

**COURSE TITLE: RESEARCH METHODOLOGY IN  
COMPUTER SCIENCE COURSE**

**CODE: AI800**

**WEIGHTING: 20%**

**LECTURER: DR. MOHAMMED ANBAR**

**HAND-OUT DATE: 20 JUN 2026**

**HAND-IN DATE: 04 JULY 2026**

**HAND-IN METHOD: ONLINE SUBMISSION VIA  
E-LEARNING.**

**ASSIGNMENT REPORT: ARTIFICIAL  
INTELLIGENCE AND EVOLUTION OF USE IN  
EDUCATION**

---

# CONTENTS

|                                                                                                   |                                     |
|---------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>1.     <u>INTRODUCTION</u></b>                                                                 | <b>ERROR! BOOKMARK NOT DEFINED.</b> |
| <b>2.     LIST OF CHAPTERS</b>                                                                    | <b>3</b>                            |
| <b>2.1 CHAPTER 1 – SUMMARY RESEARCH PAPER'S</b>                                                   | <b>3</b>                            |
| <b>2.1.1 PAPER1: HUMAN-MACHINE COLLABORATIVE INTELLIGENCE . (MORAVEC'S PARADOX.</b>               | <b>3</b>                            |
| <b>2.1.2 PAPER2: DATA ANALYTICS AND MACHINE LEARNING IN EDUCATION</b>                             | <b>4</b>                            |
| <b>2.1.3 PAPER3: THE IMPACT OF ARTIFICIAL INTELLIGENCE (AI) ON STUDENTS' ACADEMIC DEVELOPMENT</b> | <b>4</b>                            |
| <b>2.1.4 PAPER4: GENERATIVE AI IN PROGRAMMING EDUCATION</b>                                       | <b>5</b>                            |
| <b>2.1.5 PAPER5: THE USE OF GENAI TECHNOLOGY - THE CASE OF CHATGPT.</b>                           | <b>5</b>                            |
| <b>2.1.6 PAPER6: SEVEN BEST CHATGPT ALTERNATIVES IN 2026 - MANUS AI</b>                           | <b>6</b>                            |
| <b>2.2 CHAPTER 2 – CRITICAL ANALYSIS</b>                                                          | <b>6</b>                            |
| <b>2.3 CONFLICTS BETWEEN THE FINDINGS</b>                                                         | <b>7</b>                            |
| <b>2.4 CHAPTER 4 - SYNTHESIS MATRIX FOR LITERATURE REVIEW</b>                                     | <b>8</b>                            |
| <b>3 REFERENCE</b>                                                                                | <b>11</b>                           |

# 1. Introdatction :

Higher education has changed a lot in recent years because of the rapid growth of Artificial Intelligence ,This technology has opened up new possibilities for teaching, learning, and academic research. AI has gained a lot of interest from educational institutions and researchers who want to improve educational quality and effectiveness. I would like to provide a brief overview of this report ,which integrates all Evolution for computer seince and AI in education based on previous and present articles and experiences.

This report presents Artificial Intelligence And Evolution Of Use In Education.

## 2. List of Chapters

### 2.1) Chapter 1 – Summary research paper's

#### 2.1.1 Paper 1: Human-machine collaborative intelligence . (Moravec's paradox)

It features human machine compatibility through collaborative technology, and artificial intelligence has emerged from the concept of simulating human thought processes and translating them into computer systems.(Turing, 1950), and has existed in an uneasy relationship with them ever since. Interestingly, while we are used to reading about dramatic AI successes, the limitations of current AI approaches are becoming increasingly clear. In fact, while AI has been good at processes that can be challenging for humans (such as pattern discovery and statistical reasoning), it remains weak at other processes that are relatively easy for humans (such as self-directed learning, common sense, and value judgements). This is known as Moravec's paradox

Most of the time, humans are required to frame the problem, formulate the questions, choose the algorithms, decide how the pieces fit together, and make decisions based to values.

Accordingly, many tasks are likely to be complete, there are still key roles for humans to play, for which we need to be properly prepared . the increasingly complex and nuanced relationship between humans and AI has led to calls for AI to be reconfigured and rebranded as 'augmented

intelligence'. For example, while computers can now easily beat humans at chess, computers and humans working together appear to be stronger than either working alone.

### **2.1.2 Paper 2: Data Analytics and Machine Learning in Education**

The researcher explains that Technology Enhanced Learning (TEL) platforms are the main source of educational data because they record students' and teachers' activities. By analyzing this data with Data Analytics and Machine Learning, universities can improve teaching, support students, and make better academic and management decisions.

Other example : students in university can analyse the data have specific topics we can group them under the three broad approaches:

(1) data analytics and machine learning methods for studying student behaviour

.

(2) tools for the improvement of learning environments.

(3) optimization of the management in these environments

we could be classified into more than one of these groups

### **2.1.3 Paper 3: The Impact of Artificial Intelligence (AI) on Students' Academic Development**

This section explains that AI is transforming education by offering personalized learning and intelligent teaching systems that adapt to each student's needs.

In traditional education, students develop critical thinking, problem solving, and analytical skills through active participation and practice. However, because AI student can process information and generate answers very quickly and it challenges traditional learning methods. The researcher concludes that although AI is a valuable tool for supporting education, it cannot replace human creativity, deep understanding, or critical thinking.

Moreover, the availability of Materials and methods like samples, data collection & Research instrument and analysis support the learning process .

#### **2.1.4 Paper 4: Generative AI in Programming Education**

A Generative AI is a technology that combines years of teaching knowledge to create dynamic, personalized, and innovative educational experiences. Unlike traditional Intelligent teaching Systems, which rely on manually created knowledge bases, AI models use extensive pretraining to offer on-demand tutoring in various languages and subjects. GenAI plays a critical role in potentially transforming education. It shows its flexible effects ,It has also improved software developers' productivity and sped up the prototyping process, freeing up time from tedious low-level tasks to focus on higher-level tasks and experimental design .

GenAI tools have been integrated into programming education, resulting in tools like Microsoft Copilot, Codex, Bard (now known as Gemini), and ChatGPT. Although GenAI has helped with code management and production and has been used for programming tutoring, significant challenges remain in effectively incorporating these tools into programming courses.

To understand how using GenAI can address programming problems, it is crucial to grasp programming logic for the effective use of GenAI tools in programming education. This highlights the need for students to understand programming concepts. Many students lack the programming skills required to understand and modify generated code, which is essential for a solid foundation in programming education.

#### **2.1.5 Paper 5: The Use of GenAI Technology - The Case of ChatGPT.**

The capabilities and limitations of GAI, particularly ChatGPT, have attracted considerable attention in recent research. These technologies are creating new opportunities to improve educational practices while also introducing challenges.

ChatGPT has been widely adopted in higher education with researchers examining its potential to enhance student support, improve teaching practices, and increase research productivity. during semistructured interviews to explore both the opportunities and challenges associated with its use in education. the technology can provide continuous support for students while promoting more engaging and interactive learning experiences.

integrating ChatGPT and DALL·E into game development courses) was found to strengthen students creativity, critical thinking, and problem solving abilities, highlighting the potential of these tools to support more flexible and adaptive.

### 2.1.6 Paper 6: Seven Best ChatGPT Alternatives in 2026 - Manus AI

ChatGPT has changed how we interact with technology, but the AI landscape is evolving at a breakneck pace. While ChatGPT remains a powerful and versatile tool, a growing number of users are seeking the best CGPT alternatives in 2026 that offer specialized features, more competitive pricing, or a different approach to AI interaction. Whether you need an AI chatbot for writing, a powerful research assistant, or a tool to automate your work, there is likely a alternative that is a better fit for your specific needs.

Recently comes up with many GPT that can get used to the your specific subject and material such as the Claude AI, Google Gemini, Perplexity AI, Microsoft Copilot, DeepSeek, Grok and Manus AI.

**Manus AI** is best for Task automation & large scale research, standout in An AI that can complete complex tasks on its own.

## 2.2) Chapter 2 – Critical Analysis

IN Generative AI in programming education if we talk about the strengths points it focuses on specific topic to making the discussion more practical , in a other weaknesses it use a long sentences it comes up with a lot of grammar and language error . the paragraph would benefit from better organization and smoother transitions between idea.

However, stronger because it provides more detailed information, practical examples, and a balanced discussion of the advantages

In AI impact to student on development it ensure that the AI is a helper tools and can't replace human creativity critical and understanding , needs more tools and detailed explanation and stronger link between ideas would improve the overall quality .

overall, the impact of AI on development is easier to understand but is more general and would be stronger with additional evidence, examples, and clearer organization.

## 2.3) Chapter 3 – Conflicts between the findings

### **1. Human-machine VS. AI**

The AI can't do any process without Human instructions and correctly and intelligence AI was borne of attempts to simulate and mechanize human thought processes, Shifting to augmented intelligence leads to an emphasis on developing AI technologies that complement and expand human cognition, suggests ways that humans and AI might work together more effectively.

### **2. Impact of AI Development VS. Programming**

The AI helps make work faster by doing some tasks automatically while programming depends on writing code manually and gives more control for the results.

The conflict is that AI can make developers and reduce their coding skills and programming without the AI development takes more time but helps people understand how systems work better.

the challenge is to use AI as a helper without losing important programming skills.

### **3. ChatGPT Alternatives VS. Manus AI**

The first step is to identify your primary reason for using an AI chatbot. if your needs go beyond simple Q&A and normal research you require an AI that can actually execute tasks, Manus AI is in a category. specifically designed for research, providing answers with direct citations for more comprehensive research that involves gathering and synthesizing information from hundreds of sources. however, will costing you more than the other AI.

In the mean while ChatGPT It continues to top the usage list due to its ease of use.

## 2.4 Chapter 4 - Synthesis Matrix for Literature Review :

| Study                                                                        | Authors                                                  | Year | Research Design                       | Key Findings/Results                                                                                                                                                                                                                                | Methodology                                             | Limitations                                                                                                                                                                                                       |
|------------------------------------------------------------------------------|----------------------------------------------------------|------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Human-machine collaborative intelligence                                     | Miao, Fengchun, Holmes, Wayne, Ronghuai Huang, Hui Zhang | 2021 | Systematic literature review          | Most of the time humans are required to frame the problem & formulate the questions, select, clean and label the data, design or choose the algorithms, decide how the pieces fit together draw conclusions and make judgments according to values. | They're still key roles & main part for humans to play. | Giving computers the perception and movement of a one-year-old is difficult or impossible, yet it is quite straightforward to make them perform at an adult level on intelligence tests or when playing checkers. |
| The Impact of Artificial Intelligence (AI) on Students' Academic Development | Aniella Mihaela Vieriu, Gabriel Petrea                   | 2025 | Systematic survey / literature review | 95.6% of respondents uses AI technologies in academic activities                                                                                                                                                                                    |                                                         | Some of research received no external funding                                                                                                                                                                     |
| Data Analytics and Machine Learning in Education                             | Juan A. Gómez-Pulido ,                                   | 2023 | Systematic survey /                   | - to have opportunity to research lines                                                                                                                                                                                                             | computer and data sciences provide                      | - There is a possibility of obtaining                                                                                                                                                                             |

|                                                         |                                                                         |      |                              |                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                 |
|---------------------------------------------------------|-------------------------------------------------------------------------|------|------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                         | Young Park ,<br>Ricardo Soto , José M. Lanza-Gutiérrez                  |      | literature review            | that deserve to be explored in data base.<br>- To support your decisions based on the original data                     | advanced methods for data processing and analysis for knowledge extraction.                                                                                                                                                                                                                                                                                        | inaccurate data<br>- cannot analyze data without inputs                                                                                                                         |
| Generative AI in Programming Education                  | Jemimah Nathaniel, Solomon Sunday Oyelere, Jarkko Suhonen & Matti Tedre | 2025 | Systematic literature review | Foundational programming logic includes understanding algorithms, data structures, syntax, and the logical flow of code | -The development of higher-order thinking skills is important in programming education, as it advances critical thinking, problem-solving , and creativity.<br>-Problem solving skills equip individuals with the capacity to think computationally and approach challenges from a computational viewpoint, which helps develop learners critical thinking ability | These systems were restricted to predetermined problem types and frequently required large domain-specific rule sets, despite their notable improvements in scaffolded learning |
| <u>The Use of GenAI Technology—The Case of ChatGPT.</u> | Joao Batista, Anabela Mesquita, Goncalo                                 | 2024 | Experimental                 | -understand the role of GAI tools in preparing students for                                                             | - A Collaboration between AI and human in Teaching                                                                                                                                                                                                                                                                                                                 | -the articles reviewed only cover a period up until the end of January 2024                                                                                                     |

|                                                |        |           |              |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                             |                                                                                                                                                                                                    |
|------------------------------------------------|--------|-----------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                | Carnaz |           |              | <p>future employment and developing necessary skills for the evolving job market.</p> <p>-identifying the essential skills students need to effectively use GAI tools in their future careers and how higher education curricula can be adapted to incorporate these tools.</p> | <p>Instead of replacing instructors.</p> <p>-ChatGPT could serve as an intelligent helper to improve teaching efficacy by models and assess their impact on classroom engagement and curriculum design.</p> | <p>-Policymakers must strike a balance between promoting innovation and putting in place comprehensive governance mechanisms to oversee AI within a regulated environment</p>                      |
| 7 Best ChatGPT Alternatives in 2026 - Manus AI | Manus  | Dec, 2025 | Experimental | <ul style="list-style-type: none"> <li>- Automates complex, multi-step tasks.</li> <li>- Can research hundreds of sources at once</li> <li>- Creates editable reports and presentations</li> </ul>                                                                              | <ul style="list-style-type: none"> <li>- executing code</li> <li>- automating entire workflows from A-Z</li> <li>- interacting with web browsers</li> </ul>                                                 | <ul style="list-style-type: none"> <li>- Longer processing time for complex tasks</li> <li>- Credit-based pricing can be unpredictable</li> <li>- Overkill for simple, for one question</li> </ul> |

## Reference :

1:

AI and education: guidance for policy-makers - blished in 2021 by the United Nations Educational, Scientific and Cultural Organization7, place de Fontenoy, 75352 Paris 07 SP, France© UNESCO 2021ISBN 978-92-3-100447-6<https://doi.org/10.54675/PCSP7350> - <https://unesdoc.unesco.org/ark:/48223/pf0000376709>

2:

Data Analytics and Machine Learning in Education - applied sciences – (2023)  
<https://www.mdpi.com/2076-3417/13/3/1418#B1-applsci-13-01418>

3:

The Impact of Artificial Intelligence (AI) on Students' Academic Development-education sciences – (2025)  
<https://www.mdpi.com/2227-7102/15/3/343>

4:

Literature Review on the Integration of Generative AI in Programming Education \_  
International Journal of Artificial Intelligence in Education (2025) 35:2724-2755 \_  
<https://link.springer.com/article/10.1007/s40593-025-00524-3>

5:

Generative AI and Higher Education: Trends, Challenges, and Future Directions from a Systematic Literature Review - The Use of GenAI Technology—The Case of ChatGPT.  
<https://www.mdpi.com/2078-2489/15/11/676>

6:

Overview of the 7 Best ChatGPT Alternatives in 2026 - <https://manus.im/blog/best-chatgpt-alternatives>