Supplementary Material (Table S3). Perception Questionnaire on Intelligent Maintenance Competencies among Mechanical Engineering Students

Perception Questionnaire on Intelligent Maintenance Competencies among Mechanical Engineering Students

Response scale:
1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree

Technical Competencies in Predictive Maintenance

		Scale				
		1	2	3	4	5
1	I can correctly interpret a mechanical vibration spectrum.					
2	I can identify potential mechanical faults based on vibration analysis.					
3	I can correctly interpret infrared thermographic images of industrial equipment.					
4	I can relate thermal patterns to potential mechanical or electrical faults.					
5	I can integrate information from vibration analysis, thermography, and acoustic monitoring to establish a diagnosis.					
6	I feel prepared to participate in real-world predictive maintenance activities.					

Digital Competencies and Industry 4.0

		Scale				
		1	2	3	4	5
7	I understand the basic principles of the Internet of Things (IoT) applied to industry.					
8	I can interpret variables monitored in real time through digital platforms.					
9	I feel comfortable using remote monitoring tools.					

Supplementary Material (Table S3). Perception Questionnaire on Intelligent Maintenance Competencies among Mechanical Engineering Students

10	I consider digital skills to be as important as traditional mechanical competencies					
11	I believe my current education adequately prepares me for Industry 4.0 environments					
	Use of Artificial Intelligence in Engineering	**Scale**				
		1	**2**	**3**	**4**	**5**
12	I believe that tools such as ChatGPT can support the analysis of engineering problems.					
13	I am able to formulate appropriate technical queries for an artificial intelligence tool.					
14	I can identify technical errors in responses generated by an artificial intelligence system.					
15	I believe that artificial intelligence can improve the speed of maintenance problem analysis.					
16	I trust my own judgment to validate information generated by artificial intelligence.					
17	I believe that artificial intelligence should be used as a support tool rather than as a substitute for engineering judgment.					
	Future Professional Challenges	**Scale**				
		1	**2**	**3**	**4**	**5**
18	I believe that future engineers will need to master data analysis tools.					
19	I believe that future engineers will routinely work with artificial intelligence systems.					
20	I believe there is a gap between university education and the technological needs of industry.					
21	I believe that I need to strengthen my digital competencies to face future professional challenges.					

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22	I believe that I need to strengthen my data analysis and decision-making competencies.					