Artificial Intelligence (AI) in Journalism: Is Bangladesh Ready for it? A Study on Journalism Students in Bangladesh

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While talking about technological development of the world, we always define the word "world" with developed nations or first world countries predicting that developing nations will catch up or follow the trend. This statement is also true for journalism as it is one of the world's fastest growing tech-based sectors. First world countries newsrooms are getting ready for the fourth major wave of journalism (after online, mobile and social media) to use large scale amount of data with the help of AI. In this circumstance, this study focuses on future journalists of Bangladesh; those who have enrolled themselves in this discipline in different universities to pursue a career in the field of journalism. A survey on undergraduate university students from different universities of Bangladesh helped us to predict the readiness of Bangladeshi future journalists for the new wave of digital journalism which will likely hit Bangladesh within the next three to four years. This study will help journalism practitioners and academicians to prepare for the new wave of digital journalism.

Keywords: Artificial Intelligence (AI), Bangladesh, digital journalism, fourth wave of journalism

Introduction

Today we are living in a digital world, in a society which is interconnected with unimaginable opportunities. In this digital world, journalism is a profession hugely dependent on technology. From gathering a piece of news to print/broadcast, everywhere technology is a crying need. But the most interesting fact is that nowadays technologies are no longer used as a helping hand to journalism, rather they are re-shaping the way journalism is. Artificial intelligence is being used to make journalism more efficient than ever before. Big organizations like New York Times are using AI to speed up research, accumulating and cross-referring data (Underwood, 2019). Since 2016 Washington Post is using AI based robo-reporters which they claimed have written 850 news articles within one year (Moses, 2017). This term, Artificial Intelligence, has been popularized more as "Automated Journalism" where stories, videos, data are created on a large scale using artificial intelligence with minimal human input (Arkadium, 2019). So, it has been already half a decade since artificial intelligence is taking in account seriously by big giants of journalism sector.

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In this circumstance, Bangladesh is also experiencing the urge to accommodate AI in mainstream journalism. In Bangladesh, use of AI in journalism field is not sufficient enough. But, with the advancement of technology, AI will soon enter and will be indispensable in no time. Changes are happening; especially Bangladeshi Journalists are keen to know modern journalistic skills like digital and data journalism. One organization named "Dataful" is arranging special training programme for professionals and students of journalism (UNB, 2020).

Taking these changes in consideration, this study mainly focuses on the future journalists, the students of Journalism from different universities. So, this research is focused on their perception and knowledge of using AI in journalism to understand their mental readiness to welcome the bigger change.

What is Artificial Intelligence?

Artificial intelligence has got an abundance of definitions and explanations. But most people hardly have clear ideas on AI. In a report created by *Data & Society* one interviewee said, *"If I walked into a room and said, 'We're going to talk about an artificial intelligent personal assistant, 'nearly everyone would have a picture in their head. The problem is everybody's picture would be different'"* (Elish and Hwang, 2017). Especially in the journalism sector the definition is being shaped and reshaped every day.

Artificial intelligence is something that is not "natural". It works in contrast with typical ways humans and animals display their intelligence. Artificial intelligence shortly named as AI is based on intelligent agent, an autonomous entity working with sensors giving rational result by analyzing like a computer programme (Russell and Norvig, 2003). Some scholars are naming it as "Weak AI" as AI may outperform human in some specific task like facial recognition or playing chess but not in specialized ones based on cognition (Lu et al. 2018).

In journalism, using AI has got specialized naming like "Automated Journalism" (Carlson, 2015; Weeks, 2014), "Algorithmic Journalism" (Napoli, 2014; Uricchio, 2011) or "Robot Journalism" (Clerwall, 2014). Whatever be the name, journalism has become more modern and trendier with the help of AI than ever before. AI has made news to be generated faster, with fewer errors. From processing big data to in depth investigation, AI is used everywhere by big news companies (Graefe, 2016). Some scholars are considering it as an opportunity for journalists to free from routine works and a suitable cost cutting tool (Dorr, 2016). On the other hand, some scholars are considering AI as a threat to journalism which will replace human journalists than helping them out (Montal and Reich, 2017). Whatever be the controversy, no one can deny the importance of AI in every profession especially in the field of journalism. Especially for a developing country like Bangladesh, usage of AI has become a crying need to keep pace with the modern era and modern journalistic arena. As AI will come into full force globally in no time, it is very important to teach the future journalists the possibilities, threats and challenges of AI and getting them prepared for the big wave.

Research Background

As described earlier, AI has become indispensable in several sectors including journalism. For Bangladesh, it is quite a new phenomenon. So, accepting AI as a new technology is very challenging for journalists, perhaps more challenging for the new learners. There can always be a possible resistance for new technology as some scholars described it "to remain unaffected or undamaged by something" (O'Neill, 2001, p. 1050). Maurer (1997) conducted a survey on fortune 1000 companies on using a new software-based application by the employees and found that the reason for the failure of using the new software is resisting a new technology. He concluded the research with the suggestion that motivational strategies are best to create a sense of urgency among them to welcome new technologies. Following this, Sevier (2003) highlighted the fact that, these strategies should be implemented in the academia as well so that students can enter their professional life with a different mindset.

In accepting AI, there can be several challenges coming up. Biswal and Gouda (2020) stated that most people are resisting AI usage in journalism because of the lack of credibility. According to them, some academicians and practitioners firmly believe that human's credibility, creativity and humor cannot be replaced by AI. Some are concerned about the ethical issues; some are on losing their job to machines. These sorts of mental blockage are working against the use of mainstream news production, according to them.

For this reason, this study explores the use of AI in Bangladesh as a newly emerged sector and focusing more on the "Mental Readiness" of the future journalists rather than infrastructural challenges. How the undergraduate students perceive AI, how much they are using AI, what is the future of AI to them are some of the prime focuses of this study.

Literature Review

AI has always been in spotlight for many scholars, practitioners and academicians. Dorr (2016) termed AI in journalism as "Algorithmic Journalism" where structured data is converted into texts through Natural Language Generation (NLG). Although having some technological limitations, NLG has huge economic benefit where production cost is much less than a human journalist. In this research, thirteen semi structured interviews were conducted on relevant service providers on NLG.

The study was conducted in two phrases. In first phrase, technological potential analysis brought out the several limitations including infrastructural incapability of an algorithmic model. The second phrase uncovers the economic potential of NLG in near future such as arranging big data, generating news in multiple language and overall minimizing production cost in reaching broader audience.

Thurman et al. (2017) did a qualitative study where ten journalists were given advanced training on different AI software and were given space to work

independently with a software enable to generate automated texts. The journalists then went through semi-structured interviews where their opinions were investigated qualitatively.

Although having great speed and time benefit, this study found AI technologies still in the early stages of development and therefore not "worthy of" making the whole journalism field automated. Journalists pointed out six major limitations including lack of human angles, lack of sensitivity, ethical dilemmas and of course problems in understanding news behind news. It is true that Journalists could point out the limitations because of their professional experiences but again this study also noticed their incapability in full use of AI software.

In the book *"Tech Giants, Artificial Intelligence, and the Future of Journalism"* (2019) writer Jason Whittaker talked about five biggest tech giants (Amazon, Apple, Facebook, Google and Microsoft) who are working intensively with artificial intelligence and thus creating impact in the future of journalism. According to him, these tech-giants are creating such a "Digital Ecosystem" where public sphere are emerging with the help of social machines and gaining social computational power.

He stated that artificial intelligence has changed the understanding of the consumers about journalism and media, so as people's behavior in consumption. The shift in automation especially by using artificial intelligence has compelled big tech-giants thinking more about these changing trends. It has placed media industry in a strong position where tech-giants have no other options than to invest in developing AI to make maximum profit out of it. He predicted an even better future of AI in journalism practice where AI will not only help in profit making but also will aid human in understanding and transforming the world.

Some scholars have given several valuable recommendations specially for learning AI in the academic field of journalism (Broussard et al., 2019). According to them the learning curve should follow a more conceptual path starting for what is and what not is AI. Clear understanding on AI will help to understand the strengths, weaknesses, ethical issues and applications of AI with the field of journalism.

According to them, understanding AI beyond the definition and overcoming the fear of technologies can be one of the major challenges journalism is facing currently. So, they recommended to include special courses in the academic arena with resourceful contents and specialized faculties.

Lewis et al. (2019) talked about human machine communication domain where the typical role of machines has changed, working as a news source rather than news channels. They termed this change as "Ontological Transaction" by focusing on the shift of technology use in traditional journalism practice.

Their research concluded by tagging AI as "Communicator" rather than a "Mediator" inside any given context. Automated texts, chatbots, social bots are reducing human roles and thus pushing the understanding of AI further. News writing software are challenging creative writings, thus questioning some fundamental principles of journalism practices. According to them, human machine communication domain is yet unclear to us. As our relationships with

machines are changing so rapidly with newly emerged technologies and innovations, this relationship with devices are subject to ongoing negotiations.

Theoretical Framework

To analyze the readiness of Bangladesh in using AI in the field of journalism, Technology Acceptance Model (TAM) has been taken as the theoretical framework of this study. It is one of the widely used models introduced by Davis (1986) to understand how users are accepting newer technologies in their day to day life. The theoretical background of this model comes from Theory of Reasoned Action (Fishbein and Azjen, 1975) which states that attitude is influenced by beliefs, which changes the intention and thus generate new behavior in someone. The model constructed by Davis (1986) is shown in Figure 1.

Figure 1. Technology Acceptance Model (Adapted from Davis, 1986)

This model has got two important constructs "Perceived Usefulness" and "Perceived Ease of Use" which are actually individual attitudes and can be influenced by external behaviors. According to Davis (1986) these two constructs led to attitude and intentional changes and thus actually accepting the system usage. Taking about external variables, it varies from context to context. For example, in using mobile applications Kim (2012) got five external variables (Utility, Quality of Content, Entertainment, Price, Design) important where Shin (2016) got another five (Interaction, Information Offer, Personalization, Playfulness, Instant Connectivity) variables playing crucial roles in TAM.

Davis has done several experiments to validate his model alongside other scholars in this field. This model showcases the mutual relationships between external variables with two constructs "Perceived Usefulness" and "Perceived Ease of Use" and thus affecting the system use at the end. Davis found both these constructs related to two things- self-reported current usage and self-predicted future usage.

Although having got huge acceptance in academic and research arena, it was identified with one big limitation, the absence of social influence. Taking that in consideration, in 2000 Venkatesh and Davis (2000) introduced an extended version popularly known as TAM 2.1 the modified model of TAM 2 is shown in Figure 2.

Figure 2. TAM 2 Model (Adapted from Venkatesh and Davis, 2000)

In TAM 2, external variables are easily understandable and identifiable. Here, attitude is excluded from the model and two specific external constructs (social influence process and the identical tool process) are included. Subjective norms, voluntariness, experiences and image are under the social influence process and job relevance, output quality, and result demonstrability are under identical tool process. Instrumental determinants are defined in Table 1.

Table 1. Definition of Variables by Scholars

Process	Variables	Definition of Variable
Social Influence	Subjective Norms	It means if someone is important to him/her, he/she should not put their behavior in question (Fishbein and Ajzen, 1975, p. 302)
	Voluntariness	It means someone who is a potential adopter will take the decision by choice/ non-mandatorily (Venkatesh and Davis, 2000, p. 188)
	Image	It can be described as the increase of someone's status by using the innovation from a societal perspective (Moore and Benbasat, 1991, p. 195)
	Experience	"The direct effect of subjective norm on intention may subside over time with increased system experience" (Venkatesh and Davis, 2000, p. 189)
Cognitive Instrumental	Job Relevance	Can be described as individual perception of using a new innovation having relevance to someone's job where the innovation is capable of carrying out set of tasks (Venkatesh and Davis, 2000, p. 191)
	Output Quality	Individual perception on how well the innovation can perform the tasks matching their job relevance (Davis et al., 1992, p. 985)
	Result Demonstrability	"Tangibility of results of using the innovation which directly influence perceived usefulness" (Moore and Benbasat, 1991, p. 203)

Research Hypothesis

The main objective of this research is to find out the readiness of Bangladesh in using AI in the field of journalism. The following hypotheses have been developed by the researcher and tested in the study:

1. Some external variables of technology acceptance model have influence on student's system use.
2. Internal constructs are also working with external ones to accelerate system usage behaviors.
3. Being comparatively new concept in Bangladesh, students have negative intentions to learn and use AI in journalism studies.

Research Questions

To meet the objective, the following questions have been taken in consideration:

1. Which external variables of technology acceptance model are working in changing the system's use?
2. Are there any internal constructs working to accelerate the change?
3. Do the journalism students have positive intentions to learn and use AI in journalism?

Research Method and Sampling

Quantitative method has been followed in this study. To understand the basic knowledge of journalism students about AI and journalism a survey was done on them. 120 participants from 10 different Universities have participated in this survey. All the participants are studying in the field Mass Communication and Journalism and they had a course on Information and Communication technology. Out of the 120 respondents, 88 were males and 42 female students. We take more male students than female ones to reflect the lower ratio of male and female students in the Communication and Journalism discipline of Bangladesh. This is a representative sample because all the participants represent all the necessary features for this research. For example, there are participants from the public university, the private university, the urban area and rural area-based University as well. Most of the participants come from a different economic background. All the 120 participants of this survey represent necessary diversity and background information related with this study.

A questionnaire was developed based on the findings of *"New Powers, New Responsibilities: A Global Survey of Journalism and Artificial Intelligence"* (Beckett, 2019) conducted by the Google news initiative and POLIS Think tank at LSE. This report was based on a survey of the state of mind and state of play in 71

news organizations from 32 different countries regarding artificial intelligence (AI) and associated technologies (2020). Their research findings were taken to make the research questionnaire so that we can ask engage student with the latest development on the field of AI and journalism. To understand their thought about AI some ideas were taken from the survey report entitled "What Consumers Really Think about AI: A Global Study" (2020).

Research Findings

The findings of the survey can be analyzed into three phrases:

1. Finding the existence of variables.
2. Finding the existence of major constructs.
3. Finding out the intentions to use AI.

Here, all these three phrases are interdependent. External variables are influencing the major constructs and thus changing/impacting the use of AI among journalism students. The findings of the survey are as follows.

Finding the Existence of Variables

Interacting with AI Beforehand

In the era of social media and internet students are interacting with many AI applications, but the question is, are we capable enough to recognize it? We asked to our respondents, have you ever interacted with Artificial Intelligence technology? We got the following responses Figure 3.

Figure 3. Interaction with Artificial Intelligence Technology

About 65% have confessed that they had already interacted with Artificial Intelligence technology meanwhile only 17% respondents have never had an interaction with Artificial intelligence. To have a clear view on their understanding about what kind of AI technology they have used recently, they were asked another question and the questions was which of the following technologies have you used or encountered in the last year? 8 different features were mentioned in the questionnaire and a free to answer option was given for their opinion as well (Figure 4).

Figure 4. Interaction with Artificial Intelligence Technology

Most of the respondents (almost 80%) have used Facebook-recommended news, while only 7.5% of the respondents have interacted with AI for fake news detection. This is a great finding for our research because students are using an AI application which is related with journalism that's why it will be more interesting to see their basic knowledge and preparation for the uses of AI in journalism. More than 63% students got online shopping recommendation from AI and around 50% students uses email spam filters. Only 22% and 10% students are taking help from Siri virtual assistant and home virtual assistant, respectively. Only 3% student have not interacted with any of these features.

This result shows the influence of "Experience" variable for the TAM 2 model having more interaction with gadget AI beforehand.

Voluntary Use of AI/ Preferring AI

A question was asked to our respondents to understand their preferred communication using AI. The question was, when you need any service, what is typically your preferred contact channel? And we got the following responses (Figure 5).

Figure 5. Contact Channel

Around 48% respondents preferred social media especially chatbot and 25% wants to talk with a person as contact channel when they need any services. Around 15% respondents will use online chat as medium of contact. It is clear that respondents are choosing contact channel where AI can be used. They prefer chatbot over a human representative which shows the presence of "Voluntariness" variable.

AI and Future Journalism

Another important variable "Job relevance" is dominantly visible in the result of the survey. Most of the students in journalism believe that AI is the future of journalism. We asked the question are you concerned about the impact that AI might have on journalism (Figure 6).

Figure 6. Impact of AI in Future Journalism

A big number of respondents (almost 82%) are aware about the impact of AI in future journalism meanwhile only just above 18% respondents thinks that they are not aware about the impact of AI in future journalism. It is clear that AI will have an impact on future journalism but now the question is in which area of journalism it will be more impactful. So we asked; where we can do the best use of AI and their response was very impressive (Figure 7).

Figure 7. Impact of AI in Future Journalism

The result clearly shows that AI will have almost equal impact on the three major fields of journalism, i.e., news gathering, news production and news distribution. According to the respondents from news writing to news publishing AI is equally important to every steps of journalism.

Output Quality of AI

Most of the journalism students believe that AI performs great by doing several tasks. To understand their preliminary knowledge about the output quality of AI we asked a question, how do you describe what AI can do? We also provide a checkbox where we have mentioned few applications of Artificial intelligence. The findings are shown in Figure 8.

Figure 8. Output Quality of AI

Out of 10 applications, students give more priority to solving problems. Around 72.50% students believe that AI solve problem, where around 50% students keep faith on AI's ability to learn while Machine learning is a key factor of Artificial intelligence. More than 50% students think that AI can think logically, and it can replace human jobs but only 27% students think that AI can take over the world though it can replace human jobs. The least number of students (only 15%) thinks that AI can feel emotion.

AI in Reshaping Journalism

We also wanted to know specifically about the probable impact of AI in the future of journalism. The question was in which arena you think AI can reshape journalism? We asked this question with multiple options with checkbox (Figure 9).

Figure 9. AI in Reshaping Journalism

Around 70% respondents think that we can detect the fake news using AI technologies and 64% students thinks that we will get more efficient, automated production of content. Around 60% respondents believe that AI can be useful for better personalized distribution of content and it will also enhance image or video search options. Around 48% respondent also think that with the help of AI news consumers will find more data in stories and journalist will find more stories in data. More than 34% respondents also believe that AI will help the media business though dynamic pricing for both for ads and subscriptions. This result shows the presence of the variable "Result Demonstrability" where tangible result are influencing in overall AI use.

Finding the Existence of Two Major Constructs

This survey has found the presence of both important constructs "Perceived Usefulness" and "Perceived Ease of Use". The analysis of the survey is as follows:

AI Helping in Daily Life

81.67% of the respondents believe that AI can help them to improve their daily life while only 6.67% respondents think that AI is not able to improve their daily life. Around 12% respondents are dilemma regarding this question (Figure 11).

Figure 11. AI Helping in Daily Life

More than 80% students believe in AI's contribution in daily life (for example: saving time and money) it clearly shows the existence of the construct 'Perceived Usefulness'. Students believe AI is useful for them and that indicates the readiness of Bangladesh in accepting technology.

Comfort Ability in Using AI

It is important to find out whether Bangladeshi students are always comfortable to work with our colleagues, devices or technologies or not. The following question is asked to our respondents. How comfortable are you/would you be with a work/study/job using Artificial Intelligence to interact with you? (Figure 12).

Figure 12. Comfortability in Using AI

It seems that most of the respondents 74% are comfortable to interact with where around 7% (6.67%) respondents are not comfortable to interact with Artificial Intelligence. This successfully indicates the presence of another construct "Perceived Ease of Use". The students of Bangladesh are quite techno-freak and using modern gadgets on daily basis. That is why they are more open and comfortable in using AI.

Finding Out the Intention to Use AI

According to the model of TAM 2, variables are responsible in influencing two constructs (Perceived usefulness and Perceived ease of use) and from the two constructs intention of using the system is created. In the survey, we also found the intention among students on readiness to use AI. They have demonstrated positive intentions in learning AI as a part of their academic coursework. To understand their academic orientation of AI, we asked the question: Did you learn about Artificial Intelligence (AI) in any of the courses that you have studied so far? (Figure 13).

Figure 13. Intention to Use AI

Almost 70% (68.33%) students of Communication and Journalism discipline had learned about artificial intelligence (AI) in any of the courses but there was no specific course on Artificial intelligence. Around 29% students did not have any knowledge on AI in the courses that they have studied so far. Then we asked the most important question of our research: Do you think that the potential role of AI in journalism should be included in the course curriculum? (Figure 14).

Figure 14. Intention to Use AI

The most interesting fact is that not a single respondent said no about including the potential role of AI in journalism in the course curriculum. More than 87% respondents agreed on it and around 13% respondents are in dilemma regarding this issue. This finding gives us a clear overview on the intention of learning AI and most importantly the necessity of the inclusion of AI in journalism in the course curriculum.

As there is an ongoing debate on ethical perspective of using AI, we have also asked a question regarding the ethical aspects of AI in journalism. We asked specifically: Do you think that using AI in journalism is ethically right? (Figure 15)

Figure 15. Intention to Use AI

Almost 70% respondents think that it is ethically right, and about 30% respondents think that it will be ethically wrong. This shows their welcoming outlook towards studying AI as they understand the necessity of AI in modern era.

Discussion

Analyzing the results of the survey data based on the TAM 2 model, the overall findings look like as follows (Figure 16).

Figure 16. Analyzing with TAM 2 Model

Here, the marked ones are the existing factors found responsible for analyzing AI usage based on technology acceptance model (TAM2). Here, in this survey, five out of seven external variables are found working in social influence and cognitive instrumental process. Two variables subjective norms and images were not found having any kind of impact. This result strongly suggests the fact that usage of AI is not popular enough to make it a subjective norm or enhancing someone's status. Unlike these two, the rest of the five factors are working strongly in self-reported current use and self-predicted future usage.

Being influenced by external variables, two internal constructs (perceived usefulness and perceived ease of use) are also found working positively in showcasing the readiness of Bangladesh in accepting AI. According to the survey, students of journalism are very optimistic about the usefulness of AI and also very comfortable in using them.

All these positive outcomes above are also influencing in changing intentions of students in using AI. The results show that, students have interacted with AI in personal life by far and these are creating the intention of using it in academic and professional level also. The survey result showcases student's increasing expectations and enthusiasm in using AI. All these variables are working together to gather the final outcome of the model, usage behavior.

So, excluding two external variables (subjective norms and image) Venkatesh and Davis's Technology Acceptance Model (TAM 2) is quite (if not fully) successful in analyzing the readiness of Bangladesh in using AI in journalism.

Conclusion

From the above discussion, we can conclude that, AI has tremendous importance in the field of journalism. The hypothesis concerning external variables (Hypothesis 1) has been tested in phase 1. It stated having strong influence of five variables on system usage. The second hypothesis that states existence of internal constructs has significant impact on behavioral change also. So, we can easily conclude that the first two hypotheses have been tested successfully with positive outcomes.

On the other hand, the third hypothesis concerning negative intentions of students to learn and use AI has been found, contradicting earlier results. Results found that the journalism students of Bangladesh are mentally ready for learning, using and experimenting with AI. They have basic knowledge on the concept and are very much eager to learn and use AI at personal and professional levels. This is undoubtedly a good sign for the mainstream journalism industry of Bangladesh.

So the study ends with noteworthy results. Despite having possible risks and challenges, there is no alternative to AI to keep up with modern mainstream journalism. The future journalists of Bangladesh, the students, have mental readiness to learn and accept AI as a new technology with unlimited personal and professional benefits. All we need to do now is working to ensure huge infrastructural development to get the best outcome of the system usage and thus helping the future generation in serving fast and reliable news to mass people. This study will certainly open a new chapter for the discipline of Mass Communication and Journalism and will be the pioneer study in the research arena of AI and journalism education in Bangladesh.

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