and Flexibility, Importance of Cardio-Respiratory Endurance. Obesity and Health Risk Factors. Body Composition Indicators and Measurements.

Practicals: Football, Kabaddi, Volleyball (Any Two) & Table Tennis (Mandatory) Layout of Courts / Fields, Skills, Rules & Lead-up Games.

A) Teaching and Training

A time period of 32 hours is allotted to the engage the students in NSO which was divided as 2 hour of class conducted once in a week. In this 32 hours, 16 hours i.e. 8 classes were allotted for theory and 16 hours i.e. 8 classes were allotted for practical.

1) In class room – Theory classes are held in the Smart Digital Classrooms of University to different streams at different allotted time slots. In classrooms a power point presentation is utilised to explain the theoretical knowledge regarding dimensions of health, fitness, physical fitness components which deeply includes the information about the physiological, health risk factors, psychological, social, spiritual, environmental aspects. This information is depicted through different slides of power point presentation. This is made more interesting by using pictorial representation and videos.

The sessions are made interactive by including several activities which engages students also to share their outcomes about the given aspects. In the end of the session, a short time period is allotted to answer the queries of the student and a question-and-answer session or a quiz is conducted about the topic that has been taught in that class.

2) In ground – The practical classes to students of different streams are conducted in the playground at different allotted time slots. The practical classes include general fitness followed by conducting different sports matches and providing them detailed knowledge of a particular sport, which includes practical explanation and exploration about skills, rules and regulations required to play a sport. Different outdoor sports like Basketball, Volleyball, Football, Cricket, Handball, Kabaddi, Kho-Kho and Indoor games like Table Tennis, Badminton etc.

To make the session more interesting and for a practical exposure of the topics learned and to improve their mental skills, sportsmanship, team work, leadership and healthy competition, teams are divided among themselves and a competitive game is conducted.

To grab the attention of the students further recreational activities are conducted. Different equipment and resources required during the session are also provided.

3) *Projects & assignments* – This domain includes the presentations on sport related topics that are assigned to students to research, learn and present it in the class. Students are divided in to groups and group discussions are also conducted. Topics related to syllabus are assigned to the students to prepare creative presentations and share with fellow classmates for better understanding.

B) Assessment

A questionnaire was designed by the researchers to assess the outcomes of three months of NSO course to the students. The questionnaire assessed the benefits that were gained by the students in terms of Fitness, Concentration, Leadership, Teamwork, Social wellness, Relaxation, Interest, Active Participation, and Academic Hindrance and also accepted suggestions for their fellow mates who were not undergoing the NSO course. The questionnaire also had a field for the respondents to write suggestions for the students who are pursuing engineering education across the world.

IV. ANALYSIS

The responses collected from 750 students pursuing engineering education in different streams was tabulated and analysed using statistical techniques in SPSS software.

Analysis is the most important part of any research and usage of appropriate tools and techniques makes the output reliable. For this research, we have used the tools to calculate the coefficients, t-values and p-values which would accurately explain the outcomes and results. The outcomes of this study were divided into two prts. The first one being the responses of the participants against the benefits gained by them through active participation in the physical education activities and the second being the analysis through responses of the participants for the statements analyzing the hinderance caused to them due to participation.

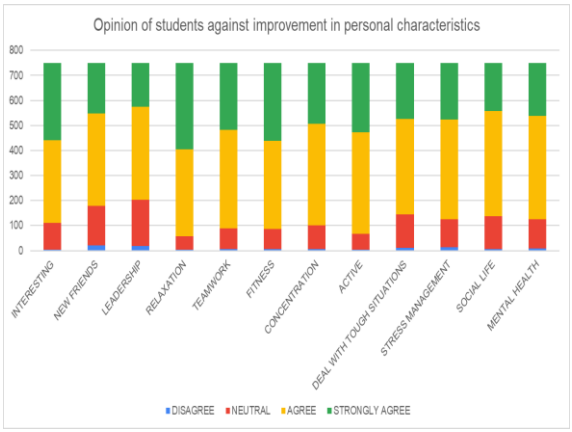
The analysis is put forward in the following formats to explain the experiences of the active participants by participating in physical education activities through practice of National Sports Organization.

TABLE:1- DATA OF RESPONSES AGAINST STATEMENTS PROVIDED IN THE QUESTIONNAIRE

Statement	Disagree	Neutral	Agree	Strongly Agree
Participation in sports was interesting	4	107	330	309
Participation in sports gave new friends	22	158	368	202
Participation in sports made me a good leader	19	183	374	174
Participation in sports gives relaxation	4	53	347	346
Participation in sports taught me Team work	7	83	392	268
Participation in sports made me physically fit	6	80	353	311
Participation in sports improved my concentration	6	96	406	242
Participation in sports made me active	5	63	405	277
Participation in sports taught me how to deal the tough situations	12	132	382	224
Participation in sports taught me Stress Management	13	113	399	225
Participation in sports helped me develop socially	7	130	421	192
Participation in sports helped me in mental well being	8	117	413	212

From the above table, it is seen that majority of the students near to about 85% responded with the options Agree and Strongly Agree for the statements provided for assessment of benefits gained by the students through participation in sports and games activities. The responses against the statements as Disagree were negligible ranging from 1 to 2% which means that sports and games were in no manner against the benefits of physical activity.

To present a better understanding of the outcomes of this part of the study , the data has been presented in the graphical form where Disagree is represented by blue colour and Neutral, Agree and Disagree have been represented by Red, Yellow and Green colours respectively.



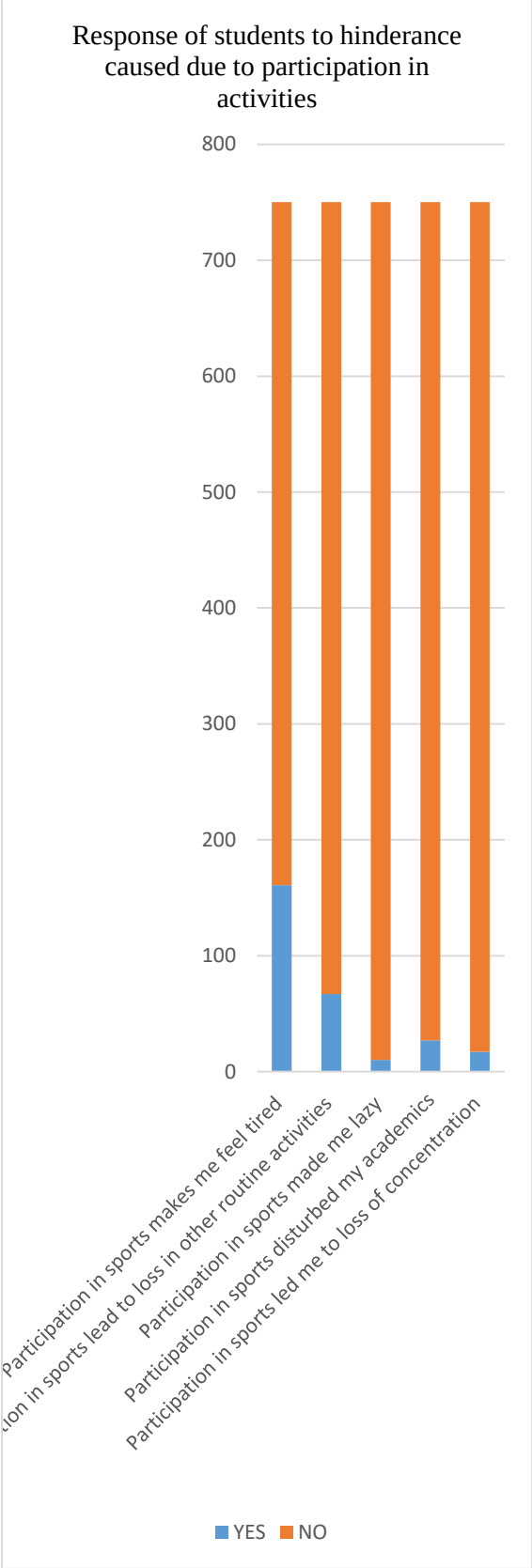
Pic 1: Graphical representation of responses to assessment of benefits gained through participation in sports and games.

In addition to the positive statements made in part 1 of the questionnaire for assessment, the questionnaire also had 5 statements against the benefits gained through participation in sports and games where respondents had to reply YES or No only. This was designed to make sure that the respondents were not just posting responses in a flow for the sake of filling up. Hence, the data was collected against these 5 questions and the same has be presented below

TABLE:2 - DATA OF RESPONSES AGAINST NEGATIVE STATEMENTS ABOUT PARTICIPATION IN SPORTS AND GAMES

Statement	YES	NO
Participation in sports makes me feel tired	161	589
Participation in sports lead to loss in other routine activities	67	683
Participation in sports made me lazy	10	740
Participation in sports disturbed my academics	27	723
Participation in sports led me to loss of concentration	17	733

The above table shows that 161 students felt tired by participating in sports and games and 589 did not experience tiredness. 67 students felt that they lost their routine activities by participation in sports and games, whereas 683 students had no change in their routine. In the remaining three aspects namely becoming lazy, disturbance in academics and loss of concentration it was observed that hardly 3 % of the respondents were positive and remaining 97% disagreed with these 3 statements.



Pic:2 – Graphical representation of responses against negative statements about participation in sports and games.

TABLE:3 – REGRESSION ANALYSIS ON CGPA WITH RESPECT TO BENEFITS GAINED THROUGH PARTICIPATION IN SPORTS AND GAMES.

	Coefficients	*t Stat*	*P-value*
Participation in sports was interesting	-0.045	-0.755	0.450
Participation in sports gave new friends	-0.085	-1.462	0.144
Participation in sports made me a good leader	-0.061	-0.938	0.348
Participation in sports gives relaxation	0.090	1.2459	0.213
Participation in sports taught me Team work	0.094	1.1746	0.240
Participation in sports made me physically fit	-0.126	-1.597	0.110
Participation in sports improved my concentration	0.116	1.412	0.158
Participation in sports made me active	0.009	0.111	0.911
Participation in sports taught me how to deal the tough situations	-0.123	-1.719	0.085
Participation in sports taught me StressManagement	0.101	1.332	0.183
Participation in sports helped me develop socially	-0.065	-0.797	0.425
Participation in sports helped me in mental well being	0.111	1.417	0.156
Participation in sports makes me feel tired	-0.025	-0.325	0.744
Participation in sports lead to loss in other routine activities	0.186	1.589	0.112
Participation in sports made me lazy	0.198	0.648	0.516
Participation in sports disturbed my academics	0.151	0.770	0.441
Participation in sports led to loss of concentration	0.503	2.455	0.143

The above table shows that none of the p-values in the entire table are less than 0.05 which directly means that CGPA (Cumulative Grade Point Average) or the academic indicator of the engineering students does not have any significant difference with respect to benefits gained through participation in sports and games.

In addition to the statistical data collected in the form of questionnaire, the respondents had an option of writing their suggestions to other students pursuing engineering education about the participation in sports and games. Mentioned below are some of the selected suggestions written by the students

"It's better if sports also have credits in academics."

"Not only academics, participation in sports will also teach us many lessons and we will enjoy a lot."

"Participating is essential and very helpful for mental health and physical health."

"Participating in sports makes us feel relieved from all other tensions."

"Do participate. It will make you gain confidence."

"Sports participation can be a wonderful way for engineering students to stay active, relieve stress, and build teamwork skills. It's important to find a balance between academics and sports to ensure success in both areas."

"Apart from academics one should also have knowledge regarding sports with active participation."

"Playing sports teach life skills such as teamwork, leadership, accountability, patience, and self-confidence and prepares them to face life challenges."

"Participate more in sports as it teaches one how to react to every situation and how to deal with problems. Sports can be related to our normal life it helps in solving our own problems."

"Sports time is the only time where we can rejuvenate ourselves. So, participate in sport competitions."

"I missed sports and games during my intermediate education and now I feel blessed to get back to active life through participation in sports."

V. RESULTS AND DISCUSSION

The study intended to study the benefits of participating in sports and games for engineering student with respect to their professional growth. 750 students pursuing third year of B.Tech were given the course of NSO for duration of 3 months where they experienced classroom teaching and also practicals on field. The assessment of the outcomes was done using the customized questionnaire and the following results were drawn from this study.

The participants responded positively for all the following statements about their experience by participation

Participation in sports was interesting, Participation in sports gave new friends, Participation in sports made me a good leader, Participation in sports gives relaxation, Participation in sports taught me Team work, Participation in sports made me physically fit, Participation in sports improved my concentration, Participation in sports made me active, Participation in sports taught me how to deal the tough situations, Participation in sports taught me Stress Management, Participation in sports helped me develop socially, Participation in sports helped me in mental wellbeing and when assessed about the negative impact of sports participations on certain aspects the respondents expressed a strong NO to the following statements - Participation in sports makes me feel tired, Participation in sports lead to loss in other routine activities, Participation in sports made me lazy, Participation in sports disturbed my academics and Participation in sports led me to loss of concentration.

In addition to these results respondents' data showed that their academic performance had no significant impact over participation and expression of benefits. The participants also suggested to inculcate the habit of sports for everyone and strongly recommended sports into curriculum with credits to performance.

VI. CONCLUSIONS

The following conclusions were drawn from the study

Sports and games have a positive impact on academic performance of engineering students.

Participation in sports and games improves life skills among individuals.

Regular physical activity keeps individuals fit and healthy.

Participation in sports teaches professional ethics and helps in enhancing professional life of engineering students.

Education has nowhere been disturbed due to participation in sports and games activities.

VII. RECOMMENDATIONS

Sports and games must be made a part of curriculum in all the courses of education starting from nursery to Research studies.
Giving weightage to sports and games participation would make difference in student performance.
Better performers can be yielded in any profession if they are active in sports and games.
Engineering education should have sports, games ad extra-curriculars as a major part in academics and evaluation.
Participants in co-curriculars and extra-curriculars must be given preference in recruitments if the organizations want the best employees.

REFERENCES

Huiqiu Guo (2020) Effect of Curriculum Planning for Physical Education in Colleges on Innovation Ability. *iJET – Vol. 15, No. 12, 2020.*

Dr. Ashok Kumar et.al (2020). Benefits and Outcomes of Physical Education and Sport in Schools. *IOSR Journal of Sports and Physical Education (IOSR-JSPE) e-ISSN: 2347-6737, p-ISSN: 2347-6745, Volume 7, Issue 4, (Jul. – Aug. 2020), PP 29-32.*

BF Haverkamp (2020). Effects of physical activity interventions on cognitive outcomes and academic performance in adolescents and young adults: A meta-analysis. *Journal Of Sports Sciences 2020, Vol. 38, No. 23, 2637–2660.*

Rüstem Orhan (2020). The effect of school education on students' participation in sports and physical activity and profiles of individuals with physical activity and fitness habits in Turkey. *African Educational Research Journal Special Issue 8(2), pp. S287-S297, October 2020.*

C.Malm (2019). Physical Activity and Sports—Real Health Benefits: A Review with Insight into the Public Health of Sweden. *Special Issue Intersection of Sport, Physical Activity and Human Health. Sports **2019**, 7(5), 127.*

Dr. Serhiy Kovalchuk et.al. (2017). Transitioning from University to Employment in Engineering: The Role of Curricular and Co-curricular Activities. *American Society for Engineering Education, 2017.*

DRSEG Creamer (2017). The Role of Extracurricular Activities in the Education of Engineers. *9th International Conference on Engineering Education.*