

Incorporating Network Communication and Sports Psychology: An In-depth Quantitative Analysis of Interdisciplinary Knowledge Graphs and Association Patterns in Chinese Sports News Communication

Zhendong Pan^{1*}

Abstract

In the rapidly evolving landscape of sports news and sports psychology, driven by the proliferation of mobile Internet and Internet media in China, it is essential to recognize two pivotal factors shaping the discourse. Firstly, there is the imperative 'construction of new liberal arts' within professional knowledge education. Secondly, the practice of news communication is undergoing transformative changes due to media integration, particularly in the context of sports news concerning Chinese athletes. These two dynamics together create a favorable environment, underpinned by robust policy support, for interdisciplinary research at the intersection of sports psychology and sports news communication. Within the academic realm, our efforts must be attuned to the evolving curriculum and the unique challenges posed by this dynamic landscape. Such an approach is instrumental in advancing in-depth interdisciplinary research at the confluence of sports psychology and the communication of sports news. Recent years have witnessed an upsurge in research interest in media communication, with a pronounced emphasis on sports. In light of this, we have a unique opportunity to conduct a comprehensive analysis of interdisciplinary interactions within the domain of sports news and sports psychology. To facilitate this, we propose employing advanced knowledge graph techniques and correlation analysis. In this specialized context, the interdisciplinary study of sports psychology and sports news communication can be envisaged as a dynamic process that involves the assimilation and dissemination of specialized knowledge. We advocate for the application of a network environment correlation analysis method rooted in knowledge mapping principles. This approach entails the development of a tailored knowledge map specific to the realm of sports news concerning Chinese athletes, within the framework of sports psychology. Furthermore, we will explore the creation of efficient storage and retrieval mechanisms to optimize the effectiveness of our research pursuits in this exciting and evolving field.

Keywords: Sports news, sports psychology, Journalism and communication; Interdisciplinary; Network communication; Knowledge graph; Correlation analysis.

1. Overview

In the ever-evolving landscape of sports news and sports psychology, the rise of the mobile Internet and Internet media in China has ushered in a new era of rapid transformation. Within this dynamic environment, two pivotal forces demand our unwavering attention. Firstly, the ongoing evolution of professional knowledge education, often referred to as the 'construction of new liberal arts,' is reshaping the foundations of our educational institutions. Secondly, the practice of news communication is undergoing a profound metamorphosis, especially within the realm of sports news concerning Chinese athletes, as media integration continues to reshape the way we perceive, consume, and engage with news. (Darvishy et al., 2020).

The confluence of these two dynamic forces has created a highly conducive environment, bolstered by robust policy

support, for the exploration of interdisciplinary research at the crossroads of sports psychology and sports news communication. Within the academic sphere, it is imperative that our endeavors remain attuned to the ever-shifting educational landscape and the distinctive challenges posed by the evolving field of sports news communication for Chinese athletes. This adaptive approach is pivotal in facilitating the advancement of in-depth interdisciplinary research within this exciting and dynamic intersection. (Peters, Neilson, & Jackson, 2022).

In recent years, the academic community has witnessed a surge of interest in media communication, with a pronounced emphasis on sports. This shift offers us a unique and timely opportunity to delve into a comprehensive analysis of interdisciplinary dynamics within the domain of sports news and sports psychology. To this end, we propose harnessing the power of advanced knowledge graph techniques and correlation analysis.

¹ School of Communication and Arts, the University of Queensland, Brisbane Queensland QLD4072, Australia

*Corresponding Author: Zhendong Pan, Email: zpan0001@163.com

Within this specialized context, the interdisciplinary study of sports psychology and sports news communication unfolds as a dynamic process characterized by the assimilation and dissemination of specialized knowledge. We advocate for the application of a network environment correlation analysis method deeply rooted in knowledge mapping principles. Through this approach, we aim to develop a tailored knowledge map specific to the domain of sports news concerning Chinese athletes within the framework of sports psychology. Additionally, we will explore the creation of efficient storage and retrieval mechanisms to optimize the effectiveness of our research pursuits in this captivating and ever-evolving field. (Dressel, Whitehead, & Heitkam, 2023).

2. Sports News: Exploring the Landscape of Journalism and Communication in the Era of Network Communication

In the dynamic realm of Sports News within the landscape of network communication, the relentless advancement of mobile Internet technology has brought about subtle yet profound shifts in data transmission mechanisms. These changes have ushered in an era of greater convenience and enhanced service platforms for the integration of sports news resources. As network communication continues to evolve, it has become imperative for Internet media to adapt and innovate, forging stronger connections between diverse news media entities and leveraging the Internet's capabilities to chart a promising trajectory for the communication of sports news.

Amidst this ever-changing landscape, characterized by knowledge graphs and correlation analysis, sports news communication finds itself at the forefront of transformative developments. To fortify the foundational underpinnings of journalism and communication within the context of sports news, it is essential to embark on a journey of profound reform and innovation. Such endeavors aim to construct a theoretical framework that seamlessly aligns with the contemporary dynamics of sports journalism. A pivotal aspect of this endeavor lies in the precise measurement of interdisciplinary news transmission, a primary focus of exploration for modern experts. (Rossi et al., 2021).

Within the multifaceted domain of sports journalism, characterized by its adaptability and comprehensiveness, it is essential to tailor application modes to suit diverse communication environments. This approach ensures the applicability of cognitive frameworks and facilitates more effective quantitative analysis. Drawing upon insights from reputable sources such as Journalism and Communication

Research, Journalism and Communication, and esteemed sports journalism institutions, this paper undertakes a comprehensive examination of sports news communication. In doing so, it seeks to unveil the challenges facing the field and offers effective solutions to fortify the foundations of sports journalism and communication within the networked landscape (Neuzil et al., 2018).

2.1 Problems existing in network news communication in sports news.

(1) Users can forward it freely

At the present stage, many sports news network do not need to detect the hot news content, but blindly pursue timeliness and occupy the hot news sales market, mainly because the verification is not careful. Some online media reports have not been authenticated by authorities, which is a violation of the law. The Office of the State Internet Information Corporation published Requirements for Internet Information Management and Service: Website publishing, APP, community forum, blog, Sina Weibo and WeChat public account must obtain the Internet information service project license (Kolitsas, Ganea, & Hofmann, 2018). It is prohibited to carry out network media data service activities without permission or beyond the permitted scope. Data Research reports that only about 25 percent of consumers in China check the authenticity of news reports before forwarding them. Since there is no cost for forwarding, online rumors are very easy to spread.

(2) The quality of network news communication content is low

In the pursuit of rights and interests, many news publishers ignore the quality of news content and blindly pursue the rapid spread of news reports, ignoring the quality of the video. No matter what video news is released on the Internet, it will result in vulgar news content and excessive entertainment. Some values deviate from the reader's correct values. The process of network users disseminating low-quality content is shown in Figure 1:

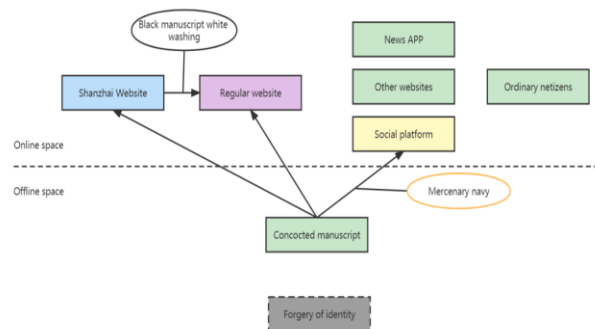


Figure 1. Flow chart of low-quality content spread by network users.

2.2 Solutions to sports network news communication

(1) Improve the credibility of news content

If the whole process of sports journalism is not managed efficiently, news reports will be flooded and poorly distributed, and readers' interest in learning and truthfulness will be reduced. Therefore, before media dissemination, journalists must have clear provisions on their own specific content or their own responsibility, abide by the values of justice, not fabricate facts, and constantly improve the detection before the release of the news. We need to start at the source and provide a good foundation for the next press release.

(2) Internet real-name registration system to strengthen supervision.

At present, our network media lacks complete supervision and efficient supervision schemes, so we must pay more attention to these aspects. The use of legal sanctions to sustain the development of the Internet. Real-name registration should be promoted to prevent criminals from using false accounts to publish bad records, so as to guide readers toward incorrect values. Disconnect this outlaw from its source. Compared with the service platform, it can achieve the technical standards of real-name registration system through technical identification of false accounts. Relative to the average user, always be vigilant about their ability to distinguish between right and wrong. The market supervision department, strictly investigate and punish "fake powder" customers, safeguard the legal rights of the masses on the Internet. Create a clean Internet (Yu & Huang, 2022).

3. Interdisciplinary research of journalism and communication

By bridging the realms of sports journalism and psychology, this interdisciplinary inquiry seeks to unravel the complexities surrounding the production and reception of sports news. It delves into the psychological factors that influence audience engagement, perception, and decision-making in response to sports narratives. Furthermore, it explores the evolving landscape of sports media in the digital era, shedding light on the strategies employed by sports journalists to capture and maintain the attention of diverse audiences. Through this interdisciplinary lens, we aim to decipher the synergies between sports journalism, communication methodologies, and the psychological underpinnings that shape the sports news landscape. This endeavor not only enriches our understanding of sports media but also offers valuable insights for sports journalists, communication scholars, and psychologists navigating the ever-evolving terrain of sports

news in the 21st century (Chen, 2022).

In order to better reflect the cross-disciplinary research status of sports journalism in communication studies, we carried out an in-depth analysis. From the perspective of academic history, we can learn from the book *History of Chinese sports Journalism* that scholars have been self-conscious about "revealing the characteristics of journalism as a comprehensive and cross-disciplinary discipline", and there is a certain crossover between journalism and other disciplines. The interdisciplinary approach is shown in Figure 2:

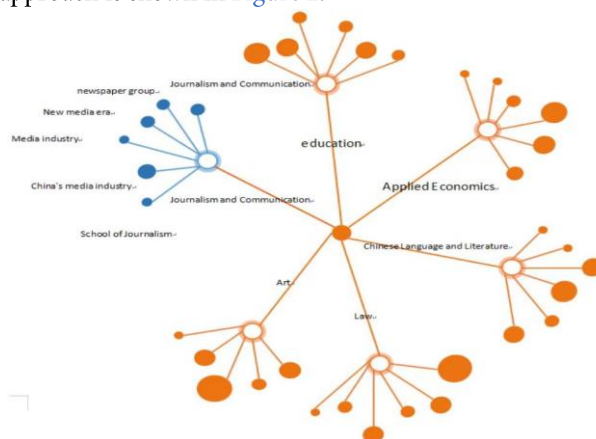


Figure 2. Cross-disciplinary approach

On the one hand, academic organization. At present, the interdisciplinary research of sports news communication studies is embodied in the intersection of internal structure. In the original society of knowledge base and production based on the media type, the establishment of interdisciplinary research has been gradually reconstructed, and the interdisciplinary research has been launched. Some schools are trying to "project" graduate students, collaborating with other schools to create a cross-disciplinary system. This shows that the combination of education and other disciplines has been a common way of journalism and communication. The new force of academic research that grows up under this teaching model will be more interdisciplinary. However, in terms of academic research, the School of Journalism, as a basic research and education organization, has limited connections with other schools. Many research organizations, including those at the national level, are struggling to meet their goals across universities and disciplines. Therefore, to promote interdisciplinary research, it is necessary to innovate the current organizational model. Compared with organization, platform and organizational structure, it is better to set up the project-centered, temporary and decentralized academic organization, and carry out system management and planning closely around the project and research situation.

Second, it is different from the in-depth cooperation and evaluation system of academic subjects. From the conclusion of

academic research production and manufacturing, especially the representative journal papers, the current cross-type research of sports journalism communication in China is specifically manifested that scholars in this discipline apply the basic knowledge, basic theories and methods of other disciplines to assist the development of research, and there is less in-depth cooperation among scholars in different disciplines. To put it bluntly, interdisciplinary discipline research requires researchers to grasp the theories and methods of other disciplines except for sports journalism and communication. For most researchers, it is difficult to imagine that they must master two or more theories and methods of disciplines at the same time. Therefore, the interdisciplinary research in this area cannot be carried out, or not only stay at the basic level. High-end yet in-depth interdisciplinary research must be the result of collaboration between scholars in different disciplines. However, as the main body of knowledge production, researchers belong to different types of colleges or organizations, and there are certain obstacles in many aspects of social development, such as result evaluation and ownership, resource allocation, personnel adjustment, etc. In particular, the scientific research evaluation system must be reformed and innovated accordingly.

Based on the communication problems of the journalism department and its interdisciplinary, it is necessary to make adjustments and innovations toward the goal of weakening classification and improving openness. For most researchers, the most important thing is to face up to the problem, actually carry out research, ask questions and carry out research from the perspective of the discipline, and contribute their wisdom. Perhaps interdisciplinary research gives us a great inspiration, we must be aware of the integrity of the research object and the constraints of a single discipline, and then consciously eliminate the discipline limits in the research.

Interdisciplinary is a method and mode. This paper needs to adopt certain methods for interdisciplinary studies. The connection between disciplines of journalism and communication can be studied by knowledge graph and correlation analysis. These two methods are also a change of thinking patterns and values. Just as research requires the ability to think outside the box, you might call it "interdisciplinary thinking." This kind of concept should become the most basic concept of journalism research (Van Witsen & Takahashi, 2018).

4. The analysis of Knowledge graph and correlation analysis in interdisciplinary measurement of sports journalism

4.1 Research status of knowledge graph

The knowledge graph is composed of entities related to each other and their properties. In fact, we know that the

information obtained is not "appropriate" for related entities, considering only individual entities. In other words, it is far from enough to build a knowledge base system for a group that only includes the basic knowledge of this group and immediately related groups (Zhao & Wang, 2020). The development of knowledge map is shown in Figure 3:

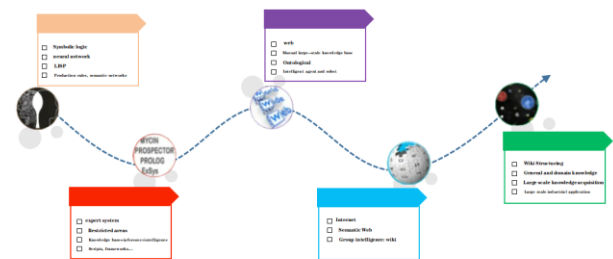


Figure 3. Development process of knowledge map

The information source of knowledge graph generally comes from the Internet, but from the database. The Internet is mainly used for the construction of general industry knowledge graph, and information must be collected from a large number of data networks, analyzed, calculated and combined (Menezes, 2018). From the perspective of the database, a lot of information in the professional field is clearly constructed for the construction of knowledge graph in the professional field. In the database, the construction of knowledge graph in the professional field mostly depends on the projection of data storage structure into ontology, which is constructed by industry experts and professors. The technical framework of the knowledge graph is shown in Figure 4:

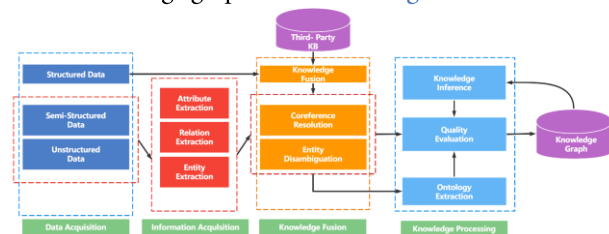


Figure 4. Technical framework of Knowledge graph

With the accumulation of knowledge and the rapid development of science and rationality, the development of human society has launched a huge productivity reform which has changed the social system several times. The recent productivity revolution coincides with the technological revolution triggered by the development trend of Web technology. Google provides the knowledge graph to improve the quality and experience of customer search. The knowledge graph is essentially a graph connecting connections between entity lines, that is, a semantic network that exposes the relationships between entity lines. It is widely used to represent knowledge through network resource narrative architecture (Takahashi & Parks, 2018). The whole life cycle of

knowledge graph mainly includes three important technologies: (1) knowledge extraction and representation technology which reads data from sample source and represents it as structural knowledge; (2) Knowledge fusion technology that integrates different sources of knowledge; (3) Carry out knowledge logical reasoning and quality evaluation according to the existing knowledge in the knowledge map. In recent years, more and more experts and scholars have paid attention to interdisciplinary measurement, and knowledge graph has been paid more and more attention. The paper makes a comprehensive analysis of the relevant

technologies of the Knowledge graph, and specifically describes the research and common application of the key technologies of the knowledge graph. You can apply the knowledge graph to the dissemination of the news department. The whole life cycle technology of knowledge graph is summarized, and a detailed description is carried out from the aspects of knowledge extraction and presentation and knowledge fusion, so as to create logical thinking of scientific methodology (González Alcaide & Gorraiz, 2018). The representative knowledge map is shown in Table 1:

Table 1

Representative knowledge map

designation	Start time	Dependence on resources	Scale (Entity, concept, relationship, fact)
Cyc	1984	Expert Knowledge	239,261/116,822/18,014/2,093,000
WordNet	1985	Expert Knowledge	155,287/117,659/18/-
ConceptNet	1999	Swarm intelligence	-/8,000,000/36/21,000,000
YAGO	2007	WordNet+WiKikipedia	4,595,906/488,469/77/≈40m
DBpedia	2007	Wikipedia+Expert Knowledge	17,315,785/754/2843/79,030,098
Freebase	2008	Wikipedia+Domain knowledge + Swarm intelligence	58,726,427/2,209/39,151/3,197,653,841
NELL	2010	Machine learning	-/287/327/2,309,095
BabelNet	2012	WordNet+WiKikipedia	9,671,518/6,117,108/1,307,706,673/-
WikiData	2012	Freebase+Swarm intelligence	45,766,755/-/-/-
Google Knowledge Graph	2012	Based on the freebase	570M/1500/35000/18000M
Knowledge Vault	2014	Machine learning	45M/1100/4469/271M

4.1.1 Knowledge extraction and representation

Entity extraction is also called entity identification, the main goal is to search for data from the sample. Search for relevant information on the level of communication discipline of journalism department, and take the paper reference as the

overall target. Here, the discipline of journalism and communication will become the entity. The methods and steps of entity extraction are summarized as: sample selection, data collection, subject classification, data preprocessing and data analysis (Yao et al., 2020).The schematic diagram of knowledge extraction is shown in Figure 5:

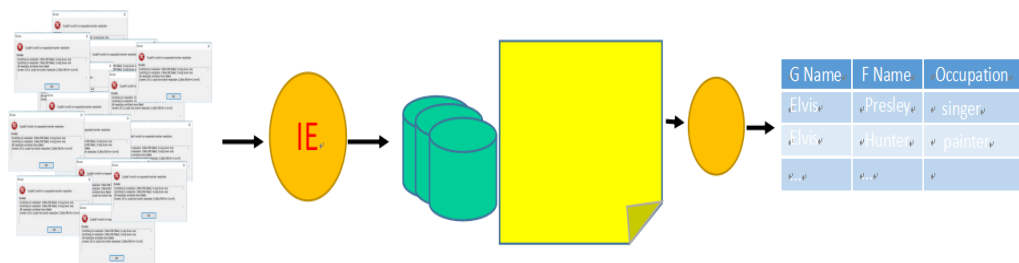


Figure 5. Schematic diagram of knowledge extraction

There is usually a cross relationship among the entities obtained by entity extraction. Based on relation extraction, the semantic connection between entities can be

constructed. Relationship extraction technology is mainly divided into three kinds: (1) According to the relationship of the template extraction. Application template can extract

entity associations according to manual or equipment learning methods. Although it has high accuracy and strong operability, it is not suitable for large-scale data sets, low mean square error, and cannot be maintained. ② According to the relation of unsupervised learning, A lot of manually indicated data information is sent into the solid model for practice, and the carefully designed reasonable features are used to measure the similarity of correlation cases and the correlation is screened by the svm algorithm. ③ According to the relation of semi-supervised or unsupervised learning (Wahyudin et al., 2021).

The purpose of attribute extraction is to supplement the entity information content and obtain the entity attribute information or attribute value from the sample source. Entity attribute can be understood as a relationship between attribute value and entity, so it can be obtained through the solution strategy of relation extraction.

4.1.2 Knowledge fusion

According to knowledge extraction and representation, a considerable amount of formal knowledge is obtained. Because the source of knowledge information is not the same, resulting in the quality of knowledge being uneven, and there are contradictions or overlapping knowledge. At this time, the basic knowledge map is created, and the quality and quantity of knowledge need to be improved. Knowledge fusion technology is applied to process multi-source knowledge, improving the quality of knowledge graph on the one hand, and enriching the total amount of colorful knowledge on the other hand (Yanping & Gang, 2022). With the rapid development of knowledge graph, specialized knowledge fusion methods have also emerged, as shown in Figure 6:

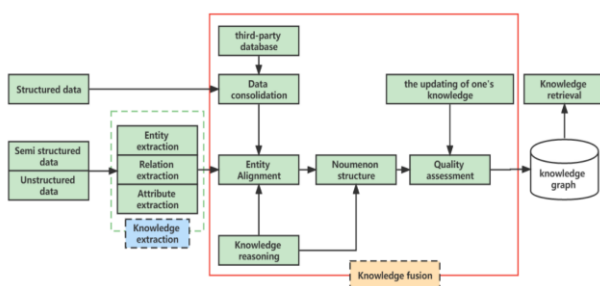


Figure 6. Knowledge fusion method

(1) Disambiguation of knowledge

For each entity in the knowledge graph, there should be a clear bias, that is, to define the category of journalism and communication, which is the reporting activities, communication activities and other information content communication phenomena of the contemporary political parties. The industry involved is a network and new media communication. In the basic knowledge map, there are

heterogeneous entities with the same name because of the complex information sources. In order to ensure that each entity has a clear meaning, entity disambiguation technology is used to distinguish the entities with the same name. The existing knowledge base and implicit data in the knowledge graph are used to assist in word sense disambiguation, and the probability distribution function obtained from the Markov chain in the knowledge subgraph on the knowledge base is used to describe the meaning of entities and text documents. In the future, the daily task of entity disambiguation is carried out according to the iterative updating greedy proximity optimization algorithm and learning permutation method (Guo, 2019).

(2) Knowledge crossing

Knowledge crossover is to combine knowledge from the general perspective of knowledge graph, expand the scale of knowledge graph according to the existing knowledge base and knowledge graph, and enrich the knowledge contained in it. Since the technology of knowledge graph was put forward clearly, it has attracted great attention due to its advantages of open interconnection of word meaning processing and simple and flexible expression forms. Sociology has a close relationship with journalism and communication, and the two disciplines have a crossover tradition. For example, the Department of Social Development Journalism is a separate discipline in journalism and communication, especially the whole process of information reporting and social communication related to social development. It is a discipline formed by the intersection of sociology and journalism and communication. Second, the sociology of news reporting refers to the scientific study of the relationship between journalism activities and the development of human society. Its main feature is to study the situation of news reporting by using the principles and methods of sociological design. It is also an interdisciplinary subject between sociology and journalism and communication.

4.2 Research status of association analysis technology

In this part, the bibliometrics statistical analysis method is selected and CiteSpace is applied to solve and analyze the literature information of the dissemination course of relational journalism. This software can make the knowledge map of journalism, revealing the development status and future trends of the discipline in a certain period of time. Literature keywords should be the extraction and summary of the full text information of the literature, and the identification of the basic knowledge information of the literature. Based on the co-occurrence analysis of professional knowledge and cluster analysis of literature keywords, the overall status of related data research can be quickly and deeply grasped (Liu & Wei, 2018; Vargo, Guo, & Amazeen, 2018). Bibliometric analysis formula:

$$\text{Factor of influence} = \frac{\sum_{i=1}^m nk-i}{\sum_{i=1}^m NK-i} \quad (m = 1,2,3,\dots) \quad (1)$$

In this study, CNKI, a more authoritative Chinese science and technology journal database system in China, was selected to search the "associated data" and other research results. In order to ensure the accuracy and recovery rate of the retrieval, the retrieval method was professional retrieval, and the retrieval type was set up as "TI= associated data". Formula of association rule [18]:

$$\text{Confidence}(A \rightarrow B) = P(B/A) = \frac{\text{support_count}(A \cup B)}{\text{support_count}(A)} \quad (2)$$

The mischecked references and references inconsistent with the research topic were deleted from all relevant search results. The author's co-occurrence analysis, research organization co-occurrence analysis and topic keyword co-occurrence cluster analysis were carried out according to CiteSpace 5.6.R2 data analysis tool. Core research scholars, key research institutions and research network hotspots in this field are obtained. Through the keyword co-occurrence analysis function of CiteSpace, the keyword network map with the highest frequency in CNKI database was obtained, as shown in Figure 7:

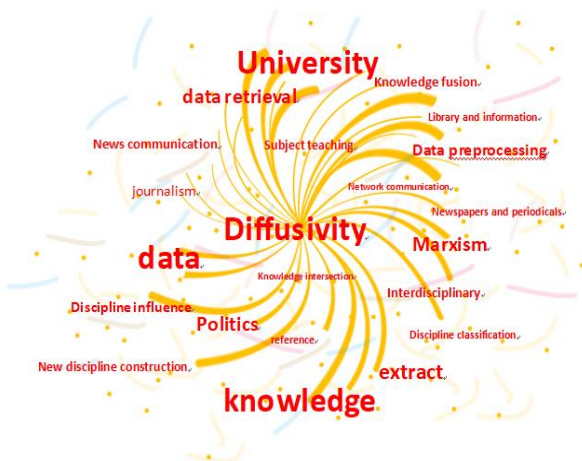


Figure 7. Keyword network diagram

In the 11 years from 2006 to 2016, the total number of published papers related to journalism and communication showed an increasing trend year by year. It is worth noting that in the three years from 2015 to 2017, the annual number of published articles was about 550, the highest number of published articles in the field, indicating that countries around the world paid close attention to the field of journalism at this stage. Since then, the number of published papers has declined, but the average annual total number of published papers remains above 400, indicating that although the popularity of the journalism and communication has decreased, it still belongs to the key research content (Orr et al., 2021). The distribution of foreign literature is shown in Figure 8:

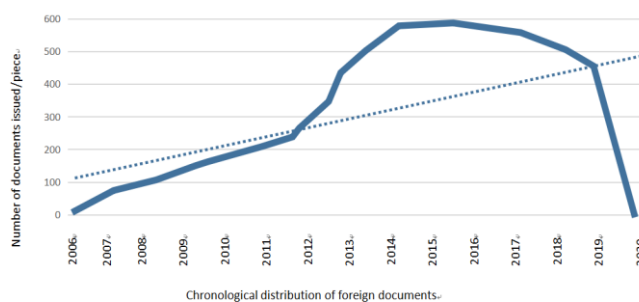


Figure 8. Distribution of foreign references

According to the reference data derived from CNKI full-text database system, the total number of publications of journalism department was relatively small during the 5 years from 2006 to 2010, indicating that China did not pay much attention to journalism and communication at this stage, and the exploration of this field was in the embryonic stage. The period from 2011 to 2015 is a period of efficient development in contemporary times. The number of published papers in 2010 was only more than 10, the number of published papers in 2012 soared to nearly 70, and the number of published papers in 2015 reached 75, the highest value in the field, indicating that China paid close attention to the field of linked data in this stage. In the fourth decade from 2016 to 2019, the number of published papers showed a downward trend. The distribution of domestic literature is shown in Figure 9:

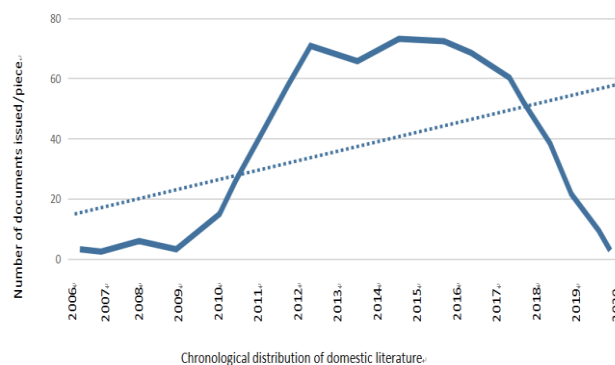


Figure 9. Distribution of domestic references

In the context of new media communication, on the premise of sorting out the concept of associated data and publishing standards, this paper describes the literature citation status of the exploration of relational journalism. The total number of references in journalism increased rapidly, but the introduction of relevant journalism professional knowledge could not keep up with the increase in quantity, which was closely related to the quality and effectiveness of the research. Therefore, how to dig deeply into related data, and improve the usability of related data, so as to realize the value of related data set has become an urgent problem to be solved at this stage.

5. Research ideas and design

5.1 Sample selection

This paper analyzes the interdisciplinary situation of journalism and communication in China. Some representative graduation thesis references are selected as research samples, such as Journalism and Communication Studies, History of Chinese Journalism, Journalism and Communication, and Journalism University. The selected publications are generally well-known and have representative article contents in the discipline of journalism. At the same time, they can well reflect the cross-disciplinary situation and better apply the knowledge graph.

5.2 Data Collection

Data collection is based on the reference mentioned above to extract keywords, references, author information, journal type, volume number, etc., but this paper first analyzes from the reference level. Search the data from the CNKI database, and then obtain the ranking of literature citation frequency, that is, cite the data information of academic papers in the literature. The reason why the CNKI database is selected in this paper is that the reference

materials of CNKI are more abundant and authoritative than those of other database systems.

5.3 Subject Classification

To achieve the classification of reference disciplines, first, select the category of the discipline. We can match the sequence numbers and characteristics of each subject. Then the subject classification basis of reference literature and cited literature. The types of references are relatively rich, including academic papers, special references, books, newspapers, periodicals and so on. It is especially emphasized that special references are special scientific and technological documents, including conference proceedings, graduate papers, scientific and technological reports, etc. Because the subject types of references such as newspapers, magazines and periodicals are not obvious, this paper does not make reference.

5.4 Data Preprocessing

First of all, we can classify the subject by citing the literature. The first step is to sum up the data information of the cited literature and academic papers, and then screen the types of references to figure out the proportion of them. General data preprocessing is shown in Figure 10:

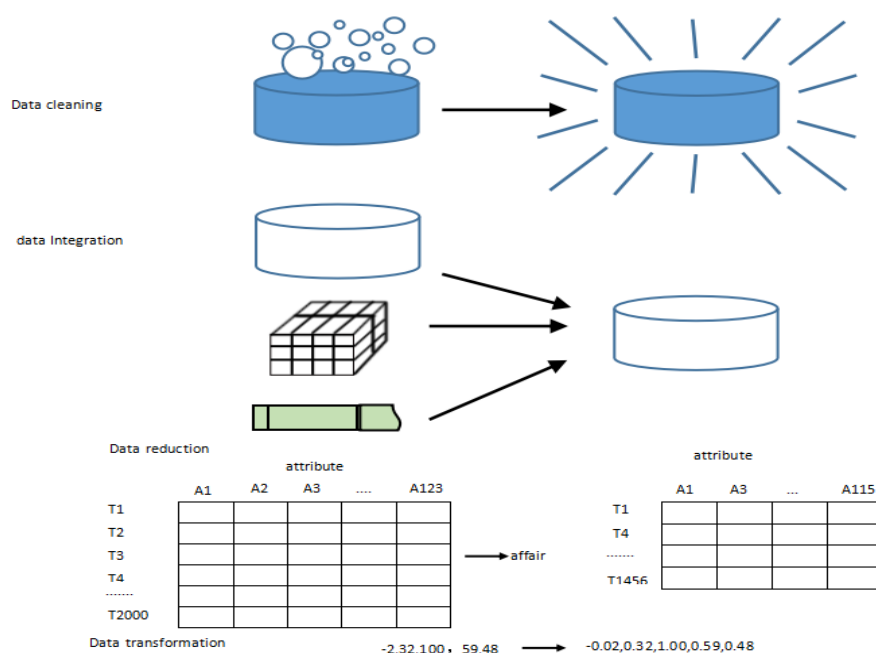


Figure 10. Common data preprocessing methods

We query the design scheme through the access number database, and type the upgrade sentence in the SQL main view: update citation journals, subject category table set citation journals. Type = General table of subject categories. Type where cited journal. Citation journals = General table of subject categories. The preliminary table of subject classification of citations and references for each year is obtained (Xu, 2022). Finally, the unclassified journals in the table were reclassified according to the subject names of the

journals in CNKI. During the operation process, it was found that very few journals could not be found in CNKI. For such journals, the author searched the web pages to find the introduction of the journals and carried out the course classification, and finally obtained the subject classification data information of citations and references for each year. Then the data is combined to obtain the total citations and references subject classification data information. The distribution table of various references is shown in Table 2:

Table 2

Distribution table of various references

Type of reference		Number	The proportion of
Chinese References	Chinese Journal Papers	23320	23.8%
	Books in Chinese	28731	29.32%
	Chinese special literature	2420	2.47%
	Other Chinese Literature	14271	14.56%
	Total	68742	70.15%
Foreign language References		29253	29.85%
Total		97995	100%

5.5 Principles and methods of data analysis

Based on the above interpretation of the interdisciplinary style of journalism and communication, we first select the sample version, then through data integration, carry out disciplinary classification of the collected papers and references, and carry out statistical analysis of the data, so as to reflect the phenomenon of the interdisciplinary style of journalism and communication. The combination of multiple disciplines and its professional level are analyzed. (1) Discipline influence. Subject influence can also be called subject absorption capacity. Citation influence of discipline standardization refers to the evaluation index system after normalization for different literature types, publication and release years, and disciplines and industries, which is a very meaningful and unbiased citation influence index value. According to the influence of the discipline, it can accurately measure the influence of this discipline on different disciplines. Calculation of measurement formula:

$$X_i = N_i / \sum N_i * 100\% \quad (3)$$

Where xi represents influence and ni represents the number of citations.

(2) Discipline diffusion degree. Within the scope of the source journal of the statistical analysis, the total number of periodicals cited by the journal is not so much the proportion of the total number of periodicals in the subject. Reference operating frequency is different, the degree of diffusion is not the same. We can measure it using the scientific diffusion formula:

$$K_i = C_i / \sum C_i * 100\% \quad (4)$$

K_i represents the degree of scientific diffusion and C_i represents the number of citations.

(3) Multidisciplinary integration. It refers to the exploration, classroom teaching and application of interdisciplinary and multi-disciplinary cross-disciplinary integration, cross-disciplinary integration, cross-disciplinary integration and cross-disciplinary exploration. The following formula is used to calculate and carry out metrological verification. The more the standard value, the greater the degree of dispersion and diversity of the subject, that is, the higher the crossover. The formula of information entropy:

$$H_i = -\sum_1^i \left(\frac{n_i}{N} \ln \frac{n_i}{N} \right) \quad (5)$$

H_i represents information entropy, N represents total number of references, and ni represents category.

The formula of statistical entropy:

$$H_B = \frac{1}{N} * \ln \frac{N!}{n_1!n_2!n_3! * \dots * n_i!} \quad (6)$$

H_B represents information entropy, N represents total number of references, and ni represents category.

(4) Degree of discipline and specialty. A professional level refers to the significant degree of discipline classification characteristics, which is different from the degree of integration of multiple disciplines. The more marks it has, the more professional ability it indicates. The expression formula is:

$$H_p = \frac{\sum i \cdot n_i^2}{(\sum i^{n_i})^2} \quad (7)$$

H_p represents the degree of specialization, n_i represents the number of citations by subject category, and i represents the number of subject categories.

6. Analysis of Research Results

The authors mainly analyzed the influence of disciplines. First, they combined the degree of knowledge integration and the total amount of knowledge to analyze the overall influence of the journalism department on the knowledge of communication. The total number of disciplines influenced by knowledge reflects the degree of rich and diverse sources of scientific knowledge from the perspective of introduction. Analysis from the knowledge map and correlation also indicates that the degree of knowledge integration is high and the correlation is strong (Liu et al., 2022).

Discipline influence is an important index value to test the knowledge integration level of a discipline to other disciplines, which can accurately measure the influence degree of this discipline to different disciplines, so as to obtain the degree of interdisciplinary. In this paper, the discipline influence degree of several years is selected according to the discipline influence formula, and the common data preprocessing method is shown in Table 3:

Table 3

Subject influence of some disciplines

Serial number	Knowledge input discipline	Frequency of reference	Influence of discipline(X _i)
1	Journalism and communication	25096	50.79%
2	Political Science	5166	10.45%
3	history	3316	6.71%
4	Sociology	3068	6.21%
5	Economics	2534	5.13%
6	literature	1933	3.91%
7	philosophy	1786	3.61%
8	law	1256	2.54%
9	Science of art	1097	2.22%
10	Linguistics	602	1.22%
11	Computer Technology、 Technology of automation	524	1.06%
12	Education and education	490	0.99%
13	Science, scientific research	363	0.73%
14	Psychology	340	0.69%
15	Library business, information business	303	0.61%

According to some extracts, professional knowledge of journalism and communication can be entered into various disciplines. According to the report, the key professional knowledge mentioned in journalism and communication is concentrated in politics, history, social psychology, and social economics, etc., while the introduction of education, social psychology and other aspects are less.

Political science should be the most well-known external discipline of journalism and communication, with its subject absorption of 10.45%, much higher than other disciplines. Political science and journalism and communication have a close relationship over the years. Firstly, journalism cannot be separated from politics and metallurgy, and the quality of political thought is the key accomplishment of journalists. As mentioned in the Code of Professional Ethics for Chinese Journalists: To study, publicize and implement the Party's theory, road book, strategic principles and current policies "; It can be seen that the relationship between journalism and political science is particularly close, so political science has a great influence on journalism and communication.

7. Conclusion

In the realm of Sports News, where network communication reigns supreme, the concept of interdisciplinary studies has emerged as a prominent and pertinent topic. As we navigate the currents of communication within the field of journalism, the

development trends of this era have underscored the significance of knowledge graph measurement and correlation analysis. These methodologies represent the cutting-edge discourse within the networked landscape, offering fresh perspectives and opportunities for exploration.

In light of these advancements, it becomes increasingly imperative to foster a synergistic relationship between sports journalism and other disciplines, facilitating their holistic development. Despite its evolution, journalism has yet to establish deeper connections with complementary fields. Consequently, there is a pressing need to prioritize interdisciplinary collaboration, nurturing a multifaceted educational ecosystem that molds well-rounded professionals.

Navigating the intricate web of network communication presents a plethora of practical challenges, each awaiting innovative solutions through dedicated scientific research. The ascendancy of network communication aligns harmoniously with the growing interconnectivity of journalism and communication disciplines. This convergence not only validates the indispensability of network communication but also serves as a testament to the evolving landscape of Sports News, where adaptability and interdisciplinary synergy hold the key to unlocking new horizons.

References

- Chen, Z. (2022). Research on Public Governance from the Perspective of Interdisciplinary and Knowledge Integration *Chinese Public Administration*, 1(7).
- Darvishy, A., Ibrahim, H., Sidi, F., & Mustapha, A. (2020). A Hybrid Approach to Personalized News Recommendations. *IEEE Access*, 8, 46877-46894. <https://doi.org/10.1109/ACCESS.2020.2978505>
- Dressel, J., Whitehead, L., & Heitkam, S. (2023). Linking knowledge transfer and industry with a collaborative performance of biotech companies: A distributed leadership perspective. *Journal of Commercial Biotechnology*, 28(1), 326-338. <https://doi.org/10.5912/jcb1904>
- González Alcaide, G., & Gorraiz, J. I. (2018). Assessment of researchers through bibliometric indicators: the area of information and library science in Spain as a case study (2001–2015). *Frontiers in research metrics and analytics*, 3, 15. <https://doi.org/10.3389/frma.2018.00015>

- Guo, L. (2019). Media agenda diversity and intermedia agenda setting in a controlled media environment: A computational analysis of china's online news. *Journalism Studies*, 20(16), 2460-2477. <https://doi.org/10.1080/1461670X.2019.1601029>
- Kolitsas, N., Ganea, O.-E., & Hofmann, T. (2018). End-to-end neural entity linking. *arXiv preprint arXiv:1808.07699*. <https://doi.org/10.48550/arXiv.1808.07699>
- Liu, X., Li, L., Wang, M., & Guo, X. (2022). Research on the Mechanism of Interdisciplinary Knowledge Intersection and Fusion: Taking EEG Technology as an Example. *Science and Technology Management Research*, 42(15), 240-248. <https://doi.org/10.3969/j.issn.1000-7695.2022.15.028>
- Liu, X., & Wei, R. (2018). Context, Evolution and Paradigm: Imagination of Network Research. *Journalism University*, 3, 98-106.
- Menezes, S. (2018). Science Training for Journalists: An Essential Tool in the Post-Specialist Era of Journalism. *Frontiers in communication*, 3, 4. <https://doi.org/10.3389/fcomm.2018.00004>
- Neuzil, M., Freedman, E., Poulson, D., & Duffy, K. (2018). Challenges in the teaching of environmental journalism. *Applied Environmental Education & Communication*, 17(4), 323-334. <https://doi.org/10.1080/1533015X.2017.1415775>
- Orr, L., Leszczynski, M., Arora, S., Wu, S., Guha, N., Ling, X., & Re, C. (2021). Bootleg: Chasing the tail with self-supervised named entity disambiguation. *arXiv preprint arXiv:2010.10363*. <https://doi.org/10.48550/arXiv.2010.10363>
- Peters, M. A., Neilson, D., & Jackson, L. (2022). Post-marxism, humanism and (post) structuralism: Educational philosophy and theory. *Educational Philosophy and Theory*, 54(14), 2331-2340. <https://doi.org/10.1080/00131857.2020.1824783>
- Rossi, A., Barbosa, D., Firmani, D., Matinata, A., & Merialdo, P. (2021). Knowledge graph embedding for link prediction: A comparative analysis. *ACM Transactions on Knowledge Discovery from Data (TKDD)*, 15(2), 1-49. <https://doi.org/10.1145/3424672>
- Takahashi, B., & Parks, P. (2018). Journalists and communicators' perceptions of their graduate training in environmental reporting: an application of knowledge-based journalism principles. *Frontiers in Environmental Science*, 5, 94. <https://doi.org/10.3389/fenvs.2017.00094>
- Van Witsen, A., & Takahashi, B. (2018). Knowledge-based journalism in science and environmental reporting: Opportunities and obstacles. *Environmental Communication*, 12(6), 717-730. <https://doi.org/10.1080/17524032.2018.1455723>
- Vargo, C. J., Guo, L., & Amazeen, M. A. (2018). The agenda-setting power of fake news: A big data analysis of the online media landscape from 2014 to 2016. *New media & society*, 20(5), 2028-2049. <https://doi.org/10.1177/1461444817712086>
- Wahyudin, D., Darmawan, D., Suryadi, E., Setiawati, L., & Rahmawati, Y. (2021). Digital Strategic Communication Management in Developing Curriculum of Universitas Pendidikan Indonesia. *Journal of Hunan University Natural Sciences*, 48(10), 118-130. <http://jonuns.com/index.php/journal/article/view/769>
- Xu, N. (2022). Research on the Construction of News Media Management System from the Perspective of Media Convergence - Comment on "On News Media: A New Vision of Journalism Research". *Science & Technology Management Research*, 42(6), 3. https://caod.oriprobe.com/articles/63161435/mei_jie_rong_he_shi_yu_xia_xin_wen_chuan_mei_guan_.htm
- Yanping, L., & Gang, W. (2022). A comparative analysis of data preprocessing methods based on typical datasets [J]. *Journal of Shenyang University of Technology*, 44(02), 185-192. <https://doi.org/10.7688/j.issn.1000-1646.2022.02.11>
- Yao, S., Zhao, T., Wang, R., & Liu, J. (2020). Rule-guided Knowledge Graph Joint Embedding Method. *Journal of Computer Research and Development*, 57(12), 2514-2522. <http://dx.doi.org/10.7544/issn1000-1239.2020.20200741>
- Yu, W., & Huang, Y. (2022). Cross-platform dissemination of journalism and communication professional knowledge from the perspective of media ecology—Based on data mining of CSSCI journals on journalism and communication from 2013 to 2021. *China Publishing Journal*, 8(7), 59-65. <https://qikan.cqvip.com/Qikan/Article/Detail?id=7107144052>
- Zhao, M., & Wang, L. (2020). The Status Quo and Prospect of Translation Teaching in China —A Study Based on Analysis of CNKI Knowledge Map. *Foreign Language audio-visual teaching*, 191(01), 59-64+59. <https://wydhjx.cbpt.cnki.net/WKG/WebPublication/paperDigest.aspx?paperID=8a751b87-c91c-459a-a9bd-b087953b3a6d>