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Generativity is a Core Value of the ESJ: A Decade of Growth

Erik Erikson (1902-1994) was one of the great psychologists of the 20th century¹. He explored the nature of personal human identity. Originally named Erik Homberger after his adoptive father, Dr. Theodore Homberger, he re-imagined his identity and re-named himself Erik Erikson (literally Erik son of Erik). Ironically, he rejected his adoptive father's wish to become a physician, never obtained a college degree, pursued independent studies under Anna Freud, and then taught at Harvard Medical School after emigrating from Germany to the United States. Erickson visualized human psychosocial development as eight successive life-cycle challenges. Each challenge was framed as a struggle between two outcomes, one desirable and one undesirable. The first two early development challenges were 'trust' versus 'mistrust' followed by 'autonomy' versus 'shame.' Importantly, he held that we face the challenge of **generativity** versus **stagnation in middle life**. This challenge concerns the desire to give back to society and leave a mark on the world. It is about the transition from acquiring and accumulating to providing and mentoring.

Founded in 2010, the European Scientific Journal is just reaching young adulthood. Nonetheless, **generativity** is one of our core values. As a Journal, we reject stagnation and continue to evolve to meet the needs of our contributors, our reviewers, and the academic community. We seek to innovate to meet the challenges of open-access academic publishing. For us,

¹ Hopkins, J. R. (1995). Erik Homburger Erikson (1902–1994). *American Psychologist*, 50(9), 796-797. doi:<http://dx.doi.org/10.1037/0003-066X.50.9.796>

generativity has a special meaning. We acknowledge an obligation to give back to the academic community, which has supported us over the past decade and made our initial growth possible. As part of our commitment to generativity, we are re-doubling our efforts in several key areas. First, we are committed to keeping our article processing fees as low as possible to make the ESJ affordable to scholars from all countries. Second, we remain committed to fair and agile peer review and are making further changes to shorten the time between submission and publication of worthy contributions. Third, we are looking actively at ways to eliminate the article processing charges for scholars coming from low GDP countries through a system of subsidies. Fourth, we are examining ways to create and strengthen partnerships with various academic institutions that will mutually benefit those institutions and the ESJ. Finally, through our commitment to publishing excellence, we reaffirm our membership in an open-access academic publishing community that actively contributes to the vitality of scholarship worldwide.

Sincerely,

Daniel B. Hier, MD

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Abstract

With the progress of AI-driven technologies, machine translation has significantly impacted tourists' travel experiences by transforming how they engage with or interpret language at their destinations. However, the body of empirical literature on the benefits, obstacles, and future prospects of these emerging technologies in tourism and hospitality is yet to be fully explored. This study aims to explore and outline 320 travelers' perceptions of machine translation. A distinctive sample of Italian travelers, along with their current and potential customers in the digital environment, is analyzed. Descriptive statistics was used to present the number and main characteristics of travelers' perceptions about AI-based machine translators. Travelers were grouped into two clusters based on perceived benefits and implementation challenges. The results contribute to the growing literature on AI-based machine translators in the tourism and hospitality industries and offer managerial insights by mapping the benefits, challenges, outlook, and maturity levels of machine translations. This is among the first studies exploring the tourism and hospitality approaches adopted by travelers to manage their interactions with AI-based machine translations while traveling abroad.

Keywords: Machine translation, artificial intelligence, tourism and hospitality, destination

Introduction

Technological progress, especially in artificial intelligence (AI), has significantly impacted the tourism and hospitality industries (Gurso & Cai, 2025).

The development of AI-driven technologies has accelerated the development of machine translation, providing a broad array of translation services, including text, voice, and even image translations (Alhaj, 2024). AI-based machine translations have become increasingly prevalent in the travel and tourism sectors. In particular, AI-based machine translators have significantly influenced tourists' travel experiences (Wang & Kirilenko, 2024) by changing how they interact with or comprehend language at their destinations (Carvalho et al., 2023). Research has demonstrated that utilizing technological tools in translation reduces cognitive effort while enhancing speed, efficiency and consistency (Alsaawi, 2024).

With the rapid pace of globalization and increasing intercultural mobility (Fan et al., 2022), tourists often face encounters with different cultures and communication as part of their cross-cultural experiences. However, tourists from various cultural and linguistic backgrounds, especially those with limited language proficiency in the local language of their travel destination, may experience challenges during their trips, as international travel involves interactions between speakers of different languages (Higgins & Ikeda, 2021). The inherent linguistic diversity in international tourism creates language barriers that disrupt smooth intercultural communication (Liu et al., 2023), and language differences can lead to misunderstandings and miscommunications (Fiset et al., 2024). The inability to speak the local language or having limited foreign language skills can result in a wide range of interpersonal difficulties, often accompanied by heightened anxiety or discomfort (Lu et al., 2021). Since language barriers can lead to dissatisfaction among tourists and negatively affect their overall travel experiences (Kim et al., 2020), overcoming these obstacles is crucial.

In this context, AI-based machine translation could be considered an effective tool for assisting tourists with communication challenges during travel to international destinations (Carvalho et al., 2023). Given the substantial impact of machine translation on how tourists engage in multilingual environments and foster intercultural communication with people from different linguistic and cultural backgrounds (Stewart, 2019), it can serve as an effective aid for tourists with limited local language skills, helping them bridge language gaps (Liebling et al., 2020). Tourists may face greater

challenges when evaluating the quality of machine translation in non-native languages, especially when they lack proficiency in those languages.

In the field of tourism research, there is a dearth of research that delves into how tourists experience machine translations and how AI-based machine translations play a role in shaping their travel experiences. It is important to understand how travelers perceive the use of AI-based machine translation in international communication because machine translations not only have revolutionized the way tourists communicate during overseas travel, but they can also affect tourists' performance and the overall quality of tourist experiences (Carvalho et al., 2023).

This study will explore the role of AI-based machine translations in affecting tourist experiences and provide new insights into the usage practices and limitations of AI-based machine translations.

Research outcomes should shed light on analyzing the impact of AI-based machine translations on travelers, understanding how machine translations can influence travel decisions, concluding by offering practical recommendations for tourism commerce, and communicating the desired features of AI-based machine translations that influence travelers' purchase intention. Consequently, there are three specific objectives in this study:

1. Investigate the usage of tools of AI-based machine translation and the perception of the effectiveness of AI-based machine translations. This objective provides much better insight into the existing partial and fragmented knowledge in current trends in AI-based language processing applications and their application in improving the quality of the tourism experience;
2. Identify strengths, weaknesses, opportunities and threats of AI-based machine learning;
3. Provide managerial implications for practitioners and marketers of the tourism sector to increase the AI-based machine translations' ability to attract floating consumers thereby achieving a competitive advantage.

Literature Review

Machine translation and artificial intelligence (AI) have seen significant advancements in recent years, profoundly impacting translation and cross-border communication. Modern, advanced technology is commonly used for tasks like creating translation memories, aligning texts, managing terminology, checking spelling and grammar, accessing and searching electronic corpora, and performing translations. Additionally, the development of Neural Machine Translation (NMT) has made it possible to interpret context and linguistic nuances, leading to more accurate and contextually informed translations. This rapid progress has opened up new opportunities in various fields, including tourism and hospitality, where the

demand for cross-language communication and cultural exchange continues to grow.

A major advantage of these technologies is their ability to quickly and efficiently produce translations. By automating the complex process of language conversion, they facilitate the rapid dissemination of information to a global audience, greatly minimizing the time and effort required. Additionally, AI technology plays a key role in maintaining consistency in both language and style across diverse content, which is essential for ensuring clarity in tourism-related communication.

Despite these benefits, machine translation and AI technology have limitations that can affect the quality of translated tourism messages. One significant drawback is the potential for inaccuracies and mistranslations, especially when dealing with culturally specific references and idiomatic expressions. Additionally, the technology still struggles to fully adapt to the target audience, take into account local cultural norms, or handle languages that are less commonly spoken, such as those beyond English, German, or Spanish.

Recent academic studies have explored the transformative impact of advanced AI models, particularly ChatGPT, on translation and content retrieval in the tourism sector. For instance, ChatGPT's effectiveness in translating English into Hindi, Telugu, and Kannada can assist tourists in India's diverse linguistic landscape (Kolar & Kumar, 2023). Their findings indicated that while Hindi translations were notably accurate and fluent, Telugu translations were less effective. Furthermore, several studies examined ChatGPT's potential contributions to various tourism operations, including accommodation, transportation, and food services (Erul & Işın, 2023). They concluded that ChatGPT could significantly enhance customer service by providing instant assistance and personalized recommendations, thereby improving the overall tourist experience.

However, despite these advancements, challenges persist. The authors highlighted potential risks associated with ChatGPT's application in tourism, such as the dissemination of inaccurate information and the lack of human empathy in customer interactions (Carvalho & Ivanov, 2024). They emphasized the necessity of human oversight to mitigate these issues and ensure the delivery of reliable and culturally sensitive information to travelers.

In summary, while AI technologies like ChatGPT offer promising enhancements in translation and information retrieval within the tourism industry, it is crucial to balance automation with human intervention to address inherent limitations and uphold service quality.

Methodology

To investigate our research propositions, researchers adopted an exploratory descriptive approach, which emphasizes identifying patterns in data rather than testing theory-driven hypotheses (Mason et al., 2010). This approach is suitable when a field is relatively new or underexplored (Denzin & Lincoln, 2005) and when there is limited or no existing theory to comprehensively explain the phenomenon (Truong et al., 2020). Exploratory descriptive research aims to propose causal relationships by examining and outlining connections between variables, helping to build a foundation for understanding those relationships before formally testing them through explanatory research. This research design has been successfully utilized in many tourism and hospitality studies.

An exploratory design is essential in the initial stages of investigating a phenomenon in the tourism and hospitality field (Pantano & Servidio, 2011), especially for emerging and widely discussed technologies. The limited practical and theoretical understanding of machine translations in tourism and hospitality inspired our methodological approach. Additionally, there have been numerous calls in the tourism and hospitality literature for more empirical observations and descriptions of machine translation adoption and usage (Lee and Lee, 2024).

An introduction to the questionnaire was just below the seven questions on the cover page, including an assurance to respondents that their responses would be kept confidential.

The questionnaire has three sections and five two questions. The first section included demographic questions. Another section asked respondents to report their travel habits in a series of dichotomous questions. To explore the relationship between respondents and usage of IA-based machine translations for travel, the intensity has been measured using a 5-point Likert scale that varies between not useful at all = 5 to very useful = 1. The remainder of the questionnaire focused on the general knowledge of AI-based machine translators and their influence on holiday, including an exhaustive list of strengths, weaknesses, opportunities and threats.

The questionnaire was written in Italian because all respondents are Italian to limit nationality and social influence. To facilitate interviews, participants lived in Italy and used smartphone apps or at least had experience and knowledge of using smart devices.

An eleven-page questionnaire was used as the survey instrument and it was developed with four main constructs including scale items. Further, to collect required information from many respondents, interviewers used a face-to-face survey method.

Two-period pretests were conducted to test the questionnaire among tourism experts to enhance the length of the questionnaire. The validity of the

research instrument can be appraised by a panel of able professionals whose expertise can judge whether the scale measures what it intends to measure and the questions are clear (Zikmund et al., 2013).

The first pretest (n = 32) employed interviews with experts in restaurants and hotels. Some basic formatting issues were addressed because of the pretest. A second pretest (n = 12) was conducted with experts from travel agencies. Modifications and reviews, including a radical change of seven questions, were made because of this second test.

Based on the input received, modifications and reviews, including the cancellation of a few items in the questionnaire and a radical change of seven questions, were done and wording was changed to enhance understandability.

This study adopted a one-stage questionnaire survey approach to address concerns about non-temporal causal relationships in cross-sectional studies. Data collection occurred in September 2024. Questionnaires were sent out through email, and steps were implemented to verify IP addresses and avoid duplicate submissions. A total of 380 completed questionnaires were received, resulting in a response rate of 46.38%. Respondents were explicitly asked to reflect on the online context when filling out the responses to the questionnaire items. Fifty responses were eliminated due to their non-random missing value. The non-response biases were tested and compared the “early” and “late” respondents’ responses, based on the date of the received replies to the questionnaire (Tjuatja et al., 2024). Useable responses in the sample set from the face-to-face survey, from the total of 320 collected surveys (Table 1).

The data for the main study were collected, coded, and entered into the SPSS (Statistical Product and Service Solutions) program and tested via descriptive statistics.

Table 1. Descriptive information of the sample

Item		Per-cent (n) 100 (320)
Sociodemographic characteristics		
Gender	Male	37,30 (119)
	Female	62,70 (201)
Age (20-over 60)	20-29	29,68 (95)
	30-39	25,02 (80)
	40-49	18,12 (58)
	50-59	17,18 (55)
	Over 60	10 (32)
Nationality	Italian	100 (320)
Origin	Milan	91,88 (294)
	Milan suburbs	8,12 (26)
Relationship status	Single	20,94 (67)
	Living with another	16,56 (53)
	Married	50,31 (161)
	Widowed	0 (0)

	Separated Divorced	9,69 (31) 2,5 (8)
Education completed	High School Undergraduate Graduate Other	28,13 (90) 33,75 (108) 25,63 (82) 12,50 (40)
Occupation	Not employed Student Self-employed Professional Work in a firm Other	1,56 (5) 30,31 (97) 3,75 (12) 42,5 (136) 15,00 (48) 6,88 (22)
Vacation characteristics		
Vacation destination	Italy EU Outside EU	92 (420) 4,84 (25) 3,16 (10)
Principal means of transport	Ferries and boats Plane Train Rental car Personal car and motorbike	5,4 (25) 7,2 (33) 13,7 (62) 5 (23) 68,7 (312)
Motivations	Scout Family Sport Religion Business Education Culture and leisure	0,4 (2) 38,2 (174) 8 (36) 1,7 (8) 4,1 (19) 28,7 (131) 18,9 (85)

Findings and discussion

The results of this study yield several insights that confirm previous findings and shed light on the future of AI-based machine translations in tourism and hospitality.

Most of the respondents consider it very important to communicate in a foreign language while traveling. 82.6% of the participants reported encountering communication difficulties in a foreign country, but they believe that language barriers are not a major obstacle to travel. During their trips, many people use AI-based translation apps, such as Google Translate and ChatGPT, mainly to translate images (45.7%) and for voice translation (41.3%). Only 13% of the sample use them to translate messages or emails.

The use of AI-based translation software has allowed 52.2% of people to solve language misunderstandings, while 54.3% believe it increases independence while traveling. Only 34,8% of the sample believe it improves tourism experience.

Despite the use of intelligent translation software, most people believe it can never replace learning a foreign language. While traveling, people

primarily use Google Translate and ChatGPT to read tourist information and menus (65.2%) or to communicate with locals (47.8%).

However, the accuracy of translations is still a topic of discussion due to the immaturity of computer algorithms and cultural differences. Additionally, 71.7% of respondents expressed concerns about personal data security, believing that there are risks, but that these risks can be managed with proper data security safeguards.

The questions to the open questions proposed in the questionnaire about strengths, weaknesses, opportunities and threats are interesting. Out of a total of 145 responses, there are some recurring strengths, weaknesses, opportunities and threats that many respondents are interested in (Table 2).

Table 2. Strengths, weaknesses, opportunities and threats of AI-based machine translations

Strengths	-Speed and efficiency: machine translation can process texts and speech almost instantly, reducing the time needed to translate documents or communications. This is particularly useful in business contexts, travel, or emergencies. -Affordability: many AI-based translation tools, such as Google Translate or DeepL, are free or require a low-cost subscription. This makes them accessible to private users, businesses, and organizations of all sizes. -Multilingual support: AI tools can translate between dozens or even hundreds of languages, including less common dialects, helping bridge the language gap in many areas around the world.
Weaknesses	-Limited precision and quality: despite advancements, IA-based machine translations can contain errors, especially in complex or technical texts. There are still challenges in translating idioms, slang, or creative content such as poetry. -Lack of cultural context: AI struggles to grasp the cultural or emotional context of a phrase. Literal translations or misinterpretations can lead to misunderstandings, particularly in sensitive situations. -Dependence on data: the quality of translations heavily depends on the quantity and diversity of the data used to train the models. Languages that are less represented in datasets may receive less accurate translations.
Opportunities	-Expansion of global markets: AI-based translations enable businesses to communicate with international customers without language barriers, opening new commercial opportunities. -Integration with emerging technologies: AI can be combined with emerging technologies like augmented reality (AR) or virtual reality (VR). For instance, tourists could use AR devices to translate street signs or menus in real-time. -Specific sectors: the development of AI models tailored for sectors such as law, medicine, or engineering can lead to more accurate and useful translations for professionals and organizations.
Threats	-Growing competition: The increasing number of AI-based translation service providers can make it challenging for businesses to differentiate themselves and maintain market share. -Privacy concerns: Translation tools that process sensitive data could compromise user privacy or be vulnerable to security breaches.

	-Risk of misunderstandings: Translation errors in critical contexts (e.g., medical or legal) can have serious consequences, leading to misunderstandings or wrong decisions.
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Intelligent translation apps are important tools for travelers, primarily used to communicate with locals, translate menus, and obtain tourist information, somewhat enhancing the comfort of the travel experience. However, due to the current immaturity of computer algorithms and cultural differences, translation errors may occur. Additionally, some tourists have concerns about data security, fearing potential privacy breaches. Despite this, the questionnaires indicate that the use of AI-based translation tools will never replace learning and knowing a foreign language.

Conclusions

Previous research demonstrated that AI machine translations significantly influence the experience that a tourist perceives or expects from tourism products or services. Furthermore, tourist's experiences could change across different countries. While a growing body of research has explored the perception of AI machine translations (Carvalho et al., 2025) and the experiences of travelers, there has been no research that reveals several suggestions that could be applied by manufacturers of AI-based translation devices to improve the product and, consequently, enhance the consumer experience. First and foremost, improving the accuracy of translations, as it is not always guaranteed, was a key point. It is therefore recommended that providers of AI-based translators invest further in optimizing algorithms to improve precision. Regular updates to language databases and the introduction of models that consider cultural nuances could reduce errors and enhance the user experience. Concerns about data security are evident among users. Therefore, it is essential that AI-based translation applications adopt strict data protection measures, such as encryption and transparent privacy policies. This way, users will be more willing to use these tools without the fear of compromising their privacy. Additionally, to improve the user experience, translation apps should be easily integrable with other device functions, such as the camera, messages, and voice calls. A single app that offers real-time voice, text, and image translations could be very useful, eliminating the need to switch between different applications. By implementing these improvements, AI-powered translation tools could become even more effective and appreciated by travelers, enhancing the overall travel experience and increasing user trust. However, travelers still perceive the knowledge of a foreign language as highly necessary, and how these new AI-based translator systems are not yet a primary tool for consumers to satisfy this need. In conclusion, there is no doubt that AI-powered automatic translators are a

breakthrough in terms of the tourism experience. They are an evolving and changing tool that is being refined year after year, ensuring smaller margins of error and an increasing number of translatable languages. This new tool could revolutionize the tourism sector, smoothing out language barriers that still exist today and also making the work of industry operators easier. The marketing efforts of the main producers of this service should, therefore, focus on continuously improving the product. In addition, they should tailor their sales approach to highlight the consumer's need to interpret a foreign language as quickly and accurately as possible, while also making their own needs more understandable in a country where they do not speak the local language. While this research offers important insights, it does have some limitations. The study was primarily conducted with participants from Italy, which could affect how widely the results can be applied. Moreover, nearly half of the participants were in their 20s and 30s with strong digital skills. Different age groups often have distinct views on machine translation, especially since older adults may struggle with it due to their unfamiliarity or limited experience with such technology (Panayiotou et al., 2019). The study also raised additional questions and hypotheses that should be explored in future research. To begin with, the implication of the subject matter on the acceptability of the visitors in relation to the host communities, such as locals, retailers, tourism employees, and other tourists, should form part of future research (Lee & Lee, 2025). Further studies could explore how individual characteristics, such as cultural backgrounds or linguistic knowledge, as well as age, influence opinions on machine translation usage in tourism and hospitality. Gaining an understanding of these differences could offer valuable insights into how different demographic groups perceive and use machine translations. Furthermore, as artificial intelligence technology continues to advance, the accuracy of machine translations in grammar and vocabulary translation is improving (Chen, 2023). As a result, tourists' perspectives on machine translations may change or evolve over time. Therefore, a longitudinal study would be useful for capturing a more nuanced understanding of context-dependent and individual-specific views on machine translations in the tourism and hospitality sector.

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Prácticas de Sustentabilidad en Restaurantes de la Ciudad de Chilpancingo: Retos y Oportunidades

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Resumen

La industria restaurantera es sin duda una actividad importante para el desarrollo económico, por lo que su relación con la sustentabilidad debe ser un elemento necesario de analizar para desarrollar acciones en beneficio del medio ambiente, la organización y los consumidores. En el caso de la ciudad de Chilpancingo, no se han realizado estudios de la sustentabilidad y su relación con la industria restaurantera, por lo que es importante hacer los diagnósticos correspondientes, para obtener información importante. El objetivo de la investigación es conocer las prácticas en materia de sustentabilidad que los restaurantes de Chilpancingo realizan en tres categorías, gestión de residuos, menús y ahorro agua y energía. El tipo de investigación es cuantitativa, con enfoque exploratorio, para obtener la información se diseñó un cuestionario de opción múltiple, el cual fue aplicado a dueños y administradores de los diferentes establecimientos de alimentos como restaurantes, pozolerías y marisquerías, la aplicación del cuestionario fue de manera digital por medio de tableta y laptop, previa cita con el encuestado. Como resultados se tiene que: no existe una cultura sobre la sustentabilidad en los dueños, empresarios o administradores de los negocios de alimentos considerados en el estudio, aunque realizan acciones en materia sustentable estas no están alineadas a la filosofía organizacional o a la política empresarial. El mayor enfoque sustentable que realizan los restaurantes está ligado al consumo de energía, ahorro y uso de agua, mientras que las cuestiones de menús y alimentos

sustentables es poca la participación, así como en el caso de la gestión de los residuos.

Palabras clave: Restaurantes, sustentabilidad, estrategias

Sustainability Practices from Restaurants in Chilpancingo: Challenges and Opportunities

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Abstract

The restaurant industry is without a doubt a significant activity for the development of the economy, which implies that its relationship with sustainability is an element that must be analyzed in order to develop strategies that would benefit the environment, the organization itself, and its consumers. In the particular case of Chilpancingo, studies regarding the relationship between sustainability and the restaurant industry have never been made, which makes it important to carry out the corresponding diagnosis in order to obtain pertinent information. This research aimed to recognize the practices regarding sustainability that restaurants in Chilpancingo carry out in three different categories: waste management, menus, and water and electrical power saving. The research used a quantitative approach with an exploratory focus; in order to obtain the data, a multiple-choice survey was designed and administered to restaurant owners and managers from different food-related businesses, such as regular restaurants, pozole restaurants, and seafood restaurants. This survey was administered digitally through tablets and laptops during previously scheduled appointments with the respondents. The results demonstrated that there is no acquaintance with sustainability from the owners, businesspeople, or managers who took part in this research; despite the fact that they carry out activities related to sustainability, these practices are not based on organizational philosophies or corporate policies. The most relevant focus related to sustainability carried out by restaurateurs is in regards to energy consumption and the use and saving of water, while matters related to menus and sustainable food are visibly disregarded, as well as the disposal of wastes.

Keywords: Restaurants, sustainability, strategies

Introduction

En la actualidad todas las organizaciones de cualquier tipo y tamaño deben de abordar las necesidades y situaciones que a nivel local y mundial existen, ello con la finalidad de estar acorde a las tendencias, los cambios y exigencias de la sociedad, para dar satisfacción a las necesidades que los consumidores tienen.

De acuerdo a Fischer, (2017, p 13) el concepto de sustentabilidad es una tendencia de los gobiernos, los ciudadanos y las empresas, quienes están conscientes sobre la situación actual en el mundo, el impacto de la sustentabilidad abarca tres aspectos, social, ambiental y económico, por ello la importancia de aplicar este concepto a los restaurantes vistos estos como estructuras organizacionales.

Este estudio aborda desde una visión local, las prácticas, así como las oportunidades que se pueden desarrollar a partir de prácticas sustentables en los restaurantes de la ciudad de Chilpancingo, México, dado que no se han hecho estudios relacionado a ello, así como los posibles beneficios económicos o comerciales que se pueden derivar de estas prácticas importantes en la actualidad.

De acuerdo a datos del INEGI (2024) en Chilpancingo existen un total de 182 establecimientos catalogados como restaurantes de diferentes categorías y especialidades, lo que significa un número importante de empresas dedicadas a la industria restaurantera, por ello se debe identificar la relación con la mercadotecnia a partir del desarrollo de productos, servicios, necesidades de los consumidores, tendencias de consumo y la comunicación comercial de la sustentabilidad.

Desde el contexto económico la ciudad de Chilpancingo es la segunda ciudad en importancia en el estado de Guerrero, en ella se desarrollan diversas actividades como el comercio, las actividades gubernamentales y servicios, los cuales propician la actividad restaurantera que dan servicio diversos segmentos de mercados como son los habitantes y visitantes de la ciudad.

Hay factores externos que han obligado a las empresas a reformular sus estrategias empresariales, a fin de estar acorde a las tendencias del mercado, caso concreto es la pandemia de 2019, Alsetoohy et al., 2021; Mohammed, 2022; State & Popescu, 2022, mencionan que desde el COVID-19 se han desarrollado cambios en los hábitos y prácticas alimentarias, adoptando alimentos locales y prácticas ligadas a la sustentabilidad. Lo anterior es una oportunidad de la industria restaurantera local para desarrollar estrategias de mercado para atender las necesidades del mercado, las tendencias en materia sustentabilidad para ser más competitivos.

La sustentabilidad también está asociada a las formas de hacer Responsabilidad Social Empresarial (RSE), a nivel local se tienen algunos datos significativos de estudios en restaurantes, Susano, et al (2020), dicen que

en restaurantes de Chilpancingo se desconocen algunas acciones relacionadas con lo sustentable, lo ambiental, y la relación con el marketing como una estrategia de negocio. En este sentido Vargas (2017), dice que los consumidores conciben a la RS en las empresas como una manera estratégica para desarrollar productos y acciones que incidan en el mejoramiento competitivo y el posicionamiento empresarial.

Por ello resulta importante conocer las acciones en materia de sustentabilidad que los restaurantes de la ciudad de Chilpancingo realizan, desde aspectos como productos, ahorro de energía, reutilización de insumos, ahorro de agua, entre otros, como parte de sus estrategias competitivas para dar respuesta a las necesidades y exigencias sociales.

En México la Secretaría de Turismo (SECTUR), estableció un reconocimiento desde al año 2012 conocido como Distintivo S (Sustentabilidad), en el cual se reconoce a las buenas prácticas sustentables en el desarrollo de proyectos turísticos y la obligación de las empresas en materia de sustentabilidad, dentro del universo de empresas se encuentra la categoría de restaurantes, con ello se busca fortalecer el desempeño de las empresas con la incorporación de dos herramientas: un diagnóstico, así como un sistema de medición de energía, agua, residuos y carbono.

En el caso de los restaurantes de la ciudad de Chilpancingo en la actualidad ninguno de los restaurantes cuenta con el reconocimiento de dicho distintivo, por lo que resulta importante identificar los motivos o factores del porqué no se cuenta con este reconocimiento y en un futuro incidir en la gestión de dicho reconocimiento.

Para este trabajo, el objetivo es conocer las prácticas en materia de sustentabilidad que los restaurantes de Chilpancingo realizan, así como la posibilidad de generar estrategias de mercadotecnia a través de la sustentabilidad.

Alvarenga, (2023), menciona que se debe generar una cultura alimentaria y gastronómica (gourmetización) en la región, dado las tendencias gastronómicas, los nuevos nichos de mercados y las exigencias sociales. En este sentido dada la riqueza gastronómica de la ciudad, se han identificado establecimientos de comida de diferentes tipos y categorías como es el caso de las pozolerías, las cuales son típicas en el estado de Guerrero y en particular Chilpancingo, así como las marisquerías las cuales han tenido mucho auge en los últimos años, debido a las exigencias del mercado y la cercanía con las costas, así como restaurantes temáticos de comida regional.

La sustentabilidad y prácticas sustentables en los restaurantes

De acuerdo a De Niz, et al (2023), los restaurantes deben tomar decisiones que pueden contribuir positiva o de manera negativa a la

sustentabilidad ambiental, como es el caso de la selección de ingredientes y su origen hasta la gestión de residuos y consumo de energía.

Por otra parte, Adams (2008) considera que los restaurantes no solo se limitan en la satisfacción de necesidades alimenticias de sus consumidores, también tienen impacto significativo en los temas de la sustentabilidad ambiental.

Por ello, como mencionan Alsetoohy et al., (2021), la industria restaurantera debe de tener un equilibrio entre la oferta y demanda de alimentos de calidad y la experiencia gastronómica, a través de la adopción de prácticas sustentables.

Existen aportaciones significativas que hablan sobre el tipo de acciones que los restaurantes deben realizar para poner en práctica la sustentabilidad en los establecimientos de negocios de comida, en este caso los restaurantes. En este sentido. De Niz, et al (2023) mencionan que son tres categorías: a) gestión de residuos, b) menús y alimentos sustentables c) eficiencia de recursos como agua y electricidad).

Gestión de Residuos

La generación de desechos son acciones que los restaurantes enfrentan día con día, en este sentido, de acuerdo a Martín-Ríos et al., (2022), la gestión de ellos debe ser una actividad que aminore el impacto ambiental por parte de los restaurantes a través de reducir, reutilizar y reciclar los residuos generados en sus operaciones diarias. Por ejemplo, Da Silva et al., (2022) y Teixeira et al., (2020) menciona que muchos restaurantes para evitar desperdicios ajustan las cantidades de alimentos de acuerdo a la demanda y realizan almacenamiento adecuado.

Por otra parte, Martín-Ríos et al., (2022) mencionan que una manera de contribuir a la sustentabilidad en los restaurantes es la donación del exceso de alimentos a instituciones que lo requieran, para ello se debe hacer una concientización y promoción entre su personal y los consumidores.

Con respecto al reciclaje como gestión de residuos, Baloglu et al., (2022) indican que los restaurantes deben de poner en prácticas acciones como separación de residuos clásicos y el uso de productos biodegradables o compostables y no renovables, como una nueva forma de contribuir a la sustentabilidad.

De Niz, Ángel y Nájera Areli (2023), propone seis acciones relacionadas con la gestión de residuos en restaurantes, las cuales son importantes para llevar implementar la sustentabilidad, como son realización de compostas a partir de desechos de comida, uso correcto de aceite quemado, disminución de desperdicios orgánicos, reciclaje de residuos sólidos, concientización a los empleados sobre gestión de residuos y la evaluación de las prácticas de gestión de residuos.

Menús y Alimentos

En cuestión de la preparación los menús y alimentos como elementos tangibles existen propuestas y aportaciones relacionadas con la sustentabilidad. Remar et al., (2022) y Yoon et al., (2020), mencionan que los restaurantes deben de realizar prácticas relacionadas a la utilización en sus menús y alimentos producidos de manera naturales y orgánicos, para contribuir a los aspectos sustentables, así como información nutrimental para que los comensales tengan datos significativos y puedan tomar decisiones respecto a sus platillos.

En el caso de menús, además de las opciones saludables, existe la tendencia de demanda de nuevos productos de acuerdo a las necesidades y características de nuevos consumidores, como es el caso de platillos vegetarianos y veganos (Lamy et al., 2023; Niederle & Schubert, 2020). Para contribuir al fomento de productos saludables los restaurantes deben de evitar productos como frituras y alimentos procesados, para dar paso a los cocinados al vapor o al horno, lo que impacta en la sustentabilidad en el uso de aceite. Kaljonen et al., (2020).

Nigam & Kumari, (2018), enfatizan que se debe buscar una vinculación entre los productores locales y los restaurantes a fin de obtener de alimentos frescos y locales, lo que impacta en el menor uso de transporte y emisión de carbono.

Al consumir productos locales de acuerdo a De la Lama et al., (2020) y Camilleri, (2021), sin duda se apoya a los productores y se genera una sinergia económica, promoviendo la diversidad de sabores y productos de la región, además de aportar a los aspectos de sustentabilidad en los restaurantes. En cuestión de evitar desperdicios de alimentos en los restaurantes, Sakaguchi et al., (2017), mencionan que se deben de buscar estrategias como ofrecer diferentes tamaños de porciones, revisar lo que devuelven en los platos, evitar desperdiciar al hacer la producción, entre otras

De Niz, Ángel y Nájera Areli (2023), proponen seis acciones relacionadas con los menús y los alimentos: abastecimiento de hierbas y vegetales a través de jardines propios, no uso de fertilizantes químicos en jardines, presentación de información nutrimental de alimentos, opciones de menús y cocciones saludables, uso de productos orgánicos, naturales locales y porciones en platillos reducidas.

Eficiencia de recursos de electricidad y agua

Este tercer aspecto está relacionado con elementos como recursos naturales y energéticos, que impactan en el consumo de energía, agua y otros recursos, reduciendo el impacto ambiental de los restaurantes.

De acuerdo a Justa Energía (s.f). menciona que el sector de restaurantes muy heterogéneo por la diversidad de sus servicios, tamaños y tipología de los

edificios que albergan su actividad, los restaurantes tienen como principal fuente de energía la electricidad frente al gas natural u otros combustibles, siendo el equipamiento de cocinas el mayor consumidor de energía.

Los restaurantes deben de optimizar el uso del agua a través de instalaciones que permitan el tener un bajo flujo de agua en llaves de agua y sistemas de riego, realizar de manera constante la revisión de las instalaciones de agua, para dar mantenimiento y reparación a las fugas, con ello se contribuye a la concienciación de los recursos humanos respecto a la necesidad e importancia del uso del agua de forma responsable. Maynard et al., (2021).

Con respecto al ahorro de energía eléctrica, Baloglu et al., (2022) mencionan que se debe promover en los restaurantes acciones que permitan la reducción de energía eléctrica mediante uso de electrodomésticos ahorradores de energía, como hornos, refrigeradores y lavavajillas y utilización de iluminación LED en el establecimiento.

En este aspecto, Vaughn, et al., (2016), consideran la importancia de establecer acciones de ahorro de energía y agua; para ello se debe de hacer un diagnóstico del establecimiento de acuerdo a la función de su entorno, como acceso a tecnologías, capacitación y economía.

Finalmente, De Niz, et al., (2023), proponen tres acciones relacionadas con la eficiencia de recursos como agua y electricidad: uso y reciclaje de aguas residuales para jardinería, establecimiento de metas sobre el uso de agua residual y la eficiencia de electrodomésticos ahorradores de energía.

El consumidor sustentable

Desde el ámbito de la mercadotecnia se pueden clasificar o segmentar a consumidores de acuerdo a diferentes variables, categorías e indicadores a fin de tener un perfil y características, homogéneas o heterogeneas de los diferentes mercados. Susano, (2018).

De acuerdo a Hughner et al. (2007) los consumidores presentan características o motivaciones relacionados a los aspectos ambientales tiene relación con la preferencia por productos ecológicos, cuidado de la salud, la preocupación por el medio ambiente, el bienestar animal, la seguridad ambiental, apoyo a la economía local y la cocina tradicional.

Así en la actualidad, existe ya una conciencia acerca de los diferentes problemas ambientales en el mundo, en donde los consumidores requieren saber acerca del origen de los alimentos que consumen y las formas en las que se preparan los mismos, ello con la finalidad de evaluar y evitar un menor impacto en el medio ambiente, State & Popescu, (2022).

Por ejemplo, Fraj y Martínez (2006), explican que existen consumidores ecológicos, los cuales tienen estilos de vida con una conciencia ambiental, realizan acciones como el reciclaje, la selección de productos no contaminantes, participan en la protección del medio ambiente, se interesan

en empresas que realizan acciones medioambientales y que tengan productos que den experiencia ecológica a sus consumidores. En este sentido los millennials buscan establecimientos alimenticios como restaurantes que realicen acciones de responsabilidad ambiental y social, a través de información mediante redes sociales, ello debido a que estas características sustentables son parte de su estilo de vida y valores. Oke et al. (2023).

Atzori et al., (2018), indican que los consumidores y en especial las nuevas generaciones, exigen transparencia en la toda la cadena alimentaria (procesos de producción, transporte y distribución, procesos de cocción y preparación) a fin de conocer el impacto ambiental de los alimentos que consumen.

Por lo tanto, es importante para los restaurantes promover practicas más sustentables reflejadas en producir y preparar alimentos a fin de fomentar la adopción de decisiones informadas que beneficien tanto a la salud del planeta, como al bienestar de los consumidores. De Niz, et al. (2022).

En vista que la preocupación por el medio ambiente de los consumidores aumenta y sus decisiones son en torno a una conciencia más ecológica, la industria de restaurantes ha empezado a invertir y desarrollar productos y un mejor servicio en camino a lo ecológico aplicando nuevas prácticas, Cortez & Ospina, (2021).

Beneficios de la sustentabilidad en restaurantes

Riestra, J. (2018) menciona que la sustentabilidad tiene impactos en tres dimensiones: el aspecto social, el ámbito ambiental y la económica, esta última busca el impacto en el sector y el desarrollo económico, como procesos de producción limpios y eficientes, la generación de valor agregado a materias primas y la satisfacción de los consumidores. En este sentido la realización de actividades relacionadas con la sustentabilidad ambiental en los restaurantes, sin duda traerá beneficios económicos a dichos establecimiento de alimentos. (Kim & Hall, 2020).

En el caso de la relación entre lo sustentable y los beneficios para los restaurantes que practiquen estas acciones, Namkung & Jang (2013) comentan que deben de procurar estrategias de marketing verde, dichas acciones impactan en beneficios dentro del establecimiento, como una forma de cimentar buenos negocios y buenas acciones para el planeta

De Niz, et al., (2022), considera que los restaurantes tienen que desarrollar acciones relacionadas con la sustentabilidad y en especial del aspecto ambiental, ligadas a una visión y política empresarial y de negocio, contribuyendo de manera efectiva al tema sustentable.

Un ejemplo de beneficio económico a partir de las prácticas sustentables en los restaurantes es la que De Niz, et al., (2022) mencionan como la reducción de costos operativos, la adopción de ingredientes,

productos locales de temporada, se establecen relaciones con proveedores y se desarrolla la economía local.

Otro beneficio relacionado con la práctica de la sustentabilidad en los restaurantes es la que mencionan Iraldo et al., (2017) y Montesdeoca et al., (2020), que es la generación de una ventaja competitiva, ello a través de la identificación de segmentos de mercados específicos, la gestión de la lealtad y un mejor posicionamiento de la marca (restaurante).

Así, al asumir los restaurantes esta responsabilidad de acuerdo a Higgins & Wijesinghe, (2019), además de cumplir con las expectativas de los consumidores, también son un referente que aporta a la sociedad en prácticas de sustentabilidad para un mejor futuro con equilibrio y respeto medioambiental. Por ello el impacto puede ser la generación de una ventaja competitiva y diferenciación, que incidirá la atracción de nuevos clientes y el fortalecimiento de los existentes, Atzori et al., (2018).

Las acciones de sustentabilidad que los restaurantes realizan son sin duda valoradas por los consumidores, lo que se refleja en la preferencia de los restaurantes sustentables, en una mayor preferencia en el consumo, lealtad y mayor disponibilidad del pago de productos y servicios sustentables, Kwok et al., (2016).

Lee et al., (2020), consideran que los restaurantes al comunicar y educar a sus clientes sobre las prácticas sustentables, generarán impactos positivos sobre todo en la compra y consumo, así como la promoción sobre la importancia de la sustentabilidad en la cadena alimentaria.

Metodología

El trabajo se centra en una investigación cuantitativa, con un enfoque de tipo exploratorio, ello debido a que no se han hecho investigaciones de este tipo en los establecimientos de alimentos en la ciudad de Chilpancingo, por lo que es un estudio de tipo local.

Desde la perspectiva cuantitativa se pretende cuantificar las acciones en materia de sustentabilidad que los restaurantes de la ciudad de Chilpancingo realizan, ello con la finalidad de tener datos numéricos sobre las prácticas de gestión de residuos, menús y alimentos, consumo y ahorro de energía.

Para la determinación del universo, se recurrió a la base de datos denominada DINUE Directorio Estadístico Nacional de Unidades Económicas, del INEGI, ello con la finalidad de obtener los datos precisos sobre el universo de establecimientos de alimentos en la categoría de restaurantes, como se menciona en la tabla 1.

Tabla 1. Total de establecimientos de comida en Chilpancingo

TIPO DE ESTABLECIMIENTO	CANTIDAD
Restaurantes	130
Pozolerías	27
Marisquerías	25
TOTAL	182

Fuente: Elaboración propia con base en el INEGI (2024)

Se determinó determinar la muestra no probabilística y por conveniencia ello debido a que se conocen quienes son los dueños y administradores de los restaurantes, la facilidad de acceso a los establecimientos fue otra determinante, tamaño del negocio considerando una PYME, lo anterior debido a que se ha trabajado con anterioridad con estudiantes realizando Prácticas Profesionales, por lo que existe una relación de vinculación. Para ello se establecieron los contactos para la realización de las entrevistas, previa cita, acordando tiempos, momentos y forma.

Sin embargo, con la finalidad de abarcar todos los segmentos de establecimientos de comida en la categoría de restaurantes se hizo una distribución considerando el total de los establecimientos y categorías, quedando como se indica en la tabla 2.

Tabla 2. Muestra por tipo de establecimiento y categoría

TIPO DE ESTABLECIMIENTO		CANTIDAD
Restaurantes	Alta cocina	5
	Familiar	15
	Cocina regional	10
Pozolerías		10
Marisquerías		10
TOTAL		50

Fuente: Elaboración propia

Se determinaron tres categorías: Gestión de Residuos, Preparación de Menús y Alimentos; Consumo y Ahorro de Energía y 37 indicadores, de acuerdo a la tabla 3.

Tabla 3. Categoría e indicadores de sustentabilidad en restaurantes

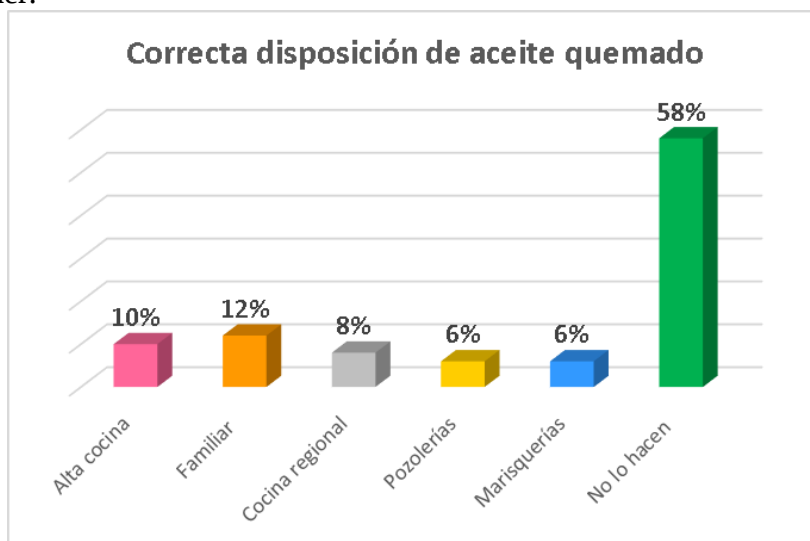
CATEGORÍA	INDICADORES
Gestión de Residuos	• Uso correcto y destino del aceite de cocina quemado • Disminución desperdicio de alimentos • Elaboración de composta de residuos de comida • Separación de basura • Uso de contenedores por tipo de residuos
Preparación de Menús y Alimentos	• Creación de nuevas recetas para rendir más los ingredientes. • Menús acordes con existencias y que provoque la rotación de los productos, principalmente los frescos, para evitar una generación masiva de residuos • Jardines o macetas para cultivo de hierbas y vegetales

Consumo y Ahorro de Energía	• Uso de agua de lluvia para baños y jardines. • Cambio de sistema de iluminación. • Uso de sanitarios ahorradores de agua • Menús digitales en lugar de impresos
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Se aplicó una encuesta de opción múltiple a través de un formulario de Google Forms a dueños y administradores de los restaurantes, para ello se establecieron fechas y lugares para llevar a cabo la actividad, el cuestionario fue presencial a través de aparatos electrónicos como Tablet y Laptop.

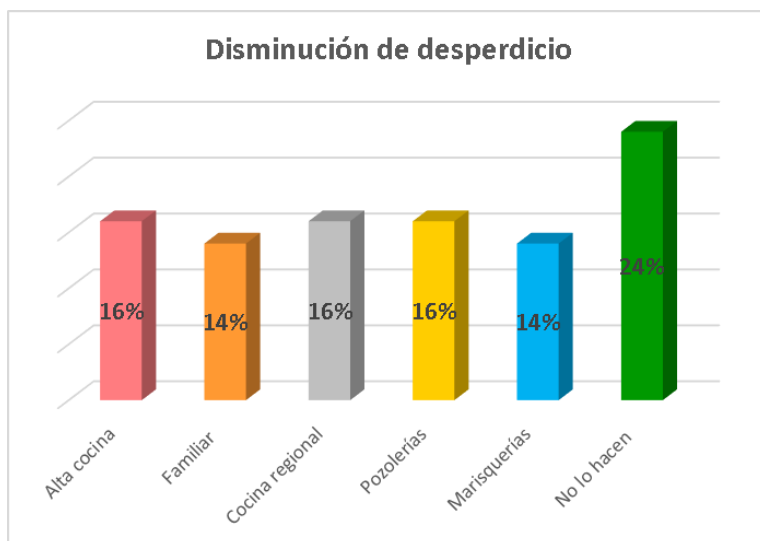
Resultados

Los resultados fueron abordados desde la estadística descriptiva a través de gráficas, con la finalidad de brindar al lector datos fáciles de entender.



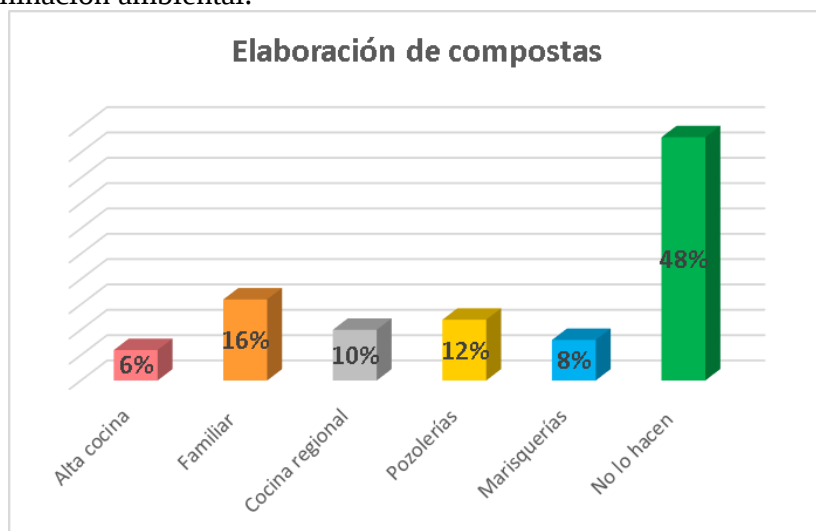
Gráfica 1.

Se evidencia que más de la mitad de los restaurantes de la ciudad de Chilpancingo, no realizan un uso y un adecuado tratamiento del aceite que utilizan en los diferentes establecimientos de comida, ello indica que no contribuyen hacia la sustentabilidad ambiental de la región, contribuyendo con residuos contaminantes, por lo que es necesario y urgente una atención en materia de uso y tratamiento de aceite quemado.



Gráfica 2.

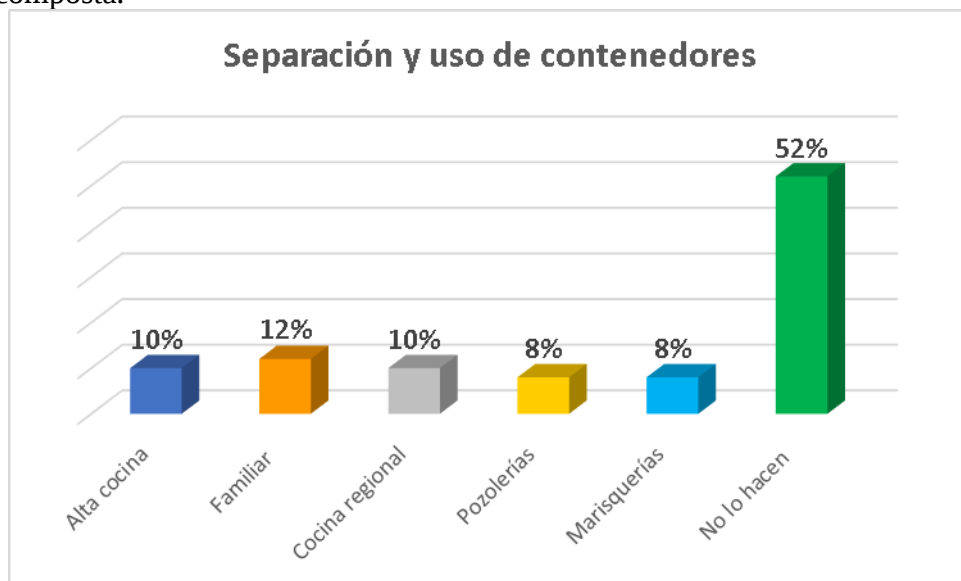
Con relación al tratamiento y disminución del desperdicio que se origina respecto a los alimentos y uso de materiales, también es notorio que los restaurantes no hagan esta actividad para la disminución del desperdicio, lo que incide en la generación de basura y por lo consiguiente en la contaminación ambiental.



Gráfica 3.

En el caso del uso de residuos o basura orgánica, muy pocos establecimientos de alimentos de la ciudad de Chilpancingo hacen un buen uso de ello, es decir no lo recicla para la elaboración de compostas, tampoco lo destinan para realizar abono orgánico. El 48% de los restaurantes de todas las

categorías no hace uso de los desechos orgánicos para la elaboración de composta.



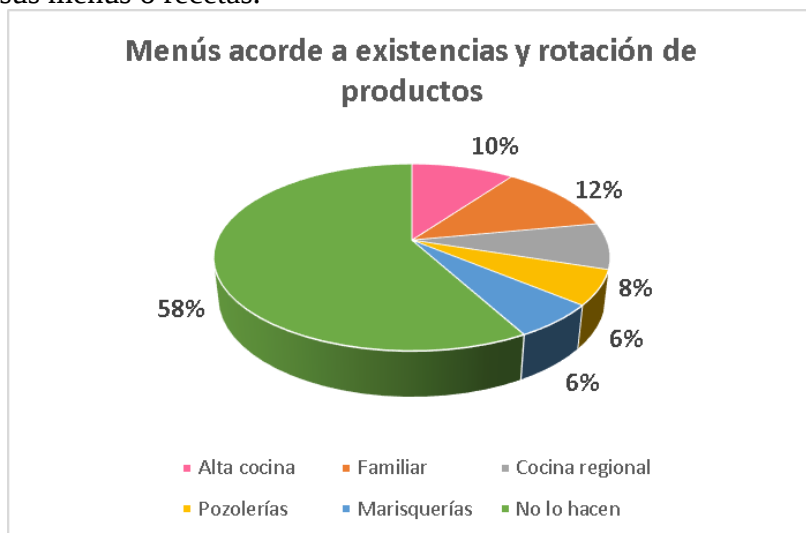
Gráfica 4.

La anterior información está relacionada con esta gráfica, la cual indica que el 52% de los restaurantes no hacen la separación de la basura ni hacen uso de contenedores por tipo de residuos como se indica en la reglamentación de los establecimientos de alimentos para el uso correcto de la basura o desechos, como son los contenedores de colores azul, verde, naranja, gris y amarillo.



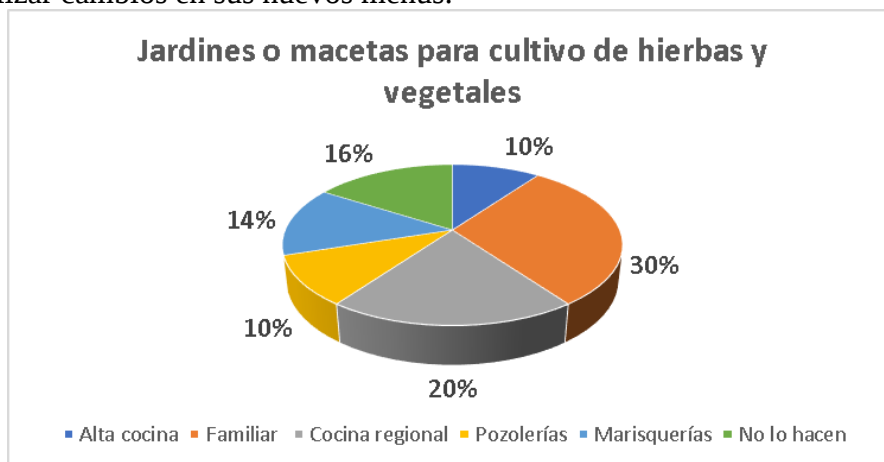
Gráfica 5.

Por otra parte, en materia de reutilización de alimentos, los restaurantes de este estudio si realizan alguna acción sustentable a fin de dar otro uso a las materias primas ejemplo de ello es la preparación de otras recetas a partir de ingredientes que les sobra o que no se han utilizado en platillos principalmente los restaurantes de cocina regional y de tipo familiar, en el caso de las marisquerías y pozolerías ya cuentan con platillos especiales y no pueden variar sus menús o recetas.



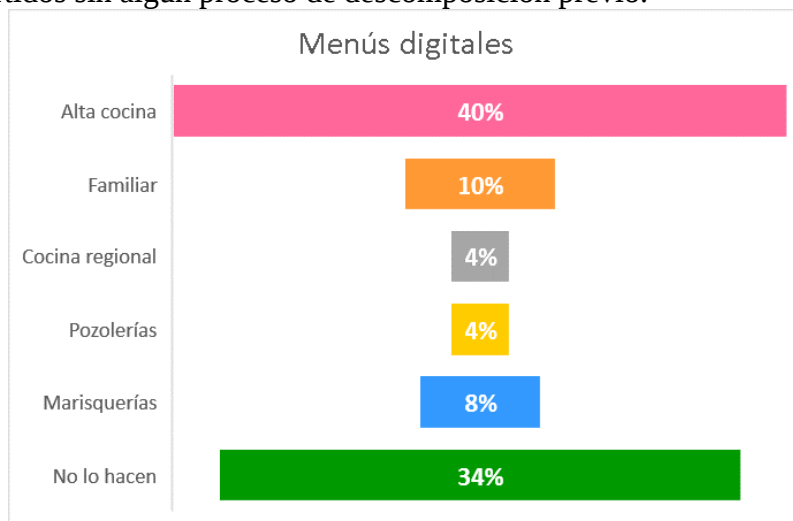
Gráfica 6.

Con respecto a la realización de nuevos platillo relacionados con la rotación de insumos y productos de stock, se indica en el estudio que el 58% de los establecimientos no experimentan nuevas propuestas culinarias para los consumidores, tienen menús definidos por lo que es un poco complicado realizar cambios en sus nuevos menús.



Gráfica 7.

Con respecto al uso de los desechos orgánicos para jardines o cultivo de hierbas o vegetales los restaurantes locales hacen poco uso de esta acción como parte de actividades de sustentabilidad, por lo que se evidencia que no existe una cultura del reciclaje, no realizan compostaje por lo que los desechos son vertidos sin algún proceso de descomposición previo.



Gráfica 8.

De acuerdo a las tendencias y exigencias del mercado que es la utilización de menús digitales, en la actualidad son pocos los establecimientos que hacen uso de ello, los datos arrojaron que solo los restaurantes de alta cocina tienen la disponibilidad de este tipo de estrategia sustentable, con un 40% de participación.

Finalmente, el 100% de los establecimientos de alimentos considerados en el estudio realizan estrategias de sustentabilidad relacionadas con el ahorro de energía y consumo de agua, indicaron que utilizan el agua de la lluvia y la almacenan para el riego de plantas y jardines, cuentan baños ahorradores de agua y en el caso de la luz eléctrica, todos utilizan bombillas LED, así como sistemas de iluminación por ventanas.

Conclusiones

La sustentabilidad es un tema transversal que impacta en diferentes áreas desde lo social, ambiental, político, cultural y económico, por lo que las organizaciones de todo tipo, estructura y tamaño la deben abordar en sus políticas y objetivos organizacionales.

En este caso, los restaurantes de Chilpancingo deben adoptar acciones que vayan ligadas a la tendencia y nuevas formas de organización desde el aspecto de la sustentabilidad, las cuales deben estar plasmadas en la

filosofía organizacional de la empresa, a fin de contribuir con el logro de los ODS.

En el caso de los restaurantes de la ciudad de Chilpancingo, tiene un reto y oportunidad para implementar estrategias y acciones ligadas a lo sustentable, no solo en la parte ambiental, también en lo organizacional y el establecimiento de una cultura de la sustentabilidad, que esté ligada a los objetivos y filosofía organizacional.

Es importante que desde lo local se hagan acciones que contribuyan al desarrollo sustentable como lo indican los ODS y así mejorar las condiciones en nuestro planeta, la participación de los restaurantes es sin duda muy importante para generar cultura de la sustentabilidad.

Desde la perspectiva de la industria restaurantera en la ciudad de Chilpancingo, hace falta una capacitación en materia de sustentabilidad, mostrar a los empresarios sobre la importancia de la sustentabilidad y cómo esta puede generar una retribución económica al negocio, a través de acciones pertinentes.

Se reconoce que existen acciones y prácticas en materia de sustentabilidad por parte de los restauranteros, sin embargo, hace falta mejorarlas y abordar más aspectos de la sustentabilidad, de tal manera que estas sean más integrales y abarquen diversas áreas de la industria.

Los retos a los que la industria restaurantera local se enfrentan son significativos, sin embargo, se deben de afrontar para lograr una mejor competitividad en los restaurantes y con ello se pueda responder a las necesidades y exigencia de la sociedad en materia de sustentabilidad.

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Disponibilidad de los datos: Todos los datos están incluidos en el contenido del artículo.

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Fostering Inclusion in Italy: Analyzing the 2022 Educational Guidance Reforms for Students with Disabilities

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Abstract

The educational guidance and inclusion practices in Italian schools have undergone significant evolution over the last few years. Recent legislative updates emphasize equity, inclusion, and personalized educational paths, acknowledging the diverse backgrounds, languages, and abilities of students. The 2022 guidelines for school guidance, introduced within the framework of the National Recovery and Resilience Plan (NRRP), further underline the importance of creating an inclusive educational environment. This article explores the most recent regulations from 2020 alongside the latest Eurydice reports to analyze their implications for inclusive education, the role of pedagogical frameworks, and strategies to advance equity and accessibility in schools. By integrating legislative analysis, pedagogical frameworks, and comparative European perspectives, the study identifies challenges and proposes strategies for improving accessibility, teacher training, and systemic collaboration to ensure the realization of inclusive education for every student.

Keywords: Educational guidance, inclusive education, educational policy

Introduction

Educational guidance plays a vital role in shaping students' educational and professional trajectories, aiming to align their choices with their skills, aspirations, and the needs of the job market. In Italy, recent legislative measures have recognized the importance of equity, inclusion, and personalized pathways to cater to the diverse backgrounds of students.

One of the cornerstone changes in this landscape was the enactment of Law 92/2019, which integrated civic education across all educational levels. This reform emphasized active citizenship, sustainability, and the goals outlined in the UN's Agenda 2030 (Ministry of Education and Merit, 2020a). Furthermore, the Interministerial Decree 182/2020 revised the framework for Individualized Education Plans (IEPs), emphasizing collaborative approaches among teachers, families, and support services to ensure effective learning strategies.

The 2022 Guidelines for School Guidance (Ministry of Education and Merit, 2022), a central component of the NRRP reforms (Presidency of the Council of Ministers, 2021), build on these efforts by emphasizing personalized educational pathways and lifelong guidance. Their primary goal is to create inclusive environments where students with disabilities can thrive. This article examines the implications of these guidelines, drawing insights from recent Eurydice reports and pedagogical research to evaluate their effectiveness in fostering inclusion and equity in Italian schools.

Background and theoretical framework

Inclusive Education: Legislative and Pedagogical Foundations

Inclusive education seeks to provide equitable learning opportunities for all students by addressing diverse needs within mainstream settings. Rooted in the Salamanca Statement (1994), this approach emphasizes the value of diversity as a resource for learning communities. In Italy, these principles were institutionalized through the 1977 Law 517, which abolished special education classes, and later through Law 104/1992, which guarantees the rights of students with disabilities to an inclusive education. With Law 3 March 2009, n. 18, the Parliament also authorized the ratification of the United Nations Convention on the Rights of Persons with Disabilities, further reinforcing Italy's commitment to inclusive education.

The 2022 guidelines reflect both national and European commitments to inclusion. Documents such as the Eurydice report *Equity in School Education in Europe* (2022) underline the importance of adaptive pedagogy and policy coherence in fostering inclusive environments. Italian policies, including Legislative Decree 66/2017, integrate Universal Design for Learning (UDL) principles, ensuring that instruction accommodates diverse learners through multiple means of engagement, representation, and expression (Burgstahler, 2020).

From a pedagogical perspective, inclusive education necessitates a shift toward student-centered practices that value individual strengths and contributions. Ianes, Cramerotti and Fogarolo (2021), Ianes and Heidrun (2023) emphasize that effective inclusion is achieved through continuous collaboration among educators, families, and community stakeholders,

supported by robust legislative frameworks like the Interministerial Decree 182/2020.

Educational Guidance and Inclusion

Educational guidance functions as a bridge between students' educational experiences and their future aspirations. According to Sanchez-Tapia e Rafique (2020), guidance must address not only academic progression but also the social and emotional development of students. The 2022 guidelines align with this perspective by embedding personalized guidance modules within school curricula, beginning at the middle school level. These modules aim to foster self-awareness, align educational choices with individual capabilities, and support students with disabilities through tailored interventions (Ministry of Education and Merit, 2022). So also the PCTO (Pathways for Transversal Skills and Guidance) program, restructured in alignment with the 2022 guidelines, strengthens connections between school and work. This integration aims to equip students with the skills necessary for professional success while addressing the needs of local labor markets. For students with disabilities, this involves tailored work-based learning experiences that align with their capabilities and aspirations.

Insights from the Eurydice Report on Guidance Systems in Europe (2021) reveal that early and continuous guidance significantly enhances students' capacity to make informed decisions. The introduction of tools such as the E-Portfolio in Italy provides a structured mechanism for documenting student progress and facilitating personalized planning. For students with disabilities, these tools ensure that their unique needs and achievements are adequately recognized and supported.

Research approach

This article employs a qualitative research approach to investigate the implementation and impact of Italy's 2022 Guidelines for School Guidance, with a particular focus on their role in promoting the inclusion of students with disabilities. The study integrates multiple sources to provide a comprehensive analysis of the guidelines' effectiveness and their alignment with inclusive educational frameworks at both national and European levels.

The research draws on a selection of primary legislative documents, including Law 104/1992, Legislative Decree 66/2017, Interministerial Decree 182/2020, and the 2022 Guidelines for School Guidance, which collectively form the backbone of inclusive education policies in Italy. These documents were selected for their direct relevance to the legal and institutional frameworks that underpin inclusive education and their explicit focus on guidance practices. The analysis also incorporates data from the latest Eurydice reports, including Equity in School Education in Europe (2022),

Guidance Systems in Europe (2021), and the most recent publication, Key Trends in Inclusive and Adaptive Education in Europe (2024). The Eurydice 2024 report offers up-to-date insights into emerging trends and policy innovations, providing a timely comparative perspective that contextualizes Italy's efforts within the broader European educational landscape.

Methodologically, the study employs a document analysis framework to examine these sources, focusing on three key dimensions: (1) the implementation of personalized guidance practices, (2) the alignment of Italy's policies with European standards, and (3) barriers to the practical realization of inclusive education. The qualitative nature of the research allows for an in-depth exploration of how legislative mandates translate into school-level practices, emphasizing the lived experiences of educators and students. Legislative documents were analyzed for their prescriptive content, with particular attention to provisions related to the Universal Design for Learning (UDL), the Individualized Education Plan (IEP) framework, and resource allocation mechanisms.

In addition to primary documents, the Eurydice reports provide valuable comparative data that highlight best practices across Europe and identify areas where Italy's policies diverge from or align with broader trends. For instance, the Guidance Systems in Europe (Eurydice, 2021) report underscores the critical role of early intervention and continuous support in preventing school dropout and fostering equity. This insight informs the analysis of Italy's focus on middle-school guidance modules and tools like the E-Portfolio. Meanwhile, the Key Trends in Inclusive and Adaptive Education in Europe (Eurydice, 2024) report offers a forward-looking perspective, examining the integration of adaptive technologies and data-driven decision-making in inclusive education—a crucial consideration for the Italian context.

The analytical framework adopted in this study combines insights from special pedagogy and educational policy literature, drawing on works such as Bocci (2021), Ianes, Cramerotti and Fogarolo (2021), D'Alonzo (2019) and Goussot (2015) to ground the discussion in established theories of inclusion and differentiation. By synthesizing legislative analysis with comparative policy insights and theoretical perspectives, the study aims to provide a nuanced understanding of the 2022 guidelines' impact. This approach not only evaluates the current state of implementation but also identifies actionable recommendations for enhancing the inclusivity and effectiveness of Italy's educational guidance system.

Through this comprehensive methodological lens, the research offers a critical appraisal of how Italy's policies are evolving to meet the needs of students with disabilities while situating these developments within the broader European push toward equity and inclusion in education.

Analysis and discussion

Lifelong Guidance and Personalization

The 2022 guidelines emphasize lifelong guidance as a means of fostering equitable educational trajectories. Early interventions, introduced at the middle school level, help students identify their interests and strengths while preparing them for future educational transitions. The incorporation of personalized guidance modules aligns with Burgstahler and Cory's (2020) advocacy for UDL principles, which emphasize flexible teaching methods to accommodate diverse learning needs.

The use of E-Portfolios represents a significant advancement in promoting student-centered guidance. By documenting progress and achievements, these tools provide a platform for adaptive planning, ensuring that students with disabilities receive support aligned with their Individualized Education Plans (IEPs). However, the Eurydice Report on Guidance Systems in Europe (2021) highlights disparities in the availability of such tools across different regions, underscoring the need for standardized implementation.

Inclusive Pedagogy and Equity

Inclusive pedagogy forms the foundation of the 2022 guidelines, integrating UDL principles to create flexible and accessible learning environments. For students with disabilities, this approach ensures that their unique needs are addressed through differentiated instruction and collaborative planning. Ianes and Heidrun (2023) stress the importance of tailoring educational strategies to individual capabilities, a practice reinforced by Italy's Legislative Decree 66/2017.

Despite these advancements, challenges persist. Regional disparities in resource allocation and teacher training continue to hinder the effective implementation of inclusive practices. The Eurydice Report on Equity (2022) notes that schools in disadvantaged areas often lack access to assistive technologies, limiting the reach of inclusive policies.

Challenges and critical issues

Despite the advancements represented by Italy's 2022 Guidelines for School Guidance, significant challenges persist that hinder their effective implementation, particularly in fostering the inclusion of students with disabilities. One of the most critical issues is the persistent regional disparity in access to resources, which continues to undermine the equitable application of inclusive education practices. Schools located in disadvantaged areas often lack the necessary infrastructure, including assistive technologies and adaptive tools, to meet the needs of students with disabilities. These disparities are exacerbated by broader socio-economic inequalities, which limit not only material resources but also access to specialized training and support services

for educators. As highlighted by Goussot (2015), this resource gap perpetuates systemic inequities within the education system, ultimately restricting the ability of schools to create inclusive environments that align with the principles of Universal Design for Learning (UDL) and the rights-based approach to education mandated by European and national frameworks.

Another major challenge lies in the inconsistent provision of professional development for teachers, particularly in the areas of digital competence and inclusive pedagogy. The National Digital School Plan (Ministry of Education and Merit, 2020b) underscores the importance of integrating technological tools into classroom practices to overcome learning barriers and promote accessibility for all students. However, the successful implementation of these technologies depends heavily on the skills and readiness of teachers to employ them effectively. In many schools, particularly those in under-resourced regions, educators report limited access to training programs that focus on the use of assistive technologies, differentiated instruction, and collaborative teaching methods tailored to the needs of students with disabilities. This lack of targeted professional development restricts the potential of inclusive pedagogical approaches to transform learning environments, as teachers struggle to adapt to the demands of a rapidly evolving educational landscape.

The disparity in teacher preparedness also reflects broader issues related to policy implementation and systemic support. While the 2022 guidelines and related legislation emphasize the importance of continuous guidance and personalized learning, the practical realization of these principles often depends on the availability of adequately trained staff and collaborative networks among schools, local authorities, and external organizations. Recent findings from the Eurydice Report on Equity in School Education (2022) highlight that the absence of cohesive support systems frequently results in fragmented efforts to support students with disabilities, particularly in rural and economically disadvantaged areas. These challenges are further compounded by the uneven adoption of digital platforms such as the E-Portfolio, which are central to the 2022 guidelines' vision of personalized education. While such tools offer significant potential for tracking and adapting learning pathways, their effective deployment requires consistent access to technological resources, robust data management systems, and the active engagement of teachers and families in their use.

Furthermore, the integration of inclusive practices within the broader framework of school guidance requires a cultural shift that goes beyond legislative mandates. As Ianes and Heidrun (2023) point out, inclusion is not simply a matter of policy but a fundamental transformation of the school environment that demands the active participation of all stakeholders, including educators, families, and students themselves. However, resistance

to change and a lack of awareness about the benefits of inclusive education continue to pose barriers, particularly in schools with entrenched practices that prioritize traditional, one-size-fits-all teaching approaches. Addressing these attitudinal challenges requires not only comprehensive training but also the promotion of a shared vision of inclusion as a core value within the educational community.

The COVID-19 pandemic has further highlighted and, in many cases, exacerbated these challenges. The rapid transition to remote learning exposed significant gaps in digital infrastructure and teacher readiness, with students with disabilities disproportionately affected by the shift. Studies conducted during the pandemic, including findings from the Italian National Institute of Documentation, Innovation, and Educational Research (INDIRE, 2021), reveal that many students with disabilities faced increased isolation and reduced access to individualized support due to the limitations of virtual learning environments. These findings underscore the urgency of bridging digital divides and equipping schools with the tools and training needed to ensure that inclusive practices are resilient in the face of future disruptions.

To address these challenges, it is essential to adopt a multifaceted approach that combines increased investment in resources with systemic reforms to strengthen the capacity of schools to implement inclusive policies. This includes prioritizing the equitable distribution of funds to ensure that all schools, regardless of their geographic location, have access to the infrastructure and tools needed to support students with disabilities. Additionally, targeted efforts to enhance teacher training programs must focus on building expertise in inclusive pedagogy and digital competence, with an emphasis on practical applications that address the realities of diverse classrooms. The development of collaborative networks involving schools, local authorities, and third-sector organizations can also play a crucial role in providing holistic support for students with disabilities and their families, fostering a culture of inclusion that extends beyond the classroom.

Finally, robust monitoring and evaluation mechanisms are needed to assess the implementation of the 2022 guidelines and identify areas for improvement. By adopting data-driven approaches to policy evaluation, education authorities can gain valuable insights into the effectiveness of current practices and make informed decisions about resource allocation, training priorities, and the development of new initiatives. As the education system continues to evolve, these measures will be critical to ensuring that the promise of inclusive education becomes a reality for all students, regardless of their circumstances.

Proposals for improvement

To address the persistent challenges in implementing inclusive education and the 2022 Guidelines for School Guidance, a multifaceted approach is necessary to enhance resources, collaboration, and evaluation processes. Priority must be given to investments in infrastructure and assistive technologies, ensuring schools have access to digital platforms, adaptive tools, and training resources capable of supporting the diverse needs of students with disabilities. The equitable allocation of these resources is critical to reducing disparities across regions, particularly in under-resourced areas, where access to such tools often determines the feasibility of inclusive practices.

At the same time, fostering robust collaborative networks is essential for creating comprehensive support systems. These networks should integrate schools, local authorities, and third-sector organizations to provide holistic assistance to students with disabilities and their families. Such collaborations enable schools to leverage external expertise and resources, facilitating the development of personalized educational pathways and guidance tailored to individual needs. Additionally, the establishment of effective monitoring and evaluation frameworks is imperative to ensure the successful implementation of these initiatives. By adopting data-driven approaches, education policymakers and practitioners can systematically assess the impact of the guidelines, identify best practices, and address gaps in implementation. This iterative process not only enhances accountability but also supports the continuous refinement of inclusive practices to align with evolving educational goals.

Recent studies, including those by Sanchez-Tapia e Rafique (2020), emphasize the importance of using evidence-based strategies to bridge the gap between policy design and practical outcomes, underscoring the need for sustained professional development and targeted resource distribution. By addressing these interconnected aspects - resources, collaboration, and evaluation - Italy's education system can advance its commitment to inclusion, ensuring that every student, regardless of ability, has equitable access to quality education and opportunities for personal and academic success.

Conclusions

The 2022 guidelines for school guidance reflect Italy's commitment to fostering inclusion through innovative tools and adaptive pedagogy. By prioritizing lifelong guidance and personalized pathways, these measures aim to create equitable educational environments that empower students with disabilities to achieve their potential.

However, achieving these goals requires addressing persistent challenges, including resource disparities and uneven teacher training. By aligning national policies with European standards and investing in

sustainable reforms, Italy can continue to lead in promoting inclusive education.

To fully realize the potential of these initiatives, Italy must commit to sustained investments in innovative tools, collaborative networks, and capacity-building programs. Aligning national policies with European inclusion goals ensures that every student, regardless of their abilities, has access to quality education and the opportunity to succeed.

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Innovaciones en la cadena de valor de la miel de *Melipona beecheii* localizada en un área natural protegida

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Resumen

La abeja *Melipona beecheii* es una especie sin aguijón, nativa de México, cuyo aprovechamiento se produce a menor escala que la *Apis mellifera*. El objetivo fue identificar innovaciones en la cadena de la miel de *M. beecheii* en meliponicultores del sureste mexicano, en el Área de Protección de Flora y Fauna Cañón del Usumacinta. Se utilizó la metodología del estándar de competencias EC0818: mapeo de la cadena, análisis de los procesos de producción, identificación de la innovación y diseño de una estrategia de gestión de innovación. Se encontró que el mercado de la miel es focalizado, se centra en el autoconsumo, con una comercialización limitada; la producción artesanal se centra en realizar una cosecha al año. Sin embargo, en el mercado local, el precio de la miel de meliponas es 20 veces mayor que la de *A. mellifera*; de ahí la importancia de mejorar la calidad de la cadena para cumplir con las características que el mercado meta requiere. Además, la creciente demanda de productos naturales incrementa la oportunidad para su comercialización como ingrediente en cosméticos mediante plataformas digitales. Una estrategia a implementar es la organización de los productores en asociaciones para tener acceso a fuentes de financiamiento que permitan mejorar la calidad de la producción para introducir innovaciones, mejorar los

canales de distribución e incursionar en actividades turísticas relacionadas con la meliponicultura.

Palabras clave: Miel, meliponicultura, cadena de valor, área natural protegida, innovación

Innovations in the Value Chain of *Melipona beecheii* Honey Located in a Protected Natural Area

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Abstract

The *Melipona beecheii* is a stingless bee native to Mexico that is exploited on a smaller scale than *Apis mellifera*. The objective was to identify innovations in the *M. beecheii* honey chain among beekeepers in southeastern Mexico, in the Usumacinta Canyon Flora and Fauna Protection Area. The methodology of the EC0818 competency standard was used: chain mapping, analysis of production processes, identification of innovation and design of an innovation management strategy. It was found that the honey market is mainly localized, focused on self-consumption, with limited marketing; Artisanal production focuses on one harvest per year. However, in the local market, the price of melipona honey is 20 times higher than that of *A. mellifera*; hence the importance of improving the quality of the chain to meet the characteristics that the target market requires. In addition, the growing demand for natural products increases the opportunity for their commercialization as an ingredient in cosmetics through digital platforms. One strategy is to organize producers into associations to have access to sources of financing that allow them to improve the quality of production, introduce innovations, improve distribution channels, and venture into tourist activities related to bee farming.

Keywords: Honey, bee farming, value chain, protected natural area, innovation

Introduction

Las Áreas Naturales Protegidas (ANP) son zonas del territorio mexicano en donde los ambientes originales no han sido alterados

significativamente por la actividad del ser humano o requieren ser preservadas y restauradas. Se crean mediante un decreto presidencial y las actividades que pueden llevarse a cabo en ellas se establecen de acuerdo con la Ley General del Equilibrio Ecológico y Protección al Ambiente (Comisión Nacional de Áreas Naturales Protegidas, CONANP, 2016). El Área de Protección de Flora y Fauna Cañón del Usumacinta, APFFCU, es un área protegida del sureste de México, localizada en Tenosique, Tabasco. Esta reserva forma parte del Corredor Biológico Mesoamericano, que se extiende desde México hasta Centroamérica; es la puerta de entrada a áreas de gran biodiversidad como la Selva Lacandona y el Petén guatemalteco que forman un continuo con los últimos reductos de la vegetación selvática del estado de Tabasco, en México (Cabrera-Pérez *et al.*, 2013).

Una de las actividades económicas promovidas entre los pobladores de comunidades asentadas dentro del área natural protegida es la meliponicultura. La abeja *Melipona beecheii* es una especie sin aguijón; fue cultivada y venerada en México por la cultura Maya, por lo que, en la actualidad es conocida como “abeja sagrada Maya”. En el país se han registrado 46 especies, de las cuales 13 son endémicas (Camargo y Pedro, 2007), siendo los estados mexicanos de Oaxaca, Chiapas, Veracruz, Quintana Roo y Tabasco con el mayor número de especies reportadas (Arnold *et al.*, 2018). La miel de las meliponas tiene un valor cultural significativo en Mesoamérica y cada vez adquiere un mayor valor comercial en el México actual. De acuerdo con Jacinto (2021), la miel de melipona se cotiza mejor en los mercados nacional e internacional que la miel de *Apis mellifera*.

Sin embargo, así como otras actividades agropecuarias, la meliponicultura presenta una serie de obstáculos del tipo productivo, económico, social y comercial. Además de los problemas en cuanto a la mortandad de los individuos de la colonia se encuentran otros como la adulteración de la miel, el envejecimiento de las generaciones de meliponicultores y el poco interés de las nuevas generaciones en la práctica de esta actividad. Aunque la miel de melipona tiene gran demanda, el número de colmenas ha disminuido, lo que dificulta satisfacer la demanda del mercado ocasionando que el precio se eleve entre 10 y 20 veces sobre la miel de *Apis mellifera* (López, 2014). Además, de acuerdo con Soto *et al.* (2017), es indispensable la conservación y optimización de los atributos de la miel para garantizar un producto de calidad para un mercado que cada vez es más exigente (Ramos-Díaz, 2021).

Además, a través de la meliponicultura se obtienen beneficios económicos que permiten mejorar las condiciones de vida de los habitantes de las comunidades que la practican (Organización de las Naciones Unidas para la Alimentación y la Agricultura, FAO., 2018). De acuerdo con Parra *et al.* (2018) la meliponicultura representa una oportunidad de desarrollo para las

comunidades rurales, requiere una baja inversión, contribuye a la economía familiar y al cuidado y conservación del medio ambiente, ya que la polinización de las abejas fortalece la biodiversidad (Fierro y Fuentes, 2020).

De acuerdo con la Organización de las Naciones Unidas para la Alimentación y la Agricultura, FAO (2019), las abejas son imprescindibles para el futuro de la alimentación por su actividad de polinizadores, lo que genera beneficios para el medio ambiente, estabilización y el sostenimiento de ecosistemas y el incremento de la productividad agrícola. De la práctica de la meliponicultura se obtienen múltiples beneficios para el ser humano y el medio ambiente. Los productos obtenidos de los nidos representan un alto valor económico: miel, polen, propóleos y cerumen; además de conservar y transmitir el conocimiento que por generaciones se ha conservado en la región (Secretaría de Agricultura y Desarrollo Rural, SADER., 2020).

Dada la importancia de la meliponicultura se han realizado en México estudios relacionados con el cuidado y manejo de las abejas meliponas con la finalidad de incrementar conocimientos, experiencias y relatos de vida. Parra *et al.* (2018) analizaron la producción de esta miel realizada por mujeres en el municipio de Maní, Yucatán, México. Se encontró que la abeja sin aguijón es un indicador de “salud ambiental” para los ecosistemas donde habitan y equilibrio en la medida que participan activamente en los procesos de polinización de la mayoría de las plantas con flores. Por ello, es de relevancia analizar dicha actividad e identificar las áreas de oportunidad en sus procesos y productos.

De igual manera, en la reserva Los Petenes, Campeche, México, los investigadores Pat *et al.* (2018) analizaron la situación y perspectiva de la cría de las abejas sin aguijón. Los resultados revelaron que es una actividad ancestral en vías de desaparición; es necesario rescatarla debido a su importancia como estrategia de vida familiar y para conservar la diversidad de especies de abejas nativas. Aunque los meliponicultores actuales son, mayoritariamente, hombres de edad avanzada con una débil organización para comerciar la miel, la perspectiva de la actividad es alentadora. Una de las razones para impulsar esta actividad es su ubicación en áreas naturales protegidas, así como el conocimiento y manejo tradicional que aún persiste en algunas familias mayas que producen miel para uso medicinal y ceremonial. Además, el valor de mercado y cultural de la meliponicultura son factores que pueden contribuir a su rescate.

En los últimos años ha resurgido la meliponicultura como una forma de revalorización de la cultura Maya. Se le atribuyen a la miel y al polen propiedades curativas, las cuales han sido evaluadas *in vitro* por diferentes grupos de investigación, destacando su capacidad antioxidante, antitumoral y antimicrobiana, entre otras; que también son atribuidas a las ceras obtenidas de las colmenas (Pat *et al.*, 2018). Sin embargo, este sector requiere de mejores

diseños e implementación de políticas públicas focalizadas u orientadas al mejoramiento de la infraestructura social y económica, incluyendo la innovación, ciencia y tecnología (Ramos-Díaz, 2021).

De igual manera, el sector requiere fortalecer e integrar los eslabones de la cadena de valor considerados como una línea base estructural relevante para una economía social y solidaria. También es necesario revalorizar las actividades de los pequeños productores con el reconocimiento del consumidor final mediante la oferta y precios más justos en el producto. Además, esta actividad incorpora una cultura ancestral invaluable de la población productora: rural e indígena. El objetivo de este trabajo es la identificación de innovaciones en la cadena productiva de la miel de la abeja *Melipona*, lo cual permitirá a los productores ubicados en las comunidades localizadas en el Área de Protección de Flora y Fauna del Cañón del Usumacinta (APFFCU) obtener beneficios en los tres ejes de la sustentabilidad: económico, social y ambiental.

Métodos

Área de estudio

El Área de Protección de Flora y Fauna Cañón del Usumacinta, cuenta con una superficie de 46,128.49 ha y se localiza en el municipio de Tenosique en el estado de Tabasco, México (DOF, 05 de junio del 2015); es la entrada al departamento de Petén de Guatemala y al Corredor Biológico Mesoamericano, que se extiende desde México hasta Centroamérica y constituye la segunda masa más extensa de bosque húmedo tropical después del Amazonas (Galindo *et al.*, 2021). En el área natural protegida (ANP) se encuentran diez centros de población rurales con la presencia de 120 jobones de abejas meliponas.

Método

Se utilizó un enfoque cualitativo no experimental mediante el Estándar de Competencias CONOCER EC0818, Facilitación de procesos de innovación de mejora competitiva con personas, grupos sociales y organizaciones económicas (2016). Se aplicaron técnicas de investigación como visitas a campo, observación directa, investigación documental y talleres participativos. El estándar de competencias EC0818 se desarrolló en las siguientes fases:

Fase 1: Mapeo de la cadena. En esta fase se realizó un diagnóstico de la actividad de meliponicultura en condiciones naturales mediante la programación de salidas al campo; se realizaron visitas a 29 comunidades asentadas dentro del Área de Protección de Flora y Fauna Cañón del Usumacinta para identificar a los meliponicultores. Mediante visitas

domiciliarias se invitó a formar parte del taller con el objetivo de realizar el mapeo de la cadena a través de un diagnóstico participativo.

Fase 2: Análisis de procesos. Se realizó un taller con la participación de los productores para analizar los procesos y el diseño de la Estrategia de Gestión de Innovaciones de Mejora Competitiva. El objetivo fue mejorar la competitividad de la actividad económica mediante la identificación, gestión, implementación, seguimiento y evaluación de innovaciones con enfoque de mercado meta y con la participación de los actores involucrados. Se analizaron temas relacionados con el manejo de apiarios, organización social, apoyos económicos y capacitaciones.

Fase 3: Identificación de innovaciones. En esta fase se establecieron los fines y objetivos básicos de los meliponicultores a corto, mediano y largo plazo; se analizó la situación actual de los procesos productivo, humano, tecnológico, administrativo y comercial.

Análisis de datos

A partir de la información recabada mediante investigación documental y de campo se realizó el análisis de la cadena de la miel de *M. beecheii* en el que se describen los problemas a los que se enfrentan los productores en los eslabones de la cadena productiva y las condiciones en las que se desarrollan.

Resultados

La meliponicultura es una actividad ancestral que se continúa realizando en algunas zonas del sureste mexicano. El cultivo de abejas meliponas se realiza con la intención de obtener miel y otros derivados con propiedades nutritivas y medicinales empleadas en la medicina tradicional. Esta actividad ofrece oportunidades de producción para los pobladores de comunidades situadas en áreas naturales protegidas. Sin embargo, se enfrentan amenazas como el cambio climático, la deforestación, la inserción de transgénicos, el uso de plaguicidas y la situación económica de la zona, lo que ha limitado su desarrollo. Los resultados de este trabajo permiten analizar la cadena productiva de la miel de abejas meliponas localizada en el Área de Protección de Flora y Fauna del Cañón del Usumacinta.

Mapa funcional

En la primera fase del estudio se analizó el mapa funcional mediante la identificación de eslabones, productos y funciones de la cadena de valor de la miel de meliponas. De 29 comunidades localizadas en el ANP, en 10 se encontraron jobones de estas abejas; se contabilizaron 120 jobones, siendo tres

comunidades en donde se concentra la mayor cantidad (78). De igual manera, se identificaron los principales eslabones de la cadena de producción de la miel: abasto, producción, comercialización y consumidor final, como se muestra en la Figura 1.

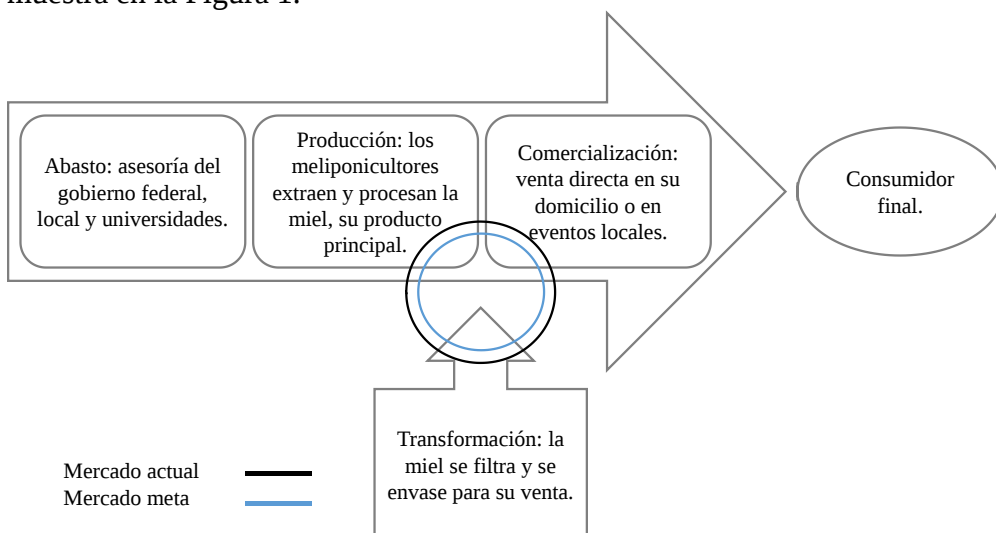


Figura 1. Mapa funcional de la cadena de valor de la miel de *Melipona beecheii*

En el eslabón de abasto se provee la materia prima a los productores como insumos, equipos, herramientas, así como asistencia técnica y capacitaciones, transferencia de tecnología, fuentes de financiamiento y desarrollo de investigaciones. En el eslabón de abasto de la meliponicultura en el ANP se integran quienes proporcionan asesoría y materiales para iniciar el proceso de cultivo: instituciones como la Comisión Nacional de Áreas Naturales Protegidas, CONANP y la Universidad Politécnica Mesoamericana, UPM. Estas instituciones apoyan a los meliponicultores con asistencia técnica y materiales para el manejo y aprovechamiento de la especie, como cajas modelo INPA y materiales, entre otros, que les permiten extraer los productos.

Además, el gobierno local mediante la Dirección de Medio Ambiente y Desarrollo Sustentable del Ayuntamiento Municipal, apoya con personal capacitado para impartir asesorías sobre el manejo, producción y rescate de las abejas, en coordinación con los trabajos que realiza la CONANP. La información proporcionada por el municipio a los meliponicultores se realiza de forma grupal con la finalidad de acceder a apoyos económicos con las financieras de la región. De igual manera, los productores pueden recibir asesoría para la obtención de créditos simples para la compra de maquinaria a través de proyectos viables, así como apoyos para definir la imagen corporativa. Sin embargo, el apoyo municipal se ofrece principalmente a cooperativas rurales.

En el eslabón de la producción, los productores logran la transformación de su materia prima; la producción de miel debe ser suficiente para autoconsumo y venta. En este eslabón únicamente intervienen los meliponicultores quienes se encargan del cuidado de las colmenas y son quienes extraen, filtran y envasan la miel, la cual se identificó como producto principal. La miel de *M. beecheii* es utilizada principalmente para autoconsumo; la venta se realiza entre los habitantes de las comunidades cercanas.

El eslabón de la transformación debe funcionar como aquel que transforma la materia prima para su venta. En esta cadena no se cuenta con procesos tecnificados o certificados; este eslabón es débil debido a que la miel obtenida sólo se filtra y se envase para su venta. En el eslabón de la transformación, se identificó que, además de la miel se obtienen productos como el cerumen, el propóleo y el polen. Sin embargo, estos productos no salen a la venta, se utilizan para autoconsumo o se reservan para la alimentación de las abejas.

La comercialización, el siguiente eslabón de la cadena, es realizada por los productores de forma directa en su domicilio o algún evento local. La miel que se comercializa es la excedente del autoconsumo y se vende entre los habitantes de la comunidad en recipientes de plástico con capacidad de 1000 ml. Sólo un productor ha iniciado el envasado de miel en goteros de pequeño volumen. El eslabón de consumidores está integrado por habitantes de las comunidades del ANP y alrededores quienes han conocido el producto por información compartida por consumidores y familiares.

La miel de meliponas también es utilizada en la industria de los alimentos como ingrediente para obtener otros productos como el vino de miel o hidromiel y vinagres, los cuales son obtenidos mediante su fermentación. De igual manera, esta miel es aplicada directamente en los ojos con la intención de eliminar impurezas como las cataratas y se le encuentra en el mercado en presentaciones de goteros de 20 ml, regularmente.

Cadena de valor

Se analizaron las fortalezas y debilidades de la cadena de la miel, como se muestra en la Tabla 1. La organización de los meliponicultores del ANP es muy débil, puesto que se carece de un comité que coordine las acciones como grupo productor. Lo anterior ha ocasionado diversidad de formas de manejo de las colmenas, falta de información sobre la importancia de esta actividad para el desarrollo económico, social y ambiental, así como los aportes de la miel de melipona a la salud.

Tabla 1. Fortalezas y debilidades de la cadena de valor de miel de Melipona

FORTALEZAS	DEBILIDADES
Asesoría de especialista en el manejo y aprovechamiento de las abejas nativas.	No se encuentran organizados en un comité de meliponicultores.
Apoyo de la Comisión de Áreas Naturales Protegidas, la Universidad Politécnica Mesoamericana y la Universidad Juárez Autónoma de Tabasco.	Manejo inadecuado de colmenas debido a falta de interés de los productores.
Hay personas interesadas en el desarrollo de la meliponicultura.	Desconocimiento del manejo de la mosca jorobada como principal enemigo de las abejas meliponas.
La actividad se desarrolla en el espacio geográfico con alto potencial para el cultivo de abejas.	Escasa participación de las nuevas generaciones en el desarrollo de esta actividad.
Se cuenta con material bibliográfico para el desarrollo de la meliponicultura.	La producción anual de la miel de <i>Melipona beecheii</i> es muy baja comparada con la de abejas <i>Apis mellifera</i> .
Es un tema de gran importancia en la actualidad relacionado con el cuidado del medio ambiente.	El número actual de colmenas es muy bajo.
Estudios previos de las abejas sin agujón: Colegio de la Frontera Sur, ECOSUR.	No se cuenta con fuentes de financiamiento o incentivos para esta actividad.

En cuanto al mercado meta, se ha definido como el conjunto de consumidores ideales a quienes se dirige un producto, servicio o acciones de marketing. Definir este mercado es fundamental para establecer las estrategias de ventas, ya que permite conocer las necesidades de los consumidores y las posibilidades de crecimiento e inversiones de la empresa. Uno de los objetivos de la metodología del Estándar de Competencias EC0818 es identificar la diferencia entre las características que demanda el mercado meta y lo que se oferta en los eslabones que intervienen en la cadena de valor.

El mercado actual de la miel de abeja melipona es local para aquellos productores que cuentan con excedentes; la venta se realiza desde sus hogares a los habitantes de comunidades cercanas. De acuerdo con Tapia-Toral (2019), los factores que inciden en la decisión de compra de un producto de calidad son sabor, color, lugar de procedencia, precio, envase y marca. En el caso del eslabón de transformación, el producto no cumple con las características y las condiciones que el mercado meta requiere. La miel debe ser consumida cruda, sin embargo, la diferencia se podría marcar en el envasado, de acuerdo con los fines de uso. En la Tabla 2 se describen las características actuales del producto y las que demanda el mercado.

Tabla 2. *Características actuales y del mercado meta de la miel de M. beecheii*

Características del mercado actual	Características del mercado ideal
1. Baja producción y mayoritariamente, para autoconsumo. 2. Presentación en envases de 1000 ml. 3. Envases de tereftalato de polietileno, PET. 4. Venta directa en el domicilio de los meliponicultores. 5. No se encuentran organizados en asociaciones. 6. No cuentan con etiqueta informativa ni marca. 7. No es un producto estandarizado y sin garantía de inocuidad. 8. La miel es el único producto. 9. No hay un establecimiento de venta. 10. Técnicas tradicionales de extracción.	1. La producción cubre mercados locales. 2. Necesidad de diversificar las presentaciones del producto principal. 3. Envasado en recipientes innovadores que resulten atractivos para los clientes. 4. Tendencia a comprar en línea. 5. Realizar el registro de la Unidad de Producción Pecuaria. 6. Contar con etiquetado de acuerdo a normas mexicanas, código de barras y una marca comercial corporativa. 7. Que sea un producto artesanal que cumpla con la normatividad oficial en cuanto a la inocuidad. 8. Diversificación de productos, aprovechamiento de subproductos y residuos cero. 9. Evaluar estrategias de las ventas acordes a los nuevos mercados y tendencias. 10. Adecuarse al Manual de Buenas Prácticas Pecuarias en la Producción de Miel.

Discusión

En el análisis de una cadena de valor, las demandas del mercado meta están relacionadas con las características del producto que se oferta, las condiciones de comercialización y producción. Los meliponicultores del ANP cuentan con una producción baja debido al escaso número de colmenas y a que realizan las cosechas sólo una vez al año obteniendo, en promedio, un litro de miel por colmena. De igual forma, la extracción de la miel se realiza con elementos que resultan inadecuados y no contribuyen a la calidad microbiológica del producto.

De acuerdo con el Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias, INIFAP (2023) en otras regiones del país es posible obtener 2.5 – 3.0 l de miel por cada colmena. Por su parte, Torres *et al.* (2022) evaluaron el rendimiento de miel en colmenas de *Melipona beecheii* en el Oriente de Honduras, reportaron que estos meliponicultores realizan tres cosechas al año para obtener 13.19 k/colmena. Estos datos colocan a los rendimientos obtenidos por los meliponicultores del ANP por debajo de promedios nacionales e internacionales.

En relación con la calidad del producto, el Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria, SENASICA (2018) indica que las mieles de abeja no deben contener contaminantes físicos, químicos o microbiológicos que pudieran afectar la salud de los consumidores y la calidad

del producto. El manejo de las colmenas en el ANP se realiza con conocimientos transmitidos de una generación a otra, por lo que es importante integrar en sus procesos las indicaciones del Manual de Buenas Prácticas Pecuarias en la Producción de Miel, este manual fue publicado en 2012 por SENASICA para las colmenas de *Apis mellifera* con la finalidad de identificar puntos de control.

Para la comercialización del producto, se debe considerar que, de acuerdo con su composición natural, la miel no representa peligro alguno para el consumo humano; sin embargo, esta característica se puede perder a través de un manejo inadecuado por parte de los meliponicultores en las diversas etapas del proceso. Es de gran importancia para el consumidor garantizar que el producto esté libre de contaminantes físicos o químico, lo cual afectaría la calidad o inocuidad del producto (Lugo-Melchor y Merino-Marmolejo, 2017).

Contreras y Magaña (2017) mencionan que en apicultura se presentan situaciones que frenan el desarrollo de la producción: falta de tecnologías actuales, nuevas formas de comercialización, el cambio climático, la precipitación pluvial y la modificación de estaciones, lo que afecta negativamente la producción. Las fluctuaciones climáticas son, en gran parte, responsables de la variabilidad interanual del rendimiento de miel, dada su influencia en la fenología tanto de la fuente de néctar como de las abejas. Al variar la producción apícola, la rentabilidad sufre el mismo cambio, aun existiendo una tendencia hacia la alta en los precios.

Innovaciones

El análisis del entorno de la cadena productiva reveló que:

- Existe gran demanda por productos naturales sin procesar debido al interés actual en el consumo de alimentos saludables.
- Las necesidades actuales sociales y de alimentos dan pie al desarrollo de nuevas oportunidades para la comercialización de la miel de melipona a través de las plataformas digitales en internet, en las que se ofertan los productos naturales con envíos a diferentes partes del país.
- Es de suma importancia la organización de los meliponicultores como un grupo organizado para lograr el acceso a fuentes de financiamiento.
- Esta actividad también tiene la oportunidad de brindar servicios de desarrollo turístico en la región.

De acuerdo con el análisis, surgen propuestas de innovaciones en la cadena de producción de la miel de melipona, como se muestran en la Tabla 3.

Tabla 3. Innovaciones para la cadena de miel melipona localizada en el ANP

Área de oportunidad	Innovación
<i>Eslabón de producción</i>	
Organización.	Capacitar a los productores respecto a temas de organización de grupos productivos.
Incremento de la productividad.	Adoptar innovaciones que permitan incrementar el número de colmenas y cosechas.
Registros nacionales.	Registro de los productores en las Unidades de Producción Pecuaria del país.
<i>Eslabón de proceso</i>	
Inocuidad.	Mejorar la calidad mediante la realización de análisis fisicoquímicos y microbiológicos del producto.
Capacitación.	Capacitar a los meliponicultores en la aplicación del Manual de Buenas Prácticas Pecuarias en la Producción de Miel.
<i>Eslabón de transformación</i>	
Cambios en las tendencias alimentarias y sociales.	Utilizar envases innovadores que permitan la distribución y venta de la miel en los diferentes canales de comercialización
Incremento en la demanda de productos naturales y saludables.	Desarrollar investigaciones orientadas al desarrollo de nuevos productos empleando la miel de melipona como ingrediente.
Aprovechamiento de subproductos.	Diversificación de productos mediante el aprovechamiento de subproductos y la generación de cero residuos.
<i>Eslabón de comercialización</i>	
Cambios en las tendencias alimentarias y sociales.	Capacitación de los productores para la comercialización del producto a través de las plataformas de internet.
Marca y etiqueta informativa.	Capacitar al recurso humano sobre los procesos que se requieren para la comercialización adecuada de productos como marca y etiquetado.
Presentación del producto.	Evaluación de envases y presentaciones del producto.
Estrategias para promocionar los productos.	Participación en eventos de difusión como ferias y festivales.

La aplicación de innovaciones tanto en la industria como en el campo busca mejorar la competitividad, rentabilidad y sustentabilidad mediante la organización de las cadenas de valor. Una asociación de productores propicia la obtención de beneficios con una mejor planeación, aplicación de estrategias para la comercialización, la compra de insumos para la producción, recibir capacitación y asistencia técnica (Terrazas *et al.*, 2019).

En el área de estudio de esta investigación se encontró que los productores de miel de la región del ANP no cuentan con afiliaciones a organizaciones. Es importante la formación de grupos de productores ya que las principales instituciones mexicanas gubernamentales y privadas otorgan apoyo a grupos organizados. El trabajo de meliponicultura en el ANP se

realiza de forma individual, cada persona de la comunidad que cuenta con un jobón de melipona inicia su cultivo con las herramientas y conocimientos a su alcance.

Entre los factores que han afectado la producción local de miel en el ANP se encuentra la pérdida y reducción de hábitats, posiblemente por la interacción y competencia por los recursos florales y lugares de nidificación con la abeja *Apis mellifera*, la cual es una especie introducida. Otras amenazas que pueden llevar a la extinción de las colonias silvestres y manejadas de *Melipona beecheii* y de otras especies de meliponinos con potencial económico, son la fuerte deforestación de las selvas y la falta de interés en las comunidades rurales (González-Acereto y Quesada-Ehuán, 2009), así como la poca o nula participación de las nuevas generaciones en el desarrollo de este tipo de actividades.

El trabajo que se realiza actualmente es de vital importancia para la conservación, manejo y aprovechamiento de la abeja nativa sin aguijón *M. beecheii*. Sin embargo, la producción actual se realiza con jobones deteriorados, lo que incide en la calidad de la miel y en afectaciones al medio ambiente. Es importante la capacitación en el manejo de colmenas, formas de trasiego y otras especies de meliponinos como *Tetragonisca angustula*, *Trigona nigra*, *Trigona fulviventris*, *Nannotrigona perilampoides*. La introducción de cajas modelo INPA puede mejorar el control, manejo y aprovechamiento de la especie.

Los pequeños productores son los que tienen una menor productividad, por lo que requieren acompañamiento técnico en la producción, además de asesoría para la creación de organizaciones de productores. El registro de una Unidad de Producción Pecuaria en el Padrón Ganadero Nacional (PGN) de México tiene varios beneficios, entre ellos que permite a los gobiernos contar con datos estadísticos sobre los inventarios ganaderos, ayuda a controlar brotes epidemiológicos y permite acceder a programas pecuarios de la SADER.

De acuerdo con Pat *et al.* (2018), la cría y explotación de colmenas de *M. beecheii* en Yucatán y zonas aledañas en México hace algunos años era deficiente; lo que trajo como consecuencia la pérdida del conocimiento tradicional en la cría y manejo de la abeja "xunan kab" (Villanueva-Gutiérrez *et al.*, 2005; Chan *et al.*, 2019). Con base en las visitas realizadas a las comunidades del Área de Protección de Flora y Fauna Cañón del Usumacinta, se encontró que es raro encontrar a la especie en forma natural. Sin embargo, se encontró que la práctica tradicional de propagar las colonias domesticadas ya se lleva a cabo por las nuevas generaciones.

Debido a su valor económico, social y ambiental, instituciones gubernamentales y educativas están realizando actividades para recuperar esta actividad económica en el sureste del país para la conservación y

aprovechamiento de esta actividad en las comunidades del ANP. Entre los estudios realizados, destaca el de la comunidad de Maní, Yucatán, en el que un grupo de mujeres emprendedoras han iniciado con esta práctica por medio de un programa conocido como “En Pro de la Mujer”, donde reciben apoyo técnico y financiero para impulsar esta actividad (Parra *et al.*, 2018).

En cuanto a la inocuidad, es necesario cuidar aspectos de manejo desde el trasiego y extracción de la miel ya que el proceso se realiza sin tomar en cuenta las buenas prácticas para la producción de miel. Generalmente no se capacita a los productores en el manejo de cajas debido a que se trabaja con un volumen pequeño de producción, se manejan pocas colmenas y lo hacen los integrantes de la familia.

La elaboración de productos saludables debe cumplir con la normatividad en cuanto a la inocuidad, etiquetado y envasado. La meliponicultura es una actividad económica que va más allá del aprovechamiento de la miel; tiene gran potencial en el desarrollo de temas como medicina alternativa y uso cosmético; la miel es uno de los productos de la colmena con mayor demanda, es utilizada como alimento, medicina, en cosméticos y artículos de tocador, así como para combinar en productos industrializados como cereales, edulcorantes y otros productos alimenticios.

Desde la antigüedad, los mayas elaboraban bebidas como el licor de balché hecho a base de la corteza de un árbol del mismo nombre que se endulzaba con miel de meliponas, esta bebida se consumía en los rituales para compartir con los dioses. La miel y la cera eran tan importantes que se utilizaban en el comercio y como forma de pago tributario. En este sentido, el fluido dorado producido por las abejas ha sido apreciado desde tiempos remotos en una relación intrínseca con la sociedad por su valor cultural, sus propiedades medicinales, alimenticias y su importancia en el comercio. Esta relación se mantiene en la actualidad, conservándose muchos de estos simbolismos, rituales y alimentos que a la fecha subsisten (Secretaría del Medio Ambiente, Recursos y Naturales, SEMANRNAT, 2023).

La miel tiene diversas propiedades útiles, entre las más importantes se encuentra su acción energizante y sedante, propiedades emolientes, antisépticas, efectos benéficos a nivel digestivo, renal y urinario, propiedades digestivas y laxantes, propiedades béquicas o alivio de la tos, propiedades que ayudan en el combate de la anemia y diuréticas (González *et al.*, 2013). Los consumidores conscientes de sus necesidades buscan en el mercado aquellos productos que contribuyan a su salud y bienestar, así como el desarrollo cognitivo y psicomotor, inmunidad, crecimiento y composición corporal (Olagnero *et al.*, 2007).

La medicina tradicional ha otorgado a la miel un lugar importante durante siglos (Patricia *et al.*, 2015). Por lo anterior, es importante la identificación del mercado meta. Uno de los mercados identificado es la

industria de la medicina alternativa, donde la miel de melipona tiene un alto valor económico debido a sus efectos en la salud; ayuda a fortalecer el sistema inmunológico, las vías respiratorias y cicatrización, detiene el crecimiento de glaucoma, alivia infecciones aculares, quemaduras y gastritis (Otero-Salinas *et al.*, 2018). También ha reportado un efecto antibacteriano en heridas y actividad antioxidante que reduce la alta concentración de radicales libres y especies reactivas de oxígeno producidas en la etapa inflamatoria (Schencke *et al.*, 2016).

En relación a la composición, la miel contiene vitaminas de los grupos A, C, D, E, B y ácido ascórbico (Figueroa, 2020). Se tiene registro de que, en el contexto de trastornos neurodegenerativos, la miel puede tener una actividad significativa contra la hipoperfusión cerebral crónica, que es uno de los factores que contribuyen a la enfermedad de Alzheimer (Goes *et al.*, 2017).

En el eslabón final se identificaron una diversidad de productos de la colmena como son la miel, polen, cerumen y propóleo, además una serie de productos derivados de la miel las cuales pueden introducirse como ingredientes con actividad funcional en productos como jabones de tocador, labiales, cremas, shampoo y en productos cosméticos como ingredientes antibacterianos, hidratantes y antienvjecimiento.

Las tendencias sobre canales de distribución de productos se han inclinado hacia los mercados en línea. En México existen plataformas electrónicas donde empresas mexicanas distribuyen productos de miel y derivados. De igual forma, el gobierno local apoya a productores para realizar sus ventas en línea, a través del Instituto para el Fomento de las Artesanías de Tabasco, IFAT (Gobierno de Tabasco, 2024), el cual ofrece planes de comercialización y capacitación.

Entre los beneficios sociales que aporta la meliponicultura se encuentra la participación de los miembros de la familia, ya que son abejas sin aguijón y su manejo es cómodo; esta actividad permite que la familia contribuya con actividades de producción y fomenta la participación de las mujeres permitiéndoles aportar a través de la extracción de la miel un recurso que es aprovechado como alimento o una aportación económica a través de la venta.

Dentro de los beneficios ambientales se encuentra la conservación de la abeja nativa sin aguijón *M. beecheii*, así como la polinización de los productos agrícolas. Con ello también la concientización de las personas, principalmente por los meliponicultores y sus familias, respecto a la importancia de la conservación de las plantas con flores, las cuales son significativas para la alimentación de las abejas.

Conclusiones

La meliponicultura en el Área de Protección de Flora y Fauna Cañón del Usumacinta se ha limitado al mercado local, caracterizada por un bajo volumen de producción. Para incidir en el mercado nacional es necesario incrementar el número de colmenas y de cosechas anuales; capacitar a los productores en la aplicación de las buenas prácticas de higiene en el manejo de la cadena productiva, así como establecer un control de calidad para descartar contaminantes. La diversificación de productos derivados de la colmena permitirá el aprovechamiento de subproductos que agreguen valor a la cadena y alcanzar nuevos mercados, siendo necesario mejorar el conocimiento sobre el valor nutritivo, medicinal y cosmético de la colmena y sus productos.

La implementación de las innovaciones permitirá reforzar las actividades comunitarias sustentables desarrolladas en áreas naturales protegidas, mejora la calidad de vida de sus habitantes y garantizar la conservación y aprovechamiento de la especie de meliponas. Se estima de vital importancia continuar con un mapeo de los futuros productores y establecer estrategias para impulsar la economía social, difundir y promocionar los beneficios integrales de la meliponicultura como actividad, económica, social y ambiental.

La meliponicultura constituye un área de oportunidad para el desarrollo local mediante la construcción de una red horizontal integrada por los productores, las instituciones educativas y el gobierno. Es necesario establecer acciones para estandarizar la calidad de la miel, que difiere de los parámetros de calidad de la miel de apicultura. Aun cuando el valor comercial de la miel de melipona es mayor que el de la miel de la abeja *A. mellifera*, faltan acciones para equilibrar la presencia de ambas mieles en el mercado.

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The Relationship Between Intrinsic Religiosity and Resilience Among Tunisian Female University Students

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Abstract

This study examines the relationship between intrinsic religiosity and resilience among Tunisian female university students. To achieve this objective, a sample of 244 participants was selected using a self-report method. Participants completed measures assessing intrinsic religiosity and resilience, and the data were analyzed using correlation and linear regression analyses. The results showed a statistically significant, albeit modest, positive correlation between intrinsic religiosity and resilience ($p < .001$). Furthermore, linear regression analysis showed that intrinsic religiosity accounted for a small but meaningful proportion of the variance in resilience scores ($R^2 = 0.055$, $p < .001$). Based on these findings, it is reasonable to conclude that an increase in intrinsic religiosity contributes to fostering resilience, although this relationship remains modest and is influenced by other unexamined factors. The implications of these findings are discussed in light of the cultural and religious contexts in Tunisia, highlighting the need for further research to explore additional psychological and social factors that may influence this relationship. Finally, this study contributes to the growing body of research on psychological resilience in non-Western, predominantly Muslim contexts, where religiosity may function as a culturally relevant coping mechanism.

Keywords: Intrinsic religiosity, resilience, Tunisia, female students

Introduction

The ability to cope with adversity can be enhanced by turning to religion and spirituality. A particular manifestation of spirituality, characterised by recurrent references to God and faith in a supreme being deemed responsible for one's fate, has been observed to fortify the resilience of young adults grappling with exceedingly stressful situations (Abdel-Khalek & Tekke, 2019; Dolcos et al., 2021; Javanmard, 2013). The concept of placing one's burdens upon a "divine and supreme power" and maintaining unwavering faith in its guidance throughout one's lifetime is a hallmark of this belief system. Consequently, this outlook engenders a sense of optimism, a resilience that is evident in their ability to face life's challenges without trepidation.

The concept of spirituality is frequently associated with that of religion, as it incorporates spiritual components that are integral to religious belief and practice. However, the converse is not true, i.e. spirituality does not necessarily indicate religiosity. Koenig et al. (2001) posit that spirituality encompasses a personal quest to comprehend end-of-life concerns, their connotations, and their connection with the sacred and transcendent. Puchalski et al. (2009) delineate an aspect of human nature characterised by the pursuit of meaning and purpose in life, as well as the establishment of connections with the present, oneself, others, nature, and one's surroundings. It is noteworthy that this pursuit of significance does not necessitate the involvement of religious practices or the establishment of religious groups (Koenig et al., 2001; Puchalski et al., 2009).

The concept of religiosity, on the other hand, pertains to behaviours, feelings, thoughts, and experiences stemming from the aspiration to identify, articulate, maintain, or transform one's relationship with a divine being or entity, a reality, or the ultimate truth. The definition of patterns of behaviour and the encouragement of overt religious expression are hallmarks of this phenomenon (Hill et al., 2000). Consequently, rituals and overt practices represent significant components of religion's construction. Finally, it is important to note that religious affiliations indicate membership of a community that shares the same beliefs and practices.

Allport's (1963) seminal work distinguished between "mature" and "immature" religious orientations, which have since become synonymous with the contemporary terms "intrinsic" and "extrinsic" religious orientations, respectively. The principal characteristic of intrinsic religiosity, as initially proposed, involves practising religion sincerely and intentionally. In contrast, extrinsic religiosity, which involves the utilisation of religion for instrumental purposes, particularly for maintaining social relationships, has been defined by Allport and Ross (1967). Research by Cohen et al. (2005) has consistently demonstrated that intrinsic religiosity is regarded as more normative than

extrinsic religiosity. Numerous studies have indicated a positive correlation between intrinsic religiosity orientation and improved physical and mental well-being (Smith, Richards & Maglio, 2004; Masters et al., 2005; Salsman & Carlson, 2005).

The concept of psychological resilience was initially intrinsic in nature, with individual characteristics enabling a person to overcome difficulties (Matsen, 2001). This initial phase of resilience has been referred to as the 'first wave' of resilience, as described by Richardson (2002). More recently, however, there has been an increase in studies of community resilience, which considers the influence of an individual's social environment on resilience. Research has identified religion and spirituality as contributing factors to enhanced community resilience (Frounfelker et al., 2020).

Resilience is currently defined as the capability to deal with, adjust to, and grow in the face of adversity in a manner that safeguards one's health, well-being, and quality of life (Connor & Davison, 2003; Luthar et al., 2000; Manning & Miles, 2018; Rutter, 2012; Tay & Lim, 2020). It is also defined as successful adaptation and healing following a disruptive life event, as well as psychological growth in the aftermath of a significant source of stress (Luthar et al., 2000; Manciaux, 2001; Rutten et al., 2013). It encompasses the ability to swiftly recover from illness and setbacks and requires the capacity to adapt to significant stressors, such as tragedy, trauma, and adversity.

In summary, the scientific literature approaches the concept of resilience either as a dynamic process influenced by life events and challenges or as an individual personality trait. Whilst the binary approach to determining the presence or absence of resilience may be tempting, the study of resilience remains complex. Indeed, as Helmreich et al. (2017) have demonstrated, the determination of resilience is influenced by numerous factors such as coping skills, self-efficacy, optimism, social support, flexibility, positive emotions, self-esteem and confidence, meaning and purpose in life and religious and spiritual beliefs.

Manning and Miles (2018) posit that religion exerts a twofold influence on the process of resilience. On the one hand, at an intrinsic level, religion offers individuals beliefs that give meaning to their trials and establish a relationship with the divine. This is achieved through active coping strategies, where the negative event is perceived as a divine lesson and an opportunity for growth, and passive coping strategies, where the event is accepted as God's will. On the other hand, at an extrinsic level, being part of a religious community has been shown to reinforce psychosocial resources such as self-confidence, self-esteem and a sense of self-efficacy (Schieman, 2008), which have been shown to be resilience resources that effectively strengthen the ability to cope with negative events.

The primary objective of this investigation is to examine the correlation and linear relationship between intrinsic religiosity and resilience among a group of Tunisian female students of a young age. Intrinsic religiosity is defined as an orientation in which individuals are wholeheartedly devoted to their religious beliefs, which provide significance and enrichment to their lives. In contrast, extrinsic religiosity is described as an orientation in which individuals use religion to fulfill personal or social needs (Allport & Ross, 1967; Kirkpatrick & Hood, 1990).

Methods

Participants and Procedure

Participants were recruited using a convenience sampling method among undergraduate students from the University of Tunis and the University of Jendouba. All the participants were recruited voluntarily, and all provided informed consent before data collection. Inclusion criteria required participants to be enrolled in psychology or education sciences, fall within the defined age range (18-26 years), and be present during data collection. However, as the selection was based on accessibility criteria, the generalisability of the findings to the broader student population may be limited.

The scales were administered in groups, under the supervision of the examiners. The assessment lasted approximately 15 minutes, following an explanation of the instructions. The research relies solely on the secondary use of anonymized data, with no possibility of identifying participants, even after data linkage.

Analysis was conducted on data collected from 244 female students aged between 19 and 26 years ($M = 20.75$, $SD = 1.93$). Our sample size is considered adequate and capable of producing reliable estimates of the associations between the variables in our investigation. Furthermore, studies using comparable techniques have used larger or similar sample sizes (Dolcos et al., 202; Llewellyn et al., 2013; Luberto et al., 2014).

Sample size and effect size were estimated prior to data collection using G*Power 3.1 to ensure sufficient power for the statistical tests employed. Based on the expected effect size and the statistical methods used, a required sample size of 226 participants was calculated to achieve a statistical power of 0.95 with $\alpha = 0.05$. With 244 participants, the study met this requirement, ensuring sufficient statistical power.

It is important to note that the decision to focus exclusively on a female population was not an intentional methodological choice; rather, it was a result of field constraints, as the majority of students at the targeted universities were female. Moreover, a review of the extant literature indicated the potential for a gender effect on resilience (Erdogan et al., 2015; Lowe et al., 2022; Yalcin-

Siedentopf et al., 2021), thereby reinforcing the decision to exclude male students from the study.

Self-report measures

The Tunisian Resilience Scale (TRS), devised by Derouiche-El Kamel and Hentati (2021) assesses two personal characteristics that reflect the degree of resilience, notably “positive adaptation” in the face of significant hardship and the “ability to recuperate” from it. The scale takes into account a resilience model that incorporates two dimensions present in almost all explanations of resilience (Connor & Davidson, 2003; Lee & Cranford, 2008; Leipold & Greve, 2009; Smith et al., 2010). Ten statements were introduced as items, each rated on a five-point Likert scale (1 = not at all true to 5 = almost always true). The collective score on the scale ranged from 10 to 50, with higher scores representing greater resilience. The reliability of the scale was assessed using Cronbach’s alpha, demonstrating adequate internal consistency with a Cronbach’s alpha of .70 (N = 554).

The Arabic Scale of Intrinsic Religiosity (ASIR), developed by Abdel-Khalek (2017), assesses intrinsic religiosity without bias towards any particular religion or belief system. The scale consists of 15 statements, each rated on a five-point intensity scale (ranging from 1, indicating 'strongly disagree', to 5, indicating 'strongly agree'). The total score can range from 15 to 75, with higher scores indicating greater religiosity. The ASIR scale exhibited high internal consistency, with a Cronbach’s alpha of .91 (N = 155).

Analysis

The data exhibited a normal distribution. No missing data was observed, as all participants completed the scales in full, ensuring a complete dataset for analysis. The bivariate relationships with the target variables were evaluated using Pearson's correlation test. The assumptions of the linear regression model were tested, and coefficients were estimated with ordinary least squares (OLS). The significance of the coefficients was assessed using the Student's t-test, and model fit was evaluated with the R² coefficient and residual analysis. All statistical analyses were performed using SPSS for Windows (IBM, version 20).

Results

In our study, the female participants' age ranged from 19 to 26 years, with a mean age of 20.75 years and a standard deviation of approximately 1.93 years. The mean score on the Resilience scale among the participants was 34.81, with a standard deviation of 6.17. The information was presented logically with causal connections between statements. The mean score on the Religiosity scale was 54.68, with a standard deviation of 13.73 (see Table 1).

Table 1: Descriptive findings of the research sample

Variable	Number	Minimum	Maximum	Mean	S.D
Age	244	19	26	20.75	1.93
Religiosity score	244	15	75	54.68	13.73
Resilience score	244	16	48	34.81	6.17

In order to examine the association between resilience and religiosity among all students, we conducted a correlation analysis. The purpose of the analysis was to ascertain the relationship between the religiosity variable and the resilience variable (refer to Table 2). Despite a small positive correlation coefficient, the result was statistically significant ($p < 0.000$).

Table 2: Pearson's correlation coefficient between religious beliefs and resilience

Variables	1	2
Religiosity	—	0.234***
Resilience	0.234***	—

*** $p < 0.000$

The purpose of conducting a linear regression analysis was to evaluate the predictability of the religiosity variable on the resilience variable (refer to Table 3). The results in Table 3 indicate that a correlation coefficient of $R = 0.234$ exists between these two variables. The coefficient of determination, signifying the proportion of variability in the resilience variable explained by regression, is roughly $R^2 = 0.055$. In other words, our sample shows that intrinsic religiosity scores account for only 5.5% of the variance in the resilience score ($R^2 = 0.055$). Therefore, religiosity has a comparatively limited impact on resilience. The adjusted coefficient of determination stands at around 0.051. This small difference from the coefficient of determination may be due to other factors or the sample size. Therefore, religiosity only partly explains the variation in resilience, as other unmeasured variables or contextual factors may have a more significant impact on explaining such variation.

Table 3: Summary of linear regression analysis model

Model	R	R ²	Adjusted R ²	Estimated standard error
1	0.234	0.055	0.051	6.011

Table 4 shows that there is a linear correlation between the variables, as confirmed by the regression analysis. The results of the variance analysis (see Table 4) support the hypothesis of a linear association between the variables, with $F_{1 \text{ \& } 242} = 14.078$ and $p < 0.000$.

The standardised and non-standardised regression coefficients reveal a substantial correlation between resilience and intrinsic religiosity ($\beta = 0.234$) at the 99% confidence level (see Table 5). The findings indicate that intrinsic religiosity is a reliable predictor of resilience.

Regarding the significance test, since the test set at zero produces a value greater than 0.05, the hypothesis of the coefficient being equal to zero should not be discarded and should be excluded from the regression equation. As a result, the equation for the regression in this study is $y = 0.105x$, which means that, while keeping all other variables constant, a unit change in intrinsic religiosity will lead to a 0.234 shift in student resilience ($\beta = 0.234$).

Table 4: Regression variance analysis of the predictor variable of religiosity and dependant variable of resilience

Model	Sum of squares	d.f	Mean of Squares	F	Sig.
Regression	508.637	1	508.637	14.078	.000
Remaining	8743.309	242	36.129		
Total	9251.947	243			

Table 5: Summary of the resultants of standardized and non-standardized regression of resilience variable prediction by the predictor variable of religiosity

Model	A	β	T	Sig.
Fixed value	29.045		18.343	0.000
Religiosity	.105	.234	3.752	

Note. Dependent variable: resilience

Discussion

The current investigation reveals a weak but noteworthy association between intrinsic religiosity and resilience. It is important to note that resilience is not an immutable characteristic, but rather an evolving process that can be cultivated and strengthened over time (Foster et al., 2019). This process encompasses the development of problem-solving skills, the utilisation of support from others, the adoption of a positive attitude, and the capacity to adapt to changing circumstances (Ungar & Theron, 2020).

The findings of this study suggest that, while religiosity may have a role to play in the development of resilience, other significant factors must also be considered when attempting to understand the full picture. Thus, religiosity seems to have a defensive role in alleviating physical and mental distress, thereby aligning with Koenig's (2009) hypothesis. This suggests that intrinsic religiosity contributes to an individual's resilience; however, it is not the only predictor. The study focuses on religiosity as a value internalized by individuals, without ethnocentrism or dogmatism (Allport, 1969, 1971).

This is in line with prior academic research which has linked religiosity to several factors, including mental health (Koenig, 2007, 2009; Mosqueiro et al., 2015; Smith et al., 2003), happiness, and well-being (Francis et al., 2003; Francis et al., 2016; French & Joseph, 1999; Myers & Diener, 1995; Rusman et al., 2023). Daclos et al. (2021) conducted a study that indicated that religious adaptation protects against emotional distress and promotes resilience.

Nevertheless, outcomes from research into the relationship between religiosity and resilience can be inconsistent. Schwalm et al. (2022) conducted

a thorough review of 2468 articles, including 34 observational studies, investigating the association between Spirituality/Religiosity (S/R) and resilience. The analysis revealed a moderate positive correlation between S/R and resilience. However, some studies did not find any evidence of a positive relationship between religious or spiritual practices and resilience (Burnett & Helm, 2013; Connor et al., 2003). Furthermore, a study undertaken on a sample of 185 Singaporean pupils during the Covid-19 pandemic has highlighted the absence of a link between religiosity and resilience, whilst revealing a distinct affirmative correlation between religiosity and well-being (Gan et al., 2023).

Based on the findings of this study, religiosity is identified as a prognostic factor for resilience. Religions often promote the idea of divine justice and an afterlife, with many world faiths – whether monotheistic or not – offering the promise of redemption and a second chance in the afterlife. Such beliefs resonate strongly among people worldwide, especially those living in poverty and hardship. Whilst the separation of the Church and the State, as demonstrated in Christian societies, has led to the dissociation between religion and public life, Arab-Muslim culture maintains a strong correlation between these two domains. A key teaching in the Qur'an emphasizes that the soul returns to its Creator after death, promising abundant rewards for the most steadfast and courageous believers. As Allah says in the Qur'an: 'O ye My servants who believe, fear your Lord. It is good for those who do good in this life. And Allah's earth is spacious. Verily the steadfast will have their reward without measure (Sher Ali, 2021, Qur'an 39:11). These teachings can offer comfort and alleviate feelings of injustice, fostering resilience in the face of adversity.

Indeed, Islamic beliefs provide an interpretative framework for people experiencing difficulties, enabling them to make sense of their experiences and better cope with adversity. The practice of prayer and engagement in spiritual activities have been identified as integral components of the resilience process. An in-depth study by Koenig & Al-Shohaib (2019) has demonstrated that practising Islam through activities such as reading and reciting the Qur'an, regular prayer, genuine faith, strict adherence to Qur'anic teachings and belonging to a supportive community, alleviates stress and promotes mental health, general well-being and happiness. It is imperative to emphasise that the influence of religiosity and spirituality varies based on an individual's interpretation, which is shaped by their cultural background. Tunisia's rich and diverse heritage, blending Arab, African, and Mediterranean influences and shaped by historical interactions with both Eastern and Western traditions, offers a distinctive perspective on religiosity. Unlike many other Muslim nations in the Middle East and Gulf regions, Tunisian religiosity is

characterized by a pluralistic belief system rather than religious fundamentalism.

In this context, the belief in fate, which is a fundamental component of Tunisian and Arab-Muslim culture in general, is an element to be taken into consideration as a factor in predicting the level of resilience. Fortier (2005) has highlighted the significance of religious texts as a primary source of these beliefs, asserting that fate (*maktûb*), which is determined for each individual prior to birth, supersedes actions. However, Islamic teachings do not perceive fate as an inevitable outcome, but rather as a developmental path that prepares an individual to cope with challenges such as loss or illness. This does not, however, negate the capacity to overcome adversity.

This notion aligns with the concept of negotiable fate, which posits that while individuals' actions are influenced by divine will, they retain the capacity for autonomous action. A study by Li and Zhu (2024) demonstrates that this concept of a malleable fate, as a positive belief in destiny, exerts a significant positive influence on self-esteem, positive psychological capital and life satisfaction. Despite the emphasis on divine predetermination within Islamic principles, the notion of individual responsibility remains a central tenet.

The study indicates a statistically significant yet weak correlation between intrinsic religiosity and resilience, suggesting that the relationship between these factors is variable. This weak correlation can be explained by the age group of the sample (19 to 26). Indeed, other studies which have examined the link between religiosity/spirituality and perceived control, viewed as resilience, adaptation and well-being resources, have shown that in a young population, religiosity had no significant impact on subjective well-being (Fiori et al., 2006; Jackson & Bergeman, 2011). Furthermore, research has demonstrated an absence of a positive correlation between R/S indicators and perceived control in young adults (Fiori et al., 2006; Jackson & Bergeman, 2011).

The absence of data on male students warrants attention, as our sample was limited to those studying psychology and education sciences-fields that traditionally attract a higher proportion of women. Despite the limitations inherent in the study's methodology, which precludes the generalisation of its results, this study contributes to the existing body of literature by exploring the relationship between resilience and intrinsic religiosity among Tunisian female students from North African and Arab Muslim backgrounds, addressing a significant research gap on the African continent (Schwalm et al., 2022).

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Data sharing statement: The current article is accompanied by the relevant raw data generated during and/or analysed during the study, including files detailing the analyses and either the complete database or other relevant raw data. These files are available in the Figshare repository and accessible as Supplemental Material. Ethics approval, participant permissions, and all other relevant approvals were granted for this data sharing.

Declaration for Human Participants: This study was approved by the Scientific and Ethical Research Committee of the Clinical Psychology Laboratory: Intersubjectivity and Culture (LR16ES01) on April 4, 2024, and the principles of the Helsinki Declaration were followed.

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Public-Private Partnership and Economic Growth in Morocco: An Empirical Analysis

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Abstract

Public-private partnerships (PPPs) have emerged as an innovative investment model for infrastructure projects. Introduced in Morocco during the 1990s, PPPs have since become an important element of the country's economic development strategy, in order to stimulate economic development and address infrastructure challenges. Our paper aims to study the impact of investment in public-private partnerships on economic growth. This study serves to enrich and complement the existing work in this field, thus contributing to the advancement of knowledge and expanding the boundaries of the existing literature. The dataset was analyzed using Autoregressive Distributed Lag (ARDL). The results indicate that investment in PPPs has a positive and statistically significant impact on Morocco's economic growth in the long term, highlighting the effectiveness of this investment model in the national context.

Keywords: Public-Private Partnership; infrastructures; economic growth; multiple linear regression

Introduction

Over the last two decades, the use of the private sector through PPP arrangements has become increasingly popular as a means of acquiring, renewing and maintaining public sector infrastructure in many sectors such as

social infrastructure, transport, public services, etc. Initiated by the United Kingdom with its Private Finance Initiative (PFI) in the early 1990s, the adoption of PPPs has now spread across the world, affecting many countries of all wealth levels and on all continents (Bettignies & Ross, 2009).

« In a general context, a PPP is a legal contract between a public entity and one or more private entities for the purpose of developing projects, or administering public services, and assigning responsibilities as well as business risks between the partners."

Public-Private Partnership (PPP) is a new practice adopted for the management and financing of public services, they are increasingly presented as the solution to the lack of financing needed to achieve the Development Goals (Loukili and Elhamma, 2024). In this article, we aim to investigate the relationship between public-private partnership and economic growth in the Moroccan context, In other words, **does the upward trend in investments in public-private partnerships have a positive impact on economic growth in Morocco?**

In order to answer our research question, we will use an econometric study based on Autoregressive Distributed Lag (ARDL) model, the data on PPPs will be collected from the World Bank database on private participation in infrastructure projects (PPI) for the period 1990 to 2020.

This work will be structured in three parts. The first part will focus on the conceptual framework, and the historical background of PPPs and offer a review of empirical literature on the effect of public-private partnerships on economic growth. The second part will present the methodology adopted and the data used. The third part, will be devoted to the estimation of the model and the presentation of the results followed by their interpretation and discussion.

Exploring the concept of public-private partnerships: definition and history

Definition of the concept

The definition of keywords in scientific work is of paramount importance, as it enables readers other than the author to gain a comprehensive understanding of the subject matter addressed in the research from various perspectives.

- According to the International Monetary Fund (IMF), PPPs are presented as an alternative to privatization. For this organization, PPP "designates arrangements through which the private sector provides infrastructure elements and services traditionally provided by the State" (IMF, 2007).
- For the European Investment Bank, PPP refers to "a wide variety of working arrangements, from the most informal to strategic

partnerships, in the design of build-finance-and-operate contracts and mixed economy companies" (EIB, 2005).

- According to the OECD, conducting a systemic analysis requires first establishing clarity in definitions. For it, "A PPP is an agreement between the State and one or more private partners (which may possibly include operators and financiers), under which the private partners provide a service in ways that reconcile the goals. service delivery objectives pursued by the state and their own profit objectives, the effectiveness of the reconciliation depending on a sufficient transfer of risk to private partners" (OECD, 2008).
- In Morocco, PPPs are defined by Article 3 of Law No. 86-12 on public-private partnership contracts: "A public-private partnership contract is a fixed-term contract, through which a public person assigns a private with the responsibility for carrying out an overall mission. This mission may include the design, partial or total financing, construction or rehabilitation, maintenance and/or operation of equipment, infrastructure or the provision of services essential to the provision of a public service."¹

History of Public-Private Partnerships

The emergence of PPPs in the world

The concept of public-private partnership was first used in the United States in the late 1970s and refers to the fact that local public authorities entrust private sector companies with the task of carrying out investments necessary for certain collective services, thus granting the disengagement of the federal government in the financing of urban development programs. However, the State has placed these types of contracts "under surveillance" following a certain distrust of PPP practices in the United States.

In Europe, it was in the 1990s that the United Kingdom became a favorable ground for the development of PPPs (under the name Private Finance Initiative PFI) and currently represents an inspiring tool for several countries. It is important to emphasize that this concept is not entirely a novel invention in Europe since the formula was used under the old regime in France in the form of a "concession contract", in many sectors, as a model of cooperation between the public and private sectors.

PPPs subsequently expanded, in a context of globalization that first affected the field of economy. This phenomenon then impacted the law and policy of states. The reasons that motivated the use of PPPs are the financial need to carry out public projects, whether it is energy, public services, or

¹ Dahir No. 1-14-192 of 1st Rabii I 1436 (December 24, 2014) promulgating Law No. 86-12 relating to public-private partnership contracts.

transport infrastructure. Public-private partnerships (PPPs) were thus encouraged due to two main factors: the abundance of global financial sources and on the other hand, the expectations of governments to promote infrastructure investments, without resorting to higher tax burdens.

Public-private partnerships in the Moroccan context

The objective of this research is to assess the impact of Public-Private Partnerships (PPPs) on economic growth in a developing country, specifically Morocco. Morocco is located in North Africa. Historically, the country was under Spanish and French protectorates, which influenced Moroccan companies to adopt numerous management practices based on the French system (Elhamma and Moalla, 2015). However, in recent years, Moroccan businesses have progressively adopted modern tools, including international accounting standards (Elhamma, 2023, 2024, 2025), advanced management control techniques (Elhamma, 2012, 2023; Snoussi, and Elhamma, 2024), and new sources of financing, such as participative finance (Bennani and Elhamma, 2015).

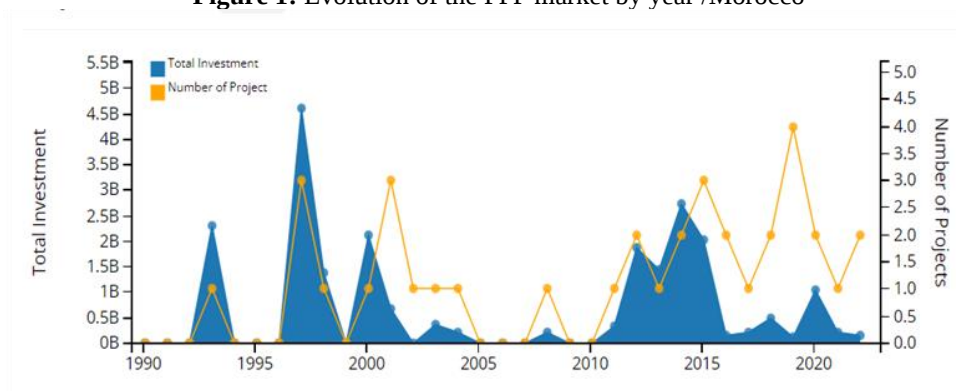
The origins of Public Private Partnerships in Morocco date back to the beginning of the 20th century, but it is in recent years that this phenomenon has developed. This new means of financing has become preferred for major structuring projects in several sectors, including public infrastructure projects.

According to a report by the United Nations Conference on Trade and Development (UNCTAD) in July 2016, "Morocco is the 2nd African country in terms of PPPs for infrastructure with a total amount of 27.5 billion dollars, behind Nigeria (37.9 billion dollars), and ahead of South Africa (25.6 billion dollars)" (UNCTAD, 2016).

PPPs appeared in Morocco in the form of concession contracts according to the Economic, Social and Environmental Council (CESE) in its opinion on Law 86-12, it was from 1914 that concessions contracts were granted in the fields of production and distribution of drinking water, railway, and port infrastructure. After the country's independence in 1956, the concessions were bought back and the activities of the concessionary companies, as well as the corresponding infrastructure, were entrusted to national authorities.

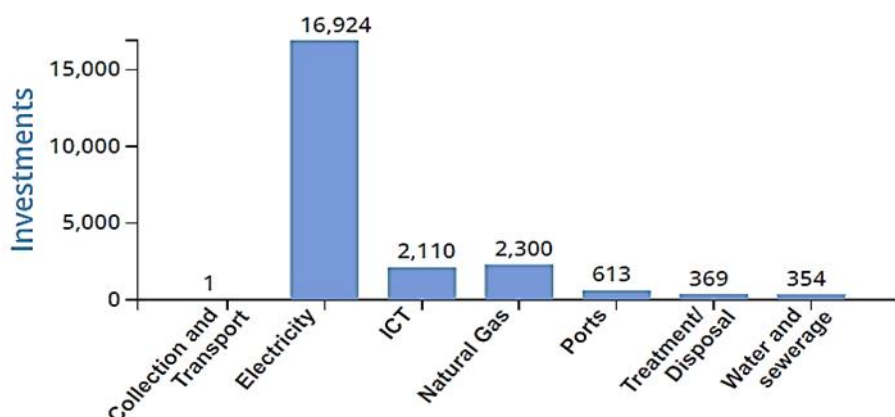
During the 1990s, the use of private operators for the operation of public services reappeared, but it is especially in recent years that this method of financing has become known with the construction of large-scale projects, such as the Tangier Med port, the Noor solar power plant, etc. The rise of PPPs on a national scale can be justified by the combination of at least three factors: the fragility of public finances, the questioning of the State's technocratic model, and the growing dissatisfaction of citizens with the quality of public services.

Figure 1: Evolution of the PPP market by year /Morocco



Source: PPI Visualization Dashboard - The World Bank & PPIAF

Figure 2 : Distribution of PPP projects /Morocco



Source: PPI Visualization Dashboard - The World Bank & PPIAF

The legal framework governing Public-Private Partnerships (PPPs) in Morocco was initially defined by local government texts or sectoral laws, which remained in force until the adoption of Law No. 86-12. Until 2014, the regulations lacked a comprehensive framework specifically tailored to PPPs. The introduction of Law No. 86-12 aimed to standardize and streamline the legal framework for PPP agreements, thereby ensuring greater clarity, consistency, and effectiveness in promoting infrastructure development and economic growth through these partnerships. The laws and regulations governing PPPs in Morocco are:

- Law 54-05 of 2006 relating to the delegated management of public services;
- Sectoral laws providing for concessions/PPPs (water, energy, ports, railways);

- Law No. 86-12 relating to public-private partnership contracts (Dahir No. 1-14-192 of December 24, 2014) ;
- Law No. 46-18 amending and supplementing Law No. 86-12 relating to public-private partnership contracts (March 2020) ;

Literature review: Impact of public-private partnerships on economic growth

In this sub-section, we will explore the studies that have examined the impact of these PPPs. However, despite the recognized importance of PPPs for economic development, empirical research on this relationship remains relatively limited, particularly in developing countries.

The public-private partnership is considered as a long-term partnership between public and private actors in order to obtain mutual benefits. This type of partnership is identified as favorable not only for the partners involved but also for the overall economy. According to Sharma (2012), “PPP offers several advantages and opportunities in terms of fiscal stabilization, flow of funds, and efficiency gains for developing countries.”

According to the endogenous growth theory of Barro (1990), increasing infrastructure investment leads to significant economic growth, thus increasing infrastructure investment through PPPs is positively associated with GDP growth (Pimentel et al., 2017). The idea is that the use of PPPs allows countries to carry out infrastructure projects, especially in a context where public resources are limited, which can lead to an increase in GDP growth.

PPP plays an important role in stimulating economic growth and improving public infrastructure. Their success depends on a series of determining factors, including the quality of the institutional framework, and political and economic stability (Hammami & al., 2006). Empirical studies on Public-Private Partnerships (PPP) show that these partnerships can have a significant impact on economic growth by improving infrastructure; this impact varies according to sectors, geographical contexts, and institutional structures.

For developing countries, empirical studies on Public-Private Partnerships and economic growth reveal significant heterogeneity in results across regions and countries. Mapule et al. (2023), show that PPPs have a positive impact on economic growth, but with variations across sectors, PPP investments in energy infrastructure have a more significant impact compared to other sectors, which promotes growth in developing economies. Aini (2024), in his study conducted within ASEAN, finds that the volume of public-private partnership projects does not seem to have a significant impact on the overall economic growth of the region. However, the effect of the value of PPP investments varies considerably across the infrastructure sectors

concerned. This indicates that the effectiveness of PPPs is largely conditioned by the sector and the specific context of each country. Banda & Jeke (2022), in their research, studied the long-run link between PPPs and various economic indicators, including GDP. The results showed that the growth in the value of Public-Private Partnership (PPP) projects positively influenced national GDP. For other developing countries in Asia, several studies agree on the positive contribution of PPP investments to economic growth (Lee et al., 2018) (Atapattu, 2019). These studies often associate the acceleration of economic growth with the improvement of transport and telecommunications infrastructure.

On the other hand, In Turkey, Yurdaku & Kamasa (2020) initiated their study from the observation that PPP investments can boost GDP. However, the results of the study show that there is a weak relationship between PPP activities and GDP growth. Yurdaku & Kamasa, (2020) relate this result to other macroeconomic variables that affect GDP growth as a proxy for economic development.

On their part, studies conducted in developed countries have also demonstrated a great heterogeneity of results. According to the study of Jasiukevicius & Vasiliauskaite (2013), four countries in their sample, namely Belgium, Ireland, France and the United Kingdom, showed significant relationships between PPP activity and economic growth. The same goes for Bakırtaş & Aysu (2019), who also showed through their study that there is a positive and significant relationship between PPP investments and GDP per capita in the long term for 15 OECD member countries. However, contrary to previous observations, Pimentel & al. (2017), in their study on the case of Portugal showed that PPP investments would have had a negative impact on GDP growth in Portugal, unlike public and private investments which had a positive impact.

The table below summarizes the results of several research studies on the impact of PPPs on economic growth.

Table 1: Summary table of empirical research

Authors	Study area	Method of Analysis	Year of observation	Result
Jasiukevicius & Vasiliauskaite (2013)	Countries of the European Union (EU)	Calculation of correlation coefficients.	1995 - 2011	The results revealed that Belgium, Ireland, France and the United Kingdom (UK) showed strong or medium correlations between GDP growth and PPP market development.
Hamed Sallam (2015)	Egypt and the United Kingdom	Ordinary Least Squares (OLS) Regression On panel data with fixed effects model.	1992 - 2012	The results of the study indicate that PPP investments have a positive and significant influence on GDP per capita growth in Egypt and the UK.
Pimentel & al. (2017)	Portugal	VAR (Vector Autoregression) model.	1998-2013	The analysis based on a VAR estimation indicates that unlike public and private investments which have a

				positive effect, Public-Private Partnerships seem to reduce the country's GDP.
Lee & al. (2018)	19 developing economies in Asia	Regression analysis on panel data	1985 - 2015	Empirical results show that an increase in PPP investments as a percentage of GDP is associated with higher growth in real GDP per capita.
Atapattu (2019)	19 developing economies in Asia	Regression (OLS) On panel data with fixed effects model.	1990 - 2015	The study found positive effects of PPP infrastructure stock on economic growth.
(Bakırtaş & Aysu, 2019)	15 OECD member countries	Panel Data Analysis (Dynamic Ordinary Least Squares)	1990 - 2013	The DOLS estimation results indicate a positive and significant relationship between PPP investments and long-run economic growth.
Yurdaku & Kamasa (2020)	Turkey	Vector Auto Regression (VAR)	1990 - 2014	The analysis reveals that there is only a weak association between GDP and PPPs.
Banda & Jeke (2022)	Zambia	Auto-regressive Distributed Lag (ARDL)	2000 - 2017	PPPs have a positive impact on GDP and economic development (improved household consumption and job creation).
Mapule & al. (2023)	35 developing countries	Generalized Moment Method (GMM)	1997 - 2018	PPP investment contributes positively to economic growth. PPP investment in the energy sector contributes positively to economic growth. PPP investment in the transport sector has no significant effect on economic growth.
Aini (2024)	ASEAN	Generalized Moment Method (GMM)	1990 - 2022	The number of PPP projects does not show a significant influence on economic growth in ASEAN. PPP investment in the telecommunications sector has a positive and significant influence on economic growth in ASEAN.

Therefore, according to the previous results of these empirical studies, our hypothesis to be tested is:

Hypothesis: Public-private partnership investments have a positive impact on economic growth in Morocco.

Methodological framework

Data Sources

To empirically analyze the impact of public-private partnerships (PPPs) on economic growth, we used the World Bank's database on private participation in infrastructure. This database represents a primary means and tool for measuring and monitoring trends in public-private partnerships (PPPs) worldwide, and more particularly in developing countries. It also provides technical advice and support to help countries to improve their regulatory

environment and attract private investors to finance and operate infrastructure. The data collected from this database is conducted over a sample period extending from 1990 to 2020, providing a comprehensive time frame to assess trends and patterns over three decades.

Several studies conducted in the context of public-private partnerships such as Lee & al. (2018), Mapule & al. (2023), Hammami & al. (2006), Yurdaku & Kamasa (2020), have all used private participation in infrastructure projects (PPI) database.

Variable Descriptions

To verify our hypothesis, attention was given to the role of Public-Private Partnerships on growth in Morocco; the analysis was developed by introducing additional variables (control variables). Thus, we will draw inspiration from the endogenous growth model of Barro (1990, 1991, and 1996).

Control variables are included in the analysis to account for variations in macroeconomic conditions. This approach facilitates, to some extent, the isolation of the impact of sentiment from that of economic variables, thus reinforcing the robustness of the results.

Based on existing literature, the model includes investments in Public-Private Partnerships, Labor force, Money Supply, Inflation, Government Revenue and Gross Capital Formation as determinants of economic growth.

- Dependent variable:

GDP (Y): GDP per capita is gross domestic product divided by midyear population. it is the most widely used indicator to assess a country's production of goods and services over a year. It illustrates the importance of a country's economic activity. Macroeconomic theory suggests that an increase in PPP investments leads to significant GDP growth, so PPP activities are positively associated with GDP growth (Pimentel & al, 2017).

- Independent variables:

PPP variables: Represents the amount and number of public-private partnerships (PPPs) carried out in Morocco over time. It provides an aggregate measure of the scale and importance of PPPs, taking into account both the quantity (number) and the total monetary value of PPPs.

GCF: Gross Capital Formation represents the total amount of expenditure made for the purchase of capital goods such as equipment, machinery, buildings, etc. It measures investment in fixed capital and is often used as an indicator of economic activity.

Labor force: All persons who provide labor for the production of goods and services during a given period. The labor force can influence the overall demand for goods and services, which in turn can affect the level of economic output (GDP).

Money supply: refers to the total amount of money in circulation in an economy at any given time. It typically includes currency in circulation, demand deposits, and other forms of liquid money. Changes in the money supply can impact inflation and other aspects of economic activity.

Inflation Rate: The inflation rate measures the rate of change in the prices of goods and services in an economy over time. High inflation can affect consumption, investment, and other aspects of economic activity.

Government Revenue: Government revenue consists of taxes, social contributions, grants receivable and other revenue.

Table 2 : Summary of Proposed Variable Description

Variable Name	Abbreviation	Unit of Measurement	Data Source
Dependent variable			
GDP per capita	GDP	\$ US courants	World Bank's World Development Indicators database
PPP variables			
PPP investment	INV_PPP	US \$	World Bank's Private Participation in Infrastructure database
Number of PPPs	NBR_PPP	Number	World Bank's Private Participation in Infrastructure database
Control Variables			
Gross Capital formation	GCF	% GDP	World Bank's World Development Indicators database
Labor force	LABOR	Labor force size	World Bank's World Development Indicators database
Broad money supply	MM	% GDP	World Bank's World Development Indicators database
Inflation	INF	% Annual	International Monetary Fund's World Economic Outlook data base
Government Revenue	REV_GOV	% GDP	International Monetary Fund's World Economic Outlook data base

Source: Authors

Econometric model

In response to our problem, we propose an estimation by **autoregressive distributed lag model (ARDL)** suggested by Pesaran et al. (2001) in order to estimate the effect of Public-Private Partnerships on economic growth in Morocco, over a period between 1990 and 2020. We will also advance our research by introducing macroeconomic performance

indicators as control variables. Thus our model is inspired by the endogenous growth theory of **Barro (1990, 1991, and 1996)**.

To study both the relationships and the impact of PPPs on growth and economic development, the study uses the following ARDL model specification:

$$\begin{aligned} \text{LogGDP}_t = & \alpha_0 + \sum_{i=1}^p \alpha_{1i} \text{LogGDP}_{t-i} + \sum_{i=0}^p \alpha_{2i} \text{GCF}_{t-i} + \sum_{i=0}^p \alpha_{3i} \text{INV_PPP}_{t-i} + \sum_{i=0}^p \alpha_{4i} \text{NBR_PPP}_{t-i} + \\ & \sum_{i=0}^p \alpha_{5i} \text{INF}_{t-i} + \sum_{i=0}^p \alpha_{6i} \text{MM}_{t-i} + \sum_{i=0}^p \alpha_{7i} \text{LogLABOR}_{t-i} + \sum_{i=0}^p \alpha_{8i} \text{REV_GOV}_{t-i} + \beta_1 \text{LogGDP}_{t-1} + \beta_2 \text{GCF}_{t-1} + \beta_3 \text{INV_PPP}_{t-1} + \\ & \beta_4 \text{NBR_PPP}_{t-1} + \beta_5 \text{INF}_{t-1} + \beta_6 \text{MM}_{t-1} + \beta_7 \text{LogLABOR}_{t-1} + \beta_8 \text{REV_GOV}_{t-1} + \varepsilon_t \end{aligned}$$

Where $\alpha_1 \dots \alpha_5$ represent the short-term dynamics of the model while $\beta_1 \dots \beta_5$ represent the long-term relationship and ε is the white noise error term.

Result and discussion

Result of the study

Descriptive statistics

Table 3 shows the descriptive statistics of the main variables used in our study over a period of 30 years. For each variable, this table provides the mean, standard deviation and range of variation of the data. The variables examined include gross domestic product (GDP), gross capital formation (GCF), inflation (INF), investments in Public-Private Partnerships (INV_PPP), money supply (MM), number of PPPs (NBR_PPP), labor force (LABOR), government revenues (REV_GOV).

The mean for GDP stands at \$75.5 billion, while the median is slightly lower at \$68.9 billion, indicating a relatively balanced distribution with some outliers. For gross fixed capital formation, the mean is 26.01% of GDP, and the median is 25.79%, showing a stable trend in capital accumulation. For inflation, the average is 1.97%, with a median of 0.89%, suggesting variability in inflation rates over the period.

GDP reached a maximum of \$129 billion, while the minimum was \$30.2 billion, illustrating phases of marked growth but also economic challenges to overcome. PPP investments also varied, with a maximum of \$2.75 billion and a minimum of zero, indicating that PPP investments have been sporadic. Money supply fluctuated between 46.15% and 128.86% of GDP, reflecting significant changes in economic liquidity.

The standard deviation of GDP is 35.5, indicating considerable variability around the mean. For GFCF, the standard deviation is 2.52, suggesting some stability in capital accumulation. Inflation has a higher standard deviation of 2.89, showing notable fluctuations. PPP investments have a standard deviation of 0.84, highlighting their irregular nature.

Thus, descriptive statistics provide valuable insight into Morocco's economic performance. The variability of indicators such as GDP, PPP investments and inflation suggests that the country has gone through phases of growth and economic difficulties. This information can be essential to guide economic policies and development strategies, with an emphasis on the need to encourage more regular investments in infrastructure through PPPs.

Table 3: Descriptive statistics

	GDP	GCF	INV PPP	NBR PPP	INF	LABOR	MM	REV GOV
Mean	7.55E+10	26.00591	0.570399	0.967742	1.970724	10260353	83.30741	22.86753
Median	6.89E+10	25.79361	0.141000	1.000000	0.886221	10570285	83.31918	23.18125
Maximum	1.29E+11	31.26829	2.746000	4.000000	11.65717	12141859	128.8631	28.88086
Minimum	3.02E+10	21.78203	0.000000	0.000000	-1.767599	7439482.	46.15091	18.45640
Std. Dev.	3.55E+10	2.523479	0.835667	1.079626	2.885556	1483392.	25.24389	2.795813
Skewness	0.120669	0.162087	1.318985	1.033573	1.717723	-0.464725	-0.043340	0.206160
Kurtosis	1.356589	2.055847	3.311835	3.441256	5.691627	1.851656	1.494483	1.939003
Jarque-Bera	3.563765	1.287165	9.114161	5.770908	24.60255	2.819154	2.937373	1.673641
Probability	0.168321	0.525407	0.010493	0.055829	0.000005	0.244247	0.230228	0.433085
Sum	2.34E+12	806.1831	17.68237	30.00000	61.09243	3.18E+08	2582.530	708.8934
Sum Sq. Dev.	3.77E+22	191.0384	20.95016	34.96774	249.7930	6.60E+13	19117.62	234.4970
Observations	31	31	31	31	31	31	31	31

Source: Authors

Unit root tests

The unit root test is essential before estimating the model using the ARDL approach to assess the stationarity of the variables and their degrees of integration.

Table 4 : Unit Root ADF Test Results

Variables	Level		First difference		Order of integration
	ADF Statistics	Test Proba.	ADF Statistics	Test Proba.	
GDP	-0.812629	0.8010	-4.517964	0.0012	I(1)
GCF	-1.473749	0.5239	-5.448657	0.0001	I(1)
INV PPP	-4.112552	0.0033	-	-	I(0)
NBR PPP	-2.918700	0.0550	-7.312054	0.0000	I(1)
INF	-5.323935	0.0001	-	-	I(0)
MM	0.091125	0.9597	-5.207933	0.0002	I(1)
LABOR	-3.726063	0.0087	-	-	I(0)
REV_GOV	-1.282102	0.6200	-3.617467	0.0139	I(1)

Source: Authors

According to the ADF test results, it is observed that the variables INF, INV PPP and LABOR are stationary at the level (I (0)), while the variables GDP, GCF, MM, NBR PPP, REV_GOV are stationary at the order of the first difference (I (1)). Thus, no series of orders of two I(2) or more are integrated, which is essential for the application of ARDL. This result perfectly matches

the conditions of application of the ARDL approach as presented by Pesaran et al. (2001).

Lag length selection

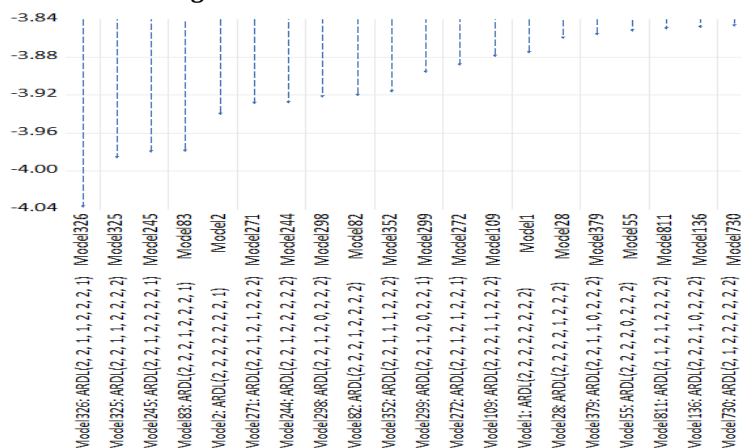
Defining the ideal number of lags to consider is an important phase in the ADRL (Auto Regressive Distributive Lags) method. To achieve this goal, several criteria are generally used, among which the most common are: the Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC). In our study, we will use the Akaike information criterion (Kuma, 2018) to choose the best ARDL model. According to this standard, the optimal model is the one that offers statistically relevant results. According to the information criterion (AIC), the twenty best-performing models include the ARDL (2, 2, 1, 1, 2, 2, 2, 1) which is considered the ideal model and has the lowest AIC value. Figure 2 illustrates the results.

Table 5: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-269.0544	NA	0.027444	19.10720	19.48439	19.22533
1	-86.13065	252.3087*	8.91e-06	10.90556	14.30023*	11.96873
2	9.118140	78.82659	3.43e-06*	8.750473*	15.16262	10.75868*

Source: Authors

Figure 2: Akaike Information Criterion



Source: Authors

Co-integration Analysis: ARDL bounds Test

In order to confirm the presence of co-integration and to study the existence of a long-term relationship between the variables of our research, we applied the co-integration test "Bounds test".

Table 5 : ARDL Bound test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	8.250535	10%	1.92	2.89
k	7	5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9

Source: Authors

From Table 5 the value of Fisher statistic ($F = 8.25$) exceeds the lower and upper bounds for the different significance levels (1%, 2.5%, 5% and 10%). Therefore, we reject the null hypothesis and accept that there is a long-term relationship between the variables.

Study of the short and long-term relationship

Once we have verified the existence of a long-term relationship between growth and PPPs and other control variables considered in this study, we will move on to the study of the long- and short-term relationship.

Long-term relationship estimation

Table 6 provides us with the different results of the long-term equilibrium estimates between economic growth and PPPs.

Table 6: ARDL long-run coefficients

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GCF	-0.003766	0.014692	-0.256314	0.8042
INV PPP	0.029196	0.012515	2.332792	0.0480
NBR PPP	-0.053634	0.010270	-5.222559	0.0008
INF	0.028192	0.008298	3.397296	0.0094
LOG(LABOR)	1.033919	0.415733	2.486981	0.0377
MM	0.022574	0.002752	8.202283	0.0000
REV GOV	-0.035115	0.013828	-2.539477	0.0347
C	7.201359	6.656361	1.081876	0.3108
EC = LOG(GDP) - (-0.0038*GCF + 0.0292*INV PPP -0.0536*NBR PPP + 0.0282*INF + 1.0339*LOG(LABOR) + 0.0226*MM -0.0351*REV GOV + 7.2014)				

Source: Authors

The results of the study presented in (Table 6) show that there is a significant and positive relationship between PPP investments and the increase of economic growth in Morocco over the long term. With a probability of $0.048 < 0.05$. A 1% increase in public-private partnership investments leads to an average increase of 0.048% in GDP. Several studies In Asia, Africa and Europe, conducted by Mapule & al. (2023), Banda & Jeke (2022), Turan & al. (2011), Lee et al. (2018) and Hammami et al (2006), found that PPP investments have a positive effect on economic growth, because they stimulate and strengthen the development of public infrastructure, but at the same time they encourage private investment in infrastructure which leads to an increase in national production.

In this study, other variables revealed a significant impact on explaining economic growth which are LABOR, MM and INF. It is noted that the variable which has the greatest impact on long-term economic growth is the working population. Contrary to our expectations, our study found a positive impact between inflation and economic growth. This result can be interpreted as an indication that a moderate level of inflation can stimulate economic growth. During the two decades preceding 2020, Morocco benefited from moderate inflation of around 2%. This result is consistent with the results of Mallik & Chowdhury (2001) in their study, where they examined the relationship between inflation and GDP growth in a sample of 4 South Asian countries and found that inflation and economic growth are positively related.

Government revenues are negatively related to economic growth and are statistically significant at the 5% level. Government revenues are a proxy for higher tax burdens, suggesting that the higher the tax burden, the more difficult it may be for governments to raise taxes further to cover the bulk expenditures that are likely to contribute to economic growth, such as infrastructure investments (Checherita, 2009).

The estimation of the short-term relationship

We will now present the results of the estimates of the short-run relationship (Table 7).

Table 7: ECM model estimation (short term)

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(GDP(-1))	0.227284	0.068859	3.300709	0.0108
D(GCF)	-0.014582	0.004256	-3.426085	0.0090
D(GCF(-1))	0.022436	0.004227	5.308109	0.0007
D(INV PPP)	0.005926	0.005336	1.110541	0.2990
D(NBR PPP)	-0.033321	0.005066	-6.576747	0.0002
D(INF)	0.013513	0.001785	7.571914	0.0001
D(INF(-1))	-0.011077	0.002394	-4.627829	0.0017
DLOG(LABOR)	4.386331	0.495716	8.848468	0.0000
DLOG(LABOR(-1))	3.558832	0.683406	5.207496	0.0008
D(MM)	0.004468	0.001496	2.986180	0.0174
D(MM(-1))	-0.013589	0.002753	-4.935619	0.0011
D(REV GOV)	-0.001465	0.005655	-0.259041	0.8021
CointEq(-1)*	-1.358154	0.111448	-12.18645	0.0000
R-squared	0.960237	Mean dependent var		0.045658
Adjusted R-squared	0.930414	S.D. dependent var		0.079531
S.E. of regression	0.020980	Akaike info criterion		-4.588682
Sum squared resid	0.007042	Schwarz criterion		-3.975756
Log likelihood	79.53589	Hannan-Quinn criter.		-4.396721
Durbin-Watson stat	2.600420			

Source: Authors

CointEq (-1) corresponds to the lagged residual from the long-term equilibrium equation. According to the results in Table 6, the coefficient of CointEq (-1) is negative and highly significant, confirming the existence of a short-term adjustment mechanism to reach equilibrium is significant. This term is estimated at -1.35 for our ARDL model, reflecting a rapid adjustment to the long-term target.

Regarding the short-term relationship between the independent variables and the dependent variable, we find a positive relationship between the GFC if we consider the lagged value and economic growth, unlike PPP investment which shows a positive and insignificant impact on economic growth economic growth with a probability of $0.2990 > 0.05$. This is explained by the fact that in the short term, it can be difficult for PPP investments to reveal their effects on growth in a relatively short period of time. This may be due to the project preparation, design, and financing phase, as well as the time required for the infrastructure to be operational and begin producing tangible results. In addition, administrative processes and coordination between the public and private sectors can cause delays, limiting the immediate effects of investments. However, once projects are completed, PPPs contribute significantly to economic growth, improved public services, and long-term productivity.

Validity of the model

In this model validation step, we will check if the residuals of the model obtained follow a normal distribution, this depends on the value of the Jarque-Bera normality test, whether we have a value greater than 5%, the same for the autocorrelation tests (Breusch-Godfrey) and homoscedasticity (Breusch-Pagan Godfrey), the p-value values associated with the two Breusch-Godfrey tests and the Breusch-Pagan Godfrey test, are greater than 5%.

Table 3 : Validity test results

<i>Hypothesis</i>	<i>Test applied</i>	<i>Test result</i>
<i>Normality</i>	<i>Jarque-Bera</i>	<i>J-B= 3.955730 (p-value=0.1383)</i>
<i>Autocorrelation</i>	<i>Breusch-Godfrey</i>	<i>F= 2.353116 (p-value =0.1760)</i>
<i>Heteroscedasticity</i>	<i>Breusch-Pagan- Godfrey</i>	<i>F= 0.925950 (p-value =0.5846)</i>

The results of the statistical tests for the ADRL model indicate that the residuals follow a normal distribution, which ensures the validity of the estimates. The absence of a significant correlation of the residuals with their past values also reinforces the robustness of the model, confirming that the forecast errors are independent. In addition, the heteroscedasticity analysis reveals that the residuals do not present significant variability depending on the explanatory variables, thus reinforcing the credibility of the model. Overall, these results ensure the reliability of economic analyses and the decisions that result from them.

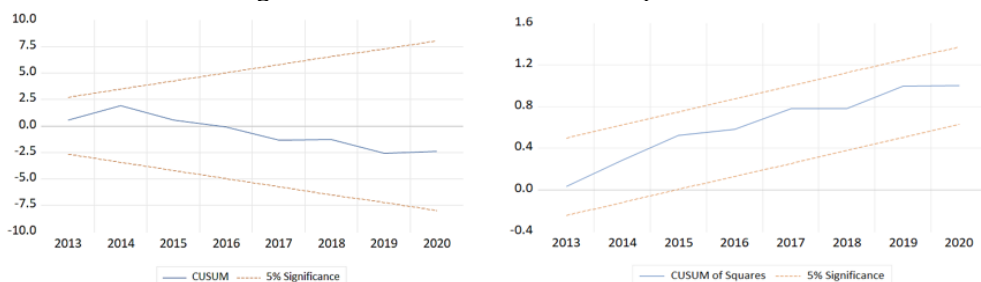
Model stability test

We are now at the last two diagnostic tests of our model, which are also the most crucial: the CUSUM and CUSUMSQ stability tests. These two tests are applied to the residuals from the equation of our model. As for the CUSUM test, it is illustrated by a curve of the cumulative sum of the residuals with a significance threshold of 5% and under the null hypothesis: the stability of the model parameters if the curve is located in the critical zone between the two lines representing the limits of the interval. On the other hand, according to the alternative hypothesis, they would be considered unstable if the curve is outside this critical zone. As for the CUSUMQ test based on the sum of squares of the residuals, the same CUSUM procedure is applied to perform it. The graph shows the results of the CUSUM test (Figure 3). The stable position of the CUSUM line within the limits indicates that our regression model is stable over time. This means that the coefficients of the model have not undergone significant changes, suggesting that the relationships between the explanatory variables and Moroccan GDP are constant. This stability is essential for economic decision-making, as it ensures that the forecasts based on the model are reliable and that the conclusions drawn from the analysis are valid over the period studied.

Similarly, the CUSUM of Squares line remaining within the bounds

confirms that the model error variance is constant over time. This indicates that there is no heteroscedasticity in the residuals, which is crucial for the validity of the estimates. A constant error variance ensures that the predictions are not influenced by unpredictable fluctuations, thus enhancing the credibility of the results.

Figure 3: CUSUM and CUSUM of Squares Tests



Source: Authors

In conclusion, the fact that the CUSUM and CUSUM of Squares lines remain within the confidence interval limits for the Morocco GDP regression model demonstrates the robustness and stability of the model. These results strengthen confidence in economic analyses, allowing decision-makers to use these estimates to guide effective policies and informed decisions.

Interpretation and discussion of results

Data analysis through the model Autoregressive Distributed Lag (ADRL) for the case of Morocco over the period 1990-2020 highlights several key trends concerning economic growth, investments in Public-Private Partnerships (PPPs) and various economic indicators (control variables). According to our results, we find the existence of significant long-term effects and an absence of immediate short-term impact of PPPs on economic growth, requiring a certain time to generate concrete and persistent consequences.

The long-run results reveal a significant and positive relationship between PPP investment and economic growth. These results corroborate with the findings of Lee & al. (2018), Pimentel & al. (2017), Banda & Jeke (2022), Bakırtaş & Aysu (2019), Hamed Sallam (2015). This finding validates the idea that PPPs can boost economic development, which is consistent with Morocco's policy orientation and the results of current theoretical studies. In recent years, Morocco has actively implemented policies to promote the standardization and rationalization of PPPs, which has enabled it to innovate and develop in the direction of improving quality and efficiency.

Our results are also consistent with the findings of Mapule & al. (2023) who highlight that PPPs have a positive effect on growth and that PPP investments in the energy sector play a determining role in economic growth.

Indeed, the analysis of the data for the case of Morocco (Figure 2) shows that the majority of PPP investments in Morocco are concentrated in the energy sector, which largely explains the positive impact on growth.

Regarding the impact of the number of PPP projects on economic growth, we can observe in (Figure 1) the existence of a large divergence between the amount invested and the number of projects, an increase in the number of projects does not necessarily coincide with an increase in investments or growth. The periods between 1995-2000 and 2010-2025 are periods with high investments but few projects, which explains the positive impact of investments in value on growth, unlike the other periods, and therefore the negative impact of the variable number of projects on growth. This result highlights the importance of prioritizing the quality and concentration of resources on strategic projects to stimulate economic growth rather than increasing small projects.

In the short term, we find no significant effect between PPP investments and economic growth. Estache & Garsous (2012) highlight the fact that the time factor is crucial in conducting studies on infrastructure investments, whether it is Public-Private Partnerships or traditional infrastructure investments. Research that covers long periods of time is more likely to show a positive impact of infrastructure investments on growth and output. This is because infrastructure typically has a unique cash flow profile, with high short-term costs and a slow but long-term revenue stream. Investments in the energy and transportation sectors are often built on revenue forecasts that extend over a period of more than 30 years.

This study highlights the importance of ADRL models to capture complex temporal dynamics, separating short-term effects from long-term relationships. These findings underline the need to incorporate a distinct temporal dimension in the formulation and evaluation of economic policies, for a more detailed understanding of their overall impacts. In conclusion, the lack of immediate effects should not be interpreted as inefficiency; rather, it emphasizes the significance of a long-term strategic perspective in order to guarantee substantial and long-lasting effects on economic performance.

Conclusion

Public-private partnership (PPP) investments are an innovative financing mechanism designed to facilitate projects that generate widespread economic benefits. This approach addresses the constraints posed by limited public resources, enabling the implementation of critical infrastructure projects that stimulate economic growth. By promoting investments in sectors essential to development, and contributing to improving the overall investment climate in a country.

Our empirical analysis measures the impact of PPP investments on economic growth in Morocco for the period 1990-2020. This relationship is empirically tested using the World Bank's database on private participation in infrastructure for developing countries. This is the largest database of its kind, using a consistent methodology across countries and periods to record private investment commitments in four public infrastructure sectors: transport, energy, water and sanitation, and telecommunications.

Our results reveal a positive and significant relationship between these investments and the country's economic growth in long term. This underlines the crucial role of PPP investments, particularly in infrastructure. The sectoral allocation of these investments, with a strong focus on the energy sector, appears to be a decisive factor in maximizing their impact. Unlike the number of PPP projects that do not have a significant influence on growth, this means that investments in large-scale projects produce a greater impact than that generated by small-scale projects. In addition, the strategic selection of PPP projects is essential to ensure that resources are allocated to initiatives with the greatest potential for economic and social returns.

Although these results are significant, our analysis is not without limitations, particularly with regard to the PPI database which only covers PPPs in infrastructure, and more specifically in the transport, energy, water and sanitation, and telecommunications sectors. While infrastructure is likely to constitute the majority of PPP investments, other sectors (such as health and education, etc.) may also be of great importance in helping to alleviate fiscal constraints and supporting economic growth. Broadening the sectoral coverage could be the subject of further work, particularly if the analysis is extended to other countries.

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Influence of School Climate on Teachers' Turnover Intention in Public and Private Primary Schools, Ikeja City, Lagos, Nigeria

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Abstract

Teacher career turnover is a serious global occupational hazard, with the estimated teacher turnover rate ranging from 13 to 15% annually. Even countries with the best educational systems are not insulated in this regard. There cannot be actual turnover without turnover intentions, which are a key precursor. Being a multilevel structured phenomenon, several school variables could be implicated, such as school climate and job satisfaction. The Nigerian education system is portrayed as an environment where turnover intention thrives. Due to the dearth of literature on this regard in Lagos state, Nigeria, this research work utilized a survey research design to study the phenomenon in public and private primary schools. A total of 373 teachers were sampled using a simple random technique, and data was collected through a structured questionnaire. Appropriate descriptive and inferential statistics, such as Pearson product moment correlations, simple linear regression, and Independent t-tests, were used to analyze the data. The findings revealed that there was a moderate negative significant influence of school climate of public and private primary schools' teachers on turnover intention. This means as school climate improves, the turnover intention goes down. School climate measures (safety, academic climate, community climate and organizational environment) jointly influenced teachers' thinking of quitting their current job.

There was a significant difference between public and private primary schools' teachers' turnover intentions. The study concluded that school type (public or private primary schools' climate) has a significant, moderating effect on teachers' turnover intention. Teachers' turnover intention was higher in private schools. It is recommended that public and private primary schools in Ikeja City should intentionally improve school climate by improving safety, academic climate, community climate, and organizational environment to reduce teacher turnover intention.

Keywords: School Climate, Teachers Turnover Intention, Public and Private Primary Schools

Introduction

Turnover intention is used to measure people's intention to resign from their current job, look for another job, and follow through on resigning. Interest in the study of turnover intention as a proxy for actual turnover has gained much popularity among researchers and academics in industrial-organizational psychology (Griffeth, Hom & Gaertner, 2000). Turnover intention is the relative strength or desire of a person to voluntarily withdraw from an organization. Intention is the reason, and turnover is the result. High turnover intention predicts a greater likelihood of a person actually leaving a job. For several decades, the turnover intention has received extra attention from teachers and practitioners, including education practitioners, because its existence is suspected of disrupting organizational conduciveness. Teacher turnover intention has severe consequences for the quality of instruction, for students and their learning, and, more broadly, for the school community. A school loses institutional memory due to significant staff changes. Changes in staff raise the need for additional resources for recruiting and familiarizing new members with the everyday practices adopted by that school community (Ronfeldt, Leob & Wyckoff, 2013). Ekabu and Arnoux-Nicola et al. (2018) opined that teacher turnover intentions are influenced by certain working conditions that teachers are not comfortable with. They agree that adverse working conditions are positively and significantly associated with turnover intentions. Working conditions, such as physical and psychological factors within a school or work organization, are strong motivators that keep employees on their job. Park and Shaw (2013) conducted a meta-analysis of the relationship between turnover rates and organizational performance. The results show that the relationship between total turnover rates and organizational performance is significant and negative. Similarly, in a quantitative correlational study to determine the extent to which organizational climate and teacher stress predict teacher turnover intention, Roebuck (2023) found that the Organizational Climate Index achievement

press subscale score (OCI-AP; $B = -.356$, $p = .028$) and total Teacher Stress Inventory score ($B = .014$, $p = .000$) were statistically significant predictors of turnover intention. An increase in achievement press resulted in a decrease in turnover intention, while an increase in total score predicted an increase in turnover intention.

Where such motivating factors do not exist, turnover intention among employees is inevitable. Bauer (2012) found it perplexing that employees were voluntarily willing to face the uncertainty of a new place of employment instead of accepting their current work situation. In many countries, the estimated teacher turnover rate ranges from 13 to 15% annually (Nissinen & Välijärvi, 2011). Even in Finland, where the teaching profession has traditionally been highly appreciated and where teachers have been committed to their profession, there is a rising concern about teacher job-satisfaction, the attractiveness of the teaching career, and an increase in turnover (VAKAVA Statistics, 2017). No doubt, the high rate of teacher turnover intention is a global phenomenon. In Kenya, for example, despite government intervention through various policies, the problem of teacher turnover intention persists (Kamau, Muathe & Wainaina, 2020). Another study by Ekabu, Kalau, and Nyagah (2019) revealed that 64.2% of the respondents intended to leave teaching in secondary schools in Meru County, Kenya.

These statistics thus indicate a high rate of intention to leave among public school teachers in Kenya. A study by Ajayi and Olatunji (2017 & 2018) portrays the Nigerian education system as an environment where turnover intention thrives. They implicated many variables, such as job satisfaction and other school-related factors. However, research on teacher turnover in Nigeria seems to be limited. A healthy school climate promotes job satisfaction, which in turn brings forth the low staff turnover intentions, leading to high service delivery. If turnover intention is not adequately addressed, academic staff may constantly seek to move from a stagnant and unhealthy school climate to healthier ones. While organizations expect or even desire some level of voluntary employee turnover (e.g., to promote innovation or avoid stagnation), they are motivated to prevent it from becoming excessive due to its cost (Dess & Shaw, 2001). Such costs include losing specialized human capital, replacing personnel, and training new or reassigned personnel. Minimizing turnover intention in this multilevel phenomenon is the focus of this study. It is with this objective that this research on influence of school climate on academic staff turnover intention is conceptualized.

The following research hypotheses were tested;

H0₁. There is no significant relationship between school climate and teacher's turnover intention in public and private primary schools in Ikeja City, Lagos State.

H0₂: There is no significant influence of school climate on teacher's turnover intention in public and private primary schools in Ikeja City, Lagos State.

H0₃: There is no significant moderating influence of school type on school climate and teacher's turnover intention in public and private primary schools in Ikeja City, Lagos State.

Method and Materials

A survey research design was used in the study. All the public and private primary schools in Ikeja City, Lagos State, formed the population of the study. In total, there were 98 primary schools and 1281 teachers in both private and public primary schools. Following the sampling formula of Taro Yemane, a sample size of 305 teachers formed part of the study drawn through simple random sampling technique.

This sample consisted of 18 private primary schools and 5 public nursery and primary schools.

The school climate questionnaire covered four major aspects of the school climate: safety, academic climate, community climate, and the organizational environment. The school safety questionnaire contained 11 items, the academic climate section contained 13 items, the community climate section contained 18 items, and the organizational environment section contained 14 items. All Items were measured using a scale of 1 to 4. A four-point Likert scale was used to rate the items, ranging from 1 (strongly disagree) to 4 (strongly agree).

The scale includes a total of 56 items, divided into two factors: hygiene factors (safety and academic climate) and motivational factors (community climate and organizational environment). Turnover intention was measured using a modified version of a turnover intention assessment scale, which consist of 6 items. The six-item turnover intention scale (TIS-6), developed by Michaels and Spector (1982), was used. A four-point Likert scale was used to rate the items, ranging from 1 (never, or strongly impossible) to 4 (always, or very possible). The total score of the six items were computed as the score for turnover intention, ranging from 6 to 30. A high score suggests a greater turnover intention (" ≤ 15 " comprised the "low" group and "> 15" comprised the "high" group). The scale includes a total of six items, divided into three dimensions: thinking of quitting a current job (turnover intention I, items 1 and 2), searching for another job (turnover intention II, items 3 and 4), and obtaining the employment letter for another work (turnover intention III, items 5 and 6). Four major aspects of the school climate safety, academic climate, community climate, and the organizational environment were tested upon collection of data. The questionnaires were tested for validity and reliability. Face validity, content validity, and construct validity methods were used in

the process. The Cronbach's alpha coefficient test for internal consistency and reliability showed values higher than 0.70 alpha benchmark and composite reliability (CR) greater than 0.6.

Specifically, the Cronbach's alpha reliability test showed an alpha of 0.817 for the independent variable, school climate, and 0.723 for the dependent variable, teacher's turnover intention.

Findings

H0₁. There is no significant relationship between school climate and teacher's turnover intention in public and private primary schools in Ikeja City, Lagos State.

Table 1. Correlation Analysis of the Relationship between School Climate and Teacher's Turnover Intention

		Thinking of Quitting current job	Searching for another job	Obtaining employment letter or another job
Safety related statements	Pearson Correlation	-.499**	-.587**	-.627**
	Sig. (2-tailed)	.000	.000	.000
	N	372	373	369
Academic climate related statements	Pearson Correlation	-.481**	-.577**	-.620**
	Sig. (2-tailed)	.000	.000	.000
	N	372	373	369
Community climate related statements	Pearson Correlation	-.587**	-.610**	-.653**
	Sig. (2-tailed)	.000	.000	.000
	N	372	373	369
Organizational environment related statements	Pearson Correlation	-.527**	-.582**	-.640**
	Sig. (2-tailed)	.000	.000	.000
	N	372	373	369

**. Correlation is significant at the 0.01 level (2-tailed).

The safety climate of a school has moderate, negative, and significant relationship with thinking of quitting current job ($r = -.499$, $p < 0.05$). It also has moderate, negative, and significant relationship with searching for another job ($r = -.387$, $p < 0.05$) and with obtaining employment letter for another job ($r = -.627$, $p < 0.05$). This implies that when safety improves, thinking of quitting current job, searching for another job, and obtaining employment letter for another job decreases.

The academic climate has a moderate, negative, and significant relationship with thinking of quitting current job ($r = -.481$, $p < 0.05$). It also has a moderate, negative, and significant relationship with searching for another

job ($r=-.577$, $p<0.05$) and with obtaining employment letter for another job ($r=-.620$, $p<0.05$).

This implies that when the community climate improves, thinking of quitting current job, searching for another job, and obtaining employment letter for another job decreases.

The community climate has a moderate, negative, and significant relationship with thinking of quitting current job ($r=-.587$, $p<0.05$). It also has a moderate, negative, and significant relationship with searching for another job ($r=-.610$, $p<0.05$) and with obtaining employment letter for another job ($r=-.653$, $p<0.05$). This implies that when the community climate improves, thinking of quitting current job, searching for another job, and obtaining an employment letter for another job decrease.

The organizational environment has a moderate, negative, and significant relationship with thinking of quitting current job ($r=-.527$, $p<0.05$). It also has a moderate, negative, and significant relationship with searching for another job ($r=-.582$, $p<0.05$) and with obtaining employment letter for another job ($r=-.640$, $p<0.05$). This implies that when the organizational environment improves, thinking of quitting current job, searching for another job, and obtaining an employment letter for another job decrease. Through these findings, light is shed on the alternative hypothesis (H_{11}) that there is no positive relationship between school climate and teacher's turnover intention in public and private primary schools in Ikeja City, Lagos State.

H02. There is no significant influence of school climate on teacher's turnover intention in public and private primary schools in Ikeja City, Lagos State.

Table 2a. Regression Analysis of School Climate on Teachers Thinking of Leaving Current Job

	Model	Sum of Squares	Df	Mean Square	F()	Sig.(P)
1	Regression	469.658	4	117.415	53.336	.000 ^b
	Residual	807.920	367	2.201		
	Total	1277.578	371			

R = .606; $R^2 = .368$; Adjusted $R^2 = .361$; Standard Error of the Estimate = 1.48372;

b. Predictors: (Constant), Organizational Environment-related statements, Safety- related statements, Community Climate-related statements, Academic Climate- related statements

Table 2a indicates that the predictors (organizational climate, safety, community climate, and academic climate) have a significant positive influence on thinking of quitting current job ($F_{(4, 367)} = 53.336$, $p < 0.05$). The predictor variables have a moderate negative significant influence on thinking of quitting the current job. The school climate, which included the hygiene factors, safety and academic climate, and the motivational factors, community

climate and organizational environment, all have a moderate, negative, and significant relationship with teachers thinking of quitting current job. They account for 36.1% of the criterion variable (thinking of quitting the current job) ($R = .606$, $Adj. R^2 = .361$). They can only explain 36.1% of the variations in dependent variable (turnover intention); however, 64% remains unexplained in this study. In other words, there are additional variables that are important in explaining turnover intention that have not been considered in this study.

Table 2b. Coefficient of Regression Analysis of School Climate on Teachers Thinking of Leaving Current Job

	Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.799	.396		22.200	.000
	Safety related statements	-.036	.025	-.152	-1.450	.148
	Academic climate related statements	.108	.030	.483	-3.583	.000
	Community climate related statements	-.122	.018	-.777	-6.764	.000
	Organizational environment related statements	-.022	.021	-.129	-1.081	.280

a. Dependent Variable: Thinking of Quitting current job

The coefficient table indicates the contribution of each predictor variable. The table shows that safety has no significant effect on thinking of quitting the current job ($B = .036$, $t = -1.450$, $p > .05$). Academic climate has a significant negative influence on thinking of quitting current job ($B = .108$, $t = -3.583$, $p < .05$). Community climate has a significant negative influence on thinking of quitting current job ($B = -.122$, $t = -6.764$, $p < .05$). Organizational environment has an insignificant effect on thinking of quitting current job ($B = -.022$, $t = -1.081$, $p > .05$). Generally, the community climate ($Beta = -.777$) has the most influence on thinking of quitting the job compared to the other independent variable. This is followed by academic climate ($Beta = .483$).

Table 2c. Regression Analysis of School Climate on Teachers Searching for Job

ANOVA ^a						
	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	509.183	4	127.296	58.024	.000 ^b
	Residual	807.332	368	2.194		
	Total	1316.515	372			
R = .622; R2 = .387; Adjusted R2 = .380; Standard Error of the Estimate = 1.48116;						

a. Dependent Variable: Searching for another job

b. Predictors: (Constant), Organizational environment related statements, Safety related statements, Community climate related statements, Academic climate related statements

The table indicates that the predictors (organizational climate, safety, community climate, and academic climate) have a moderate negative significant effect on searching for another job ($F_{(4, 368)} = 58.024$, $p < 0.05$). The predictor variables and the dependent variable, turnover intention, which is searching for another job, have a correlation coefficient ($R = .622$), indicating a moderate positive relationship. The predictors (organizational climate, safety, community climate, and academic climate) account for 38.0% ($R^2 = .380$) of the variance in the criterion variable (searching for another job).

Table 2d. Regression Analysis Coefficient of School Climate on Teachers Searching for Another Job

		Coefficients^a			
		Unstandardized Coefficients		Standardized Coefficients	
	Model	B	Std. Error	Beta	T Sig.
1	(Constant)	9.510	.395		24.057.000
	Safety related statements	-.060	.024	-.251	-2.438.015
	Academic climate related statements	.021	.030	.094	.707 .480
	Community climate related statements	-.064	.018	-.401	-3.557.000
	Organizational environment related statements	-.015	.021	-.083	-.706 .481

a. Dependent Variable: searching for another job

The coefficient table indicates the contribution of each predictor variable. The table shows that safety has a significant negative effect on searching for another job ($B = -.060$, $t = -2.44$, $p < .05$). Academic climate has no significant effect on searching for another job ($B = .021$, $t = .707$, $p > .05$). Community climate has a significant effect on searching for another job ($B = -.064$, $t = -3.557$, $p < .05$). Organizational environment has an insignificant effect on searching for another job ($B = -.015$, $t = -0.481$, $p > .05$).

Based on the standardized coefficient, community climate ($Beta = -.401$) is the largest predictor variable, followed by safety ($Beta = -.251$).

Table 2e. Regression Analysis of School Climate on Teachers Obtaining Employment Letter for Another Job

ANOVA^a						
	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	809.531	4	202.383	73.476	.000 ^b
	Residual	1002.604	364	2.754		
	Total	1812.136	368			
R = .668 ; R ² = .447; Adjusted R ² = .441; Standard Error of the Estimate = 1.65964;						

a. Dependent Variable: Obtaining employment letter for another job

b. Predictors: (Constant), Organizational environment related statements, Safety related statements, Community climate related statements, Academic climate related statements

The table indicates that predictors (organizational climate, safety, community climate, and academic climate) have significant negative effect on teacher's intention of obtaining an employment letter for another job ($F_{(4, 364)} = 73.476$, $p < 0.05$). Teacher's turnover intention, which is obtaining an employment letter for another job, has a moderate relationship ($R = .668$) with the predictors variables, accounting for 44.1% ($R^2 = .441$) of the criterion variable (obtaining an employment letter for another job).

Table 2f. Regression Analysis Coefficient of School Climate on Teachers Thinking of Leaving Current Job Coefficients^a

	G Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.086	.446		24.876	.000
	Safety related statements	-.065	.028	-.233	-2.376	.018
	Academic climate related statements	.033	.034	.123	.975	.330
	Community climate related statements	-.067	.020	-.357	-3.303	.001
	Organizational environment related statements	-.047	.023	-.225	-2.020	.044

a. Dependent Variable: Obtaining employment letter for another job

The coefficient table indicates the contribution of each predictor variable. The table shows that safety has a negative significant influence on obtaining an employment letter for another job ($B = -.065$, $t = 2.376$, $p < .05$). Academic climate has no significant effect on obtaining an employment letter for another job ($B = .033$, $t = .975$, $p > .05$). Community climate has a negative significant influence on obtaining employment letter for another job ($B = -.067$, $t = -3.303$, $p < .05$). Organizational environment has a significant negative influence on obtaining an employment letter for another job ($B = -.047$, $t = -2.020$, $p < .05$). From the table above, it can be seen that community climate is the greatest contributor to the variance of the dependent variable, followed by safety and organizational environment.

H0₃. There is no significant moderating influence of school type on school climate and teachers' turnover intention in public and private primary schools in Ikeja City, Lagos State.

Table 3a. Multiple Regression Analysis of the Moderating Influence of School Type on School Climate and Teachers' Thinking of Quitting Current Job (Turnover intention I)

	Model	Sum of Squares	Df	Mean Square	F	Sig.
Public	Regression	469.658	4	117.415	53.336	.000 ^b
	Residual	807.920	367	2.201		
	Total	1277.578	371			
Private	Regression	489.338	5	97.868	45.442	.000 ^c
	Residual	788.240	366	2.154		
	Total	1277.578	371			
Public: R = .606; R ² (Adjusted) = .361; Standard error estimate = 1.48372; R ² (Change) = .368; Sig. F(Change) = .000; Private: R = .619; R ² (Adjusted) = .375; Standard error estimate = 1.46754.; R ² (Change) = .015; Sig. F(Change) = .003;						

a. Dependent Variable: Thinking of quitting current job

b. Predictors: (Constant), Organizational environment related statements, Safety related statements, Community climate related statements, Academic climate related statements

c. Predictors: (Constant), Organizational environment related statements, Safety related statements, Community climate related statements, Academic climate related statements, Is the school a public or private school

The table shows that the school type has a significant negative moderating effect on school climate and teacher's turnover intention ($R^2 = 0.368$ $F_{(5, 366)} = 45.442$, $p < 0.05$). This implies that being a teacher in either a private or public primary school influences school climate and teachers' turnover intention regarding quitting the current job. The school climate in public schools is better than in private schools, and the better the school climate, the lower the turnover intention. The turnover intention in private schools is higher than in public schools.

Table 3b. Multiple Regression Analysis of the Moderating Influence of School Type on School Climate and Teachers' Searching for Another Job (Turnover intention II)

	Model	Sum of Squares	Df	Mean Square	F	Sig.
Public	Regression	509.183	4	127.296	58.024	.000 ^b
	Residual	807.332	368	2.194		
	Total	1316.515	372			
Private	Regression	520.729	5	104.146	48.030	.000 ^c
	Residual	795.786	367	2.168		
	Total	1316.515	372			
Public: R = .622; R ² (Adjusted) = .380; Standard error estimate = 1.48116; R ² (Change) = .387; Sig. F(Change) = .000; Private: R = .629; R ² (Adjusted) = .387; Standard error estimate = 1.47253.; R ² (Change) = .009; Sig. F(Change) = .022;						

a. Dependent Variable: Searching for another job

b. Predictors: (Constant), Organizational environment related statements, Safety related statements, Community climate related statements, Academic climate related statements

c. Predictors: (Constant), Organizational environment related statements, Safety related statements, Community climate related statements, Academic climate related statements, Is the school a public or private school

This table shows that school type has a significant moderating influence on the relationship between school climate and teacher's turnover intention ($R^2 = 0.387$ $F_{(5, 367)} = 48.030$, $p < 0.05$). This implies that school climate in private and public primary schools differ in its influence on teachers' turnover intention regarding searching for another job (Turnover intention II). The school climate in public schools is better than in private schools, and the better the school climate, the lower the turnover intention. The turnover intention in private schools is higher than in public schools.

Table 3c. Multiple Regression Analysis of the Moderating Influence of School Type on School Climate and Teachers' Obtaining Employment Letter for Another Job (Turnover intention III)

	Model	Sum of Squares	Df	Mean Square	F	Sig.
Public	Regression	809.531	4	202.383	73.476	.000b
	Residual	1002.604	364	2.754		
	Total	1812.136	368			
Private	Regression	813.758	5	162.752	59.175	.000c
	Residual	998.378	363	2.750		
	Total	1812.136	368			
Public: $R = .668$; R^2 (Adjusted) = .441; Standard error estimate = 1.65864; R^2 (Change) = .447; Sig. F(Change) = .000;						
Private: $R = .670$; R^2 (Adjusted) = .441; Standard error estimate = 1.65842.; R^2 (Change) = .002; Sig. F(Change) = .216;						

a. Dependent Variable: Obtaining employment letter for another job

b. Predictors: (Constant), Organizational environment related statements, Safety related statements, Community climate related statements, Academic climate related statements

c. Predictors: (Constant), Organizational environment related statements, Safety related statements, Community climate related statements, Academic climate related statements, Is the school a public or private school

Table 3c clearly indicates that the school type has a significant moderating influence on school climate and academic staff turnover intention ($R^2 = 0.447$ $F_{(5, 363)} = 59.175$, $p < 0.05$). This implies that being a teacher in either a private or public primary school impacts the school climate and teachers' turnover intention regarding obtaining an employment letter for another job (Turnover intention III).

School type yielded a coefficient of multiple regression change (R^2) ranging from .368 to .447. This shows that 36.81% to 44.7% of the total variance in school climate is accounted for by school type in the relationship between academic climate and turnover intention. The table also indicates that the analysis of variance of the multiple regression data produced an F-ratio value significant at the .000 level. Therefore, school type has a significant moderating effect on the relationship between public and private primary schools' climate and teachers' turnover intention. As such, the hypothesis that "There is no significant moderating influence of school type on school climate and academic staff turnover intention in Ikeja City, Lagos State" was rejected.

Conclusion

School climate factors have a moderate, negative, and significant relationship with, and influence on, teachers' turnover intention items. When the academic climate improves, the likelihood of thinking of quitting current job, searching for another job, and obtaining employment letter for another job decreases. School climate influenced teachers' turnover intention in public and private primary schools in Ikeja City, Lagos State. A total variance of 34.9% in school climate is accounted for by teachers thinking of leaving current job, searching for another job, and obtaining an employment letter for another job. The analysis of variance of the regression data showed that school climate had a significantly negative influence on teachers' turnover intention in primary schools in Ikeja City, Lagos State. Regarding the moderating influence of school type on school climate and teachers' turnover intention in public and private primary schools in Ikeja City, Lagos State, school type (private or public) had a significantly moderating effect on schools' climate and teachers' turnover intention. Private schools had significantly higher mean scores in Turnover Intention I, Turnover Intention II, and Turnover Intention III than public schools. There is significant difference between public and private primary schools' teachers' turnover intention in Ikeja City, Lagos State. Public schools had significantly higher mean scores in school climate than private schools. Hence, private nursery and primary schools in Ikeja City should intentionally improve their safety, academic climate, community climate, and organizational environment to reduce teacher turnover intention in private nursery and primary schools in Ikeja City, Lagos, Nigeria.

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Styles Educatifs Parentaux, Estime de Soi et Addictions aux Drogues chez les Adolescents du Centre d'Accueil de la Croix Bleue d'Abidjan

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Résumé

La présente étude examine la relation entre les styles éducatifs parentaux, l'estime de soi et les addictions aux drogues chez des adolescents patients au Centre de la Croix Bleue Côte d'Ivoire. A cet effet, 35 participants, de sexes masculin et féminin, âgés de 17 à 19 ans, ayant au moins consommé de la drogue durant les 12 derniers mois, sont sélectionnés à l'aide des dossiers de consultation médicale. Ensuite, les questionnaires de l'échelle d'estime de soi de Coopersmith (1984) de l'échelle du style parental de Robinson & al (2001) leur ont été administrés afin de relever le niveau d'estime de soi et le style parental auquel chacun d'eux était soumis. Enfin, le questionnaire du Drug Abuse Screening Test (DAST-10) a été administré pour le diagnostic des addictions. L'analyse du Khi-deux réalisée sur les données recueillies suggère une relation simple et interactive entre le style parental démocratique, l'estime de soi élevée et les conduites addictives liées aux drogues chez des adolescents à Abidjan comparativement au style parental permissif et l'estime de soi faible. Ces résultats s'inscrivent dans la perspective des théories de l'attachement de Bowlby (1988), psychosociales de Peele (1985), et des modèles psychologiques des addictions. Cette étude, dans l'optique d'apporter une explication des addictions aux drogues en lien avec le contexte social et les caractéristiques intrinsèques des adolescents, pourrait contribuer à sensibiliser les parents à l'usage des pratiques éducatives stimulantes pour le

développement optimal de leurs enfants et ainsi les éloigner des pratiques susceptibles de leur causer des dommages.

Mots clés : Styles éducatifs parentaux, estime de soi, addictions aux drogues

Parental Educational Styles, Self-Esteem and Drug Addictions among Adolescents at the Blue Cross Reception Center in Abidjan

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Abstract

The present study examines the relationship between parental educational styles, self-esteem and drug addiction among adolescent patients at the Côte d'Ivoire Blue Cross Center. To this end, 35 participants, male and female, aged 17 to 19, having used drugs at least during the last 12 months, were selected using medical consultation files. Then, questionnaires from Coopersmith's self-esteem scale (1984) and Robinson & al's (2001) parenting style scale were administered to them in order to identify the level of self-esteem and the parenting style to which each of them was subject. Finally, the Drug Abuse Screening Test (DAST-10) questionnaire was administered for the diagnosis of addictions. The chi-square analysis carried out on the data collected suggests a simple and interactive relationship between democratic parenting style, high self-esteem and addictive behaviors related to drugs among adolescents in Abidjan compared to permissive parenting style and low self-esteem. These results fall within the perspective of the attachment theories of Bowlby (1988), psychosocial theories of Peele (1985), and psychological models of addictions. This study, with the aim of providing an explanation of drug addiction in relation to the social context and the intrinsic characteristics of adolescents, could contribute to raising parent's awareness of the use of stimulating educational practices for the optimal development of their children and thus keeping them away from practices likely to cause them harm.

Keywords: Parental educational styles, self-esteem, drug addictions

Introduction

La consommation de substances psychoactives fait partie du large spectre des conduites à risques et est étroitement liée à l'adolescence. Quand

vient l'adolescence, période de bouleversements multiples, les jeunes font l'expérience de situations nouvelles. La question des consommations à risques se pose alors souvent avec une acuité particulière. En effet, si faire l'expérience de prise de produits peut sembler banal et d'une grande fréquence à cette période de la vie, les risques de s'engagement dans l'addiction n'en restent pas moins préoccupants. Car les drogues ont en commun d'agir directement sur le circuit de récompense du cerveau impliqué dans le renforcement des comportements et sur d'autres circuits dont dépend la gestion des émotions, de l'humeur, de la motivation et des apprentissages (Reynaud, 2016). Elles sont à l'origine, des sensations de plaisir qui engendrent le désir de renouveler l'expérience et conduisent certains à ne plus pouvoir contrôler leur consommation, ce qui entraîne la dépendance de l'organisme à la substance (Valleur & Matysiak, 2002). Cette manifestation comportementale caractérisée par l'envie irrépressible de consommer la substance en dépit des conséquences négatives renvoie au concept d'addiction aux substances.

L'addiction peut être définie comme « l'impossibilité répétée de contrôler un comportement visant à produire du plaisir ou à écarter un malaise interne et la poursuite de ce comportement en dépit de la connaissance de ses conséquences négatives (Reynaud, 2016). Elle est donc, la résultante d'une répétition d'actions quotidiennes comme boire, fumer, et agissant conséquemment sur le système de récompense mésolimbique du sujet (Balland & Lücher, 2009).

L'adolescence se caractérisant par sa grande vulnérabilité somatique, cérébrale et psychique, constitue une période propice à l'adoption de conduites déviantes telles que la consommation de substances psychoactives et la délinquance (Brunelle, 2022). De telles manifestations comportementales dues à la consommation régulière de drogues peuvent trouver leur origine dans divers facteurs. Il s'agit des facteurs liés à la substance, aux facteurs individuels et mésologiques (Luce, 2016).

Au niveau mésologique, la famille est un indicateur important de l'explication des comportements et conduites chez l'homme (N'Guessan, 2013). En effet, la famille joue le rôle de formateur et d'éducateur de l'enfant en développement. C'est selon les valeurs sociétales transmises dans le cocon familial que l'enfant parvient à émettre des comportements déterminés dans son environnement (N'Guessan, op. cit). Les devoirs et pouvoirs des parents dans l'éducation de leurs enfants sont très importants, de sorte qu'un enfant en difficulté psychologique ou sociale témoigne en réalité de l'échec éducatif de ses parents (Cissé et al., 2017 cité par Hatta et al., 2022). La famille a donc une réelle influence sur les adolescents.

Par ailleurs, il est nécessaire de faire remarquer que l'estime de soi des adolescents se construit en tenant compte de la relation qu'ils ont avec leurs

parents. Elle est déterminée par la force des identifications et des interactions sociales à l'origine (Gordon cité par Yéo, 2013). Une estime de soi positive ou négative découle donc du lien affectif qui existe entre parent et enfant. De ce fait, l'estime de soi est positivement associée à un soutien affectif parental perçu (DeHart, Pelham & Tennen, 2006 ; Dogbe Foli et al, 2018). A l'inverse, l'estime de soi est négativement associée à la surprotection ou au contrôle abusif parental perçu (Gauthier, 2021 ; DeHart et al 2006). Conséquemment, le style éducatif parental et l'estime de soi pourraient être des déterminants du développement des conduites addictives chez l'homme.

Pour ce qui est du style éducatif des parents, il a été démontré qu'il représente un indicateur influant sur les conduites addictives aux substances. En effet, Sahed (2016) et Schoonheere (2005) ont pu établir dans leurs études la relation entre les styles éducatifs parentaux et la consommation de substances psychoactives. Leurs résultats indiquent que les sujets qui déclarent avoir des parents qui exercent un fort encadrement parental, ont une faible consommation d'alcool. Tornay et al (2013) ont montré que la surveillance et le suivi parental pourraient être liés à une faible consommation de drogues. Un niveau élevé de surveillance des parents où des personnes responsables des adolescents est identifié comme l'un des facteurs de protection associé à la consommation de drogues (Wellman et al, 2023). Dans le même ordre d'idées, Courtois et al. (2007) ont montré que le style vigilant ou démocratique des parents réduit la consommation et la dépendance tabagique des adolescents, tandis que le style indulgent ou permissif les augmente. Quant à l'estime de soi et les addictions aux substances, il est suggéré une influence significative de l'une sur l'autre (Oubrayrie-Roussel & Safont-Mottay, 2001 ; Laure et al, 2005).

De ces travaux, il ressort que les styles éducatifs permissif et démocratique d'une part et l'estime de soi d'autre part sont corrélés avec les addictions aux substances. Toutefois, aucune de ces études n'a abordé spécifiquement l'examen de la relation des pratiques éducatives parentales et de l'estime de soi dans l'explication différentielle des addictions aux substances. Par conséquent, des relations interactives peuvent être envisagées entre le styles éducatifs parentaux, l'estime de soi et l'addiction aux substances psychoactives. L'examen de ces relations nous rapproche au plus près des situations réellement vécues, car les comportements humains émanent d'une conjugaison de facteurs multiples. Or, les chercheurs, dans leur grande majorité, se sont contentés d'établir des relations simples entre ces variables. En d'autres termes, les études antérieures semblent ignorer l'influence interactive des styles éducatifs parentaux et de l'estime de soi sur l'addiction des adolescents aux substances psychoactives.

Une telle étude pourrait apporter de façon théorique des données nouvelles dans l'explication des addictions aux substances. Elle pourrait aider

les autorités gouvernementales à prendre des mesures préventives adéquates, capables d'éviter ou de réduire la dépendance aux substances pratiquées par la plupart des adolescents. En outre, elle aiderait à sensibiliser les parents sur l'impact de leur style éducatif sur le développement psychologique et social de leurs enfants. Notre étude se propose donc de mettre en évidence la relation entre le style éducatif parental, l'estime de soi et le niveau d'addiction aux substances chez des adolescents à Abidjan, dans le but de les protéger et d'apporter aux familles des solutions aux problèmes individuels, relationnels et professionnels liés à la consommation problématique des drogues.

Hypothèses de l'étude

Au regard de l'objectif visé et des idées qui émanent des études consultées, nous avons émis une hypothèse générale qui nous conduit à dégager des hypothèses opérationnelles dans une visée corrélationnelle. En effet, nous présumons que l'effectif des adolescents soumis au style éducatif permissif et qui ont une consommation excessive de drogues est supérieur à celui de leurs pairs soumis au style éducatif démocratique ayant une même consommation. En outre nous prédisons que le nombre d'adolescents d'estime de soi faible qui ont une consommation excessive de drogues est supérieur à celui de leurs homologues d'estime de soi élevée ayant une consommation identique. Pour finir, dans une visée interactive de la relation entre les variables considérées, nous estimons que l'effectif des adolescents soumis au style éducatif permissif et d'estime de soi faible qui ont une consommation excessive de drogues est supérieur à celui de leurs homologues soumis au style éducatif démocratique et d'estime de soi élevée qui ont la même consommation.

Méthode

Il est question de situer le cadre méthodologique qui a sous-tendu cette étude. Cette partie est consacrée à la présentation des participants, du matériel et de la procédure de collecte des données.

Participants

La présente étude s'intéresse aux adolescents consommateurs de SPA pris en charge ou qui demandent une consultation au Centre d'Accueil de la Croix Bleue Abidjan. Elle examine la relation entre style éducatif parental, estime de soi et les addictions aux SPA. Pour ce faire nous neutralisons les indicateurs liés aux styles éducatifs parentaux (démocratique/permissif) et ceux liés à l'estime de soi (élevée/faible). En somme, la technique d'échantillonnage par choix raisonné nous a permis de sélectionner 35 adolescents âgés de 17 à 19 ans.

Instruments de mesure

Les instruments prévus pour la réalisation de notre recherche sont trois questionnaires notamment l'inventaire d'estime de soi de Coopersmith, l'échelle du style parental de Robinson et al (2001), et le Drug Abuse Screening Test (DAST-10). En dehors de ces instruments, nous avons eu recours avant tout aux dossiers médicaux (la fiche Consultation Addictologie).

Fiche Consultation Addictologie

Cette fiche comprend, en plus des informations identitaires du patient en vue de faciliter la constitution du dossier patient, des informations plus poussées, notamment l'histoire de la consommation, les motifs de la consommation, les symptômes manifestes de l'usage et autres informations nécessaires à la compréhension du phénomène à l'étude.

Echelle des styles parentaux de Robinson et al

Les énoncés pour mesurer les styles parentaux démocratique, autoritaire et permissif ont été repris de l'instrument Parenting Styles and Dimensions Questionnaire de Robinson, Mandleco, Olsen, & Hart (2001). La formulation en français a été validée par la méthode de traduction/contre-traduction.

Test d'estime de soi de Coopersmith (SEI)

Le SEI a été élaboré pour fournir une mesure fidèle et valide de l'estime de soi. La forme scolaire s'appliquant aux enfants et aux adolescents scolarisés a été utilisé pour le présent travail. Elle comprend des items qui sont au nombre de cinquante-huit (58) items, décrivant des sentiments, des opinions ou des réactions d'ordre individuel, auxquels le sujet doit répondre en cochant une case : "Me ressemble" ou "Ne me ressemble pas".

Drug Abuse Screening Test (DAST-10)

Le DAST (Drug Abuse Screening Test) est un auto-questionnaire élaboré en 1992, par Skinner Harvey, qui fournit un indice quantitatif des problèmes liés à la consommation de drogues, notamment certains symptômes de dépendance aux drogues et d'autres conséquences résultant de l'usage abusif de drogues pendant la période des 12 derniers mois. Il évalue le degré de sévérité de la consommation de drogues. Le score total au questionnaire est obtenu par la somme des points aux différents items.

Procédure de collecte des données

Dans une première démarche, l'accord de la direction du centre de réadaptation de la toxicomanie dans la commune d'Adjamé Williamsville (Centre d'accueil de la croix bleue) a été préalablement obtenu pour que nous

y menions notre étude. Nous avons procédé à la passation des questionnaires auprès des patients de façon individuelle. La passation des différents instruments (3 questionnaires) et l'entretien individuel s'est réalisée simultanément. L'étude de terrain s'est déroulée sur une période de quatre (4) mois. Eu égard à la nature qualitative des variables à l'étude, c'est le khi-deux de Pearson qui convient le mieux au traitement statistique des données collectées. Par ailleurs, une analyse de contenu du discours des participants est réalisée. Ce sont ces résultats tant quantitatifs que qualitatifs que nous présentons dans la section suivante.

Résultats

Aspects quantitatifs

Tableau 1 : Fréquences des adolescents manifestant une addiction aux drogues selon le type de style parental

ADDICTIONS AUX DROGUES STYLES PARENTAUX	Addicts	Non addicts	TOTAL
Démocratique	2	9	11
Permissif	16	8	24
TOTAL	18	17	35

Ce tableau indique que l'effectif des patients addicts soumis au style éducatif permissif est égal à 16, tandis que l'effectif de leurs pairs soumis au style éducatif démocratique est égal à 2. Avec l'analyse statistique de ces données, il ressort que la différence qui s'établit entre les groupes comparés est significative ($X^2 = 7,14$, $p < .05$). La première hypothèse de notre étude qui stipule que le nombre d'adolescents addicts soumis au style éducatif permissif est supérieur à celui de leurs homologues addicts soumis au style éducatif démocratique est alors confirmée. Autrement dit le style éducatif permissif est davantage impliqué dans les addictions aux SPA chez les adolescents que la pratique éducative démocratique.

Tableau 2 : Fréquences des adolescents manifestant une addiction aux drogues selon le niveau d'estime de soi

ADDICTIONS AUX DROGUES ESTIME DE SOI	Addicts	Non addicts	TOTAL
Elevée	5	9	14
Faible	13	8	21
TOTAL	18	17	35

Ce tableau montre que la fréquence des patients addicts d'estime de soi faible est de 13 alors que celle de leurs pairs d'estime de soi élevée est de 5. Cependant l'analyse statistique de ces données indique qu'il n'y a pas de différence significative entre les deux groupes de patients ($X^2 = 2,3$ à 1 ddl $p < .05$). Nous pouvons conclure que notre deuxième hypothèse qui énonce que

l'effectif des adolescents addicts aux SPA d'estime de soi faible est supérieur à celui de leurs pairs addicts d'estime de soi élevée est infirmée.

Tableau 3 : Fréquences des adolescents manifestant une addiction aux drogues soumis au style démocratique, d'estime de soi positive et celles d'adolescents soumis au style permissif, d'estime de soi négative

ADDICTION AUX DROGUES				
STYLES PARENTAUX	ESTIME DE SOI	Addicts	Non addicts	TOTAL
Démocratique	Elevée	2	6	8
	Faible	0	3	3
Permissif	Elevée	3	3	6
	Faible	13	5	18
TOTAL		18	17	35

L'analyse statistique des résultats, à l'aide du test de Khi deux, montre qu'il existe une différence significative entre les deux groupes en présence au niveau de la manifestation des conduites addictives aux drogues ($X^2_{cal} = 9,02 > X^2_{th} = 7,81$ à 3 ddl, et au seuil de probabilité .05.). Par conséquent, l'hypothèse interactionnelle est confirmée. On conclure que les adolescents soumis au style permissif d'estime de soi négative, manifestent plus de conduites addictives au drogues comparés à leurs pairs soumis au style démocratique, d'estime de soi positive.

Discussion

Cette étude se proposait d'investiguer sur l'implication de facteurs psychologiques (estime de soi) et familiaux (styles éducatifs parentaux) dans l'explication des addictions au sein d'une population d'adolescents.

Selon le premier résultat de l'étude et conformément à notre hypothèse, il y a un lien entre le style parental et les conduites addictives chez les adolescents. L'idée que les pratiques éducatives parentales, paraissent liées au développement d'une consommation problématique de substances psychoactives est fondée. En effet, la différence de pratique éducative, qui implique une différence au plan de la qualité des relations entre parents et enfants, est susceptible de générer des différences dans la façon de se comporter des enfants. En d'autres termes, les comportements adoptés par les enfants face aux substances psychoactives sont influencés par le style éducatif adopté par les parents. Un tel résultat peut s'expliquer par la théorie de L'attachement de Bowlby (1988). Selon cette théorie, l'adolescent ne peut se construire en marge de son environnement familial. La famille constitue le premier milieu de socialisation, où l'individu développe ses premières capacités d'adaptation sociale. Les parents adoptent des comportements éducatifs variés vis-à-vis de l'enfant. Ce sont ces attitudes et comportements qui vont construire sa personnalité.

Dans le style parental démocratique le parent garde un équilibre entre les exigences et la sensibilité ce qui a une plus grande compétence sociale chez les individus (Bornstein et al, 2014). Ainsi ceux qui ont des parents démocratiques sont plus compétents dans leur première relation avec les pairs, consomment moins de drogues et jouissent d'un plus grand bien-être affectif au début de l'âge adulte. A l'inverse, les enfants qui grandissent dans un foyer permissif risquent de ne pas recevoir les conseils, l'encadrement et la supervision nécessaires à leur développement moral et au choix d'objectifs (Bornstein et al, 2014). C'est donc la raison pour laquelle les adolescents soumis au style permissif sont plus addicts que leurs pairs soumis au style démocratique.

Ces expériences familiales caractérisées par la sensibilité, l'affectivité, le contrôle et le support parental exercé durant l'enfance et l'adolescence sont mis en relation avec l'apparition de conduites déviantes et avec le développement de conduites addictives aux drogues. De ce point de vue, notre résultat est congruent avec la littérature suggérant que les adolescents soumis au style parental permissif sont plus addicts que leurs pairs soumis au style parental démocratique.

Les résultats de l'étude de Bartlett, Girst & Hahn (2011) ont montré en effet, que le style éducatif exerce une influence sur les comportements des jeunes. Ils soulignent que les parents qui accordent beaucoup de temps à leur enfant et savent combiner affection et autorité (parents démocratiques) exercent une influence protectrice : à l'adolescence et à l'âge adulte, leur enfant aura moins tendance que les autres à s'engager dans des consommations à risques. Les chercheurs en concluent qu'une éducation reposant sur des limites claires associées à un climat affectueux est un facteur de protection important à prendre en considération.

De même, selon les résultats des travaux de Schoonheere (2005), les sujets qui déclarent avoir des parents qui exercent un fort encadrement parental (style démocratique) ont une faible consommation d'alcool. A l'inverse, les jeunes qui ne subissent pas de contrôle parental (style permissif) ont des risques plus grands de boire et éventuellement de devenir des consommateurs à problèmes.

Le second résultat montre qu'il n'existe pas de lien fort entre le l'estime de soi et les addictions aux SPA. L'une des idées qui sous-tend notre étude est que l'estime de soi intervient dans la manifestation des addictions aux drogues chez les adolescents. En effet, il est généralement admis que l'estime de soi est associée à l'usage des produits psychoactifs. Cependant, nos résultats ne laissent apparaître aucun lien significatif entre les conduites de consommation et le niveau d'estime de soi des adolescents. Autrement dit les patients, quel que soit leur niveau d'estime de soi, ont les mêmes risques de devenir dépendants des substances psychoactives. De tels résultats ne

rejoignent ni ceux des travaux qui montrent que les adolescents usagers réguliers de substances psychoactives présentent des niveaux faibles d'estime de soi (Oubrayrie-Rousel & Safont-Mottay, 2001 ; Laure et al, 2005 ; Grégoire, 2005 ; Szinay et al, 2019) ni les résultats des travaux qui montrent contrairement qu'une estime de soi élevée constituerait un facteur contribuant à une plus grande sévérité de l'usage des substances psychoactives à l'adolescence (Simard, 2011 ; Dorard et al, 2013). Une explication possible de ces résultats contradictoires serait qu'à l'adolescence la recherche d'autonomie et d'identité occasionne un détachement de la sphère familiale et un rattachement au groupe des pairs qui s'avère être le groupe le plus influent à cette période. L'entrée dans l'adolescence coïncide avec l'importante croissance des pairs dans la vie des jeunes, et ce, pour les deux sexes. L'appartenance à un groupe d'amis devient ainsi essentielle et nécessaire car elle répond à des besoins éducatifs, personnels et sociaux : se découvrir, s'affirmer, se construire une image, une personnalité, à travers l'identité groupale mais également à travers l'intimité, le soutien affectif, l'entraide (Hernandez et al, 2012). Ce besoin de se sentir lié, connecté à ses pairs et intégré parmi eux est un important facteur de régulation émotionnelle de fonctionnement et de bien-être des jeunes (Ryan & Deci 2017). Et donc au risque d'être exclu du groupe auquel il a développé des liens d'attachement et une identité dans sa quête de son autonomie, l'adolescent se trouve souvent obligé de se conformer à certains comportements (usage de drogues) adoptés par les membres du groupe.

L'effet interactif des deux variables indépendantes sur les addictions aux SPA a été montré dans cette étude. Il en ressort que le style éducatif permissif et le niveau faible d'estime de soi forment un couple important dans l'initiation et le développement des conduites addictives chez les adolescents. Par ailleurs, même si de telles relations n'ont pas été évaluées dans les études antérieures, celles se rapprochant de notre travail permettent de soutenir ces résultats. Les résultats des travaux de Boudreault-Bouchard, (2011) révèlent, tout comme l'ont indiqué plusieurs études portant sur le style parental (DeHart et al, 2006 ; Milevski et al, 2007) ou sur la relation parent-adolescent que le soutien affectif, accordé par le style démocratique adopté par les parents favorise une meilleure estime de soi chez l'adolescent. Certaines études se sont attardées en particulier sur le style parental permissif. Et les résultats de l'étude de Gauthier (2021) indiquent que le style permissif est lié négativement à la motivation, au rendement scolaire et à l'estime de soi. Ainsi, ce lien interactionnel auquel nous aboutissons permet de comprendre qu'un adolescent soumis au style éducatif parental permissif et d'estime de soi faible est plus enclin à expérimenter et à développer une addiction aux SPA. L'enfant soumis au style éducatif permissif et dont le niveau d'estime de soi est faible est confronté à une trop grande liberté et à un manque d'exigence de la part de

ses parents. Dans cet environnement où tout lui est pratiquement permis, il n'est confronté à aucune réglementation ferme à la maison. Lorsqu'il quitte la cellule familiale, et que son expérience avec les SPA lui procure plaisir et satisfaction, il va accentuer cette pratique. C'est alors cette régularité et les récompenses positives à la suite de ses consommations qui font de l'enfant un addict. Ce sentiment de bien-être et la régularité de la consommation des SPA se trouve être associée au conformisme au groupe d'appartenance. Dans le groupe de pairs (consommateurs réguliers) l'enfant bénéficie d'une communication où il peut se confier aisément, ce qui n'est pas le cas en famille. A l'inverse, le style éducatif démocratique et le niveau d'estime élevée de l'adolescent favoriserait une limitation et un arrêt de la consommation. Une telle attitude est liée à la disponibilité affective et la supervision active des parents. La disponibilité affective et la modélisation des pratiques éducatives parentales permettraient à l'enfant d'arrêter sa consommation avant d'atteindre le niveau excessif. L'on parlerait d'un éveil des capacités cognitives stimulé par un tel environnement de vie.

Les résultats auxquels nous sommes parvenus peuvent présenter une faiblesse majeure. En effet, les parents n'ont pu être questionné sur leurs styles et leur soutien à l'égard des adolescents de peur que du fait de la désirabilité, ils passent pour des parents qu'ils ne sont pas en réalité. Seul l'avis des adolescents a été pris en compte considérant qu'à cet âge, ils sont à même de décrire fidèlement leurs relations avec les parents. Cette démarche constitue une limite car les deux avis quant à la relation parent-enfant aurait permis de rendre compte fidèlement du style parental et de son influence sur le développement psychosocial des jeunes enfants.

Conclusion

Notre étude s'inscrit dans le cadre des travaux qui cherchent à comprendre les addictions aux drogues chez les adolescents. Elle a examiné l'influence des styles éducatifs parentaux et de l'estime de soi sur la manifestation des addictions chez les jeunes patients du Centre d'Accueil de la Croix-Bleue.

Les résultats obtenus indiquent que l'addiction aux SPA est fortement représentée chez les adolescents soumis au style éducatif permissif et ayant un niveau d'estime de soi faible. Ce résultat interactif a été conforté par l'un des résultats distinctifs confirmant nos hypothèses. Notamment celui indiquant une significativité entre style éducatif et addiction aux SPA. Cependant, il n'a été trouvé aucun lien entre le niveau d'estime de soi des adolescents et la manifestation de conduites addictives aux drogues.

Des résultats pareils permettent de souligner l'effet important des relations au sein de la cellule familiale dans le développement de comportements addictifs chez des individus. Ils aident également à

comprendre que les modes de relations interindividuelles dans la famille peuvent être des modérateurs ou des incitateurs des comportements pathologiques chez des adolescents consommateurs de SPA.

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Intégration pédagogique des technologies de l'information et de la communication (TIC) et développement des compétences numériques des des élèves des établissements secondaires publics de l'arrondissement de Kousseri au Cameroun

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Resume

Dans un monde en pleine révolution numérique, les établissements scolaires sont contraints d'adopter des innovations technologiques pour développer les compétences des apprenants. En revanche, la promotion des technologies en éducation dans des zones où de nombreuses écoles ne disposent pas encore de ressources énergétiques est un défi réel. Le présent article se propose d'étudier l'influence de l'intégration pédagogique des technologies de l'information et de la communication (TIC) sur le développement des compétences numériques des apprenants des zones rurales. Une approche méthodologique de type quantitatif a permis d'opérationnaliser cet objectif. Le cadre théorique s'appuie sur la théorie socioconstructiviste de Vygotski (1985) pour la contextualisation et l'interprétation des résultats obtenus. Un questionnaire a été distribué à 95 élèves participants. Les données recueillies ont été analysées à l'aide d'un test de régression linéaire simple réalisé avec le logiciel *Statistical Package for the Social Sciences* (SPSS 20.1.). Les résultats révèlent que l'utilisation des outils

d'autonomisation, la pratique de la gamification et l'utilisation des startups dans l'apprentissage développent des aptitudes numériques des apprenants. Bien que des défis subsistent, les perspectives d'intégration des TIC dans l'éducation en zone rurale sont prometteuses. En s'appuyant sur les principes de la théorie socioconstructiviste et en favorisant une culture d'apprentissage collaboratif, il est possible de transformer ces défis en opportunités pour le développement des compétences numériques des apprenants.

Mots clés : Intégration pédagogique des TIC, outils d'autonomisation, gamification, startups, compétences numériques, établissements secondaires publics, arrondissement de Kousseri, zone rurale, Extrême-Nord/Cameroun

Pedagogical integration of information and communication technologies (ICT) and development of digital skills of students in public secondary schools in the Kousseri district in Cameroon

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Abstract

In a world of digital revolution, schools are increasingly forced to adopt technological innovations to develop learners' skills. However, the promotion of educational technologies in areas where many schools lack subsequent resources is a real challenge. This article aims to study the influence of the pedagogical integration of information and communications technologies (ICT) on the development of digital competencies of learners in rural areas. A quantitative methodological approach was used to operationalize this objective. The theoretical framework based on Vygotsky's social constructivist theory (1985) helped to contextualize our research and interpret the results obtained. A questionnaire was distributed to 95 participants. The data collected were analyzed using a simple linear regression test performed with the software *Statistical Package for the Social Sciences* (SPSS.20.1). The results reveal that the use of empowering tools, the practice of gamification and the use of startups in learning develop learners' digital competencies. Despite the challenges in this domain, the prospects for integrating ICT into education in rural areas are promising. The study suggests

that, by drawing on the principles of socio-constructivist theory fostering a collaborative learning culture, it is possible to turn these challenges into opportunities for developing learners' digital skills.

Keywords: Pedagogical integration of ICT, empowering tools, gamification, startups, digital skills, public secondary schools, Kousseri district, rural area, Far North/Cameroon

Introduction

Les Technologies de l'Information et de la Communication (TIC) ont profondément transformé les sociétés modernes, et leur influence s'étend également au domaine de l'enseignement. Comme l'ont souligné Castells (2001) et Lévy (1997), les TIC ont un impact majeur sur l'éducation en permettant de repenser les méthodes d'enseignement et d'apprentissage. En parallèle, les compétences numériques deviennent essentielles dans ce contexte. Les gouvernements, suivant les recommandations de Morin (2001), investissent massivement dans ce secteur pour développer les compétences numériques des apprenants et des enseignants dans le but d'améliorer l'efficacité et l'efficience de leurs systèmes éducatifs.

Cependant, depuis un certain temps, les systèmes éducatifs en Afrique font face à de nombreux défis. La plupart des pays ont procédé à des réformes qui accordent peu d'importance aux TIC. L'Association pour le Développement de l'Education en Afrique (ADEA : 2002) a mis en avant le potentiel des TIC comme un moyen d'apprentissage pouvant considérablement améliorer la qualité de l'enseignement. Néanmoins, les disparités entre les populations et les diverses communautés culturelles en Afrique entraînent des coûts plus élevés pour l'accès aux TIC et rendent leur utilisation plus complexe dans les zones rurales. Comme le souligne le rapport de l'ADEA (2004) ainsi que les études du réseau ouest et centre africain de recherche en éducation (ROCARE : 2006 ; 2008), les défis majeurs à surmonter incluent le manque de connexion Internet fiable et à haut débit, ainsi que l'insuffisance de matériel informatique adéquat et de salles appropriées.

En effet, depuis les années 1980, la question de l'intégration pédagogique des technologies numériques éducatives a attiré l'attention des responsables en charge des politiques éducatives. Selwyn (2011) note que l'encouragement des organisations internationales telles que l'UNESCO a motivé de nombreux gouvernements africains, donc le Cameroun, à intégrer les technologies numériques dans son système éducatif. Ainsi, Prensky (2001) mentionne que ces pays se sont lancés dans une course effrénée pour maîtriser les savoirs techno-pédagogiques. Cette tendance reflète la transition vers une société de l'information électronique. Castells (1996), Shiva (2000) et Turkle (2011) notent que, bien que cela se fasse parfois au profit des zones rurales,

les TIC sont des outils qui permettent de vaincre la distance et d'accéder à un savoir encyclopédique. Lorsqu'elles sont mises au service de la pédagogie, elles permettent d'apprendre, de comprendre, d'entreprendre, de motiver, de partager, d'interagir, de communiquer, d'échanger, de collaborer, d'exposer, de transmettre et de distribuer le savoir (Leclerc, 2003 ; CSE, 2000). Ils permettent par ailleurs la continuité des enseignements en période de crise sanitaire telle celle du COVID 19 (Weladji Fongang et Hassana, 2024 ; Mfomo Mballa et Hassana, 2024).

Toutefois, lorsque l'on aborde les enjeux essentiels, il est crucial de considérer en premier lieu l'infrastructure nécessaire à l'intégration technologique. Ensuite, il faut prendre en compte les compétences humaines requises pour mettre en œuvre ces applications technologiques. Enfin, la conception des programmes d'enseignement à l'usage du numérique doit également être examinée. Leclerc (2003), CSE (2000) et Fullan (2001) soulignent que l'intégration des TIC en éducation se heurte à des défis organisationnels, administratifs et humains. Cela inclut également des défis pédagogiques liés à la formation en TIC, à l'accès à l'information, au soutien technique et au financement. En d'autres termes, il est illusoire de promouvoir les technologies en éducation dans des zones où de nombreuses écoles ne disposent pas d'électricité ou d'autres dispositifs technologiques numériques.

De nos jours, l'attention se porte moins sur l'intégration de la technologie en zone rurale bien qu'elle soit formellement intégrée dans le système éducatif camerounais. Pourtant, cette intégration offre des améliorations significatives à divers niveaux. Kofi Annan (2005), lors du dernier sommet mondial sur la société de l'information, a souligné l'importance croissante des technologies dans tous les aspects de nos vies en cette ère de mutations rapides. L'intégration des technologies numériques en zone rurale apparaît aujourd'hui légitime dans plusieurs établissements scolaires au Cameroun. Cette légitimité peut encourager le développement des compétences des apprenants à l'ère numérique. Pour renforcer ces compétences en zone rurale, il est essentiel d'évaluer l'efficacité de l'enseignement des TIC dans ces contextes spécifiques.

Au regard de ce qui précède, il apparaît que les difficultés d'intégration des technologies de l'information et de la communication semblent préoccupantes pour les établissements des zones rurales au Cameroun en général, et pour ceux de la Région de l'Extrême-Nord en particulier. Or, la loi d'Orientation de l'Éducation du 14 avril 1998 stipule en son article 25 que « l'enseignement dans les établissements scolaires devrait prendre en compte l'évolution des sciences des technologies éducatives » et que « le système éducatif doit former les camerounais enracinés dans leurs cultures et ouverts au monde ».

L'objectif poursuivi par cet article est donc d'étudier l'influence de l'intégration pédagogique des TIC sur le développement des compétences numériques des apprenants des zones rurales. Autrement dit, nous allons montrer dans quelle mesure les difficultés d'intégration pédagogique des TIC peuvent avoir un impact sur le développement des compétences numériques des apprenants dans l'enseignement secondaire en zone rurale de la Région de l'Extrême-Nord.

Problématique de L'étude

Les établissements scolaires ruraux au Cameroun se heurtent à des problèmes liés aux compétences numériques. C'est un phénomène qui, avec l'avancée des technologies, ne favorise pas un climat d'apprentissage de qualité. La directrice générale de l'UNESCO, lors de la Conférence mondiale sur l'éducation et le développement durable en novembre 2014, mentionne que « pour parvenir au développement durable, la technologie, les réglementations et les incitations financières ne suffisent pas. Nous devons aussi modifier notre façon de penser et d'agir en tant qu'individu et en tant que société » (UNESCO, 2014, p. 5). Dans le même ordre d'idées, le rapport final de la Décennie pour l'éducation au développement durable insiste sur « la nécessité de veiller à ce que tous les élèves acquièrent les connaissances et compétences nécessaires pour promouvoir le développement durable » (UNESCO, 2014, p. 7).

L'examen de la situation actuelle de l'éducation dans les établissements de la zone rurale dans la région de l'Extrême-Nord/Cameroun laisse constater que les TIC ne sont pas considérées comme prioritaires. En effet, les politiques éducatives estiment que les besoins à combler sont si vastes que d'autres priorités doivent être privilégiées, reléguant ainsi l'équipement informatique et le développement des compétences des apprenants au second plan. Par conséquent, les besoins en matière d'utilisation des TIC par les élèves et les enseignants sont souvent négligés (Weladji Fongang et Hassana, 2024 ; Mfomo Mballa et Hassana, 2024). Bien que ces arguments soient légitimes, ils ne doivent pas conduire à négliger le développement des compétences numériques des élèves. Il est essentiel que l'éducation prépare tous les citoyens camerounais, sans exception, à affronter les réalités contemporaines.

En abordant les obstacles au développement des compétences numériques des élèves en zone rurale, il est crucial de relever les défis pour surmonter les entraves au progrès. Cette préoccupation crée une disparité de compétences entre les élèves des établissements urbains et ceux des zones rurales. Les recherches menées par Nkhesera (2011) mettent en lumière la fracture numérique entre ces deux environnements au Cameroun. En 2005, seulement une vingtaine d'établissements d'enseignement secondaire

disposaient de Centres de Ressources Multimédias (CRM) équipés d'ordinateurs connectés à Internet. Aujourd'hui, la quasi-totalité des lycées et collèges des zones urbaines en sont pourvus. Cette situation souligne un désavantage considérable pour les élèves vivant dans les zones rurales en matière d'accès aux TIC.

L'objectif du développement des compétences numériques des apprenants en zone rurale est de leur fournir une connaissance pratique des TIC nécessaire à leur vie quotidienne après l'école tout en leur offrant une base solide pour des études avancées et en promouvant l'unité et la vie en communauté. Cependant, il est regrettable de constater que ces objectifs n'ont pas été pleinement réalisés dans les écoles, malgré les efforts déployés par l'État. Le développement des compétences numériques des apprenants reste insuffisant. Lors d'une observation faite au Collège d'Enseignement Technique Industriel et Commercial (CETIC) et au lycée mixte de Kousseri au mois de mars en 2024, il a été noté que les apprenants affichent un faible niveau de compétences numériques. Un test a été soumis aux élèves des classes d'examen du CETIC et du lycée Mixte de Kousseri afin d'évaluer leur degré de maîtrise des outils numériques éducatifs en leur présentant des ordinateurs portables et certains téléphones Androids. Au total 35 élèves interrogés sur leur maîtrise des applications numériques et leur habileté à mener des recherches. Le tableau ci-dessous présente les résultats.

Tableau 1 : récapitulatif du test sur le développement des compétences des élèves

Appréciation	Le niveau de maîtrise des applications numériques	%	Le niveau d'habileté à mener des recherches	%	Le niveau d'habileté à maîtriser du logiciel d'apprentissage	%
Très bonne	5	14,3	9	25,7	5	14,3
Bonne	8	22,8	12	34,3	13	37,1
Mauvaise	22	62,9	14	40,0	17	48,6
Total	35	100	35	100	35	100

Source : données du terrain 2024

La lecture de ce tableau nous renseigne sur la question relative au développement des compétences numériques des élèves en zone rurale. En ce qui concerne la compétence en matière de recherches sur Internet, parmi 35 élèves sondés, 5 d'entre eux (soit 14,3 %) montrent une excellente aptitude à ces recherches, 8 autres (22,8 %) ont une bonne aptitude, tandis que 22 élèves (62,9 %) manifestent une mauvaise compétence.

En ce qui concerne l'habileté à mener des recherches, il apparaît que 9 élèves (25,7 %) ont une très bonne maîtrise, 12 autres (34,3 %) ont une bonne maîtrise et enfin 14 élèves (40 %) montrent une mauvaise maîtrise. Pour ce qui est de l'habileté à maîtriser le logiciel d'apprentissage (forums, WhatsApp), parmi les 35 élèves interrogés, 5 élèves (14,3 %) ont une très

bonne habileté à utiliser ces logiciels d'apprentissage en ligne ; 13 autres (37,1 %) affichent une bonne habileté tandis que 17 élèves (48,6 %) montrent une mauvaise habileté.

Nous pouvons donc conclure qu'il reste beaucoup à faire concernant le développement des compétences numériques chez les élèves en zone rurale. Malgré la disponibilité d'un ensemble de ressources technologiques infrastructurelles telles que laboratoires informatiques avec connexion Internet et matériels informatiques opérationnels financés par l'État ainsi que par l'APEE (Association des Parents d'Élèves et Enseignants) et certains donateurs, sans oublier la présence de professionnels apportant un soutien technique indispensable aux enseignants, plusieurs élèves peinent à s'engager dans cette discipline souvent démotivés par leurs insuffisantes compétences.

Selon Jonassen et Reeves (1996, p.18), « différents usages de l'ordinateur et d'Internet permettent d'améliorer la production des apprenants en favorisant la réflexion ». En effet, l'usage des TIC influence la façon dont les apprenants traitent l'information (Kozma, 1991). De surcroît, il est important de se préoccuper du développement des compétences numériques chez ces apprenants en zone rurale.

Méthodologie de L'étude

Cette étude s'inscrit dans une approche quantitative et cherche à évaluer le niveau de compétences numériques des apprenants en zone rurale. Pour ce faire, il est essentiel de présenter la population d'étude, qui se divise en deux catégories : la population cible et la population accessible.

Présentation de la population d'étude

A ce niveau, nous allons distinguer deux types de population : la population cible et la population accessible.

Population cible

En ce qui concerne la population cible, elle correspond à tous les élèves de la localité de Kousseri. Cependant, étant donné qu'il n'existe pas de statistiques précises identifiant cette population, la phase de pré-enquête a été nécessaire pour identifier les effectifs des élèves. Cette démarche a permis de mieux cerner les caractéristiques et les besoins spécifiques des apprenants concernés.

Tableau 2 : Population cible

N°	Etablissements	Effectifs		
		F	G	Total
1	Lycée Mixte de Kousseri	393	741	1134
2	CETIC de Kousseri	211	413	624
Total		604	1154	1758

Source : Archives du lycée et CETIC de Kousseri (décembre 2023)

Cette population est composée de 1758 élèves de la localité de Kousseri.

La population accessible

Dans notre étude, nous nous sommes intéressés aux classes d'examens du lycée et du CETIC de la localité de Kousseri 3^{ème}, 4^{ème} année, 1^{ère} et Tle dont l'effectif est de 475 élèves.

Tableau 3 : Population accessible

N°	Etablissements	Effectifs			Population accessible
		3 ^{ème} /4 ^{ème} année	Première	Terminale	
1	Lycée Mixte de Kousseri	146	133	98	377
2	CETIC de Kousseri	98	00	00	98
Total		244	133	98	475

Source : Archives du lycée et CETIC de Kousseri (décembre 2023)

Échantillon et technique d'échantillonnage

Pour prélever un échantillon représentatif de la population, il est essentiel de se baser sur une technique appropriée. Ainsi, dans cette section, nous allons d'abord définir l'échantillon, puis décrire la technique d'échantillonnage qui sera utilisée. Cette approche permettra de garantir que l'échantillon sélectionné reflète fidèlement les caractéristiques de la population cible, assurant ainsi la validité des résultats obtenus.

Échantillon

Dans le cadre de cette étude, le type d'échantillon utilisé est probabiliste. Cette méthode consiste à sélectionner les événements au hasard afin d'assurer une représentativité adéquate de la population. Concrètement, pour constituer l'échantillon, nous avons appliqué la méthode des quotas. Cette technique permet de créer un échantillon en respectant des pourcentages spécifiques d'événements. Par conséquent, nous avons calculé les quotas en fonction du nombre total d'élèves dans les différentes classes.

Nous avons donc utilisé l'échantillonnage aléatoire simple, ce qui a permis de tirer au hasard et avec remise jusqu'à atteindre le quota souhaité. La technique d'échantillonnage utilisée dans cette recherche est par quota consistant à déterminer les pourcentages des élèves des différentes classes qui participeront à l'enquête. Ainsi, sur un effectif total d'environ 475 élèves, nous avons décidé de constituer un échantillon représentant 20% de cette population. La taille de l'échantillon a été calculée selon la formule suivante : Population parente x 20 %. Ainsi, cela donne : $(475 \times 20) / 100 =$ environ 95 élèves.

Technique d'échantillonnage

Dans notre étude, nous avons procédé par un échantillonnage par quota relativement homogène. Notre méthode d'échantillonnage repose sur une approche probabiliste. En effet, notre groupe d'étude inclut des participants à la fois notables et peu nombreux, qui œuvrent dans les lycées et le CETIC de Kousseri. Nous avons donc opté pour l'échantillonnage par quotas, qui implique d'examiner la composition de la population en fonction de critères déterminés de manière empirique. Ainsi, notre échantillon comprend quatre-vingt-quinze (95) élèves provenant de ces établissements secondaires.

Le taux de sondage (TS) a été calculé selon la formule suivante : $TS = (TE \times 100) / TA$, où TE représente la taille de l'échantillon et TA désigne la population accessible. En appliquant cette formule, nous obtenons : $TS = (95 \times 100) / 475 = 20 \%$, ce qui confirme que notre taux de sondage est effectivement de 20 %. À l'issue de ces calculs, le taux de sondage obtenu nous permet donc de prélever un quota de 20 % dans l'effectif total des élèves du lycée et du CETIC de Kousseri.

Tableau 4 : Représentation de l'échantillon

Tableau 4 : Représentation de l'échantillon								
N°	Etablissements	Effectifs						Total
		3 ^{ème} /4 ^{ème} année		Première		Terminale		
		F	G	F	G	F	G	
1	Lycée Mixte de Kousseri	11	19	06	19	04	16	75
2	CETIC de Kousseri	05	15	00	00	00	00	20
Total		16	34	06	19	04	16	95
		50		25		20		

Source : Archives du lycée et CETIC de Kousseri (décembre 2023)

Bien que cette restriction des participants limite la représentativité de cette étude, elle se justifie par les urgences des examens nationaux dans ces classes pour examiner les efforts d'intégration des outils TICE par les élèves desdites classes. Ainsi, la majorité de la population cible est lésée. Notre choix de restriction des participants se justifie également par le manque de moyens logistiques et de temps pour parcourir tous les établissements de Kousseri, dont certains se situent dans des zones d'accès difficile et en proie à l'insécurité due à la présence sporadique des groupes terroristes de Boko Haram (Ntuda Ebode et al., 2017).

Après avoir déterminé le nombre de sujets à enquêter dans chaque établissement, il est nécessaire de mettre sur pied les instruments permettant de collecter les informations sur le terrain.

Les instruments de collecte et d'analyse des données

Au-delà des observations et de la littérature existante, le principal instrument utilisé pour cette étude est le questionnaire. En effet, cet outil nous

a permis de recueillir des données précises et pertinentes concernant les compétences numériques des apprenants.

Pour traiter efficacement nos données quantitatives, nous avons utilisé d'une part la statistique descriptive afin d'avoir un aperçu général des résultats, et d'autre part, le logiciel SPSS (Statistical Package for the Social Sciences). Ce dernier nous a permis d'attribuer des codes à chaque répondant en fonction des modalités identifiées dans notre étude. Ainsi, l'utilisation conjointe de ces méthodes analytiques garantira une interprétation rigoureuse et fiable des données recueillies.

Variables de l'étude

Au terme de l'analyse théorique, trois principaux axes de l'étude sous forme de variables ont été adoptés. Il s'agit de l'accessibilité des élèves à l'énergie électrique, des difficultés d'accès à la connexion internet fiable et rapide et l'accès restreint aux plateformes éducatives.

Tableau 5 : Variables de l'étude

Variables	Indicateurs	Modalités
V.I.1: Outils d'autonomisation	Utilisation des technologies d'assistance	- Toujours - Parfois - Jamais
	Utilisation des plateformes d'apprentissage en ligne	- Toujours - Parfois - Jamais
	Utilisation des ressources multimédias	- Toujours - Parfois - Jamais
V.I.2: Pratique de gamification	Utilisation des plateformes ludiques.	- Toujours - Parfois - Jamais
	Utilisation des systèmes de points et récompenses	- Toujours - Parfois - Jamais
	Feedback immédiat	- Toujours - Parfois - Jamais
V.I.3: Utilisation des startups dans l'apprentissage	Plateformes d'apprentissage adaptatif	- Toujours - Parfois - Jamais
	Utilisation de technologies immersives	- Toujours - Parfois - Jamais
	Assistance pédagogique virtuelle	- Toujours - Parfois - Jamais
VD : Développement des compétences numériques des apprenants en zone rurale	Capacité à se connecter aux réseaux sociaux	- Toujours - Parfois - Jamais

	Aptitudes à utiliser des informations en ligne pour les travaux scolaires	- Toujours - Parfois - Jamais
	Maîtrise des logiciels éducatifs (traitement de texte, tableurs, présentations)	- Toujours - Parfois - Jamais

Source : Auteurs (octobre 2024)

Présentation, Analyse et Interpretation des Resultats Issus du Questionnaire

Dans cette section, nous allons explorer les résultats en lien avec l'objectif principal de la recherche, qui vise à étudier l'influence de l'intégration pédagogique des TIC sur le développement des compétences numériques des apprenants des zones rurales. Cette analyse se divise en deux segments distincts. La première section se concentre sur l'exposition des données collectées ainsi que sur l'évaluation des résultats issus du questionnaire administré aux participants. La seconde section est dédiée à l'examen des hypothèses initialement posées, permettant ainsi d'approfondir notre compréhension des enjeux identifiés.

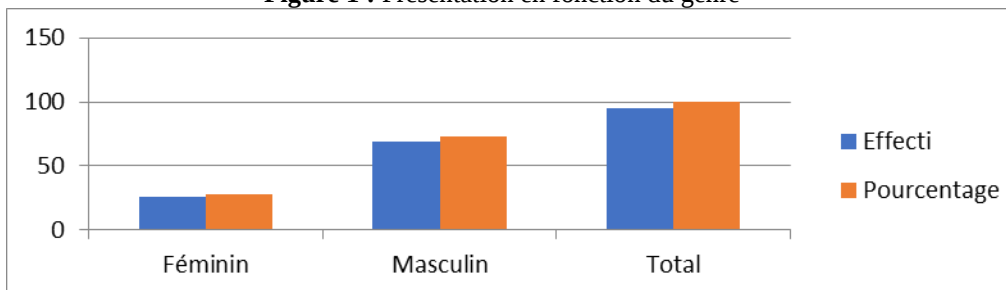
Caractéristiques des répondants

Dans cette partie, nous mettons en avant les traits associés au genre, à l'âge et au niveau d'éducation des participants à l'étude.

Le genre

Dans le but de collecter des données concernant le genre des participants, nous avons formulé la question suivante : Pouvez-vous indiquer votre sexe ? L'analyse du graphique ci-dessous présente les diverses réponses fournies par les personnes interrogées.

Figure 1 : Présentation en fonction du genre



Source : Auteurs (Traitement des résultats obtenus par le logiciel Excel octobre 2024).

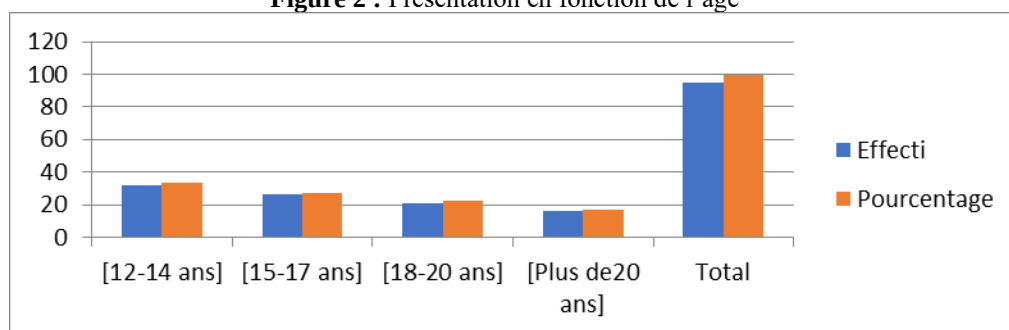
L'analyse des données révèle une majorité significative de répondants masculins, représentant 72,63 % de l'échantillon, tandis que les féminins constituent 27,37 %. Cette disparité indique une surreprésentation des

hommes parmi les participants à l'étude. Cette différence de genre pourrait avoir plusieurs implications pour l'intégration pédagogique des TIC dans les établissements secondaires publics de l'arrondissement de Kousséri notamment : 1) Le nombre réduit de femmes pourrait indiquer des barrières à l'accès aux technologies de l'information et de la communication pour les jeunes filles dans ces régions rurales, un point qui nécessite une considération spéciale pour encourager l'équité des sexes dans le domaine éducatif. 2) La perception et l'implication : Les divergences de sexe peuvent affecter la manière dont on perçoit et s'engage dans les technologies éducatives. Il serait judicieux d'examiner la manière dont ces perceptions diffèrent selon le sexe et de moduler les approches d'intégration des TIC en fonction de cela.

L'âge

Le graphique ci-dessous résume les diverses réponses fournies par les participants concernant leur âge. La question posée était : Quel est votre âge ? L'analyse de ce graphique révèle les différentes réponses des répondants.

Figure 2 : Présentation en fonction de l'âge



Source : Auteurs (Traitement des résultats obtenus par le logiciel Excel octobre 2024)

Concernant l'âge des répondants, nous avons observé que 32 élèves se situent dans l'intervalle [12-14 ans] avec un taux de 33,68%, 26 se trouvent dans l'intervalle [15-17 ans] pour un taux de 27,37% et 21 répondants appartiennent à la tranche d'âge [18-20 ans] soit 22,11%. De plus, 16 élèves ont plus de 20 ans avec un taux de 16,84%. Cette diversité d'âge a plusieurs implications pour l'intégration pédagogique des TIC :

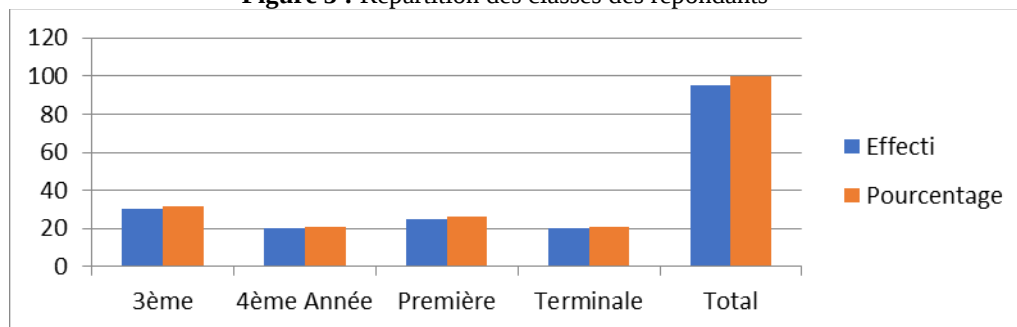
- **Adaptation des contenus pédagogiques :** Étant donné la diversité des âges, il est crucial d'adapter les méthodes d'enseignement et les ressources numériques pour répondre aux besoins variés de chaque groupe d'âge. Les jeunes adolescents peuvent nécessiter une approche plus ludique et interactive, tandis que les jeunes adultes pourraient bénéficier d'une formation plus orientée vers la carrière.
- **Engagement et motivation :** Les apprenants plus jeunes (12-14 ans) sont potentiellement plus motivés à s'engager avec les TIC. Il est donc

essentiel de créer un environnement d'apprentissage qui stimule leur intérêt et leur participation active.

La classe fréquentée

Le graphique ci-dessous présente des données concernant les classes fréquentées par les élèves. En examinant les réponses à la question posée sur leurs classes, l'analyse de ce graphique met en lumière les différentes réponses fournies.

Figure 3 : Répartition des classes des répondants



Source : Auteurs (Traitement des résultats obtenus par le logiciel Excel octobre 2024)

Concernant les classes fréquentées par les participants, il a été noté que 30 élèves, représentant 31,58 %, sont inscrits en 3ème, tandis que 20 élèves, soit 21,05 %, se trouvent en 4ème année. De plus, 25 élèves correspondent à 26,32 % en classe de Première, et enfin, 20 élèves, soit 21,05 %, sont en Terminale. Cette diversité au sein des niveaux scolaires met en évidence la nécessité d'adapter les ressources numériques et les méthodes pédagogiques, telles que la pédagogie inversée, afin de répondre aux besoins variés des apprenants.

Analyse statistique liée à l'intégration pédagogique des TIC

Nous avons opérationnalisé la variable indépendante, qui concerne l'intégration pédagogique des TIC, en trois catégories : outils d'autonomisation, pratiques de gamification et utilisation de startups dans l'apprentissage. Chaque catégorie inclut plusieurs indicateurs et des modalités (toujours, parfois, jamais).

Présentation et analyse des résultats sur les outils d'autonomisation

Cette section vise à présenter les résultats dans le tableau ci-dessous, à les analyser et à procéder à leur vérification.

Présentation et analyse des résultats

La première variable indépendante, axée sur les outils d'autonomisation, repose sur trois questions liées à l'utilisation des

technologies d'assistance, aux plateformes d'apprentissage en ligne et aux ressources multimédias. Les réponses recueillies sont résumées dans le tableau ci-dessous.

Tableau 6 : Outils d'autonomisation

Variables	Indicateurs	Modalités	Effectif	%
V.I.1: Outils d'autonomisation	Utilisation des technologies d'assistance	Toujours	5	4,9
		Parfois	33	34,9
		Jamais	57	60,2
	Total		95	100
	Utilisation des plateformes d'apprentissage en ligne	Toujours	50	52,64
		Parfois	32	33,68
		Jamais	13	13,68
	Total		95	100
	Utilisation des ressources multimédias	Toujours	41	43,16
		Parfois	29	30,53
		Jamais	25	26,31
	Total		95	100

Source : Auteurs (Traitement des résultats obtenus par le logiciel Excel octobre 2024).

L'analyse des résultats concernant les outils d'autonomisation met en évidence des tendances significatives dans l'utilisation des technologies par les apprenants des établissements secondaires publics de l'arrondissement de Kousséri au Cameroun. En ce qui concerne l'utilisation des technologies d'assistance, il est important de noter que 60,02 % des élèves n'y ont jamais recours, tandis que seulement 4,9 % les utilisent toujours. Ce constat souligne une absence marquée d'intégration de ces technologies dans le quotidien scolaire, ce qui pourrait limiter l'autonomie et la capacité d'apprentissage des élèves. Cependant, 34,9 % des élèves déclarent les utiliser parfois, ce qui indique une certaine familiarité avec ces outils, bien que leur intégration ne soit pas systématique.

En revanche, la situation est plus encourageante pour les plateformes d'apprentissage en ligne. En effet, 52,64 % des élèves affirment les utiliser toujours, tandis que 33,68 % le font parfois. Seuls 13,68 % ne s'en servent jamais. Cela suggère que les élèves sont davantage enclins à tirer parti de ces ressources numériques pour leur apprentissage, ce qui pourrait favoriser un développement plus autonome de leurs compétences numériques. Concernant l'utilisation des ressources multimédias, les résultats montrent que 43,16 % des élèves les utilisent toujours et 30,53 % parfois. Toutefois, 26,31 % ne s'en servent jamais. Bien que la majorité semble bénéficier de ces ressources pour enrichir leur apprentissage, une proportion significative reste à sensibiliser ou à former sur leur utilisation.

L'analyse révèle une dichotomie dans l'utilisation des outils d'autonomisation : les plateformes d'apprentissage en ligne et les ressources multimédias sont bien intégrées dans l'éducation, tandis que les technologies

d'assistance sont peu utilisées. Cela souligne la nécessité de réfléchir à des stratégies pour renforcer l'intégration de ces outils et améliorer le développement des compétences numériques des apprenants en zone rurale.

Vérification de l'hypothèse sur les outils d'autonomisation

L'hypothèse de recherche concernant les outils d'autonomisation a été testée à partir de la régression linéaire simple. Ce qui nous a permis de prédire notre variable dépendante, grâce à des équations linéaires.

L'équation des différents modèles que nous chercherons à tester sera sous la forme suivante : $Y = aX + b + \varepsilon$ avec :

Y la variable dépendante

X la variable permettant d'expliquer la variable dépendante

A et b sont les paramètres du modèle

ε représente les erreurs du modèle encore appelés les résidus.

Analyse de la qualité du modèle

Tableau 7: Récapitulatif des modèles^b

Modèle	R	R-deux	R-deux ajusté	Erreur standard de l'estimation	Durbin-Watson
1	,597 ^a	,357	,350	,42718	2,189

a. Prédicteurs : (Constante), outils d'autonomisation

b. Variable dépendante : développement des compétences numériques des apprenants en zone rurale

Source : Données personnelles sous SPSS 27.0.1

L'examen du tableau 7, qui résume le modèle, révèle une corrélation modérée entre la variable des outils d'autonomisation et la variable dépendante, à savoir le développement des compétences numériques des apprenants en zone rurale, avec un coefficient de 0,597. Par ailleurs, le coefficient de détermination R^2 est d'environ 0,357, ce qui indique une qualité de modèle considérée comme relativement satisfaisante. Ainsi, nous pouvons conclure que les outils d'autonomisation expliquent 35,7 % de la variation observée dans le développement des compétences numériques des apprenants en milieu rural.

Analyse de la significativité globale du modèle

Tableau 8 : ANOVA modèle de régression

ANOVA ^a						
Modèle		Somme des carrés	ddl	Carré moyen	F	Sig.
1	Régression	9,417	1	9,417	51,604	,000 ^b
	de Student	16,971	93	,182		
	Total	26,387	94			

a. Variable dépendante : développement des compétences numériques des apprenants en zone rurale

b. Prédicteurs : (Constante), outils d'autonomisation

Source : Données personnelles sous SPSS 27.0.1

Le tableau ANOVA nous permettant d'examiner la statistique F du test de Fisher, nous permet de constater que la statistique F est de l'ordre de 51,604 ; une plus-value de l'ordre 0,000 qui est largement inférieur à 0,05, c'est-à-dire, qu'elle a une significativité inférieure au seuil de 5%. Ainsi nous pouvons dire que la variable « outils d'autonomisation » n'a pas un coefficient nul avec une marge d'erreur de 5%.

Analyse du coefficient de régression

Tableau 9 : Coefficients du modèle de régression

Coefficients						
		Coefficients standardisés		non	Coefficients standardisés	
		B	Erreur standard	Bêta	T	Sig.
1	(Constante)	1,753	,219		8,023	,000
	outils d'autonomisation	,466	,065	,597	7,184	,000

a. Variable dépendante : développement des compétences numériques des apprenants en zone rurale

Source : Données personnelles sous SPSS 27.0.1

L'analyse du tableau des coefficients nous indique que la significativité de la statistique *t* du test de Student de la variable *outils d'autonomisations* est de l'ordre de 8,023 avec une plus-value de l'ordre de 0,000 qui est largement inférieur au seuil de significativité de 5%. Nous pouvons donc conclure que son coefficient est non nul avec une marge d'erreur de 5%. Ce coefficient étant de l'ordre de 0,466 (ce qui est positif), nous pouvons dire que les outils d'autonomisations influencent positivement le développement des compétences numériques des apprenants en zone rurale

Présentation et analyse des résultats sur les pratiques de la gamification

Dans cette section, nous allons présenter les résultats dans le tableau ci-dessous, procéder à leur analyse et réaliser leur vérification. Pour recueillir

des informations relatives à la pratique de la gamification, nous avons posé trois questions en lien avec *l'utilisation des plateformes ludiques*, *l'utilisation des systèmes de points et récompenses* et le *feedback immédiat*. Les différentes réponses obtenues sont résumées dans le tableau ci-dessous.

Tableau 10 : Pratique de gamification

Variables	Indicateurs	Modalités	Effectif	%
VI 2: Pratique de gamification	Utilisation des plateformes ludiques.	Toujours	15	15,79
		Parfois	21	22,11
		Jamais	59	62,10
	Total		95	100
	Utilisation des systèmes de points et récompenses	Toujours	8	8,42
		Parfois	14	14,74
		Jamais	73	76,84
	Total		95	100
	Feedback immédiat	Toujours	5	5,26
		Parfois	8	8,42
		Jamais	82	86,32
	Total		95	100

Source : Auteurs (Traitement des résultats obtenus par le logiciel Excel octobre 2024).

L'analyse des résultats concernant la pratique de la gamification dans les établissements secondaires publics de l'arrondissement de Kousseri, au Cameroun révèle des tendances préoccupantes quant à l'engagement des apprenants dans l'utilisation des outils ludiques. Tout d'abord, en ce qui concerne l'utilisation des plateformes ludiques, seulement 15,79 % des élèves affirment les utiliser toujours, tandis que 22,11 % le font parfois. En revanche, une majorité significative de 62,10 % ne les utilise jamais. Ce constat indique une faible intégration des plateformes ludiques dans le processus éducatif, ce qui pourrait limiter l'engagement et la motivation des élèves. Ensuite, concernant l'utilisation des systèmes de points et de récompenses, les résultats sont également alarmants. En effet, seulement 8,42 % des élèves utilisent toujours ces systèmes, alors que 14,74 % le font parfois. Par conséquent, une écrasante majorité de 76,84 % n'y a jamais recours. Cela suggère que les mécanismes incitatifs qui pourraient stimuler l'engagement et la compétition amicale sont largement absents. Enfin, pour ce qui est du feedback immédiat, les résultats montrent que seulement 5,26 % des élèves reçoivent un retour constant sur leurs performances. De plus, 8,42 % en bénéficient parfois, tandis qu'une écrasante majorité de 86,32 % ne reçoit jamais de feedback. Ce manque de rétroaction immédiate peut entraver le développement des compétences numériques et la motivation des apprenants.

Vérification de l'hypothèse sur les pratiques de la gamification

Pour vérifier l'hypothèse spécifique de recherche selon laquelle la pratique de gamification influe sur le développement des compétences numériques des apprenants en zone rurale, posons au préalable les hypothèses statistiques :

H0 : Il n'existe pas de relation linéaire entre la pratique de gamification et le développement des compétences numériques des apprenants en zone rurale

H1 : Il existe une relation linéaire entre la pratique de gamification et le développement des compétences numériques des apprenants en zone rurale

Analyse de la qualité du modèle

Tableau 11 : Récapitulatif du modèle de régression

Récapitulatif des modèles b						
Modèle	R	R-deux	R-deux ajusté	Erreur standard de l'estimation	de Durbin-Watson	
1	,615a	,378	,371	,42013	2,359	

a. Prédicteurs : (Constante), pratique de gamification

b. Variable dépendante : développement des compétences numériques des apprenants en zone rurale

Source : Données personnelles sous SPSS 27.0.1

Une analyse du tableau 11 présentant le récapitulatif du modèle nous permet de constater que la variable *pratique de gamification* est moyennement corrélée à la variable dépendante *développement des compétences numériques des apprenants en zone rurale* avec une corrélation de l'ordre de 0,615. De plus, le coefficient de détermination R-deux est de l'ordre de 0,378, ce que nous pouvons qualifier de plus ou moins moyen, présentant ainsi la qualité du modèle comme assez bonne. Ainsi nous pouvons estimer que le prédicteur pratique de gamification explique 37,8% de la variation du développement des compétences numériques des apprenants en zone rurale.

Analyse de la significativité globale du modèle

Tableau 12: ANOVA modèle de régression

ANOVA ^a						
Modèle		Somme des carrés	ddl	Carré moyen	F	Sig.
1	Régression	9,971	1	9,971	56,491	,000b
	de Student	16,416	93	,177		
	Total	26,387	94			

a. Variable dépendante : développement des compétences numériques des apprenants en zone rurale

b. Prédicteurs : (Constante), pratique de gamification

Source : Données personnelles sous SPSS 27.0.1

Le tableau ANOVA permettant d'examiner la statistique F du test de Fisher, nous permet de constater que la statistique F est de l'ordre de 54,491 avec une plus-value de l'ordre 0,000. Ce qui est largement inférieur à 0,05, c'est-à-dire, qu'elle a une significativité inférieure au seuil de 5%. Ainsi nous pouvons dire que la variable « pratique de gamification » n'a pas un coefficient nul avec une marge d'erreur de 5%.

Présentation et analyse des résultats sur l'utilisation des startups dans l'apprentissage

Dans cette partie, nous allons exposer les résultats dans le tableau suivant, effectuer une analyse de ces données et procéder à leur validation.

Présentation et analyse des résultats

La troisième variable indépendante, qui concerne « l'intégration des startups dans le processus d'apprentissage », nous a amenés à élaborer plusieurs questions liées aux indicateurs des plateformes d'apprentissage adaptatif, à l'utilisation des technologies immersives, ainsi qu'à l'assistance pédagogique virtuelle. L'analyse du tableau ci-après met en lumière les diverses réponses apportées à ces interrogations.

Tableau 13 : Utilisation des startups dans l'apprentissage

Variables	Indicateurs	Modalités	Effectif	%
VI 3: Utilisation des startups dans l'apprentissage	Plateformes d'apprentissage adaptatif	Toujours	5	5,26
		Parfois	28	29,47
		Jamais	62	65,27
	Total		95	100
	Utilisation de technologies immersives	Toujours	18	18,95
		Parfois	12	12,63
		Jamais	65	68,42
	Total		95	100
	Assistance pédagogique virtuelle	Toujours	22	23,16
		Parfois	27	28,42
		Jamais	46	48,42
	Total		95	100

Source : Auteurs (Traitement des résultats obtenus par le logiciel Excel octobre 2024).

L'analyse des résultats concernant l'utilisation des startups dans l'apprentissage au sein des établissements secondaires publics de l'arrondissement de Kousséri au Cameroun révèle des lacunes significatives dans l'adoption de ces approches innovantes.

En ce qui concerne les plateformes d'apprentissage adaptatif, seulement 5,26 % des élèves affirment les utiliser toujours, tandis que 29,47 % le font parfois. En revanche, une majorité de 65,27 % n'y a jamais recours. Ce constat indique une faible intégration de ces plateformes dans le processus éducatif, ce qui pourrait limiter la personnalisation de l'apprentissage et

l'adaptabilité aux besoins individuels des élèves. De plus, en ce qui concerne l'utilisation de technologies immersives, les résultats montrent que 18,95 % des élèves les utilisent toujours et 12,63 % parfois. Cependant, une part importante de 68,42 % ne s'en sert jamais. Cela suggère que les technologies immersives, qui pourraient enrichir l'expérience d'apprentissage et stimuler l'engagement des élèves, sont largement sous-exploitées. Enfin, pour ce qui est de l'assistance pédagogique virtuelle, les résultats révèlent que 23,16 % des élèves en bénéficient toujours et 28,42 % disent parfois. Néanmoins, une proportion notable de 48,42 % ne reçoivent jamais ce type d'assistance. Ce manque d'accès à un soutien pédagogique virtuel pourrait entraver le développement des compétences numériques et la réussite scolaire des apprenants.

Vérification de l'hypothèse sur l'utilisation des startups dans l'apprentissage

Pour vérifier l'hypothèse spécifique de recherche selon laquelle l'utilisation des startups dans l'apprentissage a une incidence sur le développement des compétences numériques des apprenants en zone rurale, posons au préalable les hypothèses statistiques :

H0 : Il n'existe pas de relation linéaire entre l'utilisation des startups dans l'apprentissage et le développement des compétences numériques des apprenants en zone rurale

H1 : Il existe une relation linéaire entre l'utilisation des startups dans l'apprentissage et le développement des compétences numériques des apprenants en zone rurale

Analyse de la qualité du modèle

Tableau 14: Récapitulatif du modèle de régression

Récapitulatif des modèles ^b						
Modèle	R	R-deux	R-deux ajusté	Erreur standard de l'estimation	de Durbin-Watson	
1	,433a	,187	,179	,48015	2,296	

a. Prédicteurs : (Constante), utilisation des startups dans l'apprentissage

b. Variable dépendante : développement des compétences numériques des apprenants en zone rurale

Source : Données personnelles sous SPSS 27.0.1

Une analyse du tableau 14 présentant le récapitulatif du modèle nous permet de constater que la variable *utilisation des startups dans l'apprentissage* est moyennement corrélée à la variable dépendante *développement des compétences numériques des apprenants en zone rurale* avec une corrélation de l'ordre de 0,433. Cependant le coefficient de

détermination R-deux est de l'ordre de 0,187, que nous pouvons qualifier de plus ou moins faible. Ainsi nous pouvons estimer que le prédicteur utilisation des startups dans l'apprentissage explique 18,7% de la variation du développement des compétences numériques des apprenants en zone rurale.

Analyse de la significativité globale du modèle

Tableau 15 : ANOVA modèle de régression

ANOVA ^a						
Modèle		Somme des carrés	ddl	Carré moyen	F	Sig.
1	Régression	4,947	1	4,947	21,456	,000b
	de Student	21,440	93	,231		
	Total	26.387	94			

a. Variable dépendante : développement des compétences numériques des apprenants en zone rurale

b. Prédicteurs : (Constante), utilisation des startups dans l'apprentissage

Source : Données personnelles sous SPSS 27.0.1

Le tableau ANOVA permettant d'examiner la statistique F du test de Fisher, nous permet de constater que la statistique F est de l'ordre de 21,816 avec une plus-value de l'ordre de 0,000. Ce qui est largement inférieur à 0,05, c'est-à-dire, qu'elle a une significativité inférieure au seuil de 5%. Ainsi nous pouvons dire que la variable *utilisation des startups dans l'apprentissage* n'a pas un coefficient nul avec une marge d'erreur de 5%.

Discussion des résultats

La discussion portera principalement sur nos trois hypothèses de recherche.

Discussion de l'hypothèse de recherche N°1 : *les outils d'autonomisation*

L'analyse des *outils d'autonomisation* dans le cadre de l'intégration pédagogique des technologies de l'information et de la communication (TIC) met en lumière des résultats significatifs qui méritent une attention particulière. D'après nos données, 60,2 % des apprenants n'ont jamais recours aux technologies d'assistance, tandis que seulement 4,9 % les utilisent de manière régulière. Ce constat soulève des inquiétudes concernant l'accessibilité et l'acceptabilité de ces outils au sein des établissements secondaires publics de l'arrondissement de Kousseri. Des recherches antérieures indiquent que l'utilisation des technologies d'assistance peut considérablement renforcer l'autonomie des apprenants. En effet, il a été démontré que ces outils aident les élèves à mieux contrôler leur environnement d'apprentissage (Ministère de l'Éducation du Manitoba, 2023 ; Depover et al., 2013). Cela met en exergue la nécessité d'une intégration efficace de ces dispositifs pour promouvoir un apprentissage plus autonome.

D'autre part, l'utilisation des plateformes d'apprentissage en ligne (Beedeez, 2023) présente des résultats plus positifs, avec 52,64 % des répondants affirmant les utiliser régulièrement. Ce chiffre est en cohérence avec les études qui montrent que ces plateformes offrent un accès flexible aux ressources éducatives et encouragent l'engagement des élèves. Il est essentiel de souligner que la technologie éducative permet d'accéder à une vaste gamme de ressources et de contenus pédagogiques variés (UNESCO, 2023). Cette flexibilité aide les apprenants à gérer leur propre processus d'apprentissage et à prendre davantage de responsabilités dans leur parcours éducatif.

En ce qui concerne *l'utilisation des ressources multimédias*, 43,16 % des participants rapportent y recourir fréquemment. Cela indique une reconnaissance croissante de l'importance des outils visuels et interactifs dans le processus éducatif. Des recherches antérieures montrent que l'intégration de ressources multimédias dans l'enseignement peut améliorer à la fois la motivation et la compréhension des apprenants (Bienvenu, 2023). Ainsi, ces ressources peuvent jouer un rôle crucial dans l'autonomisation des apprenants en rendant le contenu plus accessible et engageant.

La théorie socioconstructiviste développée par Vygotski (1985) s'applique particulièrement bien à la question des outils d'autonomisation. Selon cette approche, l'apprentissage est un processus social qui se déroule par le biais d'interactions avec autrui et d'activités collaboratives. L'intégration des TIC peut favoriser un environnement propice à cette interaction sociale en encourageant le travail d'équipe et la collaboration entre les élèves. Grâce à l'utilisation d'outils numériques, les apprenants sont incités à participer activement et à partager leurs connaissances, renforçant ainsi leur compréhension collective.

En résumé, bien que les résultats montrent une faible utilisation des technologies d'assistance, l'engagement avec les plateformes d'apprentissage en ligne et les ressources multimédias semble plus favorable. Il est donc crucial de surmonter les obstacles psychologiques et techniques qui limitent leur adoption afin de maximiser leur impact sur le développement des compétences numériques. Ceci en vulgarisant l'utilisation des plateformes les plus usuels tels que WhatsApp, Messenger et Facebook (Fayole Dounla, 2022).

Discussion de l'hypothèse de recherche N°2 : la pratique de gamification

L'analyse de la *pratique de gamification* dans les établissements secondaires publics de l'arrondissement de Kousseri révèle des résultats préoccupants. En effet, seulement 15,79 % des apprenants utilisent régulièrement des plateformes ludiques, tandis que 62,10 % n'en font jamais usage. Ce faible taux d'engagement peut être attribué à divers facteurs, notamment le manque de ressources et de formation adéquate pour les

enseignants. Des recherches antérieures ont démontré que la gamification peut considérablement améliorer l'engagement des élèves et favoriser un apprentissage plus actif. Par exemple, il a été constaté que « la gamification encourage les étudiants à acquérir des compétences et des connaissances efficaces tout en améliorant la rétention à long terme » (Marcos, 2016, p. 22). Cela souligne l'importance d'intégrer des éléments ludiques dans le processus éducatif pour stimuler l'intérêt des apprenants.

En ce qui concerne *l'utilisation des systèmes de points et récompenses*, seulement 8,42 % des élèves en bénéficient régulièrement. Ce résultat est en accord avec les travaux qui soulignent que « les mécanismes de jeu peuvent motiver les utilisateurs individuels en fonction de leur personnalité » (Jang et al., 2015, p. 45). L'inefficacité observée dans notre échantillon pourrait résulter d'une conception inappropriée des jeux ou d'un manque d'adaptation aux besoins spécifiques des apprenants.

De plus, le *feedback immédiat* est également limité, avec seulement 5,26 % des élèves déclarant en bénéficier toujours. Le feedback rapide est crucial dans un environnement gamifié, car il permet aux apprenants de suivre leurs progrès et d'ajuster leurs stratégies d'apprentissage. Les études montrent que « le feedback immédiat est essentiel pour maintenir l'engagement et favoriser un apprentissage efficace » (Dichev & Dicheva, 2017, p. 78). L'absence de ce type de retour pourrait expliquer pourquoi une majorité d'apprenants ne s'engage pas pleinement dans les activités proposées.

La théorie socioconstructiviste de Vygotski (1985) cadre particulièrement bien avec la pratique de la gamification. Selon cette théorie, l'apprentissage est un processus social qui se produit par l'interaction avec autrui et par le biais d'activités collaboratives. La gamification peut créer un environnement propice à cette interaction sociale en favorisant le travail d'équipe et la collaboration entre les élèves. En intégrant des éléments ludiques dans l'apprentissage, les élèves sont encouragés à participer activement et à partager leurs connaissances ; ce qui renforce leur compréhension collective.

En résumé, bien que la pratique de la gamification présente un potentiel considérable pour le développement des compétences numériques en milieu rural, son adoption reste limitée dans notre échantillon. Il est donc impératif d'explorer des stratégies pour améliorer l'intégration de ces outils dans le processus éducatif afin d'accroître l'engagement et la motivation des apprenants.

Discussion de l'hypothèse de recherche N°3 : *l'utilisation des startups dans l'apprentissage*

L'examen de *l'utilisation des startups dans l'apprentissage* met en évidence des résultats significatifs concernant l'intégration des technologies innovantes dans le milieu éducatif. Selon nos données, 65,27 % des apprenants

n'utilisent jamais les plateformes d'apprentissage adaptatif, tandis que seulement 5,26 % les utilisent de manière régulière. Ce constat soulève des préoccupations relatives à l'acceptabilité et à l'accessibilité de ces outils dans les établissements secondaires publics de l'arrondissement de Kousseri.

De plus, des études antérieures indiquent que les startups jouent un rôle crucial dans la transformation de l'éducation grâce à des solutions technologiques adaptées. Par exemple, il a été démontré que « les startups développent des outils basés sur l'IA pour améliorer les processus de formation continue » (Maddyness, 2023, p. 2). Cette affirmation met en lumière le potentiel des innovations technologiques pour enrichir l'expérience d'apprentissage et favoriser une approche plus personnalisée.

En ce qui concerne *l'utilisation des technologies immersives*, seulement 18,95 % des répondants déclarent les utiliser régulièrement. Ce résultat est cohérent avec les recherches qui montrent que « la réalité virtuelle et augmentée peut offrir aux élèves une expérience d'apprentissage immersive » (Agence SAT, 2023, p. 4). Ces technologies permettent aux apprenants d'interagir avec le contenu d'une manière qui dépasse les méthodes traditionnelles, rendant ainsi l'apprentissage plus engageant.

Quant à *l'assistance pédagogique virtuelle*, 23,16 % des participants affirment y recourir fréquemment. Les recherches antérieures révèlent que « les agents conversationnels et les tuteurs virtuels sont de plus en plus utilisés pour fournir un soutien personnalisé aux apprenants » (Stewdy, 2023, p. 5). Cela indique que les startups peuvent contribuer à créer un environnement d'apprentissage adaptatif où chaque élève peut progresser à son propre rythme.

La théorie socioconstructiviste de Vygotski (1985) s'avère particulièrement pertinente en ce qui concerne l'utilisation des startups dans le domaine de l'apprentissage. Dans ce contexte, les startups ont la capacité de faciliter cette interaction sociale en proposant des plateformes qui favorisent le travail d'équipe et la collaboration entre les élèves. De plus, en intégrant des outils numériques développés par ces entreprises, les apprenants sont encouragés à participer activement et à partager leurs connaissances, ce qui renforce leur compétence sociale.

Bien que les résultats montrent une faible utilisation des plateformes d'apprentissage adaptatif et des technologies immersives, il existe un potentiel considérable pour une intégration plus efficace des outils développés par les startups. Il est donc crucial de surmonter les obstacles psychologiques et techniques qui limitent leur adoption afin de maximiser leur impact sur le développement des compétences numériques.

Conclusion

L'intégration pédagogique des TIC dans le cadre des établissements secondaires publics de l'arrondissement de Kousseri a révélé des résultats

significatifs concernant les trois variables étudiées : les outils d'autonomisation, les pratiques de gamification et l'utilisation des startups dans l'apprentissage. Les analyses statistiques ont confirmé l'impact positif de ces variables sur le développement des compétences numériques des apprenants en zone rurale. En effet, comme le souligne Vygotski (1985, p. 57), « l'apprentissage est un processus social qui se produit par l'interaction avec autrui ». Ce processus est essentiel dans un contexte où les ressources sont limitées et où la collaboration peut jouer un rôle déterminant. Ce contexte de défis en ressources semble toucher aussi bien les apprenants du secondaire de l'Extrême-Nord du Cameroun (Weladji Fongang et Hassana, 2024) que ceux du supérieur en pleines zones urbaines (Mfomo Mballa et Hassana, 2024).

Les résultats montrent que, bien que l'utilisation des outils d'autonomisation soit encore faible, il existe un potentiel considérable pour améliorer l'engagement des élèves grâce à des méthodes innovantes telles que la gamification et les plateformes développées par des startups. En effet, les startups peuvent offrir des solutions adaptées qui favorisent non seulement l'apprentissage individuel mais également la collaboration entre pairs, ce qui est en accord avec la théorie socioconstructiviste de Vygotski. Ce dernier affirme que « toute fonction apparaît deux fois : d'abord au niveau social, puis au niveau individuel » (Vygotski, 1985, p. 112). Ainsi, les interactions sociales facilitent l'appropriation des connaissances et renforcent la compréhension collective.

Pour maximiser l'impact de ces outils pédagogiques, il est crucial d'investir dans la formation des enseignants afin qu'ils puissent intégrer efficacement ces technologies dans leurs pratiques. De plus, il serait bénéfique de sensibiliser les apprenants à l'utilisation des startups et des outils numériques afin d'accroître leur autonomie et leur engagement. Comme le soulignent Schneuwly et Bronckart (1985, p. 111), « chaque fonction psychique supérieure apparaît deux fois au cours du développement de l'enfant : d'abord comme activité collective, sociale et donc comme fonction interpsychique ». Cela implique que les enseignants doivent adopter une approche collaborative pour favoriser un apprentissage significatif.

Bien que des défis subsistent, les perspectives d'intégration des TIC dans l'éducation en zone rurale sont prometteuses. En s'appuyant sur les principes de la théorie socioconstructiviste et en favorisant une culture d'apprentissage collaboratif, il est possible de transformer ces défis en opportunités pour le développement des compétences numériques des apprenants. De façon spécifique, nous recommandons de doter les établissements secondaires publics de l'arrondissement de Kousseri des salles multimédias, des ordinateurs, mais aussi d'inciter les élèves à intégrer davantage les TIC dans leurs pratiques de classes pour développer leurs compétences numériques.

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