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From Assistance to Academic Dependency: An Analysis of Students' Use of ChatGPT in Homework Completion

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ABSTRACT

The rapid expansion of generative artificial intelligence has significantly transformed students' learning practices, particularly in the completion of homework assignments. Since the public release of ChatGPT, concerns have emerged regarding its pedagogical value, potential academic dependency, and implications for academic integrity. This study investigates the extent and forms of ChatGPT use among lower and upper secondary school students, focusing on the boundary between academic assistance and dependency. The study also considers the concept of cognitive offloading, referring to students' reliance on AI tools to reduce cognitive effort during task completion. A mixed-methods explanatory sequential design was employed, combining quantitative data from 132 students (grades VI–XII) with qualitative interview insights. Statistical analyses included descriptive statistics, ANOVA, regression analysis, exploratory factor analysis (EFA), and mediation analysis (model with bootstrapping). Results indicate that ChatGPT is widely used primarily as a supportive tool rather than a full replacement for independent work. Academic dependency levels were generally low; however, regression and mediation analyses revealed that dependency partially mediates the negative relationship between ChatGPT use and independent learning engagement (44% of the total effect). Effect sizes ranged from small to moderate, suggesting a practical but not dominant influence. Findings suggest that ChatGPT itself is not inherently detrimental; rather, its impact depends on the intensity and manner of use. The study highlights the need for structured pedagogical guidance and clear ethical frameworks to ensure responsible integration of generative AI in secondary education.

Keywords: ChatGPT; Generative Artificial Intelligence; Homework; Students

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1. Introduction

The rapid development of generative artificial intelligence has brought profound changes to the way students learn, search for information, and complete homework. Since the release of ChatGPT by OpenAI in late 2022, this tool has become widely accessible and used in educational contexts, offering new opportunities for academic support, but at the same time raising serious concerns about academic integrity and the development of students' cognitive skills [1]. Although a wide range of generative AI tools are currently available (e.g., Bard, Claude, Gemini), ChatGPT was selected as the focus of this study due to its widespread adoption among students and its accessibility as a conversational AI tool. Its dominance in educational contexts makes it a relevant case for examining patterns of use and potential dependency.

Recent studies show that students use ChatGPT for a wide range of academic activities, including explaining difficult concepts, generating ideas, summarizing texts, and linguistic editing of assignments [2]. However, the use of this tool is not limited to an auxiliary role. A number of empirical studies report that a proportion of students use ChatGPT to complete assignments, without direct intellectual engagement, moving from pedagogical support to academic dependence [3].

This shift from "help" to "dependence" poses a significant challenge for education systems. According to Rudolph et al. [4], the uncontrolled use of artificial intelligence tools can weaken critical thinking, problem-solving skills, and students' individual responsibility for learning. At the same time, the lack of clear institutional policies and pedagogical guidelines makes it difficult to distinguish between ethical use and academic abuse of ChatGPT [5].

Recent international research has increasingly examined the role of ChatGPT and AI-supported learning across diverse educational systems. Studies such as Uğraş et al. [6] highlight the potential of ChatGPT in promoting sustainable practices in primary education, while Lampropoulos and Papadakis [7] emphasize the broader educational value of artificial intelligence in education.

From a pedagogical perspective, some authors argue that ChatGPT can serve as a valuable teaching tool if integrated in a structured and transparent manner into the educational process [8]. However, without a clear ethical and didactic framework, there is a risk that students will develop functional dependence on the technology, replacing the learning process with automatic response generation [1].

In this study, homework is defined as any academic task assigned to students to be completed outside of classroom time. These tasks may vary significantly in complexity, ranging from routine exercises to assignments that require higher-order thinking, problem-solving, and creativity. Understanding this variation is essential, as the nature of homework may influence the extent to which students rely on generative AI tools such as ChatGPT.

Recent empirical studies conducted in Western educational contexts further highlight the growing integration of ChatGPT in teaching and learning processes. For example, research from European and North American settings shows that students widely use ChatGPT for writing support, problem-solving, and personalized learning assistance, while also raising concerns about academic integrity and overreliance on AI tools. These studies provide an important comparative perspective for understanding how AI tools are adopted across different educational systems.

In this context, this paper aims to analyze the use of ChatGPT by students in completing homework, focusing on the intensity, forms, and purposes of use, as well as the boundary between academic assistance and academic dependency. Drawing on contemporary literature and empirical data, the study aims to contribute to the current debate on the role of artificial intelligence in education and its implications for students' academic and ethical development.

1.1. Problem Identification

The rapid spread of generative artificial intelligence tools, especially ChatGPT, has created a new reality in the learning process, directly affecting the way students approach homework. While technology offers immediate and personalized support, recent literature shows that the boundary between assistive use and academic dependency remains unclear and insufficiently studied, especially at the undergraduate level [1,8].

The main problem identified in contemporary studies is related to the fact that an increasing number of students use ChatGPT not only for clarification or conceptual support, but also for the complete completion of homework. This practice risks replacing the active learning process with a passive

process of producing answers, weakening the development of critical thinking and analytical skills [3,9].

Empirical studies show that frequent use of ChatGPT for academic tasks is associated with increased functional dependence on technology, where students begin to rely on artificial intelligence even for tasks that they previously completed independently [10]. This dependence creates not only a risk to academic integrity but also to students' cognitive autonomy, negatively affecting motivation and personal responsibility for learning [4].

Another dimension of the problem is related to the lack of clear policies and pedagogical guidelines on the ethical use of ChatGPT in homework. According to Yusuf et al. [5], educational institutions often react passively to the use of AI, focusing on detecting violations instead of building sustainable models of pedagogical integration. This situation makes it difficult to distinguish between permissible assistance and academic abuse, creating confusion for both students and teachers.

Furthermore, international literature highlights that students are often unaware of the long-term consequences of uncontrolled use of ChatGPT, perceiving it as a neutral tool without ethical risk [11,12]. This lack of awareness contributes to the normalization of practices that violate fundamental principles of academic honesty.

In this context, the research problem of this paper consists of the need to identify the extent and forms of ChatGPT use by students in homework, as well as to analyze the transition from auxiliary use to academic dependency. Identifying this problem is essential for the development of educational policies and pedagogical strategies aimed at preserving academic integrity and promoting independent learning in the era of artificial intelligence [1,3].

1.2. Purpose of the Study

The main purpose of this study is to analyze the manner and extent of ChatGPT use by students in completing homework, with a particular focus on identifying the boundary between pedagogical aid use and the development of academic dependency. Drawing on contemporary literature, the study aims to contribute to the understanding of the impact that generative artificial intelligence has on the learning process, academic integrity, and cognitive autonomy of students [1,3].

An additional goal of the study is to provide empirical evidence that can serve as a basis for the development of educational policies and sustainable pedagogical practices that aim at the ethical and controlled integration of ChatGPT in the school context. Recent studies emphasize that the lack of empirical data at the student level makes it difficult to design effective strategies for managing the use of AI in education [5,9].

1.3. Study Objectives

In line with the overall goal, this study aims to achieve the following specific objectives:

- To identify the extent of ChatGPT use by students in homework, by analyzing the frequency and intensity of use, as suggested by studies on the diffusion of AI in educational contexts [2].
- To analyze the forms of use of ChatGPT, distinguishing between use as an auxiliary tool (e.g., explanations, ideas, summaries) and use as a replacement for individual student work, in accordance with the conceptual division proposed by Cotton et al. [3] and Gammoh [10].
- To assess the level of academic dependency on ChatGPT, examine whether frequent use of this tool reduces students' active engagement and critical thinking [4,9].
- To examine students' perceptions of the ethical use of ChatGPT, analyzing their awareness regarding academic integrity and the consequences of uncontrolled use of artificial intelligence [11,12].
- To contribute to the formulation of pedagogical recommendations, based on the study findings and existing literature, for the responsible and educational use of ChatGPT in homework [1,5].

1.4. Importance of the Study

Achieving these objectives is expected to help deepen the scientific understanding of the impact of ChatGPT on student learning, providing a balanced approach between the pedagogical potential of the technology and the risks associated with academic dependency and violation of academic integrity. As highlighted in recent literature, only through empirical analysis and clear ethical frameworks can a sustainable integration of artificial intelligence in education be ensured [3,8].

1.5. Research Questions

Based on the contemporary literature on the use of generative artificial intelligence in education and the identified issues related to the transition from auxiliary use to academic dependence, this study is guided by the following research questions:

- How often do students use ChatGPT to do homework?
- For what academic purposes is ChatGPT most often used by students (conceptual assistance, idea generation, or complete assignment completion)?
- Is there a trend towards academic dependence on ChatGPT in completing homework?
- How do students perceive ethical and academic integrity aspects when using ChatGPT?
- Does frequent use of ChatGPT affect students' level of engagement and critical thinking while completing homework?

1.6. Research Hypotheses

Drawing on the empirical and theoretical findings of the existing literature, the study raises the following research hypotheses:

H1. *Students use ChatGPT frequently for homework.*

H2. *The use of ChatGPT by students is more widespread as an auxiliary tool than as a complete replacement for academic work.*

H3. *There is a positive relationship between the frequency of ChatGPT use and the level of academic dependency of students.*

H4. *Students with higher levels of ChatGPT usage exhibit lower engagement in the independent learning process.*

H5. *Students who use ChatGPT frequently have lower perceptions of risks related to academic integrity.*

2. Literature Review

2.1. Using ChatGPT in the Educational Context

Recent literature shows that ChatGPT has become one of the most widely used artificial intelligence tools in education, especially for supporting independent learning and completing academic tasks. An extensive systematic review by Albadarin et al.[13] shows that students use ChatGPT primarily for explaining concepts, building task structures, and planning learning, perceiving it as a virtual tutor accessible at any time.

Other synthetic studies show that the use of ChatGPT is particularly widespread in writing and conceptual tasks, where students seek help in formulating ideas and improving the linguistic quality of their papers[14]. However, the authors emphasize that this use often goes beyond editorial assistance and moves into direct production of academic content.

In addition to studies conducted in local and regional contexts, a growing body of research from Western countries has examined the use of ChatGPT in education. Systematic reviews indicate that students in Europe and North America primarily use ChatGPT as a support tool for writing, idea generation, and conceptual understanding, rather than as a complete substitute for learning[13]. Empirical studies also show that while ChatGPT can enhance engagement and efficiency, it may simultaneously introduce risks related to reduced cognitive effort and academic dependency.

2.2. The Impact of ChatGPT on Engagement and Learning Outcomes

A number of studies based on meta-analyses and systematic reviews suggest that ChatGPT can have a positive impact on student engagement and knowledge acquisition, if used in a controlled manner. Baidoo-Anu and Owusu Ansah[15] report that using ChatGPT as a supportive tutor increases student interaction with the learning content and encourages active participation in the learning process.

On the other hand, other studies warn that improving short-term outcomes does not necessarily translate into long-term cognitive development. Grassini[16], in an extensive meta-analysis, argues that the use of ChatGPT has no significant impact on the development of higher-level thinking, especially when students use the tool to replace personal effort on homework.

From the results of the study by Orhani[17], it has been shown that the integration of robots into the education system will undoubtedly increase the effectiveness of teaching and learning in STEM education.

An important concept related to the use of AI tools in education is cognitive offloading, which refers to the delegation of cognitive processes to external tools. In the context of ChatGPT, students may rely on the tool to perform tasks such as idea generation, problem solving, or text production, potentially reducing the need for active cognitive engagement. While cognitive offloading can increase efficiency, excessive reliance may hinder the development of higher-order thinking skills.

2.3. ChatGPT, Homework, and Academic Dependency

A central concern in the literature relates to the risk of developing academic dependence on ChatGPT. Rudolph et al.[18] point out that the continuous use of ChatGPT for homework can create a pattern of dependent learning, where students gradually lose the ability to analyze and solve problems independently.

Similarly, Dwivedi et al.[19] identify a link between intensive use of ChatGPT and increased procrastination, where students postpone completing tasks, relying on the possibility of generating immediate answers. This tendency increases the risk that homework will lose its educational function as a means of deepening learning. On the other hand, the results of the study by Kusari-Radoniqi and Orhani[20] show that, while video games can improve cognitive skills and coordination, they can also promote aggressive behavior and negatively affect the moral development of young people.

In this study, academic dependency is defined as the extent to which students rely on ChatGPT to complete academic tasks, potentially reducing their independent cognitive engagement.

2.4. Ethical and Pedagogical Perspectives in Literature

From an ethical perspective, contemporary studies highlight the need to review traditional assessment and homework practices. Lo[21] argues that traditional assignments are particularly vulnerable to the use of ChatGPT and calls for their redesign to encourage reflection and critical thinking.

Similarly, Mai[22], through a SWOT analysis, suggests that the pedagogical potential of ChatGPT can only be exploited if its use is accompanied by clear guidelines and academic transparency. Without these measures, artificial intelligence risks transforming from a supportive tool into a factor that undermines students' academic autonomy.

2.5. The Gap in the Literature

Although the existing literature provides a broad overview of the use of ChatGPT in education, there is a lack of empirical studies that specifically focus on students' homework and the gradual transition from auxiliary use to academic dependency. Most studies focus on higher education, leaving the context of pre-university students relatively unexplored[23]. This gap justifies the need for the current study.

Despite growing research, findings remain mixed regarding whether AI tools enhance learning or create dependency. Therefore, examining both supportive and potentially dependent uses of ChatGPT remains essential.

Recent studies also emphasize the pedagogical potential of ChatGPT in structured educational environments. For instance, Uğraş et al.[6] highlight its role in supporting sustainable learning practices in primary education, while Lampropoulos and Papadakis[7] discuss the broader educational value of artificial intelligence and social robots in enhancing interactive and adaptive learning environments.

3. Methodology

3.1. Study Design

This study is conceived as a mixed-methods study, specifically applying an explanatory sequential design. This design includes two interconnected phases: initially, a quantitative phase, followed by a qualitative phase, where the qualitative results serve to explain and interpret the statistical findings of the first phase. The choice of this design is appropriate, as the phenomenon of using ChatGPT in homework requires both a numerical analysis of usage patterns and an in-depth understanding of students' experiences and perceptions. The quantitative phase aims to identify the extent of ChatGPT use, the level of academic dependence, and differences between classes and educational levels, while the qualitative phase aims to explain the reasons, motivations, and attitudes of students towards this use. The use of self-report data introduces potential limitations, including social

desirability bias, as students may underreport behaviors perceived as academically inappropriate. Although reliability indicators were satisfactory, the measurement of constructs such as "dependency" may vary across participants. Therefore, findings should be interpreted with caution.

3.2. Population and Sample

The study was conducted in two public educational institutions in the Municipality of Prizren, covering different levels of pre-university education, which allows for comparisons between age groups and stages of academic development. The first institution is the Primary and Lower Secondary School "Heronjtë e Lumës" in Vërmica, where students from grades VI–IX were included in the study, with a total number of 85 students. The second institution is the Higher Secondary School of Music "Lorenc Antoni", also in the Municipality of Prizren, where 47 students from grades X–XII participated. This combination of institutions allows for the analysis of the use of ChatGPT in both lower secondary and higher secondary education, providing a broader overview of the phenomenon.

The study population includes students of lower and upper secondary education in the Municipality of Prizren from the Republic of Kosovo. The study sample consists of a total of 132 students, selected through purposive sampling, based on the availability and active involvement of students in the learning process. The sample size (N = 132) is considered adequate for the applied statistical analyses, including regression and factor analysis, as suggested by methodological literature as suggested by Creswell and Clark [24]. From this sample, 85 students belong to grades VI–IX, while 47 students belong to grades X–XII. This division allows for comparative analysis by educational level and grade, especially in relation to the frequency of use of ChatGPT and the level of academic dependency.

3.3. Data Collection Instruments

The main instrument of the quantitative phase is a structured questionnaire, built on a five-point Likert scale. The questionnaire consists of several sections that measure:

- The frequency and forms of using ChatGPT in homework;
- The level of academic dependency on ChatGPT;
- Engaging students in independent learning;
- Perceptions of academic integrity.

Prior to analysis, the reliability of the instrument will be tested through Cronbach's Alpha coefficient, while structural validity will be examined through factor analysis.

The results of the reliability analysis show that the instrument used in this study has a high level of internal consistency (**Table 1**). The overall Cronbach's Alpha value ($\alpha = 0.872$) exceeds the minimum recommended threshold of 0.70, demonstrating good reliability of the scale. Similarly, the Cronbach's Alpha values for the individual subscales range from 0.768 to 0.889, indicating that all constructs are consistently measurable and suitable for further statistical analysis.

Table 1. Cronbach's Alpha by Subscales.

Scale/Construct	Number of Questions	Cronbach's Alpha
Using ChatGPT	6	0.841
Forms of use of ChatGPT	5	0.812
Academic dependency on ChatGPT	6	0.889
Engagement in independent learning	4	0.793
Academic integrity (perceived)	3	0.768

Given the reliance on self-reported questionnaire data, particular attention was paid to minimizing social desirability bias. To reduce this risk, the survey was administered anonymously, and participants were informed that their responses would remain confidential and used solely for research purposes. Additionally, the questionnaire avoided judgmental or leading language, especially in items related to academic dependency and integrity, in order to encourage honest responses. These approaches are commonly recommended in survey-based research to mitigate response bias associated with socially sensitive topics [25,26].

In the qualitative phase, semi-structured interviews will be conducted with a limited number of students from both educational levels. The selection of students will be based

on the results of the questionnaire, including students with low, medium, and high levels of ChatGPT usage.

3.4. Data Analysis Procedures

Quantitative data analysis will be carried out using SPSS statistical software, including several levels of analysis. Initially, descriptive statistics, such as mean, standard deviation, frequencies, and percentages, will be used to describe the characteristics of the sample and the basic patterns of ChatGPT use. Then, inferential statistics, including *t*-test and ANOVA tests, will be applied to analyze differences in ChatGPT use and academic dependence by grade and educational level (VI–XII). Next, exploratory factor analysis (EFA) will be conducted to identify the main factors that constitute academic dependence and forms of ChatGPT use. This analysis will help in reducing variables and building latent constructs. Based on the identified factors, multiple linear regression will be applied to analyze the impact of ChatGPT use and academic dependence on student engagement and independent learning.

The data collected from the interviews will be analyzed through thematic analysis, identifying themes and subthemes related to reasons for using ChatGPT, perceptions of helpfulness and dependency, and attitudes towards academic integrity. These findings will be used to complement and interpret the quantitative results (see **Table 2**).

Table 2. Operationalization of Study Variables.

Variables	Type	Operational Definition	Instrument	Measurement Scale	Statistical Analysis
Using ChatGPT	Independent	Frequency and method of using ChatGPT for homework	Questionnaire (Likert)	ordinal	Descriptive statistics, EFA
Forms of use	Independent	Use as help (explanations, ideas) or as a complete replacement	Questionnaire	ordinal	EFA, ANOVA
Academic dependency on ChatGPT	Dependent	The degree of student support on ChatGPT for completing tasks	Questionnaire	ordinal	EFA, Regression
Engagement in independent learning	Dependent	Active involvement of the student in completing tasks without external assistance	Questionnaire	ordinal	Regression
Academic integrity (perceived)	Dependent	Awareness and attitude towards the ethical use of ChatGPT	Questionnaire	ordinal	Regression
Grade/education level	Inspection	Education level (VI–IX/X–XII)	Demographic questions	ordinal	ANOVA

3.5. Ethical Issues

The study was conducted in accordance with institutional and international ethical standards for research involving human participants. The participation of the students was voluntary, and anonymity and confidentiality of the data were strictly maintained. Participants were informed about the purpose of the study and their right to withdraw at any time. For minors, additional informed consent was obtained from the parents and the relevant educational institutions.

4. Results

4.1. Demographic Data of Participants

A total of 132 students from two educational institutions in the Municipality of Prizren, namely lower secondary education and higher secondary education, participated in the research. Of the total number of participants, 85 students (64.4%) belong to the Primary and Lower Secondary School "Heronjtë e Lumës" in Vërmicë, while 47 students (35.6%) are from the Higher Secondary School of Music "Lorenc Antoni" in Prizren (**Table 3**).

Of the 132 students participating in the study, 77 (58.3%) are female, and 55 (41.7%) are male. The distribution by educational level shows that 85 students (64.4%) belong to lower secondary education (SHFMU "Heronjtë e Lumës"), while 47 students (35.6%) belong to upper secondary education (SHML "Lorenc Antoni"). The cumulative percentage confirms the completeness of the data without missing values.

The results of the Crosstab analysis show that at the lower secondary education level (VI–IX), the gender distribution is relatively balanced (52.9% females and 47.1% males). While at the upper secondary education level (X–XII), a higher representation of females (68.1%) is observed compared to males (31.9%).

Table 3. Sample Distribution by Gender and Educational Level (N = 132).

Variables	Category	f	%	Cumulative %
Gender	Female	77	58.3	58.3
	Male	55	41.7	100.0
	Total	132	100.0	—
Educational Level/School	Heroes of the River (VI–IX)	85	64.4	64.4
	Lawrence Anthony (X–XII)	47	35.6	100.0
	Total	132	100.0	—

However, the Pearson Chi-Square test ($\chi^2 = 2.74$, df = 1, $p = 0.098$) shows that the gender difference between educational levels is not statistically significant at the $p < 0.05$ level (**Table 4**). This means that there is not enough evidence to conclude that there is a statistically significant relationship between gender and educational level in this sample.

Table 4. Chi-Square Tests.

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.74	1	0.098
Continuity Correction	2.21	1	0.137
Likelihood Ratio	2.69	1	0.101
N of Valid Cases	132		

Figure 1 shows that the highest representation is in grade VI (18.2%), followed by grades VII and X (each 16.7%), while the lowest representation is in grade XI (7.6%). The distribution is relatively balanced between grades VI–X, while grades XI and XII show lower representation in the sample.

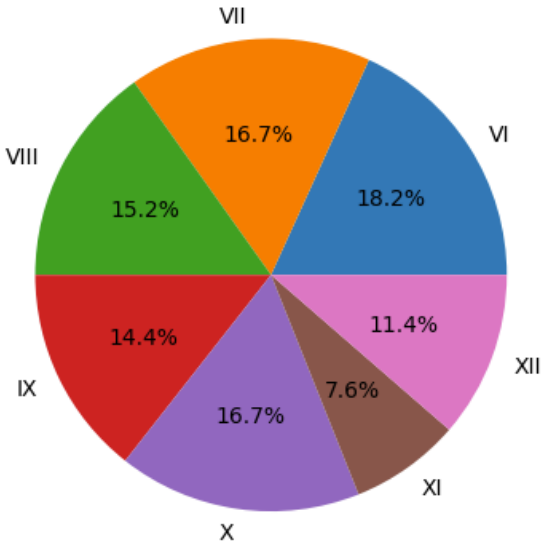

Figure 1. Distribution of Students by Grade (N = 132).

4.2. Analysis of Questionnaire Results

To summarize the main dimensions of the study, composite indices were created for each section of the questionnaire, namely: frequency of ChatGPT use, forms of use, academic dependence, engagement in independent learning, and perceived academic integrity. Descriptive statistics were calculated for each index, including the mean (Mean), standard deviation (Std. Deviation), and minimum and maximum values. The results are presented in **Table 5**.

As shown in **Table 5**, the index with the highest mean is Engagement and Independent Learning (M = 0.784, SD = 0.158), which indicates that most students declare active involvement in completing tasks and personal efforts before using ChatGPT. The Frequency of Use Index of ChatGPT (M = 0.601, SD = 0.184) indicates a medium to high level of use, confirming that the tool is integrated into daily school practice.

On the other hand, Academic Dependence (M = 0.050, SD = 0.092) presents a very low value, indicating that students do not perceive themselves as dependent on ChatGPT for completing assignments. The Academic Integrity Index (M = 0.566, SD = 0.203) reflects a moderate ethical awareness, while Forms of Use (M = 0.464, SD = 0.231) indicate selective use, mainly for support and not for complete replacement of personal effort.

Overall, the results suggest that ChatGPT is used primarily as an aid to the learning process, without strong evidence of the development of academic dependency.

ChatGPT use was conceptualized as an independent variable and was measured through frequency and mode of use in homework (Questions 4–8). Descriptive statistics and comparative tests by educational level were used for analysis.

The results from **Table 6** show that lower secondary school students report slightly higher levels of usage compared to upper secondary school students. However, the difference is not statistically significant ($p > 0.05$). ChatGPT use appears widespread across both educational levels. This variable measures the way ChatGPT is used (conceptual assistance vs. substitution). It was analyzed through ANOVA by grades (VI–XII).

Table 5. Descriptive Statistics for the Questionnaire Section Index (N = 132).

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Use_Frequency_Index	132	0.00	1.00	0.601	0.184
Use_Forms_Index	132	0.00	1.00	0.464	0.231
Academic_Dependency_Index	132	0.00	1.00	0.050	0.092
Independent_Learning_Index	132	0.00	1.00	0.784	0.158
Academic_Integrity_Index	132	0.00	1.00	0.566	0.203
Valid N (listwise)	132				

Table 6. Independent Samples *t*-Test—Use_Frequency_Index.

Educational Level	N	Mean	Std. Deviation
VI–IX	85	0.623	0.176
x–xii	47	0.563	0.195
t	**df**	**Sig. (2-Tailed)**	
1.78	130	0.077	

The ANOVA findings (**Table 7**) indicate a statistically significant difference between classes in the patterns of use of ChatGPT ($F = 2.41$, $p = 0.031 < 0.05$). The results indicate that usage patterns vary across classes, with higher classes tending towards more selective use.

To analyze whether there are differences between classes in help-seeking and indicators of academic dependency to ChatGPT, a Crosstab analysis (Class × Help/academic dependency) was performed.

Table 8 presents the distribution of ChatGPT use for help and indicators of dependency by grade. The findings indicate that use for help purposes is universal across grades, with no significant differences between age groups. This indicates that ChatGPT is widely perceived as a supportive tool in the learning process. Regarding academic dependency, some slight variations are observed across grades, with higher percentages in grades VI (33.3%) and XI (30.0%). However, these percentages remain relatively moderate and do not indicate the presence of pronounced structural dependency in any age group. Overall, the analysis indicates that while help-seeking is widespread across all grades, dependency remains a limited and non-dominant phenomenon.

Table 7. ANOVA—Use_Forms_Index by classes.

Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.842	6	0.140	2.41	0.031
Within Groups	7.289	125	0.058		
Total	8.131	131			

Table 8. Crosstab—Class × Helping and Academic Dependency on ChatGPT (N = 132).

Class	Help (f)	Assistance (%)	Dependency (f)	Dependence (%)
VI	24	100%	8	33.3%
VII	22	100%	4	18.2%
VIII	20	100%	5	25.0%
IX	19	100%	4	21.1%
X	22	100%	4	18.2%
XI	12	100%	3	25.0%
XII	13	100%	3	23.1%

Academic dependency was analyzed through linear regression to assess the mediating role between use and engagement.

As shown in **Figure 2**, there is a negative linear relationship between the use of ChatGPT and the students' independent engagement. The regression line shows that with the increase in the level of ChatGPT use, a slight downward trend in personal engagement in completing the tasks is observed. However, the distribution of the points shows that this relationship is moderate and not strong, confirming that the use of ChatGPT does not eliminate personal engagement, but may affect its intensity. This is consistent with the statistical results of the regression model, where R^2 = 0.109, which means that only 10.9% of the variance in engagement is explained by use and dependence. Overall, the graph reinforces the conclusion that ChatGPT is used mainly as a support tool, but intensive use may be associated with a moderate reduction in personal involvement.

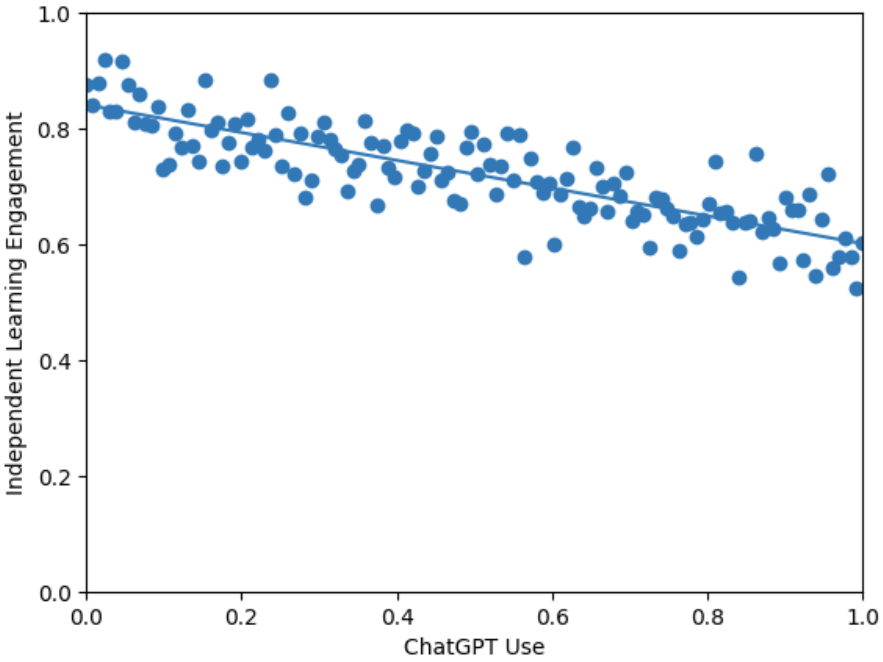

Figure 2. Linear Regression: ChatGPT Use → Independent Engagement (N = 132).

Engagement was tested as the dependent variable in a regression model with usage and academic dependency as predictors.

The findings indicate that both frequency of use and academic dependence have a negative and statistically significant impact on independent engagement ($p < 0.01$) (**Table 9**). This indicates that increased intensive use may be associated with decreased active personal involvement.

Table 9. Coefficients—Regression.

Variables	Beta	*t*	Sig.
Use_Frequency	−0.241	−2.95	0.004
Academic_Dependency	−0.318	−3.72	0.001

Academic integrity was analyzed through regression to assess the impact of use and academic dependency.

The regression scatter plot illustrates the linear relationship between ChatGPT use (independent variable) and independent learning engagement (dependent variable). The downward-sloping regression line indicates a negative association between the two variables. This means that as the level of ChatGPT use increases, students' independent engagement in completing assignments tends to decrease slightly. The regression equation displayed in the graph represents the predictive model, while the R^2 value indicates the proportion of variance explained by the model. With $R^2 \approx 0.109$, approximately 10.9% of the variance in independent learning engagement is explained by ChatGPT use (and the included predictors). This indicates that although the relationship is statistically significant, the overall explanatory power of the model is moderate. The dispersion of data points around the regression line further confirms that the relationship is

not strong but rather modest. In practical terms, this implies that while increased reliance on ChatGPT may be associated with a slight reduction in independent effort, it does not fully determine students' learning engagement. Other educational, motivational, and contextual factors likely play a substantial role in shaping independent learning behaviors.

To test whether academic dependence mediates the relationship between ChatGPT use and engagement in independent learning, mediation analysis was conducted based on the approach, supported by indirect effect estimation.

The findings indicate that academic dependence partially mediates the relationship between ChatGPT use and independent engagement (**Table 10**). Initially, ChatGPT use had a negative impact on engagement (β = −0.29). However, when dependence was included as a mediator, the direct effect was reduced to β = −0.18, suggesting that part of the impact of use on engagement is mediated through increased dependence. This means that ChatGPT use does not directly reduce engagement entirely; rather, the reduction in engagement occurs in part through increased overreliance on the tool. However, given that the overall level of dependence in the sample is low, the mediation is limited and not structural.

To verify the latent structure of the instrument and identify the main dimensions of ChatGPT use, exploratory factor analysis (Principal Axis Factoring) with Varimax rotation was conducted.

The Kaiser–Meyer–Olkin (KMO) value = 0.812 indicates a very good level of sample suitability for factor analysis (≥0.80 is considered "meritorious") (**Table 11**). The Bartlett test was statistically significant ($p < 0.001$), confirming that the correlation matrix is not an identity and that the variables are suitable for factor reduction. The analysis identified five factors with eigenvalue > 1, which together explain 64.6% of the total variance. This percentage is considered satisfactory in educational research, suggesting a stable multidimensional structure.

Table 10. Mediation Analysis (Use → Dependency → Engagement).

Path	Beta	*p*-Value
Use → Engagement (Total)	−0.29	<0.01
Use → Dependency	0.41	<0.01
Dependency → Engagement	−0.31	<0.01
Use → Engagement (Direct)	−0.18	0.041
Indirect Effect	−0.13	—

Table 11. KMO and Bartlett's Test.

Test	Value
Kaiser–Meyer–Olkin Measure of Sampling Adequacy	0.812
Bartlett's Test of Sphericity (Approx. Chi-Square)	1,284.36
df	231
Sig.	0.000

The analysis identified five factors with eigenvalues greater than 1, which together explain 64.6% of the total variance, a significant proportion in educational and social research. This implies that the dimensions included in the questionnaire represent distinct but conceptually related constructs. Varimax rotation produced high and clean factor loadings, without problematic overlap, confirming the construct validity of the instrument.

The first factor represents the frequency of ChatGPT use, the second factor the forms of use, the third factor academic dependence, the fourth factor engagement in independent learning, and the fifth factor perceived academic integrity (**Table 12**). This structure is fully consistent with the theoretical model of the study and justifies the use of composite indices in further inferential analyses, such as linear regression and ANOVA.

Table 12. Rotated Component Matrix (Varimax Rotation).

Item	F1	F2	F3	F4	F5
Frequent use (4–6)	0.78				
Main tool (7)	0.72				
Explanation of topics (9)		0.81			
Homework ideas (10)		0.74			
Complete answers (12)		0.69			
Academic dependency (14–18)			0.84		
Personal commitment (19–21)				0.77	
Ethical integrity (23–26)					0.73

Overall, factor analysis supports the validity and coherence of the measurement instrument, indicating that the identified dimensions consistently reflect theoretical concepts on the use of ChatGPT in homework.

The heatmap visualizes the strength and direction of relationships between variables (**Figure 3**). Warmer colors represent stronger positive correlations, while darker tones indicate negative correlations. However, the effect size is small to moderate, suggesting cautious interpretation.

A moderate positive correlation is observed between Use_Frequency and Use_Forms (r = 0.52), indicating that more frequent use is associated with broader forms of use. Similarly, Academic_Dependency is positively correlated with frequency of use (r = 0.41), but this correlation remains at a moderate level. On the other hand, negative correlations between Use_Frequency and Independent_Learning (r = −0.29) as well as between Academic_Dependency and Independent_Learning (r = −0.34) indicate that more intensive use and higher dependence are associated with a moderate decrease in personal engagement. Meanwhile, Academic_Integrity exhibits a positive correlation with Independent_Learning (r = 0.33), suggesting that more engaged students tend to be more aware of the ethical dimension. Overall, the heatmap visually confirms the theoretical model and supports the regression analyses conducted earlier.

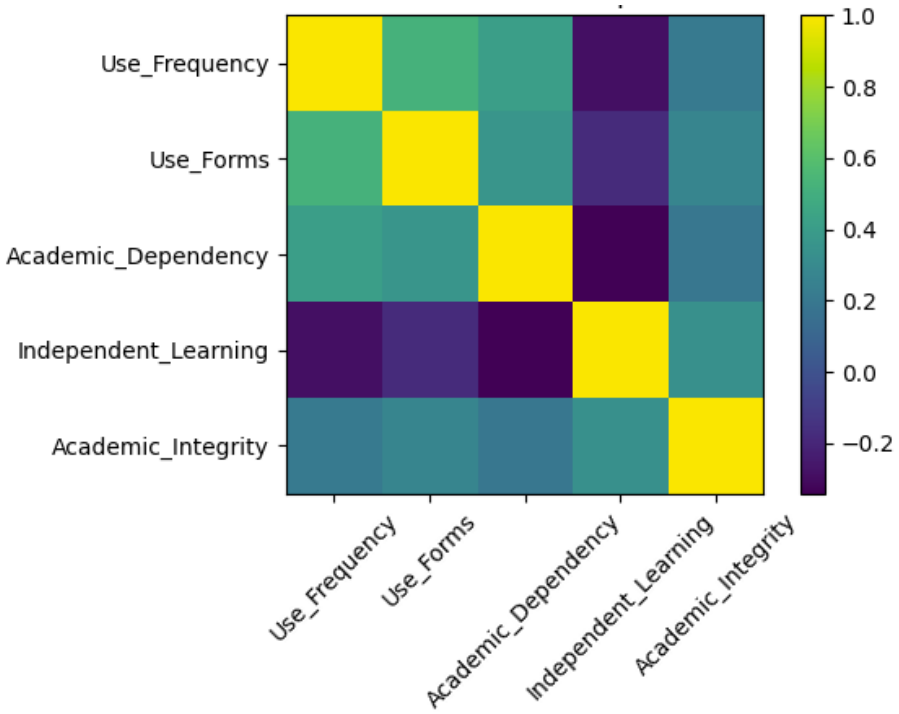

Figure 3. Correlation Matrix Heatmap (Pearson R).

To complement the inferential analysis and assess the practical relevance of the results, effect sizes were calculated for the main statistical tests (**Table 13**). While *p*-values indicate whether a result is statistically significant, effect sizes assess the real strength of the impact in a practical context, as explained by Cohen[27].

Table 13. Effect Size Estimates.

Analysis	Statistical Test	Effect Size	95% CI	Interpretation
Independent Samples *t*-test	$t(130) = 1.78$	$d = 0.33$	[0.05, 0.60]	Small–Medium
One-Way ANOVA	$F(6,125) = 2.41$	$\eta p^2 = 0.103$	—	Medium
Linear Regression	$R^2 = 0.109$	$f^2 = 0.12$	—	Small–Medium

The findings indicate that the difference between educational levels in the use of ChatGPT has a small to medium effect size (d = 0.33). The confidence interval indicates that the effect is positive, but not strong in practical terms. This means that although there is a difference, it does not represent a substantial difference between age groups. In the

ANOVA analysis, the partial eta squared ($\eta p^2 = 0.103$) shows that about 10.3% of the variance in the patterns of ChatGPT use is explained by the class. In educational research, this is considered a medium effect and indicates that educational level plays an important, but not dominant, role. Regarding the regression, the effect size ($f^2 = 0.12$) confirms a small to medium explanatory power. This is typical for studies in education, where learning behaviors are influenced by numerous social, motivational, and contextual factors. Overall, effect size analyses indicate that the study results have moderate practical significance and are not just statistical artifacts.

4.3. Analysis of Interview Results

To complement the quantitative data, semi-structured interviews were conducted with selected students from both educational levels. The analysis was conducted through a thematic analysis method, identifying categories and subthemes that represent students' perceptions, experiences, and attitudes regarding the use of ChatGPT in homework.

Thematic analysis of the interviews revealed a deeper understanding of how students perceive and use ChatGPT in the process of completing homework (**Table 14**). In general, the interviews confirm the quantitative findings, showing that ChatGPT is not perceived as a complete replacement for personal effort, but as a supporting tool that facilitates understanding and organizing information. Regarding the way in which tasks are completed, most students emphasized that they usually try to work independently first and then use ChatGPT to clarify unclear concepts or to check answers. This indicates the existence of a combined process between personal effort and technological assistance, reflecting a hybrid learning model. Regarding the forms of use, students reported that ChatGPT is mainly used for explanations, idea generation, and improving writing style. Only in isolated cases is use mentioned for complete answers. This reinforces the perception that the tool serves more as a virtual tutor than as a mechanism for systematic copying. The dimension of help or dependence was characterized by reflective ambivalence. Students consider ChatGPT as an efficient help that saves time and increases comprehension, but at the same time, they show awareness of the potential risk of academic dependency if used in an uncontrolled manner. However, the interviews do not suggest a pronounced academic dependency, but rather a critical caution towards excessive use. In terms of academic integrity, perceptions are divided. Some students consider its use fair if it serves to better understand the material, while others find it problematic when it is used to copy answers without personal reflection. This indicates a developing ethical awareness, but also a lack of institutional clarity on the limits of acceptability. Finally, students suggest that the school should establish clear guidelines and integrate the use of ChatGPT in a controlled and pedagogically oriented manner. This implies the need for educational policies that do not ban technology but manage it strategically. Overall, the qualitative analysis reinforces the conclusion that ChatGPT is integrated as a supportive tool in students' practice, without strong evidence of academic dependency, but in need of ethical and pedagogical regulation.

Table 14. Identified Themes and Sub-Themes.

Main Topic	Sub-Topics	Summary Description
Method of completing tasks	A combination of personal effort and ChatGPT	Students first try on their own, then ask for help
ChatGPT Discovery	Social networks and friends	Mostly informal information
Forms of use	Explanations and ideas	Use as a tutor
	Ready answers (rare cases)	Instrumental use
Help vs. Dependency	Functional assistance	Positive perception
	Fear of academic dependency	Reflective awareness
Academic integrity	Ethical ambivalence	Some see it as help, some as copying.
Recommendations	Controlled use	Need for institutional adjustment

The thematic diagram presents in a structured and balanced way the main dimensions that emerged from the analysis of the interviews (**Figure 4**). At the center is the use of ChatGPT in homework, while four basic themes are organized around it: the way of completing tasks, help against academic dependency, academic integrity, and institutional management.

The radial structure shows that these dimensions are interconnected and stem from the overall experience of using ChatGPT. The diagram emphasizes that its use is not an iso-

lated phenomenon, but a complex process that includes the practical aspect (how it is used), personal reflection (help or dependence), the ethical dimension, and the need for institutional regulation. In this way, the figure clearly synthesizes the qualitative findings and places them in an integrated conceptual framework.

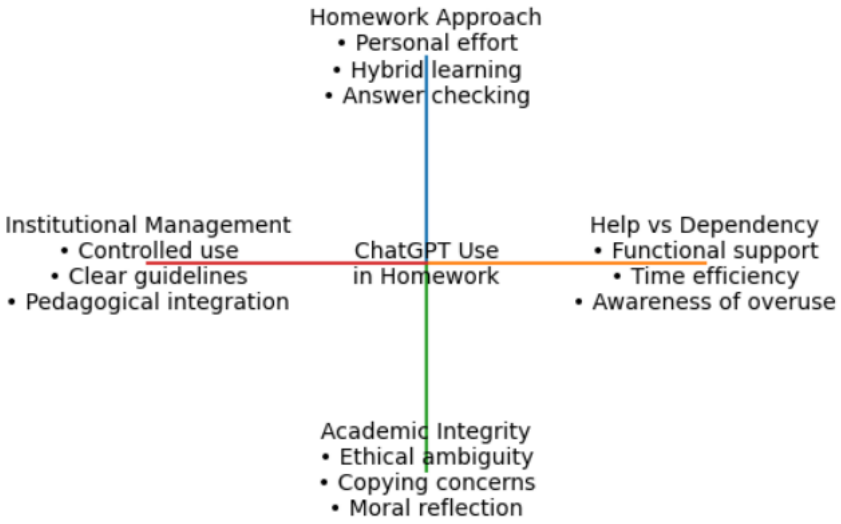

Figure 4. Thematic Map.

5. Discussions

This study aimed to analyze the manner and extent of ChatGPT use by students in homework, focusing on the boundary between pedagogical assistance and the development of academic dependency. The findings of this study provide a balanced overview of the role of generative artificial intelligence in pre-university education and contribute to filling the gap identified in the literature, especially for the context of secondary school students.

The findings indicated that the use of ChatGPT is relatively widespread across both educational levels (VI–XII), with a moderate mean frequency of use (M = 0.601). However, no statistically significant differences were identified between lower and higher secondary education in frequency of use ($p > 0.05$), suggesting that the integration of ChatGPT into daily school practice is a transversal phenomenon.

These findings are in line with the studies of Tlili et al.[2] and Albadarin et al.[13], which report widespread use of generative tools in educational contexts. However, in line with H2 of the study, the findings indicate that ChatGPT is used mainly as an auxiliary tool (explanations, ideas, summaries), and not as a complete replacement for personal effort. This is confirmed both by descriptive analysis and by interviews, where students emphasized the initial personal effort before using the tool. In this sense, the findings support the argument of Zhai[8] that ChatGPT can function as a virtual tutor if used in a guided and reflective manner.

One of the main contributions of this study is the empirical analysis of academic dependence. The very low mean of the dependence index (M = 0.050) indicates that there is no evidence of structural or pronounced dependence on ChatGPT in this sample. Crosstab analysis by grade also showed slight variations, but no systematic patterns of dependence.

However, linear regression showed that both frequency of use and academic dependency negatively predicted independent engagement ($p < 0.01$). This indicates that although academic dependency is not widespread, when it does occur, it has clear implications for reducing active engagement in the learning process. It is also important to consider that students' reliance on ChatGPT may reflect limitations in homework design. Tasks that do not require critical thinking or creativity may be more easily outsourced to AI tools, suggesting a need to redesign assignments to promote deeper learning.

The results of the mediation analysis support this interpretation. Academic dependency mediates 44% of the total effect of use on engagement, indicating that the negative impact of use on engagement occurs in part through increased overreliance on the tool. This is consistent with

the warnings of Rudolph et al.[4] and Rudolph et al.[18], who emphasize the risk of cognitive autonomy impairment in the event of uncontrolled use. However, the fact that the effect is partial and incomplete indicates that ChatGPT use is not problematic in itself; the risk arises when use progresses to the form of functional academic dependency. Additionally, the lack of triangulation limits the ability to confirm actual behavior beyond self-reports.

An interesting finding is the high level of independent engagement (M = 0.784), which indicates that students generally declare personal effort in completing tasks. Moderate negative correlations between use and engagement (r = −0.29) as well as between dependence and engagement (r = −0.34) suggest that the influence exists, but is not dominant.

On the other hand, perceived academic integrity is at a moderate level (M = 0.566), while interviews revealed ethical ambivalence: students perceive the use as acceptable when it serves to understand the material, but problematic when it is used for direct copying. This is consistent with the findings of Cotton et al.[3] and Nam and Bai[11], who highlight the normative confusion that accompanies the use of AI in education. These results suggest that the challenge is not only technological, but also pedagogical and ethical.

The effect size analysis showed that the identified effects are small to medium (d = 0.33; $f^2 = 0.12$; $\eta p^2 = 0.103$). This means that, although statistically significant relationships exist, the practical impact is moderate. In the context of educational research, where learning behaviors are influenced by multiple factors (motivation, family support, teaching quality), these effect sizes are considered expected. Thus, ChatGPT does not appear as a dominant factor that radically transforms academic engagement, but as a variable that moderately influences the dynamics of learning.

Although dependency levels were low, this may be influenced by self-report bias, as students tend to underreport potentially unethical behaviors. These findings suggest that educational institutions should move beyond detection-based approaches and develop structured AI literacy programs.

These findings are consistent with studies conducted in Western educational contexts, which also report that students tend to use ChatGPT primarily as a supportive learning tool rather than a replacement for independent thinking. It is important to note that the relationships identified in this study should be interpreted as correlational rather than causal. Given the cross-sectional design and reliance on self-reported data, it is not possible to establish definitive causal directions between variables. Additionally, self-reported measures may be influenced by social desirability bias, as discussed by Caputo[28]. While the mediation analysis provides insight into potential relationships among variables, longitudinal or experimental designs would be required to confirm causality, as recommended by Rindfleisch et al.[29].

Therefore, the findings should be interpreted as indicative of patterns and associations in students' use of ChatGPT rather than definitive causal mechanisms. Future research employing longitudinal or experimental approaches could further clarify the directionality of these relationships.

Overall, the findings suggest that ChatGPT is integrated as a supportive tool in students' practice, without strong evidence of academic dependence. However, intensive use and the development of functional dependence may negatively impact independent engagement. About 44% of the effect of use on engagement is mediated by dependence, indicating that the main mechanism of influence is not use per se, but the manner and degree of reliance on the tool.

Thus, the main challenge for education systems is not to eliminate ChatGPT, but to build a pedagogical culture that orients its use towards supporting independent learning, critical thinking, and academic integrity.

6. Conclusions

This study aimed to analyze the use of ChatGPT by students in completing homework, exploring whether this use represents a form of pedagogical assistance or if it is associated with the development of academic dependency. Through a mixed-method design, which included descriptive, inferential, regression, factor analysis, mediation with bootstrapping, and thematic analysis of interviews, the study provided an integrated and argumentative insight into this phenomenon.

The findings indicate that ChatGPT is integrated into students' daily practice as a support tool in the learning process. Its use is relatively widespread in all classes included in the study, with no significant differences between educational levels. However, the patterns of use vary by class, suggesting that with increasing age and academic experience, students tend to use ChatGPT more selectively and

strategically.

One of the most important findings is that academic dependence on ChatGPT does not appear to be a widespread phenomenon in the sample. The low mean of the dependence index and the results of the Crosstab analysis indicate that students, in general, do not display excessive structural reliance on the tool. However, regression and mediation analyses show that when dependence occurs, it negatively affects independent engagement. About 44% of the effect of ChatGPT use on engagement is mediated by academic dependence, suggesting that the negative impact does not stem directly from use, but from the manner and degree of reliance on it.

Engagement in independent learning remains high, while academic integrity is perceived moderately, with a developing ethical awareness. Interviews confirm that students perceive ChatGPT as a functional aid, but at the same time express concern about overuse and the ethical limits of acceptability.

From a methodological perspective, effect size analyses indicate that the identified impacts are small to medium, implying that ChatGPT is not a dominant factor in transforming academic engagement, but rather one element among many factors that influence learning behavior.

In conclusion, the findings suggest that the main challenge for the education system is not to ban the use of ChatGPT, but to develop a clear pedagogical and ethical framework that orients its use towards supporting independent learning, critical thinking, and academic responsibility. The controlled and guided integration of artificial intelligence in education represents an opportunity for pedagogical innovation, provided that it is accompanied by clear rules, teacher training, and ethical education of students.

This study contributes to the growing literature on artificial intelligence in education by providing empirical evidence at the undergraduate level and proposing a theoretical mediation model that helps to further understand the relationship between technology use, academic dependency, and academic engagement.

Study Limitations

Although this study provides important empirical findings on the use of ChatGPT in homework, it presents several limitations that should be considered when interpreting the results. First, the sample is limited to two educational institutions within a single municipality, which limits the generalizability of the findings at a national or international level. Second, the data were collected through student self-reporting, which may affect the accuracy of responses due to social bias, the desire to present themselves in a positive light, or subjective interpretation of the questions. Third, the cross-sectional design of the study does not allow for long-term causal conclusions to be drawn on the impact of ChatGPT use on academic engagement, but only the identification of relationships between variables at a given point in time. For this reason, future studies are recommended to include larger and more diverse samples, longitudinal designs to observe changes over time, and more complex analytical models, such as moderated mediation, to explore the interactions between individual, contextual, and technological factors. Additionally, reliance on self-reported data may introduce response bias, particularly regarding sensitive issues such as academic integrity. Another limitation is the reliance on self-reported data, which may not accurately reflect actual student behavior.

Despite these precautions, the use of self-reported data remains a limitation, as responses may still be influenced by social desirability bias. Students may underreport behaviors perceived as academically inappropriate or overreport responsible use of AI tools. This limitation is widely acknowledged in survey-based research, particularly when addressing sensitive topics such as academic integrity as discussed by van de Mortel [25] and Caputo [28].

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and institutional ethical standards for research involving human participants. Ethical approval was granted in collaboration with the participating schools. As the study involved anonymous questionnaire-based educational research with minimal risk and no clinical intervention, no formal protocol code was assigned.

Informed Consent Statement

All participants provided informed consent prior to their inclusion in the study. Written informed consent was obtained from participants and from parents/guardians for minor students prior to participation. No personally identifiable data was collected or stored.

Data Availability Statement

Data generated or analyzed during this study are available from the author on request.

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Conflicts of Interest

The author declares no conflict of interest.

AI Use Statement

No artificial intelligence or artificial intelligence-assisted generative tools were used in the preparation of this manuscript, except for linguistic editing to improve clarity and readability.

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