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ARTICLE

Coverage of Science and Technological Issues in Two Leading Kannada Newspapers: An Overview

VINAY GP[1] & SATHYAPRAKASH MR[2]

*[1]Research Scholar, Dept of Journalism and Mass Communication
Kuvempu University, Shankaraghatta 577451, Shivamogga
Karnataka, India

[2]Assistant Professor, Dept of Journalism and Mass Communication
Kuvempu University, Shankaraghatta 577451, Shivamogga
Karnataka, India

*Email: vinaygpa@gmail.com

ABSTRACT

In the age of knowledge-based civilisations, science and technology are essential for development, modernisation, and a booming economy. The practice of informing the public about these critically important science and technological issues through various forms of mass media could be termed as one of the important means of science communication. Critical analysis of the literature has revealed that print media appears to be educating the masses more on science and technology issues than other media. RNI 2018-19 report reveals that around 80 per cent of the nation's print media is in Indian languages and the circulation and readership base is gradually increasing in the rural areas. The same rural background people are suffering from various superstitions, black magic, etc., and losing innovative opportunities due to the lack of knowledge on local resources usage. The present study employed a content analysis technique and enquired about the trends that exist in the coverage of science and technology information by selecting two statewide Kannada language dailies. The study found that science dissemination is still insignificant in comparison to the coverage of other categories. Science publication is still event oriented (episodic) in nature while Agriculture, Environment, Astronomy, and Defense subtopics gained high prominence. The news was the dominant format and around 80 per cent of stories were published along with a picture/illustration.

Keywords: Newspaper, Print media, Science and technology, Science communication, Science coverage

Introduction

Every act of human life has been influenced by the process and progress of Science and technology. In the era of knowledge-based societies, science and technology are the prerequisites to achieve development, modernisation and a successful economy. Development at any phase is always linked with technology and the advancement in science results in the creation of technology. Therefore science, technology and development are all inextricably linked. By observing history, it is proved that developed countries have efficiently utilised science and technology in their growth efforts (Mummigatti, 2012). Dissemination of information on science and technology through various mass media plays important role in shaping and influencing people's perceptions of science and technology (Metcalfe and Gascoigne 1995). Making aware people of science and technology with the help of different kinds of mass media can also be termed as science communication/journalism.

Among mass media, print media is known for its consistency and credibility. Newspapers are one of the forms of print media, catering the readers with news, articles, columns, analysis and editorials on various topics like politics, agriculture, sports, commerce, art, environment, science & technology, etc. Dailies are one of the oldest and most relevant sources of information for the larger populace of India. Despite the proliferation of digital media and high-pitched debates on news channels, print media continues to be considered a credible source of information. The distinct features of newspapers such as low cost, high recall, permanency, longer storage possibilities, inclusion of local news, and repeated & multiple access privileges make them unique from other media. CVOTER an Indian international polling agency carried out a survey on different mass media users, where 63 per cent of respondents said that reading newspapers has become more important in times of COVID-19 (Jha, 2020).

Print media scenario: Print media, which includes books and a range of publication periodicities such as daily, weeklies, bi/tri weeklies, monthly magazines, and annuals, gives information about events occurring all over the world. RNI's 2019 (Press in India 2018-19) report stated that the total number of registered

publications, as of 31 March 2019 is 1,19,995 where 17,504 are newspapers and 1,02,491 are periodicals. Compared to the previous year, there was an appreciable growth of 1.48 per cent seen i.e., 1,841 new publications registered during 2018-19. India is catering for the largest number of publications from Indian (regional) languages. The report revealed that Hindi publications comprised 40.55 per cent (48,666 publications) of total Indian publications, followed by other languages publications (47.12%) and English (12.3%). Hence, 88 per cent of publications belonged to Indian (regional) languages. The highest number of publications in different languages that submitted annual statements to RNI during 2018-19 were in Hindi (18,109) followed by English (3,043), Marathi (2,915), Telugu (2,603), Gujarati (2,270), Urdu (1,932), Kannada (1,242), Tamil (920), Bengali (650), Odia (511) and Malayalam (457) and some others.

Newspapers: The Daily publications were brought out in almost all the main languages of the country. Out of 1,841 new publications registered in 2018-19, 344 were daily newspapers. Hindi Dailies topped the list with 7,573 and the Kannada language stands in sixth place with 904 daily newspapers. The claimed circulation of dailies increases from 24,26,90,557 copies to 29,15,35,681 copies per publishing day, an increase of 20.13 per cent (Press in India 2018-19). Indian readership grew by 110 million over the last three years or around 11 per cent year to year. With this, the reader base has grown to 395 million Indians, who have read any publication during the previous month. 98 per cent of readers read dailies, while 20 per cent read magazines. 52 per cent of the readership of dailies was from rural markets (FICCI, 2018). The growing push on education is the main cause for this development and which results in increasing readership (Indian readership survey 2017).

Kannada language press: In 1843, *Hermann Mögling*, a Basel Mission missionary, published the first Kannada newspaper, *Mangalooru Samachara*, from Mangalore, beginning in the era of Kannada newspapers in Karnataka. During 2019, it was the fifth largest in the Indian print media scenario. 5372 publications of Kannada involve 904 Dailies, 06 Bi/Tri weeklies, 1006 Weeklies, 1009 Fortnightlies, 2273 Monthlies, 101 Quarterlies

and 04 annuals and 69 other periodicities. Dailies have a circulation of 24 lakhs, where the numbers included the major 10 statewide daily newspapers. The highest circulated publication in Kannada language is "*Vijayavani*", a daily published from Bangalore and Hubli with a circulation of 7.4 lakh copies per publishing day (ABC, 2019).

Science communication through dailies: Till the rise of new media, Science and technology information was widely catered through print media and radio than television. The percentages of science coverage in various media are as follows: 3.4 per cent in print media, 2.18 per cent on television, and 5.84 per cent on the radio (Patairiya, 2011) which is varying per media and needs to hike to 10 per cent. A survey conducted by CVOTER suggested that 75 per cent of respondents prefer to read newspapers for their holistic coverage of news and current affairs (Jha, 2020). Newspaper circulation and rural readership, dependency on it for information are rising gradually. Their core objective of educating the masses to be assessed seriously. As we know science and technology knowledge plays a crucial role in the development of an individual and society, and it is important to understand the newspaper's role in educating the people about it (Verghese, 2016). Therefore, the serious examination has to be done on science reporting patterns and trends followed in Indian-language newspapers.

Review Literature

Science Coverage in Print media

There have been a lot of studies carried out on the dissemination of science and technology information through newspapers. Vigyan Prasar conducted a survey of science and technology coverage in Indian print media where it analyzed 52 newspapers, of which 31 were from Hindi and 21 from English for a period of three months in 1999-2000. On average, only 3.3 per cent of science items were given in the media where English stands ahead with 4.3 per cent while 2.5 per cent by Hindi. Health care/medical received maximum coverage (31.8%) under science irrespective of language, place of publication and day (Kumar, 2013). Dutt and Garg's (2008) study on the Indian English newspapers revealed that *The Times of India* devoted the highest

space to Science than the other English dailies and the health subtopic got prominent importance (37%) followed by environment (~15%) and space S&T (~11%), which was in total spans 63 per cent of space. Only 4 per cent of items (129) appeared on the first pages which covers 6 per cent of the total S&T space. Of all the reported items, 48 per cent of stories were published without mentioning sources and 78 per cent of the items mentioned their workplace of research (dominated by USA), 24 per cent of items incorporated journal citations. Researchers opined that science hardly gets coverage in a prominent position unless it has socio-political ramifications at the national or international level (Dutt & Garg, 2012).

Verghese's (2016) comparative analyses of two English dailies revealed that the Science dissemination structure is almost similar in the selected newspapers. One-tenth of their total space (average 9.57 %) was allotted to the coverage of science. Maximum number of items were belonging to Environment, Nature and ecology. The author opines, the negligence of agricultural news is a major drawback, as 60 per cent of India's population is agrarian. The dominance of health and medicine topics is not just limited to Indian newspapers, a similar pattern of coverage was found in the newspapers published outside of India (Bauer, *et al.*, 1995; Nelkin, 1995; Rooyen, 2011; Dutt & Garg, 2012). This could be due to the direct concerns of every individual and easy to understand than basic physics (Lewenstein, 1995; Dutt & Garg, 2012). Next to health topics, emphasis on environmental issues was influenced by global political activity, raising concern levels and interest among decision-makers and masses around the world. Space S&T is an issue embedded with state-of-the-art big hi-tech science, involving the prestige and power of the performing country, and has political connotations, so it finds prominence in the coverage (Dutt & Garg, 2012).

The same scenario can be seen among the Indian language dailies. A study of four Tamil newspapers showed that they publish only 3.5 per cent of science and technology information. The medical category got the highest priority (31.35 %) followed by agriculture (22.2%) and Computer related news (21.5%). The researcher pointed at lagging points for the inadequate coverage

like the lack of enough dedicated S&T reporters, writers and modern communication technologies and networking along with the absence of a policy to monitor science journalism in media organisations (Arulchelvan, 2010). In a comparative analysis of science coverage between Hindi and English by Kumar (2013), English is ahead in coverage with 2.34 per cent while Hindi's share is 1.74 per cent. The same kind of survey by Vinay (2016) revealed that Kannada dailies provided more space for science (1.90%) than English newspapers (1.77 %).

According to a survey of readers' perceptions of science reporting in Kannada newspapers, the majority of readers benefited from the stories, but they had difficulty in understanding them (Vagle & Poornananda, 2018). The recently implemented Right to Compulsory Education Act, 2009, clearly indicates that science teaching at the school level is also, primarily aiming at promoting scientific thinking and creating scientific attitudes among the students in particular and the people in general (Sharma & Gore, 2016).

Objectives

The objective of the study was to analyze the coverage of Science and technology content by Kannada dailies.

Specifically,

1. To quantify the number of items and space devoted to S&T issues published by the selected newspapers;
2. To classify the above items into broad subtopics, space allotted for them;
3. To understand the formats used and placement preferences in the coverage of science information;
4. To analyze the news origin and nature of the reported items and their prominence;
5. To identify the themes, issues, and visual representation reflected by these items.

Methodology

S&T coverage analysis demands the examination of overall space provided for S&T, science subtopics covered, space allotted,

formats and illustrations utilised in the process of reporting. Science and technology content in this study is operationally defined as any science news, feature, column and editorial that deals with any new discovery, invention and innovation that people can apply to improve their lives and that which adds to existing knowledge. This enquiry involved both qualitative and quantitative data, hence content analysis method is the most suitable one. Kerlinger (1986) defined content analysis as a method of studying and analyzing communication in a systematic, objective, and quantitative manner to measure variables.

The researcher selected two popular statewide dailies (among the top 3) namely *Vijaya Karnataka* and *Prajavani* where their circulation makes up half of the total Kannada newspapers circulation (11, 58, 284). The advantage of selecting prominent and popular dailies has also been pointed out by Moyer and colleagues (Moyer *et al.*, 1995). One year newspaper issues were analyzed in a census method which was from November 2018 to October 2019. Researcher carried out constructed weeks method to calculate total news items, total printable space and ad space. The findings of the content analysis are discussed below.

Findings and Discussion

The study intended to understand the trends that exist in the coverage of scientific and technological information coverage by Kannada newspapers.

Science Items and Space allocation

Total space dedicated for S&T: Content analysis of the selected newspapers revealed (Table 1) that *Prajavani* daily was far ahead in providing science items (424) which is 0.84 per cent in comparison to the *Vijaya Karnataka* which published 265 items (0.48 %) out of 55, 179 news items.

Table 1 — Details on news and science news items

Newspaper	Total News Items	Science Items	Percentage
Prajavani	50,028	424	0.84%
Vijaya Karnataka	55,179	265	0.48%

Space for science: Space for S&T issues was compared with the total space available for printing news, articles, editorials, etc., but it excludes space for advertisements. Table 2 shows that again *Prajavani* devoted more proportion (1.54%) of space for technological information than its rivalry daily *VK* (0.96 %). On average science is receiving 1.25 per cent space share in the total news coverage by Kannada newspapers.

Table 2 — Space devoted to science and technology among total printable space

Space / Newspaper	Total Printable Space (cm^2)	Total Ad Space (cm^2)	%	Total News Space (cm^2)	%	Total Science Space (cm^2)	%
Prajavani	1,11, 25,139.1	31,47, 098.7	28.29 %	79,78, 040.4	71.72 %	1,22, 955.25	1.54 %
Vijaya Karnataka	1,15,55,118	36,24, 680.1	31.36 %	79,11, 742.7	68.46 %	75, 985.5	0.96%

Science Subtopics Covered: Science and technology content published during the study period was classified into 19 subtopics (Table 3). The below-provided data shows Agriculture got prominence (14.65 %) in the *Prajavani* daily followed by Environment and ecology (13.87%), Astronomy (13.79%), Health (10.74%) and Gadgets (6.39%). In the case of *Vijaya Karnataka*, Astronomy got the highest coverage (24.43%) followed by Agriculture (11.61%), Defense (9.90%), Environment & Ecology (8.92%) and Medicinal Science (7.25%).

Concerning health and medicinal sciences, the study reiterated the previous research results. Together these two categories occupied 16.29 per cent of space in *Prajavani* (highest coverage) but it is only 9.62 per cent under *VK*. *Vijaya Karnataka's* health items were given on the supplement's lifestyle page, as health tips that too with commercial interest which didn't meet the operational definition. Hence, they were excluded from the analysis.

Agriculture issues are repeatedly (25 out of 37 in PV; 20 out of 26 in *VK*) published in their dedicated supplement pages and most of them were success stories of various farmers. Serious lack of news on any new inventions and developments related to agriculture and its serious problems were not reported.

Environment news is more due to the rise of awareness related to pollution and its effect on lifestyle, and Astronomy received 3rd highest priority due to ISRO Chandrayana-2 mission's stories and the category along with normal astronomical developments.

Table 3 — Various science sub-topics covered and space devoted for them in cm^2

Sub-topics	*Prajavani*			*Vijaya Karnataka*		
	Items	Space (cm sq.)	Space %	Items	Space (cm sq.)	Space %
Aeronautics	3	550.25	0.44	3	776	1.02
Agriculture	37	18017.25	14.65	27	8828	11.61
AI & Robotics	9	2806.25	2.28	5	1287	1.69
Archaeology	4	629	0.51	5	787	1.03
Astronomy	87	16963.5	13.79	67	18570	24.43
Automobile	10	4582	3.72	7	1412	1.85
CT & CC	11	3567	2.90	14	3820	5.02
Defense	28	4706	3.82	25	7526	9.90
Environment & Ecology	57	17061.25	13.87	20	6785	8.92
Gadgets	25	7860.5	6.39	14	3259	4.28
General S&T*	17	6327.75	5.14	12	3037	3.99
Genetics	4	1616	1.31	2	694	0.91
Health	35	13213.25	10.74	6	1806.5	2.37
Information Science	7	2627.75	2.13	2	518	0.68
Medicinal science	35	6827.25	5.55	20	5516.5	7.25
Physics	1	120	0.09	3	1197	1.57
Science Communication	6	2555.5	2.07	1	841	1.10
Waste management	2	1207	0.98	6	2220	2.92
Zoology	29	7780.75	6.32	15	3391.5	4.46
Others*	17	3937	3.20	11	3714	4.88
Total	**424**	**1,22,955.3**	**100**	**265**	**75,985.5**	**100**

* Others include the subtopics like Botany, Fossils, Geology, Microbiology, Neuroscience, and Social Sciences which either occupied less than 1 per cent of space or nil items in one of the newspapers. *CT & CC — Computer Technology and Cyber-crime, AI — Artificial intelligence, General S&T include the topics like Biotechnology, Marine Science, Physics, Education, Engineering, etc.*

Both dailies tried to meet the digital world's needs by providing a good amount of space for computer technology and cybercrime and Gadgets categories. Fair number of stories (06) published by *Prajavani* on Science communication is an exemplary trend.

Formats and placement preferences: News was the dominant format (Avg. 62 %) engaged in the coverage of Science followed by articles, columns and news feature formats by both dailies (Table 4). This was due to science communicators and experts like Nagesh Hegde, T.R. Anantaramu and others who were regularly writing (articles & columns) for *Prajavani* and the same job was done by Dr Sudhindra Haldoderi, Mallikarjuna Tippar and B. Avinash for *VK*. Along with these, Science has to be covered more in News features and feature formats which encourages the usage of a good number of photos, tables and graphs which helps readers in understanding complex S&T topics easily. Only 8 editorials were published during the analysis period, which is very disappointing.

Table 4 — Formats utilised in reporting S&T issues

Formats	*Prajavani*			*Vijaya Karnataka*		
	Items	**%**	**Space (cm sq.)**	**Items**	**%**	**Space (cm sq.)**
News	264	62.26	46,280.3	166	62.64	32,230.5
Article	82	19.33	39,586.8	39	14.71	15,130
Analysis	4	0.94	3,334	7	2.64	4,061.5
Column	33	7.78	11,536.8	26	9.81	10,377.5
Editorial	7	1.65	1,443.5	1	0.37	176
Feature	20	4.71	14,303	3	1.13	1,398
News Feature	7	1.65	2,701	22	8.30	12,131
Photo News	1	0.23	52	0	0	0
Interview	3	0.70	1,568	1	0.37	481
Phone-in-Program	2	0.471	2,094	0	0	0
Letter	1	0.23	56	0	0	0
Total	**424**	**100**	**122,955**	**265**	**100**	**75,986**

The literature survey highlighted the dependency between the positioning of science stories and their socio-political connections and connotations. In this study, the researcher observed that newspapers seriously engaged themselves in providing space and specific sections for science stories or information as per the prominence and relevance of the topic in

question. Apart from this, editorial policy pertaining to news values plays a major role in the selection as well as positioning of the stories about science and technology. The data shown in table 5 reveals that more than a quarter of science stories published in the supplement pages in *Prajavani* followed by International and national pages. This is due to the dedicated agriculture, gadgets, and vehicle world sections in the supplement pages. Other than column and article formats, news features also got space on the editorial page in *VK*, hence its share was high in the table. It's an appreciable growth that a fair amount (around 10 %) of science stories appeared on the front pages of newspapers but the contrary trend was seen in relation to local pages.

Table 5 — Placement preferences in publishing science items

Placement of Science items	***Prajavani***		***Vijaya Karnataka***	
	No.	%	No.	%
Front page	41	9.66	30	11.32
Local	20	4.71	19	7.169
State	46	10.84	46	17.35
Ed page	38	8.96	60	22.64
National	76	17.92	58	21.88
International	86	20.28	11	4.15
Commerce	3	0.70	10	3.77
Supplement	114	26.88	31	11.69
Total	**424**	**100**	**265**	**100**

Illustration: *VK* reported 237 science items (total of 265) along with a photo which comprises 89 per cent whereas *Prajavani* did the same for 349 out of 424 science items (82%). Among these substantial number of items were served with occasional photos only which means they don't have direct relevance to the respective stories. Other than photos, science can be effectively narrated by using tables, graphs and sketches, which was neglected by both dailies. Here also *VK* leads with 17 per cent (45 items out of 265) and *PV* followed the trend with only 9.6 per cent (41 out of 424).

News origin: Almost 75 per cent of the science and technology stories reported by *VK* during the study period were related to India only. The second dominant news origin/source of science issues for both dailies was North America, especially USA based research and innovations. An ample number (Avg. 15 %) of

stories were not particularly related to any region or country, technically which might feel like an uncompleted story. Global news source means the news origin is related to two or more two countries.

Table 6 — News sources for science and technology issues

News Origin	*Prajavani*		*Vijaya Karnataka*	
	Items	**%**	**Items**	**%**
India	237	55.89	198	74.71
Rest of the Asia	22	5.18	6	2.26
North America	51	12.02	27	10.18
Europe	20	4.71	9	3.39
South America	2	0.47	0	0
Australia	3	0.70	0	0
Global	19	4.48	19	7.16
Not applicable	70	16.50	6	2.26
Total	**424**	**100**	**265**	**100**

Nature of science coverage: The newspapers' coverage of science and technology focused on the events rather than the issues underlying those events. Table 7 shows that both dailies provided less than ten per cent of thematic nature stories which proved the fact that there is a serious lack of detailed coverage on various S&T issues. A small number of thematic items that appeared were related to ISRO's Chandrayana-2 mission, success stories of farmers and Malnad region affected KFD issue i.e., other much needed science issues like environmental pollution, waste management, food science, etc., were completely sidelined.

Table 7 — Nature of the stories covered under S&T

Newspaper	***Prajavani***		***Vijaya Karnataka***	
Nature	Items	%	Items	%
Episodic	384	90.56	252	95.1
Thematic	40	9.43	13	4.90
Total	**424**	**100**	**265**	**100**

Qualitative analysis of S&T coverage

The study revealed many interesting facts under the content analysis approach that newspapers of the same language may possess similarities in some cases and at the same time contradictory results under different categories. Overall science coverage was 1.25 per cent in the Kannada newspapers which

was very poor when compared to the coverage of politics, sports and commerce issues. Studies showed that the tone or approach of more than 50 per cent of the news items (180) was just to inform the readers rather than educate and enlighten them. A very small number of stories were bylined and research-based with proper citations of research organisations and journal names. An ample number of items were seen on the front pages but their space allocation was moderately less.

Like previous studies' findings, it is again proved that combining share of health and medicinal sciences stood as top coverage. A substantial amount of space was given to Agriculture, Environment, Astronomy (which included space science also), and general science. This was due to their increasing need for awareness to tackle pollution problems and stories of ISRO, especially Chandrayana-2 missions. Next prominent coverage was received by computer technology & cyber-crime and gadgets news because of the newspapers' efforts to fulfil the needs of tech-savvy youth in a technologically driven society.

Headlines were published more effectively by using rhyming words and questioning heads. Photos and graphs were used occasionally to support the write-up with original photos. While comparing with *Prajavani*, the researcher necessarily felt that *Vijaya Karnataka's* approach towards science coverage needs to be entirely readdressed and improved. Newspapers must improve in their overall science coverage along with emphasising the other subdisciplines like health, automobile, science communication, earth sciences, etc., rather than just agriculture and environment. The researcher identified the presence of commercial interests in health science items of *Vijaya Karnataka* where concerned doctors' and organisations' contact details were provided.

New arenas of science like data science, marine science, etc., news items to be given to make readers more updated about the trends. Along with news items, editorial presence and interviews of science experts must be provided to help the readers more concerned about science which will result in shaping their opinions on day-to-day issues and helpful decision-making process. During the sample period, science related to children

was very rarely seen and not more than 3 items. To make people of all age groups scientifically literate, newspapers must incorporate more scientific content which should possess the characteristics of informing, educating and enlightening. The use of relevant photos, sketches and graphs will arouse the interests of readers which further helps in an easy understanding of science.

The qualitative part of the study showed that newspapers were less concerned towards the educative and persuasive kind of science content, which must be addressed very quickly to make society scientifically literate which would pave the ways to mitigate social evils like poverty, superstitions, black magic, etc., Newspapers are the chief sources of science and technology information whose dedicated efforts to cover science and related developments will result in the improvement of science literacy and education.

Conclusion

The current study showed that, compared to the second top daily, *Vijaya Karnataka*, *Prajavani* newspaper was superior in science communication in terms of frequency, space, method of presentation, and other qualitative aspects. The study also showed that the combined fields of health and medicine took up more space. Other than them, astronomy, agriculture, and the environment were the main science categories published, in the news format followed by articles, columns, and news feature formats. Although serving the most science-related items with photographs was a successful outcome, their methodology has to be revised. Newspapers are required to inform readers of international advancements in science and technology in addition to self-sourced science of Indian origin by utilising news articles from around the globe.

Qualitative research revealed that science topics were not covered purely with scientific and educational perspectives. Instead of conceptual and multidimensional approaches that will play an instructive and persuasive role in ingraining science into our daily lives, more than half of S&T coverage takes a nominal and functional approach. Therefore, research suggests that

newspapers' coverage of science should be improved in terms of both quantity and quality wise, which has the potential to instil a scientific mindset in readers, allowing them to combat numerous superstitions and health myths. This will also benefit media organisations to expand their readership and contribute to the creation of a scientific mindset among readers, which will, in turn, aid in the creation of a fair, democratic, and developed society in the long term.

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