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Digital transformation of journalism education through a pedagogical and technological lens

Article's History:

Received: 24.11.2025
Revised: 30.03.2026
Accepted: 25.05.2026
Published: 29.06.2026

Suggested Citation:

Mykolaichuk, A. (2026). Digital transformation of journalism education through a pedagogical and technological lens. *Scientific Bulletin of Mukachevo State University. Series "Pedagogy and Psychology"*, 12(2), 35-46. doi: 10.52534/msu-pp2.2026.35.

Abstract. Contemporary journalism education is undergoing transformation under the influence of digital media ecosystems, platform communication, data-driven news production, and artificial intelligence; however, the integration of digital literacy, ethical reasoning, professional values, and resilience-oriented competencies in curricula remains insufficiently systematised. The purpose of the study was to analyse pedagogical and technological dimensions of journalism education transformation in the digital media era and to substantiate an integrated competency-oriented framework for professional training. The research used historical-pedagogical analysis, comparative analysis, and a systemic approach. The empirical basis consisted of recent peer-reviewed publications and selected curriculum materials representing different regional contexts. The study identified three stages in the development of journalism education: industrial newsroom-centred training, multimedia journalism education, and digital journalism education shaped by artificial intelligence, data analytics, and algorithmic communication. The results showed that contemporary journalism curricula increasingly combined classical professional values with digital storytelling, data journalism, audience analytics, artificial intelligence literacy, verification culture, and ethical decision-making. The comparative analysis demonstrated that European models mainly emphasised responsible innovation and interdisciplinary learning, Turkish programmes reflected policy-driven technological modernisation, whereas Ukrainian journalism education combined digital competencies with resilience-oriented preparation under conditions of information warfare and crisis communication amidst the full-scale invasion and Russia's war against Ukraine. The practical value of the study lay in clarifying competency blocks and pedagogical priorities that can be used for curriculum renewal, course design, and the development of future empirical research on artificial intelligence integration in journalism education

Keywords: curriculum modernisation; digital pedagogy; artificial intelligence literacy; higher education; professional competencies; crisis communication

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INTRODUCTION

The rapid expansion of digital technologies has reshaped the professional role of journalists and transformed the educational requirements for journalism training. Journalism is no longer limited to traditional newsroom routines, print-centred communication models, or linear forms of news production. Contemporary journalistic practice develops within digital media ecosystems shaped by multimedia storytelling, platform infrastructures, data analytics,

algorithmic distribution, automated content production, and artificial intelligence. These changes directly affect journalism education and require universities to reconsider not only the content of professional training but also curriculum design, pedagogical strategies, competency models, and ethical preparation.

Recent research has increasingly examined how journalism education responds to digital and AI-mediated



professional change. M.S. Hossain & D. Wenger (2024) analysed whether journalism education has kept pace with digital transformation, while M.S. Wenger *et al.* (2025) showed that AI affects not only newsroom skills but also curriculum design, ethical preparation, faculty readiness, and institutional decision-making. V. Katzenberger (2024) focused on the gap between digital skills and journalism curricula, whereas M. Severijnen & Y. de Haan (2024) proposed future-oriented scenarios for journalism education in a changing media landscape. Together, these studies indicate that journalism education modernisation should be understood not merely as the addition of new technological subjects but as a broader transformation of professional competencies and pedagogical models. Artificial intelligence has become one of the most influential factors in this transformation. Generative artificial intelligence (AI) tools are increasingly used in newsroom routines, media education, content production, and experimental forms of digital storytelling (Pavlik, 2023; Cools & Diakopoulos, 2024; Sánchez-García *et al.*, 2025). At the same time, AI integration creates new pedagogical and ethical challenges. Journalism students must learn not only how to use AI-supported tools efficiently but also how to evaluate their limitations, identify algorithmic bias, ensure transparency, avoid misinformation, and preserve professional responsibility in automated or semi-automated communication environments (Miao & Holmes, 2023; Porlezza & Schapals, 2024).

The development of artificial intelligence in education also highlights a broader pedagogical issue. In recent journalism and media research, AI literacy has increasingly been conceptualised as a professional, critical, and ethical competence. M. Jaakkola & J. Wiik (2025) showed that journalism educators' preparedness to teach AI depends not only on technical knowledge but also on the pedagogical domestication of AI tools within existing educational structures. T. Hollanek *et al.* (2025) further emphasised critical AI literacy as a condition of responsible reporting, transparency, and public accountability in AI-mediated media environments. Therefore, AI literacy in journalism education should be interpreted not as an isolated technical skill but as a multidimensional professional competence that combines technical awareness, critical evaluation, ethical reasoning, and responsible application. This is especially relevant to journalism education, where digital tools must be connected with professional values such as accuracy, verification, independence, public accountability, and ethical responsibility.

The problem addressed in this study is that, although digital media and artificial intelligence have become central to contemporary journalism practice, journalism education still lacks an integrated pedagogical framework that connects technological training, ethical reasoning, data-oriented competencies, and resilience-oriented professional preparation. Existing research has often examined digital skills, data journalism, AI-assisted media production, curriculum modernisation, or media ethics as separate areas. However, these dimensions are not always considered as

interconnected components of a holistic educational model. As a result, the relationship between technological competencies, pedagogical strategies, professional values, and the changing identity of future journalists remains insufficiently systematised. This problem is particularly significant in the Ukrainian context. Ukrainian journalism education develops under the simultaneous influence of global digital transformation and the specific challenges of wartime communication, information warfare, disinformation, digital instability, and crisis reporting. Recent Ukrainian studies emphasise the growing importance of fact-checking, verification culture, related to open-source intelligence (OSINT) practices, AI-assisted learning, ethical responsibility, and resilience-oriented competencies in the training of future journalists. Thus, the Ukrainian case demonstrates that journalism education must prepare students not only for technologically advanced media production but also for responsible professional activity in high-risk information environments. International experiences show that journalism education modernisation follows different institutional and regional trajectories. European approaches increasingly emphasise ethical AI integration, interdisciplinary learning, critical media analysis, and responsible innovation. In Türkiye, journalism education reflects a stronger orientation toward policy-driven technological modernisation and the integration of AI-related disciplines into undergraduate and graduate curricula. These differences indicate that journalism education cannot be reduced to a universal set of digital skills. It should instead be analysed as a socio-technical pedagogical system shaped by technological change, institutional structures, professional cultures, and socio-political contexts.

The study aimed to analyse the pedagogical and technological dimensions of journalism education transformation in the digital media era and to substantiate an integrated competency-oriented framework for professional training. The objectives of the research were: to identify the major stages in the evolution of journalism education under the influence of digital media, data-driven communication, and artificial intelligence; to determine the key competency blocks required for contemporary journalism education, including traditional journalistic, digital, data-oriented, AI-related, ethical, and resilience-oriented competencies; to clarify the pedagogical logic of integrating these competencies into curriculum design, learning activities, and selected international models of journalism education modernisation.

MATERIALS AND METHODS

This study used a qualitative conceptual and comparative research design. It examined the transformation of journalism education under the influence of digital media ecosystems, artificial intelligence, data-driven communication, and changing professional requirements. The design was aligned with three research objectives: identifying the main stages of journalism education transformation, determining the key competency blocks required for contemporary

journalism training, and clarifying the pedagogical logic of integrating these competencies into curriculum design and learning activities. The study was not based on a survey, experiment, or statistical measurement. Instead, it relied on structured qualitative analysis of scholarly literature and selected institutional examples in order to identify conceptual patterns, competency transformations, pedagogical strategies, and regional differences in journalism education modernisation. The methodological framework combined historical-pedagogical analysis, comparative analysis, and a systemic approach. Historical-pedagogical analysis was used to trace the evolution of journalism education from industrial newsroom-centred training to multimedia and digital or AI-mediated models. Comparative analysis was applied to identify similarities and differences in journalism education modernisation across selected regional contexts. The systemic approach made it possible to conceptualise journalism education as a socio-technical pedagogical system shaped by the interaction of educational institutions, professional standards, digital technologies, artificial intelligence, ethical norms, and socio-political conditions.

The analytical basis of the study consisted of peer-reviewed scholarly publications, academic books, international reports, and selected curriculum materials related to journalism education, digital pedagogy, artificial intelligence literacy, data journalism, media ethics, and higher education transformation. The core literature was selected primarily from publications issued between 2019 and 2026, with priority given to recent studies published between 2022 and 2026. Earlier sources were included only when they provided foundational concepts relevant to journalism transformation, artificial intelligence in education, or algorithmic media systems. Sources were selected according to four inclusion criteria: relevance to journalism or media education; focus on digital, AI-related, data-oriented, ethical, or curriculum transformation; academic or institutional credibility; and usefulness for comparing different educational contexts. Publications were excluded if they focused only on general media industry trends without educational implications, described AI tools without connection to journalism training, lacked academic reliability, or duplicated arguments already represented in more relevant sources. To ensure consistency between the empirical extraction and the presentation of findings, the selected sources and institutional examples were analysed according to four predefined thematic directions. The first direction involved a historical-pedagogical analysis of journalism education transformation, tracing the shift from industrial to digital and AI-mediated models. The second direction focused on competency restructuring, systematically extracting data to map traditional, digital, data-oriented, AI-related, ethical, and resilience-oriented competencies into a unified pedagogical matrix. The third direction comprised a comparative analysis of regional modernisation patterns across Europe, Türkiye, and Ukraine to identify distinct institutional and pedagogical trajectories. The fourth direction involved the conceptual synthesis of the extracted

pedagogical, ethical, and technological components into an integrated educational framework. The analysis was conducted through a structured qualitative coding procedure. The extracted information was grouped strictly according to these four thematic directions, which provided the architectural basis for organising the results. Recurrent themes, differences between contexts, and pedagogical implications were compared across the corpus. This procedure made it possible to move from individual source interpretation to broader conceptual synthesis.

The comparative analysis focused on three selected contexts: Europe, Türkiye, and Ukraine. These contexts were chosen because they represent different trajectories of journalism education modernisation under the influence of digital technologies and artificial intelligence. The European context was analysed as an example of interdisciplinary, research-oriented, and ethically grounded journalism education. To address the methodological consistency of the comparative procedure, the Turkish context was analysed not only through recent scholarly studies but also through selected official curriculum materials from Turkish journalism and communication programmes. In particular, the analysis included journalism-related curricula from Istanbul University, Çukurova University, and Selçuk University. These institutional materials were examined according to the same analytical categories as the European and Ukrainian examples: digital competencies, data-oriented competencies, AI-related competencies, ethical reasoning, resilience-oriented preparation, and pedagogical or curriculum modernisation. Ukraine was examined as a context in which global digital transformation intersects with wartime communication, information warfare, disinformation, crisis reporting, and the need for resilience-oriented professional preparation. The comparison was conducted in four steps. First, selected sources were grouped by region and thematic focus. Second, each group was analysed according to the six analytical categories. Third, the identified features were compared in terms of dominant educational focus, key competencies, pedagogical models, professional values, and major challenges. Fourth, the findings were synthesised into comparative tables and interpretive categories reflecting the transition from industrial and multimedia journalism education toward contemporary digital and AI-mediated professional training. To ensure comparability, the three contexts were interpreted at the same analytical level: as regional examples of journalism education modernisation rather than as exhaustive national mappings of all journalism programmes. In each case, attention was paid to the relationship between technological change, curriculum priorities, competency formation, pedagogical strategies, and socio-political conditions. This approach allowed the comparison to remain focused on pedagogical patterns rather than on institutional statistics.

The study was conducted in five stages: specification of the research problem; formation of the source base according to inclusion and exclusion criteria; historical-pedagogical

analysis of journalism education models; comparative analysis of Europe, Türkiye, and Ukraine; and synthesis of the findings into an integrated competency-oriented interpretation of journalism education transformation. The study had several limitations. It is based on qualitative analysis of scholarly literature and selected institutional examples rather than on surveys, interviews, classroom observations, or quantitative curriculum mapping. Therefore, the findings should be interpreted as conceptual and comparative rather than statistically generalisable. Despite these limitations, the chosen methodology is appropriate for systematising current scholarly discussions, comparing different educational trajectories, and substantiating an integrated pedagogical framework for journalism education in the digital and AI-mediated media environment.

RESULTS

The analysis identified four interrelated results that clarified the transformation of journalism education in the digital media era. First, journalism education developed through historically overlapping models: industrial newsroom-centred education, multimedia journalism education, and contemporary digital or AI-mediated journalism education. Second, this transformation was expressed through the restructuring of professional competencies rather than through the simple addition of technological subjects. Third, Europe, Türkiye, and Ukraine demonstrated different pedagogical logics of modernisation shaped

by institutional traditions, policy priorities, technological readiness, and socio-political conditions. Fourth, the findings supported the development of a conceptual pedagogical framework that connected the digital media environment with curriculum transformation, competency blocks, pedagogical strategies, and the expected graduate profile. Evolution of journalism education models. The first result was the identification of three major models in the evolution of journalism education. These models should not be understood as strictly separated historical periods because their elements may coexist within contemporary curricula. However, they reflect different dominant logics of professional preparation: the industrial model is based on stable newsroom routines and print-centred professional training; the multimedia model responds to internet-based publishing and online storytelling; and the digital or AI-mediated model is shaped by data journalism, platform logic, artificial intelligence literacy, algorithmic communication, and ethical decision-making in automated or semi-automated media environments (Solkin, 2020; Severijnen & de Haan, 2024; Westlund *et al.*, 2025). Table 1 shows that journalism education has moved from a relatively stable professional model toward adaptive and interdisciplinary training. In the contemporary model, students are expected not only to produce media content but also to understand digital infrastructures, work with data, evaluate AI-supported outputs, and preserve professional values under conditions of technological uncertainty.

Table 1. Evolution of journalism education models

Criteria	Industrial Model	Multimedia Journalism Model	Digital / AI-Mediated Journalism Model
Dominant media environment	Print-dominated mass communication and traditional broadcasting	Internet media, online publishing, multimedia platforms	Hybrid digital ecosystems shaped by platforms, algorithms, data, and artificial intelligence
Core educational focus	Professional routines, writing, editing, and newsroom discipline	Multimedia production, digital storytelling, and online journalism	Data-driven journalism, AI literacy, algorithmic awareness, digital analytics, and ethical responsibility
Main competencies	Writing, editing, verification, interviewing, news judgement	Multimedia storytelling, digital publishing, basic audience engagement, online production	Data interpretation, AI-assisted content production, verification in digital environments, platform analysis, ethical AI use
Pedagogical approach	Apprenticeship-oriented professional training within academic institutions	Integration of digital tools and practical multimedia assignments	Interdisciplinary, project-based, research-informed, and competency-oriented learning
Professional values	Accuracy, objectivity, editorial responsibility, public service	Preservation of traditional values under conditions of technological change	Accuracy, transparency, accountability, independence, algorithmic responsibility, and resilience
Institutional context	Stable media organisations and relatively predictable professional roles	Transitional newsrooms and widening gap between academia and industry	Flexible collaboration between journalism, communication, data analytics, computer science, and digital media fields
Main challenges	Balance between theory and practical training	Rapid technological change and unequal access to digital infrastructure	Misinformation, algorithmic amplification, AI bias, information overload, platform dependency, and ethical risks

Note: the table summarises the transformation of journalism education from newsroom-centred professional training to digital and AI-mediated competency-oriented education

Source: developed by the author based on L. Solkin (2020), J.V. Pavlik (2023), M. Severijnen & Y. de Haan (2024), M.S. Hossain & D. Wenger (2024), V. Katzenberger (2024), H. Cools & N. Diakopoulos (2024), O. Westlund *et al.* (2025)

Competency transformation matrix. The second result concerned the restructuring of competencies required in journalism education. Traditional journalistic

competencies remained fundamental, but they were increasingly reinterpreted within platform-based, data-driven, and AI-mediated media environments. The analysis

showed that contemporary journalism education required the integration of traditional, digital, data-oriented, AI-related, ethical, resilience-oriented, and reflective pedagogical competencies. This confirmed that digital transformation should be understood as a multidimensional competency shift rather than as a purely technical modernisation of curricula (Long & Magerko, 2020; Ng *et al.*, 2021;

Porlezza & Schapals, 2024). Table 2 demonstrates that AI literacy should not be treated only as a technical ability. It includes the capacity to understand, critically evaluate, ethically apply, and professionally contextualise AI-supported tools within journalistic practice. The table also shows how each competency block can be translated into educational activities and assessment-oriented task

Table 2. Competency transformation matrix in journalism education

Competency block	Content of competencies	Educational expression	Professional significance
Traditional journalistic competencies	Writing, editing, interviewing, source evaluation, verification, news judgement, editorial responsibility	Reporting assignments, editing workshops, interviewing practice, newsroom simulations, peer review of journalistic texts, and portfolio-based assessment	Preserves the professional identity of journalism and ensures accuracy, credibility, and public accountability
Digital competencies	Multimedia storytelling, digital publishing, platform communication, content management, audience engagement	Multimedia production projects, online publishing tasks, platform analysis, social media analytics exercises, audience engagement assignments, and reflective evaluation of digital storytelling formats	Enables students to work effectively in contemporary digital media ecosystems
Data-oriented competencies	Data journalism, data interpretation, visualisation, computational thinking, audience analytics, evidence-based storytelling	Data journalism modules, work with open datasets, visualisation assignments, spreadsheet and dashboard exercises, evidence-based storytelling projects, and interpretation of quantitative information	Supports evidence-based reporting and strengthens analytical capacity in complex information environments
AI-related competencies	AI literacy, generative AI use, algorithmic awareness, prompt-based interaction, evaluation of AI outputs, understanding of automation	Practical work with generative AI tools, prompt-based editorial tasks, comparison of human and AI-generated texts, identification of AI errors and bias, evaluation of AI outputs, and reflective justification of AI use	Prepares students to use AI responsibly while understanding its limitations, risks, and professional implications
Ethical and accountability competencies	Transparency, prevention of misinformation, algorithmic bias awareness, responsible AI use, editorial independence, public interest	Media ethics case studies, AI ethics debates, editorial decision-making scenarios, transparency statements, policy analysis, and assessment of risks related to misinformation and algorithmic bias	Protects professional standards in automated and platform-mediated communication environments
Resilience-oriented competencies	Fact-checking, OSINT-related practices, disinformation detection, crisis communication, information security awareness	Verification labs, fact-checking assignments, disinformation analysis, OSINT-related exercises, crisis reporting simulations, digital security tasks, and scenario-based work in unstable information environments	Prepares journalists to operate in high-risk, unstable, or conflict-affected information environments
Pedagogical and reflective competencies	Critical thinking, reflective practice, interdisciplinary learning, collaborative problem-solving, lifelong learning	Project-based learning, interdisciplinary teamwork, reflective journals, learning portfolios, peer feedback, self-assessment, and analysis of professional decision-making in complex media cases	Supports adaptive professional development in rapidly changing media environments

Note: the matrix presents competency blocks that connect technological training with ethical reasoning, data-oriented preparation, resilience-oriented professional development, and concrete pedagogical forms of implementation

Source: developed by the author based on W. Holmes *et al.* (2019), D. Long & B. Magerko (2020), D.T.K. Ng *et al.* (2021), L. Bounegru & G. Gray (2021), F. Miao & W. Holmes (2023), M.S. Hossain & D. Wenger (2024), C. Porlezza & A.K. Schapals (2024), S. Fiialka & Z. Kornieva (2024), V. Vladymyrov (2025)

The competency matrix also demonstrated direct pedagogical implications. The identified competency blocks should be formed through learning activities that combine professional practice, critical reflection, technological experimentation, and ethical decision-making. Traditional journalistic competencies require reporting assignments, editing workshops, and newsroom simulations. Digital and data-oriented competencies require multimedia projects, work with datasets, visualisation tasks, and audience analytics exercises. AI-related competencies should be developed through practical tasks that require students to test

generative AI tools, compare human and AI-generated outputs, identify errors or bias, and explain editorial decisions. Ethical and accountability competencies should be taught through case studies, policy analysis, and editorial decision-making scenarios. Resilience-oriented competencies require verification labs, disinformation analysis, crisis reporting simulations, and OSINT-related exercises. Therefore, the pedagogical significance of the proposed matrix lies in connecting competency blocks with concrete learning activities and assessment evidence. This interpretation was consistent with recent studies that emphasise

the pedagogical conditions of AI integration in journalism education. D. Wenger *et al.* (2025) showed that the impact of AI on journalism education concerns not only professional skills but also curriculum design, faculty readiness, ethical preparation, and institutional decision-making. M. Jaakkola & J. Wiik (2025) demonstrated that journalism educators' preparedness to teach AI depends on the pedagogical domestication of AI tools rather than on technical awareness alone. L. Chen & M. Chen (2026) further indicated that generative AI can contribute to professional competency development when it is mediated by learning engagement and media literacy. These findings supported the view that AI should be integrated into journalism education through structured pedagogical tasks rather than isolated tool demonstrations.

Comparative regional patterns. The third result was the identification of three regional patterns of journalism education modernisation: the ethical-interdisciplinary European model, the policy-driven AI modernisation model in Türkiye, and the resilience-oriented Ukrainian model. Those patterns did not represent all possible regional trajectories, but they showed that digital and AI-related modernisation was shaped by educational traditions, policy priorities, institutional readiness, and socio-political conditions. The European pattern was characterised by interdisciplinary learning, responsible innovation, research-based education, critical media analysis, and ethical reflection. Institutional examples supported this tendency: the Erasmus Mundus Master's programme in Journalism, Media and Globalisation emphasised a critical, academic, and globally oriented understanding of journalism, while the University of Hamburg's programme in Communication and Journalism Research for a Sustainable Society connected journalism and digital media with digitalisation, artificial intelligence, public communication, and societal transformation.

The Turkish pattern reflected a policy-driven and curriculum-visible form of AI modernisation. H. Babacan *et al.* (2025) showed that AI-related content was increasingly present in Turkish journalism and new media programmes, but it often remained more theoretical than practice-oriented. A.F. Şen (2025) similarly indicated that direct AI integration in journalism curricula was still limited and that practical training with AI tools remained underdeveloped in the analysed public universities. The analysis of selected official Turkish curriculum materials showed that AI- and digital media-related courses were present in journalism-related programmes at Istanbul University, Çukurova University, and Selçuk University (Istanbul University, 2025; Çukurova University, 2025; Selçuk University, 2025). These materials confirmed the visibility of AI, digital journalism, data journalism, media ethics, digital news literacy, web design, and coding-related journalism practices in Turkish curricula, while also supporting the conclusion that AI integration often remains organised through separate courses or electives rather than through a fully integrated pedagogical model. The Ukrainian pattern differed because digital transformation intersects with wartime communication, information warfare, disinformation, crisis reporting, and the need for professional resilience. Ukrainian journalism education therefore combines digital media competencies with verification culture, fact-checking, OSINT-related practices, ethical responsibility, and preparation for high-risk information environments (Fiialka & Kornieva, 2024; Mykolaichuk, 2025; Vladymyrov, 2025). The Master's programme in Digital Media at Taras Shevchenko National University of Kyiv illustrated this tendency through learning outcomes related to digital media analysis, multimedia and interactive technologies, digital project management, data visualisation, automated processing of search results, and digital media projects. The comparative characteristics of the three regional patterns are presented in Table 3.

Table 3. Comparative regional patterns of journalism education modernisation

Region / context	Dominant modernisation logic	Key curriculum priorities	Competency emphasis	Main pedagogical challenge
Europe	Ethical and interdisciplinary modernisation	Digital journalism, media globalisation, communication research, data journalism, AI and digitalisation, responsible innovation	Critical media analysis, AI ethics, algorithmic accountability, research literacy, interdisciplinary thinking	Maintaining balance between technological innovation, professional values, and critical academic reflection
Türkiye	Policy-driven and curriculum-visible AI modernisation	AI and media, digital journalism, data journalism, digital news literacy, media ethics, web design, coding-related journalism practices	Conceptual AI awareness, digital journalism, data-oriented journalism, media literacy, technological adaptation	Moving from visible AI-related courses and electives toward systematic pedagogical integration of AI, data, ethics, and practice-based learning across journalism curricula
Ukraine	Resilience-oriented digital modernisation	Digital media, multimedia storytelling, data journalism, fact-checking, OSINT-related practices, crisis communication, AI-assisted learning	Verification culture, disinformation detection, digital resilience, ethical judgement, data-oriented journalism, crisis reporting	Integrating global digital competencies with preparation for information warfare and unstable media environments

Source: developed by the author based on M. Severijnen & Y. de Haan (2024), V. Katzenberger (2024), S. Fiialka & Z. Kornieva (2024), University of Amsterdam (2024), University of Hamburg (2024), Taras Shevchenko National University of Kyiv (2024), H. Babacan *et al.* (2025), A.F. Şen (2025), Istanbul University (2025), Çukurova University (2025), Selçuk University (2025), V. Vladymyrov (2025)

Table 3 showed that journalism education could not be modernised through a universal list of digital tools. Europe, Türkiye, and Ukraine all moved toward digitalisation and AI literacy, but they demonstrated different pedagogical priorities: ethical interdisciplinarity, policy-driven technological adaptation, and resilience-oriented preparation for unstable information environments. These differences are pedagogically significant because they determine not only what content should be included in journalism curricula but also how learning activities should be organised. In the European context, curriculum modernisation required ethically grounded interdisciplinary learning; in Türkiye, it required stronger movement from theoretical AI awareness to practical AI-supported learning tasks; in Ukraine, it required the

integration of digital production, verification culture, crisis communication, and resilience-oriented professional preparation. The fourth result was the development of a conceptual pedagogical framework for journalism education transformation in the digital media era. The framework synthesised the previous findings and showed how changes in the media environment could be translated into curriculum design, competency formation, pedagogical strategies, and the expected graduate profile. It was based on the assumption that journalism education should not respond to digital transformation by mechanically adding technological courses, but should instead connect technological training with professional values, data-oriented thinking, AI literacy, ethical reasoning, and resilience-oriented preparation.

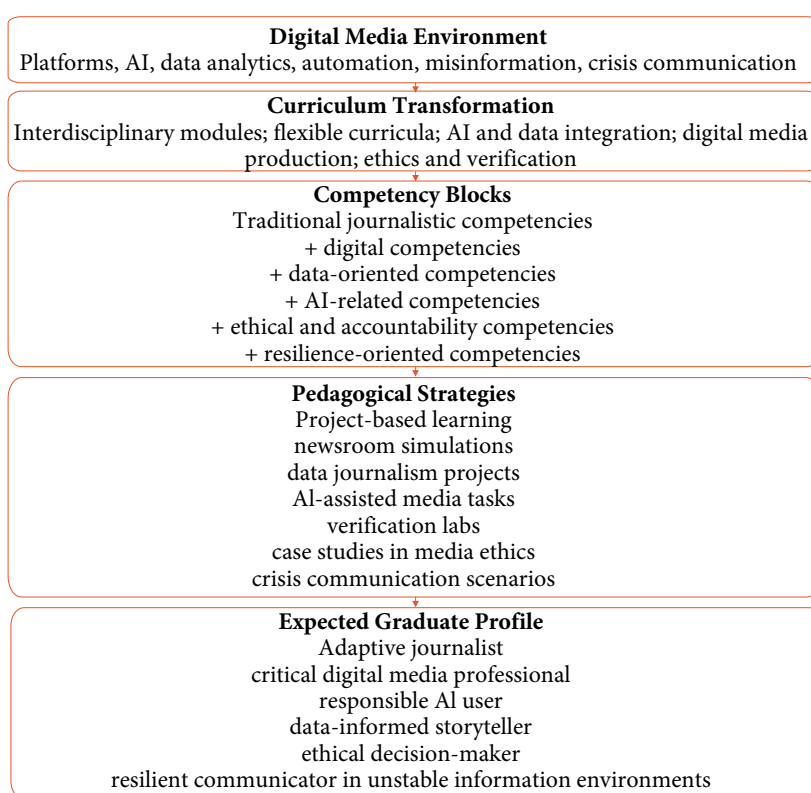


Figure 1. Conceptual pedagogical framework for journalism education transformation

Source: developed by the author

The framework connects the external transformation of digital media ecosystems with internal curriculum modernisation and the formation of an integrated graduate competency profile. The framework demonstrated a movement from tool-based modernisation to integrated pedagogical redesign. As a result, the expected graduate is not merely a user of digital tools but an adaptive, ethically responsible, data-informed, and resilient journalism professional.

DISCUSSION

The findings of this study indicated that the transformation of journalism education should be interpreted as a

process of pedagogical redesign rather than as the simple introduction of digital tools into existing curricula. The analysis showed that digital media ecosystems, artificial intelligence, data-driven communication, platform infrastructures, and wartime information challenges affected not only the content of journalism training but also the logic of curriculum design, learning activities, assessment practices, and professional identity formation. Therefore, the main educational problem was not whether journalism programmes should include digital technologies or AI-related topics, but how these components should be pedagogically integrated with professional values, ethical

reasoning, verification culture, data-oriented thinking, and resilience-oriented preparation. This interpretation extends earlier discussions of journalism transformation by shifting the focus from media change as a professional phenomenon to media change as a curriculum and pedagogy problem. M. Deuze & T. Witschge (2018) and N. Diakopoulos (2020) remain useful for understanding broader changes in journalism, algorithmic media systems, and computational news practices. However, the present study used these foundational perspectives to support a specifically pedagogical argument: journalism education needs integrated learning models that connect technological awareness with editorial responsibility, critical reflection, and professional decision-making.

The first result, which identified the transition from industrial newsroom-centred education to multimedia journalism education and then to digital or AI-mediated journalism education, corresponded to previous studies on the historical and structural transformation of journalism training. L. Solkin (2020) argued that journalism education in the twenty-first century cannot be reduced to narrow vocational preparation because it increasingly involves broader questions of professional identity, knowledge production, and adaptation to media change. M. Severijnen & Y. de Haan (2024) similarly emphasised that journalism education must prepare students for a changing media landscape through more flexible and future-oriented models. O. Westlund *et al.* (2025) also pointed to the need to rethink journalism in the context of platformisation, algorithmic systems, and digital media ecosystems. The present study developed these arguments by showing that the current stage of journalism education was shaped not only by digitalisation but also by the growing influence of artificial intelligence, data analytics, algorithmic communication, and automated forms of content production.

The second result, the competency transformation matrix, showed that AI literacy in journalism education should not be reduced to operational familiarity with generative AI tools. Foundational studies on AI literacy remain useful for defining this competence as multidimensional and combining technical understanding, critical evaluation, ethical reasoning, and responsible application. In this sense, D. Long & B. Magerko (2020) and D.T.K. Ng *et al.* (2021) provided a conceptual basis for understanding AI literacy beyond instrumental tool use. However, more recent journalism-specific research has made this issue more pedagogically concrete. M.S. Wenger *et al.* (2025) showed that AI affected journalism education at the level of curriculum design, faculty readiness, ethical preparation, and institutional decision-making. T. Hollanek *et al.* (2025) further emphasised critical AI literacy as a condition of responsible reporting, transparency, and public accountability in AI-mediated media environments. These studies support the present article's argument that AI literacy should be integrated into journalism education through structured pedagogical tasks rather than through isolated demonstrations of AI tools. Students should not only generate texts,

summaries, headlines, or story ideas with AI systems, but also compare AI-generated and human-produced outputs, identify factual errors, detect bias, explain editorial choices, formulate transparency statements, and justify whether AI use is appropriate in a given journalistic situation. This pedagogical interpretation is also consistent with L. Chen & M. Chen (2026), who indicated that generative AI integration contributed to professional competency development when it was mediated by learning engagement and media literacy. Therefore, AI literacy should be assessed not by students' ability to use a tool, but by their ability to use, question, verify, explain, and ethically contextualise AI-supported outputs.

Data-oriented competencies should be interpreted in the same integrated way. Data journalism requires analytical thinking, interpretation, visualisation, evidence-based storytelling, and the ability to transform complex information into socially meaningful narratives (Bounegru & Gray, 2021). The present study confirmed this position but added that data-oriented competencies should be developed together with AI literacy, verification culture, and ethical reasoning. From the perspective of competency-based education, journalism curricula should therefore focus not on the accumulation of separate digital courses but on the formation of coherent professional capability supported by reporting assignments, data projects, AI-output evaluation, verification laboratories, newsroom simulations, and reflective portfolios. The findings also correspond to broader research on artificial intelligence in higher education. W. Holmes *et al.* (2019) and O. Zawacki-Richter *et al.* (2019) remain important because they showed that AI in education becomes meaningful only when it is connected with curriculum, learning objectives, teacher-supported pedagogy, and assessment practices. The present study applied this broader educational argument to journalism education. It showed that AI-related modernisation should not be limited to the inclusion of separate AI modules; it should instead influence the design of reporting assignments, verification laboratories, data journalism projects, newsroom simulations, reflective portfolios, and ethical decision-making tasks.

The third result, which compared Europe, Türkiye, and Ukraine, demonstrated that journalism education modernisation was not a universal or linear process. Although all three contexts revealed movement toward digitalisation, AI literacy, and interdisciplinary learning, each represented a distinct pedagogical logic of modernisation. The European model can be interpreted as an ethical and interdisciplinary logic. European journalism education increasingly connects digital competencies with critical media analysis, research-based learning, algorithmic accountability, and responsible innovation (Katzenberger, 2024; Severijnen & de Haan, 2024; Porlezza & Schapals, 2024). This trajectory shows that modernisation should not be reduced to technical adaptation or labour-market response; it also involves the development of ethical and analytical skills required for democratic communication. The Turkish case represents

a policy-driven and curriculum-visible logic of AI modernisation. Recent studies demonstrated that artificial intelligence and digital transformation were increasingly present in journalism, communication, and new media programmes in Türkiye, although their integration often remained uneven and more theoretical than practice-oriented (Babacan *et al.*, 2025; Şen, 2025). The analysis of selected official curriculum materials from Istanbul University, Çukurova University, and Selçuk University supported this conclusion by showing that AI and digital media topics were visible in journalism-related curricula through courses or components related to AI and media, digital journalism, data journalism, digital news literacy, media ethics, web design, and coding-related journalism practices (Istanbul University, 2025; Çukurova University, 2025; Selçuk University, 2025). This finding is important because the formal inclusion of AI-related topics in curricula does not automatically guarantee deep pedagogical transformation. Effective AI integration requires practical tasks, interdisciplinary cooperation, assessment criteria, teacher readiness, and ethical frameworks for responsible use.

The Ukrainian model represents a resilience-oriented logic of modernisation. Its distinctiveness lies in the fact that digital transformation intersected with wartime communication, information warfare, disinformation, crisis reporting, and the need for professional responsibility in high-risk information environments (Fiialka & Kornieva, 2024; Vladymyrov, 2025). This distinguishes the Ukrainian case from models in which digitalisation is discussed mainly through innovation, technological modernisation, or employability. Ukrainian journalism education must prepare students to verify information under pressure, identify manipulative narratives, use open-source information responsibly, understand crisis communication, and maintain ethical standards in unstable media conditions. This finding is important for international scholarship because it conceptualises resilience not as an additional or external competence but as an integral component of contemporary journalism education. In stable media environments, resilience-oriented preparation may be discussed mainly in relation to misinformation, digital security, or platform risks. In Ukraine, however, it becomes a central pedagogical requirement. Therefore, the Ukrainian case demonstrates that digital journalism education should prepare students not only to produce content in technologically advanced media systems but also to act responsibly in unstable, high-risk, and conflict-affected information environments.

The fourth result, the conceptual pedagogical framework, should be understood as an authorial synthesis rather than as an empirically tested model. Its value lies in organising the identified transformations into a coherent educational sequence: digital media environment, curriculum transformation, competency blocks, pedagogical strategies, assessment evidence, and expected graduate profile. Compared with tool-based approaches to curriculum modernisation, the proposed framework emphasises that each technological component should be connected

with a learning objective, a professional value, a pedagogical activity, and an assessment method. In practical terms, the framework can be used for curriculum renewal in several ways. First, it can help programme designers check whether digital and AI-related topics are integrated across professional, ethical, analytical, and reflective components of journalism training. Second, it can guide the design of learning activities such as AI-output evaluation, data storytelling projects, verification labs, newsroom simulations, crisis reporting scenarios, and reflective portfolios. Third, it can support assessment by linking competencies with observable evidence: verified journalistic texts, data visualisations, transparency notes, editorial justifications, fact-checking reports, and reflective analyses of AI-supported decision-making. Thus, the proposed framework contributes not only to theoretical systematisation but also to the pedagogical design of journalism education.

Several limitations should be considered. The study is conceptual and comparative rather than empirically validated through surveys, interviews, classroom observations, or quantitative curriculum mapping. It is also based on selected scholarly sources and institutional examples, which means that it does not provide a complete mapping of all journalism education programmes in the analysed regions. The findings therefore should be interpreted as a conceptual and comparative synthesis intended to clarify pedagogical tendencies rather than to provide a full empirical validation of the proposed framework. Future research should empirically test and refine the proposed framework through comparative curriculum analysis, interviews with journalism educators, surveys of students' AI literacy, and studies of assessment practices for digital, ethical, and resilience-oriented competencies. Additional research is also needed to examine how generative AI influences professional identity formation, editorial decision-making, verification practices, and ethical responsibility in journalism education.

CONCLUSIONS

The study specified the pedagogical and technological dimensions of journalism education transformation in the digital media era. The findings showed that this transformation should be understood not as the mechanical addition of digital tools or AI-related topics to existing curricula but as a process of pedagogical redesign that connects technological training with professional values, ethical reasoning, data-oriented thinking, verification culture, and resilience-oriented preparation. First, three major stages in the development of journalism education were identified: the industrial newsroom-centred model, the multimedia journalism model, and the contemporary digital or AI-mediated model. This distinction explained the transition from stable professional routines and print-oriented training toward flexible, interdisciplinary, and technologically mediated professional preparation. Second, the study substantiated the transition toward AI-mediated and data-oriented journalism education. Future journalists should be prepared not only to produce media content

but also to interpret data, understand algorithmic systems, evaluate AI-generated outputs, identify misinformation risks, and act responsibly in platform-based communication environments. Third, the key competency groups required for contemporary journalism education were established: traditional journalistic, digital, data-oriented, AI-related, ethical and accountability, resilience-oriented, and reflective pedagogical competencies. Their integration demonstrated that professional training should combine classical journalistic values with technological awareness, analytical capacity, ethical reasoning, and preparedness for unstable information environments. These competencies should be developed through structured learning activities, including newsroom simulations, data journalism projects, AI-output evaluation, verification labs, crisis reporting scenarios, and reflective portfolios. Fourth, the comparative analysis showed that Europe, Türkiye, and Ukraine represented different pedagogical logics of modernisation. European approaches primarily emphasised ethical and interdisciplinary modernisation; Türkiye demonstrated policy-driven and curriculum-visible AI modernisation; Ukraine revealed a resilience-oriented

model shaped by information warfare, disinformation, crisis communication, verification culture, and OSI-NT-related practices. The proposed conceptual pedagogical framework may be used for curriculum renewal, course design, and alignment of learning outcomes with the real conditions of digital and AI-mediated journalistic practice. Its practical value lies in linking competency blocks with pedagogical strategies and assessment evidence. Further research should empirically test this framework through curriculum mapping, interviews with journalism educators, surveys of students' AI literacy, and analysis of assessment practices for digital, ethical, and resilience-oriented competencies.

ACKNOWLEDGEMENTS

None.

FUNDING

None.

CONFLICT OF INTEREST

None.

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Педагогічний і технологічний виміри цифрової трансформації журналістської освіти

Анотація. Сучасна журналістська освіта зазнає трансформації під впливом цифрових медіаекосистем, платформної комунікації, дата-орієнтованого виробництва новин і штучного інтелекту, однак інтеграція цифрових умінь, етичного мислення, професійних цінностей і компетентностей стійкості в освітніх програмах залишається недостатньо систематизованою. Мета дослідження полягала в аналізі педагогічних і технологічних вимірів трансформації журналістської освіти в епоху цифрових медіа та обґрунтуванні інтегрованої компетентнісно орієнтованої рамки професійної підготовки. У дослідженні використано історико-педагогічний аналіз, порівняльний аналіз і системний підхід. Емпіричну основу становили сучасні рецензовані наукові публікації та окремі матеріали освітніх програм, що репрезентують різні регіональні контексти. Визначено три етапи розвитку журналістської освіти: індустріальну ньюзрум-орієнтовану освіту, мультимедійну журналістську освіту та цифрову журналістську освіту, сформовану під впливом штучного інтелекту, аналітики даних і алгоритмічної комунікації. Результати засвідчили, що сучасні освітні програми з журналістики дедалі частіше поєднують класичні професійні цінності з цифровим сторітелінгом, журналістикою даних, аналітикою аудиторії, грамотністю у сфері штучного інтелекту, культурою верифікації та етичним ухваленням рішень. Порівняльний аналіз показав, що європейські моделі переважно акцентують відповідальні інновації та міждисциплінарне навчання, турецькі програми відображають політично зумовлену технологічну модернізацію, тоді як українська журналістська освіта поєднує цифрові компетентності з підготовкою до стійкості в умовах інформаційної війни та кризової комунікації в умовах повномасштабного вторгнення та війни росії проти України. Практична цінність дослідження полягала в уточненні компетентнісних блоків і педагогічних пріоритетів, які можуть бути використані для оновлення освітніх програм, проектування навчальних курсів і розвитку подальших емпіричних досліджень інтеграції штучного інтелекту в журналістську освіту

Ключові слова: модернізація освітніх програм; цифрова педагогіка; грамотність у сфері штучного інтелекту; вища освіта; професійні компетентності; кризова комунікація