



Research Article

Adoption of Artificial Intelligence (AI) In Drug Abuse Education and Prevention: The Prerequisites

Chizoba Theresa Okeke & Gideon Uchechukwu Nwafor, PhD

About Article

Article History

Submission: July 28, 2026

Acceptance: August 1, 2026

Publication: August 5, 2026

Keywords:

Artificial Intelligence, Drug abuse education; Drug abuse prevention, Digital literacy.

About the Authors

Chizoba Theresa Okeke

Department of Mass Communication
Chukwuemeka Odumegwu Ojukwu University

Email: chizzyokeke@gmail.com

&

Gideon Uchechukwu Nwafor, PhD

Department of Mass Communication
Chukwuemeka Odumegwu Ojukwu University

Email: gu.nwafor@coou.edu.ng

ABSTRACT

Drug abuse remains a critical public health crisis globally and in Nigeria, with the World Health Organisation estimating over 35 million people worldwide suffering from drug use disorders, and Nigeria's National Drug Law Enforcement Agency reporting that 14.4% of the population aged 15-64 years have used drugs. There has been an alarming rise in substance abuse, including cannabis, tramadol, codeine, and methamphetamine, among people, while traditional prevention methods such as school programs, media campaigns, and community outreach have shown limited effectiveness in engaging tech-savvy youth populations. This study aimed to examine the prerequisites for adopting Artificial Intelligence (AI) in drug abuse education and prevention. The research employed the desktop research methodology. It analysed existing studies, reports, and theoretical frameworks related to AI applications in substance abuse prevention. The study identified seven critical prerequisites for successful AI adoption: robust digital literacy and youth-centred engagement, inclusive data infrastructure, technological and infrastructural readiness, comprehensive policy support and ethical frameworks, culturally responsive and localised AI systems, multi-stakeholder collaboration and capacity building, and continuous evaluation with algorithmic transparency. It submitted that while AI-powered solutions offer significant potential for personalised interventions, early detection capabilities, and engaging educational platforms that can address the limitations of traditional prevention methods, their success is contingent upon coordinated planning, substantial investment, and commitment across multiple sectors. The study concluded that AI represents a transformative tool for enhancing drug abuse prevention efforts among youths, but requires systematic preparation and implementation of these prerequisites to create safer, healthier communities and more effective prevention strategies.

INTRODUCTION

Drug abuse remains a critical public health issue both globally and in Nigeria. A drug is a term given to all manner of substances that, when administered, change the mental, physical or physiological state of the body (Ibrahim et al., 2022). It can alter how the body works or behaves. Drug abuse is an abnormal, wrong or excessive consumption (administration) of substances (Umar et al., 2023). It is a behaviour of taking drugs that is not in conformity with medical approval or a socially acceptable way in society. The World Health Organisation (WHO) estimates that over 35 million people worldwide suffer from drug use disorders, with a significant proportion of these being youths aged between 15 and 24. A 2018 report by the National Drug Law Enforcement Agency (NDLEA) revealed that approximately 14.4% of Nigeria's population aged between 15 and 64 years had used drugs, with a large percentage of users being youths. Also, the World Drug Report (2023) stated that in 2021, 1 in every 17 people aged 15–64 in the world had used a drug in the past 12 months. The estimated number of users grew from 240 million in 2011 to 296 million in 2021 (5.8 per cent of the global population aged 15–64). This is a 23 per cent increase. The report also evidenced that 5.3 per cent of 15–16-year-olds worldwide (13.5 million individuals) had used cannabis in the past year. This trend suggests that young people tend to use drugs more. Little wonder that Hotujac et al. (2021) noted that the first experience with a drug occurs most frequently at the age of mid-adolescence is between 15-19 years, and that the population prone to drug abuse is largely adolescents and youths. This trend is disturbing as it places a heavy burden on public health systems, the economy, and society at large.

In developing countries like Nigeria, the challenge of youths being more prone to drug abuse is further exacerbated by socioeconomic factors, cultural influences, and inadequate enforcement of drug control policies (Aliyu & Umar, 2024). Anambra State, for instance, has witnessed an alarming rise in the use of substances such as cannabis, tramadol, codeine, and methamphetamine among young people (Nnaemezie & Nwangwu, 2024). This trend mirrors national and global patterns where synthetic drugs are becoming increasingly prevalent due to their accessibility and affordability. Several factors contribute to the high rates of drug abuse among Nigerian youth. Peer pressure (Aliyu & Umar, 2024); socio-economic challenges, including unemployment, poverty, and a lack of viable opportunities (Abikwi & Okafor, 2022; Sarkingobir et al, 2023); proliferation of illegal drug markets, weak regulatory frameworks, and limited awareness campaigns (Tambari et al, 2023) have been identified as such factors. Aliyu and Umar (2024) further noted that the absence of robust support systems for mental health and addiction recovery also plays a significant role in perpetuating the cycle of abuse.

The consequences of drug abuse are profound, affecting not only the individuals involved but also their families, communities, and society at large. Babu et al. (2024) submitted that from a health perspective, drug use can lead to addiction, mental health disorders, and an increased risk of infectious diseases like HIV and hepatitis due to unsafe practices such as needle sharing. The issue of drug abuse is deeply concerning, with several substances being commonly misused, contributing to a widespread public health crisis. Among the most prevalent drugs are

cannabis, codeine, tramadol, cocaine, and methamphetamine, each carrying its own set of dangers that pose serious risks to the health and well-being of people.

Cannabis, also known as marijuana or "weed," often acts as a gateway drug, leading to the misuse of more dangerous substances. Gathumb et al (2022) elucidated that it has psychoactive effects, which include euphoria and altered perception, with prolonged use being associated with serious health issues, including cognitive impairment, dependence, and in some cases, the development of psychotic disorders. Codeine, which is another substance of concern, was initially used for medical purposes but is frequently abused due to its sedative and euphoric properties. The false belief that it is less harmful than other drugs has made it a popular choice among young people. According to Hotujac et al. (2021), its abuse leads to addiction, respiratory problems, and, in extreme cases, overdose-related deaths. Tramadol, a prescription painkiller, has also emerged as a major problem (Nnaemezie & Nwangwu, 2024). Initially intended to manage pain, tramadol is now widely misused for its ability to induce a state of euphoria and increased energy. While this might seem appealing to abusers, the drug carries severe health risks, including addiction, seizures, and respiratory complications. Its widespread availability, often through illicit channels, has made tramadol one of the most frequently abused drugs among Nigerian youth, contributing to a rise in hospitalisations and fatalities.

Cocaine, although less accessible than other drugs, has found its way into the hands of affluent youths in the state (Babu et al, 2024). As a powerful stimulant, cocaine induces

feelings of intense pleasure, increased energy, and heightened alertness. However, these effects are short-lived, leading to frequent use and eventual addiction. The drug's dangers include severe cardiovascular problems, such as heart attacks and strokes, as well as psychological issues like paranoia and hallucinations (World Drug Report, 2022). The increasing use of cocaine, though still limited to specific social groups, is a growing concern for health authorities. Perhaps the most alarming drug currently in circulation is methamphetamine, locally referred to as "mkpurummiri" or crystal meth (Nnanna et al, 2022). Its impact on users is devastating, as it produces intense, prolonged euphoria, coupled with increased energy and hyperactivity. The drug is highly addictive, and its effects on the body are catastrophic, leading to rapid physical deterioration, aggression, and psychosis. In recent years, methamphetamine use has reached epidemic levels in southeastern Nigeria, where its availability and use have led to numerous arrests and hospitalisations (Nnaemezie & Nwangwu, 2024). There is a need for effective education, policy reform, and rehabilitation programmes to mitigate the devastating effects of substance abuse on the younger generation.

Despite the growing recognition of the dangers posed by drug abuse among young people, traditional methods of drug abuse education and prevention have struggled to make a significant impact (Babu et al, 2024). The most common approaches, which are school programmes, media campaigns, and community outreaches often limited in their ability to engage young audiences effectively and address the root causes of substance abuse. They also fail to tailor their approaches to the diverse needs and preferences of young people (Obidike & Igwe, 2024), and they are

not accessible (Ibrahim et al., 2022).

Youths today are more connected to technology than any previous generation, and many prefer interactive, personalised learning experiences (Umar et al., 2023). However, traditional campaigns often neglect to incorporate modern technology, such as social media, gaming platforms, or mobile apps, which could provide more engaging and relatable content. The absence of these innovative tools reduces the relevance of such programs in the eyes of tech-savvy youth, who might otherwise be more receptive to the information if it were delivered in a format they enjoy. Similarly, Nnaemezie and Nwangwu (2024) submitted that media campaigns, while able to reach a wide audience, often fail to engage youth in meaningful ways due to their impersonal nature and the oversaturation of competing media messages. Consequently, many young people are either unaware of these campaigns or do not find them compelling enough to influence their behaviour.

Furthermore, the effectiveness of traditional prevention methods is often undermined by the lack of follow-up and reinforcement. Hotujac et al, (2021) opined that many school programmes and public campaigns are one-off events, providing only temporary or surface-level awareness without offering long-term strategies or continued support for those at risk of drug abuse. This sporadic engagement means that while students may receive initial information, the absence of sustained intervention often leaves them vulnerable to peer pressure, curiosity, or the socio-economic challenges that drive drug use. In light of these limitations, it is clear that traditional methods of drug abuse education

and prevention are insufficient in addressing the complex and evolving nature of substance abuse among students. More innovative and tailored approaches, such as the integration of artificial intelligence and digital platforms, are needed to reach students in more engaging, accessible, and effective ways.

Artificial Intelligence (AI) has rapidly emerged as a transformative tool across various sectors, including education and healthcare, offering innovative solutions to long-standing challenges. In the view of Gathumb et al (2022), AI refers to the simulation of human intelligence in machines, enabling them to learn from data, recognise patterns, and make decisions based on complex inputs. This capability makes AI highly versatile, with applications ranging from personalised learning in education to predictive modelling and behaviour modification in healthcare. In the context of drug abuse prevention, Gathumb et al, (2022) noted that AI presents an exciting opportunity to reshape the way educational programmes are delivered to students. Traditional methods of drug education have often struggled to engage students or address their specific challenges, but AI-powered solutions can offer a more interactive, engaging, and customised approach. AI can create dynamic educational platforms that incorporate gamification, simulations, and interactive content, which not only capture the attention of tech-savvy youths but also make learning about the dangers of drug abuse more relatable and effective (Hotujac et al., 2021). For instance, AI could design virtual environments where students can experience the consequences of drug use in a safe, controlled manner, allowing them to understand the real-world implications without actual risk.

AI-powered education programmes have emerged as a highly relevant and impactful approach to addressing the growing challenge of drug abuse among young people. Obidike and Igwe (2024) posited that, unlike traditional methods, AI tools offer a unique combination of personalisation, early detection, and real-time feedback, making them particularly well-suited to enhancing drug abuse awareness and prevention in youth populations. One of the key strengths of AI-powered programmes, as noted by Bali et al. (2024) is their ability to personalise educational content based on individual behaviours, preferences, and risk factors. With young people often exposed to different environments and pressures, a one-size-fits-all approach to drug abuse education is insufficient. According to Kim et al. (2023), AI can analyse a wide range of data, including academic performance, social interactions, and even online behaviour, to detect early signs of risk and tailor prevention strategies accordingly. For instance, an AI-driven programme might identify students who exhibit risk behaviours- such as engaging in drug-related conversations on social media and offer them personalised learning modules that focus on the dangers of substance use or provide alternative coping mechanisms for stress and peer pressure. AI algorithms can proffer valuable information to keep people knowledgeable and educated about drug abuse and help them reduce their intention to use drugs (Nyabuti & Mohammed, 2024). This means that this approach ensures that young people receive the most relevant information at the right time, increasing the likelihood of preventing drug use before it begins.

In addition to enhancing personalization, AI tools provide real-time feedback and

interactive learning experiences that engage young people more effectively than static content (Nnaemezie & Nwangwu, 2024). Features such as gamification, where educational activities are integrated with game-like elements, can make learning about the consequences of drug use both informative and enjoyable. For example, students could participate in simulations where they make decisions about drug use and face the consequences in a virtual environment, helping them understand the risks in a hands-on manner. Real-time feedback from these simulations can guide learners through scenarios, correcting misconceptions and reinforcing healthy behaviours as they progress. AI-powered programs can also reduce the intention to use drugs by equipping students with accurate information and practical coping strategies (Aliyu & Umar, 2024). Misinformation about drug use is rampant, particularly among adolescents, who may be influenced by peers or misleading media representations. AI programs can counteract this by delivering fact-based, science-driven education that dispels myths and highlights the real dangers of drug abuse. Kim et al. (2023) explained that AI can clarify misconceptions and debunk myths about drugs. This dynamic and engaging approach is particularly appealing to youths, who are more likely to retain information when it is presented in an interactive and relatable format. This will make them better able to make informed decisions about drug use.

Moreover, AI's ability to analyse data at unprecedented scales holds significant potential for identifying trends and risk factors associated with drug abuse. Nyabuti and Mohammed (2024) posited that through predictive modelling, AI systems can identify

individuals or groups at higher risk of substance abuse based on behavioural, social, and demographic data. This will permit early intervention by enabling educators, healthcare providers, and policymakers to implement targeted prevention strategies before drug use escalates. Obidike and Igwe (2024) argue that AI's predictive capabilities can also help in customising educational content that aligns with the specific needs of different populations. This ensures that interventions are not only timely but also culturally relevant and responsive to local needs as well as challenges.

AI can further support drug abuse prevention through continuous monitoring and feedback (Johns et al, 2021). By analysing patterns of online behaviour, social media activity, and other digital footprints, AI systems can detect signs of vulnerability to drug use and alert authorities or caregivers to provide the necessary support. This proactive approach moves beyond one-time interventions, offering ongoing surveillance and support to youths who may otherwise slip through the cracks of traditional prevention methods. AI's ability to provide continuous monitoring and early detection of risky behaviours adds a preventative layer that traditional programmes often lack. By analysing patterns of behaviour over time, AI systems can predict when a young person may be at heightened risk of experimenting with drugs. Early interventions can then be initiated, such as sending targeted educational content or offering virtual counselling sessions, reducing the likelihood of substance abuse escalation. Ibrahim et al. (2022) explained that the use of real-time data analysis also allows educators and other caregivers to monitor progress and adjust the content or support offered to each individual. This ensures that prevention

efforts are sustained and are responsive to the changing needs of young people.

Additionally, AI can teach youths how to manage stress, peer pressure, and emotional challenges in ways that do not involve substance use, giving them practical tools to navigate the temptations they may encounter in their daily lives. Grat (2021) elucidated that AI education programmes can teach young people skills that will help them resist peer pressure and make sensible decisions. Such skills as stress management skills, assertiveness skills (to know how to say “no” to peer pressure); decision-making skills (to enable them to assess the consequences of their actions and be able to choose better options), and so on. Again, by leveraging AI-powered content, young people can become aware of the importance of healthy relationships, and so they can strengthen their relationships with families and communities. These relationships are valuable as they provide support and protection against drug abuse. Obidike and Igwe (2024) noted that the long-term effect of this is that it influences social norms and creates an environment where drug abuse is not tolerated.

Despite the existence of various drug abuse prevention programs like the National Drug Control Committee (NDCC) program, National Agency for Food and Drug Administration and Control (NAFDAC) program, United Nations Office on Drugs and Crime (UNODC) program, among others, the prevalence of drug abuse among young people still appears to be high (Aniemena et al., 2021; Onuora et al., 2025). Traditional methods of drug education and prevention, such as school programs, media campaigns, and community outreach, have had limited success in reducing drug abuse. Nnaemezie and Nwangwu (2024)

noted that these conventional approaches often fail to engage young people effectively, and they do not adequately address the unique challenges and technological preferences of today's youth. Consequently, drug abuse continues to be a significant issue, contributing to a range of negative health, social, and academic outcomes.

AI has the capacity to revolutionise addiction treatment and the prevention of drug abuse. In the view of King (2023), by leveraging AI capabilities, it is possible to facilitate accessibility, effectiveness, and efficiency in combating drug abuse, which leads to healthier and safer communities. But for the adoption of AI to be effective in drug abuse education and prevention, certain prerequisites ought to be in place. Given that AI has the potential to enhance drug abuse education and prevention among youths, it becomes critical to examine the prerequisites for the adoption of AI in drug abuse education and prevention to ensure effectiveness. Literature on this aspect seems scarce, and this has posed a gap in knowledge which this study seeks to fill. What are the prerequisites for the adoption of Artificial Intelligence in drug abuse education and prevention? Providing an answer to this question poses the thrust of this study.

Theoretical Framework

This work adopts the Theory of Planned Behaviour (TPB). The Theory of Planned Behaviour (TPB) was propounded by Icek Ajzen in 1985. It was developed as an extension of the earlier theory -the Theory of Reasoned Action (TRA), which Ajzen co-developed with Martin Fishbein in 1975. Ajzen extended the TRA to include perceived behavioural control, thus creating the TPB. The theory of planned behaviour stipulates

that the performance of a behaviour is a function of the intention to perform that behaviour, which in turn is influenced by three key factors: attitudes toward the behaviour, subjective norms, and perceived behavioural control. These factors interact to predict behavioural intentions, which serve as a proximal determinant of behaviour. Ajzen argued that these three factors collectively shape an individual's behavioural intentions and, subsequently, their actions. The addition of perceived behavioural control accounts for the fact that sometimes people may intend to carry out a behaviour but are unable to do so due to a lack of resources or other external factors.

This theory is related to the present study given the fact that AI-driven education platforms can help change youth's attitudes towards drug use by providing interactive, personalized, and engaging content that addresses the dangers of drug abuse. By presenting facts, simulations, and real-life scenarios through AI, students can develop a more negative attitude toward drug abuse. AI can also track user interactions and adapt the content to strengthen anti-drug attitudes, making the learning process more effective. For instance, AI chatbots can simulate conversations with people who have experienced drug addiction, helping users understand the negative consequences of drug use in an engaging and relatable way. This fosters a stronger, more informed negative attitude toward drug abuse. Again, AI can influence the perceived social pressure surrounding drug use. AI-powered social platforms and educational programs can leverage peer group data, role models, and testimonials to show that avoiding drug use is the norm in certain social circles. It can also highlight how respected figures or

communities disapprove of drug use, encouraging young people to conform to these positive subjective norms. AI can enhance young people's perceived behavioural control by providing them with the tools and resources to resist drug use. For example, AI can identify high-risk individuals and offer personalised interventions, such as coping strategies, reminders, and motivational support. It can simulate real-life situations where users practice refusing drugs and help build self-efficacy by showing how they can control their actions in difficult situations.

Concept of Artificial Intelligence (AI)

Artificial Intelligence (AI) has emerged as a dynamic force capable of reshaping social interactions. AI refers to the development of computer systems capable of performing tasks that typically require human intelligence (Igbokwe, 2023). These tasks include learning, reasoning, problem solving, perception and natural language understanding (Adelana & Akinyemi, 2021). Kim et al., (2023) defined AI as programs designed with human-like intelligence and structured in forms of computer, robot, or other machines to aid in provision of any kind of service or tasks to improve social economic and political development of the society. Artificial Intelligence technologies encompass various techniques and approaches, such as machine learning, deep learning, natural language processing, computer vision and robotics. Olatunde-Aiyedun (2024) explained that these technologies enable computers to analyze vast amounts of data, recognize patterns, make predictions and automate complex processes. Fullan (2023) elucidated that Artificial Intelligence has applications across

numerous fields, including health care, finance, transportation, customer service and education. It has the potential to transform industries, improve efficiency and create new opportunities (Igbokwe, 2023). Bali, et al., (2024) viewed AI as the ability of a computer or machine to mimic the capabilities of the human mind, learning from examples and experience, recognising objects, understanding and responding to language, making decisions, solving problems and combining these and other capabilities to perform functions a human might perform, such as greeting a hotel guest or driving a car.

Concept of Drug Abuse

Drugs are substances which, when taken, can limit cognition, perception, mood, behaviour and overall body function (Okafor, 2020). They can also produce a change in biological functions through their chemical actions. Drug abuse is a major public health concern that transcends geographical, social, and economic boundaries. At its core, it involves the excessive or inappropriate use of substances that alter the normal functioning of the body, either mentally, physically, or physiologically. Drugs, whether legal or illegal, are substances that, when introduced into the body, have the capacity to modify perception, mood, consciousness, or behaviour (Ibrahim et al., 2022). Rather than merely focusing on therapeutic purposes, drug abuse reflects a pattern of consumption that is harmful to the user or others within their environment. This misuse could involve illegal substances such as cocaine, heroin, and marijuana, or even the misuse of prescription and over-the-counter medications when used for purposes outside medical prescriptions or in quantities beyond recommended doses (Oluwasanmi, 2022). Drug abuse is a

complex phenomenon that goes beyond mere consumption. It reflects a pattern where the use of substances, whether legal or illegal, becomes detrimental to an individual's well-being and societal functioning. Drug abuse refers to the inappropriate or harmful use of substances that alter the body's normal physiological or psychological functions, often without medical justification or societal approval (Ibrahim et al., 2019; Umar et al., 2023; Obidike & Igwe, 2024). Among youths, drug abuse is commonly linked to substances such as cannabis, codeine-based cough syrups, alcohol, inhalants, and prescription medications like diazepam and valium (Sarkingobir et al., 2023). Abuse typically begins with experimentation and can escalate to addiction, driven by peer pressure, poverty, curiosity, academic stress, and accessibility (Nasiru et al., 2019). As usage intensifies, young individuals experience cognitive distortion, behavioural instability, and emotional imbalance, all of which diminish their capacity for sound judgment and learning (Umar et al., 2023).

It is important to note that drug abuse is not solely about the legality of the substance but more about how it is used. Roberts et al. (2025) emphasised that abuse occurs when the use of a substance is seen as problematic by the society concerned. This suggests that cultural and societal perceptions also play a role in determining what constitutes abuse. Furthermore, Eze (2023) explains that drug abuse often stems from the habitual and compulsive use of substances not necessarily for healing, but rather to alter one's mood, consciousness, or mental state. It typically develops into a maladaptive pattern that interferes with key areas of life such as work, relationships, and physical health. Umar et al. (2023) reinforced this by describing drug

abuse as the harmful or hazardous use of psychoactive substances, including both alcohol and illicit drugs. In essence, drug abuse extends beyond occasional misuse. It represents chronic behaviour that carries significant risks of social, legal, psychological, and physical consequences. Some of the commonly abused drugs are methamphetamine, opiates, cocaine, marijuana, narcotics, hallucinogens, sedatives and alcohol (Oluwasanmi, 2022; Okafor, 2022).

Causes of Drug Abuse

The rising incidence of drug abuse among students in Nigerian universities is alarming and demands a closer look at the root causes. In the view of Imam (2022), the problem is not simply about the availability of drugs, but rather the interplay of personal, familial, social, and institutional factors that shape students' choices and vulnerabilities. If drug abuse is to be combatted effectively, we must understand why many students turn to drugs in the first place. A primary cause of drug abuse among students is peer influence. University life introduces young people to new environments and relationships, many of which are outside parental or societal supervision. In their quest for acceptance, some students adopt the habits of their peers, including experimenting with drugs. Okafor (2022) noted that adolescence and early adulthood are periods of identity formation, where many individuals crave group belonging. In a study at the University of Abuja, 78.7% of respondents admitted that peer pressure was a major factor influencing drug abuse (Hassan, 2019). This reflects a broader truth: students are more likely to try drugs if it makes them feel included or respected among friends.

Closely related to this is the issue of weak parental supervision and broken home structures. The university environment often reflects the values or lack thereof instilled at home. When students come from backgrounds with little parental guidance, they tend to lack the internal discipline needed to resist harmful behaviours. Hassan (2019) found that 68.7% of surveyed students linked their drug use to inadequate parental control. This confirms the argument of Gathumb et al (2022) that the absence of consistent, value-driven parenting exposes young people to risky behaviours, including drug use.

Another notable cause is frustration, especially that which is induced by academic, financial, or emotional pressure. Students face increasing stress to succeed in competitive academic environments, often with little support. This stress sometimes pushes them to seek relief through drugs, believing it helps them stay awake, focus better, or escape from reality. Hassan (2019) reported that over 66% of students linked their drug use to frustration, while over half said they used drugs to enhance alertness or cope with academic stress. These findings support the view of Gathumb et al (2022), that academic stress as a key trigger for substance abuse among college students. In addition to stress and frustration, the mere availability of drugs on or near campuses is a serious enabler of abuse. Students who live in environments where drugs are sold or easily accessible are more likely to experiment with them. Hassan (2019) observed that 61.3% of the respondents in his study believed that easy access to drugs influenced their use. Unfortunately, many of our urban centres and university towns are flooded with drug dealers who exploit the naivety and vulnerability of young people.

Curiosity is another powerful yet underrated cause. Adolescents and young adults are naturally drawn to new experiences, and some try drugs simply to know what it feels like. Imam (2022) explained that many young people are motivated by the desire to experiment and explore unknown sensations. Once the initial experience provides a sense of pleasure or mental escape, continued use becomes easier, often leading to dependence. Supporting this, Oluwasanmi (2022) found that a significant proportion of students agreed that curiosity influenced their first experience with drugs. Other contributors include the desire for self-satisfaction, escapism through self-medication, and having money to purchase drugs without any accountability. Hassan (2019) highlighted that students often abuse drugs to cope with emotional voids, enhance performance, or simply satisfy physical sensations. Whether driven by emotional distress or boredom, these personal motivations are just as influential as social factors. From this perspective, drug abuse among youths is not a random act of deviance but a symptom of deeper societal and institutional lapses. It is a mirror reflecting the breakdown of family values, the absence of supportive academic environments, and a society that often ignores the psychological needs of its youth.

Effects of Drug Abuse on the Social Behaviour of Youths

Drug abuse among youths is not only a health crisis but also a behavioural and social one. It significantly alters the way young people relate with others, behave within society, and conform to or reject accepted social norms. This section explores how drug abuse distorts youth social behaviour, leading to the erosion of pro-social conduct and the rise of deviant, aggressive, and antisocial tendencies. As

Roberts, Odumodu, and Uye (2025) observed in their study conducted in Rivers State, Nigeria, substance abuse among youths has been linked with various forms of social dysfunction, including cultism, academic disruption, internet fraud, sexual violence, and even participation in violent crimes. These are not isolated incidents but recurring behavioral patterns that reflect a deterioration of communal values and a shift toward antisocial behavior. This finding is consistent with the assertion by Ojule and Te-Erbe (2022), who reported substance abuse prevalence rates as high as 37–38% in both urban and rural youth populations, signalling a widespread behavioural shift among young Nigerians.

The causal mechanisms behind these behaviours are multifaceted. Peer pressure is one of the most consistent predictors. Peer pressure exerts a strong influence on youth social behaviour, particularly during the identity-forming adolescent years. Akindipe and Aina (2021) found peer influence to be a significant determinant of substance abuse among youths admitted to neuropsychiatric hospitals in Southwest Nigeria. In the same vein, Roberts et al. (2025) confirmed through regression analysis that peer pressure independently predicted substance abuse behaviour. When young people seek approval and social identity within groups that normalise or glamorise substance use, they are more likely to adopt behaviours that are disruptive, risk-laden, and socially deviant. Social media is another powerful influence on youth behaviour. It creates a digital environment that often normalises or glamorises substance use. Platforms like Instagram, Snapchat, and Facebook expose adolescents to curated content where drug use

is trivialised or celebrated, contributing to the normalisation of deviant behaviours. Although Roberts et al. (2025) found that social media did not independently predict substance abuse behaviour in their study, its combined effect with peer pressure was substantial, jointly accounting for 73% of the variance in substance abuse behaviour. This aligns with findings by Imam (2022) and Oluwasanmi (2022), who reported that adolescents exposed to substance-related content on social media were more likely to engage in substance use themselves.

The theoretical underpinnings of these behaviours are well captured by Bandura's (1997) Social Cognitive Learning Theory, which suggests that behaviour is learned through observation, modelling, and reinforcement. Youths, especially those with weak family bonds or poor parental guidance, tend to model the behaviours they observe among peers or online influencers, particularly when such behaviours appear to attract social rewards or status. The Uses and Gratifications Theory (Blumler & Katz, 1974) further explains how youths seek identity, affirmation, and belonging through media engagement, which in turn influences their behavioural decisions.

These behavioural consequences, ranging from withdrawal from school to involvement in cybercrime and gang activities, constitute a profound deviation from socially acceptable norms. They reflect a shift from prosocial behaviours, such as respect for authority, academic engagement, and civic responsibility, toward behaviours that undermine social harmony and endanger both the individual and the community. Drug abuse significantly reshapes the social behaviour of

youths by increasing their susceptibility to peer manipulation, promoting antisocial conduct, and weakening their adherence to societal values. It creates a behavioural drift that affects not only personal development but also public safety and national productivity. Therefore, interventions must prioritise behavioural reorientation, peer group restructuring, and responsible media use to mitigate the social consequences of youth substance abuse.

Using Artificial Intelligence (AI) for Drug Abuse Education and Prevention Efforts

Artificial Intelligence (AI) holds immense potential in enhancing drug abuse education and prevention by offering sophisticated tools for prediction, early detection, and tailored interventions. Traditional statistical methods, such as logistic regression or linear models, though historically useful, often fall short in capturing the complex, non-linear relationships that characterize substance use behaviors (Obidike & Igwe, 2024; Unlu & Subasi, 2025). AI models, especially machine learning (ML) and deep learning (DL) techniques, surpass these limitations by effectively managing high-dimensional data and revealing hidden patterns. For example, ML has already been used to predict risk factors in various populations, such as U.S. adolescents (Bali et al., 2019) and Mexican children (Tambari et al., 2020), illustrating its global relevance in substance abuse research (Unlu & Subasi, 2025). AI revolutionizes drug abuse prevention, surpassing traditional limitations. Babu et al., (2024) submitted that through machine learning and predictive analytics, AI detects patterns, predicts risks, and customizes interventions precisely. Its personalized, data-driven approaches enhance early detection and support systems,

emphasizing innovation and efficiency in combating substance abuse.

One of the most transformative DL models in this domain is the Long Short-Term Memory (LSTM) model, which excels in analyzing sequential data and complex behavioral patterns. Unlu and Subasi (2025) demonstrated that LSTM and its variants - BiLSTM and Recursive LSTM achieved outstanding predictive performance in identifying cannabis, ecstasy, amphetamine, cocaine, and non-prescribed medication use, based on data from the Finnish National Drug Survey. These models outperformed traditional ML classifiers, achieving precision and F1-scores nearing 0.99. Such results not only indicate technical superiority but also suggest practical applications in educational and public health settings where early warning systems are needed.

Beyond prediction, AI models can support drug abuse education by helping identify the most influential factors driving substance use. Through SHAP (SHapley Additive exPlanations) analysis, for instance, Unlu and Subasi (2025) could interpret the contribution of each predictor variable such as demographic features, social influences, health perceptions, and substance accessibility thus providing innovative, actionable insights for prevention campaigns. As ML models shift focus from estimating model parameters (β) to outcome prediction, they align better with the real-world need to anticipate and address substance abuse risks (Obidike & Igwe, 2024).

Another key advantage of AI is its ability to address data imbalance and represent vulnerable subgroups. Drug use datasets

often suffer from underrepresentation of users, making it difficult to train accurate models. Techniques such as SMOTE (Synthetic Minority Oversampling Technique) and hybrid methods like SMOTE-Tomek have been employed to balance datasets, improve minority class prediction, and ensure fair representation of marginalized populations (Unlu & Subasi, 2025). These developments are crucial for drug abuse education programs that aim to be inclusive and targeted.

AI also opens new frontiers for real-time surveillance and adaptive education. Social media data, for example, have been analyzed using convolutional neural networks (CNNs) to detect substance use patterns (Hassanpour et al., 2019), while wearable technologies and mobile data have been used to predict mental health outcomes related to substance use (Zhou et al., 2021). These approaches can be integrated into educational frameworks that not only inform but also respond to emerging trends in substance use among youth and other at-risk groups.

Despite these advances, challenges remain. Concerns about transparency, ethical data use, and the interpretability of deep learning models have been persistent barriers to widespread adoption. However, recent improvements in model explainability and performance optimization such as gradient-based tuning and cross-validation are gradually mitigating these limitations (Aniemena et al., 2024; Unlu & Subasi, 2025). Importantly, such tools empower educators, clinicians, and policymakers to move from generic awareness campaigns to data-driven, personalized, and community-specific education and prevention strategies.

Using AI for Drug Abuse Education and Prevention: The Prerequisites

Artificial Intelligence (AI) has emerged as a transformative tool in health communication and substance abuse prevention. Its capacity to analyze behavioral data, detect at-risk individuals, and deliver personalized interventions makes it an invaluable resource in the fight against drug abuse, especially among youths. However, to leverage this technology effectively, certain prerequisites must be in place to ensure responsible, inclusive, and impactful deployment. These prerequisites encompass technological, ethical, social, and institutional dimensions.

- **Digital Literacy and Youth-Centered Engagement:** AI integration into drug abuse education requires a population that is digitally literate, especially among the youth who are both primary users of digital platforms and a key demographic in substance abuse vulnerability. The findings by Nnaemeka and Igwe (2024) indicate that over two-thirds of youths in Ekwusigo LGA possess a high level of AI awareness, yet this must be translated into functional digital literacy which ensures the ability to engage critically and safely with AI tools. Moreover, youths should not only be recipients of AI-driven messages but also active contributors in co-designing culturally relevant AI applications. Youth engagement ensures that solutions are relatable, empowering, and effective.
- **Robust and Inclusive Data Infrastructure:** AI systems require large, accurate datasets to function effectively. In the context of drug abuse prevention, this means collecting

reliable data on youth behavior, drug use trends, environmental triggers, and cultural factors. However, data availability and quality remain major challenges in Nigeria, particularly in rural or underserved regions where digital infrastructure is weak. Without investment in secure, inclusive data ecosystems and ethical data collection protocols, AI tools risk perpetuating bias or failing to capture the true picture (Liang, Tadesse, & Ho, 2024). Ensuring inclusivity in data sources is critical to avoid reinforcing inequalities.

- **Technological and Infrastructural Readiness:** For AI to deliver on its promises, there must be adequate technological infrastructure including stable electricity, internet connectivity, mobile devices, and digital platforms. Many parts of Nigeria still face infrastructural deficits, limiting the reach of AI-powered solutions. According to the National Broadband Plan (2020–2025), rural internet penetration remains below 40%. Thus, addressing infrastructural gaps is a necessary foundation for deploying AI tools in schools, health centers, and community networks where youths access drug-related information.
- **Policy Support and Ethical Frameworks:** Effective AI integration must be guided by clear regulatory and ethical frameworks to prevent misuse, protect privacy, and promote accountability. The ethical challenges of AI such as algorithmic bias, data manipulation, and disinformation are heightened when dealing with vulnerable populations like

adolescents. Regulatory bodies such as the National Information Technology Development Agency (NITDA) and the National Drug Law Enforcement Agency (NDLEA) should collaborate to ensure AI tools used in drug prevention are safe, transparent, and ethically grounded (Melo, Maasch, & de la Fuente-Nunez, 2021). Policies should also mandate community consultations and informed consent in AI data usage.

- **Culturally Responsive and Localized AI Systems:** AI tools must be sensitive to the cultural and social realities of the populations they serve. Nigeria's diverse cultural landscape includes varying perceptions of drugs, addiction, and rehabilitation. For instance, while alcohol use is normalized in some ethnic cultures, it is religiously forbidden in others. Therefore, AI-driven content must reflect this diversity utilizing local languages, region-specific drug trends, and contextually appropriate messaging (Paul, Sanap, & Shenoy, 2021). Cultural responsiveness enhances trust and engagement, making prevention efforts more effective.
- **Multi-Stakeholder Collaboration and Capacity Building:** Sustainable AI implementation requires collaboration between key stakeholders: government agencies, schools, religious institutions, healthcare professionals, technologists, civil society groups, and youth organizations. These actors must work together to design, deploy, and monitor AI tools in a coordinated manner. Moreover, capacity building

for teachers, health workers, and counselors is essential. Many frontline professionals lack the technical knowledge to utilize AI platforms effectively for health education or psychosocial support. Training programs should be embedded into national education and public health strategies.

- **Continuous Evaluation and Algorithmic Transparency:** AI models must undergo regular evaluation to ensure they remain accurate, fair, and aligned with user needs. Transparency in how algorithms function, what data they rely on, how predictions are made, and what actions they recommend, is vital for building public trust. Mechanisms for user feedback, algorithm auditing, and community oversight should be built into all AI interventions (Zhu, Wang, & Wang, 2021). This helps prevent harm and ensures adaptability in dynamic social environments.

Conclusion

This study examined the prerequisites for adopting Artificial Intelligence (AI) in drug abuse education and prevention among youths in Anambra State. The findings reveal that while traditional prevention methods including school programs, media campaigns, and community outreach have shown limited effectiveness in addressing the rising prevalence of substances like cannabis, tramadol, codeine, and methamphetamine among Nigerian youth, AI-powered solutions offer significant potential for transformation through personalized interventions, early detection capabilities, and engaging educational platforms. However, the success

of AI adoption is contingent upon the provision of certain prerequisites like robust digital infrastructure, widespread digital literacy, comprehensive ethical frameworks, culturally responsive system design, multi-stakeholder collaboration, and continuous evaluation mechanisms. Grounded in the Theory of Planned Behavior, AI interventions can systematically influence youth attitudes toward drug use, subjective norms, and perceived behavioral control through data-driven, personalized approaches. This research concluded that AI represents a powerful tool for enhancing drug abuse prevention efforts, but its implementation requires coordinated planning, substantial investment, and commitment across multiple sectors to create safer, healthier communities for youths.

Recommendations

The following are recommended:

1. The state government should formulate comprehensive policies governing the ethical use of AI in public health interventions, including data privacy protection, algorithmic transparency requirements, and community consent protocols specifically tailored to drug abuse prevention programs.
2. The government and philanthropics should invest in digital infrastructure development. Priority should be given to expanding broadband internet coverage and establishing digital centers in rural and underserved areas of the state to ensure equitable access to AI-powered prevention tools across all local government areas.
3. The National Drug Law Enforcement Agency (NDLEA) should develop AI-

Powered educational content. They should partner with educational technology companies to create interactive, gamified educational materials that can be deployed through mobile applications and online platforms to reach youths with evidence-based drug abuse prevention messages.

4. State Post-Primary Schools Management Boards should organize a mandate AI literacy training for educators in AI-powered educational tools and substance abuse prevention technologies to ensure effective implementation in schools.
5. Tertiary Institutions should create AI research centers for substance abuse prevention. They should establish dedicated research centers focused on developing locally relevant AI solutions for drug abuse prevention.
6. National Information Technology Development Agency (NITDA) should facilitate cross-sector collaboration by creating platforms for collaboration between government agencies, educational institutions, healthcare providers, and technology companies to accelerate AI adoption in drug abuse prevention.
7. Traditional and religious leaders should integrate AI tools into community outreach. Traditional rulers and religious leaders should collaborate with technology providers to develop culturally appropriate AI-powered educational content that aligns with local values and belief systems.

References

- Abikwi, M. I., & Okafor, C. (2022). Effect of drug abuse on the academic performance of undergraduate students in Edo state. *International Journal of Scientific and Engineering Research*, 13(4), 662-674.
- Adelana, O. P., & Akinyemi, A. L. (2021). Artificial intelligence-based tutoring systems utilization for learning: a survey of senior secondary students' awareness and readiness in Ijebu-Ode, Ogun State. *UNIZIK J Educ Res Policy Stud.*, 9(1), 16–28.
- Akindipe, A. P., & Aina, J. O. (2021). Factors influencing substance abuse among patients admitted to the two federal neuro-psychiatric hospitals in the South-West of Nigeria. *African Journal of Health Nursing & Midwifery*, 4(2), 38–66. DOI:10.52589/AJHNM-IEQS9BNQG
- Aliyu, S. & Umar, K. (2024). Drug abuse and implications on students learning: a conceptual review emphasized on Sokoto, Nigeria. *Journal of Research in Education Management*, 2(2), 60-70
- Aniemenana, C. R., Ilika, F. N., Nwosu, P. O., Adogun, P. O., Azuikwe, E. C., & Ohamaeme, M. C. (2021). The prevalence of substance use among in-school and out-of-school adolescents: A comparative analysis in Anambra state, Nigeria. *Journal of Advances in Medicine and Medical Research*, 33(17), 131-143
- Babu, B. K., Daniel Pilli, V. S-N. S., & Deepthi, K. (2024). AI-Powered Interventions: Revolutionizing Drug Abuse Prevention. *Journal of Drug and Alcohol Research*, 13(2), 67-78
- Bali, B., Garba, E. J., Ahmadu, A. S., Takwate, K. T., & Malgwi, Y. M. (2024). Analysis

- of emerging trends in artificial intelligence for education in Nigeria. *Discover Artificial Intelligence*, 4(1), 122-134. DOI:10.1007/s44163-024-00163-y
- Chopra, H., Baig, A. A., & Gautam, R. K. (2022) Application of artificial intelligence in drug discovery. *CurrPharm Des*, 28(1), 2690–2703.
- Federal Government of Nigeria, FGN (2014). *National Policy on Education*. Lagos: NERDIC
- Fullan, M., Azorín, C., Harris, A., & Jones, M. (2023). Artificial intelligence and school leadership: challenges, opportunities and implications. *School Leadership and Management*, 1(1), 56 - 67. DOI:10.1080/13632434.2023.2246856.
- Gathumb, B., Patric, M., & Bloomquist, I. (2022). Monitoring of the future national result on adolescents drug use. Retrieved from <https://www.monitoringthefuture.org>
- Grat, A. (2021). Drug abuse among urban as compared to rural secondary school students in Kenya. *Journal of Drug and Alcohol Research*, 9(2), 45-57
- Hassan, I. I. (2019). Causes and effects of drug abuse among students of University of Abuja, Federal Capital Territory, Nigeria. Retrieved from <https://www.researchgate.net/publication/359867753>
- Hassanpour, S., Tomita, N., Langlotz, C. P., & Shah, N. H. (2019). Toward automatic prediction of social media user's substance use disorder treatment outcomes via image data. *Journal of the American Medical Informatics Association*, 26(2), 148–158. DOI:10.1093/jamia/ocy160
- Hotujac, A., Sagud, M., & Hotujac, I. J. (2021). Drug use among Croatian students. *College Anthropology*, 24(2), 61-68
- Imam, H. I. (2022). Causes and effects of drug abuse among students of University of Abuja, federal capital territory, Nigeria. Retrieved from <https://www.researchgate.net/publication/359867753>
- Ibrahim A. G., Hashimu S., & Yabo, S. (2022). The social impact of drug abuse on student academic performance in Umaru Ali Shinkafi Polytechnic Sokoto State Nigeria. *Journal of Arts and Science*, 14(2), 1118-5953.
- Igbokwe, I. C. (2023). Application of Artificial Intelligence (AI) in Educational Management. *International Journal of Scientific and Research Publications*, 13(3), 300-307
- Johns, E. B., Sutton, W. C., & Cooley, B. A. (2021). *Health for Effective Living* (6th ed.). McGraw- Hill baseline
- Kim, Y., Kang, J. & Kim, N. (2023). Design and implementation of an AI-powered virtual assistant for relapse prevention in drug addiction treatment. *J Healthcare Eng*, 2(1), 1-10.
- King, M. R. (2023). The future of AI in medicine: a perspective from a Chatbot. *Ann Biomed Eng.*, 51(2), 291–295. DOI:10.1007/s10439-022-03121-w.
- Nasiru, B. S., Lydia, A., Alexander, A., & Maru, S.A. (2019). The perception of youth on the effects of substance abuse in Sokoto Nigeria. *World Journal of Pharmaceutical and Medical Research*, 5(9), 122-129.
- Nnaemezie, N. O., & Nwangwu, J. C. (2024). Secondary school students' knowledge and attitude towards drug abuse in Anambra state, Nigeria. *International Journal of Research Publication and*

- Reviews*, 5(5), 11341-11347
- Nnanna, N. C., Okpan, S. O., & Nkata, R. A. (2022). Methamphetamine (Mkpuru-miri) prevalence in Southeastern Nigeria: Exploring peoples' perception of public flogging as a control measure. *African Journal of Drug and Alcohol Studies*, 21(1), 43-52
- Nyabuti, S., & Mohammed, M. (2024). AI's potentials in the fight against drug abuse. Retrieved from www.nacada.go.ke
- Obidike, N. F. & Igwe, J. U. (2024). Utilization of artificial intelligence in prevention of drug abuse among youths in Ekwusigo LGA of Anambra state. *Mass Media Review*, 6(1), 1 - 15
- Ojule, I. N., & Te-Erbe, H. B. (2022). Prevalence and predictors of substance use disorder among urban and rural secondary school students of Khana, Rivers State, Nigeria. *European Journal of Public Health Studies*, 5, 83–97.
- Onuora, I. J., Obi-Ezeani, C. N., Onuike, A. I., Umeaba, N. G., Nnoruka, E. O., & Chiedu, I. C. (2025). Prevalence and determinants of substance use among residents aged 15 years and above in Onitsha, Anambra state. *Global Journal of Research in Medicine Science*, 5(3), 121- 127
- Ojonuba, H. S., Abdul Rahman, H., Zaremohzzabieh, Z., & Mohd, Z. N. A. (2023). The Effectiveness of an Empowerment Education Intervention for Substance Use Reduction among Inner-City Adolescents in Nigeria. *Int. J. Environ. Res. Public Health*, 20(1), 3731-3742
- Okafor, I. P. (2020). Causes and Consequences of Drug Abuse among Youth in Kwara State, Nigeria. *Canadian Journal of Family and Youth*, 12(1), 2020, pp. 147-162
- Olatunde-Aiyedun, T. G. (2024). Artificial intelligence (AI) in education: integration of AI into science education curriculum in Nigerian universities. *Int J ArtifIntell Digit.*, 1(1), 14-24
- Oluwasanmi, L.A. (2022). Effects and consequences of drug abuse. *Journal of Applied Psychology*, 3(3), 47–56.
- Roberts, R. E., Odumodu, C. N., & Uye, E. E. (2025). Substance abuse behaviour among youths: The predictive effects of social media and peer pressure. *Happiness Journal of Psychology and Islamic Science*, 8(2), 113–124. DOI:10.30762/happiness.v8i2.2614
- Sarkingobir, Y., Waheed, S. A., & Gilani, N. (2023). Drugs Abuse among Adolescent School Dropouts in Sokoto State, Nigeria: Exploring Adverse Effects on Academic Potential and Relations. *International Journal of Innovation in Teaching and Learning (IJITL)*, 9(2), 73-93.
- Sheikh, M., Bajwa, F., Jawed, M., & Mir, A. B. (2024). Survey Research: Descriptive and Analytical Power, Types and Usages. *International Journal of Politics & Social Sciences Review (IJPSSR)*, 3(3), 231-239
- Tambari, I., Aliyu M., & Sulaiman, B. (2023). Substance abuse effect on cognitive ability of selected youngsters studying in Gwadabawa, Sokoto State, Nigeria. *ALYATECH Journal of Education Technology*, 2(1), 58-67
- Umar, A., Garba, A., & Jibrilu, A. L. (2023). The effect and influence of drug abuse to the students of higher institutions in their educational attainment in tertiary institutions in Katsina State, Nigeria. *International Journal of Innovative*

- Development and Policy Studies*, 11(2), 52-64.
- Unlu, A., & Subasi, A. (2025). Substance use prediction using artificial intelligence techniques. *Journal of Computational Social Science*, 8(2), 21-31. DOI:10.1007/s42001-024-00356-6
- World Drug Report (2022). Annual review of major developments in drug market. Retrieved from www.unodc.org.
- World Drug Report (2023). Annual review of major developments in drug market. Retrieved from www.unodc.org.
- Zhou, X., Snoswell, C. L., Harding, L. E., Bambling, M., & Smith, A. C. (2021). The role of digital health technologies in the detection and management of mental health conditions: A scoping review. *JMIR Mental Health*, 8(4), 572-584. DOI:10.2196/26572.