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Enhancing Online Safety for Underage Children: Integrating Parental Control and Customization Solution

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Abstract:

Social media has greatly affected society as we know it today, most especially for teenagers and children under the age of 10, termed as 'underage children'. This requires a comprehensive understanding of its effects and risks. This study focuses on what parents think about their children's usage of social media applications. By surveying parents, we aimed to learn more about their beliefs, concerns, and how they manage their children's online activities and experiences. Our research identified a significant gap between parental awareness and their children's online experiences. This lack of understanding is concerning because social media platforms are ubiquitous. Many parents lack a thorough understanding of the potential risks and challenges their underage children encounter in this digital environment. Additionally, existing safety measures, even within supposedly child-safe platforms like YouTube Kids, focus only on video content, neglecting potential vulnerabilities in other areas. This highlights the necessity for parental perspectives in shaping safer online spaces for minors. Our Proposed model addresses the current limitations by providing a social media experience with integrated parental controls. The proposed model includes features such as content sharing control, message control, Login/Logout timings, and customizable ad preferences. The model was stimulated by the literature review and a preliminary research study, which adopts a data-driven approach to enhance child safety within the digital landscape. Future research should involve user testing of the proposed model with focused group discussions, along with their validation and analysis.

Keywords: Social Networks; Social media; Privacy; Parental Control; Underage Children.

1. Introduction

Social media is everywhere, with new applications launching all the time. To a surprising fact, more than half of the world is using different social networking platforms. With 5.16 billion internet users as of the 2023 report, a staggering 64.4 percent of the world's population is now online [1]. The COVID-19 pandemic significantly increased the need and usage of social networking platforms, fueled by a surge in online and digital activities [2]. According to January 2023, active social media users from around the globe are 4.76 billion, representing 59.4% of the world's population [3]. About 6 hours and 37 minutes is the average daily time spent on the internet by netizens [4]. Starting in 2023, Pakistan also witnessed significant growth in both internet adoption and usage. By January, the country boasted an impressive 87.35 million internet users, representing a 36.7% internet penetration rate compared to the total population [1]. Trending in 2023, YouTube reigned supreme in Pakistan's social media landscape. With over 71 million users, representing 30% of the population, it offered a massive advertising reach [5]. Many internet users have seamlessly integrated these social networking platforms into their daily routines and habitual conduct. [6] When users share content, these social networking platforms can collect and analyze it, raising concerns about

users' privacy and what information might be exposed about their online activities [7]. While considering the negative consequences and potential risks associated with the use of these platforms, concerns regarding user safety within the cyber domain emerge as a significant area of fear [8], [9].

Furthermore, engagement with social media platforms, particularly amongst minors, is frequently linked to additional challenges, including online fraud, identity theft, dissemination of explicit material, sexting, blackmail, and various forms of exploitation [8], [9]. Pornography is another risk nowadays, focusing on addressing social concerns regarding children and teenagers' exposure to online sexual imagery. It begins with the idea that children's exposure to pornographic material online is a risk that is socially constructed. Examining the factors that determine the probability of encountering such images online and which children are more vulnerable to negative effects from this exposure [10], [11].

The truth is that everyone deserves data protection, but it's especially important for kids to have access to technology without sacrificing their privacy. Nearly all children went online in 2021, either due to pandemic lockdowns or by the instructions from schools for online studies [12]. Nine in ten children owned their mobile phones by the time they reached the age of 11 (maximum) [13]. Even though most of the social networking platforms have set their recommended minimum age of 13 or above, nearly eight out of ten children (79%) aged 3-17 utilized applications and websites designed for messaging or voice/video calls [14]. According to independent surveys, in terms of specific platform usage, Children aged 8-11 were more likely to have profiles on TikTok (34%) and YouTube (27%) [14], [15], [16]. TikTok is growing in popularity, even among the youngest groups; 16% of 3-4 year-olds and 29% of 5-7 years-old use the platform [15], [16]. YouTube is considered the most popular service among children aged 3-17, with a usage rate of 89% [15], [16]. This research also indicates that only a third of parents are aware of the minimum age requirement on social media platforms. It is also observed that significant minorities under the minimum age requirement claimed to have set up their social media profiles themselves [15]. While many people in Pakistan have internet access, a small percentage are adequately educated about its use and capable of safeguarding themselves from social media risks [17].

Since 2018, the Federal Investigation Agency (FIA) has seen a steady rise in cybercrime reports, with over 100,000 complaints recorded in 2021, as per the latest archived data [18]. Moreover, the alarming trend of children under 13 circumventing age restrictions, often with the help of older siblings or by falsifying their age, underscores the urgency of this research and the need for effective safeguards to protect children from potential harm. Thus, there is a need for a preliminary survey study specially designed to inquire parental beliefs and concerns while ensuring a balance between underage children's social media use and parental guidance. This preliminary survey draws out the requirements to produce a customizable parental control model, empowering parents to take charge of their underage children's social media experience. Also, the research findings may not universally apply to all parents due to the variations in social media literacy and usage across different families.

1.1. Research Objectives

The research aim is to create a safe online environment for children under 10 (termed as 'Underage'). To achieve this, we will conduct a preliminary survey study to gather data from parents. This survey will systematically explore parental beliefs, concerns, and actions in relation to the commercial online environment of social networking applications. Our goal is to empower parents with greater oversight over their children's social media usage, encompassing areas like viewing, sharing, advertising exposure, privacy settings, and other consumption. To address these objectives, we need a comprehensive strategy that combines theory and practical methodologies. Some specific strategies include reviewing literature, Survey design, participant selection, data collection, data analysis, findings dissemination, and intervention development. The following are the two main research objectives:

1.1.1. Research Objective 1

After reviewing the literature and before diving deep into the conclusions, we conducted a preliminary survey study to gain a better understanding of parents' perspectives on their child's activities on social networking platforms.

1.1.2. Research Objective 2

By collecting quantitative research data, we can lay the groundwork for a comprehensive system designed to meet the specific needs of young children. This data will provide the foundation for building a model that integrates parental controls and customization options specifically for underage users. By empowering parents with the knowledge and tools gleaned from this research, we can create a safer online environment for vulnerable underage children.

1.2. Research Contributions

Among the pervasive influence of social media on the lives of underage children, this study proposes a holistic approach to tackling the diverse risks children encounter online. By bridging the gap between theory and real-world application, this approach aims to significantly enhance child safety in the digital world.

- a) A preliminary survey study has been conducted to gather requirements for developing robust and reliable models that will inform proactive measures to ensure child safety online.
- b) By analyzing requirements identified through literature review and a preliminary study, a model can be formulated for underage children, integrating parental control.

This study is based on strong evidence, careful examination of existing research, and tools that parents can use comfortably. This approach has the potential to be a revolutionary development in safeguarding young children within the ever-evolving landscape of online communication. This study also proposes a user-friendly model with parental control features. This approach has the potential to be a game-changer in safeguarding young children within the ever-evolving landscape of online communication.

2. Related Work

Most of the social networking platforms like Facebook, YouTube, TikTok, and Instagram require users to be at least 13 years old [19], [20]. In contrast, YouTube Kids is an exception, catering to younger audiences with parental approval. WhatsApp, on the other hand, implements a stricter age limit that varies by region. Depending on location and phone number registration, users must be 16 or older [21], [22].

At the onset of this research, YouTube was the sole platform among other social media platforms that was identified for targeting children under 13 for advertising. This likely prompted the launch of YouTube Kids in 2015, in response to the Children's Online Privacy Protection Act (COPPA) regulations [23]. YouTube is an app created to offer a secure environment for children under 13 to access curated content, vetted through both algorithm and human review [23]. Despite safety measures, there remains a risk of encountering inappropriate content such as nudity, violence, strange content, or advertisements promoting unhealthy food [24]. Parents are also advised regarding the potential for unexpected content and have the option to block or report inappropriate videos [24]. Kids shouldn't be watching something that just anyone can make and upload on social media platforms; they should only be able to watch things made by official and reputable sources. While YouTube Kids is showing its dark side known as 'Elsagate', where videos with seemingly child-friendly titles and characters contain inappropriate content, evading viewer detection [24], [25]. Finally, concerns remain about inappropriate content slipping past filters [26]. Figure 1 shows a few disturbing ads and video content caught on YouTube Kids.

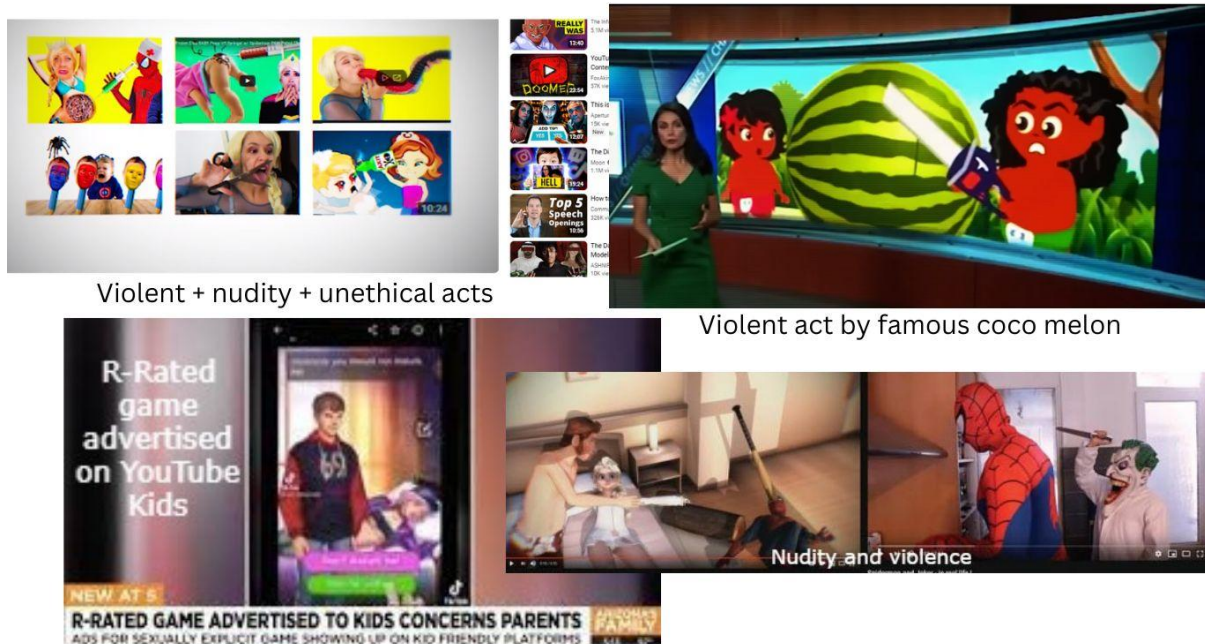


Figure 1. Inappropriate content on YouTube Kids (Source: [26], [27], [28])

Over and above, we accomplish this through several features that YouTube Kids lacks:

- It focuses only on video content.
- It has no direct message or messenger for personal chat.
- It is platform-dependent, which means parental control settings are to be done on each device.
- It promises an ad-free platform for paid accounts, but still, short commercial bumpers (break-bumpers) appear on the app.

This analysis revealed shortcomings in YouTube Kids, the platform with parental controls, highlighting where it fails to ensure the comprehensive online safety of underage children. Including YouTube, other existing parental control models often fall short, acting more like surveillance tools than supportive parental guidance. Many of these models fail to effectively monitor children's online activities, such as posts or conversations with strangers. These identified gaps will inform the development of our proposed model, ensuring it incorporates features crucial for a safer online experience of underage children and aims to address these shortcomings by providing a more comprehensive and transparent approach to parental control.

3. The Research Problem

Underage social media users face a multitude of privacy and safety concerns that threaten their emotional, psychological, and social well-being. Alarming, children under 13 often bypass age restrictions, with help from siblings or by falsifying information. This highlights the urgent need for effective safeguards to protect children from potential harm. While social media platforms like YouTube Kids offer safety features, they primarily focus on video content, leaving other areas vulnerable. We propose a unified parental control system that spans across all devices. This system would provide granular control over ad preferences, fostering a safer and more enriching online experience for children.

4. Primary Survey Study

The primary concern in designing and carrying out a research study is to fulfill the research or data collection objectives within the constraints of available resources [29]. To simplify data collection, we designed an online survey because the target population was internet users who were parents having

underage children. It was designed to gather feedback from parents regarding their awareness of online social media usage by underage children in Pakistan, utilizing the Likert scale. A Likert scale was chosen for this study because it's a quick and easy way to get quantitative data on parental satisfaction with various aspects of their children's social media use, i.e., facts, experiences, and concerns. For survey design, respondents select options to express their views. Some of the questions are agreement-based, while others are frequency-based. The questions were crafted to address potential risks that children might encounter while using social networking applications. Table 1 provides a comprehensive overview of the questionnaire's design.

Table 1. Design of preliminary questionnaire study

Questions	Data Collected	
	Information Collected	Measurement
Q1 to Q5	Personal Information	Parents' age, profession & children
Q6 to Q10	Social Networking and Parents	Their networking knowledge
Q11 to Q14	Child and Social Media Apps	Child's usage of social media apps
Q15 to Q18	Privacy on Social Media	General opinion of parents

In Table 1, demographic questions (Q1- Q5) gather information about respondents' age, occupation, and number of children (including age and gender). This data helps us to analyze:

- **Age Distribution:** We can see how many respondents fall into different age groups.
- **Professional Background:** Knowing the respondent's occupation reveals the employment sectors represented in the sample.
- **Family Structure:** Information on the number, age, and gender of children allows us to understand how family dynamics might influence responses or experiences.

By analyzing these demographics, we can identify trends, correlations, and patterns within our data. This allows us to focus our research on specific groups as needed. Then, questions from Q6 to Q10 cover parents' awareness about how much they know about social networking.

- **Internet Activity (Q6):** This assessment engaged parents online, providing context for their social media awareness.
- **Q7 & Q8:** were asked in response to Q6; if they choose the answer 'No', then provide the reason behind it, and if they choose 'Yes', then how many social media platforms are they members of.
- **Social Media Platforms (Q9):** By identifying which platform parents use, we gain insights into their preferences and habits.
- **Social Media Uses (Q10):** Parents' opinions on social media's value for children reveal their attitudes towards their kids' online activities.

In essence, these questions shed light on the interplay between parents' digital habits, social media preferences, and their views on their children's online experiences. Furthermore, the Q11 to Q14 is an analysis of children and their usage of social media applications.

- **Prevalence of Social Media Usage (Q11):** This question helps to gauge how many children in the sample actively use social media.

- **Parental Supervision Methods (Q12 & Q13):** By asking about restriction and comfort levels. We can assess parents' supervisory approaches and any ethical considerations they face.
- **Proactive Parenting (Q14):** This question sheds light on how parents guide their children's social media experience.

Overall, these questions provide a well-rounded picture of children's social media usage in the context of parental influence and ethical consideration. Lastly, Q15 to Q28 are related to privacy on social networking applications. These questions capture parents' awareness, attitude, and practices regarding social media privacy.

- **Privacy Knowledge (Q15):** This question assesses respondents' familiarity with privacy settings on social media platforms.
- **Personal Information Management (Q16):** This question gauges how responsible parents feel for securing their personal information on these platforms.
- **Privacy Education for Children (Q17):** This question explores whether parents discuss and educate their children about privacy settings, potentially revealing their comfort level with these settings.
- **Proactive Child Safety (Q18):** This question inquires about how proactive parents are in ensuring their children's safety and privacy on social media.

These questions enable parents to furnish information regarding their children's social media usage. Additionally, they serve to elicit feedback on online privacy awareness and seek parental consent for monitoring their children's activities on social networking applications. To encourage a likelihood of obtaining a substantial response rate, the questionnaire (an online version) was distributed among the netizens already actively engaged in using social networking applications.

5. Proposed Model Design

In the field of research, development refers to the creation or evaluation of something new [30]. Models, on the other hand, can be built inductively from empirical observation [31]. Our proposed solution is a web-based platform with core functionalities like Facebook, designed with parental control and customization features in mind. After having a detailed requirement analysis conducted through a primary survey, we developed a prototype of a model that offers these functionalities. The development of the model was divided into two phases:

Phase-I: Includes the initial registration process on the platform for account creation, necessitating completing the given parameters in the sign-up form. This form requires the input of the user's first name, last name, gender, date of birth, and the parent's email address and mobile number to create the account, thereby asking for the parent's permission if the person is their child. The model encompasses a procedure known as account creation and parental monitoring, which entails the following steps shown in Figure 2:

- Users initiate the registration process on the platform.
- Age serves as a compulsory criterion during the account creation phase.
- Parental permission is actively sought for users to create their accounts.

The parents' email plays a role as a verification method. When these parameters are filled in by a child user with or without any elder's help, an email goes to the parent, who decides whether to allow the child user to create their account or not. In case the parent decides not to grant permission, then the child user would not get access to create the desired account. But if the parent permits the child, another set of parameters is offered to the parent to make their child's online experience secure and monitored by them.

Phase-II: This is termed as the customization phase, when parental permission is granted by the child user's parent. He/she is provided with some more options for setting ad preferences. Parameter choices

that appear for parents are the choices they have to make, and some more verifications, as illustrated in Figure 3.

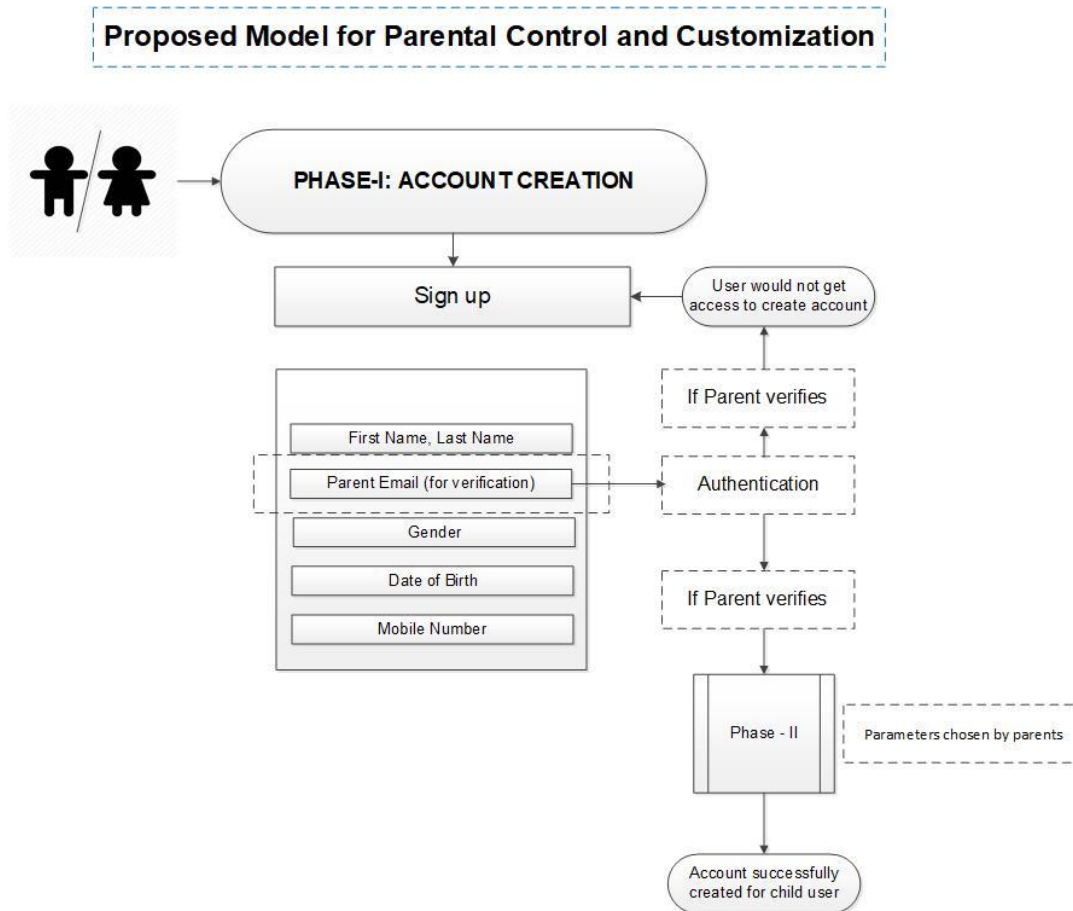


Figure 2. Phase-I of the proposed model (account creation)

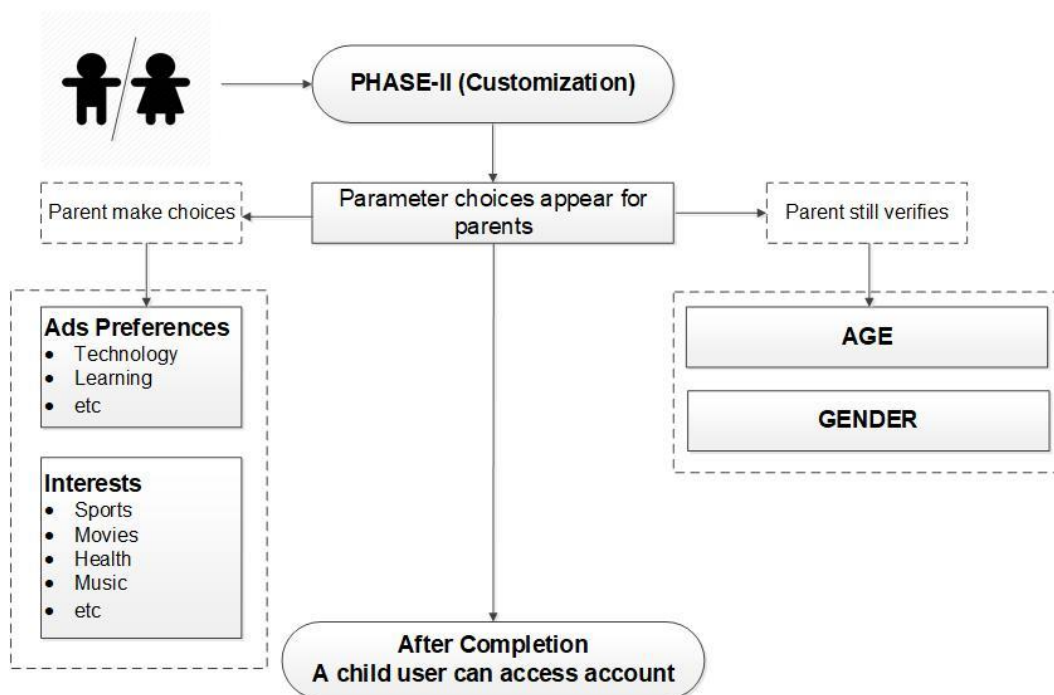


Figure 3. Phase-II of the proposed model (customization)

Parent verifies the following parameters for foolproof verification, and this verification can be utilized in filters provided according to the provided details.

- Age
- Gender

Parent is provided choices to select from:

- Ads Preferences
- Interests

The ad preferences could include options such as technology, learning, and cosmetics, which could be filtered and pop up on a child's timeline according to the parent's choice. Another interesting choice, which includes sports, movies, health, and music, could be the posts that appear in the newsfeed, which can interest a child user.

6. Results and Discussion

This research investigates social media used by underage children. The study employs a quantitative research method, using an online questionnaire to gather data on parental beliefs, concerns, and actions regarding their children's use of social networking platforms. By analyzing survey results, we aimed to understand parents' perspectives on their underage children's use of social networking platforms. Drawing requirements as variables from both the preliminary survey and reviewing existing literature, key requirements were identified for the design of a prototype model. This model is a web-based platform designed specifically for underage children, with integrated parental control and monitoring features to promote a safe online environment.

6.1. Results from the Preliminary Study

For this pilot survey, data analysis was conducted using IBM's SPSS Statistics. It is a powerful tool that offers a wide variety of analysis options, data transformation capabilities, and output formats, making it well-suited for our research needs. The questionnaire consists of 18 questions with offered answers based on the Likert scale. The questionnaire avoided any questions that could identify respondents, such as their name or location, to ensure their privacy. The data was collected through an online questionnaire form filled out by 100 parents having underage children, and they must be active or inactive social media users in order to fulfill our research requirements. Several statistical formulas are available for estimating sample size, with various methods for computing sample size for categorical data, each employing a distinct formula. Hamid Taherdoost [32] explains a formula to calculate the required sample size:

$$n = \frac{P(100-P)z^2}{E^2} \quad (1)$$

Where n = required sample size; P = percentage occurrence of a state or condition; E = percentage of maximum error required; z = value corresponding to level of confidence required. We set a confidence level 95 % with a population variance 50%, 100 sample size was enough for the survey, giving 1% margin of error, which happens to be 99 sample sizes [33]. The following are the sample size requirements predefined before the survey, as observed from a book on 'How to design survey studies' [34].

General Purpose: To get feedback from parents on the awareness of online social media usage by underage children.

Target Population: Parents having children under the age of 10.

Sample Size: Participants who are (active/inactive) internet users (as the questionnaire was distributed online).

Inclusion Criteria (Eligibility): are the characteristics a person must have to be eligible for participation in the survey.

- Between the ages of 25 and 45 years
- Having at least one kid below 10 years old
- Must be an active or inactive internet user

6.1.1. Measuring 'Personal Demographics'

The survey started by asking respondents about their gender. There were 100 participants, with males constituting 49% and females 51%. Next, the survey asked parents about their ages. The dataset stratifies parents into three age groups, indicating that each group might have different experiences raising kids. Figure 4 shows the percentage of parents with underage children who fell into each age group.

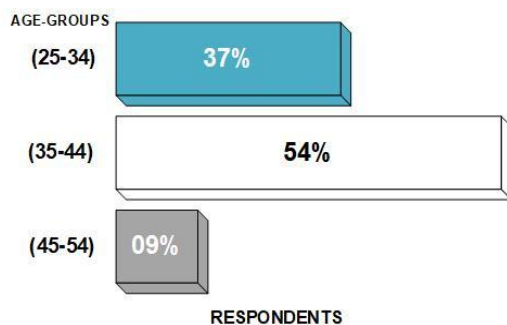


Figure 4. Sample population of parents

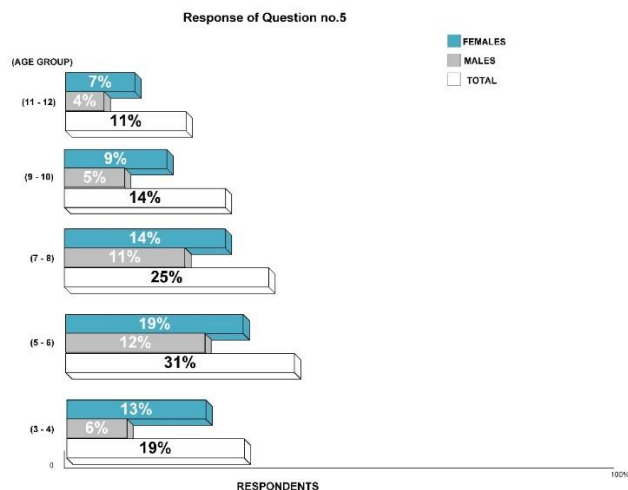


Figure 5. Demographic representation of children's age and gender

The survey showed a mix of parents at different stages of parenthood. Parents between 25 and 34 years old made up 37%, suggesting a significant number of new parents. The 35-44 age group, at 54%, likely represents parents with more experience. The remaining 9% fell into the 45-54 age range. This spread across age groups helps us understand the diverse needs of parents navigating different challenging phases of raising children. Question 5 requires parents to tell us about their children, like how many children they have, their ages, and whether they are boys or girls. Since we were interested in parents with young kids, it turns out everyone who answered had between two and three children under 12. Table 3 shows the percentage of kids who fell into each age group based on the information provided by parents. By analyzing all the information parents shared about themselves, we ought to get information providing details of the demographic composition of parents with underage children. We learned about their ages, genders, jobs, education, and family structures. This information would be helpful for tailoring future services, products, or support groups targeting this specific demographic group.

6.1.2. Measuring 'Social Networking Knowledge'

The survey includes Q6 to Q10, specifically asking parents about their social media usage and knowledge. Question number 6 measures the active or inactive internet users among participants, shown in Table 2. Regarding question no. 6, an optional question for those who are not members of

any social networking platforms is not. This survey also looked at why some parents don't use social media. 4% said they didn't know enough about it, and another 4% were worried about privacy. Another 8% just weren't interested or had bad experiences in the past. Overall, though, 84% of the parents surveyed were on social media.

Then, an important question, no. 10 asked parents' opinion about whether social media usage is important for their children. Here's what they said:

- Over two-thirds (41% + 33%) said social media is either highly or moderately important.
- Less than half (12% + 4%) said it's not very important or not important at all.
- Around one in ten (8%) were unsure of it.

By understanding these dynamics, we can come up with ways to assist children's social media interactions with their parents, by avoiding problems and promoting responsible social media usage.

Table 2. Response to Q6 – analyzing active and inactive internet users

Options	Percentage	Response to Question 6	
		Active Users	Inactive Users
Yes, an active user of a few social media apps	37%	✓	--
Yes, an active user of many social media apps	16%	✓	--
Yes, but not an active user	29%	--	✓
No, not using any social media app	12%	--	--
No, but thinking to become a member of one soon	6%	--	--
TOTAL	--	53%	29%

6.1.3. Measuring 'Child's Usage of Social Media Applications'

After the first ten questions, the next four questions were specifically about how kids use social media. All these questions had the same answer choices. However, question no.12 was different; it asked about how old kids were when they first started using social media. The response shows that a lot of children begin using social media around the age of 7. It seems that with the help of older siblings and/or lying about their age are common ways for underage children to get on these platforms.

Table 3. Responses to questions 11, 13, and 14 (questionnaire study)

Q. No.	Questions	Opinions				
		YES	NO	Don't Know	Unaware	Not Interested
Q-11	Does your child have an account on any social media application?	83%	4%	8%	4%	1%
Q-13	Has your child used wrong information about his/her age to gain access to a social media app?	54%	12%	11%	20%	3%
Q-14	Has your child ever asked permission from you or any elder before creating their social media account?	46%	25%	16%	8%	5%

Response to question no.11, when analyzed, shows a very high number (83%) of the kids in this study have social media accounts, while Table 5 shows us more details about these kids' social media usage. Interestingly, it seems many parents also know their children are on social networking platforms, and even that some of them lie about their age to gain access to these platforms. However, analyzing Table 3 suggests that while many parents claim awareness of their child's social media usage, there is a significant discrepancy between this perception and the reality of children's actions online. This underscores the importance of parental involvement, awareness, education, and platform regulations to ensure safer online experiences for children.

6.1.4. Measuring 'General Opinion About Privacy'

The final set of four inquiries pertains to what parents think about privacy on social networking platforms and how much they are aware of privacy policies and settings. In Figure 6, questions 15 to 18 are designed to measure parental attitudes and behaviors regarding privacy concerns when it comes to their children and social media.

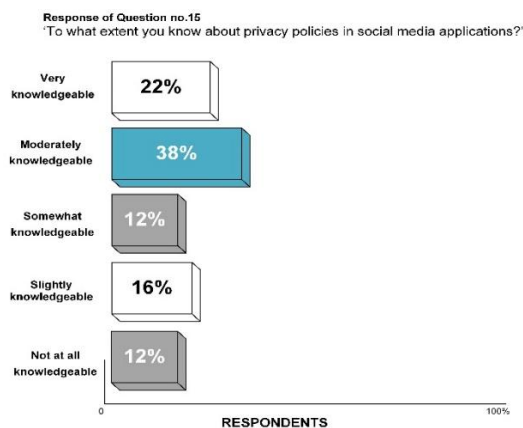


Figure 6. Response to question no. 15

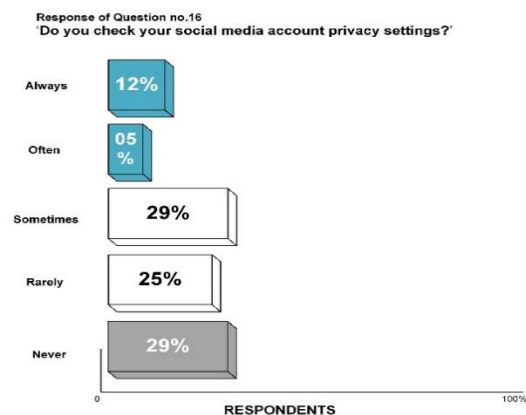


Figure 7. Response to question no. 16

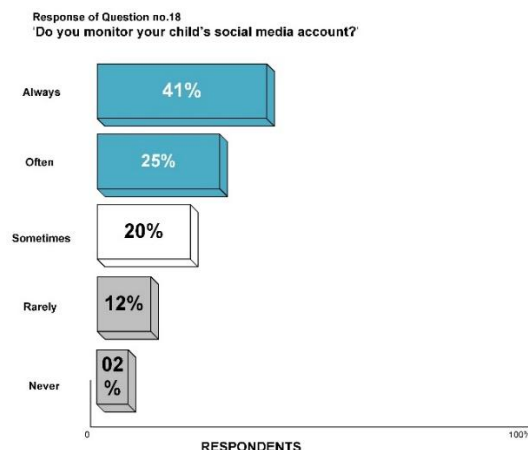


Figure 8. Response to question no. 18

Figure 6 presents that most participants (60%) had moderate (38%) or high (22%) knowledge of social media privacy policies. But a surprising number (12%) didn't know anything at all. The rest fell somewhere in between. The responses to question no.16 presented in Figure 7 break down how parents answered this inquiry. As per the feedback, close to one-third (29%) of parents never review their privacy settings, with an additional 25% rarely check them. Meanwhile, 29% answered that they occasionally check their privacy settings. Out of everyone, only 17% (5% often + 12% always) check

them regularly. This means a lot of parents might not realize what information their children's profiles are sharing. On the other hand, question no.17 represents what parents think about their kids' awareness of social media privacy. In which 85% of parents believe their children are at least somewhat aware of privacy settings. On the flip side, a concerning 15% report their child has no awareness at all. This suggests there might be some gaps in how well children understand social media privacy.

Finally, question no.18 inquires about the extent to which parents monitor their child's online activity on social media platforms. The responses to it are presented in Figure 8, which reveals that a good chunk of parents (41%) watch their children's social media activity closely, while another quarter (25%) check in regularly, but maybe not as intensely. Roughly a fifth (20%) monitor their children's social media accounts sometimes. On the other hand, there's a gap in how often some parents check. A small but concerning 2% of parents admitted to never monitoring their child's social media accounts, highlighting that 12% monitor selectively. From an analytical standpoint, there is a noticeable gap between awareness of privacy policies and actual actions taken to manage settings. While more people claim knowledge of policies, fewer actively adjust them. Similarly, parents overestimate their child's awareness compared to monitoring their child's social media accounts.

6.2. Requirements Driven by the Preliminary Survey for Model Formulation

After the preliminary study from the quantitative data collection, some attributes were obtained through requirement analysis to design a model that would fill the research gap of the study. Table 4 categorizes the necessary variables for the proposed model, which were derived from reviewing the literature and the pre-design study through a questionnaire survey, and describes the requirements for the essential attributes.

Table 4. Requirements for model formulation

Types of variables	Data-driven foundations for model formulation	
	Attribute	Requirement
Key Stakeholders/ or End Users	Children's Age Group	Under 10 years old (not more than 13)
	Parents	Active/ Inactive social media users
Features	Age-appropriate	At the Sign-up step, the age parameter is given
	Parental Control	If a child posts anything, a notification goes to the parent
	Manage Screen Time	Log-in/ Log-out time (blackout hours setting)
	Personal Messaging	Notifications of the user ID (with whom the child interacts)

The main variables in Table 4 are divided into two categories, the first one representing the end user's type. Another defines the necessary features required for the proposed model. This further defines that our end users or participants must be parents who are active or inactive social media users. They must have at least one child under the age of 10 but not more than 13. The reason behind setting the age parameter not more than 13 was that the age limit for using most of the social networking platforms is about 13 years. Therefore, most of the kids, instead of this age limit boundary, are still using social media platforms actively. Our focus is centered on the underage children. Conversely, we focus on analyzing four specific attributes extracted from variable features. The age-appropriateness is the first feature, in which the age parameter will be given at the sign-up step of the model. Whereas the second

feature includes parental control, where a child's activities are monitored by their parent, along with the third feature, which manages the screen time of the child, though sending notifications to a parent about the login/log-out time of the child user. The last and fourth feature is the possibility of messaging any unknown or stranger online, which was again a big concern while reviewing the literature discussing the threats and risks associated with cyberbullying, for which a notification is generated towards the parent with the user id/ account with whom the child interacts as a requirement. Grounding this research study's findings in Pakistani culture underscores the urgency for public awareness and policy interventions to protect children from online exploitation and other dangers. Ultimately, this research aims to provide a comprehensive analysis of parental approaches to social media usage among underage children. By concluding with practical methods that ensure a robust and reliable process for the formation of a Parental control model.

7. Conclusion and Future Direction

The research explores the dangers faced by underage children navigating the pervasive influence of social media. The exponential growth of internet users, particularly since COVID-19, underscores the critical need for online child safety. Despite existing rules and safety features, children can still be bullied, exposed to inappropriate content, or have their information compromised. This study aimed to understand parents' perspectives on online safety through a survey. The findings identified areas where parental control and child protection can be improved. Notably, while platforms like YouTube Kids offer some parental controls, they often have limitations. To address these limitations, we propose a platform-independent parental control system with customization options, empowering parents with greater control and fostering a safer online environment. The design and development of this prototype, 'Social Book', considered both parent and child needs, leading to its improvement. This research also highlights the importance of understanding parental concerns when developing online safety tools and environments for minors. Additionally, collaboration among stakeholders, including policymakers, educators, and tech companies, is crucial for creating a safer online landscape for underage users. Based on valuable insights gained from the preliminary survey, further development and usability testing of 'Social Book' are recommended. Focus group discussions involving parents and children would be effective for the next phase of this study.

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Conflict of Interests

Publication of this research article has no conflict of interest.

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9. Appendix (Primary Survey Questionnaire)

This survey is designed to get feedback of Parents on the awareness of online Social Media usage by children in Pakistan.

"Make it a rule never to give a child a book you would not read yourself" _ George Bernard Shaw

Social media applications are the platforms to build social networks among Netizens (Internet Users). Online social networks are websites that function like an online community of internet users who share common interests. An example of social network is Facebook. This study investigates the role of parental control, trust and disclosure as protective factors of social media usage among underage children these days.

I. PERSONAL INFORMATION:

1. Gender:

- ☐ Male
☐ Female

2. Age:

- ☐ 25-34
☐ 35-44
☐ 45-54 ☐

3. Occupation:

4. Qualification/ Degree last attended:

- ☐ PhD
☐ Mphil/ Msc
☐ Graduate
☐ Intermediate/ Matriculation
☐ Other (please specify) _____

5. Children information along with their age?

Gender	Age

II. SOCIAL NETWORKING & YOU:

6. Are you a member of any Social Media Application? (facebook, Twitter, Google+, etc)
- ☐ Yes, Active User of few social media applications only
 - ☐ Yes, Active user of many social media applications
 - ☐ Yes, but not an active member of any social media application
 - ☐ No, not using any social media application
 - ☐ No, but thinking to become member of one soon
7. If your answer to the above question is NO, then choose the reason why? (You can choose more than one)
- ☐ I don't know what social media application is
 - ☐ I am not interested in joining any social media application
 - ☐ I joined once but I didn't enjoy it
 - ☐ It's against my culture
 - ☐ There is no privacy
 - ☐ Other (please specify) _____
8. If YES then how many social media applications are you a member of?
- ☐ 1-5
 - ☐ 5-10
 - ☐ 10-15
 - ☐ Above 15
 - ☐ None
9. Please select all social media platforms for which you have created a personal profile (You can choose more than one)
- ☐ Facebook
 - ☐ Twitter
 - ☐ WhatsApp
 - ☐ YouTube
 - ☐ Instagram
 - ☐ Snapchat
 - ☐ Pinterest
 - ☐ LinkedIn
 - ☐ Google+
 - ☐ Other (please specify)
10. Do you think the use of social media applications is important for children in this era?
- ☐ Highly Important
 - ☐ Moderately Important
 - ☐ Uncertain
 - ☐ Less Important
 - ☐ Not Important at all

III. YOUR CHILD AND SOCIAL MEDIA APPLICATION:

11. Does your child have account on any social media app on smart phone/Tablet?
- ☐ Yes
 - ☐ No
 - ☐ Don't know
 - ☐ Unaware
 - ☐ I am not interested
12. If yes then what is the age he/she started using that website?
- | Child | Age when started |
|-------|------------------|
| | |
| | |
| | |
| | |
| | |
13. Have your child used wrong information about his/ her age to create account/ gain access to a social media application?
- ☐ Yes
 - ☐ No
 - ☐ Don't know
 - ☐ Unaware
 - ☐ I am not interested

14. Have your child ever asked permission/ suggestion from you or any elder before creating their accounts on social media applications?

- ☐ Yes
- ☐ No
- ☐ Don't remember
- ☐ Unaware
- ☐ I am not interested

IV. GENERAL OPINION ABOUT PRIVACY ON SOCIAL MEDIA:

15. To what extent you know about privacy policies in social media applications?

- ☐ Very knowledgeable
- ☐ Moderately knowledgeable
- ☐ Somewhat knowledgeable
- ☐ Slightly knowledgeable
- ☐ Not at all knowledgeable

16. Do you check your social media app account privacy settings?

- ☐ Always
- ☐ Often
- ☐ Sometimes
- ☐ Rarely
- ☐ Never

17. Is your child aware about privacy settings and policies?

- ☐ Very Aware
- ☐ Moderately Aware
- ☐ Somewhat Aware
- ☐ Slightly Aware
- ☐ Not at all Aware

18. Do you monitor your child's social media account?

- ☐ Always
- ☐ Often
- ☐ Sometimes
- ☐ Rarely
- ☐ Never