

**Online news editors application of algorithmic media in online newspaper
production in Nigeria**

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Abstract

Newsroom automation is among the many ground breaking revolutions that the mass media have seen in recent years. These automations have aided in the improvements of media operations and editorial processes through the deployment of artificial intelligence software that helps reduce the burden on human editors. Computer algorithms and other new forms of computer automations have been adopted by big news agencies in and around the world. Also, some organisations have adopted or automated some sections of their news room to allow for more democratisation of news contents and to improve speed and accuracy. This study adopted explanatory mixed method research design and utilised the survey method employing questionnaire and the personal interview to collect data. Using multi-stage sampling the research was guided by four research objectives. The study found very poor awareness, knowledge level and very poor (almost non-existent) utilisation of algorithmic media in online news selection and production in Nigeria. Poor knowledge and lack of understanding of the workings of algorithms affected the opinions and challenges faced by online newspaper editorial staff. Therefore, the paper recommended improvements in knowledge through capacity development trainings to educate online newspaper editors and for media organisations to adopt modern day best practices through appropriate utilisation of this new media technology.

Key Words: Algorithms, Application, Media, Online Newspaper Editors and Online Newspaper Production.

Introduction

Digital technologies have continued to revolutionise all aspects of information distribution, production and access in today's complex world (Manovich, 2013). Today, many traditional newspapers media outlets apart from the traditional hard copy, now have internet websites available to satisfy the need for news of their audiences. For the most part, news has become a commodity, and a very critical means that most online media need to survive and stay relevant, (Luciano, 2018). News provides knowledge by shaping individual and collective understanding about policies and issues around them. Individuals read, watch and listen to the news to enhance their social functioning ability/roles which includes participating in public informed debates and making informed decisions and choices.

Luciano (2018) avers that the amount of generated data available to the reader in this digital era has increased exponentially, although our abilities to absorb this information may not have increased proportionately. This may be why many news organizations developed algorithms to assist audience navigate through highly complex and fragmented media environment and to help editors to prioritise important news contents through the use of this technology. In the online world, algorithms are used highly to tailor personal messages or interests so as to protect people from information

overload (Borgesuis, Trilling, Moller, Bodo, de Vresse, & Helberger, 2016). Others also indicate that performing the bulk of gate-keeping roles, selecting and sifting news using the traditional manual methods involving random decisions by human editors may have become rather impracticable in the current clime (Anderson, 2006; Bozdog, 2013; Lesage & Hackett, 2014; Napoli, 2014 and Herbest, 2016).

Finnsas Jens in Panagiotopoulos (2016), notes that Google-funded automated news service robots can put journalists 'in the driving seat', allowing them to look at the data as a whole to find the most news-worthy stories, instead of relying on pre-packaged information selected by corporation and public relations officers. Wolker and Powell, (2018) concur that autonomous production of journalistic content through computer algorithms, is increasingly prominent in newsrooms which enables the production of numerous articles, both rapidly and cheaply. Particularly, algorithmic technology in some media organisations has now taken over the functions of editors through its ability to computerise story selection. In information systems, new media and automated systems, algorithms functions as mainly control technologies through the utilisation of filter bubble which in turn makes the choices made by algorithm technology not to be transparent.

McKelvey (2014) states that, algorithms also referred to as 'journobots' are components of software that make up information and communication infrastructures. Since code is law algorithms regulate cyberspace, by determining what users can or cannot do online, how they interact with others online and which content is relevant (Gillespie, 2014). He further more notes that algorithms play key roles and enact some form of control when it comes to content by selecting what information is considered most relevant to us, a crucial feature of our participation in public life. Algorithms therefore detail the specific instructions a computer should perform in a specific order and at a particular time. As a computational routine which involves issues of representation and inclusion, algorithms are vulnerable to technological innovations, for as more communication infrastructures grow to increasingly depend on computational routines to control, produce and diffuse information, we will increasingly hear that communication has become more algorithmic, (Napoli, 2014).

Although Graefe (2014) in Panagiotopoulos (2016), notes that there isn't yet widespread public pressure for disclosure in regard to how this is carried out by algorithmic media. But this invariably points to the fact that the gate-keeping and agenda-setting roles of both traditional and algorithmic news sources play key roles in determining the content and vocabulary of the public conversation (McCombs & Shaw 1972; Scheufele 1999; Scheufele 2000).

Bimber (2003) is of the opinion that the media through editors have always served their public relevance functions in a semi-transparent manner. Thus, to a large extent, editorial methods and values have been well-documented and tracked over time (Gans, 1979; O'Neill & Harcup, 2009; Michelstein & Boczkowski, 2009). Consequently, human editors' values and their flaws are understandable and can be held accountable but programmes cannot (Fingerhut, 2016; Gallup, 2015). This is because algorithms behind these platforms act as editors with huge abilities to determine what readers see. Undoubtedly, algorithm as a technology has enabled the diversity, plurality and critiquing of mainstream news media but online bots often get things wrong on a regular basis and the full extent of the use of algorithmic 'journobots' still remains largely unknown.

Nigeria is a country with a population of over 200 million citizens, 33 million are active on the internet which is 15,8% of the nation's population and these individuals have adopted various online media platforms as a means to receive and communicate (Digital Reports 2021). Interestingly many readers are not aware about the application of algorithms in online news production because presently they are not able to make critical

decisions about what they choose to read. They also do not necessarily understand how or what makes algorithms biased and how nuanced the filters they receive content through really are. These biases also extend to search engine manipulation, which occurs when organisations, notable individuals and public leaders ensure that positive favourable contents tops search engine results in particular regions (Gillespie, 2012). The implications of these are that media critics and theorists like Tufekci (2015), Gillespie (2014), Morozov (2013), Pariser (2012) and Sunstein (2009) have expressed concerns about the implications on democracy by gate-keeping noteworthy and general interest news and how reliance on this technology will affect our access to content deemed relevant to societal preferences and interests. However, this study assesses if online news editors in Nigeria are knowledgeable about algorithmic media. The available academic evidences indicate there is scarce literature in this area and since this remains largely unknown, it has created a gap to be filled. This study also assesses the extent of use of algorithmic media technology by online news editors in news production and provides empirical evidences that will set new paths for further research works in future.

Statement of the Problem

In many news and social networking sites search engines appear to be exerting more influence in deciding what information or news that the public reads or has access to because of the advent of algorithmic personalised news aggregators. This situation to a large extent may impact on the ability of the media to monitor and set the agenda for topical issues. Not to be left out is the fact that the issues of robotic authoring of news stories together with the arguments for and against algorithmic editing which are fast becoming issues for media scholars because of its ability to set the news agenda. For as editors, journalists and publishers lose control over news distribution, social media, search engines and personalised news aggregators may take over.

This is also related to the problems of the real power to select news which now appears to rest with 'journogeeks' individuals who are programmers who create algorithms. These individual's opinions and analysis of the consequent data may be tops in directing the decisions of news platforms and media. Consequently, the role of the media and journalists in their ability to function as gate keepers become blurred as a result of the roles of robot journalists because platforms such as Google News are increasingly deciding what the public needs (Lucino, 2018). This research therefore aims at studying the extent of the use of algorithmic media in online news production and to ascertain the opinions of news editorial staff about the influence of this technology in Nigeria.

The objectives of the study are to:

- 1) Find out if Nigerian online newspaper editorial staff are knowledgeable about algorithmic media?
- 2) Assess the extent online newspaper editorial staff, utilise algorithmic media in daily news production?
- 3) Ascertain online newspaper editorial staff opinions, on the level of influence of algorithmic media in news production?
- 4) Find out the challenges associated with the use of algorithmic media in online newspaper production?

Literature Review

Algorithms a Historical Perspective

The discovery of ancient Babylonian archaeological clay tablets which described and employed algorithmic procedures in the computation of time and place of significant astronomical events, formed the oldest known records pertaining to the word algorithm.

The earliest coinage of the notion of 'algorithm' was first used in ancient Greece (around 300 BC), (Ceruzzi, 1998, Gillespie 2014). The works of ancient Greek geometers (Euclidean algorithm), the Indian mathematician Brahmagupta and the Persian mathematician Al-Khwarizm all heralded the concept of the modern-day algorithm. In late Medieval Latin, it was referred to as 'algorism'; in English 'algorism' and by later 15th Century under the influence of the Greek word, the Latin word was altered to *algorithmus*. The corresponding English term 'algorithm' was introduced in the 12th century and later modernised in the 19th Century. The study of Algorithm as done in the humanities and the arts relates more on the underlying properties of large data application effects and not on the specifics of particular implementation like in the science aspect (DeVito, 2016). Algorithm as software is not individually patentable however practical applications of algorithm are often patentable because of the processes to which it may have been employed in. Lee (2012) describes this as actually a form of soft censorship that is implemented on a particular hardware and/or software platform and its 'algorithmic efficiency' is eventually put to the test using real code.

Algorithms and Social Controls

In traditional editorial process, story selection and production process are carried out by human editors and guided by news values (DeVito, 2016). Palmer (2000) notes that these news values are systems by which, decisions are made about the inclusion and seclusion of news stories and also-critically about what types of stories to present in form of news output. Since news breaks almost at the speed of light members of the society depend on the media to get the scoop thereby making it extremely important that media houses especially the online media, device a means to match up the speed with modern technology that can enhance their news production. Hence, the deployment of automated algorithmic media that assist many online media houses to sort, sift and publish news contents in the digital space.

The use of algorithms has been questioned in some quarters and even some media practitioners do not see the potentials to completely rid a machine of any human tendencies when such machines are codified and programmed with specific rules by human scientist. Many researchers note that algorithms are not neutral and objective machines. Quite the opposite, they posit that they reflect a type of ideology embedded in a set of rules and practices prescribed by human beings to do things in a certain way (Gillespie, 2012; Lucino, 2018).

Haraway (1985) notes that, in journalism the process of command, control, communications and intelligence has a long time been an issue of concern for both critical communication media and science technological scholars. The problems associated with quality, governance and reliability of information sourced from the internet especially from these new media platforms have become a source of shared concern for media scholars. Today it is unequivocal that many people do not necessarily understand how or what makes algorithms biased and how nuanced the filters through which they receive content really are. These biases also extend to search engine manipulation, which occurs when organisations, notable individuals and public leaders ensure that positive favourable contents tops search engine results in particular regions.

Palmer (2000) admits that editors curate (select and produce) news from different perspectives, possibilities and values through human ingenuity and creativity. These news values which are often affected by cultural norms have been subject to changes over time but still there exists no universal agreement as to what the current set of news values are (O'Neill & Harcup 2009; Palmer 2000). Despite the fact that explicit values are the central basis for the journalistic instinct on newsworthiness, with the additional motivator of exclusivity often added, the selection of these news values are done bearing in mind diverse perspectives available from small everyday stories to large-scale stories with

international stories (Gatlung & Ruge 1965; Gans 1979; Harcup & O'Neill 2001; O'Neill; Schultz 2007 & Harcup 2009). Lee (2009) originated a popular formula for news values which include novelty or oddity, conflict or controversy, interest, importance, impact or consequence, sensationalism, timeliness, and proximity.

Specifically, algorithmic curation ultimately does not indicate their mechanism for selecting content unlike the human curation. In light of this, Peterson, (2001) expressed a similar view that, to understand the role a journalist plays in news production, we must recognise that the role of the journalist comes with a set of rules, authority to write and interpret some variables constituted as social actors or sources within his given privilege and competence to determine what text to use in a particular creative process. Pasquale (2011); Lievrouw (2012); Tufekci (2015) and Panagiotopoulos, (2016) all agree that many of the creators of algorithms are deliberately limited and modes of algorithmic operations are most often obscured to protect intellectual property unlike editors who can be held accountable. In today's online environment especially as regards what is popular and what to know, it is noted that algorithms leaves little room for doubt about the forms of cultural, economic and social control they exert (McKelvey, 2014).

Algorithms and Democracy

Algorithms carryout their functions through filtering bubbles, which are results of personalised search information data base in which a website algorithm selectively guesses what information a user would like to see based on information (such as location, past click behaviour and search history) about the user (Pariser, 2015). Schaarsberg, (2016) states that filtering bubbles is a term used to refer to activities of algorithms that highlight the kind of information we choose to view on the internet, based on individuals search history, past click behaviour, age gender, location etc. Filtering bubbles function as unseen personalised, coded algorithmic instructions that help, to empower individuals to select information they want to obtain making it easier to navigate the web and connecting with those who share similar passions, thus increasing one's knowledge of a particular topic or issue. They create a unique universe of information for each of us... which fundamentally alters what ideas and information we encounter if they were not utilised (Pariser, 2015). These personalised algorithms tend to determine what we see and more importantly what we do not see, thus leading to filtering bubble (a personal ecosystem of information) that protects us from any sort of cognitive dissonance by limiting what we see and at the same time, virtually everything we do is being monitored. Schaarsberg, (2016), concurs that what is in your filter bubble depends on who you are and what you do, but you do not decide on what gets in, more importantly you do not actually get to see what gets edited out. This means the information being posted on the internet shows us a world which it calculates that we may want to see and not necessarily what we need to see. Nagulendra (2014) avers that 'personalization' which is almost evident everywhere on the web could reduce the diversity of media content individuals are exposed to and ultimately have a negative effect on democratic disclosure, open-mindedness and in the public sphere.

Zuckerberg (2013) states that algorithms operate based on what we call algorithmic values, which are systems or criteria used to make decisions about the presentation or seclusion of some or all aspects of the material in an algorithmically-driven news feed. Gillespie (2012) opines that algorithms help us not only on what we want, but on what all of their users do. However, challenges exist in that there are fears that important issues which may be of concern for everyone may be filtered away and people will exist in communication echo-chambers, happily unaware of the reality of their lack of access and exposure to different viewpoints.

YouTube's automated high capacity algorithms have enabled the platform to minute by minute upload large amounts of video materials automatically, thus ascribing to the algorithm the power of a security man or gatekeeper guarding the information super gateway. According to Panagiotopoulos (2016), few organisations like the New York Times, Five Thirty-Eight and BuzzFeed have all led the way in being transparent and others should follow. He further more stated that an increasing number of companies make bots that produce automated text. Companies such as narrative Science and Automated Insights based in the United States; AX Semanties, Text-On, 2txt NLG, Retresco and textOmatic in Germany; Syllabs and LabSense in France; Arria in the United Kingdom; Tencent in China and Yandex in Russia and many others have declined to provide information about journalistic client. To this end Gillespie (2014, p.185) notes that "information about the inner working of information algorithms is a form of power, vital to participating in public discourse, essential to achieving visibility online, constitutive of credibility and opportunities that follow". Tambini (2015) conversely states that there is lack of any sort of framework (social controls) to reduce the potential impact of this loss of control to companies and organisations (online news media and social networking sites). Invariably, Gillespie (2014) buttresses this and concurs that algorithmic control has significant social consequences.

In a discussion organised by Global Editors Networks (2018) about the augmented newsroom with Reginald Chua, Lisa Gibbs, and Mar Gonzalez-Franco, moderated by Ben Rudolph, the participants addressed the concerns related to the challenges of newsroom automation in their discussions. For Chua, we're still in the early stages of these technologies. We need to raise the standards and explain the methodologies, disclosing eventual biases, so that people are comfortable with the outcome. But, of course, we should also worry that these technologies can be weaponised to produce misinformation. After all, these are tools that anybody can use. Results indicate that users may become separated from information that disagrees with their viewpoints, effectively encapsulating them in personal cultural or ideological bubbles.

Recently accusations that Facebook employees were suppressing news feed have ultimately raised widespread questions about the algorithmic censorship of its newsfeed. Algorithm developers bear some responsibility because it is impossible to wholly remove bias from algorithmic systems. Many pundits of the lack of democracy of some news and social media platform algorithms are of the opinion that readers need to have the opportunity to understand the bias profile of various algorithms when they go online. The above stated positions are key issues that affect the role of editors to effectively monitor and serve as a filter against undermining the democratic process by the political class and others for selfish reasons (Pariser, 2015). If journobots/algorithms have being deployed and if they partly function or assume gate-keeping or watchdog roles for the press, how have Nigerian editors utilised this technology and what are the opinions of news editors on the effects in relation to this technology within this context?

Theoretical Framework

This study is anchored on the Technology Acceptance Model which was developed by Davis 1989. As a model, it is applicable in studies on the determinants of information systems and information technology acceptance to predict intention to use and acceptance of information systems and information technology by individuals, (Sacide & Yasemin 2009). Davis utilised this model to predict the adoption and utilisation of technology in relation to information systems and organisational contexts. The Technological Acceptance Model theorizes that the perceived ease of use and usefulness are the critical factors that influence the acceptance or rejection of a technology. To Venkatesh (2003), this model presupposes that audiences tend to utilise or not to utilise an application or technology to the extent that they believe it will help them to perform their jobs or live

their lives better which refers to perceived usefulness. He further notes that if potential users concur that using a specific application is free of effort that their actions refer to ease of use. Perceived usefulness as espoused under this premise refers to the degree to which people believe that utilisation of a particular information system or information technology will aid in the successful performance of his or her life or job functions. Perceived usefulness was adduced to be the primary factor that indicated intention to appropriate the technology.

Instructively, users may agree that a particular technology is useful and at the same time difficult to use but if the performance benefits of the utilisation is outweighed by the relative of using the technology then, perceived ease of use is premised as influencing usefulness, (Sacide & Yasemin, 2009). Furthermore, they state that perceived ease of use refers to the degree to which an individual agrees that utilisation of a specific information system or information technology would be free of stress. Perceived ease of use and perceived usefulness both positively affect the acceptance of the user's intentions to utilise and the information system. Also, perceived usefulness is positively affected by ease of use with both influenced by external variables. This study presupposes that the acceptance and utilisation of any technology by online news editors has to primarily be easy to use, address the needs and integrate well into the personal and official requirements of the editors, journalists and other users.

Methodology

The study is anchored on the Explanatory Mixed method research design. The survey and the personal interview were considered as both appropriate for the study. The combination of the survey method and personal interview was informed by the fact that the particular strengths and limitations inherent in the survey and personal interview methods adopted ideally complement one another in a unified research design. The survey method is largely concerned with opinions, behaviours and attitudes. Wimmer and Dominick (1987), observe that the survey is indispensable in scientifically describing phenomenon and their relationship in the actual environment at a given time while also focusing on a representative sample derived from an entire population of study for generalisation purposes. The questionnaire was chosen to elicit quantitative information from the selected editorial staff sample, to help ascertain and to arrive at conclusion about the application of algorithmic media in online news production. The personal interview was utilised in generating response from knowledgeable respondents who are top personnel within their respective organisations for the qualitative analyses. It will help to gather information from the editorial staff, journalists and programmers (journogeeks).

The population of the study is limited to the selected editorial staff of online newspapers that are nationally circulated as major newspapers in Nigeria. Chalisa (2012) notes, that the population of the study comprises all subjects or elements relating to a specific phenomenon which are of interest to the researcher. Thus, the researchers purposively selected 15 online newspapers registered in 2019 with NPAN (Newspaper Association of Nigeria) of the above agencies as a specific media are targeted. Also one online news personnel journogeeks' who are engineers or programmers who create algorithms, one from each of the selected NPAN registered news organizations were interviewed. Some of these personnel of online media operate from personal residences because of the virtual nature of World Wide Web. In addition, studying every online news paper would be expensive, complicated and subject to wasting a lot of time in tracking down editors and journalists. To avoid this, the study specifically draws population from news editors of online news organisations with the above stated thematic position. Specific choices are therefore based on established newspaper organisations that possess online presence. The study did not therefore examine news editors of unregistered newspapers with national or local presence even if they are online.

The online newspapers purposively selected are as follows; *BusinessDay Newspapers, Premium Times Newspapers, Punch Newspapers, The Guardian Newspapers, ThisDay, Punch, Nation, Independent, Vanguard Newspapers, Sun Newspapers, Daily Times, National Mirror, Independent, Complete Sports, PM News and Nigerian Tribune* (Source Nigerian Newspapers Online, w3newspapers.com). Therefore, a total number of fifteen (15) news editors of online newspapers in Nigeria that possess both national circulation and are major local newspapers with online presence were selected.

Questionnaires were administered to 1 editorial staff of the 15 selected news online newspapers. While 1 online news personnel journoegeeks' who are engineers or programmers who create algorithms were interviewed for this study.

The sampling technique utilised is the multistage sampling. Consequently, a two-stage sampling procedure was adopted for this study, namely the purposive sampling and simple random sampling technique.

In stage one this study purposively selects its sample from news editors of online newspapers that are registered members of the Newspaper Proprietors Association of Nigeria (NPAN). Also the participations involved in the personal interview sessions were recruited based on the tenets of the purposive sampling techniques, which require that the respondents share specific or very similar characteristics which are, that they function within the editorial units of the selected online newspapers registered in 2019 in Nigeria with NPAN. In stage two, the simple random sampling method was adopted. To carry out this task, the names of all the editorial staff 15 online newspapers that meet the research criteria were written out on pieces of paper of the same size and placed in a bowl and shuffled several times for each of the 15 online newspapers. The researchers then picked one at a time, fifteen times from amongst bowl without replacement. Next a copy of the questionnaire was administered to each of the selected 15 editors of the online news media organization, making a total of fifteen copies of the questionnaire. This was because of their positions as experts in online media.

The instrument for data collection is the questionnaire and personal interview guide. The use of these instruments was made necessary as a result of the nature of the data required for a justifiable and empirical treatment of the research. The survey instrument was 12-item questionnaire used in generating quantitative data from the respondents on the theme of the study. The questionnaire contained both open-ended and close-ended question, allowing the respondents options to provide and express their opinions and responses. The questionnaire measured variables at nominal, ordinal and interval levels. Frequencies, percentages and the likert-scale were used in the questionnaire with a 5point rating scale was used to ensure a more quantifiable and reliable base for analysis of data obtained. Decision rule for the mean adopted for this study was; $>$ or $= 3.0$ was accepted while < 3.0 . was be rejected. The qualitative data collected through the interviews were analysed utilizing the explanation-building technique.

Demographic information of survey respondents

Table 1: Social demographic characteristics

<i>Age</i>	<i>Frequency</i>	<i>Percentage (%)</i>
26-35	4	26.7
36-45	5	33.3
46-55	4	26.7
56-65	2	13.3
66-100	0	0
Total	15	100.0

Marital status		
Never married	4	26.7
Married	8	53.3
Divorced/Separated	2	13.3
Widowed	1	6.7
Total	15	100.0
Educational qualification		
No formal education	0	0
Primary education	0	0
Secondary education	0	0
Tertiary education	12	80
Masters/PhD	3	20
Others	0	0
Total	15	100.0
Sex		
Male	15	100
Female	0	0
Total	15	100.0
Income (N)		
less than 60,000	0	
61,000-110,000	3	20
110,000-160,000	8	53.3
160,000-210,000	2	13.3
210,000 and above	2	13.3
Total	15	100.0

Table 2: Question 1. Have you seen or heard about algorithmic media technology?

Response	Frequency	Percentage (%)
Yes	3	20
No	9	60
Not sure	3	20
Total	15	100.0

Table 2 shows that only 20% of respondents answered 'Yes' to the question if they have seen or heard about algorithmic media technology with 20% indicating not sure. This shows that majority do not know about the technology.

Table 3: Question 2. If yes, are you aware of its use in newsroom automation?

Response	Frequency	Percentage (%)
Yes	3	20
No	12	80
Not sure	0	0
Total	15	100.0

Table 3 above indicates that majority of the respondents are not aware of the use of algorithmic media technology in newsroom automation.

Table 4: Have you utilised algorithmic media?

Variable	Frequency	Percent (%)
Yes	0	20
No	13	86.7

Don't know	2	13.3
Total	15	100.0

Table 4 shows the frequencies and percentages that majority have not in any way utilised this media.

Table 5: Research Question 2: To assess if online newspaper editors utilise algorithmic media in daily news production?

Variable	Frequency	Percent (%)
Yes	0	0
No	14	93.3
Don't know	1	6.7
Total	15	100.0

Table 5 shows the frequencies and percentages that majority 14 (93.3%) of the respondents news editors do not use algorithmic media. However, only 1 (6.7%) of the respondent don't know.

Table 6: The extent online newspaper editors utilise algorithmic media in daily news production?

Variable	Frequency	Percent (%)
Very high	-	-
High	-	-
Moderate	-	-
Low	1	6.7
None at all	14	93.7
Total	15	100

Data from table 6 likert-scale, frequencies and percentages show the extent online newspaper editors utilize algorithmic media in daily news production? Results indicate that majority 14 (93.7%) of the respondents indicated 'none at all' to the question on online news organizations utilization of algorithm media in daily news production. However only 1 (6.7%) of the respondents indicated low utilization.

Table 7: Research Question 3. To ascertain news editors opinions on the level of influence of algorithm media in news production?

Variable	Frequency	Percent (%)
Very high	0	0
High	0	0
Moderate	3	20
Low	7	46.7
None at all	5	33.3
Total	15	100

Table 7, shows the likert-scale, frequencies and percentages indicating that editors had varied opinions on the influence of algorithmic media in online news production. Majority 7 (46.37) of the respondents indicate moderate influence of algorithmic media in news production.

Table 8: Research Question 4: To find out the challenges associated with the use of algorithmic media in online news production?

Variable	Frequency	Percent (%)
Lack of accountability	15	100
Poorly verified news/fake news	13	86.7
Lack of transparency	8	53.3

Loss of privacy	9	60
Poor regulations	14	93.3
Total	-	100

Multiple choice questions

Table 8, shows the frequencies and percentages of the variables on the challenges associated with the use of algorithmic media in online news production? Results indicates that more than half of online editors agree that lack of accountability, poorly verified news/fake news, lack of transparency, loss of privacy and poor regulations were serious challenges militating against the use of algorithmic media in online news production.

Discussion of Findings

All questionnaires were administered and collected and all selected individuals were interviewed.

To ascertain if Nigerian online newspaper editors are knowledgeable about algorithmic media, results show that a total of 12 (80%) of the respondents indicated that they do not have any knowledge about algorithmic media Only 3 (20%) of the respondents had any knowledge about the new technology. This indicates very poor knowledge about the new technology which points to very poor available up-to-date technological facilities which has implication for media development in Nigeria. The findings of both the survey and personal interview indicate that Nigerian online news media have not come to terms with the deployment of automated technologies in new selection and production. Some of the interviewed respondents believed that stories may not be properly edited and verified if they utilise the new technology unlike in traditional, editorial gate-keeping processes when human editors are involved. The findings are consistent with the assertion of Merz (2011) who opined that a fully automated news room seemed somewhat impracticable, as the software may still have to be guided by strict editorial guidance of human forces. This also highlights the need for more training to increase knowledge on the advantages of this new technology which has its peculiar advantages.

To assess if online newspaper editors utilise algorithmic media technology in daily news production? Results indicate that majority 14 (93.3%) of the respondents stated 'no' with 1 (6.7%) of the respondents stating yes to the question. On the extent online newspaper editors utilise algorithmic media in daily news production, 1 (6.7%) of the respondent indicated low while 14 (93.3%) of the respondents noted none at all. The survey findings show that the deployment of algorithmic media in news room automation through the use of computer software for news selection is almost nonexistent or unpopular in Nigeria. 14 (93.3%) of the respondents indicated that their news organizations do not use computer algorithms in their news production. This is in line with the expression of Herbst (2016) who found out that many sympathizers of automated news room claim that automated news selection by algorithms will rid the news production of any human biases. Herbst, further revealed that, the traditional news values and news worthiness are strictly hinged on the pursuit of objectivity, which may not permit some organization to leave such sacrosanct decisions in the hands of bots. The results from the personal interview conducted, furthermore revealed that all of the participants in the two sessions agreed that their online organization do not make use of algorithms in news selection and production. Although, the Digital Editor of Guardian hinted that his organization have some form of automation in tracking readership and followership, but not in news production.

To ascertain online newspaper editors' opinions on the level of influence of algorithmic media on news production, results show that majority 7 (46.7%) of the respondents noted low influence, 5 (33.3%) of the respondents indicated none at all, 3 (20%) of the respondents indicated moderate influence while very high and high had 0

(0%) of the respondents. The survey findings show that the deployment of algorithmic media software and news room automation is not obtainable in Nigeria. Many media organizations need to train and encourage online newspaper editors within their organizations. This invariably implies that all Nigerian media organizations still depend on human editors to make editorial decision in the online news platforms. The interview sessions revealed similar results. The online newspaper editors revealed that they were skeptical about the influence of algorithms in general and still preferred their organizations to employ competent human workforce to carry out daily news operations and production. During the interview, one of the participants pointed out that his organization makes use of some “widgets” to enable them paste news faster on their site, but this activity is mainly done by a human digital publisher.

To find out the challenges associated with the use of algorithmic media in online news production? This was a multiple-choice question and majority of respondents at any point in time agreed with the fact that lack of accountability, poorly verified news/fake news, lack of transparency, loss of privacy and poor regulations were serious challenges militating against the use of algorithmic media in online news production. Also, the interview sessions with the online editors generally revealed that the Nigerian online newspaper editors will probably embrace this new technology if their fears and reservations are allayed through trainings and communication. They stated that presently online newspapers registered with NPAN employ seasoned editors to determine what goes into their online news platforms. These revelations match the statement of Deuze (2005), who noted that one of the journalism’s core values is to provide a public service as watchdogs, newshounds, active collectors and disseminators of information to keep the public informed about what is current and important. Consequently, newspapers and media companies in general, are gatekeepers that control the flow of information, and have the power to decide what can be said and who is authorized to say it.

Conclusion

This study assessed online newspaper editor’s application of algorithmic media in online newspaper production in Nigeria. The study found that a majority of respondents were not knowledgeable and there exists little or no utilisation of new algorithmic media technology. The study reported that as a result of poor knowledge, many online news editors were not sure of the extent of influence of this new technology. Majority of the respondents agreed that poor knowledge and bias were among the major challenges online news editors faced in the use of algorithmic media. Many respondents understood that change is constant and noted that there was need to understand the controversies surrounding the new wave of technological revolution which may ultimately lead to the full automation of news production by media organizations. Ultimately, online news editors will still have much to do in online media production processes because they are all gate-keepers and managers of this new technology. However, majority of participants expressed optimism about the deployment of automated software in Nigerian online news rooms in future to enhance news production. As a result of the foregoing, the study recommends that media houses should massively train their editors and content developers in newsroom automation to see where they can begin to catch up like the rest of the big-league news organizations that have adopted some forms of automation of the other. Digitization or news room automation is not an additional nightmare and collaborating with other agencies or government can provide some ease in this area. Audiences are increasingly growing more complex, highly diverse and fragmented. The deployment of automated software seems to be the only means for most online news organization to maintain their relevance in this current clime, unless, the media audience members of tomorrow will prefer blog sites and soft-sell news sites to credible news sources.

REFERENCES

- Abrougui, A. (2016). *How Algorithms Decide What is Newsworthy and what is Not: Archives and News Literacy*.
- Adeniran, R. A. & Atofojomo, O. A. (2017). Emergent Practices of Nigerian newspapers in the Digital Age in Digital New Order: *Emergent Practices in the Nigerian Media Environment*, Ayedun-Aluma Victor edited. ACSPN Book Series Nigeria.
- Bimber, B. (2003). *Information and American democracy: Technology in the evolution of political power*. Cambridge, UK: Cambridge University Press.
- Borgesuis, Z., Trilling, D. Moller, J., Bodo, B., de Vresse, H. & Helberger, N. (2016). Should we worry about filter bubbles? *Internet Policy Review Journal on Internet Regulation*. 5(1) 1-16. Retrieved from: <http://www.google.com.ng/url?sa=t7source=web7rct=j&url=http://policyreview.info>.
- Bozdag, E. (2013). Bias in algorithmic filtering and personalization. *Ethics and Information Technology*, 15(3), 209-227.
- Bozdag, Engin. 2013. "Bias in algorithmic filtering and personalization." *Ethics and Information Technology* 15 (3): 209-227.
- Chalisa, B. (2012). *Indigenous Research Methodologies*. Thousand Oaks CA: California. Sage Publications.
- Deuze, M. (2005). What is journalism? Professional identification and ideology of journalists reconsidered. *Journalism*, 6(4), 442-464.
- DeVito, M. A. (2016). From editors to algorithms: A values-based approach to understanding story selection in Facebook news feed. *Digital Journalism Journal*. 2 (2): 271-90 Doi:10/1080/21670811.2016.1178592.
- Fingerhut, H. (2016). *Millennials' views of news media, religious organizations grow more negative*. <http://www.pewresearch.org/fact-tank/2016/01/04/millennials-views-of-news-media-religious-organizations-grow-more-negative/>. Accessed 12 October, 2021.
- Finnas, Jens in Vas Panagiotopoulos (2016). *Taming the Wild West of Journobots: we need an "Algorithmic Ombudsman" to Safeguard our News*. Open Democracy European Journalism Observatory. Wired, wallpaper*dx.doi.org/1080/13691118X.2016.1154087.
- Galtung, J, & Mari H. R. (1965). "The structure of foreign news: The presentation of the Congo, Cuba and Cyprus crises in four Norwegian newspapers." *Journal of Peace Research* 2 (1): 64-90.
- Gans, H. J. (1979). *Deciding what's news: A study of CBS evening news, NBC nightly news, Newsweek, and Time*. Evanston, IL: Northwestern University Press.
- Gillespie, T. (2012). *Can an algorithm be wrong?* *Limn*, (2). Retrieved from <http://limn.it/cannanalgorithm-be-wrong>.
- Gillespie, T. (2014). The relevance of algorithms. In *media technologies: Essays on Communication, Materiality and Society*, edited by Tarleton Gillespie, Pablo Boczkowski and Kirsten Foot. Cambridge, MA: MIT Press. Retrieved from <http://culturdigitally.org2012/11/the-relevance-of-algorithms/>.
- Global Editors Networks (2018). *The augmented newsroom: How will AI impact the journalism we know?* Retrieved from: <https://medium.com/global-editors-network/the-augmented-newsroom-how-will-ai-impact-the-journalism-we-know-ec085de5469f>.
- Graefe, A, Haim, M, Haarmann, B, et al. (2016) Readers' perception of computer-generated news: Credibility, expertise, and readability. *Journalism*. Epub ahead of print 17 April 2016. DOI: 10.1177-/1464884916641269.

- Guins, R. (2009). *Edited Clean Version: Technology and the Culture of Control*. Minneapolis, MN: University of Minnesota Press.
- Harcup, T. & O'Neill, D. (2001). What is news? Galtung and Ruge revisited. *Journalism Studies* 2 (2): 261-80.
- Haraway, D.J. (1985). Manifesto for cyborgs: Science, technology and socialist feminism in the 1980's *Socialist Review*, (80).
- Herbst, J. (2016). *The algorithm is an editor*. The Wall-Street Journal. Retrieved from <http://www.wsj.com/articles/the-algorithm-is-an-editor-1460585346>.
- Lee, J. H. (2009). News values, media coverage, and audience attention: An analysis of direct and mediated causal relationships. *Journalism & Mass Communication Quarterly* 86 (1): 175-90.
- Lee, M.K., Kiesler, S., Forlizzi, J. & Rybski, P. (2012). Ripple effects of an embedded social agent: a field study of a social robot in the workplace. In *Proc. of CHI*, 695-704.
- Lievrouw, L. A. (2012). "The next decade in internet time: Ways ahead for new media studies." *Information, Communication & Society* 15 (5): 616-38.
- Liu, X., Nourbakhsh, A., Li, Q., Shah, S., Martin, R. & Duprey, J. (2017). *Reuters tracer: Toward automated news production using large scale social media data*. Thompson Reuters.
- Luciano, F. (2018). Reinforcing news-making practices through algorithmic media. *Stream: inspiring critical thought*, 19(1), 39-51.
- Manovich, L. (2013). *Software takes control*. New York, N.Y. Bloomsbury.
- McCombs, M. E. & Shaw, D. L. (1972). The agenda-setting function of the mass media. *Public Opinion Quarterly*. 36; 176-187. Oxford University Press. <http://www.jstor.org/stable/2747787>. Accessed 10th May, 2019.
- McKelvey, F. (2010). *Ends and Ways. The algorithmic politics of network neutrality*. *Global Media Journal: Canadian Edition* 3(1): 51-73. Retrieved from <http://www.g.k.uottawa.ca/1001v3ilmckelvey.pdf>.
- McKelvey, F. (2014). Algorithmic media need democratic methods: Why publics matter. *Canadian Journal of Communication*. 39(4): 597+. Retrieved from <http://www.fenwickmckelvey.com/wp-content/uploads/2014/11/2746-9231-1-PB.pdf>.
- Morozov, E. (2013). In Abrougui, A. (2016). The folly of solutionism. How algorithms decide what is newsworthy and what is not: *Archives and News Literacy*.
- Nagulendra, S. & Vassileva, J. (2014). *Understanding and controlling the filter bubble through interactive visualization: A user study*. A conference paper presented on 10th February, 2010. Retrieved from: <https://www.researchgate.net/publication/266660926>.
- Napoli, P. M. (2014). "Automated media: An institutional theory perspective on algorithmic media production and consumption." *Communication Theory* 24 (3): 340-60.
- Napoli, P.M. (2014). *On automation in media industries: Integrating algorithmic media production into media industries scholarship*. Retrieved from: <https://quod.lib.umich.edu/m/mij/15031809.0001.107/--on-automation-in-media-industries-integrating-algorithmic?rgn=main;view=fulltext>.
- O'Neil, C. (2016). *Weapons of math destruction: How big data increases inequality and threatens democracy*. New York: Broadway Books.
- O'Neill, D. & Harcup, T. (2009). "News values and selectivity." In *the handbook of journalism studies*, edited by K. Wahl-Jorgensen and T. Hanitzsch, 161-74. London, UK: Routledge.

- Ombelet, P.J., Kuczerawy, A. & Valcke, P. (2016). Employing robot journalists: legal implications, considerations and recommendations. World Wide Web Conference Committee Montreal Quebec Canada. ACM978-1-4503-4144.
- Palmer, J. (2000). *Spinning into control: News values and source strategies*, New York, NY: Leicester University Press.
- Panagiotopoulos, V. (2016). Taming the wild west of journobots: We need an "algorithmic Ombudsman" to safeguard our news. *Open Democracy European Journalism Observatory*. WIRED, Wallpaper. Retrieved from: <https://howwegettonext.com/taming-the-wild-west-of-journobots-d685aaja12d6>.
- Pariser, E. (2011). *The filter bubble: What the Internet is hiding from you*. New York: Penguin.
- Pasquale, Frank A. 2011. "Restoring transparency to automated authority." *Journal on Telecommunications and High Technology Law* 9: 235-256.
- Pariser, E. (2012). *The filter bubble: How the new personalized web is changing what we read and how we think*. Reprint edition. New York, N.Y.: Penguin Books.
- Pariser, E. (2015). Data-driven revelation. Epistemological tensions in investigative journalism in the age of big data. *Digital Journalism* 3(3). Retrieved from <http://dio.org/10.1080/21670811.2014.976408>.
- Scheufele, D. A. (1999). "Framing as a theory of media effects." *Journal of Communication* 49 (1): 103-22.
- Scheufele, D. A. (2000). "Agenda-setting, priming, and framing revisited: Another look at cognitive effects of political communication." *Mass Communication & Society* 3 (2-3): 297-316.
- Schultz, I. (2007). "The journalistic gut feeling: Journalistic doxa, news habitus and orthodox news values." *Journalism Practice* 1 (2): 190-207.
- Tufekci, Z. (2015). Algorithmic harms beyond Facebook and Goggle: Emergent challenges of computational agency. *Colorado Technology Law Journal*. v13. Retrieved from <http://ctlj.colorado.edu/wp-content/uploads/2015/08/Tufekci-final.pdf>.
- Vraneski, A. & Riichter, R. (2016). *Frames, framing and reframing in and through the mass media: reflection of four protracted environmental disputes in Isreali Press*. Haifa Isreal. Technion IIT.
- Walker, A. & Powell, T. E. (2018). Algorithms in newsroom? New readers perceived credibility and selection of automated journalism. *Sage Journalism*. <https://doi.org/10.1177/1464884918757072>.
- Wimmer, R.D & Dominick, J. R. (1987). *Mass Media Research: An Introduction*. Belmont California. Wadsworth Company.
- Wimmer, R.D. & Dominick, J. R. (2012). *Mass media Research: An Introduction*. Wadsworth Company. Cengage Learning.
- Zillman, D. (1995). The experimental exploration of gratification from media entertainment. In Wimmer, R.D. and Dominick, J.R. (1987). *Mass Media Research: An Introduction*, Belmont California. Wadsworth Company.
- Zuckerberg, A. & Zuckerberg, M. (2013). *Managing information about relationships in a social network via a social timeline*. US8583690 B2. Accessed 4th October, 2021.