

Revisiting 'Great Media Debate': Technology-Mediated Learning and Ground Realities Across the Indian Institutes of Technology

Karanam Pushpanadham^{*a}, Sayantan Mandal^b & Sheriya Sareen^b

* Corresponding author

E-mail: pushpanadham@gmail.com

a. Faculty of Education and Psychology,
Maharaja Sayajirao University of Baroda,
Gujarat, India


b. Department of Humanities and Social
Sciences, Indian Institute of Technology
Jammu (IIT Jammu), Jammu, Jammu &
Kashmir, India

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ABSTRACT

Since the onset of the COVID-19 pandemic, curriculum planners are giving more weightage to online learning. However, it would be incomplete to re-imagine curricula without considering the factors impacting learning. In this context, the 'Great Media Debate' (GMD), initiated between Richard Clark and Robert Kozma in the 1990s, discusses the factors influencing learning. While Clark focuses on instructional methods, Kozma posits that both methods and media impact learning. Our study re-visits the GMD in the present context of online learning and extends it, making it more heuristic by adding a specific contextual social factor, i.e., Availability and Accessibility of the Internet (A2I) at the individual/ household level to the debate. We build our proposition based on the 11,489 learners' responses collected as a part of the Pan-IIT study in India and focus on the case study of one specific institution, IIT Jammu. The analysis using chi-square tests, Fisher's exact tests, and descriptive statistics finds strong evidence for A2I to impact online learning, thereby broadening the GMD. A2I also influences the media by shaping the learners' preferences for the media used in traditional classrooms. Finally, it brings out the rural-urban divide due to unequal internet distribution, raising the possibility of a more exclusionary curriculum for the learners. We conclude that there is a need for the contextual social factor, i.e., A2I, among others, to be strongly acknowledged in the GMD, enabling it to take a more comprehensive form and consequently, holding the potential to enrich the curricular reimagination.

KEYWORDS

Curriculum revision; great media debate; online learning; contextual social factors; internet accessibility; Indian Institute of Technology

INTRODUCTION

The traditional universities relying on classroom teaching modes were taken aback during the COVID-19 pandemic when they suddenly had to shift to complete online methods, irrespective of their preparedness. The pandemic catalysed the curricular changes in higher education, particularly in India, as envisaged by its National Education Policy (NEP) 2020 (Government of India, 2020) and the University Grants Commission's (UGC's) mandate of 2021. The changes in curriculum laid a thrust on the online learning, which enabled continuing the teaching-learning process during the COVID-19 pandemic. However, it also witnessed the resurfacing of the deep-rooted inequalities of the Indian society in online spaces. During the same time, the academic circle saw voluminous literature comparing the efficiency of online and classroom learning. Studies focusing on media comparisons are not novel and can be traced as long as four decades back, when the 'Great Media Effects' (GME) debate sparked, initiated between its protagonists Richard Clark from the University of South California and Robert Kozma affiliated to the University of Michigan. Though GME was framed around access during times of prosperity and growing interest in the internet during the late 1990s, this paper tries to understand how and why so many students still lacked equitable access to online learning opportunities nearly four decades later makes this debate important and relevant.

The debate includes two rounds: (i) the first one comprises of Kozma's (1991) response titled "Learning with Media" to Clark's article (1983) titled "Reconsidering research on learning from media," and (ii) the second round finds Clark's (1994) reply in "Media will never influence learning" followed by Kozma's (1994) counterargument in the article "Will media influence learning? Reframing the debate." Clark (1983, 1994) was critical of media comparison studies, asserting that instructional methods influence learning. He states that "media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck delivers our groceries causes changes in our nutrition" (Clark, 1983, p. 445). Kozma (1991, 1994) disregarded Clark's stance (1983, 1994) of reducing media to mere vehicles. He posits that it is the media with instructional methods that cause learning.

In the present paper, we extend Kozma's argument in the context of online learning. While we locate the media vs methods debate in the distance education literature, we find that it has not been exploited sufficiently in the literature about online education. In its light, we exfoliate the dynamics of methods vs media debate in contemporary times and find evidence for the need to diversify it. We argue that the social factors pertaining to the Availability and Accessibility of the Internet (A²I) impact learning by directly influencing the choice of media. The problems related to A²I become more pronounced with the diffusion of the rural-urban divide in online spaces as it negatively affects higher education of the socially disadvantaged section, particularly in India. Therefore, we revisit the GME in the context of online learning to throw light on the issues of A²I during times of crisis.

Our central premise is that the social dimensions, particularly the factors related to the availability and accessibility of the internet (A²I) severely impact online learning by directly

influencing the learners' preferences for the media. In this way, our study offers to extend the debate in the present scenario by emphasizing the social context and empirically verifying the claims. It finds its implications in educational curriculum, where we emphasize the need to revise it due to the prevalent contours in online learning.

It specifically addresses the following two research questions. First, given the accelerated pace of technology integration in higher education, catalyzed by the COVID-19 pandemic as a coping mechanism, how can the methods vs media debate between Clark (1983, 1994) and Kozma (1991, 1994) in the current online educational landscape be re-envisioned? Which factor can be added to the existing GMD to expand it? How does the new set of factors impact the existing factors in the GMD? Second, how does looking into the GMD aid in the curriculum re-examination?

The sequence of the present paper is as follows. We first walk you through the counterpoints of Clark (1983, 1994) and Kozma (1991, 1994), followed by the extended deliberations by various scholars on the methods vs media debate. We then trace the locus of the debate in the online education literature, following which we redefine the term "media" in the current context. In the next section, we explicate the context of the present study, along with the sample demographics. Subsequently, we employ certain statistics to justify that (i) the GMD can be widened by including the social factor, i.e., A²I in its fabric, (ii) A²I influences learners' media preferences, and (iii) the skewed spread of A²I leads to social stratification, particularly the rural-urban divide. In the last section, we emphasise the need for serious curricular reforms in light of the prevalent social issues without disregarding the importance of online learning.

LITERATURE REVIEW

Methods vs Media debate

The Great Media Debate (GMD) involves two rounds of arguments between Clark (1983, 1994) and Kozma (1991, 1994). While Clark (1983, 1994) proclaims that instructional methods, not media, influence learning, Kozma (1991, 1994) takes the reciprocal stance and asserts that the culmination of instructional techniques and media impacts learning. The synopsis of the debate is presented below. It is to be noted that while the debate involves multi-layered arguments, we truncated it as per the focus of the paper.

Clark (1983, 1994) takes a behaviourist stance and declares that "[...] media do not influence learning under any conditions"; it only impacts the cost and speed of learning. Learning is instead fostered by instructional methods (Clark, 1983) alone. In the updated explanation of his position in 1994 (Clark, 1994), he argues that the schism between method and medium is vital to avoid misinterpretation of research on instructional media.

Given that the ample literature favours enhanced learning from the new instructional media over the conventional one (White, 1984, 1993; Cognition and Technology Group at Vanderbilt, 1992; Carroll, 1963; Keller, 1987), it is not easy to challenge the rival hypotheses. However, Clark & Salomon (1986) disregard the studies yielding such results. Clark (1983)

explains that the results in such studies are “mistakenly interpreted” due to the confounding of instructional methods with media. The sources of ‘confounding’ include uncontrolled factors consisting of: (a) change in instructor, methods of instruction, and subject matter content across different media whose learning effects are being compared; (b) lesson planning time which increases for newer media over the conventional one; (c) novelty effect leading to enhanced attention of learners when learning with newer media; and (d) biased editorial decisions favouring research with significant media comparison differences.

Further, Clark (1994) disagrees with the position of methods being intrinsic to a given media. He defies the argument that textbooks can merely produce encyclopedic knowledge, televisions can be harnessed for documentary information and computers for complex tasks involving drill and practice. He rather argues that media uses can not limit the methods employed for teaching a task. For instance, it would not be extraordinary to use computers to present documentary information and television to showcase complex learning tasks. Finally, Clark (1983) advises a moratorium on media comparison research until it can aid in theory development.

On the other hand, Kozma (1991, 1994) prefers a constructivist stance and contends that using methods with media capabilities influences learning. He states that “medium and method have a more integral relationship; both are part of the design” (Kozma, 1991, p. 205). In fact, in his updated narrative, Kozma (1994) points out that “in a good design, media and methods are inexorably confounded.” Kozma (1991) explains that while some learners may learn without the aid of a delivery device, others might harness its potential to facilitate their learning. For instance, some learners may depend on audio-visual information to develop an understanding of a topic, while others may find text sufficient.

Further, Kozma (1994) asserts that only certain methods are possible with specific media attributes. Unlike Clark (1983), Kozma (1991) calls for additional research on media to extend the present knowledge and understanding from “[...] media as conveyors of methods to media and methods as facilitators of knowledge-construction and meaning-making on the part of learners” (Kozma, 1994).

Extended Deliberations on the Methods vs Media debate

The perennial media debate, as explained by its protagonists Clark (1983, 1994) and Kozma (1991, 1994) in the above section, appear to have dichotomous schools of thought: one, which supports Clark’s (1983, 1994) position on media but methods influencing learning, and two, which flies in the face of Kozma’s (1991, 1994) stance of learning being influenced by the juxtaposition of methods and media. Thereafter, numerous researchers (Morrison, 1994; Shrock, 1994; Jonassen et al., 1994; Reiser, 1995; Carter, 1996; Hastings & Tracey, 2005; Yang et al., 2014, Kilis and Balbay, 2020; Gulbahar and Adanir, 2021) contributed to the debate. While Morrison (1994) and Carter (1996) align more with Clark (1983, 1994), Jonassen et al. (1994), Reiser (1995), Hastings and Tracey (2005), Yang et al. (2014), Kilis and Balbay (2020), and Gulbahar and Adanir (2021) seem more skewed towards Kozma’s (1991, 1994) narrative.

Further, Shrock (1994) carefully refrains from taking any side but suggests diversifying the debate. Below, we briefly explain the extended deliberations on the Clark (1983, 1994) vs Kozma (1991, 1994) debate.

Morrison's (1994) thoughts resonate more with Clark's (1983, 1994) as he suggests that the instructional strategy, not the media, facilitates learning. He explains that Kozma's (1991, 1994) experiments indicate the effectiveness of instructional material in achieving the stipulated objectives but somehow do not answer the pertinent questions Kozma (1991, 1994) raised. Further, Carter (1996) also finds support for Clark's (1983, 1994) position.

Kozma's (1991, 1994) take is diversified by Jonassen et al. (1994), who note that "learning is distributed between the media, the learner, and the context", including the social context. He raises the concern that the debate focuses "too exclusively" on media attributes vs instructional methods. By emphasizing the ramifications of instruction over the learners' role, the debate tends to lose its relevance in contemporary times. Further, Reiser (1995) does not discard that methods cause learning (Clark, 1983, 1994) but agrees with Kozma (1991, 1994) that specific media attributes shape the methods. We interpret his stance as the interdependence of methods and media and, therefore, situate his narrative closer to that of Kozma (1991, 1994).

Almost four decades after the initial debate was sparked, Hastings and Tracey (2005) unequivocally synchronized with Kozma's (1991, 1994) stance. They do it on the ground that the unique strengths of modern technology, including computers, the internet, and the world wide web, which were not existent back then, affect learning. Further, the work by Yang et al. (2014) also substantiates Kozma's (1991, 1994) narrative. They acknowledge that learners' characteristics significantly impact learning and present a tripartite structure by incorporating it with instructional methods and media attributes.

Much recently, Kilis and Balbay (2020) highlighted that media facilitates that the new teaching methods, based on the beliefs of the pre-service ICT teachers attending a state university in Turkey, thereby reiterating Kozma's (1991, 1994) opinion. Further, Gulbahar and Adanir (2021) reconstructed the debate within the context of Kozma's (1991, 1994) narrative by emphasizing social media integration into education.

Additionally, we note that Shrock (1994) saw problems in adopting either of the two schools of thought, calling them "exclusive." He espouses that locating "a single set of stimuli" imperative to learning is not easy. We understand the central premise of this argument as the need to acknowledge factors beyond media or/ and methods that impact learning.

Therefore, we discern that scholars are distributed in their thoughts on the Clark (1983, 1994) vs. Kozma (1991, 1994) debate. Also, some scholars, including Shrock (1994), Jonassen et al. (1994), and Yang et al. (2014), suggest diversifying the debate. We agree with Shrock (1994) that factors beyond methods and media can impact learning. Yang et al. (2014) acknowledge the role of learners in the debate, which becomes crucial in the present scenario. However, extending on learners' characteristics is beyond the scope of the study. We primarily extend Jonassen et al.'s (1994) take on including the context in the methods vs. media debate, focusing

particularly on the social context. However, we fail to agree with them that learning comes first, and then the context and environment, which are needed for learning. Instead, we argue that both these occur in parallel for effective learning.

Locating Online Education in the Methods vs. Media Debate

It becomes pertinent to mention that the counterpoints of Clark (1983, 1994) vs. Kozma (1991, 1994) find a place in the Distance Education (DE) literature, but are not sufficiently exploited specifically in the Online Education (OE) literature. However, since we are trying to exfoliate the position of methods vs. media debate vis-a-vis OE, a part of DE, therefore the focus of the current paper is on OE. In the present section, we locate OE as a subset of DE, and then justify this position.

We note that the literature casts a wide net for an axiomatic inclusion of OE in the broad definition of DE (Moore & Kearsley, 2004). We begin with a widely accepted definition of DE given by Moore and Kearsley (2004). They define DE as “teaching and planned learning in which teaching normally occurs in a different place from learning, requiring communication through technologies as well as a special institutional organization” (Moore & Kearsley, 2004, p. 2). OE is regarded as the subset of DE (Taylor, 2001) because students are physically separated from teachers in space or/ and time, where the teaching-learning is carried out over the internet.

The expansion in the scope of DE was made possible with the emergence of new technologies in education (Moore, Dickson-Deane, & Galyen, 2011). Infact, a plethora of literature indicates DE's dependence on technological developments (or the media) (Blin & Munro, 2008; Kovanovic et al., 2014). The underlying premise in such literature is that technology holds the potential to revolutionize education.

We argue that the position of OE is not very distinct from DE in that both pedagogy and educational technology play a vital role. However, looking at this picture by excluding the context, particularly the social context, is a matter of grave concern and needs dire attention. We attempt to justify our argument empirically in the subsequent sections of the paper. But before that, it becomes pertinent to (re)define media in the context of OE.

(Re)Defining Media in the present context

Carter (2006) underlines that for distance educators, the media debate is skewed toward comparing newer vs. traditional media. We adopt a similar approach in online environments and dissect media based on its application in two ways. First, we consider the media that supports conducting classes in a face-to-face environment. We call it Classroom Media (CM). Second, we regard the media that supports conducting classes in the online environment. We name it Online Media (OM). In no way does the study intends to compare CM and OM. However, the forthcoming sections of the paper build on this definition of media in the context of OE.

METHODS

Context of the study

The paper draws its data from two large-scale studies conducted in the various Indian Institute of Technologies (IITs), the institutes of national importance in India. The first study is a pan-IIT survey on online education for which the data were collected from learners and teachers through two well-designed questionnaires. The survey questionnaires on online pedagogy were constructed by the pan-IIT group (2020). The data for this study was collected in May 2020, when the COVID-19 pandemic hit the world globally, transitioning the Higher Education institutions (HEIs) to shift completely online.

The second study on Integrating Teaching-Learning and Digital Education (ITLDE) is a multi-institutional case study conducted by IIT Jammu, a third-generation IIT constructed in the Jammu region of the northernmost Union Territory (UT) of India, Jammu & Kashmir (J&K), India. We selected this specific IIT located in J&K for the present paper as J&K faces an additional shackle of prolonged internet shutdowns due to political decisions related to national security, in addition to the infrastructural barriers, like any other developing region. The study on ITLDE is ongoing in the HEIs of Jammu, Kashmir, and Ladakh. The present paper employs a part of its survey data obtained through the learners of IIT Jammu during its Phase 1 data collection from mid-July 2021 to March 2022, when the classes were still completely online due to the pandemic.

Instruments

The pan-IIT study uses two survey questionnaires, one for the teachers and the other for the learners. The present study derives its data from the learners' questionnaire only. It comprised 51 questions pertaining to the perceptions of the learners studying in IITs in online modes. The questionnaire, comprising of both closed and open-ended questions, was devised carefully by the 39 experts in the central team of the pan-IIT group, including directors and faculty members of various IITs.

The study on ITLDE uses the following instruments: (i) survey questionnaires for the teachers, (ii) survey questionnaires for the learners, (iii) focus group discussions with the learners, (iv) interviews with the teachers, (v) interviews with the administrators, and (vi) classroom observations. It is pertinent to mention that the present paper uses only some of the learners' data obtained through the survey questionnaires (Phase 1) during the ITLDE study. The questionnaire comprises close and open-ended questions and includes 63 questions to comprehensively understand the online teaching-learning scenario in the case study HEIs. Its construction followed a three-fold approach of content generation, pilot study, and validation (face validity and content validity).

Sample

In the first study, a total of 11,489 learners from various IITs, including IIT (BHU) Varanasi, IIT (ISM) Dhanbad, IIT Bhilai, IIT Bhubaneswar, IIT Bombay, IIT Delhi, IIT Gandhinagar, IIT Goa, IIT Guwahati, IIT Hyderabad, IIT Indore, IIT Jammu, IIT Jodhpur, IIT Kanpur, IIT Kharagpur, IIT

Madras, IIT Mandi, IIT Palakkad, IIT Patna, IIT Roorkee, IIT Ropar, and IIT Tirupati responded to the survey. The learners' demographic characteristics are placed in table 1.

Table 1: *Learners' demographic characteristics from pan-IIT study*

Variable	Category	Frequency	Percentage (%)
Gender	Male	9353	81.4 %
	Female	2029	17.7 %
	Other	107	0.9 %
Educational level	B.Tech./ B.Sc./Dual Degree	7843	68.2 %
	Postgraduate (M.Tech./M.Sc./M.A./MBA)	2344	20.4 %
	PhD	1065	9.2 %
	Other	237	2 %

In the second study, a total of 81 learners from IIT Jammu responded to the survey. Their demographic profile is mentioned in Table 2.

Table 2: *Learners' demographic characteristics from the ITLDE study (IIT Jammu)*

Variable	Category	Frequency	Percentage (%)
Gender	Male	67	82.7 %
	Female	14	17.3 %
Educational level	Graduation (B.Tech.)	65	80.2 %
	Post graduation (M.Tech./ M.Sc.)	16	19.8 %
Monthly Household Income	Less than INR 20000 (roughly less than \$250)	15	18.5 %
	INR 20000 - INR 50000 (roughly \$250 - \$600)	30	37 %
	More than INR 50000 (roughly more than \$600)	36	44.4 %
Locality	Rural	25	30.9 %
	Urban	56	69.1 %

It is to be noted that the data in table 1 and 2 do not show equal gender representation. It is because there is a general trend in IITs that females' enrolment is usually much less than that of males. This explains the reason behind the high skewness in the responses from both these genders.

Finally, descriptive statistics, the Chi-square χ^2 test (Onchiri, 2013), and Fisher's exact test (Bower, 2003) were employed to analyse the data using SPSS version 26.

RESULTS

In this section, we first show that the availability and accessibility of the internet impact online learning. Through this, we validate our claim for the need to expand the GMD by acknowledging a specific social factor, A^2I , which perturbs the online learning fabric. Thereafter, we exfoliate the impact of A^2I on the media, pointing to a stark preference for CM. Subsequently, we trace the social problems related to the rural-urban divide which diffuse into the online spaces, with A^2I being a pivotal governing factor for the polarization. Through this, we establish the need to re-design the curriculum.

A^2I influences online learning

We found strong evidence for A^2I impacting online learning. Here, learning is operationalized through (i) learning effectiveness and (ii) learners' motivation. We noted the following things in the pan-IIT study. First, we saw that the Chi-square test ($\chi^2_{(1)} = 123.92$, $p = 0.00$) revealed a significant difference between internet download speeds and motivation. From the descriptive statistics, we further found that most learners with low internet downloading speed (i.e., 64.75%) showcased less motivation for online learning. Similarly, the majority of the learners with high downloading speeds (i.e., 50.56%) indicated a high motivation for online learning.

Second, based on the Chi-square test ($\chi^2_{(1)} = 102.06$, $p = 0.00$), we rejected the hypothesis of no difference between internet upload speeds and learners' motivation. In sync with the previous trend, we observed that most learners having low uploading speeds (64.06%) were less motivated to learn online. Also, the study shows that majority of the learners having access to high uploading speeds (52.78%) were more motivated to learn online.

Third, we cross-tabulated internet stability with motivation and found them significantly related ($\chi^2_{(1)} = 548.23$, $p = 0.00$). The trend of the majority of the learners with less internet stability (68.35%) having less motivation, whereas the majority of the learners with high internet stability (57.90%) having high motivation continued.

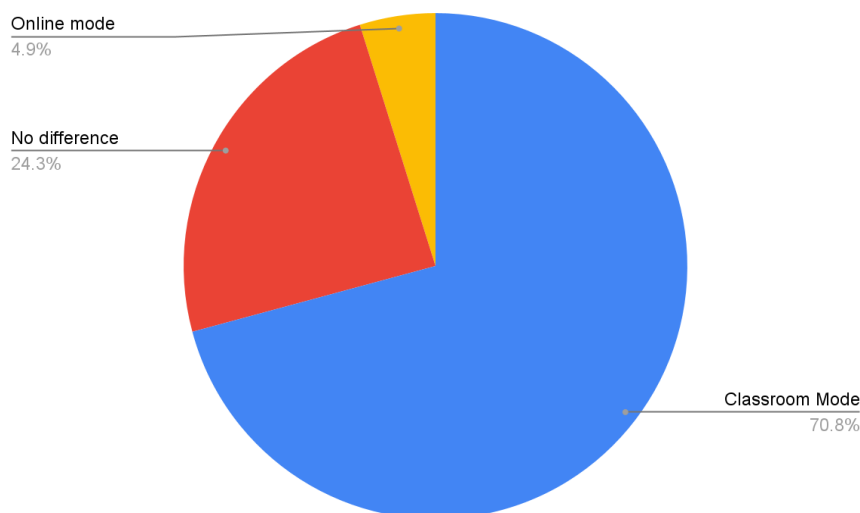
Further, the results from the ITLDE study conducted at IIT Jammu appear to resonate with the pan-IIT study. Here also, we discern learning effectiveness and internet problems to have a significant relation, as revealed by Fisher's exact test ($p = 0.020$).

As a consequence, we see that the internet attributes, particularly its quality, severely impact online learning. Also, learners with better access to the internet in terms of speed and stability exhibit better learning outcomes in the online landscape than the other learners.

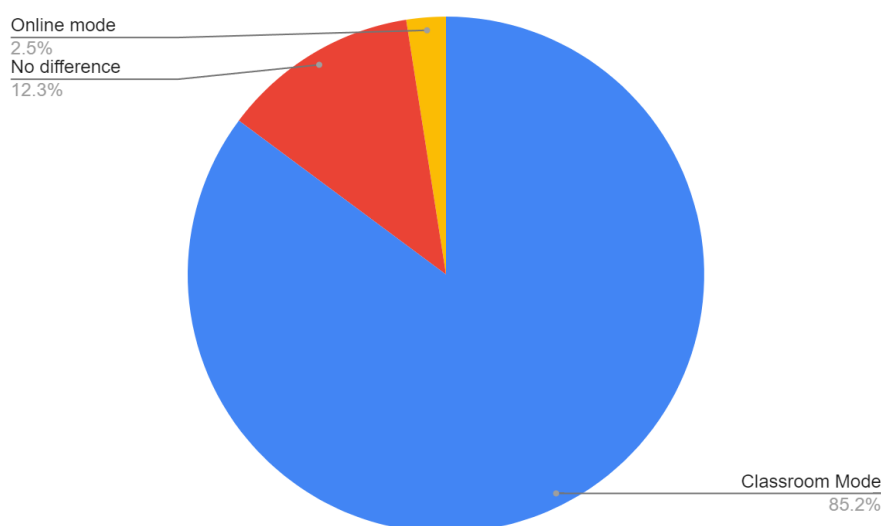
A²I shapes learners’ media preferences

After having established that A²I impact online learning, we intricately show its influence on the media. We underscore that lack of A²I is one of the primary factors, amongst the pool of others, influencing learners to be more motivated while learning through CM than OM , as shown through the pan-IIT study and the ITLDE (graph 1 & 2). In both the graphs, we notice a consistent trend of learners’ preferring to learn from CM over OM due to hiccups related to A²I.

Graph 1: *Learners’ motivation in the pan-IIT study*



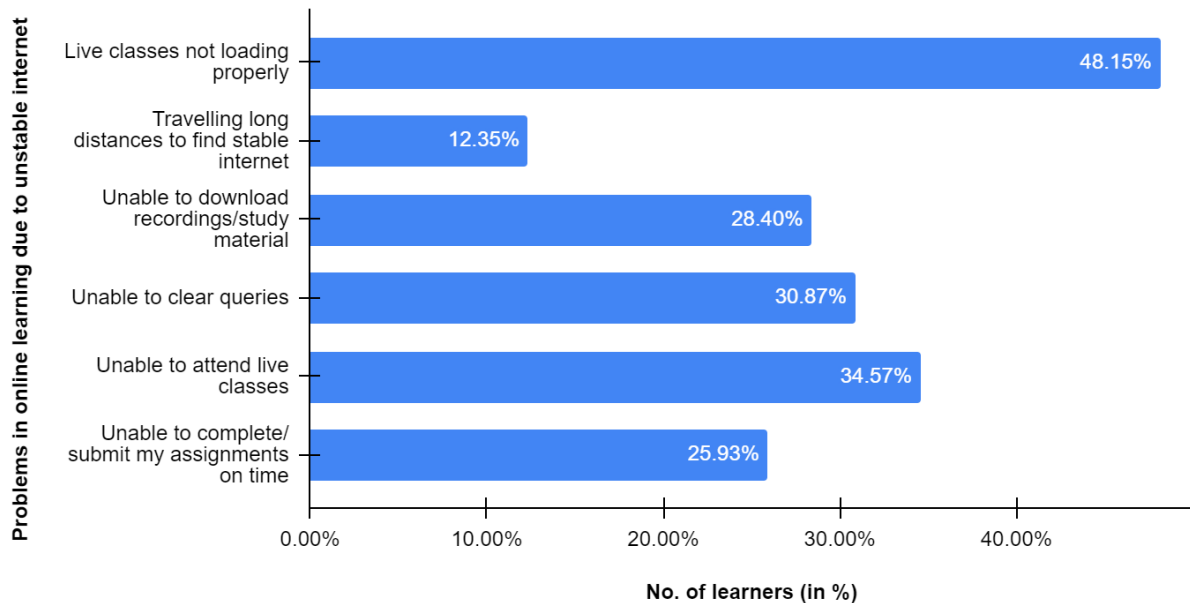
Graph 2: *Learners’ motivation in the ITLDE study*



The reverberations of A²I on media become further clear from the the ITLDE study which reveals that only 9.9% of the learners preferred learning online in the future. We justify the reasons for these skewed media preferences as follows.

First, the ITLDE study reflected the hiccups faced by learners due to poor internet connectivity, as shown in graph 3.

Graph 3: Learners' problems¹ in online learning due to internet hiccups (ITLDE study)



Second, as mentioned earlier in the paper, learners in IIT Jammu faced additional wrecks of internet shutdowns, as reported by every 4 out of 10 learners. We surmise that these learners might have taken online classes from the campus, instead of going to their homes in different Indian states and UTs, when the COVID-situation slightly improved and faced the problems of internet blackouts. Here, we highlight that 93.33% of the learners facing internet shutdowns did not prefer the OM.

Third, the pan-IIT study showed power cuts as one of the factors profoundly impacting the A²I ($\chi^2_{(1)} = 198.16, p = 0.00$), thereby resisting the smooth flow of online learning.

The above factors, related to the impact of A²I on the media, explicate the reasons for learners preferring CM in contrast to OM. Consequently, tracing A²I for leading to learners' skewed media preferences would not be incorrect.

Social stratification led by limitations in A²I

In this sub-section, we explicate how the lack of A²I lead to polarization in society, particularly emphasizing the rural-urban divide. The data from the ITLDE study revealed a significant dependence between locality (i.e., rural or urban) and internet-related problems, using Fisher's

¹ While the problems in online learning due to hiccups in internet connectivity, as shown in graph 1, are self-explanatory; there is one problem that we think is a little specific in the Indian context and needs certain elaboration for the global audience, i.e., "Travelling long distances to find stable internet connection." The contoured A²I in India leads to poor internet connectivity in certain far-flung pockets of the country, forcing learners to travel long distances in search of stable internet connection. It is to be noted that various geographical, social, and political factors are responsible for this uneven spread. The paper also discusses one of the social inequalities, i.e., rural-urban divide, erupting in the online landscape due to this uneven spread.

Exact test ($p = 0.00$). The descriptive statistics show that 96% of the learners from rural households faced internet problems over 71.42% of the learners from urban households. We speculate that the discrepancies associated with the unequal spread of A²I have the potential to aggravate the rural-urban divide, thereby devolving equal opportunities to one stratum of learners coming from a specific rural background. It throws light on the need to redesign the curriculum with urgency, making it more inclusive for the vulnerable section of the learners.

DISCUSSION

In summary, we reiterate that it becomes relevant to revisit the 'Great Media Debate' (GMD), which metamorphosed substantially with the evolution of media over the years (Hastings & Tracey, 2005). The exponential growth in technology saw an eruption of computers, the internet, and artificial intelligence in the present scenario, all of which did not exist back then when the methods vs. media debate took shape. The advancements in educational technology are believed to revolutionize the higher education. This line of thought also diffuses in the Indian context, as is evident through its national education policies. For instance, NEP 2020 (Government of India, 2020, p. 57) proclaims that the "emerging disruptive technologies [...] will necessarily transform the education system." To our best understanding, this narrative starkly invites Clark's (1983, 1994) scepticism, who emphasizes that instructional methods are responsible for learning, not the advancements in media or media attributes.

Further, it would not be wrong to say that modern technology turned the "delivery truck into a supersonic jet" (Hastings & Tracey, 2005). The concern of the 'truck' or 'supersonic jet', or simply the media reaching all the learners equally lingers on. We fail to agree with Clark's (1983, 1994) truck analogy as it undermines the importance of media in the instructional fabric by reducing it to mere carriers of knowledge. Jonassen (1994) rightly points out that "trucks would be unable to deliver anything if there were no highways, fuel distribution centres, and public safety infrastructures." There are always concerns about trucks not reaching all the marked destinations due to inadequate support. In the same manner, by discarding the role of media in learning, Clark's (1983, 1994) argument becomes exclusionary of the social inequities inhibiting the availability and accessibility of media resources to the learners. It becomes a matter of concern that despite Clark (1983) acknowledging that various media might influence other instructional problems, including equity of access, he chooses to remain silent on these issues.

We resonate more with Kozma (1991, 1994) in that he acknowledges the conjunction of media and methods to cause learning. Resier (1995) backs this argument by remarking that "successful delivery of instructional methods (the groceries) is dependent, in part, on the attributes of the medium (the vehicle) used to deliver them." Further, Anderson and Dron (2010) remark that "the technology sets the beat and creates the music, while the pedagogy defines the moves." However, we also underscore that the debate needs to be diversified in the present context by incorporating A²I as one of the social factors influencing GMD.

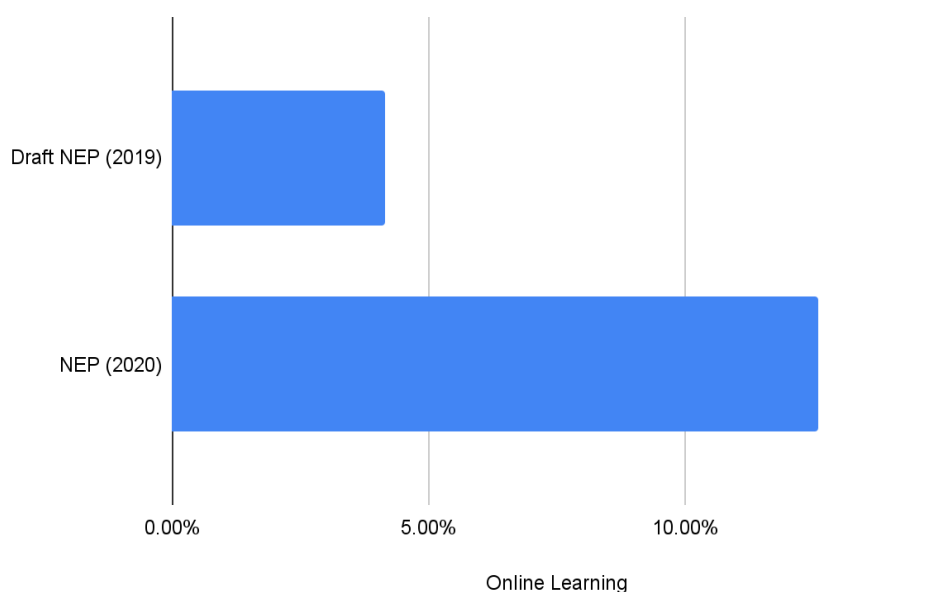
We show evidence that A²I impacts online learning in both the synchronous and asynchronous modes. We saw that learners who have a better quality of internet in terms of downloading and uploading speeds and stability showcase higher learning effectiveness and motivation. Further, we found a relationship between A²I and the media. The study shows that learners faced numerous problems due to the lack of A²I, with the bottlenecks aggravating because of factors like internet shutdowns and power cuts. This hindered the smooth flow of learning in the online landscape, thereby shaping learners' preferences toward the media employed in traditional classrooms.

The study also affirms the eruption of social polarization due to the asymmetrical spread of A²I in the form of rural-urban inequalities. The skewed distribution of digital resources to urban households bereaves a large set of learners from rural households from getting equal opportunities to learn in online mode, in contrast to their counterparts. These findings can be supplemented by the NSS 75th round (Government of India, 2018), which reveals the drastic rural-urban divide, with only 4.4% and 14.9% of rural Indian households having access to computers and internet, in contrast to 23.4% and 42% of the urban households. Additionally, it is to be marked that only 4 out of the 10 people accessing mobile internet belong to rural parts of India (India Cellular & Electronics Association, 2020). Consequently, the social polarization due to the rural-urban divide is quite stark in the Indian scenario, particularly in online spaces. Also, it becomes pertinent to note that the analysis of social stratification is based only on the data collected from the ITLDE case study. At this juncture, we highlight that the ITLDE study, to an extent, represents the national scenario, given that the online learning captured in the present paper is during the time when the enrolled students belonging to various Indian states and UTs had gone to their homes because of the COVID-19 pandemic. Also, acknowledging that internet shutdowns, power cuts, and unequal distribution of resources are not specific to J&K, we argue that the findings are not restricted to learners of IIT Jammu. For instance, the data presented on the website *Internet Shutdowns* reports more than 15 internet shutdowns in the last decade in the following regions, other than J&K: Rajasthan Uttar Pradesh, Haryana, West Bengal, and Meghalaya. Beyond access to digital resources, power cuts remain a major hurdle. The gravity of the situation is reflected in Mission Antyodaya's report of 2020, which explicates that 27,930 villages in India have no electricity at all (Government of India, 2021). However, more data from diverse HEIs can potentially further strengthen the present argument. In this way, we empirically claim that A²I is one of the social contextual factors holding the potential to variegate Kozma's (1991, 1994) standpoint in the GMD. Therefore, our work makes a contribution to the theory development related to the GMD, which finds its implications in curriculum re-imagination. It is undeniable that the need to refurbish the curriculum proliferates in the light of social contours, led by the unequal spread of A²I. This also implicates the reverberations of factors influencing learning on curriculum re-imagination.

The recent pandemic time noted a tremendous change in curriculum re-designing by giving huge impetus to online learning. The changes are plotted in graph 4, where we see

prominent weightage to online learning in NEP (2020), which was launched during the COVID-19 pandemic, in contrast to Draft National Education Policy (Government of India, 2019), which came before the onset of the pandemic. It was further championed by the UGCs (2021) mandate suggesting that 40% of the content for each course be transacted online for HE. It reflects how COVID-19 influenced the significant curricular changes in India, through its education policies, by laying a momentous thrust on online learning.

Graph 4: Comparative word Density (%) analysis of “Online” Learning in Draft NEP (2019) vs NEP (2020)



However, such a curricular reform fails to include the learners who are deprived of digital resources, specifically the students from rural households, as reinforced by the present study. It does not give due attention to the social context of the learners, who are one of the primary stakeholders (Chaudhary, 2015) and are at the receiving end of the curriculum implementation process. Therefore, it is not practical to reimagine a curriculum without taking into account the factors influencing learning. Consequently, it becomes necessary to identify the broad spectrum of factors that influence online learning. While the GMD strives to achieve the same, the present study calls for expanding its scope in the present times. Hence, by broadening the horizon of the GMD and acknowledging one of the specific factors that impact online learning, i.e., A²I, we pave the way for a holistic approach to curriculum re-imagination.

CONCLUSION

In the present paper we refurbished the Clark (1983, 1994) vs Kozma (1991, 1994) debate in the context of online learning. We acknowledged that factors beyond methods and media impact online learning and delimited the present paper to just one such pivotal factor, i.e., availability and accessibility of the internet (A²I). We established that A²I impact the media directly, influencing learners' preferences for classroom media. The study also pointed out that the

asymmetrical distribution of A²I led to growing rural-urban disparities in online learning. It calls for the pressing need to redesign the curriculum in the context of online learning by keeping into consideration (i) the various stimuli having the potential to impact learning, particularly the A²I, and (ii) the plausible contours led by the unequal distribution of A²I (for instance, the rural-urban divide). Further studies may explore other stimuli impacting teaching and learning in the present scenario and subsequently contribute to extending the GMD. Research may also be conducted linking these stimuli with curriculum revisions to make the process of curriculum development more enriching and effective.

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