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SNOOKER IN ACADEMIC PRODUCTION FROM 2003 TO 2023

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Abstract: Snooker is a complete sport that can explore performance, health, leisure, social interaction, motor coordination, sociology, personal development and others. However, there is little discussion on the subject in the Brazilian academic context and in professional training courses. The aim of this study is to analyze the academic production on snooker over the last 20 years (February 2003 to February 2023). The methodological procedures used were bibliographical and qualitative, with some quantitative data being explored. Snooker is an element of sport and culture that relates to various fronts of study in the field of Physical Education - performance, health and leisure. However interdisciplinary it may be, there hasn't been much knowledge produced on the subject in the last 20 years.

Keywords: Snooker, Physical Education, leisure, health, Education.

INTRODUCTION

Snooker is one of the most practiced sports in the world, along with soccer, volleyball and others. When we question the importance of the sport within a social context, we see various points to be analyzed, such as social acceptance (whether it is well regarded, trivialized, popular culture), personal development (ethics, leisure, cognitive, motor, emotional, psychological and so on), professional development (competitiveness, amateurism and expansion), marketing (products, events, visibility and so on), research (how widespread it is within the area of undergraduate or postgraduate research). Snooker has a breadth to be explored that goes far beyond what we perceive on a daily basis, and can become a strong tool for personal, professional and academic development. There has been very little research into the benefits of playing snooker, but lately it is gaining interest among researchers and scholars. (NIM, C.; DESHPANDE. 2020)

To find out more about *snooker*, we first need to understand that the term refers to the original game of *snooker*. The term “sinuca” is “Brazilianized” from *snooker* and, in Brazil, ends up being called this for the most diverse sports derived from the original term *snooker*. (CASA DA SINUCA, 2023)

The official birth of *snooker* comes from the *World Professional Billiards and Snooker Association* (WPBSA - the body that regulates snooker worldwide), “the game having been invented in 1875 by the British army in the Indian town of Jubbulpore (or Jabalpur, as it is now known), situated nearly 450 miles south-east of the capital”, recognizing Lieutenant Neville Chamberlain as the inventor of the sport (WPBSA, 2023).

Returning to India in 1875, as the researchers date it, in the city of Jubbulpore, during a period of heavy rain, the officers of the English army spent hours around the table, where they had moved from the open air to the tables, and at that time they began to study the evolution of adding more balls, thus giving rise to *snooker* (a sport that today has 15 red balls worth 1 point and a sequence of colors from yellow to black worth 2 to 7 points).

There are indications that snooker arrived in Brazil around 1889, when there was a transition from the monarchy to the old republic. However, there is no information as to whether it arrived as an elite sport or among the lower classes.

By approaching the sport, we can see that it is undervalued in some places and valued in others. One example is Brazil, which is beginning to see its rise through the internet.

Seeing that snooker doesn't have as much value as a sport in the country, even though there is a table in every environment we frequent, noticing the contexts in which it is played - bars, snooker halls, condominiums, clubs, academic centers and others - following broadcasts, watching how a more serious

game of snooker changes the environment, the social force, among other factors. All these points make us look to the academic world to find out how the sport is being promoted, what is being researched and what information exists on the sport. Therefore, the aim of this study is to analyze the academic output on snooker from 2003 to 2023.

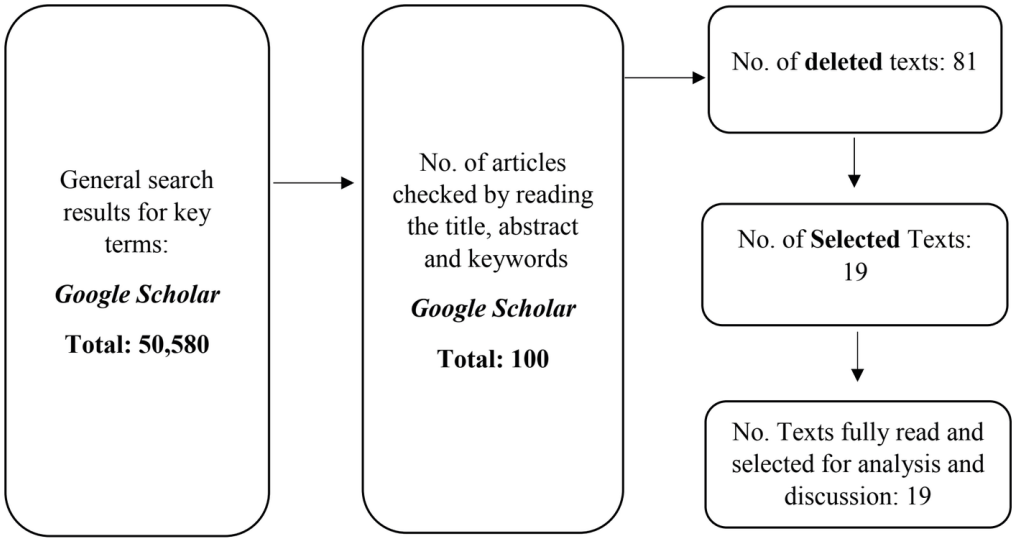
METHOD

The type of research is bibliographical, qualitative in nature, with the inclusion of illustrations with some quantitative data. In order to understand the texts selected in the bibliographic survey and construct the analysis, we will adopt the methodological guidelines presented by Severino (2007). The author’s guidelines mention that for a rich and fruitful reading there are 5 phases:

- Textual analysis
- Thematic analysis
- Interpretive analysis
- Problematization
- Personal overview

For the bibliographic survey we used the following databases: Revista Movimento, Pensar a Prática, Licere, Revista Brasileira de Estudos do Lazer, Corpoconsciência, Revista

Motrivivência, Ciência e Movimento, 36th Conference of the International Society of Biomechanics in Sports, Journal of Complex Networks, Physical Activity and Health Journal, Scielo, Journal of Sports Sciences, Revista Brasileira de Ensino de Física, IEEE xplore Visualization and Graphics Technical Committee (VGTC), elsevier computer science journals, International journal of event management research, European Journal of Operational Research, Psychreg Journal of Psychology, Research Gate, European Journal of Operational Research, Revista eletrônica de matemática, International Journal of Sports Science & Coaching, Sport in Society, Psychology of Sport & Exercise, The 18th Irish Conference on Artificial Intelligence & Cognitive Science. We selected articles from a 20-year period starting in 2003 and ending in 2023. The search was carried out using the keywords: Snooker, billiards, leisure, health. The bibliographic survey was carried out using the following steps: a- reading the title of the article; b- reading the abstract and c-reading the research. The analysis of some quantitative data will map what is related to the topic studied, and the qualitative analysis was based on a dialog with what each author has proposed in relation to the topic.



Flowchart

A form was used to extract data from the selected works. This form was adapted from research by Ferreira (2011), Terezani (2010) and Stoppa (2010). The topics extracted from the selected articles were: language, year of publication, thematic categories on snooker and what the articles say about snooker.

RESULTS

OVERVIEW OF THE ARTICLES

Content-based analysis for video from snooker broadcasts

This 2003 article presented new resources for *snooker* broadcasts called *Hidden Markov Model (HMM)* and *Motion History Image (MHI)*, which uses implicit geometry using the edges of the table where these resources would map the match in different ways: *HMM* maps the shots and can map player actions or game actions, while *MHI* maps the trajectory of the balls.

Economic impact and place marketing evaluation: a case study of the world snooker championship

The article seeks to analyze the economic impacts related to the 2002 World *Snooker* Championship that took place in the city of Sheffield in the United Kingdom - England, the authors seek to establish the flow of profitability that occurs in the city over the 17-day period that the event takes place. The economic impact is visualized by the expenditure made by outsiders such as players, visitors, media, spectators and organizers on the event. The methodology used was from Sirc, which is approved by the United Kingdom, and it was possible to evaluate the success of the event using this methodology.

Annual Conference of the British Association of Sport and Exercise Sciences

- ***Self-efficacy and causal attribution in snooker players***

The study sought to show the self-efficacy of snooker players, tracing the relationship between causal thinking and their perceptions of efficacy, analyzing the strength of internal attributions with post-championship satisfaction.

Ball, cue, snooker and physics

One of the most important aspects of snooker is physics, where the balls are bodies of mass that can be analyzed in terms of center of gravity, reactions, speed, power and more. This article aims to show the physics applied to snooker and clarify some of the movements that occur through it.

Using computer Vision to create a 3d representation of a snooker table for Televised Competition broadcasting

The article analyzes the *Snooker Extraction* and *3D Builder (SE3DB)* resource, which aims to show any angle of a snooker table through a 3D representation. Sometimes a player gets in front of the camera, the referee may be in the way or even a poorly placed camera may not generate the best visibility, the purpose of using this equipment is to generate the 3D representation making it easier for those watching to see. The technology has gained ground over the years, especially when it comes to sports broadcasts, and snooker is undergoing such experiments due to the fact that it is a table with limited lines, making it easier for the system to understand and construct the 3D image.

Older men's environments

Due to the low level of participation of elderly men in groups related to this age group, this research was carried out in an attempt to understand the environments they frequent. The article seeks to map the activities and places they frequent in order to quantify this data.

Video Visualization for Snooker Skill Training

Because snooker coaches find it difficult to quantify players' progress due to the length of time it takes to analyze videos, the study turned to *Video Perpetuo Gram* (VPG), which implements video visualization in training sessions to help train snooker skills.

Systematic Snooker Skills Test to Analyze Player Performance

The aim of this study was to quantify players' skills in the form of levels: beginner, intermediate and professional. The article then presents a variety of tests exploring the player's control, the tests have certain scores and at the end the score is counted to make the classification.

Exploring aspects of cognitive development and mental health awareness as part of health promotional goal in snooker

The study aims to investigate the development of mental cognition from the development of knowledge of the game, seeks to explore cognitive development, mental concentration and other aspects related to mental health in sport seeking the understanding of a "common snooker player", seeks to arrive at the result of the practice being a positive activity in health promotion being able to develop individual knowledge benefiting the well-being and health of the individual.

Think aloud: an exploration of cognitions in professional snooker

The following study analyzed 7 professional snooker players from the United Kingdom and used the *Thinking Aloud* (TA) protocol, which aims to collect cognitive thought processes.

A biomechanical analysis of the upper limb in different snooker batting techniques

This article aims to analyze the biomechanics of the upper limbs and compare 8 snooker players with more than 8 years' experience using the same cue with markers:

1) the flexion-extension angles and range of motion (ROM) present in the elbow and wrist joint; 2) the angle of the shaft; 3) the batting speed; 4) the batting angle.

The influence of coordination between upper limbs' joints on sport level in snooker

The study sought to explore the coordination of the upper limbs when taking shots, using 22 markers placed on the upper limbs of professional and amateur players, and thus comparing these two groups when taking shots.

Exploring Positive Impact of Pursuing Snooker on Young Adults

The aim of this article is to understand snooker when used as a leisure activity in order to verify its positive impact on the lives of young people and adults, providing quality of life and well-being, looking directly at the health sphere.

Pool game: a possibility for teaching geometry

Snooker can be used to develop teaching skills, and this article explores snooker as a teaching-learning resource for geometry in the context of students' experiences.

The global snooker market

This study seeks to analyze the growth of snooker on several continents, highlighting its progress, championships, Olympics and trajectories in an informative and clear manner. Showing the numbers related to value, seasons and broadcasts, always presenting the interest of advancing the sport in a Global way.

A complex networks approach to ranking professional Snooker players

The article sought to carry out a detailed analysis of the matches played over the 50-year period, through the collection of which the best players can be ranked, the ranking by wins, the best-ranked player, among others. It always sought to quantify the data collected.

Acquiring expertise in precision sport: What can we learn from an elite snooker player?

The aim of this study was to provide a comprehensive overview of the biomechanical characteristics of a snooker player's movement, using training sessions to apply kinematics and kinetics.

Evaluating the effectiveness of different player rating systems in predicting the results of professional snooker matches

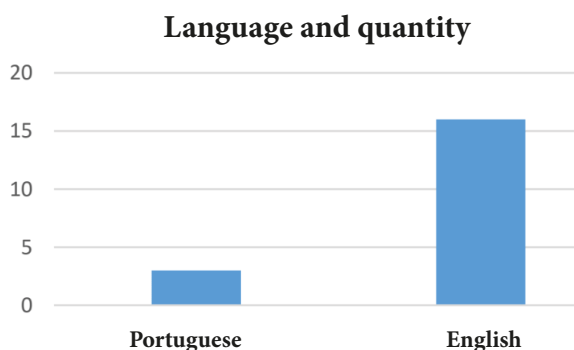
Through the methodology applied in this study, an attempt was made to classify professional players using the basis of their past performances through rankings, awards, winning percentages and others.

Simulating the progression of a professional snooker frame

Through a video analysis of more than 30,000 shots, the article seeks to trace the probability of a professional *snooker* player pocketing the ball and also attacking and defending within the shots.

EXTRACTION AND ANALYSIS OF QUANTITATIVE DATA

According to the bibliographical research carried out on the 19 articles found over a 20-year period (February 2003 to February 2023), we can see that when it comes to *snooker* in relation to the Portuguese language, there were 3 articles found. In 2007 we had an article called “Bola, cue, sinuca e física” (Ball, cue, snooker and physics), which focused on snooker and developed a method for teaching physics; in 2008 we had an article related to “Enientes masculinos da terceira idade” (Male environments for the elderly), which analyzed the places frequented by this audience; and the last one, again related to teaching, called “Jogo de sinuca: uma possibilidade para o ensino de geometria” (Snooker: a possibility for teaching geometry), now seeking to develop the teaching of geometry. The content disseminated on snooker is a method to facilitate teaching, as it is close to the reality of many Brazilians.



Graph 1:

Graph 1 shows the number of articles found per language, where in Brazilian Portuguese we have 3 articles that are first published in 2007 and 2008 and then only 12 years later. When we look at the graphs we see that in English the production is much greater, with 16 articles found, which shows that the promotion of snooker content is much greater in countries with this language.

Below is a table representing the 20-year period analyzed. In addition to production per year, the table shows the number of articles per year.

Graph 2 shows that academic production is low per year, and only in the last five years has there been a significant increase, which may be due to the greater expansion of sport worldwide.

Graph 3 shows the categories of the academic articles. In the survey, the biggest theme found was performance-related, not least because countries outside Brazil are more professionalized and more explored in general, so they end up having a greater contribution to the study of this theme, followed by the theme of snooker as a strategy for school teaching.

One point that can be analyzed is the 12-year gap between the studies on snooker that have been carried out in Portuguese, remembering that the gap refers to different subjects, but they use snooker as an equivalent.

In this analysis, we see that research in Portuguese focuses more on teaching and practice, followed by social issues. In the English language, there is more coverage of topics such as health, performance, teaching, biomechanics and economics.

The research shows that the gap for the English language is smaller, with the longest research gap being around 4 years and, after that, a greater frequency of study as it approaches the current years.

The biggest research topic is related to performance, with the greatest emphasis. They use video for analysis and data to develop players' techniques with intrinsic feedback or assistance from the coach, as well as for the advancement of technology, being able to increase the players' collection as well as broadcasts and the like. Another point that is widely researched is related to ways of evaluating players' effectiveness, evaluating techniques, tactics and results.

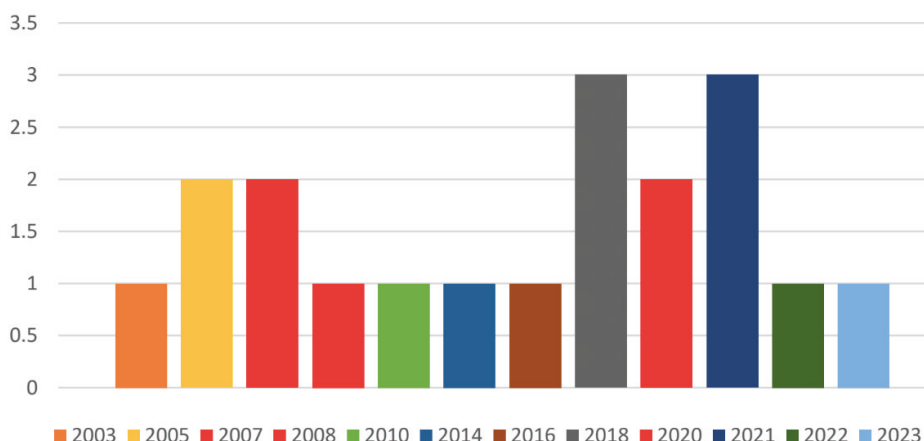
Regarding biomechanics, we see that it is more researched in the English language, but the area has been studied more recently, 2 of the 3 studies on the subject are from 2018 and the other from 2021, it seems to be a branch that is getting more attention precisely because it uses a refined technique, the upper limbs are used quite frequently due to the requirement of practice mainly elbows and shoulders.

Then we have two articles in Portuguese where snooker is explored as a teaching method, making a connection with reality because it is close to the daily lives of Brazilians. In the articles we have physics and geometry being explored in a clear way and with consistent content, making it clear that it can be a great aid in the teaching-learning model, on the *internet* we even have an episode called "donald duck in the country of mathematics" where one of the moments talks about French snooker where there are no pockets and there are different scoring dynamics and in the episode it is explained in a clear way and explores the mathematics behind the practice.

We don't usually look at snooker as a resource for advancing and caring for well-being, quality of life and development (it's something more intrinsic to working on ethics, coordination and the like) and the health articles come precisely with the aim of exploring these scenarios with concrete information seeking to cause this demystification of the theme in this area, within the search we found two articles where one works on the positive impact of snooker on the daily lives of young people and adults and the other focused on the cognitive development of practitioners.

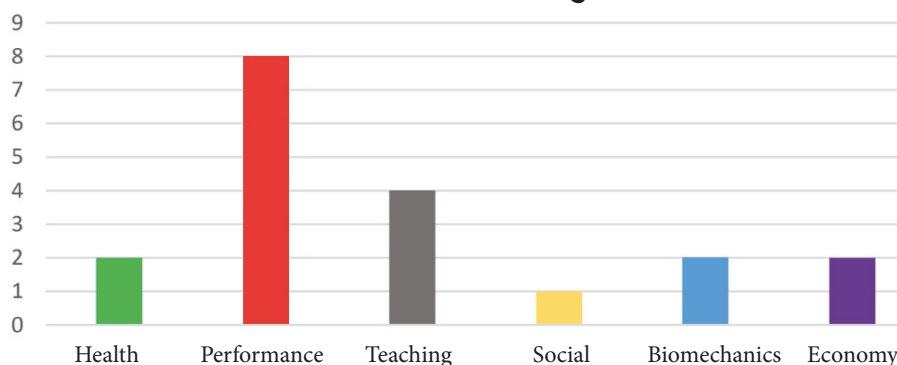
We see major events being the subject of research around the world, whether in sociology, philosophy, mathematics or, above all, economics. Major events always have a positive or negative impact on the economy of the places that host certain events, and within the two articles found we have data relating to championships and the impact of snooker

YEARS OF PUBLICATION AND QUANTITY



Graph 2:

CATEGORIES AND QUANTITY



Graph 3:

events, whether on the world market or more localized. The article found related to the social sphere refers to male environments frequented by senior citizens.

QUALITATIVE ANALYSIS

The authors show us that *snooker* is an important resource for the development of teaching, as it is something that we have great visibility in everyday life, from access in various spaces such as clubs, condominiums, bars and *snooker* bars, *snooker* venues, as well as visibility on the *internet*, where it has great worldwide strength. Because of this approach, we see the study carried out showing that *snooker* can be a resource for teaching and learning in various areas, as mentioned below.

In view of the potential of the snooker game for teaching and learning Geometry, as well as its possible exploitation by other areas such as Physics, Physical Education, Psychology and others, it is believed that the snooker game has sufficient attributes to be considered as a pedagogical resource to be included in schools. (PAULA, F.; CARVALHO, T.; REIS, M. 2020, p. 14-15).

Studies have also explored snooker in terms of health. Some studies have been carried out precisely with the aim of understanding how much it could positively influence an individual's health. The excerpt below mentions the issue of mental strength, where if you practise frequently you will have cognitive development and it will directly help your mental strength, helping with day-to-day tasks.

He argues that snooker, when practiced as a hobby or pastime, can have a positive impact on an individual's mental health. This means that one has a better knowledge of the game, which in turn helps to develop cognitive function. Individuals who practice snooker are likely to improve their mental strength, which can help them in everyday life. (NIM, C.; DESHPANDE. 2020, p. 2, our translation).

Still in the same study we have the view that *snooker* develops concentration, helping to improve mental health and well-being, and when looked at as a leisure activity, it directly helps to control stress, getting out of the routine and helping to achieve satisfaction and quality of life.

He concludes that snooker can help with day-to-day activities. It improves concentration, which is very important in a person's life. It concludes that the way pool is played can contribute to improving mental health and well-being [...] there is a connection between the satisfaction of relaxation and happiness among university students. Personal well-being or happiness can be achieved by engaging in any leisure activity that helps students manage stress and escape routine. Participation in leisure can help individuals in the long term in terms of satisfaction and quality of life. (NIM, C.; DESHPANDE. 2020 p. 2-3, our translation).

We can see that most research is focused on *performance*, seeking to improve aspects of the player, whether through questionnaires, videos, psychology, physique, training and so on. Interest in this subject extends to a variety of sports, as competition is usually the pinnacle of the sport, no matter what it is. One point that has been widely observed is how to quantify players' skills in order to understand what level they are at, whether they are beginners, intermediates or professionals.

Measuring a player's ability is a desirable tool both from the player's point of view, to review their own development within the game, and also from the coach's point of view, to identify strengths and weaknesses. Fundamentally, it allows us to analyze and compare ability between players (CHUNG, D. H. S. 2014, p. 1086).

As we saw in the previous excerpt, in addition to being able to understand the skills and quantify the level, we can see that this is important *feedback* for both the athlete and the coach, so these strategies can be used to develop the player.

Snooker has many areas to be explored in academic circles, but production is still in its infancy. Snooker has great potential to be explored in biomechanics, training, strengthening the regions most used in the sport and sports psychology. Every year snooker wins over more and more people, whether for leisure, health or learning school subjects.

FINAL CONSIDERATIONS

When I started the research, I already had an idea that snooker is a topic that is little discussed in academic circles. We realized that the subject has a certain amount of production, still low in volume, but with a lot of competence and relevant information for the dissemination of the practice.

The topics that may be most relevant to the subject are related to health and economics, because through these areas it is possible to achieve a better health of the population due to the benefits that snooker tends to bring with adherence to the practice, as for the economy the articles can bring the justification for the government to promote the sport and direct and positive benefit in the numbers of the countries that invest in the practice, due to the fact that it is a sport that is growing exponentially.

When looking at Physical Education, the points that can be relevant relate to the performance of athletes, which can be considered in terms of biomechanics, training and preparation for competitions. There's also the issue of health, which is one of the fields

in which Physical Education is very active, and there's also the area of school teaching, in which snooker can be a tool for development, working with motor coordination, strategic thinking and others.

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