

## **Environmental-based Integrated Management Model to Enhance Sport Achievement in Industrial Era 4.0**

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### **Abstract**

Sports Achievement talent and development have been carried out, but have not been maximal and are still partial. This study aims to reveal an environment-based integrated management model to enhance achievement in the industrial era 4.0. This study used an exploratory approach. The object of the research were the trainers, teachers, KONI administrators, and sports observers in Sleman District, Special Region of Yogyakarta (DIY). The data used were primary and secondary data. Data analysis used qualitative and quantitative descriptive statistics according to applicable rules. The results showed that an integrated management model was found which included 1. Active involvement based on school zone, 2. Sports talent screening based on zone, 3. Center Management based on Regional, 4. Big Data based on digital. This model is a suitable alternative in the industrial era 4.0. Based on exploration in the Sleman District, four (4) coaching zones were obtained consist of eastern zone, middle zone, western zone, and northern zone. In a zone consists of 3-5 sub-districts, and then called centers. This model is an integrated and appropriate management innovation in the current industrial era 4.0.

**Keywords:** innovation, management, integration, sports achievement.

### **Introduction**

Education is an aspect that plays an important role in the growth and development of children, especially in the fields of mental health, physical health and child growth. Education is a very decisive effort in order to improve the quality of human resources. One effort is to realize the next generation of the nation that is physically and mentally intelligent through fostering sports activities.

Sports activities are given to shape healthy behaviors while fostering mental and moral goodness so that they can produce a young generation that is good, responsible, disciplined, good personality, strong body of soul, love the country, and achieving at the regional, national although international. With young people who are good, responsible, disciplined, good personality, strong body spirit, love the motherland, and have a good reputation, national and international. Thus the formation of the character of a good young generation begins with education in sports activities. The scope of education in sports activities includes aspects of play and sports, development activities, gymnastic activities, rhythmic activities, water activities, outside classroom education, health and sports achievements.

In the world of sports in particular achievement can be achieved if the athlete has mastered several factors, namely physical, technical, tactical and mental conditions. Some of these factors can be referred to as internal factors. Whereas external factors include trainers, parents, training facilities and training environment. In principle, training is a process of change in a better direction, namely to improve physical quality, functional abilities of body equipment, and the psychological quality of

children's training.

The field of sports is one of the fields that can be maximized in its potential in this industrial 4.0 era. The era of the Industrial Revolution 4.0 provides opportunities and challenges for sports practitioners. The human role is gradually taken over by automatic machines. As a result, the number of unemployed is increasing. This of course will add to the burden of local and national problems. Therefore, to take advantage of the opportunities and answer the challenges of the industrial revolution 4.0, sports practitioners must have data, technology and human literacy skills. Data literacy is needed by UT alumni to improve skills in processing and analyzing big data for the benefit of improving public services. Technology literacy shows the ability to utilize digital technology to process data and information. Whereas human literacy must be mastered because it shows soft skill elements or individual character development to be able to collaborate, be adaptive and be wise in the "flood" era of information.

The definition of Industry 4.0 varies because it is still in the research and development stage. German Chancellor Angela Merkel (2014) argues that Industry 4.0 is a comprehensive transformation of all aspects of production in the industry through the incorporation of digital and internet technology with conventional industries. Schlechtendahl et al. (2015) emphasize the definition of the speed element of information availability, namely an industrial environment in which all entities are always connected and able to share information with one another.

Kagermann et al (2013) explain that Industry 4.0 is the integration of Cyber Physical System (CPS) and Internet of Things and Services (IoT and IoS) into industrial processes including manufacturing and logistics and other processes. CPS is a technology to combine the real world with cyberspace. This merger can be realized through integration between physical and computational processes (embedded computers and network technologies) in a close loop (Lee, 2008). Hermann et al. (2015) added that Industry 4.0 is the term to refer to a set of value chain technologies and organizations in the form of smart factories, CPS, IoT and IoS. Smart factory is a modular factory with CPS technology that monitors the physical process of production and then displays it virtually and decentralizes decision making. Through IoT, CPS is able to communicate with each other and work together in real time including with humans. IoS is all service applications that can be utilized by every stakeholder both internally and between organizations. There are six industrial design principles 4.0, namely interoperability, virtualization, decentralization, real time capabilities, service oriented and are modular. Based on some of the above explanations, Industry 4.0 can be interpreted as an industrial era where all entities within it can communicate in real time at any time based on the use of internet and CPS technology to achieve the goal of achieving new values or optimizing existing values from every process in the industry.

The efforts made in the achievement of sports achievements in the era of industrial revolution 4.0 are to provide superior sports assistance until superior assistance of a student who has achievements must be monitored from an early age. Attention and motivation are always given to early childhood who have the goal to arouse the spirit of practice and foster a child's discipline. The potential of sports and students in Sleman Regency is no less competitive with the potential from outside the city or outside Java though. Indonesia's current sports ability cannot be separated from hard work in practice. A sense of comfort in practicing exercise is an important factor in improving exercise skills from an early age.

Mentoring for sports that have an achievement advantage must be carried out from the start. The existence of superior sports identification assistance for all branches of sports in Sleman Regency makes competition even tighter, both between clubs or special sports classes. mentoring prospective student achievement is not only seen from the ability of the technique and tactics in playing it, one of which can be seen from the ideal posture. Having an ideal body has many advantages in carrying out various movements and adapted to each sporting branch.

With increasingly rapid progress, of course there are a lot of criteria to determine the quality of superior sports in the district of Sleman, as well as the selection of flagship athletes in the Sleman district. As development progresses, many experts make new breakthroughs to make efforts to advance development and accompaniment from early age to adulthood in athletes. This is indicated by the development of an exercise program to test the ability of athletes to develop identification of superior sports in Sleman Regency. By measuring and mentoring outstanding athletes, of course a coach can monitor the development of the foster child well.

Assistance for superior sports identification in Sleman Regency is a major breakthrough carried out by stakeholders, teachers or trainers in order to advance the quality of sustainable children's achievements. However, much consideration is needed in determining the superior sport. The selection of superior sports branches requires a variety of many considerations to be able to make choices, several aspects that must be considered include aspects of long-term program plans, human resources both athletes and coaches, and a track record in the national arena.

The development of sports in Sleman Regency itself is quite developed. Competition in each championship at the regional level runs quite tightly and competitively. Evidently in every championship at the regional level there are many participants who send athletes in their area. In every DIY sports championship which includes the cities of Yogyakarta, Gunungkidul, Kulonprogo, Bantul, and Sleman, they are still quite crowded. Evidently, in every championship between regions, Gunungkidul, Kulonprogo, Bantul, Yogyakarta and Sleman districts, which are always the last competition. Efforts that are always made in district administrators, stakeholders, teachers, coaches are every approaching the event, either regional sports week or pecan sports. Regional students take the effort to provide physical ability tests which include anthropometric tests, skills and fitness tests. The test is very useful for monitoring the progress of each athlete. With this attention adds to the motivation of athletes to be better than before.

## **Research Method**

The research method that will be used in research is a descriptive explorative qualitative research method that aims to uncover various potential sports achievements. It is supported by HR (Human Resources), facilities and infrastructure, guidance systems, geographical location and other aspects that support.

The population used is all regions in Sleman Regency. Respondents included sports coaches, policy makers, coaches, athletes, physical education teachers, and related stakeholders including BAPPEDA, BPS, DISPORA, Sleman district education offices, sports club.

Data collection used questionnaires, documentation studies, and interviews. Data analysis was performed with a qualitative descriptive statistical analysis approach in accordance with applicable rules.

## **Result and Discussion**

The results of this study produce big data that can be used as a basis for researchers to analyze and review the data. In the era of industrial revolution 4.0, the big data that is owned can be a data source that can improve achievements in the field of sports. Sleman District is divided into four regions, namely west, center, north, and east. The following is the division of the area depicted on the map in Figure 1.

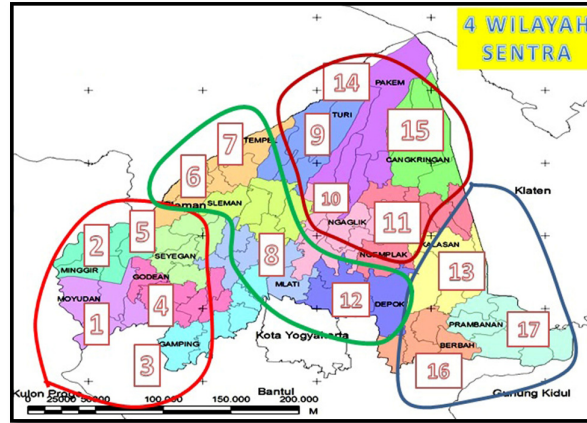


Figure 1. Division of Sleman Districts

From the picture above shows that the western region consists of Moyudan, Minggir, Gamping, Godean, and Seyegan Districts; the central region consists of Sleman, Tempel, Mlati, and Depok Districts; the northern region consists of Turi, Ngaglik, Ngeplak, Pakem, and Cangkringan Districts; the eastern region consists of Kalasan, Serbah, and Prambanan Districts. From a number of these sub-districts can be identified the type of sport that is seeded.

A. West Area

1. Moyudan Sub District

Table 1. Sports Facilities (Court) in Moyudan

Village	Football	Volleyball	Badminton	Tennis	Futsal
Sumberrahayu	1	5	7		
Sumbersari	1	6	10		
Sumberagung	1	6	7	2	
Sumberarum	1	4	5		1
Total	4	21	29	2	1

Looking at the fields in the Moyudan sub-district, there are 5 types of sports that can be developed in this sub-district, namely football, football, badminton, tennis and futsal. Badminton is a sport that makes it possible to be fostered more seriously by the number of badminton courts that exist. It is recommended that coaching from elementary school to high school be considered. Mapping and focusing on badminton can be done by looking at existing schools. A competition between schools needs to be done in order to find out the quality and experience of children. Volleyball exercise can be done, you should measure height and height predictions immediately to identify children who have high posture.

2. Minggir Sub District

Minggir sub-district has 25 primary schools consisting of 13 public schools and 12 private schools, 4 junior high schools consisting of 1 public school and 3 private, 3 high schools / vocational schools, consisting of 1 public and 2 private schools. Minggir sub-district has two soccer fields and one tennis court. Tennis courts are facilities that need to be used as well as possible, because not all sub-districts have tennis courts. The need for a school and coach that focuses on this sport. Tennis can be socialized in elementary schools by doing a lot of coaching clinics to school in the Minggir sub-district.

### 3. Gamping Sub District

Gamping District is divided into 5 sub-districts, 59 sub-villages, 187 neighborhood units (RW), and 529 neighborhood units (RT), with an area of approximately 2683 hectares. Gamping Subdistrict has a population of no less than 69,998 people, consisting of 34,878 men, and 35,120 women, with 13,891 households. Topographically, the gamping sub-district is relatively flat except in parts of the southern region of Balecatur and Ambarketawang villages in the form of mountains. A total of 1,348 hectares of land are located below 100 meters above sea level, the other 1,577 hectares are located at an altitude of 100-499 masl. Educational facilities in Gamping District include 44 Kindergartens, 40 Elementary Schools, 1 Basic SLB, 6 Middle Schools, and 6 High Schools, and 2 Universities.

Gamping Subdistrict has 3 places to practice tennis, and it needs special development with the associated number of human resources in the Gamping sub-district which is very abundant compared to other sub-districts by seeing the highest number of primary schools. There are 3 futsal courts in Gamping sub-district, this sport is a special trend for sports.

### 4. Godean Sub District

Godean sub-district has 20 primary schools both public and 12 private elementary schools, 3 public junior high schools and 5 private junior high schools, and 1 public high school. In elementary school extracurricular activities that involve sports are needed. Swimming and soccer can be a solution by looking at the facilities and infrastructure owned by the Godean sub-district. Godean sub-district has 4 soccer fields and 4 swimming pools (Sidoluhur village, sidoagung village, Sidokerto village and Sidomoyo village) to be used as a means of developing athletes.

One type of course or training in the field of football sports in the new Godean sub-district is located in Sidokarto village. Therefore it needs to be developed and rebuilt to see the many fields that can be used. A large number of elementary school students can become capital to look for football talented students to be directed and nurtured. The existing soccer and swimming pool fields should be mapped, monitored the distance from the existing primary schools and made a mapping of the sport according to the distance of the school and existing infrastructure.

### 5. Seyegan Sub District

Sayegan Sub-District has 26 primary schools both public and private, 1 public junior high school and 2 private junior high schools, and 1 high school. With the many elementary schools that exist in the Sayegan sub-district can be used as the basic capital in finding superior seeds starting from an early age. Searching for superior seeds with tests, measurements and observations can be done in elementary schools with the help of sports teachers working with sports and sport science trainers from FIK UNY.

### 6. Sayegan Subdistrict

Sayegan Subdistrict has 1 football stadium and 4 football fields, this is the basic capital to develop football sports. With the availability of facilities and infrastructure and adequate human resources will be able to create talented athletes. With so much football in the sub-district, it will help children to channel their talents and interests. What is important is how the process of training will always be monitored and measured as evaluation material and sources for improving children.

The social environment in the sub-district is closer to the world of football, with many amateur clubs under the same district. It is also related to the soccer field in the sub-district as it is, which encourages easy access to practice.

## B. Centre Area

### 1. Sleman Sub District

Sleman sub-district has 41 primary schools consisting of 30 public schools and 11 private schools, as many as 9 junior high schools consisting of 6 public schools and 3 private, 8 high

schools / vocational schools, consisting of 2 public and 6 private schools. In Sleman there are 1 Special sports school, namely SMP 3 Sleman.

Sleman sub-district has a variety of sports facilities including 1 stadium namely the stadium tridadi, soccer field, la [tennis court, basketball court, volleyball court, swimming pool, etc. With a variety of sports facilities that are quite complete, Sleman sub-district has many potential sports that can be developed. In the implementation of the elementary level O2SN in DIY Sleman District incised various achievements, especially sports such as athletics, gymnastics, and others, it needs to be given better guidance so that these talents can be developed into professionals.

## 2. Tempel Sub District

Based on the characteristics of the region, Tempel Subdistrict is included in the slope of Mount Merapi. This region is a water resource and ecotourism that is oriented towards the activities of Mount Merapi and its ecosystem. Tempel sub-district is a special function area / buffer zone which is a city of growth center for the surrounding area and is a supporter and boundary of city development in terms of the city of Yogyakarta.

The outgoing sub-district area has 30 elementary schools (20 public elementary schools and 10 private elementary schools), 5 junior high schools (4 public junior high schools and 1 private junior high school), 2 senior high schools (1 public high school and 1 public junior high school), and 5 vocational high schools (1 Public Vocational School and 4 Private Vocational Schools). From a number of schools in the Tempel Subdistrict area there were KKO's, namely at Tempel 2 Public Middle School. Based on data from the Central Bureau of Statistics, Sleman Regency shows that the type of sport that is favored by residents of Tempel Subdistrict is table tennis, while the many facilities available in the Tempel sub-district are table tennis with a total of 60 items and volleyball balls of 23 fields. Sleman also has 10 soccer fields. The condition of supporting facilities / infrastructure can make a type of sport a superior sport. Based on these conditions table tennis and volleyball can be used as superior sports for Sleman District.

## 3. Mlati Sub District

There are several rivers that flow through Mlati District. In the village of Tirtoadi, the Kenteng River, Nglarang, is passed. In the village of Sumberadi, the Kenteng River is crossed and the village of Tlogoadi is passed by the Nglarang River and Bedog River. Sendangadi Village is passed by the Denggung and Winongo rivers. Whereas in the village of Sinduadi, the Winongo river and the Code river are crossed. Based on the observation of the Yogyakarta Meteorology and Geophysics Agency (BMKG), the most rainy days in one month during 2016 are 24 days. The highest average rainfall is 465 mm.

The mlati sub-district has 37 primary schools, both public and private, 3 public junior high schools and 8 private junior high schools, and 6 high schools both public and private. The mlati sub-district has the highest number of primary schools, junior high schools and high schools compared to other sub-districts in the Sleman district. Therefore at least have more choices in managing and looking for talented athletes. We recommend that talent scouting consider this amount to find athletes.

The Mlati sub-district has 3 swimming pools that need to be optimized for building and developing swimming athletes. Early sports clubs need to be formed to facilitate this sport. Especially with the existence of a pool facility which is pretty much small but makes the main source of capital form an early age. The Mlati sub-district has 4 soccer fields that can be optimized, while there are already a number of soccer schools that practice there, but at the age of 14-18 years it has not been optimally optimized. Then it needs a forum to continue from the football school level to the academy level. Schools can also maximize field facilities by seriously conditioning extracurricular football.

Mlati District has 2 tennis courts that can still be optimized. Tennis extracurricular has not been well touched, early tennis coaches should be involved in managing tennis

achievements. A good field will not be meaningful without the development of an early age sports club. Here there is no growing early age tennis club. It should be developed and formed an early sports club which involves schools around the tennis court.

#### 4. Depok Sub District

Infrastructure and supporting clubs in depok 1) with access to one of the universities that have excellent infrastructure in the field of sports science, 2) for several sports clubs, Berbah sub-district is one of the central sports clubs in the district of Sleman, besides being strategic, many infrastructure and human resources are adequate (secondary data). The development of sports through education began with improving the quality of education, fostering school sports clubs, improving the quality of PPLP, SK Ragunan and PPLM.

Factors of facilities and infrastructure as a support for the guidance system, on the basis of being a separate obstacle in various regions. It is common knowledge that these factors often become collisions in the regions. This can be overcome by the attention of the government and employers and sports figures to pay attention to proportionally. Therefore, the central government and regional government are time to build sports facilities and infrastructure in accordance with the sporting needs of achievement in each of the executors.

Environmental factor. Sports Regional achievements cannot be separated from the environment, both the geographical environment, and the support of Human Resources. In the Kalasan sub-district it has been determined by the geographical environment that is correlated with several events at the level of students and non-regional sports (in fact many students) who participate in regional sports week. Based on primary sources obtained from BPS both in terms of geographical, facilities and facilities. infrastructure using secondary data and in terms of being correlated with the number of medals obtained from several matches held in Sleman Regency can be concluded through the suggestion of adequate infrastructure related to the strategic environment because it is in the middle of an institution that has adequate infrastructure and human resources. Flagship sports in depok sub-district are athletics, volleyball, soccer, taekwondo, karate, martial arts, tennis, table tennis, tennis, archery, rugby.

### C. North Area

#### 1. Turi Sub District

Turi Subdistrict has 22 primary schools consisting of 17 state and 5 private schools, 6 junior high schools consisting of 3 public schools and 3 private, 5 high schools / vocational schools, consisting of 1 public school and 4 private schools. Based on data from the Central Statistics Agency of Sleman Regency, the most abundant sports infrastructure in Turi District is 19 volleyball courts. The existence of an adequate volleyball field can be used as a potential to develop superior sports.

#### 2. Ngaglik Sub District

Ngaglik Sub District has sports facilities which include soccer fields, basketball courts, futsal courts, volleyball courts, tennis courts, swimming pools. With the complete sports facilities available in the Ngaglik Subdistrict area, and supported by the existence of special sports schools in the region and a large population of teenagers, it provides good potential for the emergence of sports talents. The soccer branch has good potential to be developed in this region, because there is a good SSB builder, namely the Young Soccer. At the U 12 level the SSB often enters the national round of soccer age groups. However, when entering U15, the performance tends to decrease because there are no managers. Several years ago around 2009 until 2014 there was a club with the name of the Regional Government which accommodated players who had graduated from the Youth Stadium, but the club is now not active again, the club also scored PSS Sleman soccer players. Therefore football sports need to be developed in the Ngaglik Sub District area.

### 3. Ngemplak Sub District

Ngemplak Subdistrict has 9 sports facilities, 3 tennis courts, 3 futsal courts, 7 swimming pools, volleyball courts in almost every village, etc. The Ngemplak area has quite a lot of swimming pool areas, it can potentially be as a guide for swimming athletes from the age group.

### 4. Pakem Sub District

Based on data from the BPS, it shows that sports are popular and many people are practicing sub-district folk are badminton. Badminton field infrastructure facilities also strongly support its existence in the district of the standard with a total of 57 units. The condition of the infrastructure and social conditions in this district can make badminton a superior sport in the area.

### 5. Cangkringan Sub District

Based on the characteristics of the region, Tempel Subdistrict is included in the slope of Mount Merapi. This region is a water resource and ecotourism that is oriented towards the activities of Mount Merapi and its ecosystem. The characteristics of the Cangkringan sub-district which is a mountainous area strongly supports the development of sports such as rock climbing and athletics (throwing, jumping and running), so that with environmental conditions that support the development of rock climbing and athletics, sports that can be used as superior in Cangkringan District are rock or athletic climbing (throwing, jumping and running).

## D. East Area

### 1. Kalasan Sub District

Table 2. Sport Facilities in Kalasan

Villages	Football	Volleyball	Badminton	Table Tennis	Basketball	Tennis	Sport Stadium
Purwomartani	4	6	8	26	0	2	1
Tirtomartani	2	10	9	15	0	2	-
Tamanmartani	3	7	9	15	0	1	-
Selomartani	1	8	8	16	0	0	-
<b>Total</b>	<b>10</b>	<b>31</b>	<b>34</b>	<b>72</b>	<b>-</b>	<b>5</b>	<b>1</b>

Infrastructure and supporting clubs in Berbah Village 1) Volleyball with Pervas Club, 2) For football is Cakar Mas Berbah. The development of sports through education began with improving the quality of education, fostering school sports clubs, improving the quality of PPLP, SK Ragunan and PPLM. Based on Sport Facilities in Kalasan Table Tennis, Badminton, and Volleyball could be sport priority in Kalasan.

### 2. Berbah Sub District

Based on primary sources obtained from BPS both in terms of geography, facilities and infrastructure and in terms of being correlated with the number of medals obtained from several matches held in Sleman Regency, it can be concluded that superior sports in the sub-districts are Volleyball and Table Tennis, based on natural analysis, which will be combined with scientific data taken from various parties by conducting synergy between the agency, relevant stakeholders, and the school that will be retrieved.

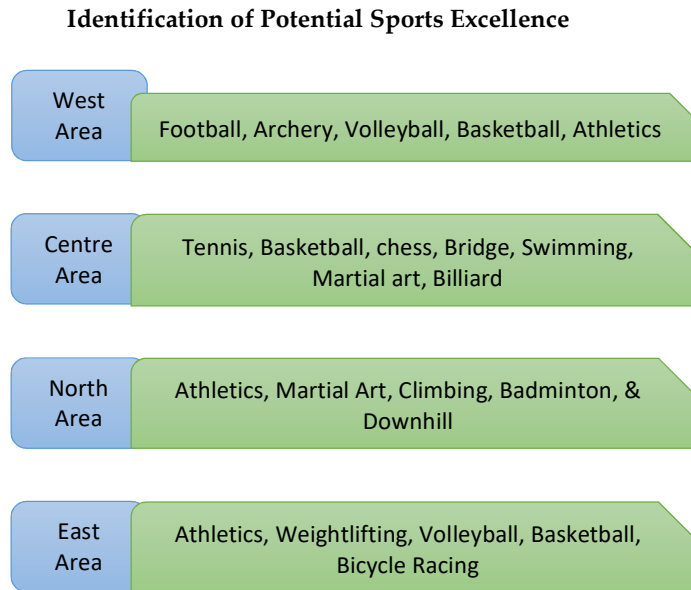
### 3. Prambanan Sub District

Based on primary sources obtained from BPS both in terms of geography, facilities and infrastructure using secondary data and in terms of being correlated with the number of medals obtained from several matches held in Sleman regency can be concluded through advice on adequate infrastructure related to strategic environments because they are in the



center of institutions that have adequate infrastructure and human resources. Leading sports branches in Prambanan sub-district are volleyball, badminton, athletics and table tennis

Based on the number of geographical locations, population, number of schools, sports facilities and other factors that support leading sports can be identified in the Sleman Regency. Next is the identification:



**Figure 2.** Sports Excellence Identification  
(Observation Result)

## Conclusion

Identification of potential sports excellence based on primary data and secondary data in Sleman Regency is divided into 4 regions. a) the western area consisting of the Moyudan sub-district, the sub-district, the sub-district of Gamping, the sub-district of the sub-district, the sub-district having superior soccer, archery, volleyball, basketball and athletics. b) the centre area consists of temple sub-districts, Sleman sub-districts, Melati sub-districts, and Depok sub-districts are field tennis, basketball, chess, bridge, swimming, martial arts, and billiards. c) the northern area consists of Pakem sub-district, Turi sub-district, Ngaglik sub-district, Ngemplak sub-district, Cangkringan sub-district has superior sports consisting of athletics, wall climbing, badminton, bicycle racing. d) the eastern area includes Prambanan, Kalasan, and Berbah have sports consisting of athletics, weight lifting, volleyball, basketball, and bicycle racing.

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