An Interaction between Teacher and Student Digital Involvement in a Pandemic-Building Resilient Classrooms

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Abstract

The adoption of the new Hybrid Education model during the pandemic altered the teaching-learning techniques that posed instructors and students with a slew of obstacles as they attempted to adapt to the digital modes of communication. The objective of this research is to discover new challenges faced by teachers and students which stayed as roadblocks in the Technology adoption process. The research provides a new framework for depicting several stages of student-teacher digital involvement. A qualitative approach is employed in order to arrive at a grounded Theory. Purposive and snowball sampling techniques are used to contact teachers and students. The findings indicate that teachers and students are now confronted with a variety of new obstacles like Unstable internet connectivity, work-life imbalance, unethical methods, and response verification dilemma. The Exploration resulted in the development of a new framework that identified four quadrants depicting phases of student-teacher digital interaction. The outcomes of this study assist institutional management authorities in identifying the numerous problems that they would face when implementing online teaching-learning methods. The research is the first attempt to unite student-teacher conflicts by proposing a four-quadrant framework, thereby giving a road map for educational institutions seeking to increase students' self-reliance.
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Keywords
Self-reliance, Teaching-learning, Digital Involvement, Education Policy, Digital transformation

1. Introduction

Coronavirus-19, one of the most devasting worldwide pandemics in history, emphasized the importance of enhancing public health and socioeconomic policies to prevent the mortality and morbidity caused by this virus. These health and social measures include personal safety measures; environmental measures; and measures of supervision. (World Health Organization, 2020). The most major change made with the implementation of the aforementioned steps was the global lockdown. This pandemic has wreaked havoc on India's economy (Das, 2020). Education is no exception. When this lockdown was declared, it immediately halted all academic-related activity taking place across the country. The velocity at which teaching-learning techniques shifted dramatically was not anticipated in previous works of literature, and perhaps the teaching profession was not prepared to face such a circumstance. These extraordinary times have brought to light significant impediments to information exchange.

(Doyumaç et al. 2020). To address this loss-causing condition, UNESCO (United Nations Educational, Scientific, and Cultural Organization) advised that remote education or open modalities of education be continued via Virtual Classrooms settings. Throughout this study, this new technology-based methodology is referred to as the Contingent Education Model (CEM). CEM connects the locations of students and teachers to enable them to continue their studies via virtual classrooms (Sharma et al. 2021). Therefore, as a result of the abrupt implementation of social distancing rules, online forms of conducting classes have proven to be the sole means of delivering content.

Technology acceptance is one of the major needs for the successful adaption of CEM. Mr Vishwanath Venkatesh and his colleagues conducted previous research in 2003 on "Technology acceptance by its users." The team synthesized eight earlier theories and developed and confirmed a unified model, dubbed the Unified Theory of Technology Acceptance and Use (UTAUT). They specified precisely the factors that influence technology acceptability among its users, regardless of their line of employment. (Venkatesh et al. 2003). As a result, any digital transformation is only successful if it is embraced by the people who will use it. The adoption of the CEM created a slew of difficulties for instructors and students (Sharma et al., 2021) since widespread acceptance and execution of this model is a difficult goal to achieve.

Due to the sudden changes in teaching learning patterns, India, too, saw difficulties adapting to the new education policy. In the New Normal, an educator's technical knowledge, skills, qualifications, and other organizational & administrative assistance, have a significant impact on the learning outcomes of students (Iglesias-Pradas et al., 2021). Due to the Educational Entities' adoption of virtual learning patterns, pupils struggle to concentrate because they are exposed to an informal setting at home (Tan, 2021). Teachers encountered significant technical challenges as a result of outmoded technical infrastructure, limited access to and comprehension of online teaching platforms, and maintaining security on a variety of online teaching platforms (Joshi et al., 2020). Educational institutions have been working tirelessly to adapt to new digital modes of teaching and learning, to induce everyone to develop a greater sense of independence and self-reliance. Concerning these points, a significant statement was made on 12th May 2020, the day the pandemic began, in which Prime Minister Narendra Modi unveiled the concept of "Self-Reliant India" or "Aatmanirbhar Bharat Abhiyan," which focuses on the country's economic development (Patel, 2021). Education should lay a strong foundation for the development of self-reliant and mature citizens. Thus, the education system should seek to build such self-sufficient students and encourage educators to enhance their skills-set to keep up with the objective of making India self-sufficient.

In today's technology-enhanced teaching-learning environment, student self-reliance is contingent upon two factors: teacher digital involvement and student digital involvement. In this article, **we define the operational definition of Self-Reliant Students as the point of equilibrium between teacher and student digital involvement in order to complete the process from content creation to content delivery to content learning and evaluation using these technology-based models.** The level of involvement varies from minimal to profound." Students' self-reliance is contingent upon their teachers' general supportive involvement via online courses and their efforts to integrate the teachings into the new normal.

Teachers and students, the two stakeholders in the education sector, demonstrated varying degrees of sensitivity to shifting patterns of knowledge exchange which further, requires the need to understand the digital involvement levels of teachers and students

1.1 Research Gap

The Education industry employs a sizable portion of the county's young people, who are in the process of maturing into future assets for the country. A good educational paradigm is one in which teachers and students may collaborate on mutual growth and development. Due to the novelty of this educational system, namely the CEM, there is no basis for defining the levels of student-teacher involvement level in the new normal. While previous research has discussed a few obstacles and offer solutions for overcoming them, no research has documented the unparalleled amounts of student-teacher digital engagement during these historic periods. There is no previously defined framework for assessing student-teacher digital engagement levels

1.2 Objectives

Following these concepts, this paper attempts to answer the following research Questions-
1. To explore various challenges faced by students and teachers due to the adaption of the New Tech-based Education Model.

2. To further explore and categorize the stages of Digital Involvement between students and teachers during Covid-19
3. To design a qualitative framework of the relationship between Student-Teacher digital Involvement patterns during Pandemic.

2. Literature Review

This section discusses the dynamics of knowledge exchange in the educational sector during the Coronavirus pandemic. Following that, it illuminates the research work depicting the obstacles faced by students and teachers, laying the groundwork for determining their levels of participation. The final sub-section discusses the levels of student-teacher digital involvement.

2.1 Knowledge Exchange in Education Sector During Coronavirus Pandemic.

Covid-19, one of the most devasting global pandemics, emphasized the importance of enhancing public health and social measures (World Health Organization, 2020). This has had a detrimental effect on every sector in India (Das, 2020). As a result of the uncertain circumstances, the CEM represents a fresh ray of light for the education sector in terms of preventing stakeholder loss, specifically teachers, students, and parents (Sharma et al. 2021). Teachers needed Upskilling and sought to improve the process of information exchange to increase student engagement levels via digital modes (UNESCO, 2020). Governments must ensure that instructors and students have access to communication tools and a digital teaching-learning experience (Mishra et al., 2020). For instance, various national and international academic bodies have adopted online learning by collaborating to incorporate available resources for mass gains (Schneider & Council, 2020). However, in the process of adhering to social distancing norms, Crisis Distance Education (CDE) was found to be the only method for adhering to social distance rules via Internationalization, popularity, expansion, imposition, and medical exigencies (Essa et al., 2020).

2.2 Student Engagement

The pandemic has resulted in the replacement of traditional learning techniques in favour of online education. Student engagement in online modes of instruction is critical (Baber, 2020). The pandemic hampered the internal emotional connectivity between the students and teachers (Murdoch Rodowicz et al., 2020). Due to the Educational Entities' adoption of virtual learning patterns, students struggle to concentrate because they are exposed to an informal setting at home. Lack of personal touch with instructors gradually results in a decrease in students' motivation levels (Tan, 2021). Several other issues that learners confront as they adjust to the new manner of life and learning are a lack of devices, increased charges for internet packs, and lower levels of training provided to teachers and students, etc (Dube, 2020). It is a widely held observation that colleges and universities train faculty to maintain a certain level of quality while conducting classes in the new virtual environment, but students receive less consideration in this regard, even though they face an equal number of challenges adjusting to the new learning environment (Neuwirth et al., 2020). Another challenge to students is the digital divide, as many of them have been deprived of educational chances (Bozkurt & Sharma, 2020), degrading their capacity for interaction. These facets demonstrate that students face numerous obstacles in enhancing student-teacher digital involvement levels.

2.3 Teachers Engagement

Work from home has become the standard (Savić, 2020). A few key issues have been identified by the teacher. They are- lack of expertise in using technological tools and platforms, the incorporation of technology into course content, a lack of desire, and an informal setting at home with fewer fundamental teaching resources than the physical workplace (Joshi et al., 2020). For example, a study conducted last year by gathering data from physical education teachers revealed that teaching online physical education programs was more challenging than in a traditional classroom setting. (Jeong & So, 2020). In the New Normal, technical knowledge, Skills & Qualifications, have a significant effect on the learning outcomes of students (Iglesias-Pradas et al., 2021). A previous study conducted by interviewing teachers who taught maker activities discovered that it was simple to teach using tangible artefacts, which enhanced teacher-student interaction. (Jayathirtha et al., 2020). According to a recent assessment by the National Foundation for Educational Research, the pandemic has burdened teachers with work-from-home demands, the use of advanced teaching methods, parental pressure, additional work duties (Adedoyin & Soykan, 2020), and the care of young children (Walker et al., 2020). All of these factors demonstrate that teachers are also struggling to adapt to the new ways of information exchange. Addressing these issues will increase student-teacher digital engagement.

2.4 Student-Teacher Digital Involvement
The ability to incorporate modern instructional technology, training formats and innovative knowledge delivery models is the defining quality of updated and gifted educators helping enhance student self-reliance (Kateryna et al., 2020). Equal access to learning resources and sufficient training for both teachers and students are two methods to enhance online teaching and learning (Dube, 2020). Further, implementing Happiness courses in universities instils pleasant feelings in students (Murdoch Rodowicz et al., 2020). Different teaching-learning methods should be adapted. If the tools are utilized properly, they can build a successful model of digital teaching patterns for current and future knowledge development processes (Yaman & Muhlis, 2020). The notion of Virtual Laboratories embraced by schools and colleges is a trend-setting innovation that has improved teaching skills and broadened students' comprehension, although its applicability remains limited (Kapilan et al., 2021). In contrast, a new study indicates that students in the medical field have a solid foundation in technology. (Kumar et al., 2020). According to a recent study, the amount of student-teacher contact in digital classes has grown (Oliveira et al., 2021), which enhanced the need for tailormade content design (Scull et al., 2020). Teachers lay the groundwork for a student's personality development and help them enhance their performance and self-efficacy (Ayllón et al., 2019). Not only have organizations assisted instructors in adapting to digital teaching patterns, but they have also established emotional education programs for teachers, assisting them in developing more positive reactions regarding their well-being and teaching practices (Marques et al., 2021)

All the aforementioned perspectives underscore the fact that technology-based teaching and learning is the only viable alternative for the Education Sector's continuous operation in the New Normal. As a result, both students and teachers must become accustomed to the new digital teaching-learning patterns and strive to expand their connection with one another to boost their levels of self-reliance.

3. Methodology
The purpose of this qualitative study is to identify the primary issues faced by educators and students in the new teaching-learning environment and to offer a framework illustrating their interdependence. For this purpose, recent research on "COVID's impact on work-life in the Education Sector" has been reviewed. In addition, to construct a conceptual model of student-teacher digital involvement levels, we collected empirical data from the field using qualitative analysis (Grounded Theory) and open-ended interviews with 12 students and 6 teachers from private schools and colleges. The interview was based on a standardized questionnaire developed through pilot testing with five teachers. After pilot testing, five of the twelve open-ended questions were removed. Final Interviews were performed face-to-face and over the telephone, adhering to all social distancing standards. The teachers were selected via Purposeful Sampling, as those teachers who have adapted to the new technology-based learning environment were questioned. Teachers provided the contact information of students, and a few students provided the contact information of their friends, so building a chain of students led to the adaption of Snowball Sampling. The participants were informed that their interviews would be recorded and that pseudonyms would be used to safeguard their identities. The interview centred on issues relating to student and instructor participation via digital modes of engagement, with each question spanning between 12 and 40 minutes. If respondents had more points to make, extra conversations were conducted with them as a follow-up. Once the interviews were conducted, they were further transcribed. Next, the transcriptions' repeating variables were colour-coded to extract defining variables. Individual semi-structured interviews provided a solid foundation for the new framework proposing the Self-Reliance stages and, eventually, for the new framework outlining the phases of student-teacher digital engagement.
Based on the data gathered from interviews and previous research, a qualitative framework, grounded in qualitative analysis, is given. Qualitative analysis is predicated on each researcher's distinct cognitive approach. Therefore, a Grounded theory is built on diverse viewpoints for different individuals, since a single theory may appear crystal apparent to someone with a similar cognitive style, while it may be incomprehensible to someone with an entirely different cognitive style. (Heath & Cowley 2004). According to Charmaz, "Grounded theory refers to a collection of systematic inductive approaches for conducting qualitative research with the goal of developing a theory." (Charmaz & Liska, 2015).

4. Data Collection
The grades, the institution location, and the subjects taught in the case of teachers are tabulated in Table 1 Pseudo names are being used to protect the identities of the interviewees.

Table 1. Interviewee details

SNO.	PSEUDO NAMES	GRADE	INSTITUTION LOCATION/SUBJECT
1.	T1	Grade 9	Haryana/ Maths
2.	T2	Grade 2	Haryana/ Science
3.	T3	Grade 12	Delhi/ Political Science
4.	T4	Grade 12	Delhi/ Business studies
5.	T5	Grade 5	Chhattisgarh/ English
6.	T6	UG, PG	Uttar Pradesh/ Economics
7.	S1	BCom (Hons)	Uttar Pradesh
8.	S2	Grade 7	Haryana
9.	S3	Grade 12	Haryana
10.	S4	BCom (Hons)	Uttar Pradesh
11.	S5	BCom (Hons)	Uttar Pradesh
12.	S6	BCom (Hons)	Uttar Pradesh
13.	S7	BCom (Hons)	Uttar Pradesh
14.	S8	Grade 9	Haryana
15.	S9	BCom (Hons)	Haryana
16.	S10	Grade 12	Haryana
17.	S11	Grade 9	Haryana
18.	S12	Grade 6	Haryana

Based on the past literature and the data collected, various statements were explored. In this section, we will tabulate some of the challenges to student-Teacher digital involvement by bifurcating them into different levels of digital involvement of teachers and students due to technology adaption. The following table presents statements portraying the different levels of student-teacher digital involvement.

Table 2. Categorisation of statements extracted from interviewees.

Deep level of involvement from the teachers BUT Least level of involvement from Students	Technology ownership Lack, Study content overloaded, Long and continuous classes, Balancing studies with extra committee meetings is challenging to manage, Long lectures, Lesser initiative by students, Low levels of attention span of students, Lack of exposure to real-life situations, One-way communication, Relocating students lacked resources, Students hesitation in online communication, Cameras and mics remaining switched off, Financial problems with students, Lengthy exam submission processes
Least level of involvement from the teachers BUT Deep level of involvement from Students	Lack of internal Satisfaction in teachers in online teaching-learning, Difficulty in adapting the technology, 24/7 calls, texts and work like PPTs preparation, focus on syllabus completion i.e quantity over quality of teaching, Not Tech-savvy, Inability to check the genuineness of students' problems, Increased workloads, Work-life imbalance, Overnight transformation to online teaching
Least *level of involvement from the teachers AND Least level of involvement from Students*	Network issues, disciplinary issues, Unethical practices undertaken by students during exams, Health Problems, Loopholes in technology, Privacy invasion, Lack of emotional connectivity, Increased workload, Absence of virtual labs
Deep level of involvement from the teachers AND Deep level of involvement from Student	Developing attachment for screen, widened scope of teaching techniques adapted, Digital website and gaming support accessible, Student engagement enhancement activities undertaken, New scope of opportunities, Extra-curricular activities, Organisational Support, Problem-solving sessions on personal audio and video calls, New software and platforms created, Reusing and uploading recorded lectures, Using voice to text converting software for language subjects

All the above statements extracted from the interviews could be categorised at 4 levels at which the student's self-reliance could be measured.

5. Findings and Discussions

The first section of the findings will address the first research objective which is bringing to light the major challenges faced by teachers and students related to the new CEM adapted during the pandemic. All the challenges extracted from the interviews are graphically presented in the form of a word cloud in Figure 1.

Figure 1. Graphical representation of extracted challenges from interviews

5.1. Challenges due to the adaption of digital modes of teaching-learning

5.1.1. Unstable internet connectivity

Nearly all interviewees cited network troubles at both ends as the primary and foremost difficulty. Due to the absence of high-speed Wi-Fi or internet connections in all areas, online teaching and learning is unable to achieve its full potential in the current environment (Sharma et al., 2021). On the one hand, **T1** reported that "Students don't have good Wi-Fi". **S2,** a student from 7th grade shared that *"Mostly due to internet problem, the major topics, like maths explanations and Sanskrit which is a new subject, was difficult to understand."* **S8,** a student of Grade 9 added *"The biggest problem that I experienced was the network problem. It happens that when the network is awesome at your side, the teacher is suffering from a network issue, when the teacher is having a good network, you are suffering from a network issue. This led to a big mess-up. Due to this, classes were postponed"*

5.1.2. Technology ownership lack

According to the CEM, we revealed that the new system of teaching and learning is conducted through electronic devices and online channels. However, a huge percentage of students in the education system lacked access to personal devices and the knowledge to use them, posing a formidable obstacle to covering all students. According to recent research, the learners encountered numerous difficulties in adapting to the new manner of living and learning due to the lack of equipment, greater costs of internet packages, lower levels of training provided to teachers and students, etc (Dube, 2020). Further, **S11** said that *"Many students were not comfortable with the technology as they do not have access to personal phones and gadgets. For them, it is very difficult to get used to the online system of education, so for some, it was a big challenge."* **T3** further shared one of her conversations with government schoolteachers and said *"We as private school teachers, students are still from well-to-do families. But what about government schools? I have talked to some of the Government school teachers, they say that we are calling our students and we are teaching them because board exams have to be offline only"* **S3** added *"Students did not have private phones, So, they could not attend the classes. Parents can't give their phones, because of work from home."*

5.1.3. Emotional connectivity blockage

In a classroom setting, a teacher and his or her students build an emotional link of engagement. Teachers can determine whether a student has comprehended the principles with a single glance in the classroom. Students can

readily communicate their concerns and questions to their teachers. A study demonstrates the significance of instilling positive feelings and enhancing students' activities by implementing happiness courses to enhance emotional connections (Murdoch Rodowicz et al., 2020). Due to the abrupt nature of this new online teaching-learning environment, however, this link between them has been severely weakened. **T2** reported that "*The biggest challenge that I faced was that I was not in contact with my children face to face. A child is always having a different type of emotion, even when they are sitting in a class you can see a varied number of emotions. When they are in class, you can see them, observe them, and easily make them comfortable But, here, the emotional factor is missing in this.*" **S4** further added "*As 1st-year students, we were expecting, a classroom experience. Interaction with teachers and classmates was difficult.*" **S5**, being a first-year student, pursuing BCom (Hons.) added that "*Nothing can match a physical, face-to-face classroom. Students are not willing to interact.*"

5.1.4. Escalated Workload

In the new normal, when everyone works from home while riveted to their computers, both teachers and students now work longer hours. It seems like teachers and students are working around the clock and felt an increase in their workload (Adedoyin & Soykan, 2020). Another study indicated that more than two-thirds of university students who participated in this research felt overloaded with study material when juggling their online classes (Yaman & Muhlis, 2020). **T5** said in this context "*The technology we are using was new for students as well as parents. So extra time went on calls to explain to students and parents about new ways of teaching and learning. It was 24/7 work. We only got time to sleep at night otherwise full day we were working for teaching, content creation, and delivery.*" **S1** said that "*Workload became a bit on the higher side. More projects were given, and they were thinking that as we are all at home, so why not give more work.*"

5.1.5. Work-life imbalance

In the CEM, teaching and learning are conducted remotely via digital devices, hence failing to create a formal environment at home. According to a previous study, the environment at home is considerably more casual than that of an institution, school, or university. (Joshi et al., 2020). **T5** shared her experience by saying "*I am a mother of 2 kids. I was not able to concentrate on my kids' classes also. During the lockdown, I had to look after my household chores because the situation was NO MAIDS, NOTHING, and class management was a big task.*" **S11** said "*When we are at home, the environment is not for learning and studying. Due to the change in environment, there is less percentage of understanding.*" **S12** shared his experience by saying that "*the teacher used to unmute students because the household discussions were audible in the class. Discussions related to what to eat by asking*" What to prepare for Lunch?" so it's disturbing.*"

5.1.6. Decelerated Internal satisfaction

A teacher feels gratified when he/she is explaining and connecting with his/her students, while the student feels compelled to increase his/her attentiveness and alertness in class. Literature reveals that student motivation to demonstrate engagement in the online class, the pre-planned framework of the course, the instructor's knowledge, and instructor up-skilling are among the most influential factors in student learning and satisfaction in online classrooms (Baber, 2020). **T3** shared her views by quoting that "*We as teachers felt that we are somewhere failing because we have the habit of interacting with students looking at their faces. No doubt we learned to engage the students, BUT what I feel as a teacher, is that internally I was not satisfied with what we are doing. Even the best technology cannot replace offline teaching.*" **T6** shared that "*In Hindu mythology, we keep our idle in our front and then we worship. For us students are our idle and teaching is our worship. So, when idle is not there, my worship was not complete*" **S7** added his views as a student by saying that "*I feel, compared to the real classroom, Online classes are a world apart. Sense of studying is not there- There is just a false ego satisfaction, that just by logging into the class, you get a full score of 5 marks for your attendance. It feels like we are in a theatre*"

5.1.7. Heightened health Issues

According to Yaman & Muhlis, 2020, teachers supply students with a wealth of knowledge across numerous educational venues. Students exhibited signs of insomnia as a result of such a massive information load. These issues ultimately increase the stress levels of kids, and if left unaddressed, might have a devastating effect on their mental peace, emotional health, and physical health. The teachers and students highlighted several arguments regarding health problems. **T3** raised the point by saying "*Our eyes were glued to the screen, and we faced health issues like headache, Backache etc. Teachers are not in a habit of sitting and teaching. We are not comfortable, being in this comfort zone.*" **S5** further added to this that "*I have an eye problem. I have a very high number which*

is -7, due to which I cannot look at the screen for a very long time. The first challenge was sitting in front of the screen for 4-5 hours".

5.1.8. Unethical practices

As more teaching and learning occurs at home, the ethical dimensions of education have become a major concern. It has been observed by both professors and pupils that sometimes there is a lack of ethics on both sides. According to a study, it is essential to improve evaluation processes to increase student engagement (Jeong & So, 2020). **T1** *said in this context "We can't judge the students. At school premises we can take tests and authentication is there, but at home, they are cheating, or they are loyal, we can't tell. That was a challenge. "S***10** further proposed that *"In a physical classroom, the students are active. They used to listen to the teacher. But in online classes, they log in to the class and use social media on their phones."* **T5** further added that *"Students were not 100% ethical during exams. We were invigilating, but in online modes of examination, invigilation is done in a limited space which is visible on the camera.".*

5.1.9. Response verification Dilemma

Till now we have discussed a lot of challenges, and this has given rise to another challenge about the authenticity of the problems which students are telling their teachers for escaping the classes. In this context, **T3** said that *"The moment you ask a question in the class student exits. He says-" Mam we have a network problem ". Now how are we supposed to check whether he/she is correct or not? And network problem has become a very reasonable excuse for students"* **T4** strongly agreed to the point that *"when you are not physically present over there, you can't even say that whether he/she is facing that problem in the present or not".*

5.2. Student Teacher Digital involvement levels

Based on the above extractions, the following levels relating to student-teacher digital involvement are proposed in the next section.

5.2.1 Deep level of involvement from the teachers BUT Least level of involvement from Students.

 It is a condition in which teachers are highly energized and enthusiastic about digital engagement with students, but student engagement is minimal. Here, the kids are either not upgraded, lack access to digital participation tools, or face any of the above-mentioned obstacles. According to previous research, students face a multitude of issues with online instruction like the problem of adjusting to and learning the new techniques, the overabundance of material in online classes resulting in a plethora of content available for students, and a rise in tension and anxiety that has a negatively affects their health (Yaman&Muhlis, 2020). This demonstrates a lack of student work-life balance. Students are overburdened with content yet are unable to access or absorb all of it due to the limits outlined in the preceding section. Student-teacher digital engagement levels have been negatively impacted by a lack of student capacity and capability. Teachers have done their utmost to assist and lead students, but a lack of student capacity and capability has badly impacted student-teacher digital engagement levels. The proposed name for this section is WEBINAR SICKNESS.

5.2.2 Least level of involvement from the teachers BUT Deep level of involvement from Students

According to a recent assessment from the National Foundation for educational research, the pandemic has burdened teachers with work-from-home demands, the use of advanced teaching methods, parental pressure, additional work duties, and the care of their young children. (Walker et al., 2020). Here, the students are attempting to communicate and engage with their teachers, but due to the digital limits discussed in the previous section, 5.1, the teacher is unable to keep up with the new ways of interaction. There is a high level of involvement on the part of the student but the lowest level of involvement on the part of the teacher. Students are increasingly active in group studies, but the instructors are unable to engage with the students. This creates a CEILING for teachers, preventing them from increasing student-teacher digital engagement. "Ceiling" refers to a circumstance in which teachers are not sufficiently updated with the new tech-based environment or face many obstacles in adjusting to the new teaching standards. It indicates a lack of teachers adopting a work-life balance.

5.2.3. Deep level of involvement from the teachers AND Deep level of involvement from Student

It is a win-win situation in which the digital involvement of both the teacher and the student is at its highest level, i.e., both exhibit high levels of engagement, achieving the highest level of Self-Reliance. In this situation, both teachers and students have adapted to the new modes of teaching-learning and taken the necessary efforts to

overcome the obstacles posed by the new patterns of information exchange in this new digital era. A study demonstrates that there are promising prospects for integrating online educational systems in universities. (Kumar et al., 2020) and the level of student-teacher engagement in digital classrooms has increased (Oliveira et al., 2021). This level unmistakably denotes the equilibrium that balances the participation efforts of both parties, as well as the point of breakthrough. i.e., depicting the actual ease of activities and participation by both parties to a degree that has proven Covid times to be even superior to pre-covid periods in the teaching-learning environment. In this case, both teachers and students have adopted strategies to overcome all the obstacles outlined in section 5.1. This is the ideal circumstance, which is known as INNOVATIVE ROUTINE. Here, teachers have produced new software and learned new teaching platforms, and students have adapted to the new teaching-learning methods and increased their engagement with their teachers.

5.2.4 Least level of involvement from the teachers AND Least level of involvement from Students
It is a circumstance in which the conditions for student-teacher contact are close to No interaction or No involvement at all. This is the lowest level of engagement for both students and teachers, as neither can adapt to the new digital work life. Here, neither the pupils nor the teachers can combat the issues outlined in section 5.1, nor are they able to adapt to the new technology-based Education system. This scenario is worse than the regular teaching-learning environment in physical face-to-face sessions since both participants feel equally handicapped because of the obstacles outlined in the preceding section. In the Indian education system, for instance, virtual laboratories are not very functional, restricting the practical knowledge exchange features (Kapilan et al., 2021). The term DERAILING refers to the derailment of the student-teacher relationship during extraordinary circumstances.
Based on the proposed degrees of student-teacher digital participation, a new framework depicting the four-quarter window of Student Self-Reliance levels is offered in the following subsection.

5.3 Proposed Conceptual Framework

In this sub-section**,** we finally propose a new conceptual framework that represents the above propositions concluded by combining the inputs from the interviewees and the past pieces of literature. It is a new framework that represents the levels of Self-Reliance of students based on the student-teacher digital involvement levels thus, named as **Self-reliance window** (Figure 2).
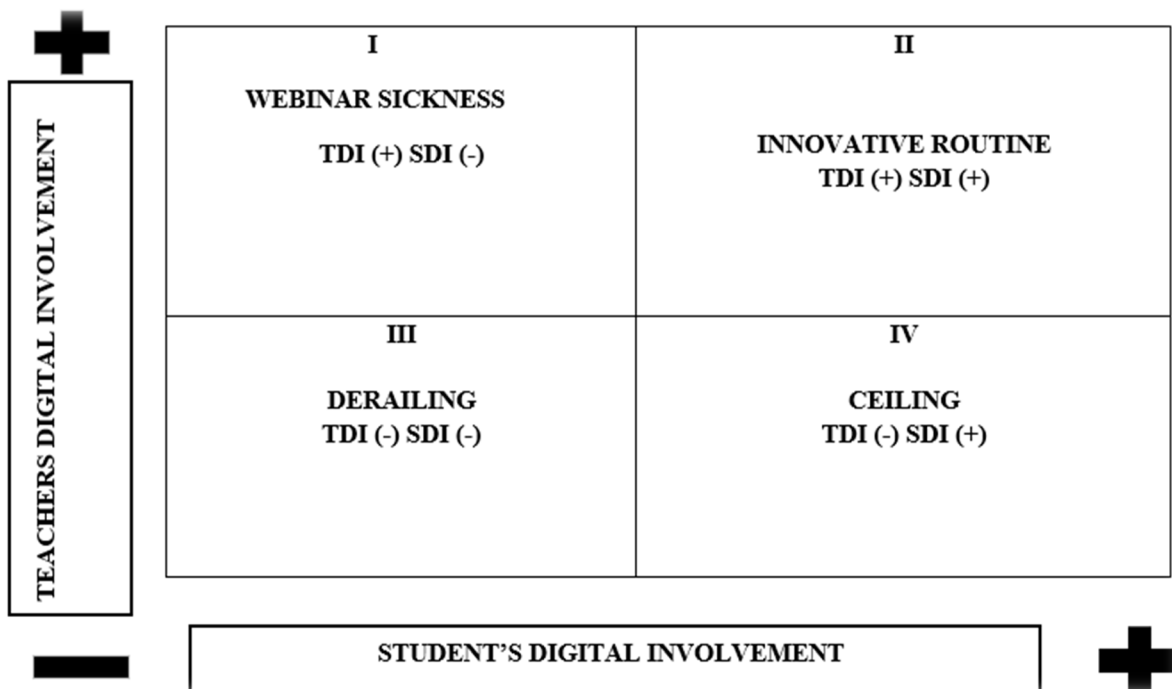

Figure 2. Self-reliance window

The above-proposed model represents the levels of digital involvement from students and teachers in this new Tech-based Education Model. The vertical axis represents the teachers' digital involvement, and the horizontal axis represents the student's digital Involvement. The "+ (positive) sign" in the framework represents the deepest level of digital involvement and the "- (negative) sign" represents the least level of digital involvement.

The Ist quadrant represents a level where the teachers are doing their best to adapt to the new ways of teaching, but students are unable to cope with the new digital environment. Students are overloaded with the content, classes, and other upgradations and they are finding it difficult to cope-up. Hence this involvement is called WEBINAR SICKNESS. The IInd quadrant represents a high level of digital involvement from both ends i.e Teachers and Students. This level of involvement is ground-breaking and is proposed to be known as INNOVATIVE ROUTINE. IIIrd quadrant represents a completely off-track situation where both parties are extremely affected negatively by the new Tech-based Education Model. This level represents the worst condition of the education sector and is thus called DERAILING. Finally, the IVth quadrant represents a situation where students are completely accustomed to the new digital environment, but the teachers are failing to cope up. Teachers are unable to contribute and thus this level is creating a bar or a CEILING.

5.4. Implications for the Proposed Framework

The suggested conceptual model has the potential to make significant contributions and expand the existing literature in this field of teaching-learning in the new normal. These results allow educational institutions to assess the level of engagement of their professors and students in the digital age. Schools and institutions can quickly collect data from students and instructors and plot the points in one of four quadrants, so providing a clear image of the total success of Knowledge Exchange. This model could assist educational institutions in assessing their current level and implementing strategies to advance to a stage that is conducive to the growth and prosperity of the education sector. This methodology would assist the educational entity in identifying the deficiency and instilling the measures necessary to overcome the restrictions faced by teachers and/or students. Institutions, colleges, and schools can develop action plans to attain the INNOVATIVE ROUTINE level to overcome all of the problems.

6. Conclusion

Based on the findings, the study suggests that both students and teachers commit to bring education to a condition of complete satisfaction on both ends to reach a degree of complete self-reliance. The flaws highlighted in the preceding sections are raised from both the instructor and student perspectives. The largest obstacle faced by teachers and students is the network problem and the need for both sides to adapt to the changing instructional patterns. Therefore, it is crucial to offer teachers and students, full access to technology and sufficient training for teaching, learning, and evaluating. Another difficulty was recreating the environment that existed in formal teaching-learning physical classrooms, as practically all interviewees favoured offline classes for superior information transmission in both directions. This issue requires significant effort to resolve. One of the new concepts uncovered by this research was the Answer Verification Dilemma faced by teachers, which rendered them incapable of confirming the authenticity of a student's response to the non-performance of a task. The difficulty was to determine whether the kids' comments were logical or an attempt to evade responsibility. This research report also offered a novel model depicting the many levels of student-teacher interaction, dubbed the Self-reliance window, which depicts the relationship between the levels of student digital involvement and instructor digital involvement. This window presents four levels of digital involvement - Quadrant 1- Webinar Sickness, Quadrant 2- Innovative Routine, Quadrant 3- Derailing, and Quadrant 4- Ceiling - allowing the education sector to assess the current student-teacher digital involvement relationship and take steps to strengthen it.

In brief, the study described the many obstacles that teachers and students experienced as a result of the implementation of the new Tech-based CEM. The paper's findings were based on previous research and open-ended interviews with teachers and students in the new institutional system. With the new online teaching-learning systems, both students and instructors encountered numerous obstacles, which is highly aggravating. New levels of Digital participation patterns have been investigated, and a new model is offered.

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