

Analyzing of the Content of Published Articles on the field of Sports Technology and anticipating the future direction of the Journal of Advanced Sport Technology (JAST)

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ABSTRACT

The main aim of the current project was to analyze the content of published articles of sports technology and anticipate the future direction of the Journal of Advanced Sport Technology (JAST). This was done to describe the state of the art and achieve a vision plan for developing and promoting this journal. The examined articles which were published in the international journal Sports Technology have been investigated from several aspects, such as sports related applications, the number of authors, and the variety of collaborator organizations. This study was conducted by using a checklist and the articles were published during the period from 2008 to 2015. The results indicated that in terms of the number of corresponding authors, Australian, British and American authors ranked first to third and in terms of the total number of authors, Australia, England, and New Zealand ranked first to third. After numerous studies, subjects in three areas of athletic performance (58.5%), sports goods (28.3%), and sports equipment (13.2%) were identified. Athletic performance has always maintained its attractiveness in the period from 2008 to 2015, and sports goods were in the next rank. Although sports equipment initially interested the researchers, over time it has attracted fewer researchers. There was no significant relationship between the numbers of authors of each article with the number of reads it gets. There is also no significant relationship between the diversity of countries in each article and the number of times it is viewed. Consequently, we suggest the Journal of Advanced Sports Technologies direct its scope toward sport performance and as the next priority, it should focus on sports goods and eventually on sports equipment.

Keywords: Content Analysis, Sports Technology, Sport Sciences

Introduction

Nowadays, Technologies of all kinds are the source of change and are considered in all environmental analyses. The sports industry, for its uniform method of execution in all countries, offers a very favorable environment to use various types of technology. This is because the venues for global sporting events, especially the Olympics, have become an exhibition of public technologies. Athletes are also trying to improve records in a variety of ways such as equipment, supplements and even reports of doping and other aspects such as smart clothing and even software simulation. The Journal of Advanced Sport Technologies (JAST) at Mohaghegh Ardabili University aims to promote sport by introducing and validating sport technologies on the one hand and internationally introducing domestically produced equipment related to sport technology on the other to take advantage of the opportunity of a global audience. Technologies have been categorized and presented based on both domestic technologies and their usage so that this journal (JAST) can outline its thematic scope.

Articles that get to be published in scientific journals contain valuable information because they are based on theses or research projects. The Sports Technology journal is of great importance because of addressing

tech-related issues in sport. Similarly, content analysis is one of the most important methods for the systematic analysis of the phenomenon of communication that was initially done about television programs, books, newspapers, etc. but today it has become a research methodology to identify research developments in any field in a systematic manner. Considering the importance of the information in this journal and its leading role in the direction that researchers take in different fields of physical education, this research was conducted to determine the participation of universities, the rate of collaboration between professors and the distribution of research in different fields. On the one hand, paying attention to the research topics offers the steps for financing research in sports and, on the other hand, helps the researchers focus on the fields that require investigation.

Mahmoodzadeh and Mohseni (2005), by investigating the effect of imported technologies on economic growth in Iran, concluded that there was no causal relationship between intermediate imports and non-oil GDP in the short term. Bakhshi et al. (2014), via examining the consequences of new communication technologies on the learning process, revealed that e-learning facilitates the learning process and improves what is related to learning.

Ansari and Tabatabaeian (2010) examined the fundamental challenges of policymaking about emerging technologies in Iran (nanotechnology for example) and concluded that challenges such as lack of authorities' attention to the new technologies and cultural issues are important. They suggested that more attention should be paid to technology if optimal results are to be obtained in tech-related fields.

Abdoulaye, explored and identified the research trends of graduate theses in Library and Information Science from 1994 to 2000 at the International Islamic University of Malaysia. The results indicated that theses done on the subject of information technology (with a frequency of 50%) were the most popular. This subject was followed by topics such as information needs, library management, library use, and publishing (Abdoulaye, 2002).

In a study entitled "Content Analysis and Trend of Sport Management Articles published in scientific journals", Azimzadeh et al. (2015) studied electronic versions of the eight scientific journals published between 2001 and 2013 and concluded that approximately 45 percent of sports management articles were related to organizational behavior. In addition, Sports Management Studies cover a total of 66% of all papers. They also found that there was a tendency towards marketing, entrepreneurship, and business. In general, the trend analysis of sports management articles in the fields under study indicates an increase in the quantity of articles, research methods, software used, and so on. This positive trend in research is expected to be a promising future for the field of sport management.

This research was conducted to help the Journal of Advanced Sport Technologies, published in English language, with an ISC index from the Ministry of Science to highlight relevant areas of research about technology in sports. The findings of this research will be applied in dealing with a real problem. Doing content analysis on articles related to sports technologies in a global scale can also lead researchers to unexplored research areas and help sports technologists provide more applied technological solutions in the sports industry.

Moreover, the research results are thought to help establish and launch, at the discretion of the authorities of the university, a major entitled Technology of Sport in the postgraduate level. Furthermore, one of the main policies of the country is to develop and promote knowledge-based technologies and the results of this research can be useful in macro policy making.

The current study was an applied research which was conducted by using a checklist as the main instrument. Qualitative content analysis methods are classified under qualitative research paradigm in scientific circles. In this type of content analysis, the researcher does not count the words but as a framework utilizes some definitions and generalizations followed by a qualitative analysis of the text. In this stage, the researcher looks for instances of those definitions and generalizations throughout the text. Therefore, a comprehensive definition of content analysis (whether quantitative or qualitative) seems to be necessary. According to Krippendorff (1969), content analysis is "the use of a valid and repeatable method to derive inferences from the content in relation to its source locations or characteristics." In other words, qualitative content analysis is an approach to empirical, systematic, controlled analysis of content using the rules of content analysis and its template steps without hasty quantification. The method of qualitative content analysis consists of two types: (1) inductive analysis and (2) deductive classification.

In this type of qualitative content analysis, before the start of the study, the researcher creates a framework by presenting and assuming certain definitions; the next step is studying the published texts by means of the mentioned framework. By comparing the predefined definitions and the analyzed texts, the researcher then judges the existence or non-existence of examples of that definition in the examined text and addresses the issues. This method which is called analogical classification (Fardanesh, 2008) was used in this research. In this type of content analysis, using a pre-defined classification which was created based on theoretical considerations, the classification of the field of technology and its applications have been examined and reviewed in the published articles.

Research questions

In this study, the following research questions were used instead of hypotheses.

1. How is the distribution of articles across countries?
2. How is the frequency of the distribution of subject categories in articles based on technology?
3. How is the subject distribution of articles between 2008 and 2015?
4. What is the relationship between the number of authors and the number of reads?
5. What is the relationship between the diversity of countries and article reads?

Statistical population and sample

All articles from 2008 to 2015 that total to 106 were reviewed in the journal of Sports Technology. The sample of this research is equal to the research population.

Instruments

By searching and recording information from the official site of the Sports Technology journal (<https://www.tandfonline.com/loi/rtec20>), and a checklist created by the researcher and data entry into the Excel file, the needed information was gathered.

Data collection method

The method of data collection in this study is a checklist which contains the information required for each article and is based on the main research questions. Descriptors were assigned to each article to determine the exact topics of each article. Each article first was read and then its topics were initially described in the form of descriptors. Each article was assigned a descriptive field of application that included athletic performance, sports equipment and sports goods. Athletic performance includes topics that have been used to enhance sports performance in practice and performance and utilize the latest technologies. Sports equipment is related to the equipment technologies of a sports field and sports goods apply to athletes and users in sports. After coding the articles from 1 to 3 for athletic performance, equipment, and goods respectively, they were entered in an Excel file. To determine the variation of the topics during the years 2008-2015, they were also ordered based on the year of publication. The number of authors per article, the number of countries participating in each research, and some other descriptive statistics were also calculated in Excel and SPSS 20 software to obtain correct and valid results.

Research findings

Descriptive information

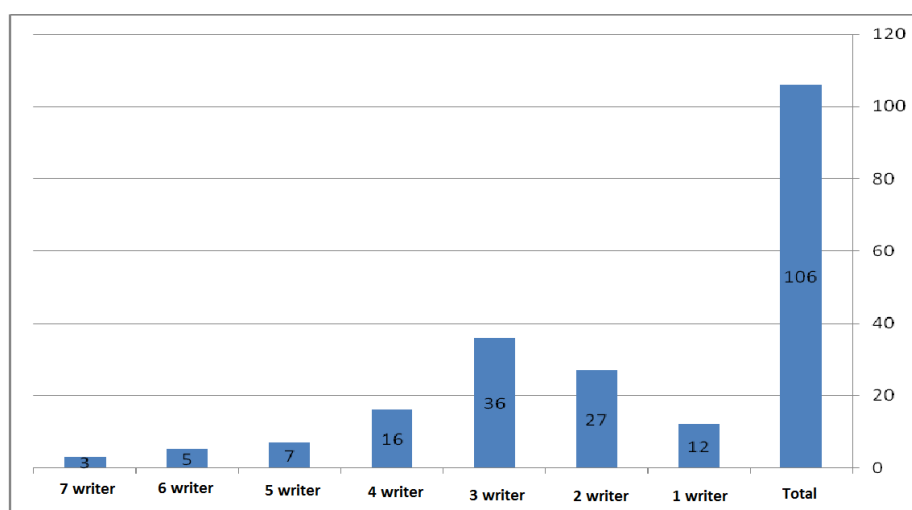


Figure 1 description the number of contributing authors in sports technology articles

In Figure 1, the numbers of co-authors in the articles from Sports Technology are presented. Out of 106 articles, 36 articles have been written by three authors, and only 3 articles have had seven authors.

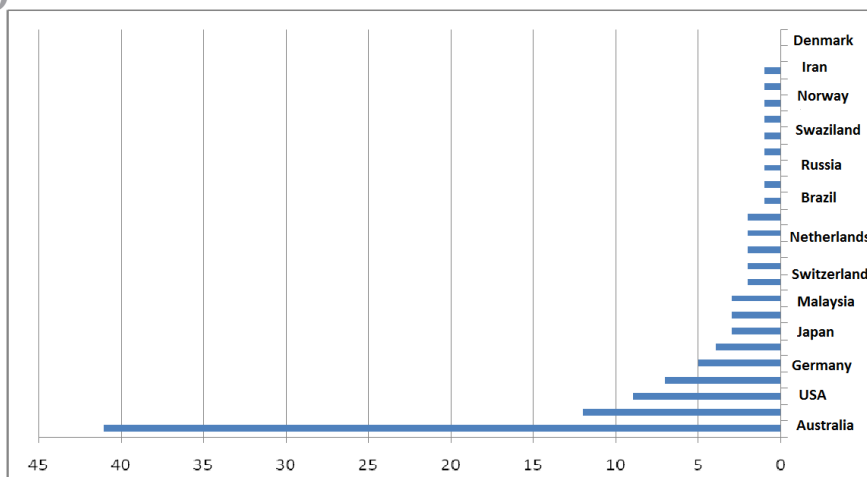


Figure2. Country Contributions of corresponding authors in Sports Technology Articles

Figure 2 shows the proportion of corresponding authors for each country: Australia has the largest number of authors while there are no corresponding authors from Denmark. Iran has only one author.

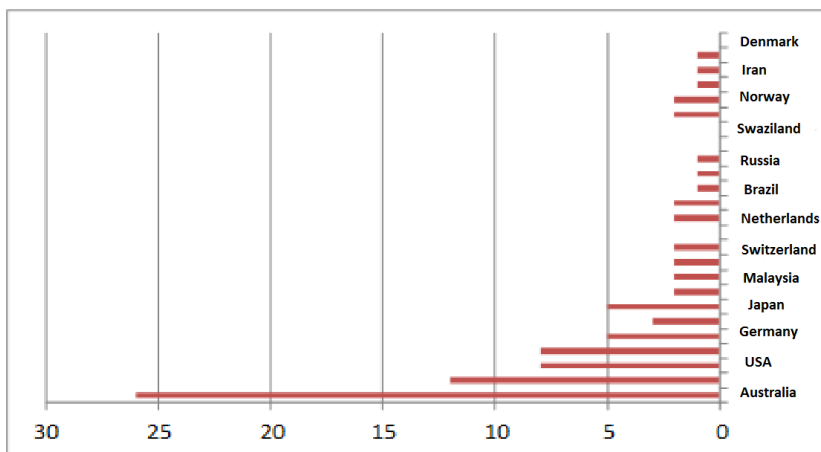


Figure3. Countries' share of second authors in sports technology articles

Figure 3 illustrates the number of second authors according to country; and Australia still has the highest number of authors.

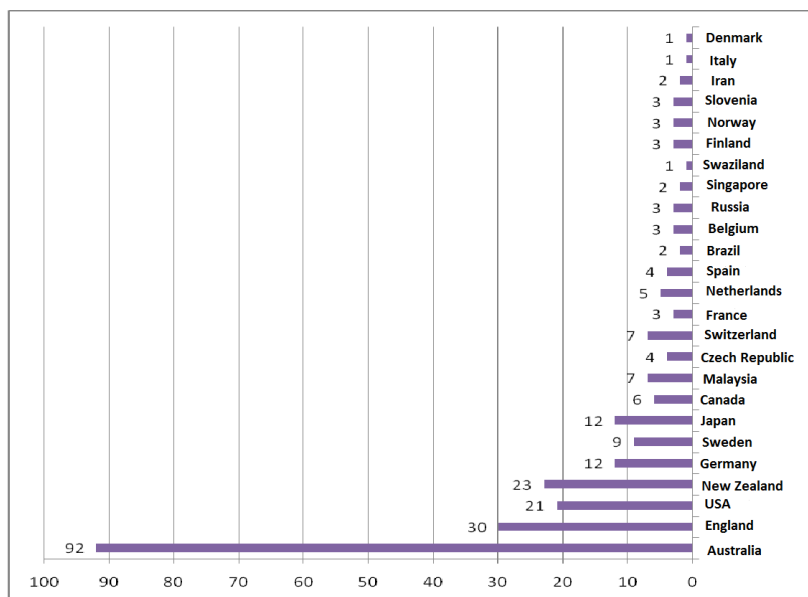


Figure4. Contribution of authors from different countries to Sports Technology articles

Figure 4 shows that out of the total number of authors, 92 authors are from Australia, 30 are from England, 23 are from New Zealand and 21 are from the United States.

Investigating the research questions

1. How is the distribution of articles across countries?

The summary of the charts is presented in Table 1, and Iran with one 2nd author and Denmark with one 3rd author are at the bottom of the table.

Table 1 Frequency Distribution of First to Third Authors of Sports Technology Articles

	The 1 st writer	The 2 nd writer	The 3 rd writer	Total
Australia	41	26	25	92
England	12	12	6	30
USA	9	8	4	21
New Zealand	7	8	8	23
Germany	5	5	2	12
Sweden	4	3	2	9
Japan	3	5	4	12
Canada	3	2	1	6
Malaysia	3	2	2	7
Czech Republic	2	2		4
Swiss	2	2	3	7
France	2	0	1	3
Netherlands	2	2	1	5
Spain	2	2		4
Brazil	1	1		2
Belgium	1	1	1	3
Russia	1	1	1	3
Singapore	1	0	1	2
Swaziland	1	0		1
Finland	1	2		3
Norway	1	2		3

Slovenian	1	1	1	3
Iran	1	1		2
Italy	0	1		1
Denmark	0	0	1	1
	106	89	64	

In terms of the number of corresponding authors, Australia, England, and the USA are ranked first to third and in terms of all authors, Australia, England, and New Zealand ranked first to third.

2. How is the frequency of the distribution of subject categories in articles based on technology?

Having been examined for three fields of athletic performance, sports equipment, and sports goods, the articles were classified the results of which are presented in Table 2.

Table 2 Frequency Distribution of Sport Technology Topics

Subject	Frequency	Percentage frequency	Cumulative percentage
Athletic performance	62	58.5	58.5
Sport goods	30	28.3	86.8
Sport equipment	14	13.2	100
Total	106	100	

After examining the articles several times, subjects in three fields of athletic performance (58.5%), sports goods (28.3%), and sports equipment (13.2%) were identified.

2. How is the subject distribution of articles between 2008 and 2015?

Table3. year * Subject cross table

Subject	Year								Total
	2008	2009	2010	2011	2012	2013	2014	2015	
performance	10	4	7	10	8	9	9	5	62
Sport goods	5	2	7	2	1	5	8	0	30
equipment	5	3	4	1	1	0	0	0	14
Total	20	9	18	13	10	14	17	5	106

Athletic performance maintained its popularity for the period from 2008 to 2015, sports goods follows as the next interesting subject, and sports equipment was good at first, but over time, it has attracted less attention.

Table4. Chi square topic numbers differences

	Value	Df	Sig. level
Chi	22.684	14	0.066
Preference ratio	27.355	14	0.017
Linear relationship	7.743	1	0.005
The number of cases	106		

Given a significance level of 95% (table 4), it is possible to confirm differences in sports technology issue. It seems issues related to athletic performance might be a more fruitful area to focus on.

4. What is the relationship between the number of authors and the number of reads?

Table 5: Relationship between authors and visit rates

Number of authors × View rate	
Pearson	-0.25
Sig. level	0.797
Count	106

There was no significant relationship between the number of authors of each article and the number of the times it was viewed.

5. What is the relationship between the diversity of countries and article reads??

Table 6: Relationship between Country diversity and article reads

Country diversity × Visit rate	
Pearson	-0.043
Sig. level	0.660
Count	106

There is no significant relationship between the diversity of countries in each article and its reads.

- ✓ In terms of the number of corresponding authors, Australia, England, and the United States ranked first to third, and in terms of the total authors Australia, England, and New Zealand ranked first to third.
- ✓ After examining the data several times, subjects in three areas of athletic performance (58.5%), sports goods (28.3%), and sports equipment (13.2%) were identified.
- ✓ Athletic performance has always maintained its popularity in the period from 2008 to 2015, sports goods is the next most popular, and whereas sports equipment was good at first but researchers have been drawn to it less over time.
- ✓ There is no significant relationship between the numbers of authors of each article and its reads.
- ✓ There is no significant relationship between the diversity of countries in each article and its reads.

Discussion

It is normal to exploit technologies in all fields. However, it is necessary to consider the challenges that other researchers too have mentioned in doing so.

These challenges include issues such as lack of attention from authorities to new technologies and also an inadequate familiarity with new technologies and the culture of using them. It is suggested that more attention to technology is needed in order to obtain the highest possible result in these areas (Ansari and Tabatabaiyan, 2010). Therefore, regarding these challenges and the findings of this research, we will finish the report by discussing each of the questions for more clarity.

In terms of the corresponding author, Australia ranks first, followed by England and the United States and New Zealand. The presence of sports technology clusters in Australia and the robust presence of Microsoft, with the powerful program entitled (GSIC) “Global Sports Innovation Centers” used in the United States and England, can justify these results (<https://sport-gsic.com/contact/>- <http://www.qsportstechnology.com/>). So far no research has been carried out on this subject and the present study could be a starting point. In Iran, The Sports Initiative Center in the Sport Science Research Center (WWW.SSRC.AC.IR) has started, which is expected to pave the way in focusing on technology research in coming years..

Most articles were focused on improving athletic performance that is 58.5% of the articles. This indicates that the main focus is directed toward improving software sectors. Sports equipment and sports goods technology are the next subjects to attract researchers. This may be so because the research results in these field are not commonly published for commercial reasons. It also makes it difficult for unorganized R&D to exist because of large global companies that cooperate with federations through sponsorships. On the other hand, the large global sports market is affected by institutionalization of the sport. But in terms of performance, the diversity of countries and individual differences can allow for local research and development.

Therefore, in an unorganized market and with poor communication with global sports organizations, it is advisable for Journal of Advanced Sport Technology to focus on the subject of athletic performance and benefit from subjects from a variety of different disciplines and the applications of technology for their development.

Sports good is ranked next, and sports equipment was the last. It seems that such a result can be considered from two aspects. First, over time, more attention will be paid to specialized technology development. For instance, the smart and precise design of sport shoes to increase athletes’ performances and even the geographic climate and its role in athletes’ personal sport equipment. Secondly, the institutionalized relationship between sport organizations will make research and development of sport goods and equipment possible. Thus, performance will be of great importance in the future research areas.

No significant relationship was found between the number of authors and the number of reads, and this finding confirms that the high number of authors in an article does not play a role in increasing the number of views an article may get.

But in terms of subject matter, there is a difference between the numbers of articles about athletic performance and the ones about the sports goods and sports equipment. Therefore, these results also confirm the previous findings. There was no significant relationship between diversity in the authors’ countries and the number of reads an article gets, and this finding confirms that the presence of authors from different countries will not contribute to an increase in an article’s views and that we must realistically focus on covering research areas that are relevant and significant for readers.

Conclusion

Understanding the research findings and their applications in real world can be very important. The purpose of this study was to determine the thematic orientation of the journal of Sports Technology. Among the three general subjects of sport equipment, sports goods and performance, it seems that athletic performance and

technology are more preferable. These subject areas can then be investigated among different groups and sectors such as professional athletes and public sport, coaches, referees and managers. Studying modern technologies in research areas related to athletic performance, compared to sports equipment and goods, will attract more researchers. Certainly, in doing research about the sports equipment and goods, it is better to be cautious and consider the market.

Orientation toward studying athletic performance and the role of technology in it can pave the way for producing athletic equipment that might improve performance. In fact, a local market for technology in sports can be predicted, and it would be better for departments of Sports Science to take advantage of this great opportunity. Using biomechanics and even combining it with sport physiology in addition to considering information technology can enhance technology-based services in the sports industry. The recent trend in developing new sport services also confirms this. Therefore, in developing and production of large and advanced professional sports equipment, Iran might not have a good opportunity. Until we can have access to global market it is not recommended to enter such areas. However, in the field of athletic performance great steps can be taken. Therefore, the Journal of Advanced Sports Technologies should focus more on improving and promoting sports performance.

Acknowledgement

This research was financially supported by the University of Mohaghegh Ardabili

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تحلیل محتوای مقالات چاپ شده مقالات فن آوری ورزش و تعریف موضوعات آینده نشریه فن آوریهای پیشرفته در ورزش (JAST)

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چکیده

هدف اصلی این تحقیق تحلیل محتوای مقالات چاپ شده مقالات فن آوری ورزش و تعریف موضوعات آینده نشریه JAST بود که به منظور توصیف وضعیت موجود جهت نیل به چشم انداز در توسعه و پیشبرد نشریه مذکور انجام شد. فن آوری ورزشی در این تحقیق از جنبه‌های متعدد مثل تعداد نویسندگان- تنوع موسسات همکار- و کاربرد ورزشی مورد بررسی قرار گرفت. این تحقیق با استفاده از چک لیست در مجله مشابه فن آوری ورزش از ۲۰۰۸ الی ۲۰۱۵ انجام شد. نتایج تحقیق نشان داد که از نظر تعداد نویسنده مسئول استرالیا؛ انگلستان و آمریکا در رتبه‌های اول تا سوم و از نظر کل نویسندگان استرالیا؛ انگلستان و نیوزلند در رتبه‌های اول تا سوم قرار دارند. پس از بررسی‌های متعدد موضوعات در سه بخش حوزه عملکرد ورزشی ۵۸،۵ درصد، لوازم ورزشی ۲۸،۳ درصد و تجهیزات ورزشی ۱۳،۲ درصد شناسایی شدند. عملکرد ورزشی در طی ۲۰۰۸ الی ۲۰۱۵ همیشه جذابیت خودش را حفظ کرده است و لوازم ورزشی در رتبه بعدی قرار دارد و تجهیزات ورزشی در ابتدا مورد استقبال بوده اما با گذشت زمان محققان کمتری را به سمت خود جذب کرده است. ارتباط معنی داری بین تعداد نویسندگان هر مقاله با بازدید آن وجود ندارد. همچنین ارتباط معنی داری بین تنوع کشورها در هر مقاله از لحاظ بازدید آن وجود ندارد. لذا به نشریه فن آوری‌های پیشرفته ورزشی پیشنهاد می‌گردد؛ الویت موضوعات خود را به سمت عملکردهای ورزشی هدایت کند و در الویت بعدی لوازم ورزشی و نهایتاً در الویت آخر روی تجهیزات ورزش تمرکز داشته باشد.

کلید واژه‌ها: تحلیل محتوا، فن آوری ورزش، علوم ورزش