



IBC2023

AI POWERED EDITORIAL SYSTEMS & ORGANISATIONAL CHANGES

D. Arets., M. Brugman., J. de Cooker, NL

Fontys University Applied Sciences, Netherlands

ABSTRACT

Journalists work with an editorial system daily; they use it to process their articles, communicate with colleagues, and produce and archive content. Yet even though editorial systems are the heart and backbone of the journalistic process, they are underexposed within innovation processes and journalistic research. This is remarkable because technological developments-amongst others, the rapid rise of Artificial Intelligence, offer numerous opportunities to revitalize editorial systems. In addition, new (hybrid) journalistic ways of working and operating call for a redesign of the editorial system.

In our research, 'The Editorial Portal,' a mixed group of experts from Fontys University of Applied Sciences (software engineers, AI experts, journalism researchers, and design researchers) investigated opportunities for a future-orientated editorial system where both organizational and technological transformations are considered. We understood that design methods, including context mapping, are suitable for identifying the relationship between editorial, system, corporate culture, and future developments. Journalists from four Dutch regional newsrooms consulted in this study call for a more intelligent system that encourages collaborative and creative working methods. Journalists, however, should be co-designing this new editorial system.

INTRODUCTION

Editorial systems are underexposed in journalistic research, which is strange because these systems are the basis of the journalistic process. The sparse studies available stress that editorial systems are the backbone of the journalistic process (Holmberg, 2002). According to Holmberg (2002), editorial systems serve multiple essential purposes, like providing editors with a toolkit to select and sort information quickly, minimizing parallel work, facilitating efficient information flow between staff members, controlling production workflow, and managing scheduling and resources. Furthermore, editorial systems are crucial for newsroom collaboration as they facilitate work processes and communication between journalists, final editors, and production (Marjoribanks, 2000, 2003).

The crucial role of editorial systems came to light during the COVID-19 pandemic, in which journalists were forced into hybrid work. Recent research by Reuters indicates that hybrid working heavily impacted the newsroom culture. Those on the news floor and those sitting at home don't have equal forms of participation in the news process (Cherubini et al., 2021), resulting in organizational and technical challenges, amongst which working with editorial systems. The current editorial systems are not well-equipped to facilitate hybrid newsrooms (Cherubini et al., 2021). In the Netherlands, many news environments switched to Microsoft Teams to enable home working and video calling.

On top of this, Artificial Intelligence's rapid advancement challenges journalism in all its facets including the journalistic editorial system. AI-driven tools for transcribing, translating



or image-editing tools, are introduced to the newsroom. However, the current editorial systems in Dutch regional news outlets are not yet geared toward working with AI.

The need for new, more hybrid operating systems, coupled with the rapid evolutions around AI, prompted Dutch regional news outlet Omroep Flevoland, in collaboration with regional outlets Omroep West, RTV Utrecht, Omroep Rijnmond, and Omroep Zeeland, to commission Fontys University of Applied Sciences to investigate future-orientated news systems.

For this one-year research project, Fontys researchers of the Professorship Journalism and Innovation, and the Professorship Design and Interaction, teamed up. Thus, the team consisted of 2 journalism researchers, one software engineer, 2 UX designers, and one innovation researcher. Next to this, journalism students (4), students software engineering (12), and media design (10) were included.

The overarching question of our project was:

Q. 1, *What organizational, technical, and functional requirements must be incorporated in a future journalistic editorial system to adequately and responsibly respond to hybrid and more AI-orientated news practice?*

To answer this question, we composed four research groups:

Group 1 consisted of journalism researchers from the Professorship of Journalism and Innovation who focused on mapping journalists' current workflow with the editorial system and mining the needs towards a future-orientated system.

Group 2: consisting of software engineering students and lecturer-researchers from the professorship of Design and Interaction, focused on investigating the system design around an AI-driven editorial system.

Group 3, consisting of design and interaction students and a lecturer-researcher from this department, investigated the UX requirements of such a system.

Finally, Group 4 consisted of the principal investigators of all teams and project managers of the participating news outlets. This group focused on investigating journalistic organizational developments concerning the editorial system.

The groups worked in parallel and exchanged results and insights through six-weekly meetups. In this way, research on mapping the journalistic process by research group 1 was supported by the UX research of group 3 and vice versa. The process of mapping the software structure of research group 2 fueled the qualitative interviews with journalists by researchers of group 1 and challenged group 4 to dive into future-orientated organizational structures.

Although all groups used their own research methods (ranging from more ethnographic and qualitative research for group 1, AI engineering in group 2 and UX design research in group 3), all four groups followed a research trough design process, where prototyping and development of tools went together with reflection (Teashakkori, Creswell, 2007).

For readability, the combined insights of all four groups are processed below in three phases: phase #1 maps current ways of working with editorial systems. Phase #2 identifies de possibilities and wishes around the future system with AI developments, and phase #3 explores editorial systems in relation to new organizational news structures.

PHASE #1: MAPPING WAYS OF WORKING WITH EDITORIAL SYSTEMS

Regional broadcasters in the Netherlands regularly cooperate; data are shared between (adjacent) regions, and exchanges occur regarding organization and knowledge development. In addition, there is cooperation with the National Broadcasting Foundation (NOS). Where editorial systems are concerned, however, there is yet sparse cooperation. This is understandable as there are four different editorial systems in circulation at regional broadcasters; some regional outlets use the Dalet system, others work with Nimbus or Nis, and others work with the INOS system developed and used by the NOS.

To properly understand and interpret how journalists interact with their editorial systems, we used a combination of desktop walkthroughs (Auricchio et al., 2022) and semi-structured interviews in the first phase of our research. Desktop Walkthrough is a valuable method because everyday actions often occur intuitively or subconsciously can be discussed. In this way, even seemingly trivial elements or intuitive operations- that often remain undiscussed in an interview setting- can still be addressed.

We observed and interviewed 22 newsroom professionals (online editors, anchors, archivist, producers, designers) from 4 regional news outlets. We asked the consulted journalists to carry out daily activities in their work context. Meanwhile, we gave them small tasks such as how to start up the system, the tabs they have open beside the editorial portal, how they communicate with colleagues, how an item is edited for social media and how it is processed for a TV, Radio and Online production, and, finally how an item is archived. We filmed the whole process with our phones (figure 1).

Subsequently, we interviewed the journalists using a topic list. We discussed how the editorial system facilitates the current work process, the merits, possible frustrations, and annoyances of the existing portal, and the desires for a future strategy. The filmed fragments were discussed during the interview to clarify operations or workarounds. We also zoomed in on changing routines during the Covid pandemic, when many newsrooms started using Microsoft Teams in addition to their approach to facilitating remote working.



Figure 1: Desktop Walkthrough at four Dutch regional news outlets

Insights Phase #1

- **Opportunities to better streamline editorial system with journalistic practice**

Except for two consulted journalists who describe their system as 'fine and pleasant,' most interviewees are indifferent to their editorial system, with about four respondents showing apparent resistance.

"Do we have to talk about the system? We don't have a say in this?"

"Do you want to talk about the system? Then, it would be best if you asked our tech colleagues."



This corresponds to Brautovic (2009) research, which points to resistance to editorial systems because the journalist is hardly involved in the development and implementation. This makes them feel no ownership. Furthermore, Brautovic points out that most systems are dominantly tech-orientated; as a result, many applications do not streamline with journalistic practice.

The latter aspect also becomes evident from the desktop walkthrough analyses. A vast majority of journalists perform operations outside the editorial system. For instance, all consulted journalists have at least three extra tabs open in addition to the editorial system. Besides a tab with an online search engine, this includes, for instance, the police channel or a communication tab (primarily social media). Moreover, additional software programs are active in the browser, such as Excel for data processing, Photoshop for image editing, Adobe for video editing, and Microsoft Teams for video calls.

The 22 journalists consulted all indicate it would be desirable if an editorial system could better integrate software and channels used.

When discussing the design and interface of the editorial system, at least six journalists mentioned that they prefer working on a 'clean sheet.' Their current system -equipped with numerous functionalities- is causing too much distraction and arousal.

"This is developed from a technical point of view; that you can design these functions doesn't mean you should. As a journalist a rather like it to be simple and clean."

- **AI empowered newsrooms**

The number of clicks is among the most frequently mentioned frustrations in interviews. A journalist must repeatedly click between the mandatory input fields to create a journalistic item. For instance, a journalistic online article has a headline, a subheading, a lead text, an image, and an author, all elements to which a specific input field is made, requiring 'a click' movement. A particular challenge here is archiving. More than half of the consulted journalists mentioned filing an article causes too much time (and frustrations); logging a report with the required metadata is considered too time-consuming.

"We have to enter almost ten fields. I often don't feel like or have time for that. I would rather like this to be done automatically."

"I find entering time, location, and people more than enough information. Other information should be done automatically."

At the same time, all interviewees indicate that the archive is poorly searchable, which they attribute to its poor maintenance. One of the consulted archivists mentioned It would save a lot of work and frustration if metadata were added automatically. *"Editors do not consequently add the metadata necessary for the archive; that's why you can hardly trace information."*

Aside from a smart archive, more opportunities are seen for intelligent applications in the editorial system. For example, interviewees (14 out of 22) mentioned opportunities for a better system to publish news to various channels, automatically adapting the content and image to the design requirements of the specific medium.

"It would be helpful if a text could be automatically adjusted for the various social channels."

"If we could just click one button for an item to be fit for Facebook, Instagram, or Twitter."



- **Communication & Collaboration**

Research by Marjoribanks indicates that editorial systems impact working relations (Marjoribanks, 2000, 2003). An editorial system interacts with working methods, people's routes, and routines and defines the conditions for interaction. Robinson (2011) finds that virtual environments correlate with the physical ones. Online spaces operated as extensions of the physical newsroom, and relationships that develop in 'virtual platforms' translate into the physical newsroom (2011:1132). However current editorial systems support that relationship between the physical and online domains; at least that was evident during Covid in which working relationships were disrupted because those working remotely lacked alignment with the physical workspace (Cherubini et al., 2021).

As for more than half of the consulted journalists, the current editorial systems do not adequately support communication, collaboration, or planning. In the observed newsrooms, only one primarily uses the editorial system for communication. One newsroom works with a separate Trello system for communication and team planning, and one newsroom communicates mainly with Microsoft teams. All journalists consulted indicate that they also communicate with colleagues via social media, in addition to this. While this way of working clearly causes stress and some irritation, four interviewees mention it is inevitable: *"It's just a sign of the times"*.

One respondent cites Microsoft Teams as an example to streamline communication better. *"The calendar function and your communication are close together. You can also see if your colleague already has an appointment. That makes things clear."* A journalist also mentioned that working with Microsoft Teams during the Covid Pandemic introduced them to the convenience of working together in a file. *"In our current system, you cannot work in a file simultaneously. I think that's a prerequisite for an editorial system if you would like to support collaboration."*

PHASE #2: MAPPING FUTURE EDITORIAL SYSTEMS

In all four investigated regional outlets, there are experiments around AI in story discovery, research and verification. However, these AI tools and applications are yet not integrated in the editorial portals. How do journalists themselves envision an AI-driven editorial system? What functionalities does this system have, and moreover, how does it appeal to new journalistic ways of working and practices? To investigate this, we organized four context mapping (Visser et al., 2005) workshops at the four news outlets.

Context mapping (Visser et al., 2005) captures contextual information of users interacting with the system. This form of generative research helps elicit emotional responses from the participants, reveal tacit knowledge, and expose latent needs (Sanders & Stappers, 2014). Furthermore, in contrast to more common research methods like interviews or focus groups, which reveal current and past experiences, context mapping can provide insights into future desires as small evocative tasks help to spark ideas around the desired future.

We designed an interactive workshop in which AI-driven tools were visualized through a card deck. Based on insights from the interviews and our AI inventory, we designed 8 AI tools:

- 3 tools that are easy to integrate from both a technical and an organizational point of view. This involves an intelligent archive tool that automatically files metadata of media productions for the archive, thus taking frustrating work and clicking out of the journalist's



hands. Furthermore, an AI-driven tool to integrate various experts in creating the news process, which supports the diversity of experts and a tool for sentiment analyses of social media with which journalists can get a quick overview of topical sentiments.

- 2 tools that are easy to integrate from a technical point of view but are organizationally challenging, like a 'smart planner' that makes appointments considering personal and team agreements and schedules, eliminating unnecessary communication. This tool, however, requires all employees to share their calendars-including personal meetings.

Furthermore we presented a 'responsive text editor' that could write articles based on previous text, like Chat GPT. However, this requires organizations to have a clear view on how to responsibly operate with AI in text generation. Introducing AI in newsrooms calls for algorithmic literacy (Deuze, Beckett, 2022), 'algorithmic transparency' (Diakopoulos & Koliska 2017, p. 812) and 'algorithmic accountability' (Arets, De Cooker, Wernaart, 2023).

- 1 tool that is easier to implement yet technologically underdeveloped. This concerned a digital twin tool with which any invited guest can be presented in a TV show without being physically present.

- We finally presented 2 tools that are more future-orientated and both organizationally and technically challenges, like smart drones serving automatically recording events and a hybrid news studio that can be situated anywhere.

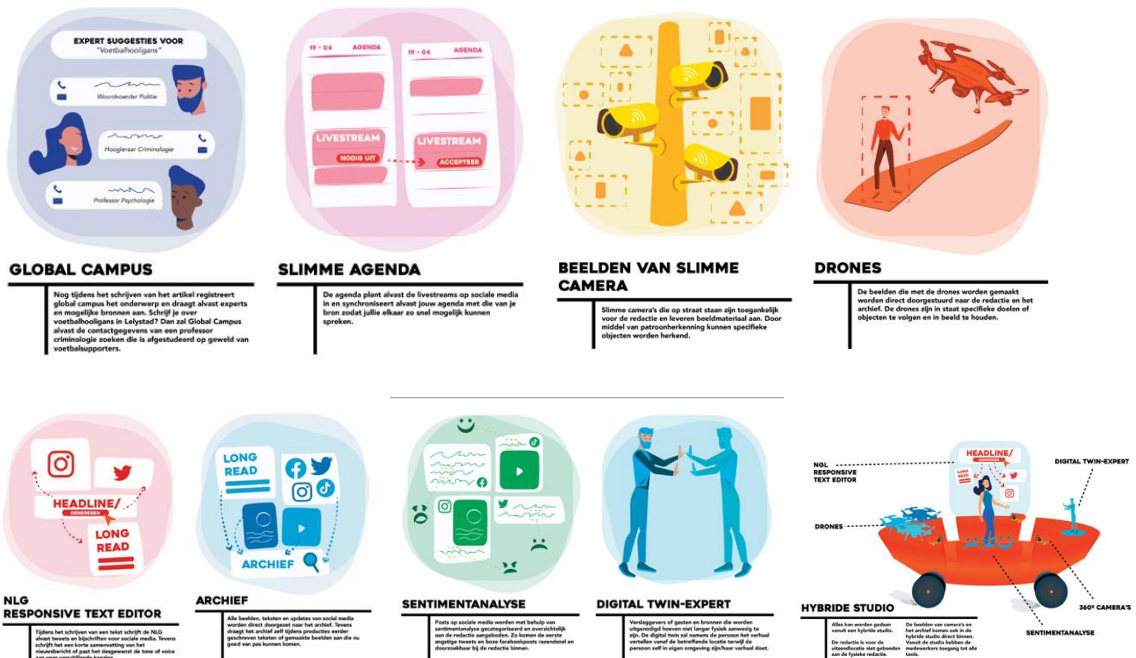


Figure 2: tools used in the context mapping workshop, designed by Floor van der Wal

In a 1.5-hour workshop, eight professionals from the regional news outlets (a mix of journalists, final editors, producers, and online editors) were challenged to create two journalistic productions using these tools. In addition, we asked the participants- paired in two groups of 4 people with mixed expertise (editor, planner, producer, technical expert)- to draw a story scenario utilizing the presented tools.



The first group was given a scenario of a news incident (scenario #1), the second group was asked to produce an investigative report (scenario #2).

#Scenario 1: A journalistic report assumes football supporters have been terrorizing the region for weeks. Social media research has revealed that a riot will take place soon. The challenge is to turn that riot into a report.

#Scenario 2: In a press conference announced, Minister Hugo de Jonge (Housing & Spatial Planning) will say that the set targets for building houses will not be met. Furthermore, due to nitrogen laws and high construction costs, large-scale brewing projects are being halted and postponed.

For 40 minutes, journalists had to investigate, create and produce a news item utilizing the tools. For this, they were given all tool cards. Each card describes the device and how it can be used. Then, the team was asked to draw a story, deciding whether to use these tools and which team members should be involved.

Two researchers took notes of the conversation in both groups during the sessions. Then, the teams presented their stories in a plenary session, followed by a joint reflection session.

Insights Phase #2

All groups see the intelligent archive and the 'smart planner' as immediately deployable and meaningful for the future news process. We noticed that AI-driven text tools, such as quickly compiling an initial template message with a responsive text editor and sentiment analysis, are considered by almost all groups (6 out of 8) with little/ Only two journalists show resistance. One mentions it could not be introduced yet as the organization is not fit for automated text writing.

We would have to redesign our process if we used automatic text generation. We should then first set up clear checks and balances and become-as an organization- more knowledgeable on AI.

Another is dismissive, as he fears for the creative aspect of the profession. *We should not want this tooling. Writing is our business. I can see perfectly well that a responsive text editor can fill a template, but please, let's keep the fun aspects of our craft in it.*

Most consulted journalists are showing cooperation towards new AI driven tooling. They see it as a welcome addition to the simple-and sometimes mind-numbing work. They also see many opportunities for text generation when adapting texts for social channels. However, they all express they should update their knowledge concerning the responsible use of AI to avoid biases or mistakes.

The smart drone camera is omitted in almost every scenario except for one group. Most journalists mentioned that this tool has no added value as drones are not allowed in public space and regarding privacy issues this is not desirable. One group, however, would like to use the smart drone especially for dangerous events, for instance when the soccer riots get out of control. However, this group also indicates that legislation should be amended to that end.

All groups used the sentiment analysis tool. The groups working on the short report would use it in order to quickly find out what the mood at the game would be like and which potential respondents should be interviewed. For the longer report, two groups deployed the sentiment analysis tool to support the research process., The two groups that did not use this tool indicated in the reflection session that it would certainly be a desirable tool to



provide initial scanning of dominant emotions surrounding a story, though they doubt the credibility of these tools. One final editor is very critical: *I doubt that this might suck you into a filter bubble. The people reporting on social media are not the whole audience. We really need to be vigilant about that.*

PHASE #3: MAPPING THE FUTURE NEWSROOM

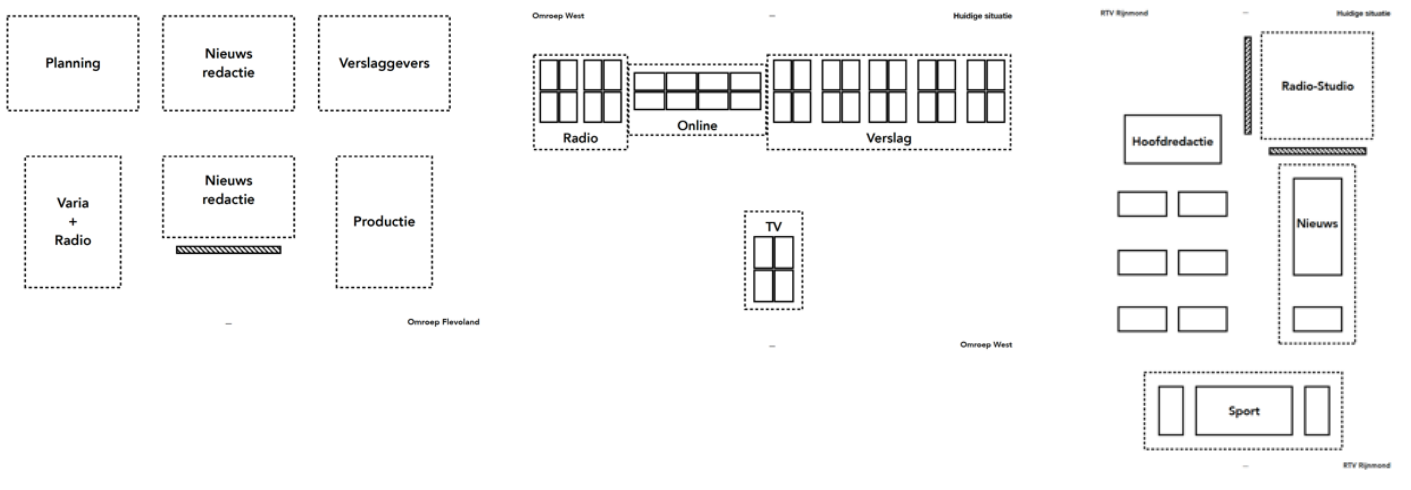
Finally, we looked at how journalists organize their future news process and how the system should facilitate it. To this end, we used sketching (Van der Lugt, 2005) as a method, combined with the insights extracted from the semi-structured interviews in Phase 1 and context mapping in Phase 2.

We asked journalists to sketch their current news space and place themselves in this space. If there is a hybrid working, this could be drawn with a dotted line. We then discussed these drawings in plenary. By physically drawing the situation, it quickly became apparent which parts of the newsroom are found most important. For instance, the technical department appears to be absent in many drawings. Sometimes this must be attributed to the fact that the technical department is on another floor or even in another building. Sometimes, the editor in question forgets to draw it.

Almost all drawings show an fragmented structure where the various experts sit together around themes (social media editors, sports editors, news editors) or the newsroom is structured around media output (radio, tv, online). Often the chief editor sits separately.

Next, we asked editors to draw the future newsroom (in 2030). These drawings were also discussed. In them, it is striking that almost all editors choose a space with more interconnectedness. There are fewer islands visible on these drawings; there is more of a central desk where the various experts 'plug in and out', at times online, at times physically. Some illustrations also feature a coffee bar in a central location where editorial and collegial conversations can occur.

In no drawing has the newsroom become redundant; the physical space is considered extra important in the plenary conversation. *"The importance of the meeting was demonstrated during Covid. Now that we can do this again, we all feel we must give that meeting even more weight. The future newsroom should facilitate this even better."*





IBC2023

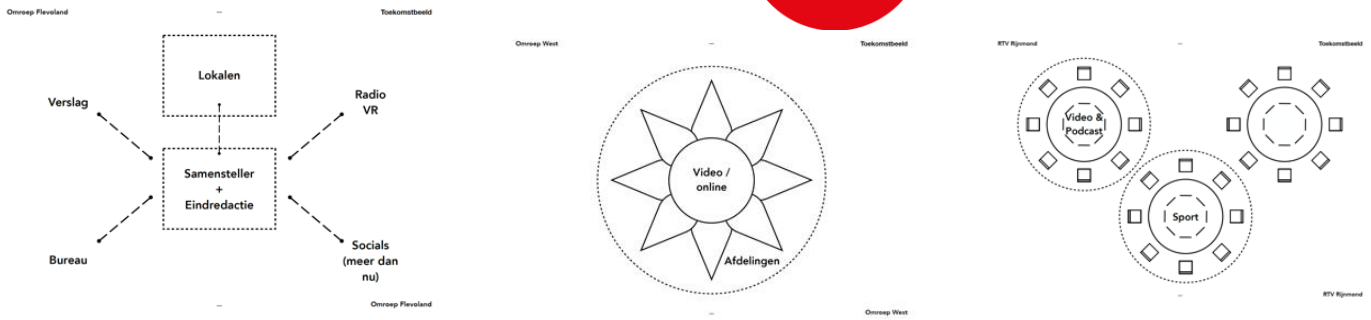


Figure 3: Newsrooms above: current situation of 3 newsrooms, below; preferred situation in 2030

When discussing the drawings of the 'future newsroom' plenary, the topic of interconnectedness appeared to be central; many indicated that there should be more collaboration between various disciplines. Some also draw this literally by having several multiple roles (social media editor, journalist, final editor) at one desk.

Furthermore, journalists refer to greater collaboration around a story that then has its manifestations through the various channels (TV, Radio, online). Now, editors from the various channels sometimes work separately on the same theme. This aligns with research on the future of story centric newsroom (Alba, 2020).

Finally, the journalists in these 'drawing' sessions clearly state that the editorial system must run hand-in-hand with physical newsroom developments. This means that the system should also focus more on mutual exchange, cooperation and organizing central meeting moments.

TO CONCLUDE

Our research shows that journalists assume the future Editorial Systems are AI-driven. Time-consuming tasks like editing articles for various media channels, archiving media content, and organizational planning could be made easier with AI tools. As for automated text writing, research and verification hesitation is visible. Opportunities are certainly seen here, but integrating these tools into the system requires more knowledge of AI and better control and monitoring.

Furthermore, journalists consider it of utter importance that the look and feel of this system should be in line with the journalistic process and not contain too many functionalities. In addition, the editorial system must respond to future organizational developments in which journalists will increasingly collaborate and multidimensional instead linear storytelling is paramount. As the future newsroom will continue to work in a hybrid fashion; something that has become part of news practice since the pandemic, the editorial system should facilitate this. This does not alter the fact that both the physical and digital news space-and thus the editorial system-will have to actively engage in collaborations and facilitate them.

As we noticed editorial systems are underexposed in research, we hope this study contributes to further investigating this area of interest from a multidisciplinary point of view.



REFERENCES

- Alba, R. (2020, November). The Challenges of Adapting News Production to the New Reality. In *SMPTE 2020 Annual Technical Conference and Exhibition* (pp. 1-7). SMPTE.
- Arets, D., De Cooker, J., Wernaart, B, Al hoort in de beroepscodex, NRC Handelsblad (19-04-2023)
- Auricchio, V., De Rosa, A., & Göransdotter, M. (2022). 5. Experiential ways of mapping: revisiting the Desktop Walkthrough. *DESIGN INTERNATIONAL SERIES*.
- Brautović, M. (2009). Usage of newsroom computer systems as indicator of media organization and production trends: Speed, Control and Centralization. *Medijska istraživanja: znanstveno-stručni časopis za novinarstvo i medije*, 15(1), 27-42.
- Broussard, M., Diakopoulos, N., Guzman, A. L., Abebe, R., Dupagne, M., & Chuan, C. H. (2019). Artificial intelligence and journalism. *Journalism & Mass Communication Quarterly*, 96(3), 673-695.
- Cherubini, F., Newman, N., & Nielsen, R. (2021). Changing newsrooms 2021: Hybrid working and improving diversity remain twin challenges for publishers.
- Deuze, M., & Beckett, C. (2022). Imagination, Algorithms and News: Developing AI Literacy for Journalism. *Digital Journalism*, 10(10), 1913-1918.
- Diakopoulos, N., & Koliska, M. (2017). Algorithmic transparency in the news media. *Digital journalism*, 5(7), 809-828.
- Holmberg, S. A. (2002). Editorial systems for multiple channel publishing. Master Thesis. Stockholm: The Royal Institute of Technology.
- Marjoribanks, T. K. (2000) *News Corporation, Technology and the Workplace: Global Strategies, Local Change*. Cambridge: Cambridge University Press.
- Marjoribanks, T. (2003) "Strategizing Technological Innovation: The Case of News Corporation", 59-75. U: S. Cottle: *Media organization and production*. Sage.
- Pashevich, E. (2018). *Automation of news production in Norway: Augmenting newsroom with artificial intelligence* (Master's thesis).
- Pavlik, J. V. (2023). Collaborating With ChatGPT: Considering the Implications of Generative Artificial Intelligence for Journalism and Media Education. *Journalism & Mass Communication Educator*, 10776958221149577.
- Robinson, S. (2011). Convergence crises: News work and news space in the digitally transforming newsroom. *Journal of Communication*, 61(6), 1122-1141.
- Tashakkori, A., & Creswell, J. W. (2007). The new era of mixed methods. *Journal of mixed methods research*, 1(1), 3-7.
- Van der Lugt, R. (2005). How sketching can affect the idea generation process in design group meetings. *Design studies*, 26(2), 101-122.