



Artificial Intelligence Skill Needs for Sustainable Development of Mechanical Technology Students in Universities in Rivers State

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Abstract

The aim explored artificial intelligence skill needs for sustainable development of mechanical technology students in universities in Rivers State. Only three of the artificial intelligence skills need were considered and they are; Automation technology skill needs, Robotics technology skill needs and Additive manufacturing technology skills need. These three formed the objectives, research questions and hypotheses for this study. This study adopted a descriptive survey research design. The population of the study was 40 respondents, comprising 30 Lecturers and 10 Instructors in the two Universities in Rivers State. The study was a census study as the entire population was studied. The instrument for data collection was a structured questionnaire titled "Artificial Intelligence Skill Needs for Sustainable Development of Mechanical Technology Students". The instrument was structured on five point likert type rating scale of Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). The instrument was subjected to face-validation by three experts and its reliability index was .76 calculated using the Cronbach alpha reliability test. The statistical package for social science (SPSS) was used to analyze the data gathered and the findings of the study revealed that respondents agreed that automation technology skills, robotics technology skills and additive manufacturing technology skills are artificial intelligent skills needed for sustainable development of mechanical technology students in universities in Rivers State. It was recommended that Universities offering mechanical technology programme should integrate AI-related coursework, for easy learning of machining, data analytics, also to enable the enhancement of practical, hands-on training using AI-driven tools and simulation software. By so doing, mechanical technology students in the universities in rivers state will be sustainably developed for tasks ahead for survival and for real world of work.

Keywords: Artificial Intelligence, Mechanical Technology and Sustainable Development

Introduction

University education in Nigeria refers to the higher level of learning provided by institutions that confer undergraduate and postgraduate degrees. Its primary goals include fostering intellectual development, equipping students with specialized knowledge and skills, preparing them for professional careers, and contributing to national development through research and innovation. The objectives of university education are to provide a broad and sound education, promote critical thinking, and produce graduates who can contribute to societal progress in various fields such as science, technology, arts, and humanities. Upon successful completion of a degree programme, graduates are awarded certificates such as Bachelor's, Master's, or Doctoral degrees. Universities in Rivers State offer a wide range of programme, including but not limited to mechanical technology.

Mechanical Technology is a specialized field of technology focused on the design, development, operation, and maintenance of mechanical systems and machinery. Its goals are to equip students with the skills and knowledge necessary to understand and apply mechanical principles in real-world applications, including the use of tools, materials, and systems in manufacturing, automation, and energy production (Bennett, 2007) ^[1]. The objectives of Mechanical Technology include providing hands-on experience with mechanical systems, fostering problem-solving and critical thinking abilities, and preparing students for careers in industries such as automotive, aerospace, and manufacturing (Groover, 2010) ^[11]. The relevance and significance of Mechanical Technology lie in its foundational role in modern industries, where advancements in machinery and systems directly impact productivity, innovation, and economic growth (Liu & Xu, 2015) ^[13]. By developing proficiency in mechanical systems, individuals are better equipped to meet the challenges of an increasingly mechanized world and contribute to technological advancements in various sectors. Acquisition of the above in this digital age will require the use of artificial intelligence and the tools associated to it.

Artificial Intelligence (AI) is a branch of computer science focused on creating systems capable of performing tasks that typically require human intelligence, such as learning, problem-solving, reasoning, and decision-making. Its primary goals are to develop algorithms and models that enable machines to mimic human cognitive functions, improve automation, and enhance decision-making processes across various domains (Russell & Norvig, 2016) ^[14]. The relevance of AI is profound in today's world, as it drives innovation in fields such as healthcare, finance, education, and autonomous systems, transforming industries by increasing efficiency, accuracy, and accessibility (Brynjolfsson & McAfee, 2014). The significance of AI lies in its potential to revolutionize how we interact with technology, solve complex problems, and create new opportunities for economic growth and societal development, while also raising important ethical and societal considerations in automation technology (Binns, 2018) ^[2]. Some of the AI skills for sustainable development of mechanical technology students in universities in rivers state include; automation technology skills, robotic technology skills and additive manufacturing technology skills.

Automation Technology refers to the use of control systems such as computers or robots to handle different processes and machinery in various industries. Its goal is to increase efficiency, reduce human error, and lower operational costs by automating repetitive tasks and processes (Groover, 2014) ^[12]. The significance of automation lies in its ability to improve productivity, enhance safety, and allow human workers to focus on more complex, value-added tasks. Skills required include proficiency in programming, knowledge of control systems, mechanical understanding, familiarity with data analytics and robotics (Bogue, 2018) ^[3]. Robotics Technology involves the design, construction, and operation of robots for tasks ranging from manufacturing to healthcare. The goal of robotics is to create autonomous or semi-autonomous machines that can perform complex or dangerous tasks, enhancing productivity and safety (Siciliano & Khatib, 2016) ^[16]. Robotics is significant as it drives innovations in sectors like manufacturing, surgery, and exploration, enabling higher precision and reducing human risk. Key skills needed include mechanical design,

programming, system integration, and a strong understanding of AI and machine learning in additive manufacturing technology (Groover, 2014) ^[12]. Additive manufacturing technology, also known as 3D printing, uses a digital model to create three-dimensional objects by adding material layer by layer. Its goal is to allow for highly customized and efficient production of complex designs that would be difficult or impossible with traditional manufacturing methods (Gibson *et al.*, 2015) ^[9]. Additive manufacturing's significance lies in its ability to reduce waste, enable rapid prototyping, and produce parts on demand, revolutionizing industries such as aerospace and healthcare. Skills required include knowledge of CAD software, material science, and 3D printing technologies (Ford & Despeisse, 2016) ^[8]. Acquisition of the above could sustainable development.

Sustainable development refers to meeting the needs of the present without compromising the ability of future generations to meet their own needs, focusing on balancing economic growth, social inclusion, and environmental protection (Brundtland, 1987) ^[4]. The goals of sustainable development include eradicating poverty, ensuring equitable access to resources, promoting social justice, and safeguarding the environment (United Nations, 2015) ^[17]. Its objectives are to foster long-term ecological sustainability, equitable economic growth, and social equity. The relevance of sustainable development is crucial as it addresses the global challenges of climate change, resource depletion, and inequality, ensuring that development benefits all, without harming the planet's ability to support future generations (Sachs, 2015) ^[15].

Statement of the Problem

The goal of Mechanical Technology Education is to provide students with the knowledge and practical skills needed to understand and apply mechanical principles in real-world contexts, particularly in design, manufacturing, and maintenance of mechanical systems (Groover, 2010) ^[11]. The objectives include fostering critical thinking and problem-solving abilities, enhancing hands-on skills through practical experiences, and preparing students for careers in industries such as automotive, aerospace, and manufacturing (Bennett, 2017) ^[1]. Mechanical Technology Education aims to ensure that students are proficient in using advanced tools and technologies, understanding material properties, and working effectively in a collaborative environment, thereby meeting industry demands for skilled professionals (Groover, 2010) ^[11]. Acquiring all that is stated above, it is expected that graduates of mechanical technology should be gainfully employed upon graduation to cushion hunger and youth restiveness, but looking at the state of the society and its derailing economy, as announced over the news every day, it is obvious that employment of students who graduate from mechanical technology from universities in rivers state is farfetched which seemed to be the reason for the level of poverty and insecurity in the land. An adage will say, a hungry man is an angry man. Literature has it that the reason for the unemployment, poverty and restiveness is as a result of the students not being equipped with the necessary and apt skills. Hence, the researcher is preferring a solution by suggesting the integration of AI skills, this gave rise to the study; Artificial Intelligence Skill Needs for Sustainable Development of mechanical technology students in universities in Rivers State.

Aim and Objectives of the Study

The aim of the study is to determine the Artificial Intelligence Skill Needs for Sustainable Development of mechanical technology students in Universities in Rivers State. Specifically, the study determined the following:

1. Automation technology skill needs for sustainable development of mechanical technology students in universities in rivers state.
2. Robotics technology skill needs for sustainable development of mechanical students in universities in rivers state.
3. Additive manufacturing technology skill needs for sustainable development of mechanical technology students in universities in Rivers State.

Research Questions

The following research were formulated to guide the study:

1. What are the automation technology skills need for sustainable development of mechanical students in universities in Rivers State?
2. What are the robotics technology skills need for sustainable development of mechanical technology students in universities in Rivers State?
3. What are the additive manufacturing technology skills need for sustainable development of mechanical technology students in universities in Rivers State?

Hypotheses

The following hypotheses were formulated and tested at .05 level of significance

H₀₁ There is no significant difference between the mean responses of lecturers and instructors on the automation technology skills need for sustainable development of mechanical technology students in universities in Rivers State.

H₀₂ There is no significant difference between the mean responses of lecturers and instructors on the robotics technology skills need for sustainable development of mechanical technology students in universities in Rivers State.

H₀₃ There is no significant difference between the mean responses of lecturers and instructors on the additive manufacturing technology skills need for sustainable development of mechanical technology students in universities in Rivers State.

Methodology

This study adopted a descriptive survey research design. The population of the study was 40 respondents, comprising 30 Lecturers and 10 Instructors in the two Universities in Rivers State (Field Survey, 2024). The study was a census as the entire population was studied. The choice of census is due to the relatively small size of the population. The instrument for data collection was a structured questionnaire titled "Artificial Intelligence Skill Needs for Sustainable Development of Mechanical Technology Students Questionnaire (AISNSDMTSQ)". The instrument was structured on five point likert scale of Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). A corresponding numerical value of 5, 4, 3, 2 and 1 was assigned to the response scale for each item.

The instrument was subjected to face-validation by three experts and had .76 reliability index using the statistical package for social science (SPSS). Data collected from the respondents were analyzed using mean and standard deviation to answer the research questions, the real limits are taken to be any item with figures within 0 - 3.50 is rejected, otherwise accept, the t-test statistics were used to test the null hypotheses at 0.05 level of significance. The decision for hypothesis was; if the calculated value of t (t-cal) is less than or equal to the critical value of (t-crit), accept the null hypothesis, otherwise rejected null hypothesis. The computation of the mean, standard deviation and t-test was carried out with statistical package for social sciences (SPSS).

Results

Research Question 1: What are the automation technology skills need for sustainable development of mechanical technology students in universities in Rivers State?

Table 1: Mean and Standard Deviation on automation technology skills need for sustainable development of mechanical technology students in universities in rivers state.

S/NO	ITEMS	Lecturers			Instructors		
		X	SD	RMK	X	SD	RMK
1	apply machine learning techniques to optimize automated systems, improve decision-making processes, and enhance predictive maintenance, thereby reducing resource consumption and waste	3.39	.837	A	2.75	.982	A
2	Proficiency in data analysis is essential for processing large volumes of data from automated systems	3.53	.826	SA	3.05	.833	A
3	use AI to predict when machines need maintenance or replacement, reducing downtime and extending the lifespan of equipment, which contributes to resource conservation and reduces the environmental impact of manufacturing	3.10	.939	A	2.83	1.097	A
4	Understanding the algorithms allows for smarter resource management and sustainable process improvement	3.11	.772	A	3.14	.953	A
5	Knowledge of AI in robotics is crucial for students to develop automated systems that operate efficiently with minimal human intervention	2.97	.986	A	2.59	1.142	A
6	Students need skills in designing AI models that reduce energy consumption in automation systems	3.04	.755	A	3.19	.915	A
7	AI skills in integrating automation technology with the Internet of Things (IoT) allow students to develop interconnected systems that track and optimize energy use and resource consumption in real time, promoting sustainability in various industries	3.09	.903	A	2.82	1.030	A
8	Students should apply AI in the design of sustainable technologies and products, ensuring that automated production methods use fewer resources, generate less waste, and can be recycled or repurposed more efficiently	3.11	.994	A	3.19	.895	A
9	Understanding and using ANN techniques allows students to build systems that can adapt to changing environmental conditions and optimize operations in real time, such as adjusting factory	3.32	.841	A	2.93	.997	A

	processes based on energy use or material efficiency						
10	Students must develop the ability to assess the ethical implications of AI in automation, ensuring that AI applications support not only economic but also environmental and social sustainability, and adhere to ethical guidelines	3.28	.940	A	3.23	.802	A
		3.18	0.50	A	2.97	0.62	A

Table 1 revealed that the Lecturers had mean range of 3.04-3.53 and standard deviation of 0.75-0.99 while the Instructors had mean range of 2.93-3.57 and standard deviation of 0.69-1.08. The closeness of the standard deviation shows the homogeneity of the respondents. The respondents agreed that automation technology skills are needed for sustainable

development mechanical technology students in universities in Rivers State.

Research Question 2: What are the robotics technology skills need for sustainable development of mechanical technology students in universities in Rivers State?

Table 2: Mean and Standard Deviation on the robotics technology skills need for sustainable development of mechanical technology students in universities in rivers state

S/NO	ITEMS	Lecturers			Instructors		
		X	SD	RMK	X	SD	RMK
1	Understanding machine learning algorithms (supervised, unsupervised, reinforcement learning) is crucial for developing AI-driven robots that can improve over time, make decisions, and adapt to changing environments	3.57	.692	SA	2.81	1.039	A
2	Knowledge of computer vision techniques enables robots to process and interpret visual information, a key component for tasks like object recognition, navigation, and environment sensing in various applications, from manufacturing to environmental monitoring.	3.56	.732	SA	3.11	.859	A
3	Skills in NLP help robots understand and process human language, which is essential for applications like voice-activated robotics, customer service robots, or even robots that assist in education	3.31	.798	A	3.16	.924	A
4	Expertise in automating repetitive tasks using AI is vital in optimizing processes across industries, from agriculture to manufacturing, and aligns with sustainable development by enhancing efficiency	3.28	.750	A	3.35	.719	A
5	Understanding the ethical considerations of AI, such as fairness, transparency, and accountability, is essential for ensuring that robotics systems are developed responsibly and serve sustainable goals	2.93	1.004	A	2.95	.932	A
6	Skills in integrating sensors (e.g., lidar, cameras, temperature sensors) with AI systems allow robots to gather and analyze real-time data, supporting smart decision-making in dynamic environments like smart cities or disaster response	3.16	.941	A	3.42	.844	A
7	Proficiency in algorithms for robot navigation and path planning is crucial for building autonomous robots capable of operating in complex, unstructured environments, such as autonomous vehicles or drones used for environmental monitoring	2.95	.875	A	3.09	.860	A
8	Knowledge of how to develop AI algorithms that minimize computational costs and energy consumption is important for creating robots that are sustainable, reducing environmental impact while ensuring longevity in the field	3.25	.931	A	3.32	.736	A
9	Expertise in designing robots that can effectively collaborate with humans, considering aspects such as user interface design, emotion recognition, and adaptability, is critical for robots used in fields like healthcare, education, and service industries.	2.99	1.088	A	3.31	.790	A
10	Students should be trained in applying AI and robotics to address sustainable development goals (SDGs), such as using robots for waste management, renewable energy systems, and precision agriculture to support environmental conservation and social well-being.	3.05	.990	A	3.42	.625	A
	Ground Mean	3.29	0.50	A	3.10	0.62	A

Table 2 revealed that the Lecturers had mean range of 2.93-3.57 and standard deviation of 0.69-1.08 while the Instructors had mean range of 2.81-3.42 and standard deviation of 0.62-1.03. The closeness of the standard deviation shows the homogeneity of the respondents. The respondents agreed that robotics technology skills are needed for sustainable

development of mechanical technology students in universities in Rivers State.

Research Question 3: What are additive manufacturing technology skills need for sustainable development of mechanical technology students in universities in Rivers State?

Table 3: Mean and Standard Deviation on the additive manufacturing technology skills need for sustainable development of mechanical technology students in universities in rivers state.

S/NO	ITEMS	Lecturers			Instructors		
		X	SD	RMK	X	SD	RMK
1	Proficiency in AI-driven generative design techniques, where AI creates optimized structures for 3D printing based on specific constraints, promoting material efficiency and reducing waste in manufacturing processes	3.23	.834	A	3.07	.838	A
2	Understanding how AI can assist in selecting and developing sustainable materials for 3D printing, ensuring that the most environmentally friendly, cost-effective, and efficient materials are used in the production process	3.40	.821	A	3.09	.808	A
3	Knowledge of AI systems for predictive maintenance in additive manufacturing equipment, helping to identify and resolve potential failures before they occur, ensuring the longevity of machines and	3.09	.722	A	3.04	.947	A

	reducing downtime						
4	Skills in using AI for optimizing printing parameters (e.g., temperature, speed, layer height) and ensuring quality control during the additive manufacturing process, leading to fewer defects, less waste, and more efficient use of resources	3.18	.658	A	3.19	.766	A
5	Expertise in applying AI for designing and producing highly customized products tailored to individual needs, which promotes sustainability by reducing mass production and minimizing overproduction	3.05	.924	A	3.12	.982	A
6	Knowledge of AI tools that help optimize energy usage during the additive manufacturing process, reducing the environmental impact of 3D printing by ensuring machines use energy more efficiently	3.19	.953	A	3.39	.774	A
7	Understanding how AI can optimize supply chains in additive manufacturing, reducing transportation costs and emissions by producing goods closer to their point of use and on-demand, minimizing inventory waste and carbon footprints	2.99	.881	A	3.19	.860	A
8	Familiarity with AI-driven automated post-processing techniques (e.g., cleaning, curing) to improve the efficiency and sustainability of 3D printing workflows, minimizing waste and resource consumption	2.95	.990	A	3.26	.856	A
9	Knowledge in using AI to design products that are inherently more sustainable, such as parts that can be easily disassembled, reused, or recycled, aligning with circular economy principles in additive manufacturing	2.98	1.033	A	3.32	.776	A
10	Expertise in leveraging AI to analyze large datasets generated during the additive manufacturing process, enabling real-time decision-making for optimizing production, reducing waste, and enhancing the sustainability of manufacturing operations	3.19	1.043	A	3.21	.725	A
	Ground Mean	3.20	0.55	A	3.10	0.55	A

Table 3 revealed that the Lecturers had mean range of 2.95-3.40 and standard deviation of 0.65-1.04 while the Instructors had mean range of 3.04-3.36 and standard deviation of 0.72-0.98. The closeness of the standard deviation shows the homogeneity of the respondents. The respondents agreed that additive manufacturing technology skills are needed for sustainable development of mechanical technology students in universities in Rivers State.

Hypotheses

H₀₁ There is no significant difference between the mean responses of lecturers and instructors on the automation technology skills need for sustainable development of mechanical technology students in universities in Rivers State.

Table 4: t-test analysis on automation technology skills need for sustainable development of mechanical technology students in universities in rivers state

Respondents	N	X	SD	P-value	DF	t-Cal	t-Crit	RMK
Lecturers	30	3.18	0.50					
				0.05	58	2.25	1.96	Sig
Instructors	10	2.97	0.62					

Result in table 4 revealed that t-cal (2.25) is higher than t-crit (1.96) which indicates that the hypothesis stated was rejected. Therefore there is a significant difference between the mean responses of lecturers and instructors on automation technology skills need for sustainable development mechanical technology students in universities in Rivers

State.

H₀₂ There is no significant difference between the mean responses of lecturers and instructors on the robotics technology skills need for sustainable development of mechanical technology students in universities in Rivers State.

Table 5: t-test analysis on robotics technology skills need for sustainable development of mechanical technology students in universities in rivers state.

Respondents	N	X	SD	P-value	DF	t-Cal	t-Crit	RMK
Lecturers	30	3.29	0.50					
				0.05	58	2.32	1.96	Sig
Instructors	10	3.10	0.51					

Result in table 5 revealed that t-cal (2.32) is higher than t-crit (1.96) which indicates that the hypothesis stated was rejected. Therefore there is a significant difference between the mean responses of lecturers and instructors on robotics technology skills need for sustainable development of mechanical technology students in universities in Rivers State.

H₀₃ There is no significant difference between the mean responses of lecturers and instructors on the additive manufacturing technology skills need for sustainable development of mechanical technology students in universities in Rivers State.

Table 6: t-test analysis on additive manufacturing technology skills need for sustainable development of mechanical technology students in universities in rivers state

Respondents	N	X	SD	P-value	DF	t-Cal	t-Crit	RMK
Lecturers	30	3.20	0.55					
				0.05	58	3.44	1.96	Sig
Instructors	10	3.10	0.55					

Result in table 6 revealed that t-cal (3.44) is higher than t-crit (1.96) which indicates that the hypothesis stated was rejected. Therefore there is a significant difference between the mean responses of lecturers and instructors on the additive manufacturing technology skills needed for sustainable development of mechanical technology students in universities in Rivers State.

Discussion of Findings

The findings of the study revealed that respondents agreed that automation technology skills are needed for sustainable development of mechanical technology students in universities in Rivers State. The result in table 4 indicates that the hypothesis stated was rejected, therefore showing significant difference between the mean responses of lecturers and instructors on the automation technology skills need for sustainable development of mechanical technology students in universities in Rivers State. Findings of the study is in agreement with Russell and Norvig, (2016) ^[14] who stated that incorporating automation technology skills into mechanical technology programme is crucial for fostering sustainable development among students. AI automation systems' enhances efficiency, adaptability, and ability to optimize resource use. The AI automation technology skills required include machine learning, data analysis, and neural networks, which enable students to design intelligent systems capable of optimizing energy consumption, reducing waste, and enhancing productivity in industrial processes (Russell & Norvig, 2016) ^[14]. Students should also learn how to apply AI automation technology for predictive maintenance, smart resource management, and process automation, which can significantly contribute to sustainable practices in manufacturing and energy sectors (Binns, 2018) ^[2]. By equipping students with AI-driven automation capabilities, universities can help create professionals who can drive technological innovations that support sustainability goals (Brynjolfsson & McAfee, 2014) ^[5].

The findings of the study revealed that respondents agreed that robotics technology skills are needed for sustainable development of mechanical students in universities in Rivers State. Result in table 5 indicates that the hypothesis stated was rejected. Therefore showing that there is a significant difference between the mean responses of lecturers and instructors on the robotics technology skills need for sustainable development of mechanical technology students in universities in Rivers State. Findings of the study is in agreement with Siciliano and Khatib, (2016) ^[16] who explained that robotics technology skills are essential for sustainable development of mechanical technology students as they enable the creation of intelligent, adaptable, and autonomous robots capable of performing tasks that improve efficiency, reduce waste, and optimize resource usage. Key robotics technology skills are used in machine learning, computer vision, and decision-making algorithms. The robots are allowed to learn from their environment and make real-time adjustments for energy efficiency and sustainability in industries like manufacturing, agriculture, and healthcare

(Siciliano & Khatib, 2016) ^[16]. Additionally, AI in robotic technology enables robots to collaborate with human workers in eco-friendly practices, such as precision farming and waste management, contributing to sustainable development goals (Brynjolfsson & McAfee, 2014) ^[5]. Equipping technology education students with these robotic AI skills ensures they can develop innovative robotics solutions that support environmental and economic sustainability.

The findings of the study revealed that respondents agreed that additive manufacturing technology skills are needed for sustainable development among technology education students in universities in Rivers State. Result in table 6 indicates that the hypothesis stated was rejected. Therefore there is a significant difference between the mean responses of lecturers and instructors on artificial intelligence skill needs in additive manufacturing technology for sustainable development among technology education students in universities in Rivers State. Findings of the study is in agreement with Gibson *et al.*, (2015) ^[9] who asserted that artificial Intelligence (AI) skills are becoming increasingly vital in additive manufacturing (3D printing) for sustainable development, as they enable more efficient, optimized, and environmentally friendly production processes. Key AI skills, such as machine learning, data analytics, and optimization algorithms, allow students to design smarter manufacturing systems that minimize material waste, reduce energy consumption, and enhance the sustainability of production methods (Gibson *et al.*, 2015) ^[9]. AI can also improve the customization of products, ensuring that manufacturing is more resource-efficient and tailored to specific needs, which contributes to a circular economy by reducing overproduction and excess waste (Ford & Despeisse, 2016) ^[8]. By equipping technology education students with these AI competencies, they are better prepared to innovate in the field of additive manufacturing, driving advancements that align with sustainable development goals.

Conclusion

In conclusion, integrating Artificial Intelligence (AI) skills into mechanical technology programme is crucial for preparing students in universities to address the challenges of sustainable development. Skills such as automation technology skills, robotic skills and additive manufacturing technology skills will equip students with AI competencies such as machine learning, data analytics, and optimization techniques, they can develop innovative solutions to enhance efficiency, reduce waste, and improve energy management in mechanical systems. AI-powered technologies enable smarter design processes, predictive maintenance, and resource optimization, all of which contribute to more sustainable manufacturing and industrial practices. As sustainability becomes an increasingly urgent global priority, ensuring that future mechanical technology professionals possess these AI skills will empower them to drive technological advancements that support both economic growth and environmental preservation, ultimately advancing the goals of sustainable development.

Recommendations

Universities offering mechanical technology programme should integrate AI courses like automated technology, robotics technology and additive manufacturing technology to enhance students' knowledge in machine learning, data analytics, and robotics, this will ensure that students develop essential AI skills. Practical, hands-on training using AI-driven tools and simulation software in areas like predictive maintenance, energy optimization, and design for sustainability, are all inclusive to achieve sustainable development amongst mechanical technology students of universities in rivers state.

To address sustainability challenges effectively, students should be encouraged to collaborate with peers from other fields, such as environmental science, economics, and computer science. Offering interdisciplinary projects and joint courses that integrate AI, mechanical technology, and sustainability will help students understand the broader impact of their innovations on the environment and society, leading to more holistic solutions.

Universities should build partnerships with industries and research organizations that focus on AI and sustainable development. By providing students with opportunities for internships, collaborative research, and exposure to cutting-edge AI technologies, institutions can help bridge the gap between academia and industry, ensuring that graduates are well-equipped to apply AI to drive sustainability in mechanical technology.

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