Research Article

Navigating the SAMR Model: Challenges and Perspectives of Delhi School Teachers

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Abstract

The SAMR model provides a theoretical framework for teachers to guide them to integrate technology in the classroom as an effective pedagogical tool. Delhi schools have been chosen for this study. The qualitative approach followed by semi-structured interviews are employed to gain the understanding, perceptions and challenges encountered by 20 educators of Delhi schools while using SAMR framework as a pedagogical tool. The findings highlight the varying level of awareness among educators, however private teachers have a better understanding of the SAMR model and its applicability as compared to public school teachers. Teachers perceive SAMR as an effective framework for enhancing student engagement and higher order thinking skills but mention a lot of challenges while implementing this model in the classroom such as limited internet connectivity and resources availability, insufficient training, rigid curricula and exam-oriented education system and so on. The study also points out the need of context-specific adaptations such as bridge India's digital divide issue and educational priorities that SAMR model needs to make.

Keywords: SAMR model, Technology integration, Qualitative study, Delhi School teachers' perceptions, Implementation challenges, Indian classroom.

Introduction

In the 21st century, lot of aspects of life has changed by Information and Communication Technology (ICT) at a very fast-paced development. Education is one of the vital areas that experienced the greatest changes. As ICT considered as an effective tool for incorporation in teaching-learning practices, educators need to well-equipped with the ICT integration ability, both within and beyond the classroom to achieve the set educational objectives (De Castro et al., 2025). The intricate aspect of new digital technologies complicates an already challenging process of teaching alongside technology (Mishra et al. 2009). Since the late twentieth century, the integration of ICTs into the educational context has sparked pedagogical and scientific discussion, but the discussion was perhaps accelerated in this century due to the existence of programs for the digital transformation of school systems, particularly in the era of science policies targeting innovation and global economic competitiveness (Lyddon 2019; McKnight et al., 2016). For many years, it was widely held that introducing ICTs into schools would transform teaching and learning processes, and the technology was often justified, at least in part, on the basis of positive outcomes considered to promote educational reforms that were called for in official government documents (Blundell et al., 2020).

To assist teachers and researchers with their integration of technology, researchers have created standards,

frameworks, models, and theories to offer guidance to both research and practice in relation to technology integration into teaching and learning. To exemplify, the International Society for Technology in Education (ISTE, 2015) created standards that exist "to support students, educators and leaders with clear guidelines for the skills, knowledge and approaches they need to succeed in the digital age" (para. 1). As stated by ISTE, these standards have been adopted or adapted by over fifty percent of states and territories within the U.S., and could potentially support K-12 technology integration and assessment.

Community of Inquiry Framework (Garrison et al., 1999) is another example in which teachers denoted the importance of 3 vital and complementary factors; i.e., social, cognitive and teaching are required for computer-mediated instructions. According to TPACK (Technological Pedagogical Content Knowledge) Framework, educators should have the knowledge and understanding about technology, pedagogy and content and how can they make the classroom teaching and learning process effective with the applicability of this TPACK framework (Koehler et al., 2014; Mishra and Koehler, 2006).

In addition, the Ecological perspective of Zhao & Frank, (2003) also emphasises interdependence among schools, teachers and students. According to the researchers, "a school exists as a complete unit necessary for functioning of a long period of time as an interdependent system in a hierarchical structure" (p. 812), as nested within a school district, which is included in a state educational system, which is part of a national educational system.

A number of popular models for technology integration in classrooms such as RAT (Hughes, 2005), TIM (Allsopp et al., 2007), TPACK (Mishra and Koehler, 2006), SAMR (Puentedura, 2006) etc exists. The SAMR model (Puentedura, 2006) is a popular choice out of the several frameworks that offer a hierarchy from simple technology substitution to the radical redefinition of learning tasks. In principle, it offers the potential for teachers to incorporate digital tools into their practice that has the potential for creativity, collaboration, and deeper student engagement. In this changing context, it is important to understand how technology is affecting and being adopted in infrastructures at the grassroots level. More specifically, from the teachers' point of view, who are critical players in the education ecosystem as facilitators of digital transformation and as vital connectors to students, students are the ultimate beneficiaries of the work of teachers.

In practice, however, there are, especially in Indian classrooms, a number of systemic, pedagogical, and infrastructural barriers to progressing through the SAMR hierarchy. While the global literature has identified that SAMR promotes a positive digital pedagogy, (i.e., higher order thinking) there is very little academic literature that critically examines the challenges faced by Indian teachers when pursuing a SAMR model.

In this paper, researcher aims to address this gap by qualitatively analysing the perspectives of school teachers in Delhi who have attempted to incorporate technology using the SAMR framework. Emphasising the teacher voices, this research provides a contextualised understanding of the barriers faced when adopting the SAMR model in an Indian educational context.

Research Questions

1. Are the teachers in Delhi schools aware about the SAMR model of technology integration?

2. What are the perceptions of teachers regarding SAMR model technology integration in the classroom?
3. What specific challenges or barriers school teachers are encountering while implementing the SAMR model in the classroom?

Significance of the study

This study is significant in a way as it illuminates the challenges related to the implementation of SAMR model in the Delhi schools. This is a gap that is underexplored in global literature. The perspectives of Delhi teachers highlight the existing realities of Indian classroom and specific challenges faced by them. This study also tries to earmark that how far or distant is Indian classrooms' present conditions from the vision of policies or initiatives such as "Digital Bharat", NEP 2020 etc. This study explores the viewpoints of private and public, both type of schools regarding SAMR model integration in classroom pedagogy and bring out the variance between the two. This study helps in understanding the existing situation of digital divide, inadequate teacher preparedness and informs new strategies to address the digital divide and create more conducive environments for student engagement.

Literature Review

SAMR Model

SAMR (Substitution, Augmentation, Modification and Redefinition) model was introduced by Ruben Puentedura in 2006 and later it popularised in 2012 (Fig. 1). Puentedura described SAMR model in 4 levels- Substitution, Augmentation, Modification and Redefinition. Initial 2 levels categorized as Enhancement level while later two levels classified as Transformative level. The SAMR model, visualized as a ladder, is a four-tier framework for selecting, utilising, and assessing technology in K-12 education. As stated by Puentedura (2006), the SAMR model serves as a mechanism to describe and categorise how K-12 educators implement technology in the classroom. The framework motivates educators to progress from lower to higher levels of technology integration, which, according to Puentedura, results in improved (i.e., enhanced) teaching and learning outcomes (Hamilton et al., 2016).

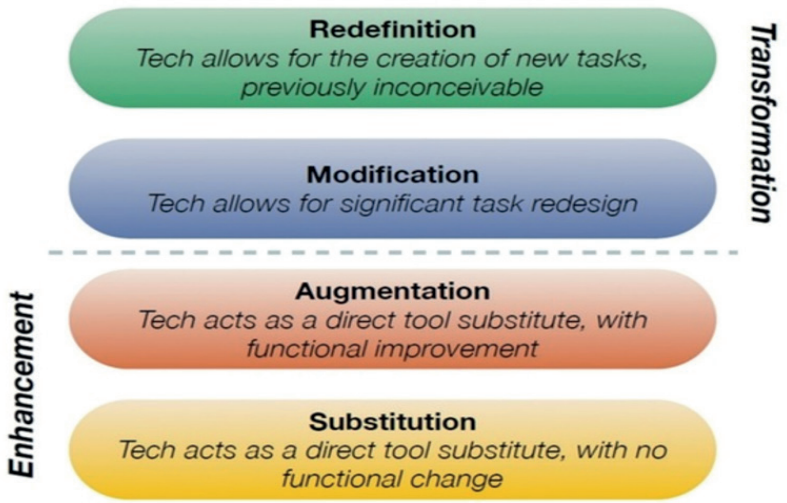

Fig. 1: Puentedura's (2006)-SAMR Model (Substitution, Augmentation, Modification, and Redefinition) [retrieved from http://www.hippasus. com/rrpweblog/]

To enhance readers' comprehension about the applications of SAMR, researcher provided concise descriptions and hypothetical examples derived from content available on Puentedura's website. At the Substitution level, digital technology replaces traditional way of instructions, but this substitution results in "no functional change" (Puentedura 2014a). For instance, in a middle school science class, a teacher preferred taking assignments on Google Classroom platform instead in handwritten form. At the Augmentation level, the technology is exchanged, leading to a positive change in the function of the task or tool. For instance, the same assignment submitted on Google Classroom platform, can be edited, modified or shared at any time anywhere by the students easily. At the Modification level, integrating technology requires a significant redesign of the task. For example, the same assignment can be shared with the peers with help of digital technology platform for getting diverse perspective on the same topic and it allows students to collaborate smoothly and another example say, in a secondary science classroom, a teacher with the help of interactive computer simulation trying to explain the concept of "Mass Volume" by manipulating the quantities. Lastly, the Redefinition level is reached when technology is employed to create entirely new tasks. For instance, the students are encouraged by teachers to publish their innovative ideas or thoughts to the public domain and instead of writing a political science persuasive editorial, teacher asks them to present their arguments individually produced videos.

Technology integration challenges in classroom

The use of the SAMR model in educational environments encounters various obstacles that impede successful technology integration. Although the model intends to improve teaching practices with technology, a considerable number of educators still operate at the substitution level, simply swapping out traditional approaches without meaningful changes to their pedagogy.

According to (Hamilton et al., 2016), the SAMR (Substitution, Augmentation, Modification, and Redefinition) model is a four-tiered framework designed to assist in the selection, use, and evaluation of technology in K-12 educational environments (Puentedura 2006). Although it has gained traction among educators, the existing literature does not adequately address the SAMR model. Researchers present a critical analysis of the SAMR model, drawing on theoretical underpinnings and previous researches to increase the ongoing discussion regarding teachers' understanding and application of technology. The researchers assess the lack of contextual considerations, the hierarchical nature of model, and the focus on results rather than the procedure involved, and researchers conclude with recommendations to support educators and researchers in their endeavours to integrate technology effectively.

The barriers associated with the use of the SAMR model include inadequate training for teachers, reluctance from institutions to embrace change, and insufficient support for the integration of technology. Many teachers are stuck at the substitution level, only able to replace traditional methods with technology without making any functional or effective advancements in pedagogy (Krisbiantoro and Ashari, 2024).

Some major obstacles to technology integration highlighted by the paper include the poor infrastructure, continuous training needed by teachers, and resistance from educators. These

elements make a huge impact on the effective application of model like SAMR in classroom settings (Melo et al., 2024).

Boateng and Kalonde (2024) tackled also issues affecting the implementation of the SAMR model: if teacher training is insufficient, there is resistance to change, resources are scarce, and students' levels of technological skills vary, the effective integration of technology could be hampered, along with student engagement and motivation.

According to the research of Kelsch and Wang, n.d., in some cases the SAMR model can provide a philosophical umbrella under which technology is integrated; however, in other cases, it also can hinder effective practices. Issues include coping with the rapid pace of change in educational practices, and the perception of the model as a rigid, linear procedure.

In the research of Zamri and Mohamad (2025), there are challenges confronting the SAMR Model such as dependence on particular contexts, emphasis on hierarchical organisation, as well as different levels of acceptance of technology among teachers. These challenges require a context-sensitive method to successfully implement technology in educational environments.

The incorporation of digital technologies in education has become a necessity rather than a choice in modern pedagogy. The SAMR model, created by Puentedura in 2006, provides an organised framework for teachers to progress from merely substituting traditional tools to completely redefining learning experiences with technology. Though the model has gained significant adoption and research worldwide, its application in Indian classrooms, especially in urban areas such as Delhi, has not been fully investigated.

Methodology

Research Design

The study employed qualitative approach descriptive research design. This study used semi-structured interview tool to capture the perceptions and experiences of teachers regarding SAMR model implementation in classroom.

Sample and sampling technique

Capital city of India is a very diversified place in terms of every aspect whether it is education, economy, politics or sociological issues. Delhi perfectly witnessed the institutional diversity. 20 school teachers of different schools (both private and public) of Delhi shared their experiences related to objectives of the present study. Initially 25 teachers were chosen for the study but 5 are excluded (lacking awareness about SAMR model) because the focus of the study is to understand about the implementation issues in classroom.

The purposive sampling was employed to collect the data. The participants of the study were selected to ensure variation in their years of teaching experiences, subjects, classes and type of school in which they are teaching. These dimensions are important to understand the phenomenon under investigation. The study tries to capture diverse experiences and practices related to the SAMR model with the help of such heterogeneous sample units. The focus of this study is not on generalisation to a larger population but on exploring meaningful and in-depth insights from educators. The information related to participants is summarised in Table 1.

Table 1: Participants' information

Partici-pants	School name	Type of School	Subject	Years Experience	Awareness of SAMR model (Yes/No)
P1	Sarvodaya Bal Vidyalaya, West Patel Nagar	Public	Economics	Less than 5 YEARS	Yes
P2	Sarvodaya Bal Vidyalaya, West Patel Nagar	Public	Economics	5-10 YEARS	Yes
P3	Sarvodaya Bal Vidyalaya, West Patel Nagar	Public	English	Less than 5 YEARS	Yes
P4	SKV Dayanand Road Daryaganj	Public	Science	MORE THAN 15 YEARS	Yes
P5	SKV Dayanand Road Daryaganj	Public	Mathematics	Less than 5 YEARS	Yes
P6	Govt. Co.Ed	Public	English	Less than 5 YEARS	Yes
P7	Govt. Co.Ed	Public	Social science	Less than 5 YEARS	Yes
P8	Delhi International Public School	Private	Science	MORE THAN 5 YEARS	Yes
P9	Cambridge School	Private	Science	Less than 5 YEARS	Ye
P10	SS Khalsa Senior Secondary School	Private	Social Science and English	Less than 5 YEARS	Yes
P11	SS Khalsa Senior Secondary School	Private	English	Less than 5 YEARS	Yes
P12	SS Khalsa Senior Secondary School	Private	Science	Less than 5 YEARS	Yes
P13	Apex Public School	Private	Science	Less than 5 YEARS	Yes
P14	Apex Public School	Private	Social Science	Less than 5 YEARS	Yes
P15	Apex Public School	Privat	Hindi	Less than 5 YEARS	Yes
P16	Queen Mary School	Private	Social Science	Less than 5 YEARS	Yes

Partici-pants	School name	Type of School	Subject	Years Experience	Awareness of SAMR model (Yes/No)
P17	Queen Mary School	Private	Science	Less than 5 YEARS	Yes
P18	Queen Mary School	Private	English	Less than 5 YEARS	Yes
P19	SKV Dayanand Road Daryaganj	Public	English	MORE THAN 5 YEARS	Yes
P20	SKV Dayanand Road Daryaganj	Public	Hindi	Less than 5 YEARS	Yes

Data collection method

The data of this study was collected through semi-structured interview of school teachers of Delhi. The interview was conducted with the focus on teachers' understanding about SAMR model, what are the perceptions they have and most importantly what barriers or challenges they are facing while implementing this model as a digital pedagogical tool in classroom.

Data analysis technique

The perceptions and experiences related to classroom activities shared by the teachers were thematically analysed by the researcher. In this process of thematic analysis codes, categories, themes and then major themes were inductively generated by the researcher.

Findings of the study

The researcher has drawn themes from the raw data obtained from the semi-structured interviews with the Delhi school teachers. This analysis of raw data revealed major themes related to awareness and understanding of SAMR model, its use as a pedagogical tool in classrooms and challenges encountered by the teachers during implementation.

Familiarity and understanding about SAMR model

All the participants acknowledged their understanding of the SAMR model since it was one of the criteria for including them in the research (5 teachers were excluded due to lack of familiarity). However, the knowledge of the model varied from person to person and was also largely dependent on the type of school, teaching experience, and the extent of professional development. For instance, private school teachers (e.g., P8-P18) were able to articulate more about the SAMR model which was evident in their frequent references to Puentedura's ladder analogy and the examples they gave across the 4 levels. For example, P9 (Science teacher, private school, less than 5 years of experience) stated, "SAMR is like going up the stairs - from substituting traditional methods of instructions such as pen-paper mode or chalk and blackboard instructions with digital technology tools such as using projector, smartboards, interactive ICT etc. to allowing students to create virtual labs that redefine the experiments that we couldn't imagine before."

On the contrary, public school teachers (e.g., P1-P7, P19-P20) were less equipped with the description of the SAMR model and their awareness was limited to substitution and augmentation. They also showed less familiarity with modification and re-definition. P4 (Science teacher, public school, more than 15 years of experience) mentioned: "I heard about SAMR model during a government workshop, but it is mostly about replacing traditional approaches with digital technologies. The higher levels: Modification and Redefinition sound interesting and look nice, but I've never observed them achieved here." The discrepancy in perceptions denotes a superficial implementation in low-resource settings where the knowledge mainly comes from mandatory training rather than self-initiated exploration.

Perceptions about SAMR model as pedagogical tool

Generally, teachers saw the SAMR model as a positive tool to environment change and learning outputs, although they still questioned its practicality in Indian classrooms. The positive views mainly revolved around the idea that SAMR could promote the use of higher-order thinking skills and facilitate student-centred learning processes. P12 (Science teacher, private school, less than 5 years) gaining the experience stated: "At the level of modification, students interact on Google Docs for group projects and shared their ideas related to particular scientific topic and it is really a good framework to enhance creative and innovative thinking in students. Through redefinition they might be able to establish global connections with experts through video, thus bringing history to life and make their ideas be available in public domain."

Perceptions of SAMR still had to be seen through the lens of realism; a lot of them considered it more of a theoretical than a practical tool for their situations. Teachers in public schools perceived the greatest problem with SAMR as its great divergence from the requirements of the curriculum; as stated by P7 (Social Science teacher, public school, less than 5 years): "SAMR is an innovative framework, but the reality is our syllabus and education system is exam-oriented. Augmentation level can do a little, e.g., the teacher can explain the difficult parts of the topic through a video, but redefinition level...? To achieve this level is quite impossible or in my perspective that is only for the elite schools."

P16 (Social Science teacher, private school, less than 5 years) mentioned, "It is perfect for the highly motivated learners, but not all the students are privileged to have laptops at home—therefore, the SAMR model assumes that everyone has the same starting point."

In a whole, perceptions were affirmative with 60% considered the SAMR model as highly worthwhile in theory and only 25% in applicability.

Challenges encountered by teachers while implementation

The data gathered through semi-structured interviews and analysed by thematic analysis revealed massive insights on the challenges or barriers facing educators when they try to integrate SAMR model as a pedagogical tool in classroom. The emerged themes are interconnected with each other somewhere.

Infrastructural Limitations: The Material Barrier

The lack of proper technological infrastructure was one of the most frequent challenges that teachers mentioned. They especially pointed out the issues of poor internet connectivity,

computer labs with outdated equipment, and the scarcity of devices for schools run by the government. In private schools, teachers also complained about the Wi-Fi that dropped and the lack of digital resources at the time of the highest demand in the classrooms.

"There is just one projector for the whole floor, and sometimes it is not even working. I would like to try online quizzes, but most of the time, there is no internet." (P3, English teacher, public school, less than 5 years of experience)

The finding here is that the SAMR model is designed to assume that there are no technological interruptions and that the transition is smooth, but in Delhi schools, it is a completely different story. Due to infrastructural shortcomings, teachers are limited to the substitution stage, where no real changes beyond the mere replacement of teaching tools can be made.

Moreover, this scenario could be seen strictly as a 'school digital divide' compared to an urban-rural digital divide, which has been the central focus of the national digital divide research community for years. Besides, it also signals the dependence of pedagogical innovation on basic resources, which is a structural limitation that the SAMR framework itself fails to address. Hence, if the model is not complemented by an infrastructural plan, it will be regarded as mere speech of high ideals.

Limited Professional Preparedness: The Pedagogical Gap

Perennial in the assessments was the lack of teacher training and professional preparedness for actual classroom use of the SAMR model. While many teachers had heard of the model's theoretical stages, they lacked the practical knowledge to design the activities that were beyond mere substitution or augmentation.

"They theoretically explained us about SAMR model in workshops but how to implement it practically in the classroom were never shown" (P20, public school, less than 5 years of experience).

This gap represents a major divide between the conceptual and pedagogical understanding among teachers. Many instructional programs are organised for the teachers' professional development but until now, they have only concentrated on the fundamental information of the technological tools or frameworks and not focused on its practical and effective use in classroom in the light of prescribed curriculum. This leaves teachers stuck at only enhancement level and unable to move forward onto transformational levels.

Construction of these barriers, arising from teacher professional development, points to a gulf between the lofty aspirations of the policy and level-headed practices. For instance, the NEP 2020 mentions to include digital pedagogy in the classroom, yet remains meagrely insufficient in placing sustained hands-on mentoring of the teacher within its ambit. This creates a "policy-practice paradox," which puts the teachers stranded for digital innovation without really backing them up in its pursuit.

Curriculum and Assessment Constraints: The Big System Barrier

Teachers in their strong opinion saying that Indian education system is very rigid and its curriculum follows exam-oriented approach which totally opposed the efforts of teachers if they really try to integrate SAMR- based instructions or any other new approach to teaching-learning process which is mainly time taking. Time is the constraint factor here as teachers are bound to complete the syllabus in the prescribed time. In such a pressure driven environment, teachers enthusiasm to integrate

explorative, engaging and technology-related pedagogical approach to enhance higher order thinking skills in students, was hampered.

"If I try to incorporate a digital project to enhance students' creative and logical thinking, it takes so much time, and then I fall behind the syllabus." (P13, Science teacher, private school, less than 5 years of experience).

The issue presents a sort of system conflict between innovation and accountability. The SAMR model therefore almost gives the autonomy to teachers to redesign task boundaries and become creative, while the whole Indian education system favours examination performance. Thus, the systemic misalignment keeps teachers bound to a risky venture in which innovation seems worthy of being done but are risky ventures to undertake.

From a more critical viewpoint, this issue highlights the instance of educational reforms that tend to ignore the assessment environment, which in the end determines classroom practice. Unless the assessments are changed to value collaborative problem-solving and technology-mediated competencies, the implementation of SAMR will forever remain a rhetoric rather than real change.

Resistance to Pedagogical Change: The Cultural Barrier

Outside the structural-and-pedagogical challenges, many teachers in the group were shown resistive behaviour toward adopting SAMR model type practices. As they were more experienced in pedagogical approaches without technology integration so their resistance saw in the form of doubting the role of technology in the instructional process, fearing the distraction element and lose the control of class.

"Honestly, I feel communication through textbook, blackboard and chalk is more effective. Technology looks effective but doesn't always work with our students" (P4, science teacher, public school, more than 15 years of experience).

Such resistance does not stem merely from the attitude of reluctance; it reflects deeper cultural and epistemological orientations. Many teachers were trained under traditional pedagogies characterised by teacher domination in lecture methods. Thus, any divergence would have either affected or distorted the professional identities of teachers and with infrastructural and systemic impediments themselves forming a sort of defensive rationalisation in resistance-they see SAMR as impractical hence find comfort in their familiar practices.

Thus, it is imperative to use development and cultural change through communities of practice, peer mentoring, and supportive leadership along with handling resistance. This finding sits well with all the academic literature around technological integration, further showing that teacher beliefs, values, and attitudes are just as important as resources in shaping programs for digital pedagogy (Ertmer, 2005).

The Interconnected Nature of the Challenges

In the focus of this study's objectives, various emerged analytical themes highlighted the challenges encountered by the teachers while implementation, are interconnected in practice. For example, lack of infrastructural availability and resources discouraged the efforts of teachers, limited professional preparedness of teachers interplays with syllabus-oriented pressure to restrict innovative pedagogical approaches. The SAMR

model is linear hierarchical in nature but this study points out that challenges faced by teachers in Indian context are much more dynamic and non-linear in fashion.

In this manner, the implementing of SAMR model in classroom is not so much about "climbing the SAMR ladder" as it is about clearing one's way through a forest filled with material, cultural, and systemic barriers that hinders the vision of successful project implementation. This understanding earmarked the point that frameworks like SAMR need to be localised and contextualised rather than just simply transposed gilt-edged into the realm of Indian classrooms.

In nutshell, the existing realities of Indian classroom are not ready to align with the transformative framework such as SAMR model. Essentially, these nature of problems are more systemic, located at the intersections of infrastructure, regulations, pedagogies, and teacher identity. The findings challenge from a critical point of view the assumptions of the generalisability of models such as SAMR. Instead, they ask for SAMR to be reframed in the realities of the Indian educational context, wherein progress may be non-linear, adaptive, and context-driven.

Discussion and Conclusion

The ramifications for the implementation of SAMR model in Delhi schools points out the nature of grounded realities, indicating a clear gap between the model's aspirational status on one hand and socio-economic, infrastructural, and pedagogical hurdles encountering education system in India on the other hand. The SAMR model is a prominent hierarchical framework guiding a path toward more creative and transformative teaching-learning process (Puentedura, 2006), but this study's findings aligned with Hamilton et al. (2016) with the criticism that it fails to engage with contextual concerns. With public schools in Delhi catering to the poor amidst rapid urbanization, any consideration of access begins with assumptions that defy local realities: sporadic power supply, a lack of devices, and so on. These issues are increasingly severe under India's digital divide, with only 45% of households having internet access (most recent NSSO data, not cited directly herein).

Awareness seems to match global trends (Krisbiantoro and Ashari, 2024), but underscores a peculiarly Indian challenge: top-down, policy-driven exposure without depth, leading to performative rather than substantive adoption. Perceptions towards the SAMR are positive, corroborating De Castro and Guia (2025) on engagement enhancement, but critically, teachers' views reflect a eurocentric bias of the model. As Zamri and Mohamad (2025) state, SAMR's hierarchy ignores cultural contexts; in exam-oriented Indian systems, redefinition may undermine the effectiveness of rote learning that guarantees employment in a competitive job marketplace.

The studies of Boateng and Kalonde (2024) and Melo et al. (2024) also witnessed the discussion on challenges faced by teachers while using technology in the classroom, but this study is more peculiar with Delhi school's nuances such as variances in public and private schools resources utility mirroring the issue of digital divide, economic inequalities which is indicating the clear point that private schools has the access of great advancements and transformative approach of instructions while public schools are lacking such opportunities due to underfunding that actually means that funding for education in Delhi in dominantly occupied by infrastructural development as opposed to technology training. If critically analysed, this reproduces inequality-while the SAMR

model could have been the empowering factor for disadvantaged students but it is widening the issue of digital divide in terms of accessibility among poor students. This resistance has been shown by more experienced or veteran teachers about integrating SAMR framework in classroom by mentioning the point that SAMR model has a very rigid structural levels (an abstraction), without understanding its practical integration in pedagogical approaches it would be a difficult process and more agrees with TPACK offered by Mishra and Koehler (2006).

A critical stance would point to SAMR's product-driven focus (Kelsch and Wang, n.d.) as neglecting vital considerations, such as teachers' agency working in resources scarce environments. Real-life existing conditions of Indian school classrooms should compel adaptations thereto: perhaps a "contextualised SAMR" that takes into account for low-technology alternatives or hybrid models.

Overall, while transformative models like SAMR escalates hope, the systemic reforms are needed in Delhi schools especially in public schools, therefore funding for infrastructural support, continuous professional teacher training programs, curricula flexibility and policy transformative approach is needed at ground level realities to turns into more advanced developed ones. Unless intersections are made on these parameters, history may just repeat itself with yet another educational reform lost within the rhetoric of digitalisation and the grit of reality within the classrooms.

Limitations of the study

Limitations of the study on SAMR model implementation at respective schools in Delhi can check its applicability and generalisability. The purposive sampling here includes 20 teachers who understand the concept of units in SAMR; therefore, it introduces selection bias or lacks representation of those who are not aware of the model or its application in the part of diverse teachers' population. Therefore, small sampling designs limits generalisation across the whole of India. It only concentrates on urban Delhi and ignores rural or semi-urban schools. Qualitative methods did not provide quantitative data on the prioritisation of barriers, and self-reported interviews created the danger of social desirability or inadequate reflection bias. No classroom observations were made, objective validation is missing. Students and administrators' perspectives would widen the viewpoint of SAMR adoption, which is lacking in this study.

Recommendations for future research

In the light of the limitations of this study, a wider and inclusive research approach would be a great recommendation for future research.

Large sample size (teachers of rural, semi-urban, and urban schools, students, administrators, policy makers) would include diverse perspectives on adoption of SAMR model.

Stratified sampling instead of purposive sampling would be great because it will include those teachers' perspective as well who are not aware of SAMR model.

Future research could also involve mixed-methods approach which aids in quantification of awareness and challenges faced by teachers while adoption of SAMR model in classroom with qualitative insights. This helps in prioritizing the solutions of the problems.

In an international context, such a cross-cultural comparison with having a similar digital divide can have a worldwide perspective with country-

specific strategies regarding technology integration into education.

Working on "contextualised SAMR model" resource specific, low-technology or hybrid model solutions can also take in consideration.

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