**\*PRODUCT DESIGN THINKING**

**\*QUANTUM UNIVERSITY**

**\*ASS NO.3 (TASK 6)**

**\*Create a reference article & create inference report**

# **TASK 06**

# **Real-Time Use Case: AI-Powered Predictive Maintenance in Manufacturing**

## **INTRODUCTION ABOUT PROJECT-**

With industries rapidly shifting towards AI-driven predictive maintenance, the challenge lies not just in implementing AI but ensuring that employees possess the right skills to operate, interpret, and integrate AI-driven insights effectively. Many workers lack experience in handling AI models, analyzing predictive data, and adapting their workflows accordingly.

In this project I aims to identify the skills gap and apply design thinking to develop a structured approach to upskilling the workforce.

### **Key Areas for Skill Gap Analysis**

To effectively identify and address skills gaps in AI-powered predictive maintenance in manufacturing, we need to break down the required competencies into key areas:

## **Technical Skills Gap**

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| --- | --- | --- | --- |
| **Skill Area** | **Required Competency** | **Gap Identified** | **Impact on Workflow** |
| **AI & Machine Learning** | Understanding AI models, training data, predictive analytics | Employees lack expertise in AI tools and techniques | Misinterpretation of AI predictions, reliance on manual maintenance |
| **Data Science & Analytics** | Interpreting machine health data, statistical analysis | Lack of familiarity with data interpretation | Inefficient decision-making based on AI insights |
| **Software & Automation** | Working with predictive maintenance software | Limited knowledge of automation tools | Difficulty in operating AI-powered tools |
| **Programming & Scripting** | Basic coding (Python, R, SQL) for AI applications | Most workers have little to no programming knowledge | Inability to customize AI models for maintenance needs |
| **Cybersecurity Awareness** | Ensuring AI security, data privacy | Low awareness of security risks in AI systems | Potential vulnerabilities in AI-driven processes |

## **Process & Workflow Integration Gaps**

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| --- | --- | --- | --- |
| **Skill Area** | **Required Competency** | **Gap Identified** | **Impact on Workflow** |
| **Predictive Maintenance Integration** | Applying AI-driven insights into maintenance schedules | Resistance to AI-driven changes | Failure to act on predictive alerts, unplanned downtime |
| **Decision-Making with AI** | Acting on AI recommendations confidently | Workers hesitate to trust AI predictions | Delayed or ignored maintenance actions |
| **Lean Manufacturing & Process Optimization** | Aligning AI-driven insights with operational efficiency | Poor understanding of how AI improves workflows | Wasted resources, inefficiencies in machine usage |

## **Soft Skills & Change Management Gaps**

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| --- | --- | --- | --- |
| **Skill Area** | **Required Competency** | **Gap Identified** | **Impact on Workflow** |
| **Communication & Collaboration** | Explaining AI-generated insights to non-technical teams | Difficulty in conveying technical data to management or operators | Miscommunication, lack of confidence in AI recommendations |
| **Adaptability & Change Management** | Adjusting to AI-driven workflow changes | Resistance to AI-based decision-making | Hesitation in adopting new technology |
| **Critical Thinking** | Evaluating AI predictions for accuracy and making decisions accordingly | Employees blindly accept AI outputs without validation | Misuse or over-reliance on AI insights |
| **Problem-Solving & Troubleshooting** | Identifying and resolving AI-related workflow issues | Lack of structured problem-solving skills | Poor response to AI-driven alerts |

## **CONCLUSION-:**

The real challenge isn’t just implementing AI—it’s closing the skills gap so that workers can confidently use, interpret, and integrate AI insights into their daily workflows.