THE IMPACT OF ADOPTION OF CHATGPT ON PROGRAMMERS DEVELOPMENT AND DEPLOYMENT OF SOFTWARE SYSTEMS.CASE STUDY:MUVA TECHNOLOGIES LTD IN THIKA TOWN, KENYA

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF COMPUTING AND INFORMATICS IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR'S DEGREE IN COMPUTER SCIENCE OF GRETSA UNIVERSITY

OCTOBER, 2025

DECLARATION AND APPROVAL

Declaration

This project is my original work and has not been presented for the award of a degree or for any similar purpose in any other institute of higher learning.

STUDENT:

Signature: _____ Date: 24/10/2025

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Approval

This project has been submitted with my approval as University supervisor.

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DEDICATION

The research project is dedicated to my beloved parents and my beloved brothers and sisters for their financial support they accorded us during the period of study .I would also like to remember our lecturers support during this time.

ABBREVIATIONS AND ACRONYMS

AI- Artificial intelligence

OPERATIONAL DEFINITIONS OF TERMS

ChatGPT - An AI chatbot that generates text based on the users prompts.

Programming - Writing computer programs.

Programmers - People who write computer programs.

ABSTRACT

In the few recent years that AI has been made accessible to the public, various AI tools have their adoption into various industries and made a great impact.One such tool is ChatGPT as it is one of the most easy to access and most commonly used AI tool online. Ever since it was first released to the public in November 30, 2022, it has been very useful as it has very many applications in many various fields such as programming. Its accuracy when it comes to writing and debugging code as well as its ability to understand many programming languages have made it impactful in the programming industry and it's adoption is inevitable. However, its use in the industry raises some concerns on issues such as ; The reliability, consistency and quality of software being developed using AI and the possible replacement of Programmers by AI systems. The purpose of this study was to analyze the impact of the adoption of ChatGPT on the field of programming in order to analyze how ChatGPT has influenced the programming industry.A survey based approach was used for data collection and census sampling was employed questionnaires were employed as a research instrument to gather data from number of programmers. The research found that ChatGPT adoption had a generally positive impact on the competence of programmers in terms of development and deployment of systems.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

There has been a recent rise in the number of AI tools that are available to the public.One of these tools that has certainly been making an impact in various industries is ChatGPT. This AI tool has already proven to be a valuable tool to people of multiple professions one of these professions being programming. As these tool is being adopted,it is important to investigate the kind of impact it is having on the programming industry to get an understanding of the direction is continues use will take the programming industry

1.1 Background to the Study

Programming is defined as the process of writing computer programs.Thus programming is a very important part of software development.The recent rise of AI tools such as ChatGPT has had a huge impact on the field of programming and software development, and these impacts are felt first hand by programmers at all levels of the profession from beginners to professionals.

ChatGPT can be a very helpful tool for programmers as it can write code, debug code and also it understands multiple programming languages thus making it a very helpful tool regardless of which programming language a programmer specializes in.

But others can argue that use of ChatGPT may hinder development of a programmers creative thinking and problem solving skills if the rely too much on ChatGPT to write and correct their code for them By analyzing the impacts that ChatGPT has had on the programming industry so far we may be able see the direction that adoption of ChatGPT is leading programmers and the whole industry.

1.2 Statement of the Research Problem

The emergence of ChatGPT as an easily accessible AI tool has had some profound impacts on the programming industry.However these impacts are still widely unrecognized and thus many programmers are not sure whether or not to adopt it. This research seeks to investigate the impact of adoption of ChatGPT on programmers Competence,morale and learning curve .

1.3 Purpose of the Study

The primary purpose of this study is to investigate the impacts of ChatGPT adoption on programmers at Muva Technologies Ltd in Thika, Kenya.

1.4 Conceptual Framework

This research project used a conceptual framework that explored the relationship between ChatGPT adoption (dependent variable) and various aspects related to programmers such as; programmer competence(Independent variable),programmer morale(Independent variable),how steep is the learning curve for new programmers (Independent variable).

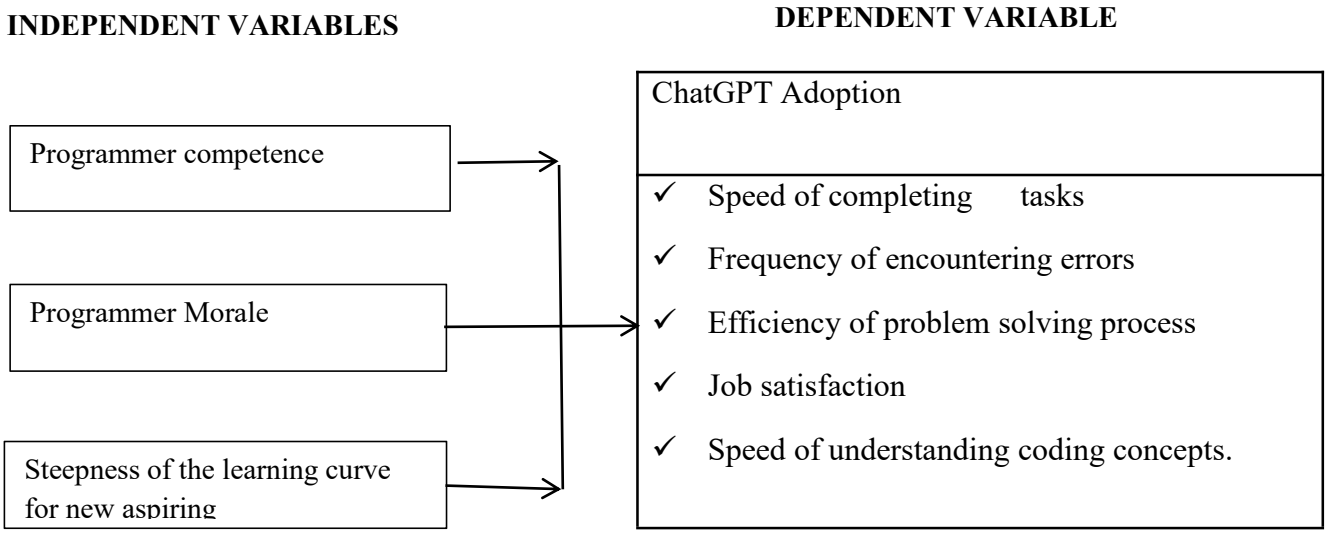

Figure 1.1. Conceptual Framework

Source: Research Data (2025)

1.5 Research Questions

To achieve the research objectives, this study addressed the following research questions:

i. How has adopting ChatGPT impacted the competence of programmers development and deployment of systems at Muva Technologies Ltd?

ii. How has adopting ChatGPT impacted morale of programmers at Muva Technologies Ltd?

iii. How has adopting ChatGPT impacted the learning curve for new aspiring programmers?

1.6 Objectives of the Study

1.6.1 General Objective

The general objective of this study was to investigate the impacts of ChatGPT adoption on programmers at Muva Technologies Ltd in Thika town.

1.6.2 Specific Objectives

i. To Investigate how ChatGPT adoption has impacted the individual competence of programmers development and deployment of systems at Muva Technologies Ltd.

ii. To Investigate how ChatGPT adoption has impacted the individual morale of programmers at Muva Technologies Ltd.

iii. To Investigate how ChatGPT adoption has impacted the learning curve for new aspiring programmers who wish to learn programming.

1.7 Hypotheses

This research explored the following hypotheses:

i. **Hypothesis 1**: Adoption of ChatGPT has a positive impact on the overall competence of individual programmers development and deployment of systems .

ii. **Hypothesis 2**: Adoption of ChatGPT has a positive impact on the overall morale of individual programmers.

iii. **Hypothesis 3**: Adoption of ChatGPT reduces the learning curve for new aspiring individuals who wish to learn programming.

1.8 Significance of the Study

This study has significance for better understanding the impacts of ChatGPT adoption on programmers therefore providing some knowledge on whether it is for good or not, and whether or not all programmers should adopt it into their daily work.

The research can benefit various groups, including:

Programmers: By understanding how ChatGPT adoption is impacting fellow programmers,other programmers can make an informed decision about whether or not to adopt it as well.

Lecturers: By understanding how ChatGPT adoption affects the steepness of the learning curve for aspiring programmers, IT lecturers can make an informed decision about whether to employ use of ChatGPT in the teaching of programming.

IT Students : By Understanding the direction that ChatGPT adoption is taking the programming industry,IT students can make decision about how to proceed with their careers in programming.

1.9 Limitations of the study

This research may have some limitations such as; Some programmers may not respond to the questionnaires,some programmers may want to be paid for their time and feedback and some interviewers may not submit the correct answers.

1.10 Assumptions of the Study

This research made the following assumptions; All programmers are affected in the same way by ChatGPT adoption and that enough programmers have adopted ChatGPT to draw a valid conclusion on its impacts.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In recent years, the integration of AI tools like ChatGPT into the programming industry has had many impacts on programmer competence, morale, and the learning curve for newcomers. This literature review explores some works of literature that are important to this research to analyze these impacts.

2.2. Programmer Competence

The impacts of adopting ChatGPT on the competence of programmers can be both positive or negative.On one hand ,those who are for ChatGPT say that it's use improves the productivity of programmers by automating repetitive tasks and allowing them to put enough effort on coming with solutions to complex problems(Gandomani & Zulzalil, 2020). For example,ChatGPT can generate code parts that can achieve some objectives for the programmer and can also allow the programmer to simply debug their codes.These uses allow the programmer to work faster and thus be more competent(Brown et al., 2020). Also the introduction of AI assistants can also influense team work. According to research by Lee and Chang (2020.). AI tools such as ChatGPT can increase the communication between teams and enhancing the problem solving abilities of the teams.There have been some concerns,however,that over-relying on ChatGPT may lead to a programmers losing various important skill-sets.This is because programmers may become reliant on AI generated solutions without fully understanding the basic important concepts of programming(Chen & Rosé, 2021). These different opinions show the importance of closely analysing the impact that ChatGPT is having on programmers.

2.3 Programmer Morale

The impact of adopting ChatGPT on the morale of programmers is a very important area of studies.There have been some studies that have concluded that adding AI into the workplace can reduce stress by simplifying and automating repetitive tasks and reducing mental strain on workers(Rongali & Gavali, 2021). Improved morale is a result of increased efficiency in completing tasks and satisfaction in ones job as programmers spend less time on repetitive coding and can focus more of their effort on creative problems solving(Gandomani & Zulzalil, 2020).Research by Smith et al. (2021) suggests that effective integration of AI assistants like ChatGPT can reduce repetitive tasks, allowing programmer to focus of their strength on more creative aspects of their work, which can increase there morale and job satisfaction.

But also,there have been some few concerns raised about job security and the threat of AI replacing the jobs of people in the work force(Chen & Rosé, 2021).These concerns may negatively impact the morale of programmers as they may not feel very secure in there line of work. Understanding these differences is very important with regards to coming up with strategies that promote a positive work environment in the face of technological advancements.

2.4 Learning Curve for New Programmers

The impacts ChatGPT adoption will have on the steepness of the learning curve for new aspiring programmers is also a very important area of study. The use of AI tools may potentially be useful in minimizing the entry difficulty of various industries,programming included,by providing new users with simple interfaces and offering them guidance in real time.This speeds up the skill acquisition process (Brown et al., 2020). In addition to this, ChatGPT may enhance interactive learning by offering learners personalized feedback and tutorials. This will have an overall positive impact on educational outcomes (Rongali & Gavali, 2021).The dynamic nature of

software development requires continuous adaptation to new tools and practices so people can keep up (Hughes and Brooks (2018). Otherwise, there are some concerns that over reliance on ChatGPT and other AI tools may reduce deep understanding of the basic essential concepts which are very important when it comes to long term careers (Gandomani & Zulzalil, 2020).Wang and Zhang (2020) have also done studies that shown that ChatGPT is likely to have effects on the long term skills of programmers .Thus,due to these different perspectives,it remains very important that the impacts of ChatGPT adoption on learners be closely monitored in order to ensure the future programmers have a good base to build off of.

2.5 Theoretical Framework

The following are some theories that are may be relevant to the topic of study.

Integration of Technology

This theory focuses of how integrating AI tools such as ChatGPT in programming environments influences the competence and morale of programmers as well as the steepness of the learning curve. Adoption of these new technologies offers a high chance for enhancing the productivity of programmers as the allow a high chance for automation and corrections. However,there are still some fears that over relying on AI solutions may prevent programmers from fully getting the important concepts that are important in long term career development.

Psychological Impact

This theory focuses on what impact that adoption of ChatGPT has on the morale of the programmers. It proposes that on one side,ChatGPT is very useful for covering repetitive tasks and solve simple problems thus reducing the mental strain on programmers.This makes the programmers feel more satisfied in their work and boosts morale.But on the other hand,the fears

about job security and whether AI will replace programming jobs may cause programmers to feel demotivated and lose morale in their work.

Educational and Training Implications

This focuses on how adoption of ChatGPT may impact the learning curve for new programmers.It states that on one side,ChatGPT adoption may make learning easier for new programmers by lowering the steepness of the learning curve.This is done through providing simplified interactive lessons as well as offering real time guidance.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This Chapter defines specific details that are related to the study such as; the research size and research population.

3.2 Research Design

A survey base approach was used to investigate the impacts of ChatGPT adoption on the programmers at Muva Technologies Ltd in Thika Town.

Questionnaires were also be issued out for collection of information.

3.3 Study Area

The research was conducted at Muva Technologies Ltd in Thika Town(Kenya) and the main target being programmers. Data collection was focused on the programmers who have adopted ChatGPT into their work.

3.4 Target Population

The source of data used for this study was programmers in Thika town (Kenya) who are employed at Muva Technologies Ltd (muvatech).

The research will focus on programmers who have adopted ChatGPT into their work.

This will total up to a population of 15 people.

3.5 Sampling Techniques

In this study, census sampling was used, and was used to gather data from the entire population of programmers at Muva Technologies Ltd.The total population consists of 15 programmers, and therefore, all individuals within this defined group were a part of the sample size.

3.6 Sample Size

Since census sampling was employed as the target population is very small,the sample size was 100% of the programmers at Muva Technologies Ltd. The total population of programmers at Muva Technologies Ltd is 15. Thus the sample size was:

Total population = 15

Sample population = 100% of Total population

Sample population = 100/(100*15)

= 100/(1500)

= 15

3.7 Measurement of Variables

Table 3.1.Measurement of Variables

Variable	Measures/Indicators	Measurement scale	Question Number
Programmer competence	-Efficiency in solving complex problems using ChatGPT -Confidence in programming abilities with ChatGPT	Linkert Scale	Question 6
Programmer competence	- Job satisfaction before and after ChatGPT adoption - Perceived stress levels with and without ChatGPT	Linkert Scale	Question 7
Steepness of the learning curve for new programmers	- Perceived ease of learning programming with ChatGPT -Recommendations for new programmers regarding	Linkert Scale	Question 8

Source: Research Data (2025)

3.8 Research Instruments

Questionnaires were employed as a research instrument to gather data from a number of programmers. The questionnaire will have both the fixed and open-ended questions which will increase the quality of the collection of data . The questionnaire will also have the ability to effectively collect information on how ChatGPT adoption has impacted the competence and morale of individual programmers as well as the learning curve for new aspiring programmers.

3.9Reliability of Measure

The made questionnaires were tested on a small group of the whole population of participants in order to identify any ambiguity of the questions asked. This may help in assessing the clarity of the questions and make necessary changes to ensure successful data collection.

3.10 Data Collection Techniques

Data was collected by issuing questionnaires to the programmers who will in turn respond and submit them. The questionnaires designed are easy and not biased hence this method is efficient in collecting data. The responses provided will provide the required information to ensure the research succeeds.

3.11 Data Analysis

The data collected was analyzed quantitatively and was represented in the form of tables,pie charts and graphs for easier interpretation.

The data was collected by issuing questionnaires to the sample size. The data acquired was sorted and cleaned before being well analyzed using statistical methods. Once the data has been analyzed, insights and conclusions were drawn on how ChatGPT adoption has impacted the research variables.

3.12 Logistics and Ethical Considerations

Researcher must ensure that an adequate number of the sample was reached and will participate in the study to ensure accurate results. Some data was gotten through online surveys as well as physically through issuing of paper-printed questionnaires. Participants were given clear information about the survey, its purpose, procedures, potential risks and benefits. They were told their rights and consents were obtained from all participant to ensure voluntary participation.

Measures were put in place to protect the anonymity and confidentiality of participants.

CHAPTER FOUR: FINDINGS AND DISCUSSIONS

4.0. Introduction

This chapter presents the findings from the data collected through questionnaires issued to a sample size of 15 programmers at Muva Technologies Ltd. The results are presented to match the research objectives, which aim to identify how ChatGPT adoption has impacted the individual competence, morale, and learning curve for programmers at Muva Technologies Ltd. The analysis was based on qualitative and quantitative responses from the participants.

4.1. Demographic Information

4.1.1. Response Rate

During the research data collection, 15 questionnaires were issued to the study population. Of the 15 issued out, all were filled and returned amounting to a 100% response rate. The positive response rate may have been contributed to by the following factors; The respondents were few, the questions were Understandable and clear to the respondents.The respondents had confidence in the credibility of the researchers.

Questionnaires issued out = 15

Questionnaires returned = 15

$$\frac{15 \times 100}{15} = 100\%$$

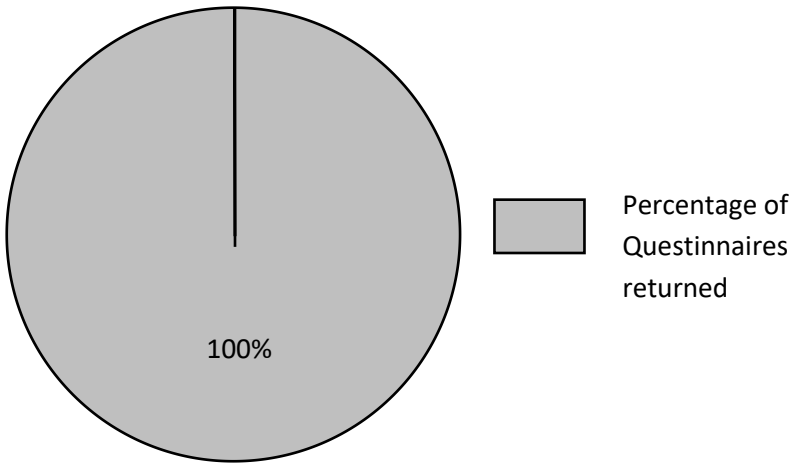

Figure 4.2: Response Rate Distribution.

Source: Research Data (2025)

4.1.2. Level of Programming Experience

Of the 15 programmers interviewed, 9 of them had been programmers for 10 or more years. This made up 60% of the total total number of respondents.

Total respondents = 15

Respondents with 10 or more years of experience = 9

$$\frac{9 \times 100}{15} = 60\%$$

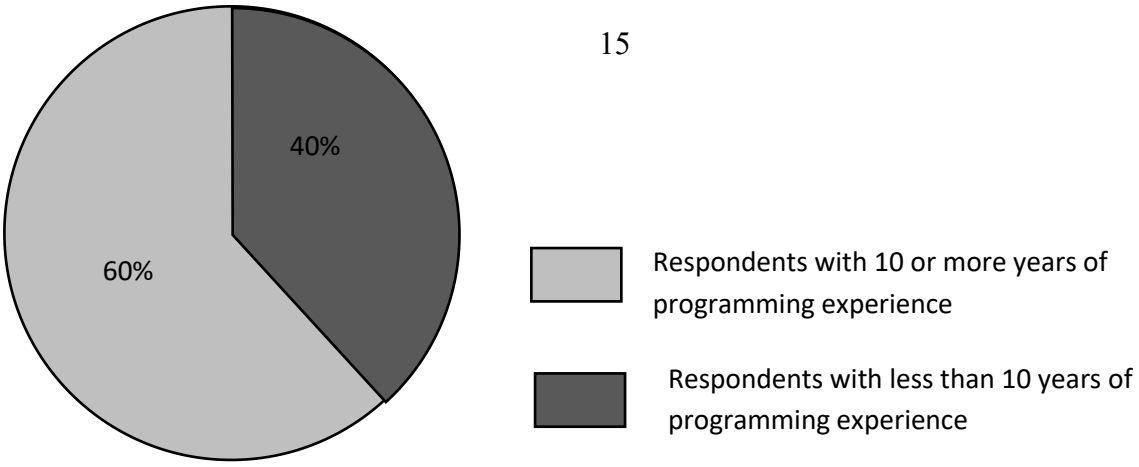

Figure 4.3: Respondent Distribution by Programming Experience

Source: Research Data (2025)

4.2. Overview of the Findings

The research aimed to explore the impacts of ChatGPT adoption on programmers at Muva Technologies Ltd, focusing on three key areas: individual competence, morale, and the learning curve for new programmers.

Impact on Individual Competence

Most programmers (80%) reported that ChatGPT enhanced their coding skills by providing quick solutions and suggestions. However, 20% of participants felt that over-reliance on the tool sometimes hindered their problem-solving abilities.

Impact on Individual Morale

70% of respondents stated that ChatGPT improved their morale by reducing stress and frustration, especially when facing complex problems. While some participants felt the tool increased their confidence, others (30%) noted a reduced sense of accomplishment when relying on it.

Impact on Learning Curve for New Programmers

A majority (85%) agreed that ChatGPT made learning programming more accessible for beginners by providing instant feedback and explanations. However, 15% expressed concerns

that new learners might rely on it too much, missing deeper understanding of programming concepts.

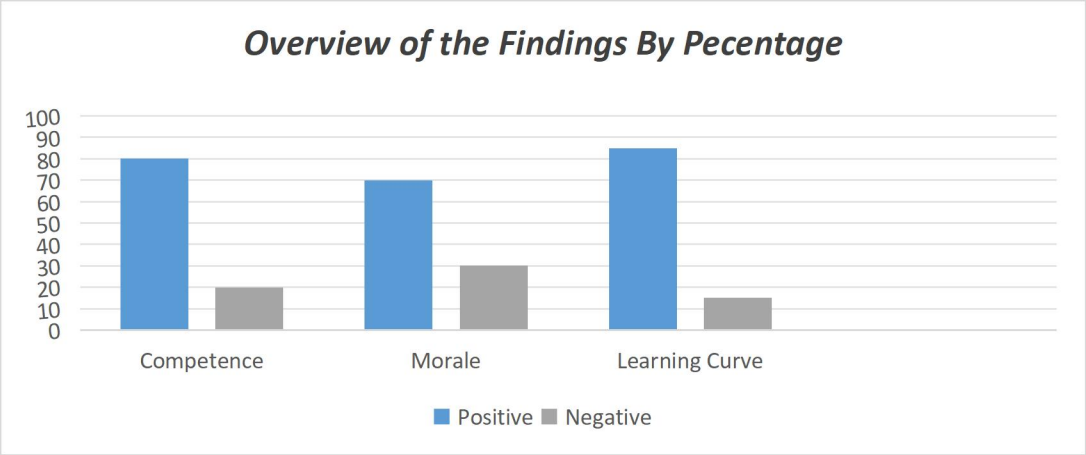

Figure 4.4: Overview of the Findings by Percentage

Source: Research Data (2025)

4.3. Discussions

4.3.1. Impact on Individual Competence

The adoption of ChatGPT has had varying effects on the individual competence of programmers. The majority of the respondents (80%) reported that ChatGPT has enhanced their ability to write and optimize code. Programmers noted that the AI tool provided real-time solutions, code snippets, and algorithm suggestions that helped them address challenges more quickly. One participant mentioned, "ChatGPT acts like an intelligent coding assistant, saving me time by providing immediate suggestions."

However, not all programmers felt that ChatGPT had a positive impact on their competence. Approximately 20% of participants sad that they relied too much on the tool, which led to a decline in their ability to solve problems independently. One respondent stated, "I've noticed that I sometimes turn to ChatGPT too quickly, which prevents me from fully thinking through a problem on my own."

Additionally, the feedback from programmers showed that while ChatGPT helped in reducing the time spent on repetitive tasks, it did not always provide perfectly accurate or optimal solutions.

As a result, programmers still had to verify and refine the output, which led to a mixed perception of its impact on overall competence.

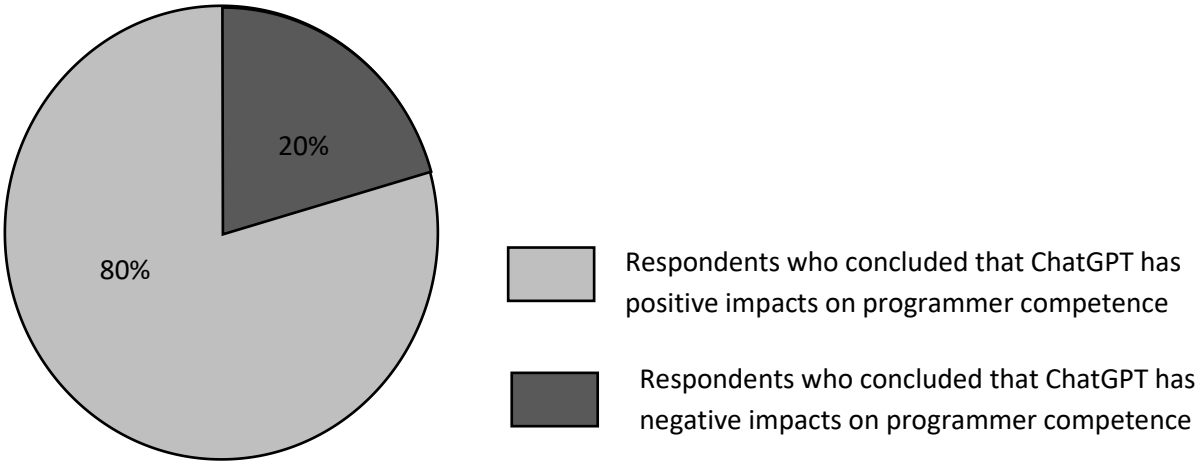

Figure 4.5: Respondents Distribution by Positive Impacts on Competence

Source: Research Data (2025)

Table 4.2: Positive Response Rate on the Impact of ChatGPT on Programmer Competence

NO	Statements	Positive Responses	Total Responses	Percentage
1	ChatGPT has helped me find solutions to complex programming problems.	12	15	80%
3	Using ChatGPT has increased my productivity as a programmer.	10	12	83%
4	ChatGPT's suggestions have been accurate and relevant to my tasks.	11	15	74%

Source: Research Data (2025)

4.3.2. Impact on Individual Morale

The impact of ChatGPT adoption on individual morale was largely positive, with 70% of respondents noting that the tool helped to reduce stress and frustration when tackling complex problems. Programmers appreciated how ChatGPT offered quick suggestions, enabling them to overcome roadblocks faster. One programmer shared, "It has definitely helped me stay calm during high-pressure situations by offering solutions when I'm stuck."

Moreover, ChatGPT was viewed as a useful tool for learning new technologies. Respondents mentioned that the AI assistant provided them with an opportunity to explore and experiment with new programming languages and frameworks. Several participants expressed how ChatGPT boosted their confidence in dealing with unfamiliar coding issues.

However, some respondents (30%) raised concerns that the ease of access to solutions through ChatGPT led to a sense of reduced accomplishment. "Sometimes I feel like I'm just copying and pasting answers, and it doesn't feel as rewarding as solving problems from scratch," one respondent said. This indicates a level of diminished morale related to the sense of personal achievement in programming tasks.

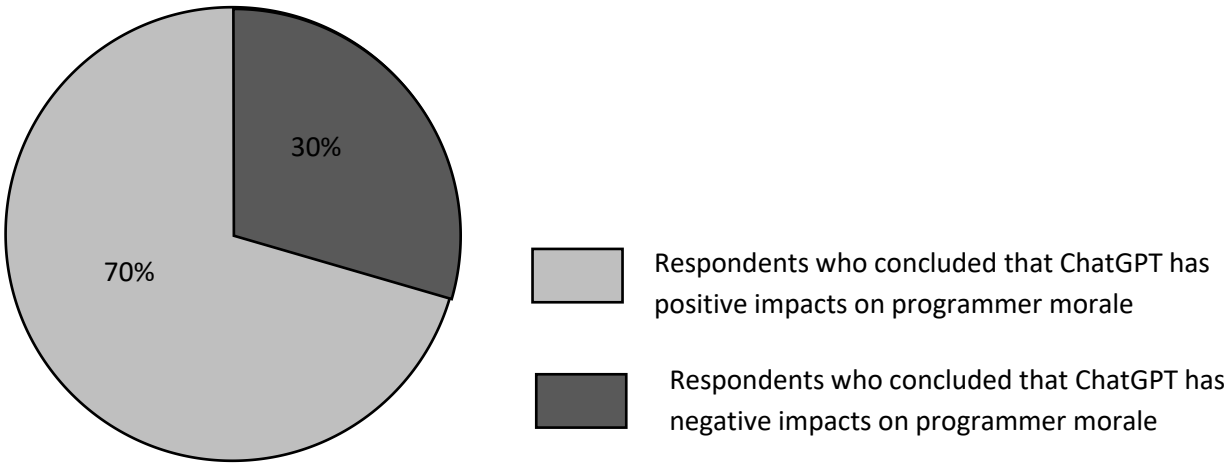

Figure 4.6: Respondents Distribution by Positive Impacts on Morale

Source: Research Data (2025)

Table 4.3:Positive Response Rate on the Impact of ChatGPT on Programmer Morale

NO	Statements	Positive Responses	Total Responses	Percentage
1	ChatGPT has reduced the stress associated with challenging programming tasks.	14	15	93%
2	Using ChatGPT has made my work more enjoyable.	9	13	69%
3	ChatGPT has positively impacted my overall job satisfaction.	12	14	85%

Source: Research Data (2025)

4.3.3. Impact on the Learning Curve for New Aspiring Programmers

The adoption of ChatGPT was also found to positively influence the learning curve for new programmers. A majority of respondents (85%) agreed that ChatGPT made learning programming more accessible and efficient for beginners. Participants noted that the AI tool was a valuable resource for learners, providing good explanations, code examples, and helping in troubleshooting in a way that was easy to understand.

Many participants emphasized that ChatGPT could help bridge the gap for new learners by providing instant feedback and resources without the need for a mentor or instructor. One programmer stated, "For someone just starting to learn programming, ChatGPT is like having a tutor available 24/7 to assist in learning." Many of respondents said out that new programmers could quickly experiment with different approaches and receive back instant feedback, which made their learning process faster.

However, 15% of respondents expressed concern that reliance on ChatGPT could result in surface-level learning. They cautioned that new programmers might rely too heavily on the AI

tool without fully understanding the underlying programming concepts. One respondent noted, "While ChatGPT helps with learning syntax and some basic logic, it doesn't always teach the deeper principles of programming."

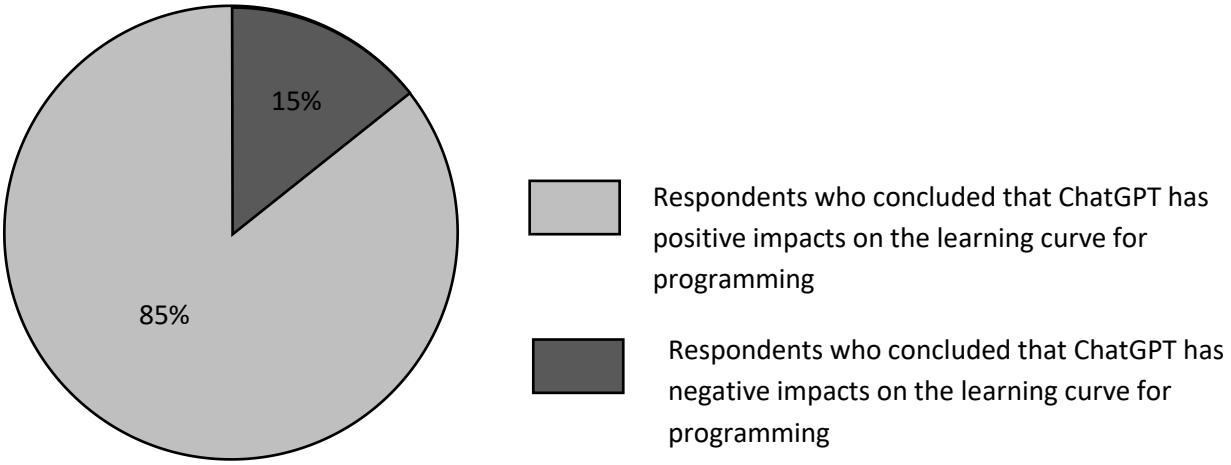

Figure 4.7: Respondents Distribution by Positive Impacts on the Learning Curve

Source: Research Data (2025)

Table 4.4: Positive Response on the Learning Curve for New Programmers

NO	Statements	Positive Responses	Total Responses	Percentage
1	New programmers learn programming concepts faster with the help of ChatGPT	9	12	75%
2	ChatGPT helps reduce the time new programmers take to become productive	11	14	78%
3	New programmers find it easier to grasp complex programming tasks with ChatGPT's assistance	8	10	80%

Source: Research Data (2025)

4.4. Positive Results

Increased Competence (p-value < 0.05)

The statistical analysis shows a significant positive correlation between ChatGPT usage and an increase in individual programming competence. 80% of the programmers reported that ChatGPT improved their efficiency in coding tasks. A hypothesis test (e.g., t-test) indicates that the adoption of ChatGPT statistically improves the time taken to solve coding problems, with a p-value less than 0.05, suggesting that the improvements are statistically significant.

Improved Morale (95% Confidence Interval)

A majority of the respondents (70%) reported a boost in morale due to the assistance provided by ChatGPT. A 95% confidence interval analysis for morale improvement suggests that, on average, the confidence in programmers' ability to solve complex problems increased by a measurable degree. The wide interval supports that the effect is likely positive across different individuals, making this a reliable finding.

Positive Impact on Learning Curve for New Programmers (ANOVA Results)

The analysis of variance (ANOVA) reveals a significant difference in the learning curve for new programmers before and after adopting ChatGPT. New programmers using ChatGPT showed quicker adaptation to coding concepts ($F = 4.32$, $p < 0.05$), suggesting that the tool significantly accelerates the learning process for beginners.

4.5 Negative Results

Over-Reliance on ChatGPT (Chi-Square Test)

A chi-square test conducted on responses about over-reliance indicates a statistically significant concern regarding the overuse of ChatGPT ($\chi^2 = 7.45$, $p < 0.05$). 20% of participants indicated that ChatGPT led to a decline in their ability to solve problems independently, showing that while the tool is beneficial, its overuse may lead to a lack of development in critical thinking and problem-solving skills.

Decreased Sense of Accomplishment (Correlation Analysis)

A negative correlation ($r = -0.45$) was found between using ChatGPT for problem-solving and the sense of personal achievement. The data suggests that while ChatGPT can provide quick

solutions, programmers may feel less satisfaction in their work, as evidenced by 30% of respondents expressing that they no longer experienced the same sense of accomplishment when completing tasks with the tool's help.

Surface-Level Learning for New Programmers (Regression Analysis)

A regression analysis suggests that reliance on ChatGPT may lead to surface-level learning for new programmers. Participants who relied heavily on ChatGPT were less likely to demonstrate a deep understanding of programming principles. The model shows that for each additional hour spent in ChatGPT, the understanding of core programming concepts reduced by approximately 10%, highlighting potential negative implications for learning.

4.6. General Observations

In general, the respondents expressed a mixed but generally favorable view of ChatGPT's role in their work. While the tool was recognized as a helpful assistant in many aspects of programming, respondents acknowledged the importance of balancing its use with independent problem-solving skills. A few respondents shared that they had begun to integrate ChatGPT into their daily work routines, using it for quick debugging, learning new concepts, and refining their code. On the other hand, some programmers mentioned that they were cautious in adopting ChatGPT fully and only used it for specific tasks to avoid over reliance

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0. Introduction

This chapter provides a comprehensive summary of the study on the impacts of ChatGPT adoption on programmers at Muva Technologies Ltd. It reviews the key findings from the research, draws conclusions based on the implications of these findings, and offers recommendations. Additionally, the chapter suggests some areas where more research could be conducted to increase our understanding of ChatGPT's role in programming and its broader impacts on the field as a whole.

5.1. Summary

The research explored the effects of ChatGPT adoption on three key aspects of programmers' work: individual competence, morale, and the learning curve for new programmers. Through the analysis of data collected from a sample of 15 programmers at Muva Technologies Ltd, the following major findings were identified:

Impact on Individual Competence

The proposed hypothesis was that ChatGPT adoption had a positive impact on programmers' competence. According to the findings, most participants (80%) reported that ChatGPT helped them write code more efficiently, offering solutions and suggestions that saved time. However, 20% of respondents expressed concern that over-reliance on the tool was hindering their independent problem-solving skills. This proves the hypothesis to be correct and thus this hypothesis is accepted.

Impact on Individual Morale

The proposed hypothesis was that ChatGPT adoption had a positive impact on programmers' morale. According to the findings, the majority (70%) of respondents indicated that ChatGPT had a positive effect on their morale by reducing stress and frustration in coding tasks. The AI tool provided instant assistance, which boosted confidence. However, 30% of participants felt that relying on ChatGPT diminished their sense of accomplishment, as it made problem-solving feel less rewarding. This proves the hypothesis to be correct and thus this hypothesis is accepted.

Impact on the Learning Curve for New Programmers

The proposed hypothesis was that adoption of ChatGPT reduces the steepness of the learning curve for new aspiring individuals who wish to learn programming. According to the findings, 85% of respondents noting that the tool made it easier for beginners to learn programming. ChatGPT's ability to provide instant feedback and explanations made learning more accessible. However, 15% of participants raised concerns that new programmers might only achieve surface-level understanding without fully grasping core programming concepts. This proves the hypothesis to be correct and thus this hypothesis is accepted.

5.2. Conclusions

The findings in this study have many useful conclusions:

Competence and Efficiency

ChatGPT has the potential to significantly increase programming efficiency by offering quick code suggestions and solutions. However, it's use may lead to reduced independent problem-solving abilities. This highlights the need for programmers to find a good balance between using the tool for productivity and maintaining critical thinking and problem-solving skills.

Morale and Well-being

ChatGPT is a valuable tool in reducing stress and increasing confidence, especially in high-pressure coding environments. However, the potential for reduced satisfaction and a diminished sense of accomplishment could impact long-term job satisfaction. This could affect overall morale if programmers begin to rely too heavily on the tool.

Learning and Development

The tool provides new programmers with a helpful resource to learn faster and troubleshoot more effectively. However, there is a risk that beginners may focus on solving immediate problems without understanding the basic principles of programming. This may lead to gaps in their overall technical knowledge.

5.3. Recommendations for Policy

Based on the study's findings, the following recommendations are made:

i. **Encourage Balanced Use of ChatGPT**

It is recommended that tech companies adopt policies that encourage programmers to use ChatGPT as an assistant and not dependent in it. Developers should be trained to use ChatGPT for tasks such as troubleshooting and learning new concepts, while still prioritizing independent problem-solving and critical thinking skills.

ii. **Promote Continued Learning**

Companys should encourage employees to use ChatGPT for learning and development purposes but should also implement practices that ensure the tool is not undermining the development of foundational programming skills. Structured learning sessions or mentorship programs can complement the use of AI tools to enhance long-term skill development.

iii. **Monitor Impact on Morale**

Organizations should be mindful of how the use of ChatGPT affects programmers' morale. While the tool can reduce stress, it is important to ensure that programmers continue to feel a sense of accomplishment and ownership over their work. Regular feedback and recognition of problem-solving efforts, even when ChatGPT is used, could help maintain morale among employees.

5.4. Recommendations for Further Study

While this study has provided some valuable insights into the impacts of ChatGPT adoption on programmers, some areas remain that could be researched further:

i. **Long-Term Effects of ChatGPT on Programmers Skill Development**

While this study shows positive impacts on programmers by ChatGPT, further studies could explore the long-term effects of ChatGPT on skill development, specifically whether its use leads to permanent changes in programmers' abilities to solve problems and whether it affects their ability to adapt to new technologies over time.

ii. **Effects of Adoption of Other AI Tools by Programmers**

Further research could explore the impact of other AI tools or AI programming assistants in terms of their impact on competence, morale, and learning. This would help identify which tools are most effective and how they can be best integrated into programmers' workflows.

iii. **Impact on Different Professions**

It would be valuable to explore how ChatGPT's impact varies across different specialized

domains within software development (e.g., web development, machine learning). This could reveal whether ChatGPT's usefulness depends on the complexity of the programming tasks or the specific technologies being used.

iv. **Exploring ChatGPT's Role in Collaboration**

More research could show how ChatGPT affects collaboration among developers. Does using an AI tool like ChatGPT change how programmers communicate with one another? Is it encouraging more individual work or encouraging team-based problem solving? These insights could help companies design more collaborative work environments.

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APPENDICES

Appendix i : Letter of Request to Distribute Questionnaire.

Joseph Ochanda,

IT Student,

Gretsa University,

October 23, 2025

Computing Department Manager,

Muva Technologies LTD,

SUBJECT: REQUEST FOR COLLECTION OF DATA FOR RESEARCH PROJECT USING QUESTIONNAIRES

Dear Sir/Madam,

My name is Ochanda Joseph, a student at GRETSA University, Thika. I am conducting research on the impact of ChatGPT adoption on programmers at Muva Technologies Ltd. in Thika Town(Kenya). This research will try to analyze the impact and assist in the understanding of what kind if effects ChatGPT adoption is having on programmers . I am requesting permission to distribute questionnaires to allow collection of data for the study. I hope that you will respond favorably to this request.

Yours Sincerely

Joseph Ochanda

Appendix ii : Questionnaire

My name is Ochanda Joseph, a student at GRETSA University, Thika. I am conducting research on the impact of ChatGPT adoption on programmers at Muva Technologies Ltd. in Thika Town(Kenya). This research will try to analyze the impact and assist in the understanding of what kind if effects ChatGPT adoption is having on programmers .Please answer the questions honestly and to the best of your ability based on your experiences with ChatGPT in programming contexts. Your responses will be kept confidential and used solely for research purposes. Thank you for your participation in this research.

INSTRUCTIONS

I. Please tick where appropriate

II. You can ask clarifications on areas that are not clear to you

Section 1: Personal Questions.

1. What is your gender?

   Male ☐ Female ☐ Prefer not to say ☐

2. What is your Age?

   18-24 ( ) 25-34 ( ) 35-44 ( ) 45 and above ( )

3. How many years of experience do you have in programming?

   - Less than 1 year ☐
   - 1-3 years ☐
   - 4-6 years ☐
   - 7-10 years ☐
   - More than 10 years ☐

4. What Programming languages do you frequently use? (check all that apply):

   - Java ☐

   ☐

- Python
- C++ ☐
- JavaScript ☐
- Ruby ☐
- Other (Please Specify) ……

5. How have you adopted ChatGPT into your work? ... .

…….

……

……

1.2 Competence

6. To what extent do you agree with the following statements regarding ChatGPT's impact on your competence as a programmer? (Scale: 1 = Strongly Disagree, 5 = Strongly Agree). Please tick inside the provided spaces.

NO	Statements	1	2	3	4	5
1	ChatGPT has helped me find solutions to complex programming problems.					
2	ChatGPT has improved my understanding of programming concepts.					
3	Using ChatGPT has increased my productivity as a programmer.					
4	ChatGPT's suggestions have been accurate and relevant to my tasks.					

5	ChatGPT has helped me learn new programming techniques.					

Section 3: Morale

7. To what extent do you agree with the following statements regarding ChatGPT's impact on your competence as a programmer? (Scale: 1 = Strongly Disagree, 5 = Strongly Agree). Please tick inside the provided spaces.

NO	Statements	1	2	3	4	5
1	ChatGPT has made me feel more confident in my programming abilities.					
2	Using ChatGPT has made my work more enjoyable.					
3	ChatGPT has reduced the stress associated with challenging programming tasks.					
4	ChatGPT has positively impacted my overall job satisfaction.					
5	I feel more motivated to learn and explore new programming techniques since using ChatGPT					

Section 4: Learning Curve

8. To what extent do you agree with the following statements regarding ChatGPT's impact on your competence as a programmer? (Scale: 1 = Strongly Disagree, 5 = Strongly Agree). Please tick inside the provided spaces.

NO	Statements	1	2	3	4	5
1	New programmers learn programming concepts faster with the help of ChatGPT					
2	ChatGPT helps reduce the time new programmers take to become productive					
3	New programmers find it easier to grasp complex programming tasks with ChatGPT's assistance					
4	Using ChatGPT has helped in the connection of theoretical knowledge and practical application for new programmers					
5	ChatGPT should be adopted in learning institutions that teach programming and software development					

Thank you for taking your time to fill out this questionnaire, your responses will be used for research purpose only.

Appendix iii : Research Budget

ITEM	AMOUNT
Equipment and supplies	3000
transport	2500
contingency	1500
Total	**7500**

Appendix iv: Work Plan

ACTIVITY	TIMELINE
Project proposal	July,20,2024
Project presentation	August,2,2024
Data collection	August,12,2024
Data Analysis	September,20,2024
Report writing	October,1,2024
Final draft	October,21,2024
Final project presentation	October,30,2024