



A hard nut to crack: Exploring journalism educators' views on data journalism education in Malaysia

Iffat Ali Aksar

Xiamen University Malaysia

Ayesha Siddiqua

National University of Modern Languages (NUML), Pakistan

*Muhammad Zaiaamri Zainal Abidin

Universiti Malaya, Malaysia

zaiamrizainal@um.edu.my

ABSTRACT

Data journalism is essential to modern journalism in the digital age; however, there is a limited body of literature on data journalism education in Asia. Despite Western experts' substantial discussion of its development and norms, data journalism research is still in its infancy. This study examines data journalism education in Malaysia, focusing on the knowledge, abilities, and challenges faced by journalism instructors. The faculty of Malaysian institutions providing undergraduate and graduate journalism courses were recruited for in-depth interviews using a qualitative methodology. The results indicate that journalism education lacks expertise in data journalism. Participants noted their departments' lack of data journalism courses and expressed a desire to learn more. Interviews reveal personnel shortages, budgetary limits, and administrative hurdles in teaching data journalism. Additionally, a drop in journalism education is observed at Malaysian institutions due to contextual factors and the changing media environment, which promotes advertising, public relations, and new media marketing. The study recommends rethinking journalism education to meet market needs and student interests and collaborating with statistics and computer departments to integrate data journalism into curricula, emphasising the need for administrative support and a visionary approach. The paper helps educators, policymakers, and industry stakeholders enhance data journalism education in Malaysia and adapt to changes in the media landscape.

Keywords: *Data journalism, journalism education, Malaysia, journalism faculty, data-driven journalism*

INTRODUCTION

Data journalism is a rapidly growing field worldwide, covering various disciplines such as journalism, information sciences, social sciences, data and computer sciences, data analytics, and visualisation. Rooted in the principles of precision journalism, data journalism promotes a journalistic approach based on factual evidence and scientific methodology (Heravi, 2019). It involves navigating complex data by utilising algorithms, requiring new writing skills, information acquisition, and presentation techniques. As journalism has evolved from web-based technologies to data journalism, Western scholars have initiated discussions and offered guidelines for academics and practitioners. For instance, Davies and Cullen (2016) recommended that data journalism courses and skills should be incorporated into Australia's journalism education. Another study explored the impact of data journalism training on practices in Canada (Leask, 2017). A scholar from City University London argued that journalism education has been relatively slow to adapt to industry developments like data journalism and suggested that journalism curricula should be innovative and responsive to industry changes (Hewett, 2016). Other researchers, such as McAdams (2019), strongly advocate for revising journalism curricula and teaching new skills pertinent to data journalism.

Journalism education aligns with technological advancements in the news industry of Western societies. However, unlike the Western and more developed regions, data journalism is only now gradually becoming an integral part of the Asian news industry. Journalism education in Asian countries is undergoing a significant shift (Ullah, 2012). Nevertheless, the pace of change remains relatively slow. For instance, a recent study in India examined the state of data journalism, emphasising the need for journalism schools to adapt and actively shape industry practices, rather than just be influenced by them (Kashyap & Bhaskaran, 2020). Another systematic review of academic literature on data journalism in Asian countries identified several challenges for journalism educators, such as fear of change, the need for up-skilling, and the difficulty of integrating data journalism concepts into curricula (Bhaskaran et al., 2022). As data journalism combines technology and journalism, it must be regarded as an interdisciplinary field (Zhu & Du, 2018). The idea of data journalism merely as numerical representations of facts should be reconsidered, recognising it as a distinct and emerging discipline (Green, 2018). However, there is limited literature on data journalism in the Asian context, and research tends to view it as a statistically complex and technologically challenging domain (Alaqil & Lugo-ocando, 2021).

Based on the available literature, there is a significant gap in the Asian context, particularly concerning data journalism education, faculty knowledge and expertise, challenges in teaching data journalism, and recommendations for fostering data journalism education. Therefore, this research aims to understand the status of data journalism education in Malaysia and examine the knowledge and skills of journalism educators, as well as the challenges they face in teaching data journalism. To lay the groundwork for the study, a brief discussion of the state of journalism education in Malaysia is included, highlighting recent progress and existing limitations.

JOURNALISM EDUCATION IN MALAYSIA

After gaining independence in 1957, Malaysia's education system underwent a significant transformation, shifting from a production-based economy to a knowledge-based one to stay relevant and competitive in the global market (Grapragasem et al., 2014). Various policies and initiatives were implemented to improve education and effectively equip the younger generation with the skills and knowledge needed in the 21st century. For instance, the Education Act of 1966 aimed to promote cohesion and standardisation across syllabi and curricula nationwide. Another important milestone was reached in 1989, with the establishment of The National Philosophy of Education, which included Malaysia's Vision 2020. Subsequently, the Ministry of Education (MOE) developed a new National Education Blueprint (NEB), officially launched in December 2012, to support Vision 2020 and achieve its goals.

The government strongly emphasised higher education, with the establishment of the University of Malaya in 1969 marking the start of this focus. Subsequently, several other institutions, such as University Sains Malaysia (USM) in 1969, Universiti Kebangsaan Malaysia (UKM) in 1970, Universiti Putra Malaysia (UPM) in 1973, and Universiti Teknologi Malaysia (UTM) in 1974, were founded to provide higher education across various fields (Hussein, 2014).

In many academic disciplines, journalism education emerged and developed during the formative years between 1970 and 1980 (Idid, 2008). After the highly reputable University of Malaysia, also known as "Universiti Malaya," declined to establish a journalism programme, USM took the opportunity and launched a communication programme in 1970 under the School of Cultural and Community Studies. Subsequently, in December 1971, it was transferred to the School of Humanities. In this manner, USM became the pioneer university in establishing journalism education in Malaysia (Idid, 2008). Following the establishment of the communication programme at USM in 1970, the Schools of Media Studies at Institute Teknologi MARA, UKM, and UPM also introduced journalism programmes. This laid the foundation for the growth of journalism education across Malaysia.

Over two decades in Malaysia, there has been a noticeable shift in journalism education; public and private higher education institutions offer journalism courses under diverse titles, such as mass communication, media studies, and communication studies, among others (Aripin et al., 2014). Additionally, concrete measures have been taken, such as establishing the Malaysian Quality Agency (MQA) in 2007 to ensure the quality of higher education is recognised internationally (Grapragasem et al., 2014). According to MQA regulations, universities are required to update their courses every five years, forming boards and committees to revise curricula and introduce new courses in response to industry developments.

A blend of Western and Eastern models, encompassing both theoretical and practical elements of the discipline, has shaped the development of journalism education in Malaysia. The aim is to equip students with comprehensive knowledge and skills vital for critical thinking and professional success in the industry (Aripin et al., 2014). Various journalism courses are regularly updated to reflect technological advancements and the integration of digital technologies in media practices, such as Online Journalism and Multimedia Reporting. Despite various reforms and achievements, researchers have

identified several issues in journalism education, including outdated course content (Ismail & Ismail, 2017), insufficient training for students to enter the journalism industry (Loo, 2013), and a significant gap between journalism education and employability (Aripin et al., 2015).

Most notably, a recent study involving interviews with journalism faculty and news editors concluded that journalism education in Malaysia requires redefinition, as the knowledge and skills among academics are not kept up to date (Ismail & Ismail, 2017). With the substantial evolution of the news industry driven by technology, Malaysian journalism students are eager to learn data journalism despite limited knowledge and awareness (Othman, 2021). Currently, students feel more comfortable engaging with technology and innovative approaches than with traditional news writing methods. However, teachers' expertise plays a crucial role in imparting techniques within the classroom. Universities are essential institutions where students are introduced to both the theoretical and practical aspects of their discipline. They bear responsibility for fostering critical thinking and preparing students to behave professionally in the industry. Consequently, the role of university faculty and teachers is vital; their knowledge, professional experience, and research skills are all key factors in their appointment.

However, no study has been conducted in Malaysia to assess the status of data journalism education, faculty knowledge, and the challenges of teaching data journalism. Nonetheless, researchers examining the growth of data journalism in developing countries have observed various challenges in teaching it, including a lack of technical skills among journalism faculty (Mabweazara & Taylor, 2012), limited understanding of data journalism (Lewis, 2021), and most importantly, in the Asian region, data journalism as an educational area is not yet flourishing (Kashyap & Bhaskaran, 2020). Therefore, considering the growing trends and the academic gap in the Malaysian context, this study serves as a baseline, with in-depth interviews with journalism faculty to explore their personal experiences and knowledge about data journalism, as well as to identify the challenges of teaching it in Malaysia.

Theoretically, this research is grounded in the Innovation Diffusion Theory (Rogers, 2003) to investigate the adoption of data journalism education in Malaysian universities. The Innovation Diffusion Theory (IDT) provides detailed insights into how an innovation is communicated through specific channels over time among members of a social system. In the context of this study, innovation refers to the integration of data journalism into journalism curricula, while the social system encompasses journalism faculties, students, educational institutions, and policymakers. IDT helps to understand the various factors that affect the slow adoption of data journalism, including faculty knowledge, administrative support, and institutional readiness.

Based on the existing literature and the purposes of the study, the following research questions are stated:

- RQ1: Do journalism teachers have the knowledge and required skills in data journalism?
- RQ2: What are the challenges journalism teachers face in teaching data journalism?
- RQ3: What are the recommendations of journalism teachers to foster data journalism education in Malaysia?

METHODOLOGY

The research focused on the personal experiences of journalism faculty members and uncovered the realities that limit education about data journalism in Malaysia; therefore, it adopted a qualitative approach and conducted in-depth interviews. In-depth interviews facilitate an understanding of complex phenomena by allowing participants to share their experiences, gain insights, and extract meaning through personal accounts (Alhazmi & Kaufmann, 2022). The list of universities was downloaded from the MQA website, which includes both public and private universities. Later, universities which offer media and journalism education were selected.

Information about the journalism faculty was obtained from the universities' websites. Subsequently, invitation emails were sent to 20 universities, including 8 public sector and 12 private universities. However, the researchers received no responses. As a result, the researchers contacted their acquaintances in the field of media education and recruited nine participants through purposive and snowball sampling. Each study participant taught journalism courses at the undergraduate and graduate levels. All participants, except one, possessed a PhD degree and were employed as Senior Lecturers and Associate Professors in their respective journalism schools.

Before conducting the interviews, a consent form and a set of tentative questions were sent via email. The interviews were conducted remotely using Microsoft Teams and recorded. The informants were informed that their interviews were being documented and that their names would be anonymised. These interviews enabled participants to share their lived experiences, expertise, challenges, and recommendations. The researchers gained a comprehensive understanding of the current state of data journalism education through in-depth, semi-structured interviews.

The interview guide was divided into four sections, grouping related topics. The first section covered credentials, professional background, industry expertise, and details on teaching courses. The second section addressed university journalism education, including comprehensive programmes and specific modules on data journalism within journalism courses. The third section focused on training individuals in gaining data journalism skills, whether through prior experience, training, or on-the-job learning to enhance their journalistic abilities. In the fourth section, questions were asked about challenges and suggestions. The data collection process took two months. After all interviews were completed, the data were transcribed into written form. Each interview was saved separately in a Word file.

DATA ANALYSIS

For analysing the interview responses, a thematic analysis approach was employed. The study utilised the NVIVO-12 software for data analysis. According to the recommendations proposed by Clarke and Braun (2016), the data were carefully reviewed several times to familiarise with the acquired information. During this step, the recordings and written texts were thoroughly examined to ensure no information was overlooked or omitted. Additionally, significant elements were integrated into the material to create a concise paper that contains comprehensive information and data. The collected data were

systematically organised to derive accurate findings relevant to the study questions and aims.

In thematic analysis, codes are generated rather than pre-defined based on the data. After several readings and gaining an understanding of the data, important details were highlighted and coded. Open coding helped the researchers identify and record information, adding more meaning and value to the research. All researchers conducted the preliminary open coding individually and then shared their codes. Following discussions, similar and different codes were grouped. Additionally, codes specific to participants were also identified. The researchers then grouped the codes into themes and reviewed each theme before progressing to their interpretation as findings. The analysis of the interviews showed that all participants were highly qualified and possessed substantial media industry experience. Table 1 presents details about the participants (see Table 1).

Table 1. Participants' profile

Participant	Qualification	Industry Experience
P-1	PhD	02 year (Part-time)
P-1	PhD	22 years
P-3	PhD	15 years
P-4	Masters	20 years
P-5	PhD	05 years
P-6	PhD	02 years
P-7	PhD	04 years
P-8	PhD	03 years (Part-time)
P-9	PhD	03 years

Analysis began with individual interview coding, and Table 2 presents the number of codes and references. To ensure the accuracy of the coding process, the researchers checked each code, combined similar codes, and identified dissimilar codes to group them separately (see Table 2).

Table 2. Coding process

Codes	Number of Codes	Reference
Academia is left behind	7	19
The Malaysian news industry is passive	8	21
Students not interested in journalism	12	15
Course upgradation is routine work	3	4
Data report course or section	3	3
Data reporting skills in courses	7	11
Freedom in changing courses	3	7
Control over news media freedom	11	17
Administrative issues in offering courses	9	13
Challenges in teaching data journalism	7	13
Data journalism is new in Malaysia	6	11
Lack of data journalism skills	7	9

Table 2. (con't)

Codes	Number of Codes	Reference
Faculty skills for future journalists	7	16
Math phobia	3	7
Industry experience	4	4
Low enrolment in journalism	5	7
Knowledge or training in data journalism	7	8
Traditional news reporting skills	13	16
No data journalism teaching faculty	5	11
No data Journalism entire fledgling course	5	5
On-job training for faculty	2	2
Required qualification	5	5
Requisite journalism skills in courses	8	7
Introductory data courses are not included	1	1
Teaching courses	2	2
Traditional journalism courses	9	12

After this, the codes were grouped to create themes that aligned with the Research Objectives (see Table 3).

Table 3. Codes, sub-themes and themes

Codes	Sub-Themes	Themes
The Malaysian news industry is passive.	Journalism and Malaysia	Data Journalism Education in Malaysia
Data journalism is new in Malaysia.		
Control over news media freedom		
Data reporting skills in courses	Journalism Education	
Course upgradation is routine work.		
Data report section		
Introductory data courses are not included.		
Traditional journalism courses		
Freedom in changing courses	Data Journalism Education	
Less requisite journalistic skills in courses		
No data journalism entire fledgling course		
Data journalism is new in Malaysia.		
Lack of data skills	Skills of Journalism Faculty	Faculties' Knowledge and Skills
Knowledge or training in data journalism		
Traditional news reporting skills		
Academia is left behind.	Challenges	Challenges and Suggestions
Low enrolment in journalism		
Required qualification		
Administrative issues in offering courses		
Math phobia		
Faculty skills for future journalists	Suggestions	
On-job training for faculty		

FINDINGS

Theme 1: Data journalism education: Just a blank sketch

According to all the participants except one, no specific data journalism course was being offered in their departments. The particular participant mentioned that a data journalism course was introduced in 2020 to give students essential exposure to the subject. However, to meet MQA requirements, updates and revisions are regular; these changes generally involve CLOs (course learning outcomes) and assessment methods, and only a few sections in the course outline.

According to the participants, journalism as a practical and skill-focused field is still underdeveloped in Malaysian universities. The participants shared their experiences and mentioned that different universities have varied practices for updating or revamping courses. For example, two participants from a private university said, *"We can suggest changes every semester. There is a specific course change form, but HoD can approve minor changes; however, major changes go to higher management, and approval depends on MQA guidelines"*. The participants from public universities shared that the course contents are revised every two to three years as per MQA requirements. Although the journalism courses have been upgraded and revised, and they are officially and institutionally recognised practices, there has been no discussion about starting a data journalism course so far.

Primarily, the revision of courses aims to identify gaps and shortcomings and update existing courses in line with new trends. A participant shared that regardless of whether they have industry experience, they cannot alter the essence of the subjects, which course committees and MQA have approved. Regarding current knowledge of data journalism, one participant said, *"Students know more about types and styles of journalism; therefore, they know data journalism, and we have a section about data journalism. However, that is just an introductory section."* Another participant added, *"I teach them about data journalism, but the discussion is mainly focused on the definition or identifying its difference from another type of journalism. However, one lecture or section is insufficient to understand data journalism's diverse scope."* The discussion with the participants revealed that new courses, such as data journalism, are not offered, and no recommendation is in the pipeline to include this course.

Theme 2: Data journalism knowledge and skills: Coated with traditional voices

The discussion with the participants also focused on their understanding and knowledge of data journalism. Although the definitions and explanations of data journalism vary, few scholars comprehensively described and defined its parameters. For example, Heravi (2019) stated in his paper that *"data journalism encompasses a suite of practices for collecting, analysing, visualising, and publishing data for journalistic purposes"*. Despite this explanation, the most significant challenge for educators is understanding data journalism (Kashyap & Bhaskaran, 2020). The research participants also shared similar interpretations and confusion when discussing their knowledge of data journalism.

For example, a participant said, *"It is merely an investigative story; you do the research, and the report description is news"*. Another participant explained, *"It is a multimedia story which is data-driven"*. However, one participant shared that *"data journalism is an extension of digital journalism. We live in big data and now rely on web-*

based data sources and software to analyse and bring out results in pictorial or graphical shape”.

While discussing the skills, the participants shared that they have the requisite skills for data journalism. However, the skills they mentioned are research skills. A participant mentioned, *“Almost all the faculty have PhD and know about research, data collection and the analysis process. So, we teach them, and we can teach data journalism too”.* Another participant shared, *“Usually, universities see academic qualifications and specialisation in the field while hiring. So, we have knowledge about news writing and editing, and we focus on ethical issues as well; however, technical aspects like data exploration, analysis, and visualisation come under computer sciences and design programs”.* The participant further added, *“Data journalism cannot be handled by journalism faculty, because the education that we had, the curriculum we teach, it focuses on journalism as writing. The other components do not come under our discipline”.*

The participants’ narrative exposed their limited knowledge of data journalism and insufficient skills to teach it as a compact subject. However, the participants expressed their interest in acquiring further skills to teach data journalism. Conversely, the participants acknowledged that the news industry and journalism practice have changed extensively. For example, the pandemic presented a challenging situation for journalists, such as the bombardment of misinformation (Mohd Nor, 2022), and data analysis skills are highly relevant in the data-driven news industry.

Theme 3: Challenges in teaching data journalism

The participants discussed the challenges in teaching data journalism, including a decline in journalism education, an insufficiently specialised workforce, and administrative matters.

Theme 3.1: Journalism education is waning

The analysis of the interviews showed that journalism education in Malaysian universities has declined. The participants discussed the local realities and the media landscape in Malaysia, both of which contribute to a decline in journalism education. Based on their professional and personal experiences, they noted that journalism as a profession progresses too slowly in Malaysia; as a result, universities are hesitant to offer advanced journalism courses, such as data journalism. Meanwhile, industries like advertising, public relations, new media marketing, and event management are expanding quickly and providing employment opportunities, compelling universities to adjust their programmes accordingly.

According to the participants, various universities in Malaysia have closed their journalism programs and are now operating under different titles, such as media and communication studies, or the school of communication. Though they offer journalism courses, these courses are pretty basic and intend to give students introductory knowledge about journalism. According to the participants, several reasons contribute to the shutting down of journalism programs. One factor is the number of students for whom journalism programs and courses are offered. A participant referred to language and writing skills among Malaysian students and explained, *“Students enrolled in journalism are too few compared to advertising programs. So, if there is no enrollment, the program must be shut down”.*

Another study participant linked the media landscape with journalism education, saying, *“Students are no more interested in journalism, as they see their seniors working in PR and advertising agencies; hardly anyone gets a job in the news industry. Because the news industry in Malaysia is not diverse and has limited scope.”* Another participant added, *“Universities watch the market, as in Malaysia, advertising, public relations, or event management are growing. Therefore, they shifted their focus to communication studies. Now, hardly any university offers specialisation in journalism. I know a few universities that have even closed their journalism programmes. To meet the requirements for communication or media studies, they offer only two or three basic courses in journalism, and that is all.”*

The participants shared a similar situation, referred to the media landscape in Malaysia and said, *“In Malaysia, access to data is not easy. Though the internet and social media, new media, all that are trending in Malaysia, authoritarian control still exists”*. The slow development of the news media industry in Malaysia reflects the limited employment opportunities, which explains why students opt for programs that optimise their career prospects and ensure financial stability.

Theme 3.2: Workforce challenges

The interviews with the journalism faculty revealed that though they have industry experience, they are willing to revamp journalism education and stress to include data journalism. However, they mentioned challenges such as workforce insufficiency and financial constraints by the administration.

Regarding the workforce, the participants held diverse opinions. Some participants mentioned that they can teach data journalism; however, they need training to understand current practices. Others stated they are aware of data journalism but lack confidence in teaching it. Furthermore, several participants noted that due to the nature of data journalism—which combines journalistic knowledge with statistical and technological expertise—specialised faculty with relevant skills are necessary, as traditional journalism teachers are not equipped to teach data journalism. Training programmes or sessions alone are insufficient. Data journalism is a distinctive and specialised field; therefore, individuals with appropriate degrees and experience are essential, but such personnel are lacking. One participant contended, *“The biggest challenge or hurdle is the workforce. I do not think anyone in Malaysia has a degree in data journalism.”* Another participant expressed concern, stating, *“Training to existing faculty is burdensome and inadequate. We need specialised faculty, especially for practical courses.”*

Theme 3.3: Administrative challenges

Participants also indicated several administrative factors, such as approval from management for any course. Most significantly, management refused such proposals due to budget constraints. A participant lamented, *“You know the financial situation; universities are cutting their expenses, and data journalism needs a lab. A good lab means a heavy budget. So definitely, it is not possible.”*

While sharing personal experience, a participant said, *“Once I offered a course, management said, offer it and see the number of students, later the required items/resources would be provided. So, in this scenario, sometimes we wish but cannot do”*. The participants' narratives relate to challenges focused on students' interest in journalism, the lack of specialised faculty, the slow progress of new media in Malaysia, and budget constraints.

Theme 4: Recommendations: From journalism to data journalism education framework is required

The last part of the interviews asked participants to share their recommendations to initiate data journalism education. A participant suggested, *“Although it is a hard nut to crack, where students are not interested in enrolling, considering data journalism as a computer sciences domain and unavailability of expert people, I think we need to redesign journalism education to market it as a new brand and align the program according to students’ interest and market demands”*. The participant further elaborated, *“I think universities, higher education ministry and other related stakeholders need to sit together, engage media professional and prepare an education framework”*. Another participant shared, *“We need to identify the gaps, what is missing in our journalism education, why we do not attract students. Now, the youth is more comfortable with apps, visualisation and creation. However, we want them to write. Data journalism will interest students and potentially revive journalism education in Malaysia”*.

Two participants took a similar approach to making recommendations, reflecting the industry’s collaboration. One participant said, *“We need to engage professionals from the news industry, not only news writers but editors, creative people, designers, and analysis writers.”* Another participant said, *“At the moment, the journalism department can collaborate with statistics and computer departments to initiate data journalism, but administrative support and a vision are required.”*

DISCUSSION

In Malaysia, academic research on journalism education widely covers curriculum, job skills, teaching challenges, and students’ perceptions (Yusof et al., 2018). However, research in the emerging field of journalism, especially data journalism, has not been thoroughly explored academically. Therefore, this qualitative study, conducted through in-depth interviews, examined the narratives of journalism educators regarding data journalism, its current state, challenges, and recommendations. The analysis of the interviews revealed intriguing and thought-provoking insights that demand attention from policymakers and higher education management. Unfortunately, most universities do not include data journalism courses in their curricula. Among the participants, only one department offers an introductory course in data journalism. The absence of such a course indicates that journalism education in Malaysia is not sufficiently updated. The revision and upgrading of courses mainly aim to meet MQA requirements, and here, the role of MQA is also quite significant in expanding its guidelines.

Participants’ understanding of data journalism is unclear; they tend to associate it with web-based journalism and research-focused news. Data journalism is not a new concept, nor is it a product of modern high technology. It is recognised as “computer-assisted reporting” or CAR, an organised and systematic approach to utilising computers for collecting and analysing data to enhance news reporting (Heravi, 2019). CAR was first employed in 1952 by CBS to forecast the presidential election results. Subsequently, American journalists in the 1960s began independently monitoring public records databases using scientific methods, primarily for investigative reporting purposes. In the 1970s, it was termed “precision journalism,” denoting the use of scientific data collection

and analysis techniques to pursue objectivity and truth. The modern trend of data journalism was reflected in the 1980s when two American journalism professors, David H. Weaver and Maxwell E. McCombs, explored the relationship between journalism and social science (Weaver & McCombs, 1980).

So, the literature and discussion related to data journalism have existed for over four decades. However, the interpretations of data journalism among the participants are unclear, which implies their lack of knowledge. Furthermore, a few participants admitted that they do not possess the requisite skills for teaching data journalism. However, a few other participants, based on their research skills, claimed that they could teach data journalism. Though the research skills, statistical analysis, and reporting of results are helpful, data journalism's technical side is more overwhelming. Therefore, looking at data from big data needs additional skills, which were not observed among the participants. Thus, there is a need to improve workforce frameworks and occupational standards to make Malaysian educators comfortable using emerging technologies (Azman Shah et al., 2021).

The National Skills Development Act 2006 [Act 652], also known as the National Occupational Skills Standard (NOSS), is aimed at the skills development ecosystem in Malaysia. Data journalism and skill gaps can be redefined through on-the-job training and industry participation. Looking at the current situation of journalism education, the educator's skills must be enhanced according to the changing dynamics of the industry. The exponential growth of technologies is causing further changes in journalism practices, such as collecting information, writing, distribution and presentation (Splendore et al., 2016). This continuity and changes are happening around the globe, and computational techniques to sift through and analyse datasets have moved to developing countries and changed the media landscape. Therefore, the Malaysian journalism education framework includes these parameters as well.

With regard to challenges, several issues hinder the initiation of data journalism courses. One is the low enrolment in journalism programs, and universities not allocating the necessary budget to upgrade labs required for data journalism and hire specialised faculty. Another aspect of the slow progress of journalism education heavily rests on the news media landscape in Malaysia. According to the participants, the decline in journalism education is due to the limited scope of the media industry in Malaysia, where job opportunities are limited. Despite numerous efforts 2000 onwards to groom diversified and commercial media in Malaysia to have quality content, democratic public opinion and employment opportunities were not met. However, the pace of media in Malaysia did not remain as expected, partially due to government policy and constraints on freedom (Tapsell, 2013). Though Malaysia respects the freedom of the press, the freedom provided by the constitution is not adequate and is limited by certain constraints passed by the Malaysian parliament.

Moreover, the lack of investment in journalism research and innovation further compounds the issue. Media organisations and universities have not forged meaningful partnerships to co-develop curricula or offer internship programs focused on data journalism. This results in graduates being inadequately prepared for industry expectations, contributing to a cycle of underemployment and lack of motivation among students. In contrast, countries that have embraced data journalism, such as the United States, the United Kingdom, and parts of Europe, have witnessed fruitful collaborations

between academia and the media sector that foster a pipeline of talent well-versed in data storytelling, coding, and investigative techniques (Appelgren & Nygren, 2014; Gray et al., 2012). By studying these models, Malaysian institutions can localise best practices and strategically implement them in their context.

Additionally, there is limited awareness of available technological tools that support data journalism. Tools such as Tableau, Flourish, Google Data Studio, and programming languages like Python or R are largely absent from the Malaysian journalism syllabi. Integrating these tools can demystify data work and make the subject more engaging for students. Faculty upskilling in these tools through micro-credentialing or collaboration with digital journalism hubs is crucial. Moreover, national journalism conferences and forums could prioritise data journalism tracks to cultivate interest and encourage interdisciplinary discussion. These steps will help break the siloed nature of journalism education and allow Malaysian institutions to gradually evolve in tandem with global trends. Furthermore, journalism programs have more written-based content, which students find boring and opt for a more interactive, practical discipline that ensures job opportunities. Proper planning and a framework committed to promoting data journalism are required. Collaboration between the department and industry within the university is the only way to renew journalism education. Data journalism education has the potential to revive journalism education; however, considering the current economic and media landscape, it is challenging to make this dream a reality.

The findings of this study underscore a significant gap in the integration of data journalism into Malaysian journalism education. This gap is characterised by limited faculty expertise, insufficient institutional support, and a lack of curricular innovation. Most educators appear to be at the early stages of Rogers' Innovation Diffusion Theory, specifically within the knowledge and persuasion phases. They demonstrate awareness of data journalism but lack the necessary skills and institutional incentives for its effective implementation. Additionally, administrative and financial constraints obstruct the innovation-decision process, hindering progress toward the later stages of implementation and confirmation. The lack of interdisciplinary collaboration and outdated curricula further indicates a low level of organisational innovativeness, which is crucial for the spread of innovations within social systems. These systemic challenges are exacerbated by weak communication channels between academia and the media industry, limiting the exchange of knowledge and best practices that are essential for advancing data journalism as an educational innovation. Therefore, in alignment with the Innovation Diffusion Theory, this study highlights the pressing need for institutional reform, targeted faculty development, and enhanced industry-academia connections to promote the adoption and integration of data journalism education within Malaysia's higher education sector.

To move forward, this study proposes a simple and actionable three-step plan. First, universities should start small by embedding basic data skills such as data sourcing, verification, and simple visualisation into existing journalism courses. This should be accompanied by short training sessions for faculty and collaboration with departments like computer science or statistics to share expertise. Second, institutions can build structure by introducing standalone data journalism courses and inviting media professionals to conduct guest lectures or mentorship sessions. Updating learning outcomes and accreditation requirements to include data competencies is also essential. Third, it is important to ensure support by establishing dedicated centres or units focused

on data journalism training, curriculum development, and research. These centres can collaborate with the Ministry of Higher Education to obtain funding and align with national education policies. By combining theoretical insight with practical steps, this study not only highlights the challenges in implementing data journalism education in Malaysia but also offers a realistic and progressive path toward reform. These actions have the potential to revitalise journalism education and better prepare students for the demands of a digitally-driven media industry.

CONCLUSION

In conclusion, this research sheds light on the status and challenges of data journalism education in Malaysia, filling a significant gap in the literature and providing valuable insights for educators, policymakers, and industry stakeholders. The study underscores the evolving nature of journalism education, emphasising the need for innovation and adaptation to meet the demands of a changing media landscape. Through in-depth interviews with journalism faculty members, it became evident that there exists a notable deficiency in both knowledge and skills pertaining to data journalism among educators. However, their expressed eagerness to enhance their capabilities underscores a willingness to adapt to emerging trends in journalism.

Furthermore, the absence of specific data journalism courses within Malaysian universities reflects a broader trend of stagnation in journalism education, exacerbated by challenges such as workforce insufficiency and administrative constraints. The decline in journalism education is compounded by a shifting focus towards industries like advertising and public relations, which offer perceived employment opportunities for graduates. Additionally, limited cross-disciplinary collaboration, lack of strategic vision, and inadequate institutional support further hinder the development of comprehensive and robust data journalism programs across institutions. These structural limitations must be addressed through policy reforms and targeted investment.

In short, this study serves as a call to action for concerted efforts towards revitalising journalism education in Malaysia, ensuring its relevance and effectiveness in the face of rapid technological advancements and evolving media landscapes. By implementing the proposed recommendations and fostering a vision for the future of journalism education, Malaysia can position itself at the forefront of data journalism education in the region, ultimately equipping future journalists with the tools necessary for impactful and data-driven reporting.

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Iffat Ali Aksar (Dr)

is an assistant professor at the School of Communication, Xiamen University. Her research focuses on media and technology in areas like journalism, culture, and gender. She earned her PhD in Communication Studies from Universiti Malaya, where she studied how social media affects women's psychological well-being and online social capital in Pakistan. Her work highlights how digital platforms can reinforce cultural norms and digital patriarchy. She has published widely in top academic journals, including *Digital Journalism*, *Journalism Studies*, *Online Information*, *SAGE Open*, and other Web of Science (WoS) journals.

Ayesha Siddiqua (Dr)

is currently an associate professor at the Department of Media and Communication Studies, NUML Islamabad. Her primary areas of focus include media framing practices, war/conflict journalism, ethnocentrism, peace and war journalism, cyber hate, and gender, and post-pandemic discourses.

Muhammad Zaiamri Zainal Abidin (Dr)

is a senior lecturer at the Department of Media & Communication Studies, Faculty of Arts and Social Sciences, Universiti Malaya. His expertise is in Strategic Communication and New Media & Elderly. He has more than 10 years of research experience in a variety of research projects.
