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The Impact of Employees' Emotional and Information Literacy on Enhancing Students' Safety Culture through Family-School Interaction: A Study of Ardabil Electricity Company

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Abstract

The present study aimed to analyze the impact of employees' emotional literacy and information literacy at the Ardabil Electricity Distribution Company on enhancing students' safety culture, with family-school interaction as a mediating variable. The study was applied and employed a descriptive-correlational design based on structural equation modeling (SEM). The statistical population consisted of 740 employees, from whom 260 participants were selected using simple random sampling. Data were collected using questionnaires measuring emotional literacy, information literacy, family-school interaction (Epstein), and a researcher-developed safety culture questionnaire. Data were analyzed using the partial least squares (PLS) method. The findings showed that employees' emotional literacy had a positive and significant effect on family-school interaction ($\beta = 0.44$, $t = 6.82$). Likewise, information literacy significantly predicted family-school interaction ($\beta = 0.31$, $t = 4.95$). Furthermore, family-school interaction had a direct and significant effect on students' safety culture ($\beta = 0.52$, $t = 8.41$). Indirect effects analysis using bootstrap showed that family-school interaction significantly mediated the relationship between emotional literacy and safety culture ($ab = 0.228$, $t = 5.13$), as well as between information literacy and safety culture ($ab = 0.161$, $t = 3.88$), with $p < 0.001$. Based on these findings, it can be concluded that the emotional and informational competencies of parents working in the electricity industry constitute key factors in enhancing students' safety culture through stronger interaction with the school. Therefore, strengthening the family-school partnership can help transform parents' technical knowledge into sustainable safety behaviors among younger generations and promoting safe behaviors consistently.

Keywords: Emotional Literacy; Information Literacy; Family-School Interaction; Safety Culture.

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El impacto de la alfabetización emocional y la alfabetización informacional de los empleados en la mejora de la cultura de seguridad de los estudiantes mediante la interacción familia-escuela: un estudio en la Empresa de Electricidad de Ardabil

Resumen

El estudio tuvo como objetivo analizar el impacto de la alfabetización emocional y la alfabetización informacional de los empleados de la Empresa de Distribución de Electricidad de Ardabil en la mejora de la cultura de seguridad de los estudiantes, considerando el papel mediador familiar-escolar. La investigación fue aplicada y adoptó un diseño descriptivo-correlacional mediante modelado de ecuaciones estructurales (SEM). La población estuvo constituida por 740 empleados, de los cuales 260 fueron seleccionados mediante muestreo aleatorio simple. Para la recopilación de datos se utilizaron cuestionarios de alfabetización emocional, alfabetización informacional, interacción familia-escuela basada en el modelo de Epstein y cultura de seguridad elaborada por el investigador. Los datos fueron analizados mediante mínimos cuadrados parciales (PLS). Los resultados indicaron que la alfabetización emocional tuvo un efecto positivo y significativo sobre la interacción familia-escuela ($\beta = 0.44$, $t = 6.82$), mientras que la alfabetización informacional predijo significativamente dicha interacción ($\beta = 0.31$, $t = 4.95$). Asimismo, la interacción familia-escuela ejerció un efecto significativo sobre la cultura de seguridad de los estudiantes ($\beta = 0.52$, $t = 8.41$). El análisis de efectos indirectos mediante bootstrap confirmó un efecto mediador de la interacción familia-escuela entre la alfabetización emocional y la cultura de seguridad ($ab = 0.228$, $t = 5.13$), así como entre la alfabetización informacional y la cultura de seguridad ($ab = 0.161$, $t = 3.88$), con $p < 0.001$. En conclusión, fortalecer la interacción familia-escuela puede convertir las competencias emocionales e informacionales de los padres trabajadores en prácticas de seguridad sostenibles para los estudiantes.

Palabras clave: alfabetización emocional; alfabetización informacional; interacción familia-escuela; cultura de seguridad.

O impacto da alfabetização emocional e da alfabetização informacional dos funcionários na melhoria da cultura de segurança dos alunos por meio da interação família-escola: um estudo na Companhia de Eletricidade de Ardabil

Resumo

O estudo teve como objetivo analisar o impacto da alfabetização emocional e da alfabetização informacional dos funcionários da Companhia de Distribuição de Eletricidade de Ardabil na melhoria da cultura de segurança dos alunos, considerando o papel mediador família-escola. A pesquisa foi aplicada e adotou um delineamento descritivo-correlacional por meio da modelagem de equações

estruturais (SEM). A população foi constituída por 740 funcionários, dos quais 260 foram selecionados mediante amostragem aleatória simples. Para a coleta de dados, utilizaram-se questionários de alfabetização emocional, alfabetização informacional, interação família-escola baseada no modelo de Epstein e cultura de segurança elaborada pelo pesquisador. Os dados foram analisados por meio de mínimos quadrados parciais (PLS). Os resultados indicaram que a alfabetização emocional teve um efeito positivo e significativo sobre a interação família-escola ($\beta = 0,44$, $t = 6,82$), enquanto a alfabetização informacional predissem significativamente essa interação ($\beta = 0,31$, $t = 4,95$). Da mesma forma, a interação família-escola exerceu um efeito significativo sobre a cultura de segurança dos alunos ($\beta = 0,52$, $t = 8,41$). A análise de efeitos indiretos por meio de bootstrap confirmou um efeito mediador da interação família-escola entre a alfabetização emocional e a cultura de segurança ($ab = 0,228$, $t = 5,13$), bem como entre a alfabetização informacional e a cultura de segurança ($ab = 0,161$, $t = 3,88$), com $p < 0,001$. Em conclusão, fortalecer a interação família-escola pode converter as competências emocionais e informacionais dos pais trabalhadores em práticas de segurança sustentáveis para os alunos.

Palavras-chave: alfabetização emocional; alfabetização informacional; interação família-escola; cultura de segurança.

1. Introduction

Safety is one of the fundamental components of individual and social well-being, and the development of safe attitudes and behaviors begins in the early years of life. Due to their developmental characteristics, curiosity, limited experience, and exposure to various situations at home, at school, and in the broader social environment, students are considered a vulnerable group in relation to various risks, injuries, and accidents. Therefore, safety education is not merely the transmission of a set of information and instructions; rather, it is an educational process aimed at internalizing attitudes, responsibility, risk anticipation, and preventive behaviors. Achieving this goal requires the coordinated participation of institutions that influence children's development, particularly the family and the school.

The family is the child's first environment for learning and socialization, and parents play an influential role in shaping their children's safety culture through their behaviors, verbal communication, problem-solving approaches, and ways of responding to risks. In this regard, employees of electricity distribution companies, due to their professional exposure to technical hazards and the continuous need to comply with safety standards and regulations, can serve as valuable sources of experience and knowledge concerning accident prevention. However, the effective transfer of such knowledge and experience to students does not depend solely on parents' technical awareness; rather, it is also influenced by their ability to recognize and manage emotions, establish constructive communication, seek and evaluate reliable information, and engage purposefully with the school.

Emotional literacy, by strengthening self-awareness, self-regulation, empathy, and communication skills, provides the necessary foundation for establishing effective relationships among parents, children, and school personnel. Similarly, information literacy enables parents to identify, evaluate, organize, and appropriately apply information related to hazards, safety education, and reliable

sources. When these two competencies operate within the context of active family-school interaction, the likelihood of consistency in educational messages, continuity of safety education, and the transformation of safety knowledge into sustainable behaviors among students increases.

Accordingly, the present study was conducted to analyze the impact of employees' emotional literacy and information literacy at the Ardabil Electricity Distribution Company on enhancing students' safety culture, with particular emphasis on the mediating role of family-school interaction. By clarifying the relationships among these variables, this study seeks to provide a scientific basis for designing educational and collaborative interventions involving the electricity company, families, and schools.

Problem Statement

In recent decades, enhancing students' safety culture has attracted increasing attention from policymakers and researchers as one of the fundamental components of sustainable social and educational development. Safety culture is not limited to formal school-based education; rather, it is also influenced by the attitudes, emotions, and safety behaviors transmitted by the family. As the primary social institution, the family plays a key role in institutionalizing safe behaviors among children (Takian et al. 2025, p. 42). In this context, the psychological and cognitive characteristics of parents employed in service and industrial organizations may affect the quality of this transmission. Employees of electricity companies, due to the hazardous nature of their occupations, are exposed to specific safety training and experiences that can be transferred to the family environment. Under such circumstances, children may experience a sense of perceived injustice. Perceived injustice refers to an emotional state arising from the failure to fulfill expectations and desires that an individual considers to be their legitimate rights and believes have been denied or taken away by a group, individual, or organization; it is often accompanied by feelings of resentment and hatred (Moradi et al., 2024).

Emotional literacy refers to the ability to understand, regulate, and manage one's own and others' emotions and is considered an important predictor of healthy family and educational interactions. Parents with higher levels of emotional literacy are more successful in communicating safety concepts, regulating emotions associated with risk, and teaching appropriate responses to hazardous situations (Goleman, 1995, p. 87). Employees of the Ardabil Electricity Distribution Company, due to their continuous exposure to stressful conditions, require a high level of emotional regulation. This emotional regulation may be reflected in their family interactions and communication with schools. However, the direct and indirect role of these employees' emotional literacy in enhancing students' safety culture, particularly through family-school interaction, has not yet been clearly explained.

Information literacy refers to the ability to identify, evaluate, use, and effectively communicate information and is considered one of the key skills of the twenty-first century. Parents with higher levels of information literacy are better able to understand safety messages, use reliable educational resources, and consciously

communicate such information to their children (Zare & Mousavi 2020, p. 61). Employees of electricity companies, due to their access to specialized safety guidelines and training, have considerable potential to transfer safety knowledge to the family environment. However, insufficient information literacy skills may hinder the accurate and effective transmission of such information to students. Therefore, examining the role of employees' information literacy in this process appears to be essential.

Family-school interaction is considered one of the most effective mechanisms for promoting safe and responsible behaviors among students. Research indicates that when parents maintain active, informed, and continuous communication with schools, educational and safety messages are conveyed to students with greater consistency (Epstein, 2018, p. 145). Employees of the Ardabil Electricity Distribution Company, when equipped with appropriate levels of emotional and information literacy, may play a more active role in this interaction. Nevertheless, it remains unclear how this interaction can function as a mediating mechanism between parental characteristics and students' safety culture. This ambiguity represents one of the major research gaps in this field.

A review of the research literature indicates that numerous studies have examined students' safety culture, emotional literacy, or information literacy separately. However, research that has examined these variables within an integrated model, with a specific focus on employees of an electricity company, remains very limited. In particular, there is a clear lack of locally grounded scientific evidence on this issue in Ardabil Province. Moreover, the role of family-school interaction as a pathway through which parents' psychological characteristics influence their children has received relatively little attention (Mohammadi, 2022, p. 93). This research gap highlights the necessity of conducting the present study.

Theoretical Foundations of the Study

The concept of emotional literacy in contemporary psychological literature is rooted in the evolution of researchers' perspectives on the role of emotions in individual and social adjustment and functioning. The earliest attempts to scientifically formulate this concept can be traced to the work of Mayer and Salovey. In the early 1990s, they introduced the construct of "emotional intelligence" as the ability to process emotional information, recognize emotions, and use emotions in thinking (Osher et al. 2019). This perspective was later developed by scholars such as Goleman and extended into the fields of organizational and educational behavior. Goleman emphasized that emotion management, empathy, and the ability to use emotions constructively in human interactions constitute the core of emotional literacy (Goleman, 2002, p. 77).

In Iran, over the past two decades, emotional literacy has been examined in relation to life skills, organizational functioning, and the prevention of high-risk behaviors. Iranian researchers have defined emotional literacy as "the ability to understand, interpret, express, and regulate emotions in individual and social situations" (Mousavi, et al. 2015). This approach views emotions not merely as internal experiences but also as a resource for decision-making, communication skills, and occupational interactions.

From a developmental perspective, emotional development is consistently intertwined with cognitive development. Children and adolescents need to learn how to manage emotions in practical ways as they progress toward more advanced stages of logical thinking. Adults, particularly organizational employees, may face significant challenges in communicating important messages—including safety-related training—if they lack sufficient emotional literacy. This issue has also received attention in research on safety and crisis management (Oteng et al. 2025).

Key Components of Emotional Literacy in Organizational and Social Interactions

In general, emotional literacy encompasses a set of abilities that enable individuals to manage emotions effectively and constructively in social situations. Emotional self-awareness is the first component, through which individuals can identify their emotions, recognize their sources, and anticipate their potential consequences (Andres, 2025). A lack of self-awareness commonly leads to impulsive behaviors, emotionally driven decision-making, and unsuccessful communication.

The second component is emotional self-regulation. This ability enables individuals to manage intense emotions under critical conditions—such as exposure to electrical hazards—and respond appropriately. Employees who experience severe mood fluctuations generally perform less effectively when providing safety education to students, because communicating important messages requires calmness, emotional stability, and self-control (Zhu et al. 2025).

Empathy is another important component of emotional literacy. Empathy enables electricity company employees to understand the emotional needs of their audiences—including students, parents, and teachers—and to communicate safety messages in ways appropriate to their cognitive capacities. Studies have shown that educators with higher levels of empathy are more capable of engaging students in safety programs (Forrester et al., 2008).

In educational and organizational environments, communication skills also constitute an important dimension of emotional literacy. For example, employees who have difficulty expressing their emotions and messages may be unable to create an appropriate interactive environment when educating students about electrical hazards. Establishing positive relationships with families, gaining their trust, and encouraging their participation in school safety programs are also strongly dependent on communication skills (Fang et al. 2016).

The Role of Employees' Emotional Literacy in Enhancing Interpersonal Communication and Persuasion

One of the most important professional functions of electricity company employees, in addition to their technical responsibilities, is raising public awareness of electrical safety. This activity requires the ability to persuade, interact effectively, and communicate sensitive messages. Research indicates that

individuals with high levels of emotional literacy demonstrate interpersonal behaviors that contribute to increased audience trust; trust is an essential prerequisite for the acceptance of safety education (Trainor, 2008).

Furthermore, employees with high emotional literacy can employ persuasive strategies based on empathy, active listening, and appropriate feedback when confronted with cognitive and emotional resistance from their audiences—for example, students who do not take hazards seriously or parents who are indifferent toward school programs. These strategies increase the likelihood of changes in safety-related attitudes and behaviors (León-Jiménez et al. 2020).

In safety education programs for students, the manner in which employees interact with teachers is also particularly important. Teachers are more likely to reinforce safety messages in the classroom when effective and professional communication has been established with employees. In this context, employees' emotional literacy becomes especially important, because creating synergy between schools and external institutions is possible only through sustained professional interactions (Nilsson, 2016).

In summary, employees' emotional literacy provides the foundation for effective interpersonal communication, management of potential conflicts, engagement of families and students, and delivery of safety messages in an understandable and persuasive manner. These abilities constitute an important theoretical basis for analyzing the impact of emotional literacy among employees of the Ardabil Electricity Distribution Company on enhancing students' safety culture.

Contemporary Approaches to Information Literacy in the Digital Age

The concept of information literacy has undergone profound paradigmatic transformations in recent decades. Initially, the concept referred primarily to the ability to access written resources and mechanically retrieve data. However, with the emergence of the digital age and the explosion of information, cognitive psychologists have conceptualized information literacy as a higher-order cognitive process closely associated with executive brain functions, critical thinking, and problem-solving (Niraula et al. 2023). In contemporary approaches, information literacy is no longer regarded as a simple technical skill; rather, it involves the ability to filter, critically evaluate, reorganize, and ethically apply information in dynamic life situations.

From a cognitive psychology perspective, exposure to vast amounts of heterogeneous data in cyberspace places users at risk of "cognitive overload." Accordingly, contemporary approaches to information literacy emphasize "information self-regulation," a construct that helps individuals clarify their information goals, distinguish reliable sources from unreliable ones, and avoid cognitive biases when analyzing information (Schunk & Zimmerman, 2003). On this basis, information literacy in the digital age encompasses five fundamental dimensions: recognizing information needs, efficiently locating information, critically evaluating source credibility, integrating new information with prior knowledge, and effectively communicating information to others while adhering to ethical principles (Singh, 2026). This structural approach demonstrates that

information becomes applicable knowledge only when it passes through an individual's cognitive processing filters and is meaningfully interpreted.

Information Literacy as an Occupational Skill

In industrial and organizational psychology, employees' cognitive competencies play a direct role in productivity and the reduction of harmful organizational behaviors. Information literacy in modern workplaces—particularly in service and infrastructure organizations such as electricity distribution companies—is recognized as a key occupational competency and a tool for career adaptability (Obeidat et al. 2025). Employees with high levels of information literacy demonstrate more effective problem-solving behaviors when facing technical challenges and operational crises because they are able to rapidly absorb safety protocols, new directives, and up-to-date technical knowledge and integrate them into their work processes.

Information literacy as an occupational skill is directly associated with “occupational self-efficacy.” Employees with strong information-processing skills can minimize ambiguity in their work and make decisions with greater confidence and competence (Gao, et al. 2025). In organizations responsible for electrical energy, where life-threatening and financial risks continuously endanger both personnel and citizens, employees' information literacy is directly linked to risk management. Highly information-literate employees not only understand technical instructions correctly but are also able to anticipate critical scenarios and categorize and adapt safety information in an accurate and comprehensible manner for external stakeholders, such as students and teachers (Khaleghi & Homaei, 2025). Therefore, this competency provides the organizational foundation necessary for employees to undertake extra-role responsibilities and fulfill their social responsibilities.

Models of Knowledge Transfer and Public Awareness

Transferring knowledge from a specialized organization to the broader community is a complex process that can be explained through theories of social learning and communication psychology. One prominent model in this field is the “Knowledge Spiral Model” proposed by Nonaka and Takeuchi. This model describes the process of converting tacit knowledge—including the practical and safety-related experiences of electricity company employees—into explicit knowledge, such as guidelines and educational brochures, and ultimately internalizing this knowledge within the community in the form of students' safety behaviors (Mahdian Kiasari et al. 2025). Within this model, employees' information literacy plays a catalytic role by transforming technical information into educational content that is clear, engaging, and appropriate for students' developmental stages.

Another model applicable to public awareness is Rogers' “Diffusion of Innovations Theory.” According to this theory, the adoption of a new behavior—such as a culture of safe electricity consumption—requires reliable communication channels and informed information intermediaries. Electricity company employees serve as information sources and intermediaries in the

transfer of knowledge. If these individuals are equipped with effective message-transfer skills, they can work with teachers to transform safety information from an abstract concept into tangible life skills for students (Martín-Rubio & Andina 2016). In this process, the "Source-Message-Channel-Receiver" communication model also indicates that the greater the information literacy and empathic capacity of the information source (employees), the more effectively the safety message can be transmitted to the recipients (families and students) with minimal cognitive noise, ultimately leading to changes in attitudes and behaviors.

Safety Psychology and Accident Prevention

Safety psychology, as an applied branch of behavioral sciences, focuses on identifying psychological factors that contribute to reducing risks and promoting individual and collective well-being. From this perspective, an accident is not merely a physical or technical event but is considered the outcome of deficiencies in human cognitive, perceptual, and motivational processes (Wenwen et al. 2011). Accident prevention among school-aged children requires a precise understanding of "risk perception" among children and adolescents. From a cognitive psychology perspective, students may experience biases when assessing the severity of accident consequences, particularly in relation to invisible hazards such as electrical current, due to the incomplete development of executive functions in the prefrontal cortex.

Safety psychology models emphasize a shift from "reactive safety" toward "proactive safety." This means that instead of relying on punishment or warnings after an accident has occurred, emphasis should be placed on preventive mental models. Personality-related factors, such as "locus of control," play a determining role in this process. Students with an internal locus of control believe that they can influence their environment and prevent harm by following safety principles, whereas individuals with an external locus of control tend to attribute accidents to fate, chance, or luck (Fathi & Mohammadi, 2023, p. 118). Accordingly, safety psychology seeks to transform students into active agents in protecting their own health and that of others by strengthening their sense of personal responsibility and functional literacy.

The Epstein Family-School Partnership Model and Related Theories

In the educational psychology literature, family-school interaction does not merely refer to the exchange of information between parents and schools; rather, it is defined as a structured pattern of collaboration aimed at coordinating educational resources, aligning educational messages, and promoting students' holistic development. Within this framework, the school and family constitute two complementary systems. When their messages and expectations are inconsistent, students may experience normative confusion and cognitive conflict, which can undermine the acquisition of safe and sustainable behaviors (Mouchrek et al., 2022).

One of the best-known models of family-school partnership is Epstein's model, which classifies parental involvement into six major types:

1. Parenting

2. Communicating
3. Volunteering
4. Learning at Home
5. Decision-Making
6. Collaborating with the Community

The significance of this model in the present study lies in the fact that “collaborating with the community” provides a structural link between schools and specialized external institutions, such as electricity distribution companies. From an implementation perspective, electricity company employees can directly contribute to strengthening students' safety-learning experiences through educational workshops, safety-oriented visits, educational content, and instructional packages. However, the effectiveness of these initiatives increases when they are reinforced through “learning at home”; that is, when families transform the content into discussion, practice, and monitoring of hazardous situations at home (Engelberg & Sjöberg, 2004).

Alongside Epstein's model, related theories contribute to a deeper understanding of the mechanisms underlying family-school participation. “Social Capital Theory,” particularly in Coleman's formulation, conceptualizes participation as a form of relational capital generated through trust, communication networks, and shared norms, which ultimately influences students' academic and behavioral outcomes. When families have a high level of trust in schools and external educational resources, the likelihood of accepting safety messages and translating them into behavior increases.

Furthermore, from the perspective of Bronfenbrenner's “Ecological Systems Theory,” family-school interaction constitutes part of the child's “mesosystem,” referring to the level at which interactions between two primary microsystems—home and school—occur. The quality of this relationship can reinforce or neutralize educational messages. In the context of electrical safety, if the school takes hazards seriously but adults at home normalize unsafe behaviors—such as improper use of power strips or neglecting faulty wiring—the child's observational learning may favor unsafe behavior (Moradi et al. 2024).

Literature Review

Göncz (2017), in a study entitled “Examining the Psychological Characteristics of Teachers and Developing an Optimal Normative Model,” investigated various dimensions of teachers' psychological characteristics. The findings indicated that teachers' psychological characteristics can be examined across cognitive, emotional, personality, social, and professional dimensions. The study emphasized the importance of teachers' psychological characteristics in improving professional performance and enhancing their interactions within the educational environment. From this perspective, attention to the psychological well-being and psychological capital of employees and teachers can provide a suitable foundation for developing and transmitting desirable attitudes within educational settings.

Farajian et al. (2021) examined the effects of social, cultural, economic, and political changes on individuals' behavioral and attitudinal patterns. In the introductory section of their study, the authors explained that factors such as technological development, individualism, increasing educational attainment, urbanization, and the expansion of cyberspace have contributed significantly to these transformations. The study further emphasized that changes in social conditions can lead to changes in individuals' attitudes and behaviors.

2. Methodology

The statistical population of this study consisted of all permanent, contractual, and temporary employees of the Ardabil Province Electricity Distribution Company during 2025–2026 who were directly or indirectly involved in departments related to customer services, training, safety, and public relations. According to the latest statistics extracted from the company's human resources database, the total number of eligible employees was reported to be 740 (Ardabil Province Electricity Distribution Company, 2025).

Based on Cochran's formula, the minimum required sample size was determined to be 253 participants. However, to account for potential questionnaire attrition and to increase the statistical power of the structural equation modeling (SEM), 260 questionnaires were distributed.

A simple random sampling method was employed. The sampling frame was prepared based on the personnel list obtained from the Human Resources Department of the Ardabil Province Electricity Distribution Company. Subsequently, each employee was assigned a unique identification code, and 260 employees were randomly selected using a table of random numbers. This procedure ensured that all members of the population had an equal probability of selection and minimized potential selection bias.

Research Instruments

Standardized and validated questionnaires were used to measure the main variables of the proposed model. Since validated instruments were available for the variables under investigation, existing questionnaires were combined or adapted as appropriate. The validity and reliability of these instruments had been established in previous studies.

Emotional Literacy Questionnaire: Employees' emotional literacy was assessed using a standardized Emotional Literacy Questionnaire. The instrument was used to measure employees' ability to recognize, understand, express, and regulate emotions in interpersonal and organizational contexts.

Information Literacy Questionnaire: Information literacy was assessed using a standardized Information Literacy Questionnaire developed based on the standards of the American Library Association (ALA). The instrument evaluates individuals' ability to identify information needs, locate relevant information, evaluate its reliability, and effectively use and communicate information.

Family-School Interaction Scale: Family-school interaction was assessed using Epstein's Family-School Engagement Scale. The scale measures various dimensions of reciprocal collaboration between families and schools, including communication, learning at home, and volunteering. Given the cultural context of the study population, the instrument underwent preliminary translation and cultural adaptation before being approved for use in the present study.

Students' Safety Culture Questionnaire: To assess the dependent variable, namely students' safety culture, a researcher-developed questionnaire (or a composite measure based on standardized child safety scales) was employed. The instrument was designed to assess two main dimensions: safety attitudes and preventive safety behaviors.

Validity and Reliability of the Research Instruments

Table 1. Summary of the Validity and Reliability of the Research Instruments

Instrument	Cronbach's Alpha (α)	Composite Reliability (CR)	AVE	Content Validity	CFA Indices	Fit
Emotional Literacy	0.86	0.89	0.61	Confirmed	CFI = 0.92, RMSEA = 0.07	
Information Literacy	0.88	0.90	0.64	Confirmed	CFI = 0.93, RMSEA = 0.06	
Family-School Interaction	0.82	0.84	0.58	Confirmed	CFI = 0.90, RMSEA = 0.07	
Students' Safety Culture	0.91	0.93	0.67	Confirmed	CFI = 0.94, RMSEA = 0.05	

The reported reliability coefficients indicate satisfactory internal consistency and composite reliability for all research instruments. Moreover, the AVE values exceeded the commonly accepted threshold of 0.50, providing evidence of adequate convergent validity. Content validity was also confirmed for all instruments, while the CFA fit indices indicated an acceptable measurement model fit.

Data Analysis

The following specialized software packages were used to conduct the statistical analyses:

- SPSS Version 26: Used for data entry, data cleaning, identification of outliers, assessment of distributional normality, and preliminary descriptive analyses.

- SmartPLS Version 3: Used to perform structural equation modeling, calculate factor loadings, and evaluate the final structural model.
- Microsoft Excel Version 2021: Used for preliminary graphical representations and organization and categorization of the raw data.

3. Research Findings

Descriptive Statistics of the Research Variables

To examine the status of the main research variables, measures of central tendency (mean), dispersion (standard deviation), and distribution shape (skewness and kurtosis) were calculated. The results are presented in Table 2.

Table 2. Descriptive Statistics of the Research Variables

Variable	Mean	Standard Deviation	Skewness	Kurtosis	Minimum	Maximum
Emotional Literacy	3.78	0.54	-0.41	0.12	2.10	4.85
Information Literacy	3.65	0.62	-0.35	-0.08	1.95	5.00
Family-School Interaction	3.42	0.59	-0.28	-0.15	2.00	4.60
Students' Safety Culture	3.81	0.48	-0.52	0.34	2.25	4.90

Interpretation of the Descriptive Statistics

1. Emotional Literacy: The mean score of 3.78 indicates that employees possess a relatively high level of ability to recognize and regulate emotions, which may provide a foundation for constructive interactions with their children.
2. Information Literacy: The mean score of 3.65 indicates a moderate-to-high level of competence among employees in retrieving and analyzing information. This competency is particularly important for transmitting safety knowledge to students in the digital age.
3. Family-School Interaction: With a mean score of 3.42, this variable had a relatively lower level compared with the other variables, suggesting some gaps in parents' active engagement with the school.
4. Students' Safety Culture: The mean score of 3.81, as reported from the parents' perspective, indicates a relatively desirable level of safety-related behaviors among their children. The standard deviation of 0.48 also suggests relatively consistent responses on this variable.
5. Normality of the Distribution: Since the skewness and kurtosis values for all variables fall within the accepted standard range, the assumption of normality is supported, and the use of parametric inferential statistical methods is considered appropriate.

Examination of Statistical Assumptions

Assessment of Data Normality

To assess the normality of the data distribution, descriptive statistics, including skewness and kurtosis, were examined. In behavioral research, data are generally considered to have an approximately normal distribution when the values of these two indices fall within the accepted range.

Assessment of Error Independence: Durbin-Watson Test

Another important assumption in causal and regression models is the independence of errors. This means that the responses of one participant do not influence those of another and that the model errors are not correlated. The Durbin-Watson statistic was therefore used to assess error independence. Values between 1.5 and 2.5 generally indicate the absence of significant autocorrelation and support the independence of observations.

Table 3. Results of the Error Independence Test

Dependent Variable	Durbin-Watson Statistic	Result
Students' Safety Culture	1.92	Error independence confirmed

Because the calculated value of 1.92 falls within the desirable range and is close to 2, the assumption of uncorrelated errors is supported. Therefore, the model does not show evidence of bias from this perspective.

Assessment of Sample Adequacy: KMO and Bartlett's Test

To ensure that the sample size of 260 participants was adequate for structural and factor analyses, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were employed. The KMO index ranges from 0 to 1, with values above 0.70 generally indicating adequate sampling adequacy.

Table 4. Results of the KMO and Bartlett's Test

Index/Test	Value	Significance Level
Kaiser-Meyer-Olkin (KMO)	0.847	—
Bartlett's Test of Sphericity (Approx. Chi-Square)	1342.56	$p < 0.001$

The results presented in Table 4 show that the KMO value was 0.847, indicating a high level of sampling adequacy and confirming that the sample was sufficiently appropriate for extracting the underlying factor structure.

Test of the First Sub-Hypothesis

H1: Employees' emotional literacy at Ardabil Electricity Distribution Company has a significant effect on family-school interaction in the transmission and reinforcement of students' safety education.

To test this hypothesis, the direct path from emotional literacy to family-school interaction was examined.

Table 5. Effect of Emotional Literacy on Family-School Interaction

Path	Path Coefficient (β)	Standard Error	t-statistic	p-value	R ²	Result
Emotional Literacy → Family-School Interaction	0.43	0.07	6.14	$p < 0.001$	0.31	Supported

As shown in Table 5, the path coefficient from emotional literacy to family-school interaction was 0.43. The t-statistic was 6.14, with a significance level of $p < 0.001$. Therefore, emotional literacy has a positive and statistically significant effect on family-school interaction. In other words, a one-standard-deviation increase in employees' emotional literacy is associated with an average increase of 0.43 standard deviations in family-school interaction.

The coefficient of determination (R²) indicates that emotional literacy and information literacy jointly explain approximately 31% of the variance in family-school interaction. Therefore, the first sub-hypothesis is supported.

This finding can be explained by the fact that employees with greater emotional self-awareness, emotional regulation, empathy, and communication skills are more prepared to establish effective communication with teachers and participate in school-based educational and safety programs.

H2: Employees' information literacy at Ardabil Electricity Distribution Company has a significant effect on family-school interaction in enhancing students' safety culture.

To test this hypothesis, the direct effect of employees' information literacy on family-school interaction was examined.

Table 6. Effect of Information Literacy on Family-School Interaction

Path	Path Coefficient (β)	Standard Error	t-statistic	p-value	R ²	Result
Information Literacy → Family-School Interaction	0.21	0.08	2.72	0.007	0.31	Supported

As shown in Table 6, the path coefficient from information literacy to family-school interaction was 0.21. The t-statistic was 2.72, with a p-value of 0.007. Thus, the effect of information literacy on family-school interaction was statistically significant at the 0.01 level.

This finding indicates that employees who have greater abilities to search for, evaluate, select, and apply information are better able to identify educational resources and safety-related messages and use them effectively in their interactions with schools. Although this effect is statistically significant, the magnitude of the path coefficient indicates that the effect of information literacy on family-school interaction is weaker than that of emotional literacy. Therefore, the second sub-hypothesis is supported.

Together, emotional literacy and information literacy explain approximately 31% of the variance in family-school interaction. Based on the standardized path coefficients, the approximate contribution of emotional literacy to this pathway is greater than that of information literacy. However, determining the precise contribution of each predictor requires an examination of effect-size measures and specific indices such as f^2 .

H3: Family-school interaction has a significant effect on enhancing students' safety culture.

To test this hypothesis, the direct effect of family-school interaction on students' safety culture was examined.

Table 7. Effect of Family-School Interaction on Students' Safety Culture

Path	Path Coefficient (β)	Standard Error	t-statistic	p-value	R ²	Result
Family-School Interaction → Students' Safety Culture	0.51	0.06	8.29	$p < 0.001$	0.46	Supported

The results presented in Table 7 indicate that family-school interaction has a positive and statistically significant effect on students' safety culture. The path coefficient was 0.51, the t-statistic was 8.29, and the significance level was $p < 0.001$. Therefore, the third sub-hypothesis is supported.

Based on the coefficient of determination, family-school interaction, together with emotional literacy and information literacy, explains approximately 46% of the variance in students' safety culture. This value indicates that the research model has moderate-to-high explanatory power.

In other words, the more coherent, continuous, and purposeful the communication and collaboration between families and schools, the greater the likelihood that safety-related behaviors will be transmitted, reinforced, and internalized by students. From a psychological perspective, family-school interaction provides an environment in which safety education is not limited to the transmission of information but is transformed into everyday student behaviors through dialogue, modeling, supervision, and continuous feedback.

Main Hypothesis

Employees' emotional literacy and information literacy at Ardabil Electricity Distribution Company have a significant indirect effect on enhancing students' safety culture through family-school interaction.

Testing the main hypothesis requires examining the indirect effects of emotional literacy and information literacy on students' safety culture through family-school interaction. In the bootstrapping procedure, a mediating effect is considered statistically significant when the confidence interval for the indirect effect does not include zero.

Table 8. Results of the Indirect Effects and the Mediating Role of Family-School Interaction

Indirect Effect	Indirect Effect (β)	Standard Error	t-statistic	Lower CI	Upper CI	p-value	Result
Emotional Literacy → Family-School Interaction → Safety Culture	0.22	0.04	5.36	0.15	0.30	$p < 0.001$	Supported
Information Literacy → Family-School Interaction → Safety Culture	0.11	0.04	2.76	0.03	0.19	0.006	Supported
Combined Indirect Effect of the Two Predictors	0.33	0.05	6.60	0.23	0.43	$p < 0.001$	Supported

Table 8, the indirect effect of emotional literacy on students' safety culture through family-school interaction was 0.22. Since the confidence interval for this effect ranged from 0.15 to 0.30 and did not include zero, the mediating role of family-school interaction in this relationship was statistically significant.

Similarly, the indirect effect of information literacy on students' safety culture through family-school interaction was 0.11. The confidence interval ranged from 0.03 to 0.19 and did not include zero. Therefore, family-school interaction also plays a statistically significant mediating role in the relationship between information literacy and students' safety culture.

The combined indirect effect of emotional literacy and information literacy on students' safety culture through family-school interaction was 0.33. This finding indicates that part of the influence of employees' emotional and information-related competencies on students' safety culture is transmitted through improved communication and collaboration between families and schools.

For percentage-based interpretation, the research model explains approximately 46% of the variance in students' safety culture, while approximately 54% of the variance is attributable to other factors not examined in the present model. This percentage should not be interpreted as a "percentage of causal effect"; rather, it

represents the proportion of variance in the dependent variable explained by the constructs included in the model.

Table 9. Summary of the Research Hypothesis Testing Results

Hypothesis		Tested Path/Relationship	Result
First Hypothesis	Sub-	Emotional Literacy → Family-School Interaction	Supported
Second Hypothesis	Sub-	Information Literacy → Family-School Interaction	Supported
Third Hypothesis	Sub-	Family-School Interaction → Students' Safety Culture	Supported
Main Hypothesis		Emotional Literacy and Information Literacy → Family-School Interaction → Students' Safety Culture	Supported

The hypothesis-testing results demonstrated that both employees' emotional literacy and information literacy have positive and statistically significant effects on family-school interaction. In addition, family-school interaction was found to have a significant effect on students' safety culture. The significance of the indirect effects further indicates that family-school interaction functions as a mediating mechanism linking parents' emotional and information-related competencies to students' safety education and safety-related behaviors.

Among the pathways examined, the strongest path coefficient was associated with the effect of family-school interaction on students' safety culture ($\beta = 0.51$). This finding highlights the importance of regular communication and purposeful collaboration between families and schools in the development of students' safety culture.

4. Discussion

Discussion of the Findings and Research Hypotheses

The findings showed that employees' emotional literacy has a positive and statistically significant effect on the quality of their interaction with schools ($\beta = 0.43$). This finding is consistent with the results reported by Goleman (1995), Salovey and Mayer (1990), as well as Iranian studies such as Andres (2025), which have indicated that communication skills based on emotional intelligence facilitate parents' openness toward social institutions.

This finding can be explained by the fact that parents with higher levels of emotional literacy possess greater capacity for emotional self-regulation. Working in high-risk environments such as Ardabil Electricity Distribution Company is associated with various occupational stressors. High emotional literacy can function as a protective resource that reduces the spillover of work-related stress

into parent-child and parent-school relationships. Such parents are more likely to demonstrate empathy, impulse control, and effective communication when interacting with school personnel, thereby contributing to the development of a stronger educational partnership between home and school.

The structural model results indicated that parents' information literacy has a positive and statistically significant effect on their interaction with schools ($\beta = 0.21$). This finding is consistent with the findings of Zare et al. (2022) and international research on digital parenting.

Today, a substantial proportion of home-school interactions takes place through electronic platforms and social networks. Parents with adequate information literacy not only possess the technical ability to use these tools but also know how to retrieve, evaluate, and analyze information concerning their children's educational and developmental status. This competence enhances parents' perceived efficacy in their parenting role and reduces anxiety resulting from a lack of information. Consequently, their willingness to participate in school-related decision-making and educational processes is likely to increase.

The findings demonstrated a strong and statistically significant direct effect of family-school interaction on the enhancement of students' safety culture ($\beta = 0.51$). This finding is consistent with Epstein's model of parental involvement (2002) and ecological research emphasizing the importance of continuity and coordination among microsystems.

The internalization of safety culture among students is not merely a cognitive process or a classroom-based educational activity; rather, it requires consistency among the messages communicated across different environments. When students learn safety rules at school and simultaneously receive consistent feedback from parents who themselves work in a safety-regulated industrial environment such as an electricity distribution company, safety values are more likely to become internalized. Continuous family-school interaction reduces potential inconsistencies between different social roles and helps establish safe behavior as an accepted social norm in the child's everyday life.

The final analysis of the structural model indicates that employees' emotional and information literacy at Ardabil Electricity Distribution Company have relatively limited direct effects on their children's safety culture. However, when these competencies operate through family-school interaction, their effectiveness increases substantially and becomes statistically significant.

Theoretical Interpretation of the Findings

According to Bronfenbrenner's ecological systems theory, child development results from interactions across multiple environmental levels. The home and school, as two important microsystems, can promote optimal child development when their interaction—the mesosystem—is dynamic and effective.

The findings of the present study demonstrate that family-school interaction functions as a critical mesosystem. Parents' individual resources, including the

emotional and information literacy acquired through their work and everyday experiences, may have limited capacity to influence the child's microsystem unless this mesosystem is activated through effective interaction between home and school.

Bandura emphasized the importance of modeling and environmental reinforcement in the development of behavior. Parents working in a technically sensitive environment such as the electricity sector may possess well-established safety-related behavioral patterns. However, transferring these behavioral patterns to children requires active communication mechanisms.

Family-school interaction creates conditions in which safety behaviors can be mutually encouraged, modeled, and reinforced across both environments. Consequently, safety education becomes more than the transmission of verbal information and can be transformed into observable and sustainable patterns of behavior.

Epstein argues that schools, families, and communities have overlapping spheres of influence. The findings of the present study provide empirical support for the proposition that the overlap among these spheres, facilitated through active interaction, can function as a catalyst for transforming parents' cognitive competencies (information literacy) and emotional competencies (emotional literacy) into practical safety behaviors among students.

Novelty and Contribution of the Present Study

Previous research has predominantly examined the direct effects of emotional intelligence on academic performance or the relationship between information literacy and organizational productivity. The innovation and added value of the present study lie in establishing a conceptual bridge between occupational safety psychology, educational psychology, and family ecology.

The study demonstrates how the cognitive and emotional competencies of employees in a high-risk industry, specifically an electricity distribution company, can be transformed through communication channels with schools into a broader social asset: the development of a sustainable safety culture among the younger generation.

Limitations of the Study

1. Instrument-Related Limitation: The use of questionnaires as the sole data-collection method may have introduced self-report bias.
2. Cross-Sectional Design: The study employed a cross-sectional design; therefore, examining causal relationships over time would require longitudinal research.
3. Geographical and Organizational Limitations: The generalizability of the findings to other organizations and geographical settings should be approached with caution, as the cultural characteristics and local context of Ardabil Province, as well as the specific organizational structure of the electricity distribution company, may have influenced the findings.

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