Genres of science news in the Nigerian press

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The decade 2001 to 2009 was one of contrasting scientific achievements in Nigeria: while the public responded positively to technology – with telephone penetration increasing from less than 900 000 telephone landlines and a teledensity of 0.73 in 2001 to 111 million Global System for Mobile Telephony (GSM) lines and a teledensity of 63.1 in 2010[1] – the use of the oral polio vaccine was banned in some parts of the country following a revolt premised on a conspiracy against Muslims. The revolt, which resulted in about 5000 new cases, spread the disease to hitherto free neighbouring countries and created an image of a country that is pro-religion and anti-science. This commentary is about the place of science in Nigerian newspapers as a proxy for public opinion.

Newspapers are a functional part of the public sphere: a realm of our social life in which something approaching public opinion can be formed.[2] The idea of a public sphere is that of a body of private persons assembled to discuss matters of public concern or common interest and newspapers, radio, television, the Internet, etc. are the media required for transmitting information and influencing those who receive it.[2,3] The media's role in transmitting information, argues McQuail, makes it an instrument of social power.[4] Being an instrument of social power does not, however, make the media our only source of social reality, but it plays a central role in the thinking society dynamic.[5] The definition of social reality, of facts, norms, values and expectations,[6] is, however, contextual; and as journalists are themselves part of society, how they practise their profession will be largely influenced by their culture, value systems and corporate practices. Livingstone[7], however, argues that audiences are heterogeneous in their interpretation and, at times, even resistant to the dominant meanings encoded in news.

Genres of science news

Newspapers are traditionally categorised by genre – which separates them into classes such as broadsheet, tabloid and business. There are also genres based on content such as news, features, editorial and sports, which cut across news media. Genres thus have similarities in strategies or forms and are recognisable by a set of shared features.[8,9] Genres also share the same communicative purpose for sense making and act as frames for social action or guideposts to explore the unfamiliar.[10,11] For Franzosi[12], the term denotes a class of texts with distinctive and invariant qualities, including an evaluation. There are also genres which describe articles that share implicit characteristics for sense making across sections and newspapers. Moscovici[13] evaluated the articles in his study of psychoanalysis in the French press based on implicit communicative purposes and categorised them into three groups: propagation, propaganda and diffusion. According to Castro and Gomes[5], Moscovici's proposals rest on a recognition of the role of contradiction and the existence of a number of ways of dealing with it. They argue that about a certain social issue, there is 'belief A' and 'belief non-A'. Belief A for this study categorises articles which are highly positive about a scientific issue; belief non-A comprises those articles that are highly critical, while those in between are mainly neutral and present largely balanced views. This format of evaluation is also called sentiment analysis.

The digital age has made the media (print, radio, television and social media) increasingly intertextual. Thus, it has become more important to categorise news across both traditional and new media. Society has also become highly polarised on some issues (nuclear power, climate change, stem cells, etc.) and finding out percentage coverage has become inadequate to categorise news. Multivariate statistical analysis (correspondence analysis, cluster analysis, etc.) has also made it possible to show how all the genres (newspapers, sources, sections, topics, evaluations, etc.) relate to each other, thereby showing the likelihood of a genre sharing similar communicative purpose for sense making with some members of one cluster more than with others. Genres of news content using correspondence analysis can thus categorise news for collective sense making derived from shared and dissimilar features. The concept is stable and statistically reproducible and the approach is often validated by the output.[14]

Using traditional content analysis, the objectives of this Commentary are to examine the following: (1) What was the intensity of coverage? (2) Which fields of science were covered? (3) How were the articles sourced? (4) How were the articles presented? (5) Visualisation of coverage as genres of science news.

Sampling strategy

Schafer's[15] meta-analysis of media coverage of science worldwide found that most authors analysed national elite newspapers or broadsheets owing to their relevance as opinion leaders and inter-media agenda setters. *The Guardian* newspaper, analysed here, is regarded as the flagship of the Nigerian press and an opinion leader in the industry. A relevant article will contain science in at least two paragraphs and categories reported were chosen to answer the research questions. The categories include source of news, story writer, academic field, strategic technology present, primary news value, discourse of benefit and risk, and positive and negative values. The valuation was based on a scale (from +7 to -7) of perceived benefits and projected risk or damage by the technology reported in the article.

The sample size is a cost–benefit issue[16] but Stempel[17] found that increasing the sample size beyond 12 in the sampling of a full year of daily newspapers did not produce marked differences in findings. Thus, for this study, every 25th edition starting from an arbitrarily chosen date in January (to allow for variations in days) was selected, leading to two constructed weeks. The years 2001, 2005 and 2009 were selected for cost–benefit reasons and the newspapers were library hard copies.

Establishing reliability requires some doubling of effort[18] by the same person after a time interval or two people at the same time. A sub-sample was re-coded 1 year after the first coding was done. Different levels of agreement were expected because of the varying number of sub-categories and often overlapping functions of the journalists' beats in the media. Distinguishing between primary and secondary actors for an article about a major oil spill in the

Niger Delta is a case in point. The oil company involved, the Niger Delta and the damage to the environment are strong news leaders presenting the journalist's dilemma of multiple leads. For most categorisations, the level of reliability is often increased when the sub-categories are reduced. Banerjee et al.[19] argue that from 0.40 and above is good agreement beyond chance when there are several categories, with fewer categories necessitating higher values of agreement. For this study, Scott's pi for source of news was 0.67; academic field, 0.92; story teller, 0.91 and strategic technology, 0.97. For the valuation, a scale variable, Spearman rho, was 0.997; exact agreement was 61% and plus or minus 2 points range was 98%.

Findings

What was the intensity of coverage?

This question examines coverage as an indicator of rising or falling interest in science. Is science fashionable in the Nigerian culture? The space allocated in terms of column inches was about 6.8% of the total in 2001, 7.7% in 2004 and 8.3% in 2009. This proportion compares well with the 5–6% devoted to science by the British press[20]; both data are, however, separated in time. The Pew Research Center's annual report[21] on US journalism showed the proportion of science stories was 9.2% (cumulated from science and technology at 1.7%; environment at 1.8% and health and medicine at 5.7%), but the focus was on cover page stories. The interest here is in the direction of the movement and the Nigerian data show increasing science news coverage which supports a public interested in reading about science.

Which fields of science were covered?

The analysis here maps the field of coverage using sub-categories delineated by academic fields such as physics, medicine, social science, technology and engineering. Also important for the analysis is the presence or absence of certain technologies strategic to modern societies such as nuclear power, genetic engineering, the Internet and the environment.

Almost half of the articles published (45.3%) were categorised as strategic (by the definition given for this research). Prominent among these articles were those on energy and telecoms, at 14% each. The telecommunication sector experienced a boom in the review period and perennial concerns over energy supplies also remained high on the public agenda. Thus the prominence of this sector in the news validates the level of attention it received in society. Articles on the environment comprised 6% compared with those on nuclear power which comprised 1.6%. Environmental concerns locally are about pollution in the oil rich Niger delta and the presence of nuclear energy related articles shows the local significance of this topic. About 5% of the articles were about HIV/AIDS, which reflects ongoing concerns about the prevalence of this disease in the country.

The academic field was dominated by technology at 49% and medical at 36%. The dominance of technology was sustained from 2001 to 2009. While the percentage of articles on medicine rose by 3% in 2005, it dropped again in 2009 to a level lower than that in 2001. Technology and engineering articles rose by 6% between 2005 and 2009.

How were the articles sourced?

Official sources – press releases, seminars and conferences – accounted for 45% of articles. Scientific journals and research reports also featured as sources of news. The wire services, including AFP and Reuters, played a substantial role (14.6%) as sources of science news from abroad. The source of news can be read alongside primary news value (novelty, elite or institutions, good or bad news, protest, others) which is an indication of why the article was published. Novelty stories were sourced primarily from scientific journals (30%) and press releases (21%). The elite's main entry point to the news was through press releases (56.8%). Not surprisingly, most good news (61.6%) emerged from press releases.

The Guardian parades a sizeable number of specialist writers, including science writers, in its various sections; but because of the multiple

nature of news beats, some science stories originate from political (National Assembly) or business (stock market) sectors. Stories written by science reporters comprised 21%; 59% were written by columnists and non-specialist reporters, while the rest (20%) were written by foreign journalists. More stories were written by science writers in 2009 (28%) than in 2001 (18%). Most (58%) of the contributions of foreign journalists to science in the Nigerian press were in the biological and medical sciences category; physical and engineering accounted for 36%, while arts and social sciences accounted for 6%. The distribution for local journalists was 31% in medical news, 60% in engineering and 9% in arts.

How were the articles presented?

The categories here are more implicit and indicate a valuation of the article. The primary location of consequences includes socio-cultural and moral which accounted for about half (48.5%) of the articles. Science also had applications in economic and financial fields (34.4%) while about 6.9% were in science itself; 8.3% were in environment and ecological and 1.8% in politics and power. Also interesting was the finding that most of the articles (66.2%) promoted the benefits of science, 13% both benefits and risk while 10% focused on risk alone. Similarly, about 83% of the articles were free of any scientific controversy and 80% were about mature and recurring issues and awareness.

The valuation genre (+7 to -7) was based on positive or negative consequences of science using a rating scale. Constructing a stable and reproducible scale is difficult and this study adopted the reach or spread of perceived societal benefits and dangers as proxy. The valuations also represent the two opposing ends of public attitudes to science in society: optimism/progress and pessimism/fear. Only 3% of all articles were in the high negative category, 14% low negative, 75% low positive and 7% high positive.

Visualisation of coverage as genres of science news

Content analysis turns words into numbers[22] and correspondence analysis is an excellent method for analysing its results. The primary goal of correspondence analysis is to transform a table of numbers into a graphical display, thus facilitating its interpretation.[23] There was a significant association between primary news value and valuation (X^2=367, p=0.01, Cramer's V=0.4); discourse of benefits and risk and valuation (X^2=459.7, p=0.01, Cramer's V=0.4); and strategic technology and valuation (X^2=172, p=0.01, Cramer's V=0.3). Cramer's V shows strong enough variation in the data to support a geometric display for the three combinations. A joint relationship of discourse of benefits and risk, strategic technologies and primary news value with valuation can be visualised in a table composed of several two-way cross tabulations. The geometric representation retains as much as possible of the individual spatial arrangements in the simple correspondence analyses.

Dimension one in the output shown in Figure 1 (left to right) contrasts the positive and negative values and this is named the 'valuation dimension' of optimism versus pessimism/fears. The second dimension separates the technologies and issues we are familiar with from those in which the risks/dangers are unknown and this is named the 'familiarity' dimension. The two dimensions account for 93% of the inertia and therefore the error in a two-dimensional interpretation is less than 7%.

Nuclear, environment, cancer and HIV/AIDS overlap between optimism and pessimism on dimension one and familiar and unfamiliar on dimension two. The dual perceptions of these issues are validated by the geometric display. Nuclear power has positive uses in power generation but disasters constantly remind the public of the global nature of their accidents. There has been a lot of progress in preventing HIV transmission but it remains a serious problem locally and stories of cancer are both of survival and death. We can thus derive genres of science news on the basis of familiar and unfamiliar issues and progress/optimism versus fear/pessimism. These categories of genres complement existing ones based on newspaper orientation and news content categories.
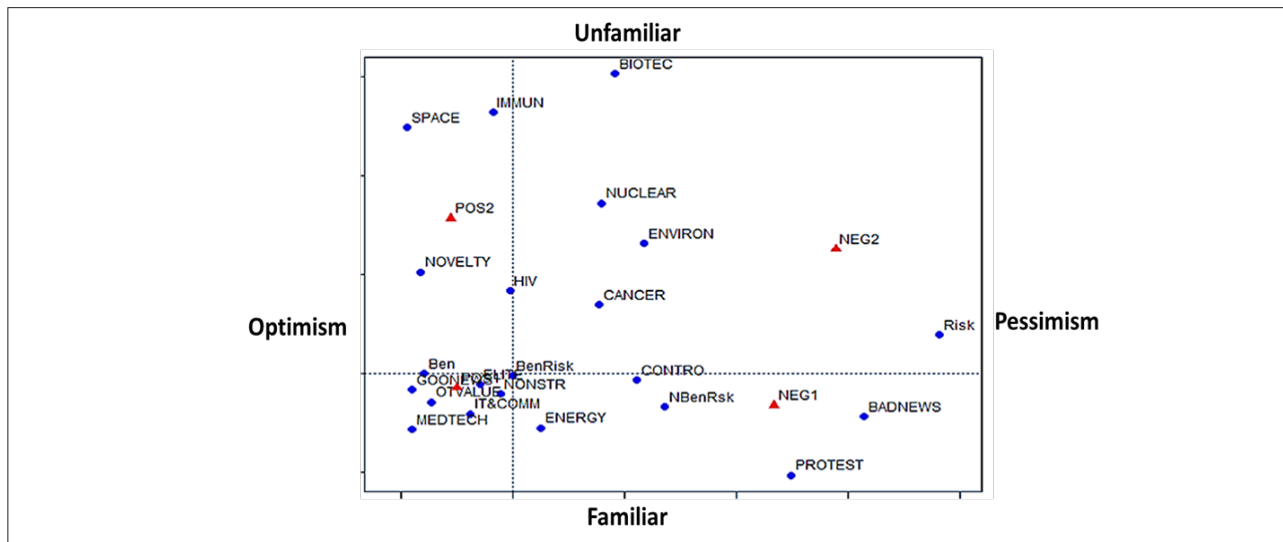
Figure 1: Correspondence analysis biplot of cross tabulations.

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