

The role of school psychology and artificial intelligence in predicting aggressive behaviors and preventing early deviations.

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Abstract: The school serves as a crucial environment for identifying early signs of psychological and behavioral disorders in youth, providing a key opportunity for early intervention to prevent deviations from escalating into criminal behavior. School psychology plays a central role here, diagnosing emotional and psychological issues and proposing suitable strategies. However, the complexity of behavioral issues and rising school violence necessitate an update to traditional assessment tools, leading to the integration of modern technologies, specifically artificial intelligence (AI).

This paper aims to demonstrate how school psychology and AI can merge to create a proactive system capable of predicting high-risk behaviors like bullying, aggression, and social isolation. This system would process various educational and behavioral data—such as attendance records, academic performance changes, and social interaction patterns—using machine learning. The paper also critically analyzes existing international AI models in education and assesses their relevance to the Arab context. We propose an "Early Psychological Warning" system prototype that allows specialists to collect and analyze data interactively, enabling timely preventive interventions, fostering a safer educational environment, and enhancing the school's ability to address problematic behaviors early on.

Keywords: School Psychology, Artificial Intelligence (AI), Aggressive Behavior, Early Prediction, School Violence, Psychological Prevention.

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1- Introduction

Arab educational institutions are experiencing profound transformations in their psychological and social structures as a result of the internal and external pressures they face, which affect learners' stability and psychological safety. Manifestations of school violence, aggression, and social marginalization have become recurring behaviors that are no longer classified as "transient disorders" but rather indicate a high susceptibility to behavioral deviation among certain groups of pupils, necessitating urgent psychological and educational intervention.

Within this framework, school psychology emerges as one of the most prominent branches capable of interpreting these behavioral dynamics at an early age, diagnosing their causes, and intervening to prevent them. However, the complexity of the phenomenon and the overlap of contributing factors mandate moving beyond traditional solutions and adopting more integrated and innovative approaches. This opens the door to integrating artificial intelligence (AI) techniques into behavior analysis and the prediction of future deviations. Today, AI has become an effective tool in analyzing big data, identifying hidden behavioral patterns, and providing accurate support to educational and psychological decision-makers. Consequently, the intersection of the school psychologist and smart technology is no longer an option but a necessity imposed by the nature of emerging problems in the school environment.

In light of this short introduction, the paper raises the following problematic:

To what extent can the integration of school psychology with artificial intelligence technologies contribute to the early prediction of deviant behaviors within schools and the construction of effective proactive models for preventing school violence and deviation ?

The Study Sub-questions

1. What are the most prominent psychological and behavioral indicators that can be monitored early within educational institutions to detect potential deviant tendencies among pupils?
2. What role does the school psychologist play in analyzing these indicators and dealing with them preventively?
3. How can AI techniques enhance the accuracy of predicting deviant behaviors?
4. What are the possible aspects of integration between traditional school psychological assessment and intelligent data-driven analysis?
5. What is the applicability of early warning models based on AI in Arab schools?
6. What are the ethical and technical challenges associated with using artificial intelligence in handling pupils' psychological and behavioral data?

Paper Objectives

Highlighting the importance of integration between school psychology and artificial intelligence mechanisms (such as machine learning and behavior analysis) in understanding the psychological and emotional factors leading to aggressive and deviant behavior.

- Proposing mechanisms relying on AI to monitor early warning signs of risk.
- Presenting applied models of software based on artificial intelligence for analyzing student data (absences, results, interaction...) to predict risks.
- Proposing a cooperation protocol between the school psychologist and artificial intelligence technicians.

2- Theoretical and conceptual framework

This paper is based on a set of theoretical and conceptual frameworks that explain aggressive and deviant behavior in the school environment, and support the possibility of predicting it through digital psychological and behavioral data.

Firstly, Albert Bandura's theory of social aggression represents the psychological basis for understanding the acquisition of aggressive behaviors among learners. According to this

theory, an individual learns criminal behavior through observation, modeling, and social reinforcement, making the school environment a crucial catalyst in shaping or modifying these behaviors. (Tian & Zhang, 2022; McInerney, 2005).

Secondly, the paper relies on models of early detection of behavioral risks, which are based on tracking unusual behavioral patterns (such as social withdrawal, frequent absences, fluctuating academic performance...) as primary indicators that can be analyzed as precursors to future deviant behavior (Eklund et al., 2020).

Thirdly, artificial intelligence techniques are integrated into behavior analysis, especially through decision support systems and predictive analytics algorithms, which allow the analysis of multi-source data (psychological, educational, social) to extract proactive models of risky behaviors. These tools enable the instantaneous and continuous analysis of behavior within the school environment and provide the psychologist with accurate indicators for timely intervention (Sievers & Mersky, 2004).

3- Concepts and terminology

Deviant Behavior: Any action that violates agreed-upon social or educational rules within society or the school institution, including forms such as violence, aggression, frequent absence, vandalism, or antisocial behavior (Hanimoglu, 2018).

School Psychology: A branch of psychology concerned with the study and understanding of behavior and learning within the school environment, aiming to promote pupils' psychological and social adjustment, and to intervene in the event of disorders that affect achievement or behavior (Arson et al., 2013).

Artificial Intelligence (AI): A field in computer science concerned with developing systems capable of "simulating" human abilities such as learning, analysis, and decision-making, through algorithms and data processing (Russell & Norvig, 2016).

Machine Learning (ML): A branch of artificial intelligence that allows systems to "learn" from data without explicit programming, utilizing algorithms to analyze patterns and predict behavior or outcomes (Jordan & Mitchell, 2015).

Decision Support System (DSS): An intelligent system used to assist individuals (such as psychologists or administrators) in making informed decisions based on the quantitative and qualitative analysis of available data (Power, 2002).

Early Warning Models: Systems aimed at identifying individuals at risk before behavior or disorder escalates, based on quantitative indicators (absence, performance...) and qualitative indicators (observations, changes in behavior...) (Graybill et al., 2025).

Educational Behavioral Analytics: The process of using educational data (results, behavior, digital interaction...) to analyze and understand behaviors related to learning, used to anticipate problems and make intervention decisions (Howard, 2019).

4- Proposed Methodology:

This paper relies on a descriptive-analytical methodology with a prospective character, aiming to clarify the dimensions of the relationship between school psychology and artificial intelligence applications in predicting deviant behaviors within the school environment. To achieve this, the study proposes combining the following elements:

1. Comparative Applied Analysis between Psychological/Educational Approaches and AI in Behavior Analysis:

A descriptive and analytical study of the phenomenon of aggressive and deviant behavior in the school environment, based on recent psychological and educational studies that highlight the early indicators of deviant behavior.

Table 1. Descriptive and Analytical Study of Deviant and Aggressive Behavior

Study Title and Objective	Methodology	Findings
Hanimoglu (2018): Deviant Behavior in School Setting.	Theoretical review exploring the environment, causes, and consequences of deviant behavior in schools.	The school environment represents a central factor in deviant behavior. The study highlights the need for preventive and systematic social interaction solutions, rather than focusing solely on the deviant behavior itself.
Salakhova et al. (2019): Deviant behavior formation factors among students: aggressive behavior and internet risks.	Statistical analysis of questionnaires from 200 students to analyze the factors influencing the formation of aggressive and deviant behavior.	Factors related to the formation of deviant behavior were identified, but the study showed a weak focus on the control of aggression and the role of the internet as an exacerbating factor.
Asiyai (2019): Deviant behaviour in secondary school and its impact on students' learning.	Field interviews and analysis of the impact of deviant behavior on students' academic performance.	Deviant behavior negatively affects academic performance. The study highlighted the need for intervention by a school psychologist, as existing psychological and professional support is often weak and unsystematic.
Wang et al. (2017): School climate and adolescent aggression: A moderated mediation model involving deviant peer affiliation and sensation seeking.	Statistical analysis to examine the relationship between school climate, deviant peer affiliation, and aggression through complex statistical models.	A strong relationship was found between negative school climate and aggression, mediated by affiliation with deviant peers and sensation seeking.
Lin et al. (2020): Predicting adolescent aggressive behavior from community violence exposure, deviant peer affiliation and school engagement: A one-year longitudinal study.	A one-year longitudinal study to build a predictive model for aggressive behavior among adolescents.	The study found strong predictive factors for aggression based on exposure to community violence, deviant peer affiliation, and school engagement.
Avakyan et al. (2022): Deviant Behavior of Young People in Educational Institutions: Criminological and Forensic Analysis.	Criminological analysis of deviant behavior in educational institutions from a forensic perspective.	The school environment represents a socio-psychological space where criminal cases of deviance escalate if psychological follow-up and control are absent.
Ali et al. (2022): Impact of School Climate on Teachers' Workplace Organizational Deviant Behavior at High and Higher Secondary School Level.	Analysis of variance (ANOVA) of questionnaires to study the relationship between organizational climate and teachers' behavior.	Poor organizational climate in schools reflects organizational deviance among the educational staff, which can lead to deviant behavior among students.

2. Comparative Applied Analysis between Psychological/Educational Approaches and AI in Behavior Analysis

The following table presents a comparative overview of traditional psychological and educational approaches alongside artificial intelligence (AI)–based methods in behavior analysis. It highlights key aspects such as underlying principles, methodology, influencing factors, strengths, weaknesses and expected outcomes. This comparison aims to illustrate how AI technologies complement or diverge from established human-centered frameworks in understanding, predicting, and influencing behavioral patterns.

Table 2. Comparison between Psychological Approaches and AI in Behavior Analysis

Comparative Aspect	Traditional Psychological/Educational Approach	Artificial Intelligence Approach
Starting Point	Relies on theories (e.g., Behavioral, Social Cognitive Theory by Bandura) and qualitative studies (interviews, questionnaires, observations).	Relies on analyzing massive data to uncover behavioral patterns through contextual analysis and Machine Learning algorithms.
Methodology	Qualitative studies (interviews, questionnaires, observations) and longitudinal analyses of the school environment.	Predictive models using AI techniques like Neural Networks or Decision Support Systems for analyzing indicators such as performance, absenteeism, and digital interaction.
Influencing Factors	School climate, deviant peers, family, social pressure, lack of guidance.	Quantifiable digital indicators: level of interaction, behavioral patterns over time, changes in performance, absenteeism patterns.
Strengths	Deep understanding of the psychological context. Possibility of providing qualitative therapeutic intervention.	High predictive capability for early intervention. Processing large volumes of data and uncovering hidden patterns.
Weaknesses	Delay in intervention. Difficulty in generalization. Limited human resources.	Requires continuous and accurate data. Privacy issues and ethical concerns regarding processing.
Expected Outcomes	Modification of behavior through individual and group psychological intervention.	Building early warning models and identifying cases prone to deviance before they escalate.
Possible Integration	The school psychologist acts as an interpreter for digital results, integrating human assessment with predictive AI to create a safe and smart educational environment.	Designing technological platforms in collaboration with specialists to interpret digital results and integrate automated protocols into the intervention.

From the above, we observe that traditional psychological and educational studies, despite their depth in understanding the causes of deviant behavior, suffer from delayed responses and difficulty in early prediction. While artificial intelligence approaches offer a high potential for early detection and proactive intervention, they require genuine integration with the expertise of psychologists to ensure accurate interpretation of results and respect for privacy.

Therefore, we believe that the optimal solution lies in an integrated approach: that is, we should have A smart preventive model that integrates traditional psychoanalysis and predictive algorithms to achieve a safe and inclusive school environment.

3. Studies Utilizing AI Techniques for Behavioral and Educational Data Analysis:

Recent studies reveal a conscious shift towards addressing psychological risks and deviant behaviors in the educational environment by utilizing AI tools as a means for early prediction and data-driven decision-making.

Table 3. Example of AI-based studies for Behavioral and Educational Data Analysis

Study Title and Objective	Methodology	Findings
Liu et al. (2022): Predicting high-risk students using learning behavior.	Analysis of student behavior data through an intelligent learning system using predictive ML models.	Enabled the identification of high-risk students academically and behaviorally with high accuracy using learning behavior indicators.
Fattah & Elsaied (2022): Effectiveness of Using the Artificial Intelligence in Behavioral Disorders Management Among the Third-Grade Primary Students.	Field experiment using AI tools to track and modify behavioral disorders.	Results showed the effectiveness of AI in controlling and modifying behavioral disorders among primary students, confirming AI as an effective tool for early behavioral intervention.
Fu et al. (2025): Apriori algorithm based prediction of students' mental health risks in the context of artificial intelligence.	Data analysis using the Apriori association rule algorithm to link mental health data with digital interaction.	Strong patterns were found linking digital interaction risks with certain psychological indicators and behavioral patterns.
Alves-Noreña et al. (2025): Technology and Emotions: AI-Driven Software Prototyping for the Analysis of Emotional States and Early Detection of Risky Behaviors in University Students.	Development of a digital platform prototype capable of monitoring emotional changes and analyzing written texts to detect emotional states.	The platform showed high effectiveness in detecting, predicting, and discovering risky behaviors before they occur.
Zhou et al. (2024): Innovative Application and Societal Impact of AI in Student Behavior Early Warning Systems within Smart Campuses.	Integration of attendance, performance, and behavior data into an integrated predictive analytical system.	The system increased the detection rate of at-risk cases, supporting decision-making for educators on campus.
Velastegui et al. (2023): Impact of Artificial Intelligence on learning behaviors and psychological well-being of college students.	Analysis of student attitudes towards AI systems using behavioral scales.	AI systems had a positive impact on learning behavior and reduced some psychological stress among university students.
Alzahrani (2023): Analyzing students' attitudes and behavior toward artificial intelligence technologies in higher education.	Electronic questionnaire analysis of student attitudes and behavior towards AI technologies.	The majority of student attitudes were positive, but some concerns related to privacy and control were noted.
Zhao et al. (2023): A learning analytics framework based on human-centered artificial intelligence for identifying the optimal learning strategy to intervene in learning behavior.	Theoretical framework design for an analytical framework based on AI to improve educational strategies.	The framework helps improve educational strategies and guide human-centered behavioral interventions based on student learning behavior.

4. **Comparative Analysis Summary:**

Comparing these studies with their traditional psychological counterparts clearly shows a shift in focus. While traditional school psychology approaches rely on manual assessment tools, direct interaction, interviews, and observation to understand the psychological context, AI applications (such as ML models, Apriori algorithms, and emotional analysis frameworks) offer advanced capabilities for monitoring precise behavioral patterns and identifying at-risk cases early.

The most prominent feature of these smart approaches is their high predictive power and data-driven behavioral intervention, which monitors emotional changes invisible to traditional observation. Smart analysis platforms also provide tools to support educational decision-making, adapting educational strategies to the psychological and behavioral status of students.

However, these solutions still face ethical challenges related to privacy protection and over-reliance on algorithms without qualified human supervision. This is where the value of integration between the school psychologist and smart technologies emerges. The specialist interprets the digital results in light of the student's psychological and social background, leading to a measured and humane educational intervention.

It is clear that the most balanced path is the integration between human assessment and predictive algorithms, moving towards a more proactive and safer educational environment capable of protecting students from deviance before it is too late.

5- **Conceptual Framework for the “Early Psychological Warning” Model**

The “Early Psychological Warning” model is proposed as an integrated system that works to predict behavioral and psychological cases of concern among students within the school environment.

This is achieved by blending the psychological expertise of the school counselor with the predictive capabilities of AI in analyzing behavioral data.

5.1- **Model Components**

a) Interactive School Data Database

- Includes information on academic performance, absences, behavioral observations, social interaction within the classroom, and mood changes.
- Integrates with data entry tools by the school psychologist, teachers, and administration.

b) AI-Powered Analytical System

- Uses Machine Learning (ML) and Classification algorithms to analyze recurring patterns.
- Assesses the “Risk Level” based on variables such as performance decline, number of absences, emotional expressions, and reports of isolation or bullying.

c) Specialized Control Panel for the School Psychologist

- Displays a prioritized list of students most exposed to risk.
- Allows viewing behavioral details and the AI analysis, along with suggested interventions.

d) Interactive Response Mechanism

- The model activates intervention procedures (e.g., scheduling an interview, family intervention, behavioral monitoring) after the psychologist confirms the prediction.
- Automatic alerts or notifications can be programmed for the educational team if the risk indicator reaches a certain threshold.

e) Smart Feedback System

- The psychologist updates the student's status after each intervention, allowing the model to learn and improve its accuracy in the future.

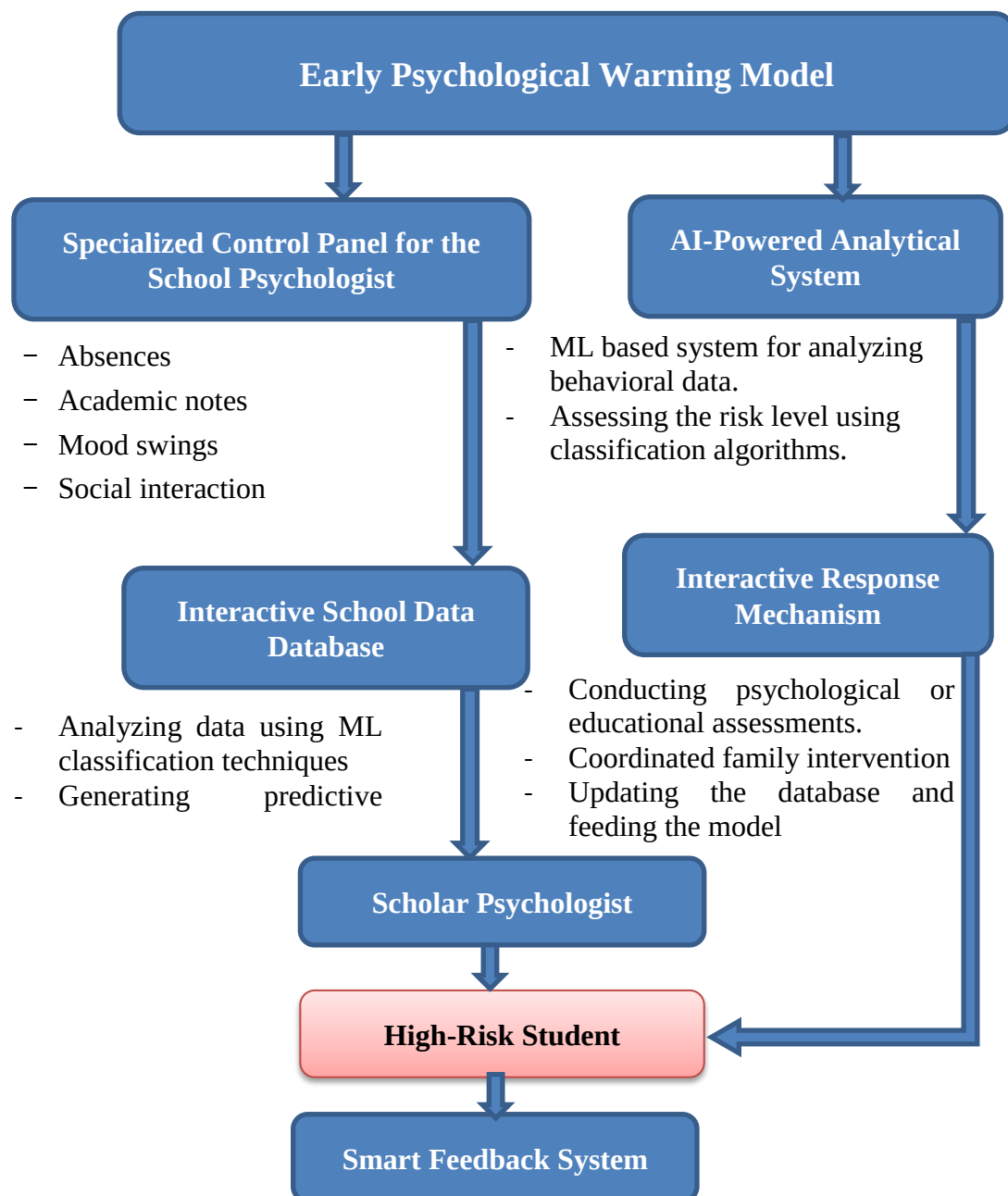


Figure 1. Early Psychological Warning Model

5.2- Model Objectives

- Reducing the time gap between the appearance of the first signs and psychological intervention.
- Supporting educational decisions with objective analytical tools.
- psychologist as a digital and analytical agent in the Strengthening the role of the school institution.

5.3- Some Illustrative S cenarios forApplying the Model

Scenario No. 01: A student suffering from isolation and a sudden drop in performance

Situation:

student has frequent absences over two weeks, then a year middle school-A first sudden decline in his academic results and his cessation of participation in class is observed.

Model response:

- The school database monitors these changes and feeds them into the analytical system .

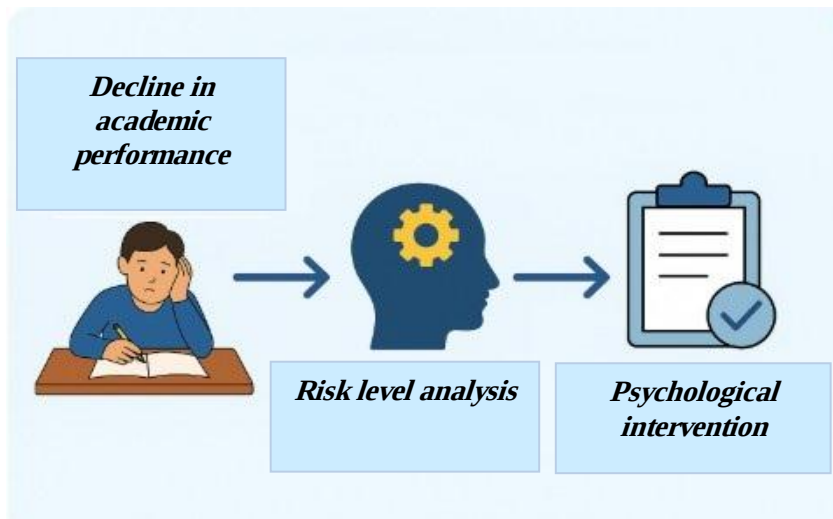


Figure (1): Scenario N°1

- concurrent changes The artificial intelligence system identifies a high risk level due to (absence + decline in performance + change in interaction).
- An alert appears on the psychologist's dashboard.
- The student is summoned for a psychological assessment session that reveals the presence of family problems.
- intervention mechanism is activated The (preferral sychological support sessions, social .)

Scenario No. 02: Repeated aggressive behavior towards colleagues

Situation:

A student who causes constant arguments with his classmates, and receives three behavioral warnings in less than two weeks.

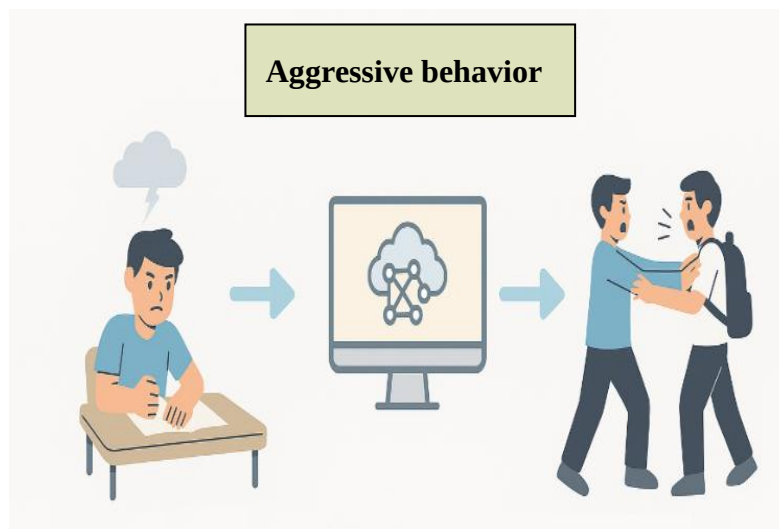


Figure (2): Scenario N°2

Model response:

- The observations are recorded in the school system (by the teacher and the school administration)
- Artificial intelligence links this repetition to high levels of aggression according to previous models.
- The student is classified as a potentially high-risk behavioral case.
- The psychologist analyzes the case and discovers a history of domestic violence.
- An integrated intervention is launched: individual psychological support + family follow-up + continuous monitoring.

Scenario No. 03: Digital indicators of decreased digital interaction in a smart learning environment

Situation:

In a school that adopts digital learning, one of the students stops completing tasks, and his interaction decreases by 80% within a week.



Figure (3): Scenario N°3

Model response:

- digital monitoring system records "digital withdrawal The" behavior.
- Machine learning algorithms infer that the student is at risk of withdrawal or depression.
- An automatic recommendation for intervention by the psychologist appears.
- dent is suffering from psychological stress resulting from social It appears that the stu isolation, and he is being prepared for a psychological support plan and integrated into group activities.

Scenario No. 04: Deliberate sabotage attempt within the institution

Situation:

A secondary school student was caught on two separate occasions attempting to vandalize school property (breaking windows, disabling a security camera). The school administration had previously recorded behavioral changes in him, including withdrawal from activities, sudden outbursts of anger, and a sharp decrease in classroom interaction.



Figure (4): Scenario N°4

Model response:

- behavior and classifies the monitors the accumulation of negative The analytical system situation as "dangerous behavior associated with deliberate aggression".
- receives a notification via the risk analysis dashboard and conducts a psychologist The direct interview with the student.
- A severe internal conflict and emotional distress are discovered as a result of family pressures and academic frustration.

- level intervention mechanism is activated-The multi:
 - up sessions-Individual psychological follow
 - Family social intervention
 - confidence and motivation An educational plan to restore

5.4- Rsystems ole of multiple indicators and human assessment in the early warning' success

Practical examples indicate that the effectiveness of the "psychological early warning" model does not depend on tracking a single isolated event, but rather on the cumulative analysis of a range of psychological, behavioral, and academic indicators that may appear simple on the surface, but which, when combined, form a pattern indicative of a potential disorder or risk. The model demonstrates that the prediction process is not entirely automated, but always requires expert human intervention, embodied in the role of the school psychologist who assesses the accuracy of the analyses and oversees the implementation of appropriate interventions. These examples also confirm that continuous feedback, through updating the student's status and monitoring the effectiveness of the response, contributes to improving the predictive model's efficiency over time and enhances the educational institution's ability to build a proactive and safe school environment.

6- Recommendations

1. **Integrating artificial intelligence into school psychological work:** Adopting intelligent predictive systems supported by behavior analysis algorithms in institutions, integrating digital data with psychological diagnosis educational.
2. **Training psychologists on digital tools:** The need to include specialized training modules in school psychology programs on artificial intelligence and educational data analysis.
3. **g a unified school databaseBuildin:** Developing digital information systems that date psychological, behavioral, and educational records for students in -to-include up educational institutions, supporting the accuracy of predictive models.
4. **y warning” platformsDeveloping digital “earl:** Designing interactive software for specialists and administrators, integrated with behavioral indicators and issuing automated alerts for potentially dangerous cases.
5. **telligence Activating the partnership between psychologists and artificial in engineers:** Promoting multidisciplinary work to ensure the reliability of behavior analysis and the effectiveness of early psychological interventions.
6. **Considering ethical aspects in analyzing student data:** Ensuring the protection of privacy and applying clear ethical standards in the collection and use of 'students digital data.
7. **Integrating the family into the early prevention system:** Involving parents in psychosocial intervention sessions based on predictive model reports.

7- Conclusion

The increasing psychological and behavioral challenges within the school environment, along with the accompanying manifestations of violence, disorder, and dropout, necessitate that educational stakeholders reconsider their traditional tools for addressing these phenomena. This intervention has demonstrated that integrating school-based psychological analysis with the predictive capabilities of artificial intelligence and data analysis constitutes a strategic step towards building a preventative school system capable of early intervention before risky behaviors escalate. We have shown through applied models that monitoring precise indicators of student behavior, whether through human observation or intelligent systems, allows for informed and timely decision-making. However, the effectiveness of these models remains contingent upon the availability of a stimulating school environment, a digitally trained psychologist, and educational policies that support innovation in prevention and guidance.

In conclusion, we recommend adopting early psychological warning models as a standard tool within educational institutions, along with developing easy-to-use integrated software and training educational and psychological staff on its use, in order to ensure a smart and safe school that anticipates problems related to acquiring dangerous aggressive behaviors that could be a prelude to criminal acts, rather than merely reacting to them.

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