

Impact of Resource Scarcity on Creative Potential in Higher Education: A Mixed-Methods Study of Digital Media Students

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ABSTRACT

Modern higher education curricula place a strong emphasis on digital innovation and creative risk-taking to prepare students for the demands of the global media industry. However, evaluating student output based solely on intrinsic capability often overlooks the critical variable of institutional infrastructure. The study counters the existing pedagogical deficit model, which often blames the lower fidelity of student media output in developing institutional settings on the absence of intrinsic motivation or underlying competence. This study uses a parallel mixed-methods design, triangulating self-assessment measures of quantitative data with environmental realities of qualitative data on digital media students (N = 31) at Kabarak University, Kenya. Quantitative data indicates the strong background of creative self-efficacy, as 71.0% of students mentioned that they had the necessary skills to develop professional content, and 67.7% of students are engaged in the exploration of new methods of storytelling. Nevertheless, qualitative thematic analysis shows that harsh realities in the environment, namely acute shortages of hardware and network instability (mentioned by 63.6% of participants), systematically undermine these intentions. As a result, this paper presents the notion of theoretical creativity: a phenomenon where students have the cognitive imagination to be creative but do not have the physical affordances to implement, and are forced to routinely demote the complex projects. The findings indicate that navigating this second-level digital divide reduces the educational experience from creative problem-solving to logistical survival. The study concludes that relying on student "forced resilience" is pedagogically unsustainable; institutions must reclassify high-performance digital infrastructure from peripheral administrative overhead to a mandatory core pedagogical requirement.

Keywords: Resource Scarcity, Theoretical Creativity, Digital Media Education, Creative Self-Efficacy, Digital Divide

INTRODUCTION

The landscape of digital media education is currently defined by rapid technological advancement and a growing industry demand for graduates capable of producing high-fidelity, innovative content. To address this particular requirement, university courses are purposefully structured in a way that encourages creativity, challenging students to go beyond the commonplace, standardized tasks and explore the more challenging digital storytelling. Nevertheless, measuring student output based on the quality of their inherent capabilities tends to ignore a very important factor: the physical and virtual space that they work in. Although the current literature on the topic extensively deals with the digital literacy of students and curriculum design, there is a clear gap in the existing empirical studies that discuss how physical resource shortage in developing university ecosystems is an artificial inhibitor of quantifiable creative output. As an example, in Kenya, academic libraries have embraced information and communication technologies, but they tend to be traditional and do not accommodate revolutionary contribution to education because of their old methodologies (Rutto et al., 2025). This institutional delay produces a great tension between the creative desire of a student and material reality of his or her study environment.

This study will use a group of media students at Kabarak University and the question is as follows: what are the effects of hardware and software constraints on the creative production by a media student? This paper discusses these challenges, and its authors observe that, in many cases, inequality in socioeconomic status and

institutional resources is an obstacle to equal participation and learning performance (Randle and David, 2025). In East Africa, digital artists have access to prohibitively hardware and software, and high import duties further limit access to needed tools such as high-performance computers to create three-dimensional audiovisual spaces (Auerbach et al., 2023). The empirical evidence indicates that the main obstacles to students in Kenyan universities are low internet speeds and a lack of diverse facilities (Tenya et al., 2023). In turn, the reduced creative performance in such resource-limited settings is not always an indicator of low ability as much as it is an imposed response to the lack of infrastructures (Ngaine, 2025). This redefining is critical, because the absence of a long-term investment in modern technology usually leads to the incomplete educational experience that slows down the introduction of the new pedagogical practices (Almakaty, 2025).

Ultimately, while situated within the specific context of Kenyan higher education, this study serves as a critical microcosm for the broader Global South. With global media conglomerates increasingly seeking emerging markets as sources of various digital skills, the infrastructural bottlenecks that are described in this study pose the threat of artificially silencing a whole generation of world creators. This paper offers researchers the world over a universal academic vocabulary by introducing the framework of the theoretical creativity in evaluating the unseen cost of the second-level digital divide on the more advanced creative fields.

LITERATURE REVIEW

Digital Literacy and Creative Self-Efficacy

Contemporary media pedagogy relies heavily on the foundational concept of creative self-efficacy, defined as a student's fundamental belief in their intrinsic ability to conceptualize and produce highly innovative digital outcomes. Empirical data indicate that computer self-efficacy is a strong predictor of success in graphic design classes, and students with such characteristics will be more willing to experiment with complicated storytelling and accomplish projects successfully (Onwuagboke, 2016). Nonetheless, the assessment frameworks have a major blind spot in that they assume that all people have access to technology. Although high-level digital literacy is often equated to the level of confidence to explore the boundaries of creativity, researchers claim that this psychological preparedness does not offset the failure of physical hardware (Randle and David, 2025). As it has been evidenced, students with disadvantaged backgrounds experience a twofold barrier in which the content relevance and technical feedback is limited by the institutional constraints (Matjie et al., 2026). As such, intrinsic motivation of students is inherently limited by extrinsic institutional realities as digital confidence alone is insufficient in the context of being able to negotiate functional infrastructural shortfalls in the learning context.

The Second-Level Digital Divide in Higher Education

The historical concept of the digital divide has evolved from a binary gap in access to a more nuanced second-level digital divide, which focuses on the quality of access and the practical capacity to use advanced technology effectively (Nkonoki, 2026). This gap is most acute in institutions of higher education in the Global South, including Kenya, where a swift increase in university enrolment has often led to inequalities in investments in technical infrastructure. In disciplines that require significant resources, such as digital media, access to a basic computer is no longer sufficient when the computer does not have the processing capacity to support high-resolution video output or commercially available software (Auerbach et al., 2023). Empirical evidence in Kenyan universities emphasizes that poor ICT infrastructures and low levels of digital literacy are the main challenges that determine the unsuccessful implementation of transformative learning technologies (Mulwa, 2025). Thus, in such emerging ecosystems, the necessary hardware is being reduced by a pedagogical level to an incredibly rare, hotly disputed resource. This institutional deficiency compels students to tailor their creative desires to technical constraints instead of their real cognitive abilities or professional desires.

The Gap in the Literature

Current educational research frequently links severe technological limitations to lower academic grades and general student frustration (Rutto et al., 2025). Existing literature extensively documents administrative and logistical challenges in implementing e-learning platforms within resource-constrained environments,

particularly following the sudden shift to virtual instruction (Kiarie & Jones, 2024). Nonetheless, there is a very sharp gap in terms of advanced digital arts pedagogy. Minimal empirical literature directly aligns institutional infrastructural scarcity with the psychological inhibition of otherwise very motivated students. Although researchers agree that ICT infrastructure has improved in moderation in Kenyan universities, they observe that readiness to transformative technologies is still low and poses a threat to fair digital transformation (Ngaine, 2025). As a result, in the majority of research, the application of technology is considered a one-dimensional concept, frequently neglecting the inherent variations in how students apply complex creative devices when confronted with physical limitations (Randle and David, 2025). Low internet connectivity and the lack of diversity of facilities are still the main obstacles in Kenyan public universities that do not allow students to engage effectively (Tenya et al., 2023).

Scientists are still to explore the extent to which the adverse effects of hardware bottlenecks are actively imposed on students to routinely reduce ambitious projects in a bid to stay afloat academically (Thakur et al., 2025). Digital creators in East Africa are confronted with prohibitively costly hardware, with the shortage of powerful processing making a key tool the object of a competitive resource war (Auerbach et al., 2023). This particular research fills that literary gap by isolating that point of friction between the high creative confidence and low practical execution of a media student in a systematic manner. This study aims to demonstrate that less creative output is an adaptive strategy to unique developing constraints of higher education ecosystems, and not an individual student failure. The paper relies on a group of media students at Kabarak University to argue that incompetent technological infrastructure and insufficient digital literacy are the key elements that are slowing down transformative integration (Mulwa, 2025). Finally, this study gives a better insight on how these dimensions work together to influence motivation among learners and their output in creative work. This re-interpretation implies that the capabilities of a person are not the only determinants of learning but also the environment plays a major role in the learning process (Randle and David, 2025).

This research proposal aims to fill this gap by hypothesizing that there is such a state as theoretical creativity whereby the students have the high level of cognitive vision and digital literacy to innovate; however, they are compelled to stifle these aspirations because of the physical lack of viable hardware. Using the systematic mapping of this friction, this study aims to demonstrate that reduced student output in creativity is an act of forced adaptation and not individual student failure. The concept of theoretical creativity is grounded in established cognitive frameworks of divergent thinking, where students possess the necessary digital literacy and intellectual capacity to generate novel ideas. By linking this to the second-level digital divide, the framework illustrates how the absence of physical technological affordances systematically suppresses the execution of these divergent thoughts, transitioning the discourse of digital inequality from basic access to the denial of high-order creative actualization.

METHODOLOGY

To thoroughly investigate the complex intersection of student ambition and institutional constraints, this study utilized a highly structured concurrent mixed-methods research design. This is a holistic design that was carefully chosen as the best methodological framework to enable methodological triangulation. Through the concomitant application of quantitative and qualitative tools, the researchers could cross-check internal psychological variables (intrinsic creative self-efficacy) with external environmental realities (physical infrastructural constraints) (Lumivero, 2025). On the one hand, the quantitative element was specifically aimed at determining internal psychological variables systematically quantifying intrinsic creative self-efficacy and technical confidence (Randle and David, 2025). Conversely, the qualitative part was designed to meticulously record external environmental facts and physical constraints that exist in the institution (Morrison and See, 2025). By implementing these strategies simultaneously, the study does not fall into the most typical trap of evaluating student performance in a vacuum, but rather enabling a more nuanced interpretation where the patterns that can be measured are mapped to the rich context (Banawa, 2025). Finally, employing a mixed-method paradigm gives the required empirical richness to conclusively demonstrate that the output of creativity is inherently influenced by the pedagogical environment around it.

This empirical study targeted a specific population that was limited to undergraduate media and communications students currently studying in Kabarak University, which is located in the booming

educational environment of Kenya (Owidi and Njoroge, 2021). In order to have the gathered information represent the realities of living with heavy technological use, the researchers were strategic in using convenience sampling in order to recruit the sample population. The particular sampling strategy was used to identify students who are already actively involved in creating challenging digital media assignments, which guaranteed respondents had firsthand and direct exposure to the technical infrastructure and hardware accessibility at the university (Tenya et al., 2023). An official ethical clearance by the appropriate university institutional review board was obtained before the actual data collection to guarantee that all guidelines were strictly followed in terms of academic research (Kabarak University, 2026). Those who participated in the study voluntarily were thirty-one in number ($N = 31$). This small group formed a very relevant, richly experienced group that was well placed to describe the harsh logistical conditions in the contemporary media production within a resource-limited environment.

Primary data were carefully collected using a specially designed, online structured questionnaire that was administered safely with a compulsory, explicit informed consent gateway. To achieve the mandate of the mixed-method, the research instrument was purposefully separated into two different yet complementary sections. The quantitative component heavily utilized a standardized five-point Likert scale, ranging from strongly disagree to strongly agree, to systematically measure three critical internal domains: individual digital media skills, baseline creative confidence, and preferred creative output.

To ensure methodological rigor, the quantitative measurement tools underwent reliability and validity testing prior to data collection. Construct validity was established through an expert review of the questionnaire items by senior faculty in digital media pedagogy. Furthermore, the internal consistency of the Likert-scale constructs was evaluated using Cronbach's alpha, ensuring that the items reliably measured the intended domains of digital skills and creative self-efficacy.

Conversely, the qualitative component featured two highly targeted, open-ended prompts specifically designed to capture the nuanced realities of infrastructural barriers and the psychological impacts of technical mastery. The first prompt asked students to explicitly detail their biggest technical frustration when trying to create media assignments on campus, immediately illuminating systemic hardware constraints. The second prompt explored how finally mastering a difficult piece of software actively changed their approach to subsequent academic projects, directly highlighting the deep pedagogical value of proper technological access.

Methodological Component	Description
Research Design	Concurrent Mixed-Methods Approach
Target Population	Undergraduate media and communications students at Kabarak University
Sampling Technique	Convenience sampling targeting students in active digital media coursework
Sample Size	$N = 31$ participants
Quantitative Instrument	5-point Likert scale measuring digital skills, confidence, and creative output
Qualitative Instrument	Open-ended prompts identifying infrastructural barriers and psychological impacts
Data Analysis Framework	Descriptive statistics (Quantitative) and Braun & Clarke's Thematic Analysis (Qualitative)

The collected mixed-methods data required a rigorous, two-pronged analytical approach to properly synthesize the findings. To begin with, the quantitative Likert-scale data were systematically processed using statistical analysis software, to come up with the correct descriptive statistics. At the same time the qualitative open-ended responses were uploaded into a dedicated qualitative data analysis program to be subjected to the comprehensive reflexive thematic analysis via the highly-regarded six-phase model proposed by Braun and

Clarke. These particular codes were then subdivided in turn into broader general themes which reflected extreme environmental and infrastructural deprivation. Lastly, these negative qualitative themes were highly saturated with negative qualitative themes, which were directly contrasted with the massively positive quantitative confidence scores. This strategic comparative analysis was a form of data triangulation, which achieved success in isolating the main phenomenon under study and certainly showing that there is a phenomenon of theoretical creativity that is generated by bottlenecks in terms of physical resources, not mental deficiencies.

Ethical Considerations

Conducting research involving human subjects necessitates a rigorous adherence to established ethical protocols to protect the rights, dignity, and overall well-being of all participants. Before all data collection processes were initiated, formal ethical approval was formally requested and obtained by the Institutional Review Board of Kabarak University. In addition, the principle of informed consent was also rigorously operationalized in the whole process of data-gathering. The online survey tool was carefully crafted to ensure that it has a mandatory and explicit consent gateway on the introductory screen. They have been given a broad outline of the main goals of the study, the anticipated time that the questionnaire will take, and clear indicators that the participation would be voluntary in totality. The students were made aware that they had the unconditional right to refuse to participate or pull out of the study at any point they prefer without any academic repercussions or negative effects.

Besides ensuring voluntary participation, the research placed a lot of importance in ensuring that participant anonymity and confidentiality of data were upheld. Since students were requested to freely criticize the institutional infrastructure of the Kabarak University, it was of utmost importance to dispel any form of fear of being disciplined. The online questionnaire was therefore deliberately set up in such a manner that collection of any form of personally identifiable information was entirely avoided. The qualitative and quantitative responses were only summed up in terms of numerical data sets and generalised thematic codes. All data gathered electronically was safely kept on highly encrypted password-cracked offline hard drives to be accessed by the primary research team.

The researchers were very strict when it comes to their reflexivity to guarantee the rigor and credibility of the qualitative thematic analysis. Since the qualitative analysis is a form of interpretive analysis, preliminary thematic codes were cross-tested with the quantitative survey data to avoid researcher bias in that the theme of infrastructural deficits identified was firmly based on the statistical reality of the participants and not the speculation of the researchers. This methodological triangulation was systematic and played the main role of achieving internal validity of the conclusions of the study.

FINDINGS AND DISCUSSION

This section synthesizes the empirical data and theoretical implications of the study. The results are thematically structured in order to address the research question in a comprehensive way. Data triangulation is actively used in each of the themes: comparing quantitative measures of self-assessment with qualitative open-ended answers, to confirm the results and instantly analyze them in the framework of the theoretical concepts of creative self-efficacy and the second-level digital divide.

Intrinsic Capabilities and the Fallacy of the Deficit Model

The initial phase of analysis sought to establish a baseline of student capability to test the validity of the pedagogical deficit model, which often attributes poor media output to a lack of student skill. Quantitative findings explicitly demonstrate a remarkably strong foundation of digital self-efficacy, summarized in Table 2 below.

Table 2: Descriptive Statistics for Digital Skills and Creative Self-Efficacy (N = 31)

Survey Construct / Item	% Agreement (Agree/Strongly Agree)
Digital Skills & Adaptability	
Learn new digital tools quickly	74.2%
Can use software without assistance	61.3%
Spend little time struggling with software	61.3%
Creative Confidence & Ambition	
Possess skills for professional content	71.0%
Experiment with novel storytelling	67.7%
Trust capacity to devise unique solutions	61.3%
Strive to produce non-traditional content	58.1%
Confident executing complex deliverables	48.4%
Prefer experimenting with new formats	48.4%

Note. Percentage represents participants who selected 4 (Agree) or 5 (Strongly Agree) on a 5-point Likert scale.

Triangulating the above quantitative data with qualitative feedback on software mastery solidifies this baseline. An overwhelming 85.0% of qualitative responses focused on immediate, positive gains in operational efficiency when students finally secure access to functional tools. The qualitative interest in mastery triangulated with these high internal measures literally destroys the pedagogical deficit model in this emerging ecosystem. According to the theoretical assumptions of Onwuagboke (2016) high computer self-efficacy is the critical predictor of successful creativity; Table 2 proves that the efficacy is in no short supply. Thus, assessing portfolios of students without putting them in context identifies a failure of an institution as a cognitive failure in a person. The results support the claim by Randle and David (2025) that there is psychological preparedness but it cannot fully make up for external hardware breakdowns.

Systemic Resource Scarcity and the Second-Level Digital Divide

Internal capabilities are statistically high, yet, they hit harsh environmental realities in a violent manner. Qualitative data provides information on acute shortages of resources, and most of open-ended answers directly indicated the lack of hardware, software, or other infrastructural challenges as their main operational constraints (see Table 3).

Table 3 Thematic Distribution of Primary Technical Frustrations

Thematic Category	Frequency	Representative Qualitative Extracts
Infrastructural Deficits	63.6%	"Not enough cameras and we are many students." "Lack of modern equipments eg computers and cameras." "One computer only working properly or sometimes lagging at computer lab."

		"Slow WiFi, some technical issues with the computers."
Logistical & Cognitive Friction	36.4%	"Equipment accessibility during high-volume periods is challenging, as everyone attempts to work simultaneously." "Producing a perfect outcome using online tools and also troubleshooting."

By triangulating these qualitative infrastructural failures with the quantitative confidence scores (with 61.3% having confidence in their ability to come up with unique solutions) it is possible to see the precise point of pedagogical friction. The students have the cognitive mapping of solving creative problems, but their physical surroundings are actively depriving them of the simplest of tools of action. This friction triangulation eloquently demonstrates how the second-level digital divide (Nkonoki, 2026) manifests in Kenyan higher education. Rapid increases in university enrolment often exceed investments in technical infrastructure, as set by Auerbach et al. (2023) and Tenya et al. (2023). The stories of the students perfectly could be traced to the theoretical 'twofold barrier' that learners in underprivileged academic contexts struggle with (Matjie et al., 2026). In this case, the necessary hardware is being turned into a pedagogical minimum to a site of intense institutional desire, posing a serious threat to the equitable digital transformation.

The Emergence of "Theoretical Creativity"

The robust baseline of self-efficacy directly informs the students' quantitative ambitions. The cohort has a strong tendency towards innovation and not risk aversion compliance. In particular, 67.7% have indicated that they often experiment with new forms of storytelling, and 58.1% are actively trying to create material that does not conform to the paradigm of the classroom. But the qualitative responses tell us that the students are regularly compelled to reduce these ambitious conceptual ideasto simplify an edit or even cut a complex visual effect--just to avoid a boiling terminal that is about to crash before a submission can occur. The statistical wish to innovate (67.7) and the qualitative fact of hardware failure triangulate to yield the essence of this study: the so-called theoretical creativity. The quantitative data supports the existence of the vision whereas the qualitative data supports that the execution is structurally blocked.

Theoretical creativity happens when an institution is able to develop high creative aspiration, but cannot furnish the dependable processing equipment to translate it into existence. Since they can use available hardware to a very limited extent, students have to adjust their output to the infrastructural shortcomings instead of their real cognitive abilities (Ngaine, 2025; Thakur et al., 2025). By situating 'theoretical creativity' within established frameworks of digital inequality, it becomes evident that this phenomenon represents a profound manifestation of the second-level digital divide. Unlike pedagogical deficit models that assume a lack of intrinsic student competence, theoretical creativity highlights a structural inequity where high creative literacy is actively stifled by material deprivation. This is in line with the literature that shows that use of technology cannot be considered as a unidimensional construct; the use of complex creative tools physically confined changes student engagement fundamentally-and often silences it (Randle & David, 2025).

Logistical Survival and the Limits of "Forced Resilience"

The final theme addresses the psychological and temporal toll of this technological scarcity. Because access is limited, the educational experience is forcefully shifted away from creative exploration and reduced to logistical resource acquisition.

This reality of high-stress was expressed by one of the respondents: "Availability of equipment during high-traffic times is a problem... The quicker you are the better. Interestingly, sometimes students described this struggle in adaptive qualitative terms, observing that it prepares them with problem solving skills. But when students actually succeed in getting resources, and breaking through these bottlenecks, the pedagogical importance of technical mastery is deep and manifold, as described in Table 4.

Table 4 Reported Pedagogical Gains Upon Achieving Technical Mastery

Perceived Benefit Theme	Frequency	Impact on Pedagogical Experience
Increased Efficiency & Speed	85.0%	Significantly reduces troubleshooting time, allowing focus on core assignment objectives.
Boosted Creative Confidence	80.6%	Empowers students to take necessary artistic risks without fear of technical failure.
Unlocking New Technical Skills	75.0%	Expands the digital toolkit available for conceptualizing complex, industry-standard deliverables.
Motivation for Future Projects	65.0%	Cultivates intrinsic academic motivation and a desire for continued technical exploration.

Triangulating this qualitative "forced resilience" against the quantitative data where a slightly lower 48.4% reported complete confidence when executing highly complex deliverables indicates a measured pragmatism. The students understand that they possess the skills, yet they understand that the race in terms of logistics that must be won to complete a complicated project is overwhelming most of the times. This triangulated information should point to a very faulty pedagogical paradigm. Resilience is a desirable professional skill, but asking students to constantly debug old software or compete to have faulty peripherals can place too much cognitive load on them and wastes important instructional time. Such a climate unwillingly encourages logistical velocity and competition of resources instead of mindful, time-consuming artistic research. This institutional lag is very frictional as suggested by Almakaty (2025) and Rutto et al. (2025). The use of forced resilience is not a sustainable policy; the concept of high-performance technological infrastructure as an administrative luxury, not a mandatory core pedagogical need, is still a bottleneck to student excellence and constrains their future sustainability in the global media industry.

Limitations and Future Research

While this study provides critical insights into the phenomenon of "theoretical creativity," certain methodological limitations must be acknowledged. The small sample size ($N = 31$) precludes broad statistical extrapolation, making the quantitative findings exploratory rather than definitive for the broader Global South context. Moreover, the study is based on convenience sampling at one institution (Kabarak University), which predisposes these results to being context-specific to a particular Kenyan higher education setting. The quantitative self-assessment measures inherently carry the risk of self-reporting bias, meaning students may have overestimated their professional technical competencies.

To enhance comparative insight and generalisation, future studies ought to attempt to substantiate the idea of theoretical creativity within a multi-institutional cohort of a greater size over East Africa or the Global South in general. The use of inferential statistical models in future research must incorporate specific compounding variables, such as socioeconomic status, prior technological exposure before university, and institutional funding models to the qualitative framework laid out in this study. Employing inferential statistical models alongside these expanded variables will allow future researchers to better quantify the true pedagogical cost of hardware constraints on grading outcomes and actualized creative output

CONCLUSION AND RECOMMENDATIONS

The empirical findings of this mixed-methods study fundamentally challenge the prevailing pedagogical deficit model by demonstrating that the ceiling for student creative output at Kabarak University is dictated by institutional infrastructure rather than internal cognitive limitations. While quantitative metrics establish a robust foundation of digital self-efficacy and an intrinsic drive for pedagogical innovation, qualitative data reveals that severe hardware shortages and network instability force students to continuously downgrade their conceptualized projects. This profound friction between high ambition and physical resource scarcity

cultivates "theoretical creativity," a paradigm where students possess the vision to produce high-fidelity media but lack the essential affordances for execution. Consequently, the educational experience is inadvertently shifted away from advanced creative problem-solving and reduced to a stressful exercise in logistical survival, demonstrating that relying on the "forced resilience" of students is a deeply flawed and unsustainable pedagogical strategy.

To effectively close this critical motivation-infrastructure gap and release the untapped potential of digital media cohorts, institutions of higher learning need to take an urgent review of their strategic technological investments. It is strongly advised that university administrators and policymakers should no longer think of high-performance hardware, up-to-date software licenses, and strong network connectivity as peripheral overhead to administration, but as solid pedagogical necessities. The institutional policies should focus on fair access to high-processing workstations and adequate peripheral recording devices to enable productive use of the precious instructional time to learn industry-standard practices and not on simple troubleshooting. After all, not taking the necessary proactive steps to unravel these infrastructural bottlenecks will not only keep the realization of measurable academic excellence at bay but will also create graduates who are artificially unprepared to face the tough realities of technology of the contemporary global media industry.

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