

## Connected yet Isolated: Digital Social Disruption and Its Impact on Learning and Interaction in Rural Elementary Education

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**Abstract:** Recent technology and gadget use have profoundly affected children and how they communicate and learn, including those living in remote areas. The goal of this study is to understand the emerging social phenomenon of digital social disruption and its ramifications for social communication and academic engagement, with a focus on elementary school children in rural areas and on intensive technology use. The study's rural context is digital social disruption and its impact on children's social engagement and learning. The study employs a qualitative approach and a case study design. Data were obtained through community and classroom observations, semi-structured interviews with parents, students, and teachers, and relevant documents collected from school and home. When relating the discovered themes to the three forms of digital social disruption, it was identified that the first digital social disruption involves the transition from a participatory social engagement to a digital individualised participation where social empathetic engagement and social/interpersonal skills are noticeably diminished; the second involves a prevalent digital distraction and poor collective learning culture that causes a focus deficiency on academic achievement tasks; and lastly, the school and family collaboration in fostering children's digital capacities has been poor resulting in inadequate digital supervision. Rural youth social ecosystems are being impacted by digital individualization through the dismantling of established social collectives. The study recommends that more responsive digital literacy programs and school-family collaboration on the responsible use of technology, and revitalizing children's social engagement are important.

**Keywords:** social disruption, digital era, social interaction, learning concentration

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### ■ INTRODUCTION

The growing presence of technology is adversely affecting the early stages of childhood development. Analytically, the average daily screen time among children and adolescents aged 0-18 years has increased from 2.7 to 4.1 hours, with an additional 84 minutes during COVID-19. Among teens aged 12-18, the reported screen time is almost 7 hours. The average daily screen time of children and adolescents aged 0-18 years increased by 52%, and during the Pandemic, it increased involuntarily. During the Pandemic, children aged 2-5 years among the under-5s were

found to adhere to the guidelines and screen time limits at lower recommended levels. While recommendations for screen time are lower than the average daily screen time observed, global adherence to guidelines remains poor. Children aged 2-5 years do not demonstrate adherence to the guidelines. Neglecting adherence to screen-time guidelines and the global disruptions in children's routines indicate the need for national and international frameworks to address the negative impacts on psychosocial health, physical health, and sleep (Madigan et al., 2022). Gadgets provide access to learning and information, but

there is a great deal of risk for addiction, mental health issues, stress, and sleep problems. WHO (2019) recommends an upper limit of 1-2 hours of daily gadget use; this recommendation should be followed. There should also be age-related screen time guidelines for children. In practice, children's screen time often greatly exceeds these recommendations. Kumar (2026) notes that 72% of teens check their messages first thing in the morning, 54% acknowledge they spend way too much time on their devices, and 47% of parents deem their children gadget-dependent. In the case of young children, the unregulated use of gadgetry will be correlated with better social relationship statuses, but at the risk of developing interventional disorders as much as 10.7 times (Lestari et al., 2024). This increased screen time was correlated with decreased communication, empathy, and interaction (Aprilita, 2024). Gaming addiction (Akar & Özer, 2025) is associated with a loss of social and interpersonal skills. Problematic Media Use (PMU) is associated with high screen time (Rega et al., 2023). Regarding parents' perceptions, more than 60% of children in the sample used digital media for 2 hours or more per day, and this was associated with emotional distress, sleep difficulties, and difficulty concentrating in school (Fitzpatrick et al., 2022). Social-emotional interactions are negatively affected by gadget overuse as use diminishes children's ability to identify and interpret facial expressions, vocal tones, and bodily cues (Izzaki et al., 2025). Through qualitative field studies, researchers found that in some rural regions of Indonesia, elementary school children spend 3 to 6 hours each day on their cellphones, primarily for gaming and social media. These studies were conducted using a combination of structured interviews and non-participant observation with 11 child participants and their parents (Nasution, 2024). The result of the disruption is the diminishing quality of face-to-face communication; empathy and emotional expression have moved to digital symbols. Permissive parenting, low digital literacy, and

weak local regulations worsen the problem of children's social and emotional disorders and academic behavioral problems (Madigan et al., 2022; Zonyfar et al., 2022).

Sanaullah (2021) characterizes social disruption as the forced and rapid alteration of a socio-cultural system that modifies a community's core values, weakens local institutions, and transforms social relations. Disruption of this nature can stem from a variety of factors. Examples include a breakdown in the social order due to the more rapid or changed social and communicative interactions as a result of technological or digital disruptions (Van Grunsven & Marin, 2024); shifts in social organization due to changes to the order, rules, or structures (Kivimaa et al., 2021); and the changes in values, norms, symbols, and identities of people (Beck, 2016); and disruptions caused by a disaster, climate change, or humanitarian crises (Pausas & Leverkus, 2023). These and other disruptions can be interrelated and affect the level of social cohesion and the quality of children's social interactions in the digital era (Maihasni et al., 2025). Ongoing studies on media disruption have identified 3 major domains. The use of gadgets and their associated consequences, such as interrupted sleep and increased mental health issues, are well-studied and well-documented (Madigan et al., 2022; Weiss & Bonell, 2025). Gadget use has educational consequences, including shorter attention spans, poorer grades, reduced ability to communicate, and reduced participation in class (Kundu et al., 2022; Rega et al., 2023). Several studies have documented the narrow scope of social communication resulting from digital communication and its contribution to social isolation and to emotional, social, and cognitive empathic deficits in the agile, non-verbal, and communicative domains (Aprilita, 2024; Izzaki et al., 2025). The literature is reviewed separately, focusing on health, mental health, and academic performance. These studies, although relevant, do not sufficiently address digital exposure within children's socio-pedagogical

environment. The studies on social disruptions in rural areas are even fewer. However, children's developmental ecology in rural settings differs from that in urban settings (Almeida et al., 2024; Jungselius, 2024). There are socio-cultural and ecological gaps, but geo-spatial gaps also exist. Considering Bronfenbrenner's theory of ecology, rural childhood development occurs within an ecology of dense and normatively coherent systems of kinship and community. Consequently, the patterns of digitally mediated social exposure, influence, and social control systems are altered.

Research indicates that collective identities are integral to rural children's self-concept. Consequently, digital behavior shifts are more disruptive of the norms of trust, authority, and participation. Given that rural schools are embedded custodians of community values, digital disruptions demand ecological-relational analyses that explain how the use of digital devices supplants socially integrated forms of play.

The alteration indicates that social disruption not only impacts interaction patterns but also impacts the primary socialization of children. Research indicates that digital use among children can limit the development of social skills, reduce face-to-face social interactions, and undermine children's social connectedness and prosocial behavior. Furthermore, the social digitalization phenomenon indicates that there is a change of collective values of societies from social to individual orientations (Bal et al., 2024; Gath et al., 2023; Kiing et al., 2024; Maihasni et al., 2025; Mekonen et al., 2024; Nagy et al., 2023; Presta et al., 2024; Steinsbekk et al., 2024). This phenomenon highlighted gaps in research on the effects of digitalization. It emphasized the role of educational institutions and learning societies in rural areas in restoring social cohesion through a social-pedagogical approach.

Social disruption in the digital age, particularly as it affects children, is an important phenomenon and warrants research. A considerable number of studies indicate that children face the greatest risk in terms of social,

self-regulatory, and attentional disruption (Kiing et al., 2024; Maghfirah et al., 2025). This has also been confirmed in studies conducted in several parts of the world. For instance, American children's use of gadgets before sleep has been shown to negatively affect their attention (Stevic et al., 2024). It has also been reported that European preschool children with high screen time have diminished capacity to maintain attention (Jourdren et al., 2023). Furthermore, research across Asia has shown that the use of electronic devices negatively affects the development of brain structures responsible for attentional control (Wu et al., 2024).

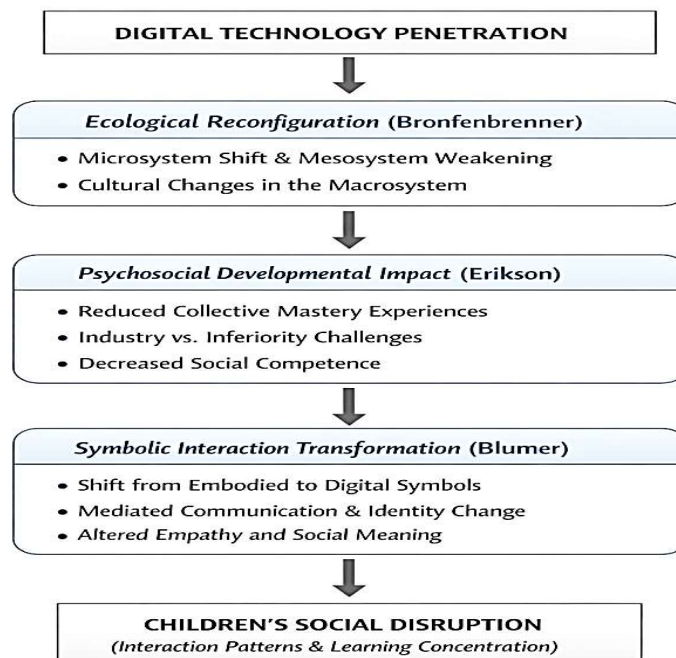
The study will use the perspectives of Urie Bronfenbrenner, Erik Erikson, and Herbert Blumer to understand the phenomenon holistically. The ecological systems perspective will assist in understanding how technology impacts the family-school-community triad, and the psychosocial perspective will demonstrate how environmental changes will affect the child's competencies, self-development, and social confidence. In addition, the social perspective will explain how children, including those in the digital world, communicate and construct meanings and identities. For the first time, these multiple perspectives will provide the rural elementary school setting with socio-pedagogical literature examining technology's impact on social interaction and development. Unlike studies focusing on the technology's impact on social, mental, and physical health, this study will examine how rural elementary school children's use of technology (e.g., smartphones and tablets) affects their interactions, attention, and digital literacy.

While studies on the social impact of technology concentrated on urban areas, the rural context offers a different set of complexities. Although the use of digital media and gadgets is rapidly increasing among children in rural areas (Unicef, 2023), these children often live in economically disadvantaged situations, and their parents are employed in the formal sector. This situation gives rise to a paradox of digital

inequality: children possess gadgets, yet the lack of adequate mentoring creates a significant gap in digital literacy and in access to mentoring (Akbar & Wijaya, 2024). The gradual replacement of the traditional functions of social families and communities may also lead to the deterioration of social cohesion, especially the emotional interactive bond between children and their parents. In the rural context, this social disruption is caused by a combination of technological, economic, and social changes. In this respect, the current study attempts to elaborate a step-wise socio-developmental model of digital disruption by integrating Bronfenbrenner, Erikson, and Blumer.

In Bronfenbrenner's ecological systems theory, child development occurs across multiple interdependent systems and layers that interact with one another. Changes in the macrosystem and microsystem, and consequently the mesosystem, are occurring due to the rapid, uncontrollable spread of digital technologies. In rural settings, collective mechanisms for monitoring and supervision facilitate children's socialization. In Erikson's psychosocial theory of development, the lack of indirect social validation

can inhibit the development of the psychosocial sense of industry and, to a large extent, will be a concomitant factor inhibiting the development of children's motivation, social confidence, and sense of competence. According to his theory, development and ecological change are interrelated through meanings and understandings in social interactions. Over the last few years, there has been a radical transformation in children's social interactions. In social microsystems, children interact and use social symbols such as smiles, tones, and gestures through face-to-face communication to express and regulate feelings of disappointment, joy, or other emotions. Due to rapid technological changes, children experience new ways to communicate using emotions and regulative symbols, which suppress the formation of social relationships. All these changes are synergistic and interdependent. All these changes affect children's engagement in social microsystems. Based on patterns of digital disruption, rural childhood contexts combine technological changes, developmental experiences, and symbolic meanings. Figure 1 shows the framework used in the study.



**Figure 1.** Ecological–psychosocial–symbolic model of digital social disruption among rural elementary school children

## ■ METHOD

### Participants

This research is a case study based on SD Negeri 2 Sawal, Sigaluh District, Banjarnegara Regency, Indonesia, which exemplifies a rural setting with growing gadget penetration. Hence, this research is hoped to provide empirical and theoretical insights into the dynamics of social disruption among children and to provide a baseline for constructing adaptive education policies (Madigan et al., 2022; Zonyfar et al., 2022).

This research employs a qualitative, intrinsic case study design to understand a particular phenomenon: the social and academic disruption of elementary school children caused by the hegemony of gadgets (Creswell, 2018; Yin, 2017). This design has the capacity to unravel the meanings, social experiences, and perceptions of children, teachers, and parents in a given context.

The limited number of student participants aligns with qualitative case study research, which focuses on understanding a phenomenon rather than a population. An intrinsic case study design focuses on fewer participants to enable more intensive data collection and a more thorough examination of participants' phenomenological experiences within a specific context. The three focal participants were selected as information-rich cases of heavy device users, enabling the study to identify more nuanced instances of social disruption and shifts in the centrality of learning. The involvement of parents and a classroom teacher enhanced the analysis by triangulating the data and supplying different perspectives on the same phenomenon. Earlier qualitative studies in education have shown that, when considering the context and process of a study and not aiming for statistical generalizations, small, deliberately chosen samples can yield valuable results (Creswell, 2018; Yin, 2017). Therefore, the selected participants were sufficient to address

the research questions and to gain a comprehensive understanding of children's social disruption as it related to rural elementary education in the digital age.

### Research Design and Procedures

To understand the phenomenon in a rural naturalistic context, the researcher used a qualitative intrinsic case study method to analyze the social and academic disruptions experienced by children resulting from the overuse of electronic devices. This is because qualitative case studies are particularly effective in understanding multi-dimensional social issues in their natural contexts (Creswell, 2018). The research site of this study was SD Negeri 2 Sawal, located in Banjarnegara Regency, a rural area with a growing digital exposure among children. The researcher spent six weeks collecting data through classroom observation, semi-structured interviews with students, parents, and the teacher, and analyzing documents such as student report cards, attendance and behavioral logs, classroom photos, and parents' screen time monitoring logs. Ethical considerations for this study included securing parental consent and child assent, maintaining participant confidentiality, and ensuring that participation was voluntary.

### Instrument

Data collection utilized structured observations, semi-structured interviews, and analysis of documents. In this case, the participants consisted of three Grade 5 heavy gadget users, the students' parents, and the classroom teacher. For this research, heavy users were defined as students who spent more than four hours a day on nonacademic screen time. This was confirmed by parents and teachers, as well as through preliminary screening interviews.

Following qualitative research principles and specifying the available qualitative research tools to Creswell (2018) the flexible nature to

combine tools, the instruments were developed to capture behavioral indicators relating to the social interactions, learning, and communication behaviors of children with respect to the use of digital devices in a real classroom environment

setting, and also the classroom context of the qualitative classroom observation.

To maintain the contextual significance of an indicator and limit the potential for subjective interpretation bias, each indicator was rated on a

**Table 1.** Structured observation sheet

Domain	Indicator Code	Observable Indicators	Operational Description
<b>Learning Concentration</b>	LC1	Sustained visual attention	Student continues to focus on the teacher and/or instructional materials while the teacher explains.
	LC2	Following multi-step instructions	Student completes multi-step directions without repeated reminders
	LC3	Task completion	Student completes assigned tasks within the allocated time
	LC4	Signs of disengagement	Student shows daydreaming, blank staring, or incomplete work
	LC5	Off-task behavior frequency	Student engages in unrelated activities during instructional time
<b>Verbal Response and Academic Participation</b>	VR1	Clarity and relevance of answers	Student provides clear and contextually relevant responses to teacher questions
	VR2	Response latency	Student responds immediately, with delay, or does not respond
	VR3	Initiative in asking questions	Student independently asks for clarification or follow-up questions
	VR4	Participation in discussions	Student actively contributes to classroom dialogue
	VR5	Willingness to present publicly	Student explains answers in front of peers
<b>Peer Social Interaction</b>	SI1	Initiating peer communication	Student starts conversations or interactions with classmates
	SI2	Participation in group work	Student actively engages during collaborative tasks
	SI3	Quality of interaction	Interaction is cooperative, passive, or avoidant
	SI4	Duration of break-time interaction	Length of social interaction during recess
	SI5	Preference for activity type	Student prefers solitary or collaborative activities
<b>Signs of Gadget-Related Distraction</b>	GD1	Verbal reference to games	Student mentions games or online content during lessons
	GD2	Drawing digital symbols	Student draws emojis or game-related images in a notebook
	GD3	Use of gaming jargon	Student imitates gaming terms in communication
	GD4	Restlessness/irritability	Student appears restless after prior gadget use
	GD5	Attempts to access gadgets	Student tries to use the gadget during school hours

four-point descriptive scale, accompanied by detailed field notes (1 = not observed; 2 = occasionally observed; 3 = frequently observed; 4 = consistently observed).

The measures focused on sustained attention, disengagement, and task completion; clarity, relevance, response time, and level of participation; and peer engagement, cooperation, and types of play. Gadget-related distractions involved mentions of the Internet and gaming. All of the variables included contextualized field notes and a four-point descriptive rating scale. Semi-structured interviews were conducted under the following four themes: patterns of gadget use, changes in social interaction, the effect of gadgets on concentration and learning, and supervision at home and at school.

Sample key questions included: “What activities do you usually do on your device every day?” “How has your relationship with your friends and family changed since you started to use devices more often?” “What have you noticed in terms of reduced concentration both in class and at home?” A checklist was used to conduct a document analysis of trends in academic achievement and/or decline, attendance, behavior, classroom documentation, parent screen-time log, and classroom photos.

To ensure the credibility of this study, the author used triangulation of sources and methods by analyzing data from students, parents, and the teacher, and then cross-examining them through observation, interviews, and document analysis. Member checking was conducted by the author to interpret and summarize the interviews, then confirm them with the study participants. Consistent with the trustworthiness criteria of credibility, dependability, and confirmability, audit trails were established through field notes, transcripts, and coding records (Moleong, 2019).

### **Data Analysis**

cite the interactive qualitative analysis framework as promoting a cyclical process of data condensation, data display, and the drawing/

verification of conclusions. The data for this study have been condensed to include a verbatim transcription, a logically structured database, open coding of patterns related to the device’s uses and interactions, axial coding aimed at categorizing and contextualizing the phenomena, and interpretive rigor through the application of analytic memos.

Thematic matrices, participant-by-theme comparison tables, and chronological event mapping would be the next steps for systematic data analysis. These examples, as a whole, helped analyze the similarities and differences among the students, parents, and the teacher, as well as the geographic data sets. Due to the ongoing development of new codes, there was a persistent updating of data sets.

The processes of cross-drawing conclusions and verification were cycled. New thematic elements were interpreted in relation to the research questions regarding the disruption of social interactions, the learners’ focus, and parental supervision strategies. The interpretative insights were corroborated through cross-source triangulation, discussions with peers (two research educators), and member checking.

Verification of interpretive accuracy and contextual validity led to the design of member checking. To avoid returning complete transcripts, the researcher provided summaries tailored to each participant (1-2 pages) that consisted of (1) the identified themes pertinent to each participant, (2) some relevant quotes, and (3) early interpretations of patterns of behavior (e.g., “intensification of gadget use”, “decline in peer participation”). These summaries were provided to each of the three students, their parents, and the classroom teacher during brief follow-up meetings (20-30 minutes). Participants were asked three guiding verification questions:

1. *Does this summary accurately reflect your experience?*
2. *Is there anything that feels misinterpreted or overstated?*

### 3. Is there important context that is missing?

The feedback obtained during member checking fell into three main categories:

#### ***Contextual Clarification***

Both parents explained that most extended screen time (e"4 hours) occurred on weekends rather than every day. They noted that weekday screen time was much more controlled due to the structure of the school day. As a result of this input, the coding category was changed from "daily intensive use" to "periodic intensive use with weekend concentration," which led to a refinement of the time-related analysis.

#### ***Alternative Explanatory Factors***

An instructor observed that a particular student was less participative in class. This behavior began when the student's family moved houses, which led to some emotional outbursts. Keeping this in mind, a message was drafted to separate the stress caused by the student's moving from the regard or attention problems caused by the student's devices. The phrases "decline in participation" and "contextual transition factor" were used to recode the relevant data segment to correct for underexposure to digital distraction.

#### ***Nuancing Emotional Interpretation***

The student's preference for chatting online suggests a reduction in embarrassment, peer avoidance, and reframing withdrawal as forms of mediated communication, with self-confidence and socio-emotional factors playing a role.

#### ***Integration into Data Analysis***

All adjustments made to the coding matrix were grounded in analysis memos and comments given from the feedback loop. In the event of discrepancies, prior recorded observations and documented proof (attendance and participation logs from class) were the basis to determine consistency. In instances where several explanations could hold, the interpretation was

restructured to capture conditional rather than determinate relations (e.g., "under certain contextual conditions, digital engagement may contribute to reduced participation").

None of the participants declined the overall thematic structure. However, several suggested more focus and clarity to the context, which led to: Revision of frequency descriptors (e.g., "daily" changed to "primarily weekend-based"), Addition of simultaneously occurring contextual variables, and More tentative causal language in the findings section.

Through this iterative verification process, member feedback functioned not merely as confirmation but as a mechanism for analytic recalibration, enhancing credibility, contextual sensitivity, and interpretive precision (Abidin et al., 2024; Ahmed, 2024; Morgan, 2024). Current qualitative validation standards regard member checking not simply as affirming a researcher's interpretation, but rather as a dialogic engagement in enhancement (Miles et al., 2018).

## ■ **RESULT AND DISCUSSION**

### **Forms of Changes in Social Interaction of Elementary School Students Due to the Use of Gadgets**

Research has shown that increased use of certain technologies affects children's social behavior. Many children prefer to engage in activities alone, rely on digital messages to communicate, and are less confident speaking to others. Teacher and parent interviews, as well as classroom observations, have shown decreases in social connectedness and increases in social isolation. To complement the qualitative data, a basic assessment of the four-tier observation rating scale was employed. The mean and frequency distribution per participant for each of the four indicators: learning focus, verbal contribution, peer engagement, and distraction by devices, is presented in Table X, regarding the scale by teacher observation during the class.

**Table 2.** Table X. frequency distribution of observation indicators

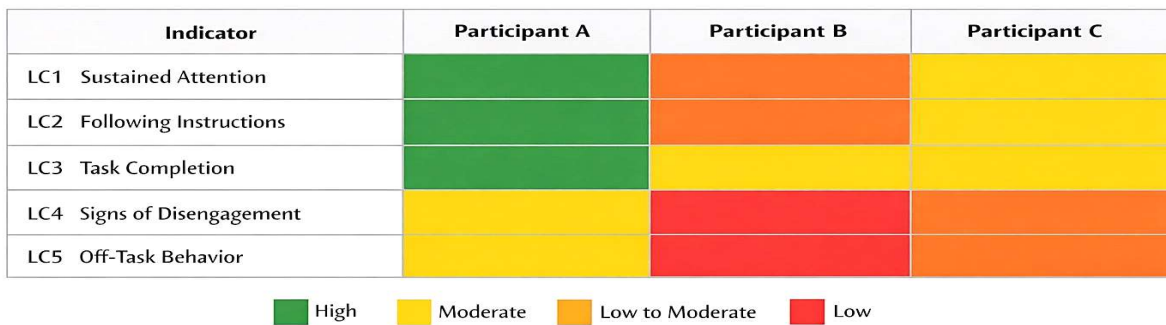
Indicator	Participant A (Mean)	Participant B (Mean)	Participant C (Mean)
LC1 Sustained visual attention	3.2	2.1	2.8
LC2 Following instructions	3.0	2.0	2.6
LC3 Task completion	3.4	2.3	2.7
LC4 Signs of disengagement	1.8	3.0	2.4
LC5 Off-task behavior	1.6	3.2	2.5

A heatmap was created to illustrate the average scores of each observation parameter for the three subjects. A more intense color indicates a higher frequency of certain observed behaviors. The heatmap illustrates behavioral

variations in learning engagement, peer interaction, and device-related distraction.

Figure 2 illustrates a conceptual map outlining the factors related to social disruption and decreased concentration.

**Figure X. Heatmap of Behavioral Observation Scores Across Participants**



The heatmap visualizes the mean observation scores across behavioral indicators for the three participants. Color intensity represents the frequency of observed behaviors, allowing visual comparison across domains such as learning concentration, peer interaction, and gadget-related distraction.

**Table 3.** Thematic matrix of social interaction disruption

Main Theme	Subtheme	Operational Definition	Cross-Participant Pattern (Students–Parents–Teacher)	Representative Quotes
Social Disruption in Rural Children’s Interaction	Intensification of Gadget Use	Gadgets are crowding peer and outdoor interactions and increasing time, frequency, and emotional dependence.	Students prefer to engage with digital forms of play, while parents see emotional backlash when restrictions are put in place, and teachers see an increase in video game talk during class.	Student: "I would prefer to play on my phone than go outside to play." Parent: "He gets mad if the phone is gone." Teacher: "Students mention video games more than they mention anything related to school."
	Digital Communication Shift	Shift from mainly in-person communication to	Children are said to be communicating less directly; parents and	Student: "It is easier to communicate over chat." Teacher: "They respond

	digitally mediated communication (chats, use of emojis, brief text replies)	teachers are noticing less verbal participation and less eye contact, and students favor communicating via text.	with one word and do not look at you.”
Decline in Peer Social Participation	Less participation in cooperative learning, conventional games, and unplanned interactions with peers.	Children prefer to engage in activities by themselves. Teachers notice a lack of confidence in children when they need to work in groups. Children tend to be solitary during breaks as well.	Teacher: "Students prefer working individually rather than engaging with other members of their class." Observation Note: A student chooses to remain seated by themselves while other students join together."
Weakening of Family Communication	Decreased quality and frequency of direct parent-child interaction due to prolonged gadget engagement	Parents report children staying in bedrooms, delayed responses when called, and reduced shared family activities	Parent: "Children rarely talk; they prefer to stay in their room." Parent: "When called for dinner, he responds late because he is focused on the phone."

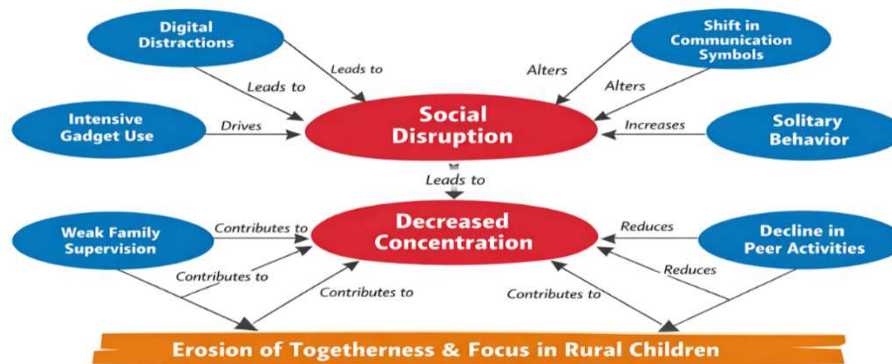


Figure 2. Conceptual map digital distraction

Thematic synthesis shows movement away from collective, embodied interaction toward more individual, digital forms of interaction, changing the microsystem of rural children. Results showed that digital engagement increased, while empathy and social competence decreased. Teachers reported increased passivity, decreased collaborative behavior, and decreased spontaneity and enthusiasm toward peer play. This is consistent with symbolic interactionism, which holds that the social relationships people form and their quality are affected by changes in the communication symbols they employ (Blumer, 1986; Izzaki et al., 2025).

The evolving nature of rural students' relationships demonstrates the impact of emerging technologies on both social and communicative relationships. An increase in digitally mediated contact illustrates the changing processes of socialization in environments that are typically supervised and face-to-face.

**Psychological Mechanism: Attentional Conditioning and Reduced Social Reinforcement**

While some observations reflected the behavior of high users, they exhibited less engagement with peers, demonstrated more

pronounced atrial apraxia and/or verbal delays, and had increased participation latencies. Interviews indicate that users were highly enthusiastic about viewing the material. This means they developed some behavioral conditioning, and their cueing response became less pronounced.

Psychologically, reduced reinforcement through in-person interactions entails fewer opportunities to develop empathy and self-regulation. On the other hand, the instant digital rewards offered in online environments progressively deteriorate one's self-regulation and socio-emotional competencies.

Research shows that parents report that children become irritable when their device use is interrupted, and educators report less cooperative learning. There is a psychological aspect to this, and it is more than being distracted. There is a gradual shift in the psychological reward system. Digital rewards outweigh social rewards.

### ***Sociological Mechanism: Network Reconfiguration and Norm Displacement***

In addition to alterations in individual cognition, this change indicates a broader sociological reconfiguration of children's social networks. The social networks of children in rural contexts like Sawal tend to be limited to a local network of relatives, neighbors, extended family, and schoolmates, with social capital concentrated within it. These kinds of networks have high relational density and high normative expectations of cohesion among members.

Research indicates decreased participation in shared recreation, informal outdoor activities, and spontaneous peer group gatherings. Parents indicated that children became increasingly apathetic toward social activities in their vicinity, with increased solitary use of digital devices indoors. This indicates a transformation of social relations from local, multiplex, and proximate ties to digital, weakly connected, distant ties.

Based on the theory of social capital and the ecology perspective, the erosion of rural bonding capital caused by individualized digital engagement affects the erosion of mutual aid, shared practices, and intergenerational mentoring of digital engagement, which in turn, transforms the structural processes that sustain moral education, identity, and social relational networks.

### ***Integrative Interpretation***

Field data show that psychological and sociological mechanisms operate simultaneously and recursively. Digitally induced overstimulation diminishes the user's attentional stamina and empathetic responses in the proxemic zone. In the proximal intermediate zone, the lack of engagement in community-based activities further erodes the already weak peer-bond network. Collectively, these mechanisms can be understood as a form of social disruption in which children are physically present within social configurations but interpersonally socially isolated.

The primary concern is that amplification varies by region, particularly in rural areas. Furthermore, the integrated engagement zones are critical, as they serve as developmental scaffolding. If that scaffolding is substituted for individual digital engagement, it is not only about the individual circumstance; it also affects the other social and behavioral routines that are displaced. Research has shown a decrease in social feedback with increased asynchronous communication. Using the ecological, psychosocial, and symbolic approaches, such changes negatively affect micro-meso systems, social feedback, social competence, social trust, social alienation, and social meaning.

This study affirms that social disruption in rural contexts is multidimensional, affecting several technological domains and is fundamentally intertwined with changes in valuation systems, social norms, and children's socialization processes.

**Factors That Affect Students’ Learning Concentration in the Digital Era**

Concentration challenges are associated not only with the amount of time spent on screens but also with sleep patterns, self-regulation, and

adult control factors. Disrupted sleep caused by nighttime device use, along with digital distractions and ineffective supervision, negatively affects students’ time management, self-regulation, and overall learning engagement and responsiveness.

**Table 4.** Thematic matrix of factors affecting learning concentration

Main Theme	Subtheme	Operational Definition	Key Indicators	Representative Quotes (Students–Parents–Teacher)
Decreased Learning Concentration in the Digital Era	Digital Distraction	Cognitive interference caused by games, notifications, and online content	Mentions games during lessons; slow response; daydreaming	Teacher: “Children are often unfocused and seem absent-minded.”
	Disturbed Sleep Pattern	Late-night gadget use leading to fatigue during school hours	Sleepy in class; yawning; low energy	Parent: “The child sleeps late because he plays cellphones all night.” Teacher: “Often falling asleep in class.”
	Weak Self-Regulation	Inability to control time allocation between study and play	Forgets homework; prioritizes gaming	Student: “Sometimes I forget to study because I play games.”
	Declining Academic Engagement	Reduced motivation and participation in learning activities	Decreasing grades; passive participation	Teacher: “The grades have decreased.”

The data suggest that the components affecting learning concentration comprise Internal components ’! Poor self-regulation and emotional control; Physiological components ’! Sleep deprivation and general fatigue; External components ’! Lack of parental control and digital overstimulation. Kahneman (1973) posits that, from a cognitive standpoint, sustained digital interruptions affect children’s ability to center and focus on an academic task, which entails situation-modulated attention. The digital ecosystem that dominates the family microsystem and disrupts

the school-family mesosystem alters children’s readiness to learn.

**Reflection on Contextual Digital Literacy Strategies in the Digital Era**

Insights from educators and parents suggest that effective digital literacy teaching should be contextual. Teaching strategies should incorporate the ethical use of technology, self-regulation, and social values, as well as the restructuring of community resource use to encourage positive social interactions and community activities.

**Table 5.** Reflection on digital literacy strategy

Source	Reflection findings	Meaning of strategy
Teacher	Children need to be taught to control their mobile phone use and to understand the consequences.	Digital literacy combined with thematic learning
Parents	Parents need to set a good example for children with gadget usage in the home environment.	Creating a healthy digital culture in the family
Documentation	Collaborative learning activities improve social interaction	Strengthening character-based learning communities

The theories of Vygotsky (1978) and Bronfenbrenner (Crawford, 2020) both emphasize the role of social contexts in shaping children's behavior and self-regulation, as well as the components of these contexts. This emphasizes the urgency of redefining the roles of family and school in the ecosystem of digital literacy to mitigate the impact of social disruption and guide children's relationships with technology.

The modern rural community is developing a new infrastructure that is concomitant with new digital communication networks. Although new forms of connectivity are emerging, greater digital engagement could change how children learn socially within their close-knit intergenerational environments, with implications for social cohesion. Also, rural communities that use engaged digitally change the ways they socialize. When people engage digitally and individually, they may lose a sense of community, underscoring the importance of using devices for purposes beyond the individual.

The study finds three trends: the quality of interaction and empathy in the relationship suffers because of the effects of digitally mediated relationships; concentration is affected by gadget distractions, sleep disruptions, and inadequate supervision; and teachers notice the importance of digital literacy and character building, revealing cognitive, socio-emotional, and moral dimensions.

Overuse of devices is linked to sleep issues, impaired attention, and diminished social skills in children (Fitzpatrick et al., 2022; Izzaki et al., 2025). Madigan et al. (2022) added that poor communication and behavioral problems are associated with excessive screen time. Insufficient digital parenting and poor digital literacy elevate social-emotional problems (Zonyfar et al., 2022). Davis et al. (2025) asserted that in digital interaction, time spent is less important than the quality. King et al. (2024) and Nagy et al. (2023) showed that psychosocial development,

motivation, and learning are negatively affected by intensive technology use. According to Lestari et al. (2024), the absence of parental guidance in children's social interactions exacerbates the situation both in and out of school.

The research shows that rural areas have changed a lot. Many communal activities that required cooperation, such as games, religious activities, and labor, have been replaced by solitary activities using a gadget. Collaborative, empathetic, communal, and local digital activities have been replaced by individual, emotionally distant, and technologically dominated activities.

This aligns with Mekonen et al. (2024), Presta et al. (2024), and Steinsbekk et al. (2024), who show that less exposure to digital media improves children's social competencies and positive social relationships. Previous studies from urban areas show that the predominant impact of digital technologies lies in individual social behavior (e.g., increased screen time, decreased concentration, peer communication, etc.). The Digital tools are not altering social behavior or social structure. In Ahmed's (2024) study of urban students, social interaction was found to have decreased, regardless of participants' presence in informal group settings, social networks, and peer activities. In the same vein, Morgan (2024) found that socially purposefully digitally active urban youth participants did not decrease informal online messaging and informal community support; on the contrary, online messaging reinforced the city's socially structured community, which was dependent on formal rather than informal collectives.

Rather than contradicting urban findings, results demonstrate contextual variation: without urban interactions, varied rural networks reduce the effects of rural-urban interactions on collective social norms, social accountability, and social support.

Consequently, rather than contradicting prior research, the present study extends prior

research by demonstrating that the social consequences of digital technologies vary across contexts. While the social cohesion of the study's rural context is maintained through regular, routine participatory collective activities, the rural context may have more far-reaching systemic implications than the urban context, where the social system is more differentiated.

The changes regarding shallow social interactions can be analyzed using symbolic interactionism (Blumer, 1986). In the case of children, social meaning in a digital context is derived from the social meaning of emojis, text messages, and online content, which stand in for gestures, facial expressions, and physical proximity. This exemplifies the position of Naveeda & Wajahat (2024) on digital symbol-based communication and hyper attention in children's techno-mediated communication, thereby reducing the emotional elements of interactions. In rural contexts, the symbolic disruption is more evident because digital media disrupts both the symbols of communication and those of local culture.

This research captures the decline in study engagement, which aligns with Bronfenbrenner's ecological systems theory (Crawford, 2020), in which child development occurs across multiple systems in the environment, with each system impacting and interacting with the others. The data from the research site, SD Negeri 2 Sawal, demonstrate impact only at the microsystem and mesosystem levels. The microsystem includes immediate environments such as families and classrooms, where interviews and observational data indicate specific changes in engagement levels. A student stated, "I talk to my friends more online than I ever play with them." This remark demonstrates a disengagement from social interactions with peers in the classroom microsystem. Previous studies and feedback from parents have indicated that children's online activities encroach on activities they would otherwise engage in that require in-person social

interactions with family, friends, and the community, thereby decreasing children's engagement in social activities and the social reinforcement within the microsystem.

At the mesosystem level, the discrepancy between the regulation exercised by parents and classroom observations illustrates the diminished integration between the family and the school. In rural areas with cohesive communities, this disjointed integration creates an ecological deficit. It cultivates an online environment for anonymous participation that rivals relational microsystems, leading to decreased educational focus and increased social disengagement.

Considering Erikson's theory of psychosocial development, elementary school-aged children are in the industry versus inferiority stage, where they gain confidence through social and academic success. Increased digital presence reduces the ability to develop skills through face-to-face interaction and encourages lower motivation, participation, and feelings of isolation. Educators have remarked on the heightened, rapid-onset boredom and individual isolation, suggesting that technological disruptions touch on key identity and self-worth issues of primary concern in Eriksonian developmental theory. In this context, Li (2024) and Van Grunsven & Marin (2024) view this phenomenon as a case of social disruption, following swift technological advancements that require rapid responses from individuals and educational systems.

Learning flourishes during social interactions in the ZPD (Vygotsky, 1978). However, the distractions of digital learning activities reduce the active roles of peers and teachers in the learning process. This misses the opportunity to develop self-regulation, critical thinking, and collaborative skills, and, ironically, passive rural areas lose much of their potential for community social development.

Therefore, this research offers new insights indicating that social disruption in rural regions has a dual character. These include: (1) the

transformation in social significance of traditional games into individualistic digital activities, and (2) the alteration of the value of mutual collaboration to a stronger, more emotionally detached, and symbolically shallow interplay. This illustrates how social disruption among children in rural areas differs from that among children in urban areas, who are more structurally adaptive.

In theory, findings from this research expand the definition of technosocial disruption (Van Grunsven & Marin, 2024). Denagn noted the dimension of rural-cultural disruption, which reflects changes in societal structures and community values resulting from the invasion of digital technologies in rural areas. From this point of view, the findings support the argument for teachers and educational policymakers to create initiatives for rural, community-oriented, digitally based literacy projects that include aspects of local culture, such as digitally modified versions of traditional community games, and community projects that resist the technology-induced silence.

The integration of symbolic, ecological, cognitive, and psychosocial frameworks suggests that changes in interaction, reduced attention to learning, and the rise of digitally literate populations reflect broader socio-structural shifts affecting the developmental range of rural youth. This study exemplifies the need to develop pedagogical strategies that address cognitive shifts and realignments emotionally and socially. However, the current pool of participants limits the applicability of the findings. The findings are only slightly applicable, and the claims will be contextually restricted, meaning they will not be able to describe worldwide patterns of children's engagement with digital technology.

## ■ CONCLUSION

This research reveals that social disruption among young rural elementary school students primarily manifests through changes in behavior and social interactions. However, in rural contexts,

these changes are unlikely to be perceived as disruptions to social systems. The retraction of participation in communal religious and neighborhood functions, diminished collaborative efforts in classrooms, and decreased participation in traditional games indicate a shift toward individual practices. Such phenomena have been documented across varying levels of classroom collaboration, the absence of peer-initiated social games, as reported in interviews, and diminished participation in social activities, as reported by parents in feedback.

The changes being studied indicate that social structures in rural areas are likely to be stable. The socialization of children is still shaped by community structures, family authority, and social norms. Still, it is also being shaped by new behavioral patterns and changes in children's social interaction. The behavioral and interactional patterns of children are changing due to the increase in participatory activities involving individual digital technologies, and there is a clear decrease in participatory activities involving communal play and social interaction with other children in the neighborhood. The changes in rural social structures captured by the study are changes in behaviors and relationships, not changes in rural social structures of the society.

The results imply changes in children's social responses, including potential declines in empathy, collaboration, and social participation. However, this does not imply a structural reconfiguration of the enduring patterns of rural communities. The changes predominantly involve micro-social, behavioral, and relational changes, which the data seem to inadequately capture, making the argument somewhat speculative. This study integrates Urie Bronfenbrenner's ecological systems theory, Erik Erikson's theory of psychosocial development, Lev Vygotsky's socio-cultural theory of learning, and Herbert Blumer's theory of symbolic interactionism. These theories are not synthesized but applied to the

interstices of children's relationships, learning, social collaboration, meaning-making, and communication in the digital realm. Rural communities are increasingly becoming economically and digitally integrated, which also widens the ecological gap in children's interactions with family, schools, and peers.

This research examines the tension in rural communities between an emphasis on collaboration and individualistic tendencies triggered by online engagement. This research also reveals the potential positive effects of the growing availability of technology in rural communities; however, in cases where digital literacy is limited, it posits that the social and emotional gaps, as well as patterns of community interaction, will deteriorate. Regarding the practical implications, the research aims to offer context-specific digital literacy frameworks that integrate digital literacy with values education, community engagement, and screen-time reduction in primary education. The study highlights rural underdevelopment in addressing the challenge of a culturally dominant cooperative society facing a technologically individualistic society. The author recommends developing and piloting rural, culturally responsive digital literacy frameworks that integrate local and diverse wisdom. The patterns of digital device access across rural-urban and socioeconomically diverse circles, and their impacts on children's social interactions and academic focus, will be the focus of future research, which should employ a variety of data collection methods.

#### ■ **DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS**

While preparing this manuscript titled "Children's Social Disruption in the Digital Era: A Qualitative Study on Changes in Interaction Patterns and Learning Concentration of Elementary School Students," the author

employed generative AI for assistance in a few areas of language editing, such as enhancing the clarity of individual sentences, paraphrasing, and converting portions of the manuscript into academic English.

All substantive ideas, research design, data collection, analysis, interpretation, and conclusions were developed independently by the author. The author used the AI tool and, in doing so, assumed responsibility for reviewing, fact-checking, editing, and revising the content so that it acknowledged the use of the AI tool and met expectations of academic integrity. The author accepts all responsibility for the manuscript's final version.

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