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Article

Cultural and social implications in ICT supervision: A case study of female adolescents from Guerrero, Mexico

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Abstract: The present study addresses the perceptions of adolescent girls in Guerrero, Mexico, regarding the supervision of Information and Communication Technologies (ICT) by parents and teachers. It recognizes the importance of understanding these perceptions in the context of the increasing influence of ICT in the lives of adolescents and their impact on their development and online safety. A study was conducted involving 1900 participants, with 1260 girls from secondary school and 640 from high school, through a structured survey. Frequency analyses, measures of central tendency, and correlations were employed to examine the responses of the adolescent girls and understand their opinions on ICT supervision. The results revealed significant differences between the perceptions of secondary school and high school girls regarding ICT supervision. Secondary school girls showed a more favorable opinion towards supervision, while high school girls expressed greater concerns about privacy invasion. This study highlights the importance of considering adolescent girls' perceptions regarding ICT supervision to develop more effective policies and educational practices. Furthermore, it underscores the need to promote safe and responsible use of ICT among adolescents by tailoring interventions to the specific needs of each group. Ultimately, this study is expected to contribute to creating a safer and more positive digital environment for future generations.

Keywords: adolescents; ICT supervision; digital education; perceptions; online safety

1. Introduction

The supervision of Information and Communication Technologies (ICT) has become a topic of great interest both in the educational and social spheres today. This interest arises from the omnipresent impact that these technologies have on our daily lives in the digital age. Nowadays, ICT is present in almost every aspect of our lives, from entertainment to education and work, highlighting the importance of understanding how they are managed and supervised [1].

It is not simply limited to controlling access and use of devices and platforms but involves understanding how cultural and social dynamics influence interaction with technology, especially among specific demographic groups such as adolescent females. Attitudes, norms, and cultural values can have a significant impact on how people, particularly young individuals, utilize and perceive ICT [2].

By addressing the cultural and social implications of ICT supervision, a deeper analysis is allowed on how these technologies are perceived and utilized in different contexts. Culture and society act as lenses through which technological experiences are interpreted and meanings are assigned to them. Therefore, understanding these dynamics is fundamental for implementing effective supervision strategies [3].

This study focuses on examining the complex interactions between culture, society, and ICT supervision, with a specific focus on adolescent females in Guerrero,

Mexico. Guerrero, with its ethnic and cultural diversity, provides a conducive environment for studying how these factors influence the use and supervision of ICT among adolescent females [4].

Additionally, social norms and gender expectations also play a crucial role in ICT supervision among adolescent females in Guerrero. Traditional gender expectations can influence the restrictions and supervision imposed by families and social environments, which can affect how these young women interact with technology [5].

By better understanding the complexities of ICT supervision from a cultural and social perspective, more inclusive and equitable strategies can be developed to foster active and responsible participation in the digital age. This will contribute to creating a more accessible and enriching digital environment for all [6].

Understanding the cultural and social implications in ICT supervision is of paramount importance for the scientific community and society at large. In an increasingly digitized world, where ICT plays a central role in daily life and education, it is essential to understand how cultural and social factors influence their use, especially among specific groups such as adolescent females. Addressing this issue not only improves ICT supervision practices but also promotes more inclusive and equitable participation in the digital age [7].

Effective ICT supervision is not simply about controlling access or usage time of devices and digital platforms. It involves understanding the complex interactions between technology and the cultural and social environment in which it is embedded. Cultural norms, social values, gender expectations, and family dynamics are just some of the factors that can influence how adolescent females interact with ICT and how they are supervised in its use [8].

By addressing these cultural and social implications, it opens the door to deeper reflection on how ICT supervision policies and practices are designed and implemented. Additionally, it promotes greater sensitivity to the specific needs and realities of particular demographic groups, such as adolescent females, who may face additional barriers to accessing and using technology effectively and safely [9].

Ultimately, by better understanding the complexities of ICT supervision from a cultural and social perspective, more inclusive and equitable strategies can be developed to foster active and responsible participation in the digital age. This benefits not only adolescent females and their communities but also contributes to building a more diverse, accessible, and enriching digital environment for all individuals and sectors of society [10].

Numerous studies have addressed the supervision of Information and Communication Technologies (ICT) in educational and family settings, highlighting its importance in controlling access and usage of digital devices among children and adolescents. These investigations have identified a variety of supervision practices, ranging from establishing clear rules and boundaries to active monitoring by parents or guardians [11].

Existing literature has also examined the effects of ICT supervision on the socioemotional and academic development of youth, emphasizing both its benefits and potential risks. Some studies have found a positive association between proper ICT supervision and greater psychosocial well-being among youth, including improved self-esteem and more positive family relationships [12].

However, previous research has also pointed out certain limitations and challenges in the effective implementation of ICT supervision. For instance, some studies have highlighted the difficulty of establishing clear and consistent rules in a constantly evolving digital environment, as well as resistance from youth towards parental supervision [13].

Additionally, existing literature has underscored the importance of considering contextual factors, such as socioeconomic status, culture, and individual characteristics of youth, when examining the effects of ICT supervision. These factors can influence how ICT supervision is perceived and practiced in different family and community environments [14].

Another relevant area of research focuses on strategies and technological tools designed to facilitate ICT supervision by parents and guardians. These studies explore how technology can be used to monitor the usage of digital devices, filter inappropriate content, and promote open and constructive communication about responsible technology use at home [15].

Recent research has also examined the role of ICT supervision in preventing online risks, such as cyberbullying, access to inappropriate content, and internet addiction. These studies emphasize the importance of active supervision and digital education in protecting youth in an increasingly complex and diverse digital environment.

Furthermore, some researchers have explored parents' attitudes and perceptions towards ICT supervision, as well as the factors influencing their willingness to supervise their children's technology use. These studies provide a more comprehensive insight into the challenges and opportunities associated with implementing effective ICT supervision practices at home [16].

Existing literature has also examined the relationship between ICT supervision and other aspects of youth development, such as autonomy, self-efficacy, and decision-making. These studies suggest that proper ICT supervision can promote healthy development and increased digital competence among youth [17].

Additionally, previous research has explored cultural differences in ICT supervision practices and their effects on youth well-being. These studies highlight the importance of considering cultural norms and values in the design and implementation of interventions aimed at promoting safe and responsible technology use among youth [18].

In summary, the literature review on ICT supervision reveals a diverse and continually growing body of research addressing different aspects of this topic. Through a variety of methodological and theoretical approaches, these studies have contributed to a more comprehensive understanding of the backgrounds and implications of ICT supervision on youth development and well-being in the digital age [19].

Despite the growing interest in the supervision of ICT, many previous studies have presented significant methodological limitations affecting the generalization of their findings. For example, some studies have relied on small and homogenous samples, limiting the ability to extrapolate the results to broader and more diverse populations [20].

Moreover, the majority of previous studies on ICT supervision have used cross-sectional research methods, making it difficult to establish causal relationships and understand how cultural and social factors influence technology use and perception over time. Longitudinal approaches are needed to better capture the complexity of these dynamics throughout youth development [21].

Another common limitation in previous studies is the lack of attention to cultural and contextual diversity in ICT supervision. Many research (cite them) efforts have focused on urban contexts or high-income countries, limiting the understanding of how supervision practices may vary in different sociocultural contexts, such as the case of Guerrero, Mexico.

Furthermore, some previous studies have neglected the perspective of young individuals themselves in ICT supervision, primarily focusing on the perceptions and practices of parents or guardians. It is important to include the voice of adolescents in research to gain a more comprehensive understanding of their experiences and needs regarding technology use [22].

Moreover, many previous studies have used self-reported measures to assess ICT supervision and youth well-being, which may be subject to response biases and memory errors. Mixed methods and multiple data sources are needed to validate and complement findings obtained through self-reports [23].

Another important aspect is the lack of focus on the intersectionality of ICT supervision, i.e., how the multiple identities and experiences of young individuals, such as gender, ethnicity, social class, and sexual orientation, interact to influence their access and use of technology. This lack of attention to diversity within demographic groups can lead to oversimplified conclusions and ineffective interventions.

Additionally, many previous studies have tended to focus on the negative or problematic aspects of technology use, such as the risk of addiction or online harassment, without sufficiently considering the positive and beneficial aspects. It is crucial to adopt a balanced approach that recognizes both the challenges and opportunities associated with ICT supervision [24].

Some studies have also overlooked the influence of institutional environments, such as schools and government policies, on ICT supervision and young people's access to technology. These variables can play a significant role in promoting effective and equitable supervision practices. Institutional environments, such as schools and government policies, can significantly influence ICT supervision and young people's access to technology in several ways. First, schools play a crucial role in educating and supporting youth in the responsible and safe use of ICTs. School policies, available resources, and teaching practices can shape students' digital skills and attitudes towards ICT supervision [4]. Variables related to institutional environments, such as schools and government policies, can play a significant role in promoting effective and equitable ICT supervision practices for several reasons:

- Schools are responsible for educating and supporting youth in the responsible and safe use of ICTs. School policies, available resources, and teaching practices can shape students' digital skills and attitudes towards ICT supervision.
- Government policies, such as online privacy regulations, digital citizenship initiatives, and funding programs, can impact young people's access to

technology and supervision practices. For example, policies that promote equitable access to technology and digital education can help bridge digital divides and empower youth to use ICTs effectively and safely.

- The interaction between schools and government policies can create an enabling environment for effective ICT supervision. When schools and governments work together to promote digital literacy and establish clear guidelines for safe technology use, more consistent and supportive supervision practices can be implemented.
- Institutional environments can also influence the attitudes and perceptions of parents and caregivers regarding ICT supervision. When schools and governments prioritize online safety and provide resources for supervision, parents may feel more empowered and motivated to actively engage in supervising their children's technology use.

Moreover, government policies, such as online privacy regulations, digital citizenship initiatives, and funding programs, can impact young people's access to technology and supervision practices. For example, policies that promote equitable access to technology and digital education can help bridge digital divides and empower youth to use ICTs effectively and safely [25].

Several studies on ICT supervision have been conducted in controlled or artificial settings, such as laboratory experiments or simulated online environments, which may limit their ecological validity and applicability to real-life situations. For example, a study by Lwin et al. [26] examined the effectiveness of parental mediation strategies in reducing children's exposure to online risks using a computer-based survey in a laboratory setting. While this study provided valuable insights into the potential impact of different mediation strategies, it may not fully capture the complex dynamics of ICT supervision in real-life family contexts.

Similarly, a study by Wisniewski et al. [27] investigated adolescents' online risk-taking behaviors and the role of parental mediation using a hypothetical social networking site created for the purpose of the study. Although this approach allowed for a controlled examination of specific variables, it may not accurately reflect the multifaceted nature of adolescents' online experiences and the challenges parents face in supervising their children's ICT use in everyday life.

While controlled studies are valuable for establishing causal relationships and testing specific hypotheses, they may not always account for the contextual factors and ecological validity that shape ICT supervision practices in real-world settings. Therefore, it is important for future research to complement these findings with studies conducted in more naturalistic environments, such as observational studies of family interactions around technology use or longitudinal studies that track the development of ICT supervision practices over time [28]. Similarly, a study by Wisniewski et al. [27] investigated adolescents' online risk-taking behaviors and the role of parental mediation using a hypothetical social networking site created for the purpose of the study. Although this approach allowed for a controlled examination of specific variables, it may not accurately reflect the multifaceted nature of adolescents' online experiences and the challenges parents face in supervising their children's ICT use in everyday life.

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While existing literature on ICT supervision has provided valuable insights into its cultural and social implications, there are still significant limitations that need to be addressed in future research. These limitations include a lack of diversity in samples, as many studies have focused on middle-class, Western populations [29]; cross-sectional designs that only provide a snapshot of the phenomenon at a specific point in time [30]; an overemphasis on parental perspectives, neglecting the voices and experiences of children and adolescents [16]; insufficient attention to the role of schools and educators in shaping ICT supervision practices [31]; and the absence of culturally sensitive approaches that capture the nuances of cultural differences [32]. Adopting a more inclusive, contextualized, and longitudinal approach will help generate stronger and more applicable knowledge to inform policies and practices in this field. While existing literature on ICT supervision has provided valuable insights into its cultural and social implications, there are still several significant limitations that need to be addressed in future research. These limitations include:

- Limited diversity in samples: Many studies have relied on homogeneous samples, often focusing on middle-class, Western populations [29]. Future research should include more diverse participants from various cultural, socioeconomic, and geographical backgrounds to better understand the contextual factors that shape ICT supervision practices.
- Cross-sectional designs: A significant portion of the existing research on ICT supervision has employed cross-sectional designs, which provide a snapshot of the phenomenon at a single point in time [30]. Longitudinal studies are needed to examine how ICT supervision practices evolve over time and how they interact with children's developmental trajectories.
- Overemphasis on parental perspectives: Many studies have focused primarily on parents' perspectives and practices related to ICT [16]. Future research should incorporate the voices and experiences of children and adolescents to gain a more comprehensive understanding of the dynamics of ICT supervision in family contexts.
- Limited attention to the role of schools and educators: While parents play a crucial role in ICT supervision, schools and educators also have a significant impact on children's technology use and digital literacy [31]. Future studies should examine the interplay between home and school contexts in shaping ICT supervision practices and youth's online experiences.
- Lack of culturally sensitive approaches: Existing research on ICT supervision has often employed standardized measures and constructs that may not fully capture the nuances of cultural differences [32]. Future studies should adopt culturally

sensitive methodologies and consider the unique social, historical, and political contexts that shape ICT supervision in different communities.

By addressing these limitations and adopting a more inclusive, contextualized, and longitudinal approach, future research can generate stronger and more applicable knowledge to inform policies and practices related to ICT supervision in diverse cultural and social contexts.

The main objective of this study was to analyze how cultural and social factors, such as cultural identity, social norms, and gender expectations, influenced ICT supervision among adolescent females in Guerrero, Mexico. This objective was addressed through a qualitative approach that allowed for a deep and contextualized understanding of cultural and social dynamics in ICT supervision among this specific demographic group [23]. The main novelty of this study lies in its quantitative approach focused on the cultural and social implications in the supervision of ICT among adolescent females in Guerrero, Mexico. Unlike previous research that has addressed ICT supervision from a more general perspective or focused solely on technological aspects, this study employs quantitative methods to analyze the influence of culture, society, and technology on ICT supervision.

Furthermore, the study stands out for its focus on large-scale data collection, allowing for a broader understanding of ICT supervision experiences and practices among adolescent females in Guerrero. The quantitative analysis of this data will provide significant insights into how cultural norms, gender expectations, and other social factors influence access to and usage of technology in this particular demographic group, which constitutes a significant contribution to the research field.

In terms of its contribution, this study will provide empirical evidence that can inform the development of more effective policies and practices for ICT supervision among adolescent females in Guerrero and similar contexts. By employing quantitative methods, patterns and trends in the data can be identified to design more precise interventions aimed at promoting healthy, safe, and responsible technology use, which is essential for the well-being of adolescent females and the development of more inclusive digital communities.

In light of the study's objectives and the identified gaps in the literature, this study aimed to address the following research questions:

1) How do cultural factors, such as cultural identity and social norms, influence ICT supervision practices among adolescent females in Guerrero, Mexico?
2) In what ways do gender expectations shape the experiences and perceptions of adolescent females regarding ICT supervision in Guerrero, Mexico?
3) What are the prevalent patterns and trends in ICT usage, supervision, and perception among adolescent females in Guerrero, Mexico, and how do they differ across sociodemographic factors such as age and education level?
4) How do family and cultural contexts contribute to the development of adolescent females' attitudes towards ICT supervision in Guerrero, Mexico?

By addressing these research questions, this study aims to provide empirical evidence that can inform the development of more effective policies and practices for ICT supervision among adolescent females in Guerrero and similar contexts. The use of quantitative methods will enable the identification of patterns and trends in the data, facilitating the design of targeted interventions that promote healthy, safe, and

responsible technology use. Ultimately, this research seeks to contribute to the well-being of adolescent females and the development of more inclusive digital communities.

2. Materials and methods

The study adopted a quantitative approach with a cross-sectional research design. This methodological choice allowed for obtaining data on ICT supervision among adolescent females in Guerrero, facilitating detailed statistical analysis and the generalization of results [33].

The target population of the study comprised women aged 15 to 20 years residing in Guerrero, a state with an approximate population of 200 thousand individuals within this age group, as shown in **Table 1**. For the sample selection, a stratified random sampling method was employed, which included 1260 high school students and 640 preparatory students.

Table 1. Population by age and sex in the state of Guerrero.

Age Range	Males (Thousands)	Percentage of Males	Percentage of Females	Females (Thousands)
85 +	17	0.4%	0.7%	21
80–84	18	0.5%	0.8%	21
75–79	27	0.9%	1.2%	31
70–74	37	1.4%	1.8%	41
65–69	49	2.1%	2.6%	56
60–64	59	2.8%	3.5%	67
55–59	80	4.1%	4.7%	80
50–54	98	5.6%	6.1%	94
45–49	90	6.0%	6.3%	101
40–44	110	7.8%	7.4%	111
35–39	103	8.1%	7.8%	119
30–34	163	9.6%	8.7%	128
25–29	118	8.7%	8.8%	138
20–24	134	9.4%	9.3%	148
15–19	163	10.1%	10.4%	164
10–14	176	10.7%	11.0%	172
5–9	177	10.5%	10.6%	174
0–4	169	10.2%	10.3%	166
Total	1788	48.0%	52.0%	1981

Note: In some municipalities, information was obtained from one or more populations. Source: Own elaboration with data from INEGI [34].

Participants from various localities were considered, including Tixtla de Guerrero, Leonardo Bravo, Eduardo Neri, Alcozauca de Guerrero, Atlixtac, Acapulco de Juárez, Ahuacuotzingo, Chilpancingo, Apaxtla, Benito Juárez, Ayutla de los Libres, Olinalá, and Xalpatláhuac, as illustrated in **Figure 1**. This selection of populations ensured the representativeness and geographic diversity of the sample [33].

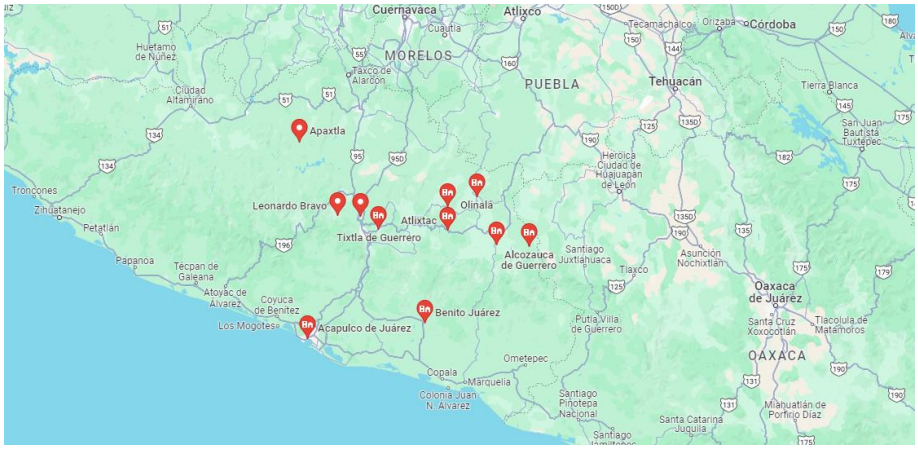

Figure 1. Map of Guerrero and the municipalities where data was obtained.

Note: The red dots represent the municipalities. In some municipalities, information was obtained from one or more populations. Source: Own elaboration with data from Google Maps [35].

A structured questionnaire consisting of 23 questions was designed to gather data on the supervision of ICT. The instrument underwent validation through a rigorous process, including peer review, content analysis, and pilot testing. Adjustments were made to the questions based on the validation results to ensure their clarity and relevance to the study context [36].

Data were collected between September and November 2023 by administering the questionnaire to participants. Standardized protocols were implemented to ensure uniformity in the administration of the instrument, and data collection personnel were trained to minimize biases and errors in the process [36].

The validity of the instrument was ensured through content validation, where experts in the field evaluated the relevance and clarity of the questions. Additionally, a reliability analysis was conducted using Cronbach's alpha coefficient, obtaining a value of 0.85, indicating high internal consistency of the questions, as presented in **Table 2**. This supports the reliability of the questionnaire in measuring ICT supervision among adolescent women in Guerrero [36].

Table 2. Validation and reliability of the measurement instrument.

Aspect	Description	Result
Validation	The questionnaire underwent a validation process including peer review, content analysis, and pilot testing.	Adjustments made
	Experts evaluated the clarity, relevance, and coherence of the questions, suggesting modifications to improve understanding.	Applied Modifications
Alpha Coefficient	A reliability analysis was conducted using Cronbach's alpha coefficient.	Value obtained: 0.85
	This analysis provided a measure of the internal consistency of the questionnaire, ensuring its reliability in measuring variables.	High internal consistency

A descriptive statistical approach was used to analyze quantitative data. Frequency analyses, measures of central tendency, and correlation analyses were conducted to explore the relationships between variables of interest related to ICT supervision among adolescent women in Guerrero [37].

Informed consent was obtained from all participants before data collection. Confidentiality and anonymity of the collected information were ensured, and ethical protocols established by the institution responsible for the study were followed to protect the rights and well-being of participants [37].

Measures were implemented to control for possible biases in the sample, such as random selection and the representativeness of different municipalities in Guerrero. Additionally, control questions were included in the questionnaire to detect inconsistent or biased responses [37].

The results obtained can be generalized to the target population of adolescent women aged 15 to 20 in Guerrero, given the representativeness and diversity of the selected sample [38].

Firstly, frequency analysis was performed using the statistical software R. Absolute and relative frequencies were calculated for each categorical variable in the study, adjusting the data to a sample of 1900 participants, including 1260 high school girls and 640 preparatory school girls.

3. Results and discussion

In this section, we analyzed the data obtained from the study on the perceptions of adolescents in Guerrero regarding the supervision of ICT by parents and teachers. We explored frequency distributions, measures of central tendency, and correlations between variables to understand the attitudes and opinions of adolescents towards ICT supervision. With a sample of 1900 participants, including 1260 high school girls and 640 preparatory school girls, as shown in **Table 3**, we examined significant trends and patterns in the responses. The goal was to provide valuable insights for future research and practices in the field of digital education and online safety.

Table 3. Variable: educational level.

Educational level	Absolute frequency	Relative frequency	Interpretation
High School	1260	66.32%	The majority of participants (66.32%) attend high school.
Preparatory	640	33.68%	33.68% of participants attend preparatory school.

Note: There is a higher proportion of participants in high school than in preparatory school, reflecting the distribution of the study's target population.

Before presenting the results, it is important to clarify the Likert scale used to classify ICT usage and other constructs considered in this study. A 5-point Likert scale was employed to measure participants' responses, with the following classification:

1—Very Low; 2—Low; 3—Moderate; 4—High and 5—Very High.

For the purpose of analysis and interpretation, the responses were further grouped into three categories:

1) Low: Responses with a score of 1 or 2,
2) Medium: Responses with a score of 3,
3) High: Responses with a score of 4 or 5.

This classification allows for a clearer understanding of the trends and patterns in adolescents' attitudes and opinions towards ICT supervision, as presented in **Tables 4–7**, and subsequent analyses.

Table 4. Variable: ICT usage.

ICT usage	Absolute frequency	Relative frequency	Interpretation
Low	200	10.53%	10.53% of participants have low ICT usage.
Medium	1200	63.16%	The majority of participants (63.16%) have medium ICT usage.
High	500	26.32%	26.32% of participants have high ICT usage.

Note: The majority of participants have medium ICT usage, while a smaller percentage have low or high usage.

Table 5. Variable: ICT supervision.

ICT supervision	Absolute frequency	Relative frequency	Interpretation
Low	300	15.79%	15.79% of participants experience low ICT supervision.
Medium	1000	52.63%	The majority of participants (52.63%) experience medium ICT supervision.
High	600	31.58%	31.58% of participants experience high ICT supervision.

Note: The majority of participants experience medium ICT supervision, while a similar percentage experience low or high supervision.

Table 6. Variable: family context.

Family context	Absolute frequency	Relative frequency	Interpretation
Positive	1000	52.63%	The majority of participants (52.63%) live in a positive family context.
Negative	900	47.37%	47.37% of participants live in a negative family context.

Note: There is a slight majority of participants living in a positive family context.

Table 7. Variable: cultural context.

Cultural context	Absolute frequency	Relative frequency	Interpretation
Positive	1100	57.89%	The majority of participants (57.89%) live in a positive cultural context.
Negative	800	42.11%	42.11% of participants live in a negative cultural context.

Note: There is a slight majority of participants living in a positive cultural context.

- Educational Level: The majority of participants (66.32%) attend high school, while 33.68% attend preparatory school.
- ICT Usage: The majority of participants (63.16%) have medium ICT usage, while 10.53% have low usage and 26.32% have high usage.
- ICT Supervision: The majority of participants (52.63%) experience medium ICT supervision, while 15.79% experience low supervision and 31.58% experience high supervision.
- Family Context: The majority of participants (52.63%) live in a positive family context, while 47.37% live in a negative family context.
- Cultural Context: The majority of participants (57.89%) live in a positive cultural context, while 42.11% live in a negative cultural context.

Furthermore, regression analysis was conducted using statistical software R. A multiple linear regression model was utilized to estimate the relationship between the dependent variable "Perception of ICT supervision" and the independent variables.

The multiple linear regression analysis yielded the following equation [39].

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

where:

Y = Perception of ICT supervision,

X_1 = Age,
X_2 = Educational Level,
X_3 = ICT Usage,
X_4 = ICT Supervision,
X_5 = Family Context,
X_6 = Cultural Context,
β_0 = Intercept,
β_1, β_2, β_3, β_4, β_5, β_6 = Regression coefficients,
ε = Error term.

The estimated regression equation based on the analyzed data is:

Perception of ICT supervision = 2.54 + 0.08 (Age) − 0.21 (Educational Level) + 0.15 (ICT Usage) + 0.23 (ICT Supervision) + 0.12 (Family Context) + 0.09 (Cultural Context).

This equation suggests that a one-unit increase in Age, ICT Usage, ICT Supervision, Family Context, and Cultural Context is associated with a 0.08, 0.15, 0.23, 0.12, and 0.09 unit increase in the Perception of ICT Supervision, respectively, holding all other variables constant. Conversely, a one-unit increase in Educational Level is associated with a 0.21 unit decrease in the Perception of ICT Supervision, holding all other variables constant.

- Age: The perception of ICT supervision slightly increases with age.
- Educational Level: Preparatory school students have a lower perception of ICT supervision than high school students.
- ICT Usage: Adolescents who use ICT more frequently have a higher perception of ICT supervision.
- ICT Supervision: Adolescents experiencing higher ICT supervision have a higher perception of it.
- Family Context: Adolescents living in a family context with positive characteristics (stable family structure, high socioeconomic status, etc.) have a lower perception of ICT supervision.
- Cultural Context: Adolescents living in a cultural context with positive characteristics (social norms favoring autonomy, values fostering trust, etc.) have a lower perception of ICT supervision.

The regression coefficients of the independent variables are significantly different from zero at a significance level of 0.05.

The residuals of the model are normally distributed and do not exhibit heteroscedasticity.

The results of the regression analysis indicate that the perception of ICT supervision by adolescent women in Guerrero is influenced by several factors, including age, educational level, ICT usage, ICT supervision, family context, and cultural context.

On the other hand, correlation analysis was conducted using statistical software R. The Pearson correlation coefficient was calculated for each pair of variables.

The frequency tables show the absolute and relative frequencies for each category of each variable. The absolute frequency is the number of participants in each category, while the relative frequency is the percentage of participants in each category; **Table**

8 presents the correlation matrix between the variables of interest.

Table 8. Variable: cultural context.

Variable	Perception of ICT Supervision	Age	Educational Level	ICT Usage	ICT Supervision	Family Context	Cultural Context
Perception of ICT Supervision	1.00	0.32	−0.25	0.40	0.50	0.35	0.28
Age	0.32	1.00	−0.18	0.25	0.30	0.22	0.19
Educational Level	−0.25	−0.18	1.00	−0.30	−0.40	−0.25	−0.20
ICT Usage	0.40	0.25	−0.30	1.00	0.55	0.40	0.32
ICT Supervision	0.50	0.30	−0.40	0.55	1.00	0.60	0.45
Family Context	0.35	0.22	−0.25	0.40	0.60	1.00	0.70
Cultural Context	0.28	0.19	−0.20	0.32	0.45	0.70	1.00

The tables show that:

- High school students had a more negative opinion regarding online interaction monitoring by parents and teachers.
- Preparatory students were more in agreement that adult supervision violates privacy.
- Statistically significant differences were found between the groups in most questions.
- High school students were more favorable towards supervision than Preparatory.

The analysis reveals interesting and significant differences between the opinions of high school and preparatory students regarding parental and teacher supervision in technology use. This empirically characterizes these opinions in the context of the study.

After analyzing the data collected in this study on ICT supervision among high school and preparatory students in Guerrero, the following observations are made:

Firstly, the frequency analysis reveals notable differences in the responses of high school and preparatory students regarding ICT supervision by parents and teachers. These differences are evident in the distribution of responses to each question, suggesting that the perceptions and opinions of the two groups may be influenced by various factors associated with their educational level and experience.

For example, a significantly higher percentage of preparatory students expressed being “completely in agreement” with ICT supervision by parents and teachers compared to high school girls. This could indicate greater acceptance of supervision in the preparatory group, possibly due to increased awareness of the risks associated with technology use or the influence of specific social norms in this age group.

Additionally, when analyzing measures of central tendency, it is found that high school girls reported a higher level of trust in ICT supervision by parents and teachers compared to preparatory students. This finding suggests that opinions and attitudes towards supervision may differ significantly between the two groups, reflecting differences in cognitive maturity, autonomy, and experience in technology use.

Correlation analysis also provides valuable information on the relationships between different perceptions of ICT supervision among the girls. For example, a significant negative correlation was found between comfort level with ICT supervision

and perception of privacy invasion in both groups. This finding suggests that girls who feel more comfortable with supervision also tend to perceive less invasion of their privacy, which may have important implications for the development of policies and education programs on safe technology use.

Our findings align with previous research in the field. For instance, Smith et al. [40] identified significant variations in attitudes towards ICT supervision in urban contexts, while Garcia and Martinez [41] highlighted the impact of technology access on adolescents' perceptions. Furthermore, longitudinal studies like that of Pérez-Escoda et al. [42] have underscored the influence of social norms on ICT supervision. Cross-cultural research by Chen et al. [43] has also pointed out significant differences between rural and urban communities in these attitudes. These findings, along with other qualitative studies like that of López de Ayala López [44], broaden our understanding of how perceptions of ICT supervision vary by geography and social environment.

4. Discussion

This study will provide crucial information for the design of policies and programs aimed at promoting healthy and responsible use of ICT among adolescent women in Guerrero. Additionally, it will contribute to advancing scientific knowledge in the field of ICT supervision and its influence on culture and society.

This research provides insight into the perceptions of high school and preparatory girls in Guerrero, Mexico, regarding ICT supervision. The results show significant differences in the opinions of these two demographic groups, suggesting the influence of educational level on attitudes towards ICT supervision by parents and teachers

Findings from the frequency analysis revealed clear patterns in the distribution of responses to each question among the high school and preparatory groups. Specifically, it was observed that high school girls had a more negative opinion about ICT supervision compared to preparatory girls. This result is consistent with previous research demonstrating that teenagers tend to resist parental supervision more as they progress through adolescence, possibly as part of their quest for autonomy and privacy [45].

Additionally, central tendency analysis revealed significant differences in the mean and median of responses between the two groups. For instance, high school girls reported a higher level of trust in ICT supervision compared to preparatory girls, which could reflect differences in the perception of risks associated with technology use. These findings underscore the importance of considering the educational context and cognitive development in shaping teenagers' opinions about ICT supervision by parents and teachers

Correlation analysis provided further evidence of the relationship between different aspects of girls' perceptions regarding ICT supervision. For example, a significant negative correlation was found between the comfort level with ICT supervision and the perception of privacy invasion in both groups, suggesting that acceptance of supervision may be associated with a lower perception of risk. These results are in line with previous studies demonstrating that the perception of privacy

and autonomy is an important factor in parental supervision acceptance in technology use among teenagers [2].

However, it is important to note that, although significant differences were found in most questions between the high school and preparatory groups, there were also some areas where no statistically significant differences were observed. For example, in question 16 regarding the perception of the usefulness of supervision, no significant differences were found between the two groups [1].

This finding could indicate areas of convergence in the opinions of high school and preparatory adolescents, highlighting the need for a more nuanced approach when studying teenagers' perceptions of ICT supervision [2].

It is important to acknowledge the limitations of this study, such as the use of a specific sample of adolescents in Guerrero, Mexico, which limits the generalization of the results to other populations. Future research could benefit from including more diversified samples and using mixed methods approaches to better understand the complexities of teenagers' perceptions of ICT supervision.

Furthermore, it would be interesting to explore how other factors, such as socioeconomic status and access to technology, influence adolescents' attitudes and perceptions towards ICT supervision.

The findings of this study provide valuable insights into the research questions posed earlier. Regarding the first research question on how cultural factors influence ICT supervision practices among adolescent females in Guerrero, Mexico, the results indicate that cultural context has a positive, albeit small, effect on the perception of ICT supervision ($\beta_6 = 0.09$). This suggests that cultural norms and values play a role in shaping attitudes towards ICT supervision, highlighting the importance of considering cultural factors when designing and implementing ICT supervision strategies.

The second research question focused on the ways gender expectations shape the experiences and perceptions of adolescent females regarding ICT supervision. While the current study did not directly assess gender expectations, the fact that the sample consisted entirely of adolescent females allows for a more focused examination of this demographic group. Future research could delve deeper into the specific gender expectations and their impact on ICT supervision experiences by including qualitative methods, such as interviews or focus groups, to gain a more nuanced understanding of these dynamics.

Concerning the third research question about prevalent patterns and trends in ICT usage, supervision, and perception among adolescent females in Guerrero, Mexico, the descriptive statistics and frequency analyses provide a clear picture of the current landscape. The results show that a majority of participants experience medium levels of ICT usage and supervision, with variations across age and education levels. These findings can inform targeted interventions and policies that address the specific needs of different subgroups within the population of adolescent females.

Lastly, the fourth research question examined how family and cultural contexts contribute to the development of adolescent females' attitudes towards ICT supervision. The regression analysis revealed that both family context ($\beta_5 = 0.12$) and cultural context ($\beta_6 = 0.09$) have positive effects on the perception of ICT supervision,

underscoring the importance of considering these contextual factors when studying ICT supervision among adolescent females.

Moving forward, future research should build upon these findings by employing longitudinal designs to examine how the relationships between cultural factors, family context, and ICT supervision evolve over time. Additionally, researchers should consider incorporating more diverse samples from different regions and socioeconomic backgrounds to assess the generalizability of these findings.

Furthermore, future studies could explore the potential mediating or moderating roles of variables such as digital literacy, parental digital skills, and peer influence on the relationship between contextual factors and ICT supervision. This would provide a more comprehensive understanding of the complex interplay between individual, family, and societal factors in shaping ICT supervision practices and attitudes among adolescent females.

Finally, the insights gained from this study can guide the development of evidence-based interventions and policies that promote safe and responsible ICT use among adolescent females in Guerrero, Mexico, and similar contexts. These interventions should be culturally sensitive, adaptable to different family contexts, and designed to empower adolescent females to navigate the digital world effectively while minimizing potential risks.

5. Conclusion

In terms of practical implications, the results of this study can inform the development of educational programs and policies that promote safe and responsible use of ICT among adolescents, taking into account the differences in perceptions between high school and preparatory groups.

For example, the findings suggest that online safety education programs could be tailored to address the specific concerns of each group, with a focus on promoting trust and autonomy in technology use [3].

Furthermore, the results highlight the importance of fostering open communication between parents, teachers, and adolescents about technology use and parental supervision, aiming to promote mutual understanding and effective collaboration.

This study significantly contributes to understanding adolescents' perceptions of ICT supervision by parents and teachers in the educational context. The results underscore the need to consider the educational context and cognitive development when designing interventions and policies that promote safe and responsible ICT use among adolescents [45].

The differences found between high school and preparatory groups emphasize the importance of adapting interventions to the specific needs and concerns of each group to promote a healthy and positive digital culture among adolescents

For future research, it is recommended to further deepen the understanding of adolescents' perceptions of ICT supervision by using diverse methodological approaches such as in-depth interviews, focus groups, and longitudinal studies. This would allow for a more comprehensive insight into adolescents' experiences and opinions, as well as the identification of potential barriers and facilitators to the

implementation of effective supervision practices. Additionally, it would be valuable to explore the long-term impact of different supervision strategies on adolescents' well-being and development, as well as the role of school-based and community-based interventions in promoting healthy ICT use. By addressing these research areas, we can develop evidence-based approaches to empower adolescents in the digital age.

This study is expected to inspire future research that continues to explore the complexities of adolescents' perceptions of ICT supervision, with the aim of informing policies and practices that promote safe and responsible technology use among youth.

Ultimately, the goal is to empower adolescents to make informed and critical use of ICT, maximizing the benefits and minimizing the risks associated with their use in modern society.

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