New chatGPT 3.5 Instruction (Prompt) to Calculate Statistical Indicators for Student Graduation Projects

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Abstract: - The paper aims to develop a new chatGPT 3.5 instruction (prompt) for computing statistical indicators in student graduation projects. A bibliometric analysis of 79606 sources published in the Scopus database revealed a high level of interest in solving problems related to "graduation projects" and "statistical indicators." Numerous studies emphasize the importance of probability and statistics education. Concurrently, educators are advised to abandon teaching manual calculation methods to students. ChatGPT could serve as a modern tool for computing statistical indicators. Modern methods employed in this research included reviewing scientific literature, analysis and synthesis, bibliometric analysis, mathematical modeling, computation of statistical indicators, and verification of statistical hypotheses using Z-statistics. Five examples of calculating statistical indicators are provided in this paper. Three tools were used for computing statistical indicators, with the new chatGPT 3.5 instruction (prompt) serving as the experimental method, while Excel tables and Windows calculator were used as control methods. Verification of statistical hypotheses using Z-statistics demonstrated the equality of results between experimental and control methods. The standard testing level was set at $\alpha = 0.05$. The novelty of this work lies in the creation of the new chatGPT 3.5 instruction (prompt) for computing statistical indicators in student graduation projects. Additionally, a User's Guide has been published. The practical value of this work lies in reducing the time and simplifying the method for computing statistical indicators in preparing graduation projects, as well as in improving their quality. An additional benefit is the expanded use of computers for educational purposes.

Key-Words: - chatGPT 3.5, prompt, computer, graduation project, statistical indicators, student.

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1 Introduction

The development of information technologies leads to growth the possibility of implementing new tools in education, [1], [2], [3], [4], [5], [6], [7], mathematical modeling, [8], [9] and the use of intelligent systems, [10], [11], [12]. For instance, ChatGPT provides users with the ability to interact with a computer using natural language. This makes ChatGPT a valuable tool in educational processes. Currently, such tools as ChatGPT are becoming increasingly popular in various fields, including higher education, [12], [13], [14], [15], [16].

"ChatGPT is an AI-powered language model developed by OpenAI. It has been trained on a massive amount of text data from the internet and can generate human-like text responses to a given prompt. It can answer questions, converse on a variety of topics, and generate creative writing pieces" (https://chatgpt.org/). Model 3.5 is a publicly available free model. Therefore, it was chosen in this study.

This article is dedicated to a new guide on using ChatGPT version 3.5 for computing statistical indicators in student graduation projects.

In the modern educational process, student graduation projects play a significant role in the development and assessment of students' skills. Computing statistical indicators is a key stage in the analysis of empirical data. Therefore, scientists from different countries are researching the process of teaching students the methodology of computing statistical indicators, [17], [18], [19], [20], [21], [22], [23], [24], [25], [26].

This article presents an instruction for computing statistical indicators, such as the mean and standard deviation, using the neural network ChatGPT version 3.5. The possibilities of using various software tools and technologies, including artificial intelligence, for automating the process of computing and presenting statistical data are discussed.

The use of ChatGPT 3.5 in student graduation projects opens up new perspectives for students. This research enables students to more effectively

apply statistical methods in their graduation projects, thus contributing to the development of their professional skills and the improvement of the quality of their final work.

The goal was to provide students with an instruction (prompt) for effectively using this technology to compute statistical indicators in their graduation projects. This instruction (prompt) can also be used in other research and practical projects of students. The author will present the prompt and a guide for its application. A very important advantage of the new chatGPT 3.5 prompt is the rejection of entering an array of data for computing statistical indicators.

Additionally, the author will provide 5 examples of its usage to simplify the processing of statistical data in student projects.

The author hopes that this instruction (prompt) will become a valuable resource for students, helping them reduce the time spent on preparing their graduation projects and improve their quality.

2 Problem Formulation

Works, [27], [28], [29], demonstrate that graduation projects as a didactic tool have been endorsed by practitioners and researchers in the field of higher education. They value this didactic tool for its rigor, depth of content, and engagement of students in cutting-edge academic work. Student graduation projects reflect a causal model of behavior, the ability to exchange knowledge, and teamwork. Such projects have had a positive impact on graduates.

The results of the first step of a bibliometric analysis are visualized in Figure 1. The analysis was conducted using 2590 document search results from the last 30 years (from 1994 to 2023). Document search was performed using the keywords "graduation project" in the Scopus database (https://www.scopus.com/term/analyzer.uri).

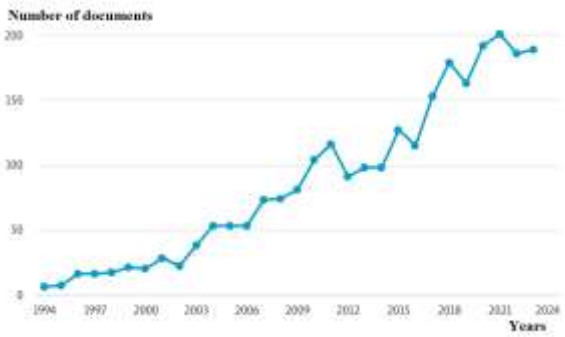

Fig. 1: Number of documents from 1994 to 2023 by topic «graduation project»

Figure 1 illustrates a generally unstable growth trend in the number of publications on the topic of "graduation project" from the beginning to the end of the analyzed period. The overall trend of increasing publication numbers indicates a growing interest among researchers in the topic of "graduation project." Figure 1 provides indirect evidence of existing issues in the field of "graduation project" that require increasing attention from researchers.

The second stage of the bibliometric analysis is visualized in Figure 2. Here, 72774 document search results from the last 30 years (from 1994 to 2023) were processed. Document search was conducted using the keywords "statistical indicators" in the Scopus database (https://www.scopus.com/term/analyzer.uri).

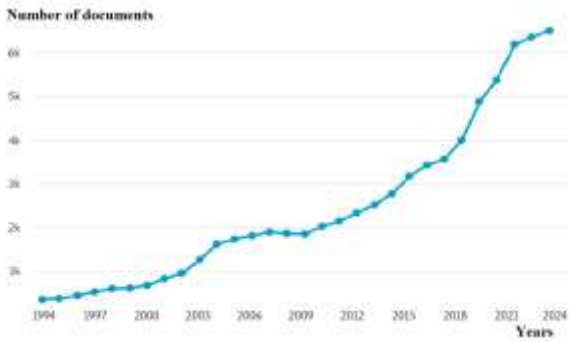

Fig. 2: Number of documents from 1994 to 2023 by topic «statistical indicators»

Figure 2 depicts a consistent and stable growth trend in the number of publications on the topic of "statistical indicators" from the beginning to the end of the analyzed period. The increasing trend in publication numbers indicates a growing interest among researchers in the topic of "statistical indicators." This suggests that researchers are continuously working on addressing issues in the field of "statistical indicators" (Figure 2).

Numerous scientific works emphasize the importance of this topic. For example, the importance of studying probability and statistics is recognized in the current Australian mathematics curriculum, [21]. Meanwhile, work [23], asserts that psychology students often experience anxiety about studying statistics, which can affect their performance. Simultaneously, the author of paper [25], states that sociology students may reluctantly engage in the study of statistical methods with apprehension. Furthermore, statistics courses are perceived by students as challenging, [17]. The attitude, motivation, and preparedness of students can negatively impact their experience and

potentially hinder students' learning of statistics, [17].

One of the reasons for students' negative attitude towards studying statistics is the limited amount of time dedicated to diversity in courses. Additionally, teachers refer to barriers such as lack of relevance and insufficient time, [26]. Integrating content into statistics is a challenging task, however, the efforts are worthwhile. Therefore, integrating diverse content into statistics courses is highly beneficial, [26].

Paper [19], notes that statistics textbooks typically teach manual methods of computing statistical indicators. The authors recommend that teachers move away from teaching manual computations and focus on conceptual information and software applications, [19].

Thus, the research problem was justified by the increasing interest in solving issues in the fields of "graduation project" and "statistical indicators." The results of previous research directly guide researchers in seeking a method of computing statistical indicators without manual computations. This implies the need to create new information tools for such computations.

On the third stage of the bibliometric analysis, the author visualized 4242 document search results for the keyword "chatGPT" (Figure 3). Document search was conducted in the Scopus database (https://www.scopus.com/term/analyzer.uri) over the last 30 years (from 1994 to 2023). Unfortunately, the Scopus database only provided results for the period 2015-2023.

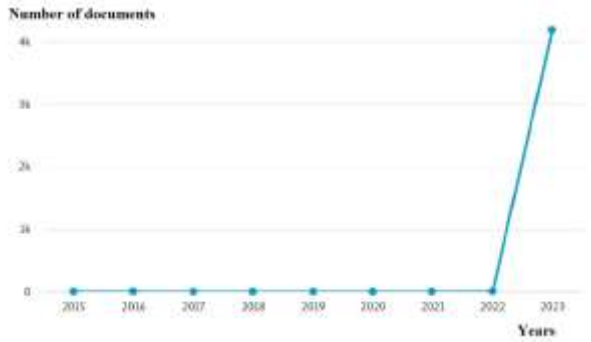

Fig. 3: Number of documents from 2015 to 2023 by topic «chatGPT»

Figure 3 illustrates a consistent absence of publications on this topic until 2022. However, in 2023, there were 4233 scientific documents related to chatGPT published. This indicates a sharp increase in research interest in this topic (Figure 3).

Summarizing the results of the bibliometric analysis (Figure 1, Figure 2 and Figure 3), you will notice three new scientific facts:

1. The interest of researchers in the topic of “graduation project” can be described by an unsustainably growing trend line.
2. The interest of researchers in the topic of “statistical indicators” can be described by a steadily growing trend line.
3. Research interest in the topic “chatGPT” is characterized by a sharp increase from zero in 2022 to more than 4233 publications in 2023.

As a result, a joint analysis of these three Figures may indicate a high scientific novelty of the idea of using chatGPT to perform statistical calculations when completing graduate work. Figure 1 and Figure 2 prove the high practical significance of this article.

The author chose to compute statistical indicators using chatGPT 3.5. When a student uses the new chatGPT prompt for computing statistical indicators, they save time on manual computations. This time can be allocated to focusing on conceptual information and software applications, as recommended, [19].

Why did the author choose version 3.5? This version of chatGPT was chosen due to its free availability and accessibility for students. The possibility of errors in calculations using chatGPT 3.5 was also confirmed in the study, [30].

The research goal is to create a new chatGPT 3.5 instruction (prompt) to calculate statistical indicators for student graduation projects.

The research goal was achieved using modern methods: review of scientific sources, analysis and synthesis, bibliometric analysis, mathematical modeling, calculation of statistical indicators, verification of statistical hypotheses (Z-statistics).

3 Problem Solution

The research was performed from December 2023 to February 2024. The empirical part of the study was carried out at National Louis University. For calculations, standard tools were used that are used in the normal educational process (including the implementation of graduation projects) of the named university. The author used standard package for Microsoft Office Excel 2007 and Windows 10. After the problem formulation, the problem was solved in five steps. The steps outlined in the article are as follows:

Step 1: Search for important sample sizes by mathematical modeling.

Step 2: Creation of the new chatGPT 3.5 instruction (prompt) for computing statistical indicators.

Step 3: Check of the new chatGPT 3.5 instruction (prompt) using 5 examples, including 2 real cases and 3 abstract cases.

Step 4: Execution of Z-statistics to compare the results of calculations of statistical indicators obtained by the new prompt and by using Windows.

Step 5: Writing a user's guide to the new chatGPT 3.5 instructions (prompt) for students conducting graduation projects.

It's noted that the numbering of the steps in the text has been changed.

3.1 Sample Sizes

The first step involved calculating 5 sample size values for which modeling the instruction (prompt) to calculate statistical indicators for student graduation projects would be performed.

The logic of this step is based on the experience of supervising student graduation projects (works). The maximum size of the population under investigation by students when conducting graduation projects was taken as the basis. In practice, this population size was assumed to be less than 50000 units. The minimum number of units for a master's graduation project should be around 200. So, these sample sizes (200-50000) are considered sufficient for a graduation project.

It is considered that for making business decisions, the sampling error should not exceed 4.00%, [31]. The standard testing levels of 0.95 or 0.99 are most commonly used, [31]. In our case, a sampling error of 4.00% and the standard testing level of 0.95 were chosen.

Table 1 shows the sample size values for further calculations. Mathematical modeling is performed using an online calculator, [32].

Table 1. Results of mathematical modeling for choosing the sample sizes

General population size	200	500	1000	3000	50000
Sample size, N	150	273	375	500	593

Table 1 shows that with a population size of 50,000 units, the sample size is N=593 units. Increasing the population size to 100000 units resulted in a sample size of N=597 units, [32]. For populations exceeding 100000 units, the sample size is N=600 units, [32]. This means that the chosen maximum sample size of N=593 units is justified for graduation projects.

Additionally, Table 1 displays 5 sample size values for which calculations of statistical indicators M(x) and δx will be performed, [33], [34]. In other words, further calculations will be conducted for five sample size values (Table 1).

3.2 Creating the New chatGPT 3.5 Instruction (Prompt) to Calculate Statistical Indicators

As mentioned earlier, chatGPT 3.5 easily performed computing statistical indicators for sample sizes of less than 10 units. However, for sample sizes exceeding 10 units, chatGPT 3.5 occasionally produced errors in the results. As shown in Table 1, the sample size theoretically can reach up to 593 units in graduation projects.

When creating the instruction (prompt), the following simple scenarios were considered: students conduct a basic study where only 2 states need to be evaluated (agree - disagree; on - off; yes - no; black - white; growth-decrease; etc.). These are situations where responses can be digitized as "0" and "1". Creating an instruction (prompt) for situations with a larger number of responses (e.g., 0.0, 0.5, 1.0) may be a task for future research.

Multiple refinements led to the following new instruction (prompt) for chatGPT 3.5:

"**The sample of numbers consists of N=X digits, of which N1=X1 digits "1", N2=X2 digits "0"** ::

1) Calculate the value of the sample mean M(x). Write down the value of M(x) ::

2) Calculate Yi as the difference between each element of the sample and the average value of the sample, Yi = xi−M(x). Write the values of Yi in the column ::

3) Calculate Bi as the squares of the differences between each element of the sample and the average value of the sample, Bi = $(xi-M(x))^2$. Write down the Bi values in the column ::

4) Calculate Zi as the product of Ni and Bi, Zi = Ni × Bi. Write down the values of Zi in the column ::

5) Calculate Z as the sum of Z = ∑ Zi. Write down the value of Z ::

6) Calculate C as a quotient of C = Z/N. Write down the value of C ::

7) Calculate the value of the standard deviation for the sample δx as the square root of C, that is, δx = √ C. Write down the value of δx ::

8) Write down the result in the form: M(x) = the result of calculations up to the fourth decimal place, δx = the result of calculations up to the fourth decimal place. Write down the letters M(x) and δx in bold, please".

This instruction (prompt) contains the following input symbols, [33], [34]:

- **N** - the sample size,
- **N1**, **N2** - the numbers of alternative answers (for

example, for "yes" and for "no").

This instruction (prompt) contains the following numerical input values:

- **X, X1, X2** - the number of respondents' responses, and X = X1 + X2.

This instruction (prompt) contains the following output symbols, [33], [34]:

- **M(x)** - the expected value,
- **δx** - The standard deviation for the sample.

The rest of the symbols do not matter to the user.

The division of the prompt into separate steps is caused by a problem that the author encountered in trying to obtain a result by setting the task of directly calculating statistical indicators. A research problem was that chatGPT 3.5 easily performed computations of statistical indicators for sample sizes of less than 10 units. However, for larger sample sizes, chatGPT 3.5 did not yield stable results. Nevertheless, student graduation projects require larger sample sizes than 10 units. ChatGPT 3.5 did a good job of dividing the process of calculating statistical indicators into small individual steps. Each stage is responsible for performing one simple mathematical operation.

At the first step, chatGPT calculated the mathematical expectation M(x). Steps 2-7 were needed for step-by-step calculation of the standard deviation for the sample δx. Step 8 gives the command to print the obtained results with a precision of 4 decimal places.

A very important advantage of the new chatGPT 3.5 instruction (prompt) lies in relieving the student from entering data arrays into the new chatGPT 3.5 instructions (prompt).

3.3 The User's Guide to the New chatGPT Instructions (Prompt)

The user of the new chatGPT 3.5 instructions (prompt) performs the following actions:

1. Registers on the website https://chat.openai.com/auth/login.
2. Copy the prompt from section 3.2 of this paper.
3. Input three individual numbers into the instruction (prompt): **X**, **X1**, **X2**. These represent the sample size and the number of responses from respondents for each of the two alternatives.
4. Pastes the instruction (prompt) into the chatGPT dialog box and presses the "Send message" button.
5. Write down the obtained values of the statistical indicators M(x) and δx. These data will be calculated with four decimal places.

The advantage of the new instruction (prompt) is the absence of the need to input arrays of empirical data or perform any manipulations with them.

3.4 Five Examples of Calculations of Statistical Indicators

Five examples are provided in Table 2 to assess the accuracy of the new instruction (prompt). The initial data N are taken from Table 1, which presents sample sizes obtained through mathematical modeling for various population sizes. Calculations of statistical indicators M(x) and δx were performed using three methods:

- Using the new instruction (prompt) for chatGPT 3.5,
- Using Excel tables,
- Using the Windows calculator.

This can be considered one of the limitations of our study, that two simple and accessible tools were used to calculate statistical indicators in the empirical part of the study. We are talking about Excel tables and the Windows calculator. However, these are tools accessible to ordinary students and the use of more complex tools is not planned.

Example 1 combines rows 1-3. Example 2 combines rows 4-6. Example 3 combines rows 7-9. Example 4 combines rows 10-12. Example 5 combines rows 13-15.

When deciding on the sample size, the following conditions were chosen when considering the examples:

- Sampling error 4.00%, [31],
- Standard testing level 0.95, [31],
- Boundaries of the general population from 200 to 50,000.

Intermediate values of the general population size were selected randomly as psychologically easily perceived values.

The sample size values N, N1, and N2 for Examples 1 and 5 (Table 2) were taken from a real-life case, [35]. They are borrowed from source, [35] because the sample sizes of N = 144 and N = 599 in the real cases are close to the modelled sample size (Table 1), [32]. In the first example, N is slightly smaller than what was obtained through mathematical modeling (Table 1). In the fifth example, N is slightly larger than what was obtained through mathematical modeling (Table 1).

In Examples 2, 3, and 4 (Table 2), the values of N1 and N2 were arbitrarily chosen.

Table 2. Five examples of calculations of statistical indicators M(x) and δx

№	N	N1	N2	The tool	M(x)	δx
1	**144**	51	93	New prompt	0.3542	0.4787
2				Excel tables	0.3542	0.4783
3				Windows	0.3542	0.4783
4	**273**	33	240	New prompt	0.1209	0.3269
5				Excel tables	0.1209	0.3266
6				Windows	0.1254	0.3302
7	**375**	34	341	New prompt	0.0907	0.2871
8				Excel tables	0.0907	0.2871
9				Windows	0.0933	0.2909
10	**500**	40	460	New prompt	0.0800	0.2716
11				Excel tables	0.0800	0.2713
12				Windows	0.0820	0.2744
13	**599**	65	534	New prompt	0.1085	0.3114
14				Excel tables	0.1085	0.3110
15				Windows	0.1085	0.3110

Table 2 demonstrates a complete match of the statistical indicators M(x) and δx for all calculation methods in Examples 1 and 5. In Examples 2, 3, and 4 (Table 2), the values of M(x) and δx coincide for the new instruction (prompt) and Excel tables.

The figures obtained in Table 2 indicate differences in the calculation of statistical indicators using Excel tables and the Windows calculator. The coincidence of the results of calculations using Excel tables and the new prompt in all cases eliminates errors of the new method. The difference in values obtained using Excel tables and the Windows calculator could cast doubt on the reliability of using the Windows calculator.

An example of computing statistical indicators M(x) and δx using chatGPT 3.5 instructions (prompt) for a sample with N=375 is presented in Figure 4 and Figure 5. In Table 2, this example is located in row 7.

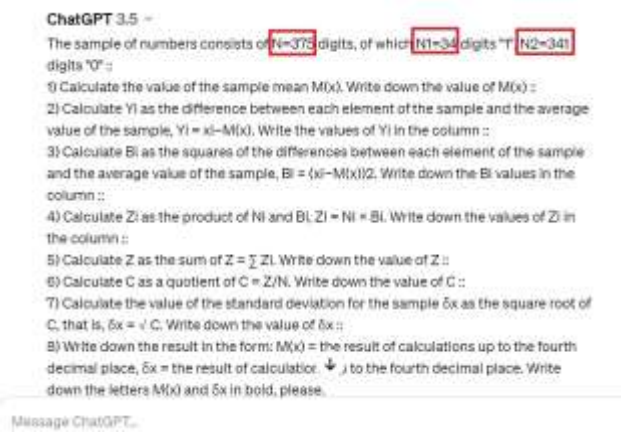

Fig. 4: Screenshot: Example of the new chatGPT 3.5 instruction (prompt) for the sample with N=375 (Table 2, example 3, lines 7-9)

Figure 4 illustrates the detailed appearance of the instruction (prompt).

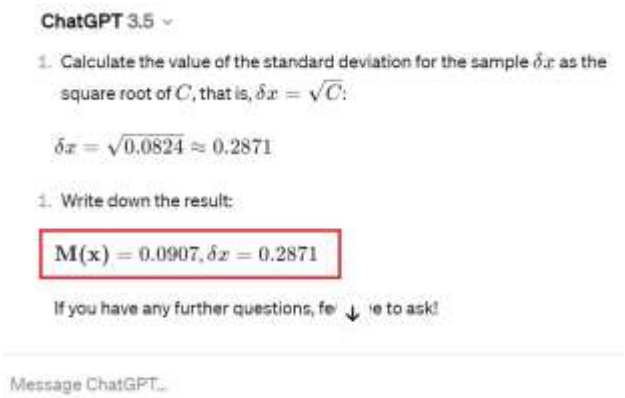

Fig. 5: Screenshot: Results of computing statistical indicators M(x) and δx for the sample with N=375 (Table 2, example 3, lines 7-9)

Figure 5 displays the obtained result in the red rectangle.

The words "ChatGPT 3.5" have been shifted to the right by the author in Figure 4 and Figure 5. The purpose of this shifting is to achieve the compact figures.

The values of M(x) obtained using ChatGPT differ by 0.0020-0.0045 from those obtained using the Windows calculator (Table 2). Thus, the presented calculation results have a difference of the third decimal place. This means that high accuracy of calculations has been achieved, which is sufficient to complete students' graduation projects.

Modern prompt engineering has already accepted the Rule that 3 checks of a new prompt are a sufficient condition for debugging it (https://clockwork-school.com/aistaff?utm_source=vebinar&utm_medium=030424&utm_campaign=workshop#about). In our case, we checked the reliability of the prompt 5 times.

Although you have equal reason to believe in the accuracy of all three tools, the author sequentially verifies three pairs of statistical hypotheses for Examples 2-4.

3.5 Z-statistics

During the verification of the statistical hypotheses, the author utilized the method of comparing the means of two independent samples. The essence of this method lies in computing the Z-statistic, [33], [34].

Z-statistics are often used to analyze whether the means of two sets of data are the same, provided that the population variance is known (https://habr.com/ru/companies/otus/articles/793678/). Thus, hypothesis testing is based on assessing the

significance of the difference M(x1) – M(x2).

When performing the Z-statistic, the research hypothesis is the assumption that there is no significant difference between the variables under study, [33], [34]. In the context of the Z statistic, which is often used to compare means, research hypothesis typically states that the means of the two groups being compared are equal. The alternative hypothesis is the opposite of the null hypothesis: the means of the two groups being compared are not equal. Therefore, the author chose the Z-statistics method.

The comparison of the two means will be conducted for two methods of calculating statistical indicators: using the new prompt and using the Windows calculator. The comparison is carried out for three pairs of rows in Table 2:

- Row 4 and Row 6,
- Row 7 and Row 9,
- Row 10 and Row 12.

So, the author made three pairs of hypotheses, [33], [34]: a Research hypothesis and an Alternative hypothesis.

Research hypothesis: M(x1) – M(x2) = 0.00. That is, if you do not take into account random deviations.

Alternative hypothesis: M(x1) – M(x2) ≠ 0.00. That is, if you do not take into account random deviations. In this case, the difference can be either greater than 0.00% or less than 0.00%.

If the difference M(x1) – M(x2) equals 0.00, it means that the two samples are equal to each other. There is no statistically significant difference between the two means. The results of calculating the statistical indicator M(x) using two methods are equal – their difference is explained by random deviations.

If the difference M(x1) – M(x2) is greater or less than 0.00, it means that the two samples are not equal to each other. There is a statistically significant difference between the two means. The results of calculating the statistical indicator M(x) using two methods differ from each other.

A detailed description of the Z-statistic is provided in statistics textbooks, including [33], [34], [36]. Here, a two-sided test was adopted because the comparison result can be both greater than 0.00% and less than 0.00%.

For each verification case (Table 3, Table 4, Table 5), the author used the standard significance level, [33], which is 0.05 ($\alpha = 0.05$).

Table 3. Results of comparing two sample averages for row 4 and row 6

Calculation stage	Row 4	Row 6
The size of a sample, N	273	273
The expected value, M(x), %	0.1209	0.1254
$\lvert M(x_1) – M(x_2) \rvert$	0.0045	
$\mu_1 – \mu_2$	0.00	
The standard deviation for the sample, $\boldsymbol{\delta_x}$	0.3269	0.3302
Average error, $\dot{S}_{\bar{X}} = \boldsymbol{\delta_x} / \sqrt{n}$	0.0198	0.0200
$\dot{S}_{\bar{X}}^2$	0.00039	0.000340
$\lvert \dot{S}_1^2 - \dot{S}_2^2 \rvert$	0.00001	
$\sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	0.00316	
$\lvert z_{stat} \rvert = [M(x_1) – M(x_2) - (\mu_1 – \mu_2)] / \sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	1.4240	
The value z_{tabl} for the standard testing level of 0.05 [33,34]	1.96	
Result, $\lvert z_{stat} \rvert > z_{tabl}$	No	

Table 3 shows that the Z-statistics $\lvert z_{stat} \rvert$ is less than the z_{tabl}. In this case, the Research hypothesis is accepted: M(x1) – M(x2) = 0.00. This means that the results of calculating of statistical indicator M(x) are equal for both ways – their difference is explained by random deviations.

Table 4. Results of comparing two sample averages for row 7 and row 9

Calculation stage	Row 7	Row 9
The size of a sample, N	375	375
The expected value, M(x), %	0.0907	0.0933
$\lvert M(x_1) – M(x_2) \rvert$	0.0026	
$\mu_1 – \mu_2$	0.00	
The standard deviation for the sample, $\boldsymbol{\delta_x}$	0.2871	0.2909
Average error, $\dot{S}_{\bar{X}} = \boldsymbol{\delta_x} / \sqrt{n}$	0.0148	0.0150
$\dot{S}_{\bar{X}}^2$	0.00022	0.00023
$\lvert \dot{S}_1^2 - \dot{S}_2^2 \rvert$	0.00001	
$\sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	0.00316	
$\lvert z_{stat} \rvert = [M(x_1) – M(x_2) - (\mu_1 – \mu_2)] / \sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	0.8228	
The value z_{tabl} for the standard testing level of 0.05 [33,34]	1.96	
Result, $\lvert z_{stat} \rvert > z_{tabl}$	No	

Table 4 shows that the Z-statistics $\lvert z_{stat} \rvert$ is less than the z_{tabl}. In this case, the Research hypothesis is accepted: M(x1) – M(x2) = 0.00. This means that the results of calculating of statistical indicator M(x) are equal for both ways – their difference is explained by random deviations.

Table 5. Results of comparing two sample averages for row 10 and row 12

Calculation stage	Row 10	Row 12
The size of a sample, N	500	500
The expected value, M(x), %	0.0800	0.0820
$\lvert M(x_1) - M(x_2) \rvert$	0.0020	
$\mu_1 - \mu_2$	0.00	
The standard deviation for the sample, $\boldsymbol{\delta_x}$	0.2716	0.2744
Average error, $\dot{S}_{\dot{X}} = \boldsymbol{\delta_x} / \sqrt{n}$	0.0121	0.0123
$\dot{S}_{\dot{X}}^2$	0.000147	0.000151
$\lvert \dot{S}_1^2 - \dot{S}_2^2 \rvert$	0.000004	
$\sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	0.002	
$\lvert z_{stat} \rvert = [M(x_1) - M(x_2) - (\mu_1 - \mu_2)] / \sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	1.000	
The value z_{tabl} for the standard testing level of 0.05 [33,34]	1.96	
Result, $\lvert z_{stat} \rvert > z_{tabl}$	No	

Table 5 shows that the Z-statistics $\lvert z_{stat} \rvert$ is less than the z_{tabl}. In this case, the Research hypothesis is accepted: M(x1) – M(x2) = 0.00. This means that the results of calculating of statistical indicator M(x) are equal for both ways – their difference is explained by random deviations.

Thus, the Z-statistic confirmed the equality of the statistical indicators calculated using the new chatGPT 3.5 instruction (prompt) and two other traditional methods. The standard testing level is α = 0.05.

This means that students can use the new chatGPT 3.5 instruction (prompt) to calculate statistical indicators when completing graduation and other projects. However, we may encounter both a prejudice that the use of artificial intelligence is not in demand for simple statistical calculations, and a prejudice about the uselessness of Artificial Intelligence in general.

4 Conclusion

The purpose of the study has been achieved.

The research problem has two main aspects. Firstly, the three stages of bibliometric analysis on 79606 sources published in the Scopus database showed increased interest in addressing issues related to "graduation project" and "statistical indicators." The research results suggest the need for finding a way to calculate statistical indicators without manual computations. Secondly, the possibility of errors in calculations using chatGPT 3.5 was empirically confirmed, as well as in scientific literature.

The novelty of the work lies in the creation of the new chatGPT 3.5 instruction (prompt) to calculate statistical indicators for student graduation projects. The new chatGPT 3.5 instruction (prompt) enables the calculation of statistical indicators without manual computations. The significant advantage of the new chatGPT 3.5 instruction (prompt) lies in relieving the student from entering data arrays into the tool for computing statistical indicators.

The created new chatGPT 3.5 instruction (prompt) should become a valuable resource for students, helping them save time in preparing their graduation projects. Students, instructors, and other interested parties can use the prompt from section 3.3.

The study has scientific and practical significance, since it reduces the time and simplifies the process of calculating statistical indicators of graduation projects, and also improves their quality:

1. New ChatGPT 3.5 instruction (prompt) is a useful resource for students to save time on graduation projects.
2. Using the proposal allows you to improve the quality of graduation projects.
3. The new ChatGPT 3.5 instruction (prompt) can help students with various statistics knowledge.
4. This discovery has the potential to expand the use of computers in education.

One of the limitations of the study is the choice of the simplest option for calculating statistical indicators. As empirical data and prompt engineering experience are collected, instructions (prompts) will be compiled for solving more complex statistical problems. Exploring how the performance of ChatGPT 3.5 might vary with different types of statistical indicators, sample sizes, or data distributions is one of the next steps of our study. The next goal of the research is to create a new chatGPT 3.5 instruction (prompt) for computing statistical indicators for a larger number of respondents (units). Creating instructions (prompts) for situations with a larger number of responses (e.g., 0.0, 0.5, 1.0) and receiving quality feedback from students who use the new instruction may also be the tasks for future research.

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