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Curriculum Impact on Employability of Industrial Engineering Students in the Philippines: A Machine Learning Approach Utilizing Random Forest Classifier

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Abstract

The Fourth Industrial Revolution has significantly transformed the global job market, making advanced skills essential for sustainable careers. This study focuses on the Industrial Engineering (IE) department at the Higher Education Institution (HEI), analyzing alumni from the 2018 curriculum and current graduating students to develop an employability prediction model. Alumni data, including academic background, employment status, and career growth, train the model, while current students' academic performance and skills serve as the testing set. Key findings highlight that communication, design and production, and leadership skills significantly impact employability, emphasizing the need to prioritize these areas in the curriculum. The model, developed using the Waikato Environment for Knowledge Analysis (WEKA), demonstrates high accuracy in predicting employability, and the full employment of 2018 graduates underscores the curriculum's effectiveness in preparing students for modern job market demands. The study also uses Alumni Tracer data to pinpoint factors influencing employability, such as curriculum relevance, soft skills, extracurricular activities, and job immersion. These insights ensure the model's accuracy and practicality in enhancing career readiness initiatives at Higher Education Institution (HEI), reinforcing the importance of aligning educational programs with industry needs.

Keywords

Employability, Curriculum Relevance, Soft Skills , WEKA.

1. Introduction

The employability of graduates is a pressing concern for Higher Education Institutions (HEI) in the country. This is a particularly important issue in the Philippines as it directly affects the growth of the country's youth employment as well as the overall economic environment. More industry-academic collaboration is needed, as evidenced by studies conducted locally by researchers like Ahmed and Fattani (2022), who have shown that there is a common gap between corporate expectations and academic preparedness. By bridging the gap, these collaborations may guarantee that graduates possess the necessary knowledge and abilities that employers value. By systematically analyzing these career trajectories, educational institutions can refine their curriculum and programs to better align with the evolving needs of the job market, ultimately boosting employability rates. In this, leveraging advanced tools like the Waikato Environment for Knowledge Analysis (WEKA) becomes essential. WEKA can assist in predicting job market trends and tailoring education to meet those demands, providing a data-driven approach to enhancing graduate employability.

By using WEKA to analyze employment data, the institution can offer targeted support and guidance to its students, ensuring that graduates are not only employable but also able to thrive in their chosen fields. These initiatives can significantly enhance the readiness of graduates for the job market, thereby improving their career outcomes. This proactive approach not only benefits the students but also enhances the institution's reputation and commitment to the continuous improvement of educational standards and student success.

1.1 Objectives

The general objective of this study aims to assess the employability of Industrial Engineering students from one of the Higher Education Institutions in the Philippines under the 2018 curriculum, with a particular focus on identifying areas for improvement to enhance graduate employability. It will explore how HEI has contributed to preparing students for careers in industrial engineering and examine the impact of education quality on their employability during this period.The specific objectives of this study are as follows:

- To collect and analyze historical alumni data in order to identify patterns and trends in the employability of HEI Industrial Engineering graduates.
- To utilize WEKA to analyze the factors affecting employability, examining how alumni career paths, academic performance, and other relevant factors contribute to employability.
- To evaluate the accuracy, reliability, and validity of the model generated using WEKA's built-in algorithm tools.
- To propose recommendations for curriculum and program improvements that could further enhance the employability of Industrial Engineering students at Higher Education Institution(HEI), ensuring that the students are prepared for the demands of the labor market.

2. Literature Review

Qian Weichang, an academician of the Chinese Academy of Sciences, held the opinion that Higher Education Institution(HEI) institutions should focus on cultivating college students' self-learning ability, practical ability, and the ability to acquire knowledge and that efficient teachers are crucial in the teaching process (Majid, 2020). Based on the Commission on Higher Education Institution Memorandum Order (CMO) No. 15 Series of 2008 on the Revised Policies and Standards for the Degree of Bachelor of Science in Industrial Engineering, graduates of the BS IE program must have specialized knowledge and skills in the mathematics, physical sciences, core courses and allied courses; which pertain to the technical or hard skills. Moreover, the said CMO also requires that the BS IE curriculum to contain language, social science, and humanities courses; which implies the non-technical or soft skills (De Ann J., 2017). Several factors influence the employability of graduates, including curriculum design, work experience, technical proficiency, and soft skills. Industrial Engineering, being a field that blends engineering principles with business and management concepts, requires a multifaceted skill set. Research has identified the following factors as crucial in determining employability.

After completing a college degree, the primary goal of every graduate is to seek employment, as this is the next significant step in sustaining a living and supporting family needs, which is a central part of Filipino culture (Chavez et al., 2016). Employability is an important factor in university-level talent development and serves as a key measure of the effectiveness of Higher Education Institution(HEI) programs. It also represents a core competency that the labor market's supply side must possess to meet industry demands (Cheng et al., 2021). According to the Department of Labor and Employment (DOLE), job mismatch remains one of the key issues in the labor market, particularly among engineering graduates (DOLE, 2019). The employability of Bachelor of Science in Industrial Engineering (BSIE) graduates is generally high, offering a wide range of career opportunities across various industries. Studies have shown that Industrial Engineering graduates often face challenges related to employability, primarily due to the gap between the skills that can students acquire during their education and the demands of the industry (Wang & Wang, 2016). Industrial Engineers are highly sought after for positions such as production engineers, systems analysts, quality control supervisors, and operations managers (Boardman et al, 2020). In the Philippines, the demand for Industrial Engineers continues to grow due to the increasing emphasis on efficiency and productivity in industries. BSIE graduates are particularly valued for their problem-solving capabilities, analytical skills, and versatility, which enable them to thrive in both technical and managerial roles, positioning them well for leadership positions in the future (Ong et al., 2021). Although engineering is very in demand, competition also exists. As noted by Chua et al. (2017), the

competitive labor market for new graduates requires individuals to stand out, and employers expect them to demonstrate distinct competencies.

Curriculum design plays a central role in determining the employability of Industrial Engineering graduates. CHED mandates that universities align their curricula with international standards to ensure that graduates are competitive in the global market (CHED Memorandum No. 46, s. 2012). However, ensuring curriculum relevance requires continuous collaboration with industry stakeholders to keep up with rapidly changing demands, especially in fields like Industrial Engineering where technology and processes evolve quickly. Several studies, such as that of Misni F. et al. (2019), have provided evidence that a well-structured university curriculum has a direct impact on the employability competencies of graduates. One key performance indicator of higher education institutions (HEIs) providing quality education is the employability of their graduates. In this context, curriculum design emerges as a crucial component in enhancing the skills and attributes that contribute to employability. Hard skills, including technical and discipline-specific competencies, significantly influence the employability of engineering graduates. For instance, mathematical and analytical skills enable engineers to solve problems systematically, making them invaluable in fields that require precise calculations and data analysis. According to Levin and Verner (2020), these skills allow engineers to approach complex technical challenges, which is a key factor in the hiring process, particularly in technical roles. While technical skills are essential, soft skills have also gained importance in enhancing the employability of engineering graduates. Communication skills, for instance, are critical as engineers often work in cross-functional teams and need to convey complex ideas effectively. According to a study by Branchet and Sanseau (2017), employers increasingly value communication skills, especially in roles that involve frequent collaboration with non-technical departments.

In educational research, WEKA has been applied to predict student performance, analyze academic trends, and identify factors influencing employability (Palacio-Niño & Berzal, 2019). By applying machine learning algorithms to large datasets, researchers can uncover patterns and relationships that are not immediately apparent through traditional analysis methods. For instance, decision trees, regression models, and clustering techniques can be used to identify key predictors of student success or employability. WEKA's ability to handle large, complex datasets and apply various machine learning algorithms makes it an ideal tool for such research (Swarnali Daw & Rohini Basak, 2020). Through WEKA, researchers can explore relationships between student characteristics and employment outcomes, offering actionable insights to educational policymakers and administrators.

2.1 Research Gap

The connection between employability and curriculum design has garnered a lot of attention, especially in engineering fields like Industrial Engineering (IE). Both technical (hard) and soft skills are important for determining employment outcomes, according to multiple studies. To study these aspects, a large portion of the literature now in publication uses traditional approaches like surveys and interviews. Despite providing insightful information, these methods frequently fall short of showing the intricate connections between curriculum components and employability outcomes. A more data-driven approach is necessary to bridge this gap and comprehend how the curriculum affects employability, especially when machine learning techniques are used. The employability of IE graduates in the Philippines is generally excellent, although problems like job mismatch and changing industry demands continue to be major concerns. Research on the relationship between certain curriculum components and employability remains lacking, despite the Commission on Higher Education's (CHED) recommendations that curricula be in line with international standards. Additionally, previous research frequently concentrates on technical or soft skills separately, ignoring their interaction and combined impact on a graduate's employment prospects.

Globally, the application of machine learning in educational research has gained attraction, with tools like WEKA being used to analyze academic performance and predict employability trends. However, in the Philippines, the integration of machine learning into curriculum assessment and employability research remains underdeveloped. International research has shown that machine learning techniques like Random Forest classifiers can be used to discover important success factors, but these methods have not yet been used to assess Filipino IE graduates' employability. Another significant gap lies in the lack of localized studies focusing specifically on the IE discipline. Although there is growing demand for Industrial Engineers in the Philippines due to the emphasis on efficiency and productivity in industries, research addressing how curriculum design equips graduates to meet these demands is scarce. Additionally, while studies highlight the importance of aligning educational programs with industry needs, there is insufficient exploration of how machine learning insights can inform curriculum revisions to bridge the gap between academic training and industry expectations.

This study aims to fill these gaps by analyzing the curriculum's effect on the employability of IE graduates in the Philippines using a machine learning approach, specifically the Random Forest classifier. By doing this, it intends to offer a data-driven perspective on how curriculum components affect the development of both technical and soft skills, and make practical suggestions for curriculum improvement.

3. Methods

This study uses the random forest classifier algorithm to identify the factors that affect the employability of Industrial Engineering graduates from Higher Education Institution(HEI). The methodology begins with the collection of data from the Alumni Tracer through Higher Education Institution Career Center and the Industrial Engineering (IE) Department. After the data is collected, it undergoes cleaning and normalization to prepare it for analysis. Feature selection is conducted using WEKA, a data mining tool, to identify key factors affecting employability. The Random Forest model is configured and trained using the preprocessed data, and its performance is evaluated based on accuracy, precision, and recall. The results are analyzed to provide insights into how Higher Education Institution (HEI) can align its curriculum with employability outcomes.

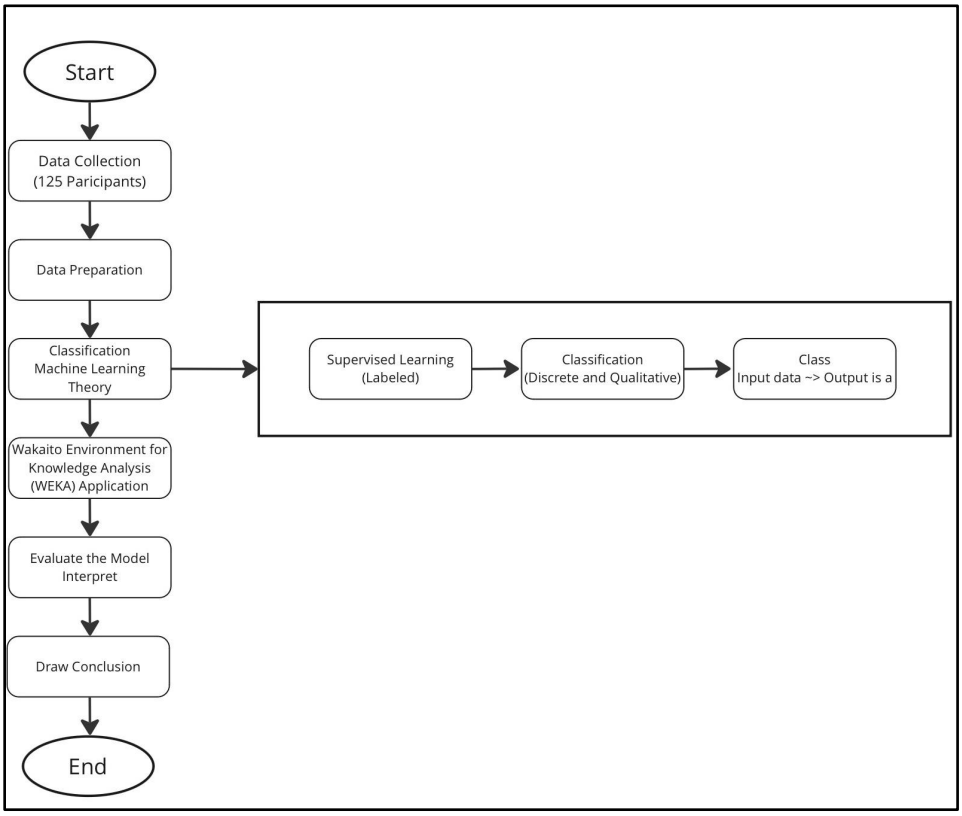

Figure 1. Methodology

Figure 1, shows the methodology used in the research for machine learning. The process begins with data collection from the Career Center and the Industrial Engineering Department, followed by data preparation to ensure the data is clean, and ready for analysis. Classification Machine Learning Theory is applied to focus on the labeling of the data to classify the results of the algorithm.

The classification process assigns input data to specific categories by the algorithm, producing an output that identifies the corresponding classification. WEKA is applied to implement classification algorithms and visualize the result of the algorithm and to test and evaluate the algorithm.

4. Data Collection

The provided subjects showcase a detailed breakdown of hard skills categorized by each course. The Table 1 encompasses a wide range of technical and analytical proficiencies, including mathematics, engineering, design, finance, operations management, and safety regulations. Each category includes specific courses or subjects that contribute to the development of these skills. This organized presentation offers a clear overview of the hard skills acquired through academic or professional experiences. According to the theory of hard skills, hard skills including technical and discipline-specific competencies significantly influence the employability of engineering graduates. For Instance, Mathematical and analytical skills enable engineers to solve problems systematically, making the graduates invaluable in fields that require precise calculations and data analysis. Furthermore, according to Xiang (2023), technical and engineering skills form the backbone of engineering practice. Graduates who possess a strong foundation in these skills are better positioned to operate within engineering standards and adapt to the technical demands of modern industry. Design and production skills

Table 1. Hard Skills

Hard skills	Courses
Mathematics and Analytical Skills	MATH 016 & MATH 017 (Calculus 1 & 2), MATH 010 Differential Equations, MATH 013 Linear Algebra with MATLAB, IE 014 Advanced Mathematics for Industrial Engineering, IE 004 & IE 005 (Statistical Concepts for IE 1 & 2), IE 504 Multi-Criteria Decision Making
Technical and Engineering Skills	PHYS 001C Calculus-Based Physics, IE 302 Industrial Materials and Processes, ITE 001A Computer Fundamentals and Programming, MECH 001 Engineering Mechanics, ME 004 Thermodynamics, EE 001 Basic Electrical Engineering
Design and Production Skills	CPE 003 Computer-Aided Drafting, IE 007 Work Study and Measurement/Productivity Analysis, IE 011 Production and Operations Management, IS 001 Information Systems, IE 505 Systems Engineering
Financial and Economic Skills	AC 004 Financial Accounting, ME 005 Engineering Economics, IE 405 Project Feasibility
Operational and Risk Management Skills	IE 003A Operations Research 1, IE 404A Operations Research 2, IE 013 Supply Chain Management
Safety and Regulatory Knowledge	BOSH 101 Basic Occupational Safety and Health

Table 2. Soft Skills

Soft Skills	Courses
Communication Skills	GEC 005 Purposive Communication, IE 012 Seminar/Colloquia for IE, GEC 001 Understanding the Self
Management and Leadership Skills	IE 006 Strategic and Industrial Organization Management,TECH 101 Introduction to Engineering Entrepreneurship
Ethical and Cultural Awareness	GEC 002 Readings in Philippine History, GEC 008 Ethics, IE 015 Industrial Engineering Values and Ethics, GEC 006 Art Appreciation, GEC 007Science, Technology and Society
Psychological and Behavioral Understanding	IE 008 Industrial and Organizational Psychology

The provided Table 2 showcases a detailed breakdown of soft skills and their importance in enhancing the employability of engineering graduates. The text highlights the significance of communication skills, management and leadership skills, and ethical and cultural awareness. According to Branchet and Sanseau (2017), employers increasingly value communication skills, especially in roles that involve frequent collaboration with non-technical departments. This suggests that the ability to effectively convey complex ideas and build strong relationships with colleagues from diverse backgrounds is crucial for engineering professionals. By emphasizing the importance of these soft skills, the text provides valuable insights for engineering students and professionals seeking to enhance their employability and career prospects.

5. Results and Discussion

5.1 Numerical Results (ReliefFAttributeEval)

ReliefFAttributeEval stands for "Relief Feature Evaluation", evaluates the worth of an attribute by repeatedly sampling an instance and considering the value of the given attribute for the nearest instance of the same and different class. It operates on both discrete and continuous class data. From the findings (see Table 3), the skills with the highest impact on employability are Design and Production Communication Skills, and Management and Leadership Skills. These subjects should be included in the curriculum focus areas as it offers the best advantages for success on the job. Other characteristics, important as it is, were associated with lower effects, which in turn emphasize the need to target high-weight courses for better employability outcomes.

Table 3. Attribute Selection Ranking for Employability Evaluation using ReliefFAttributeEval

Attribute	Information Gained	Rank
Design Production Skills	0.527	1
Communication Skills	0.418	2
Management and Leadership Skills	0.412	3
Ethical and Cultural Awareness	0.336	4
Operational and Risk Management Skills	0.325	5
Financial and Economic Skills	0.29	6
Safety and Regulatory Knowledge	0.233	7
Mathematics and Analytical Skills	0.225	8
Technical and Engineering Skills	0.173	9
Psychological and Behavioral Understanding	0.154	10

5.1.1 Random Forest

Figure 2. shows Random Forest Model through the Model Viewer tab in WEKA, showing the implementation of the Random Forest model. This provides detailed information on the decision trees that compose the Random Forest model algorithm Each tree shows the hierarchical structure of the decision tree, thresholds and classification results, showing the model's predictive process.

Figure 2. Random Forest

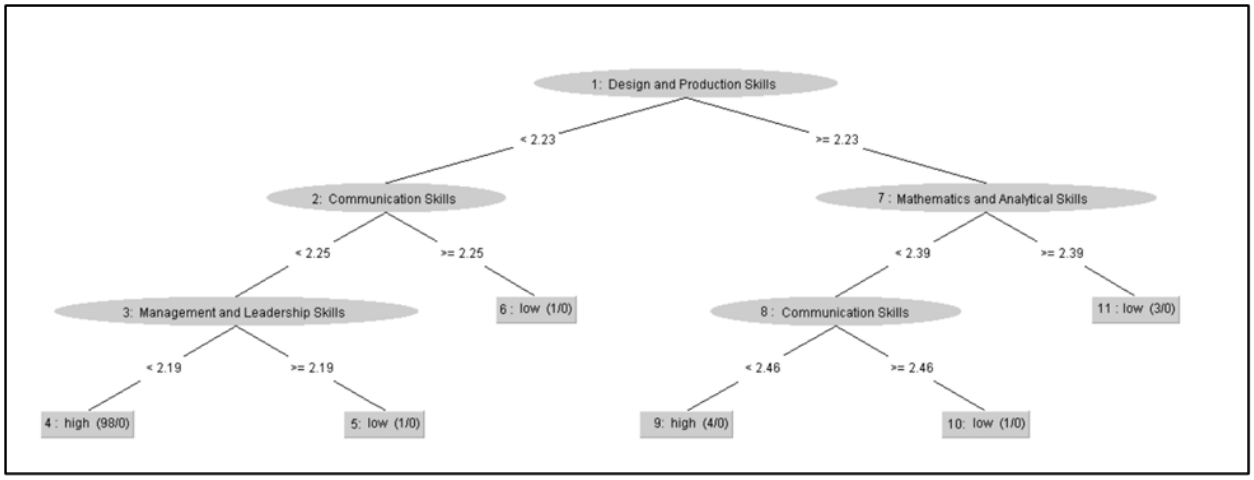

Figure 3. Classification Decision Using Random Forest

Figure 3. shows the key factors that influence the employability classification of industrial engineering students into "high" or "low" categories. The root node identifies Design and Production Skills as the most critical factor. If a student scored in this node below 2.23 as threshold, the next classification depends on their Communication Skills, Management and Leadership Skills. Scores below 2.39 proceed to evaluate Communication Skills, where scores less

than 2.46 are classified as high, while higher scores are classified as low. For Mathematics and Analytical Skills of 2.39 or higher, the classification is directly low employability. Students with strong communication skills and leadership skills are likely to be classified as "high" employability skills. Students with scores lower may fall in the "low" category.

Table 4. Classification Results Using Random Forest

Metric	Value
Correctly Classified Instances	125 (100%)
Incorrectly Classified Instances	0 (0%)
Kappa Statistic	1
Mean Absolute Error	0.022
Root Mean Squared Error	0.066
Relative Absolute Error	22.4807%
Root Relative Squared Error	30.8521%
Total Number of Instances	125

The Table 4 above is the random forest model results, which demonstrated exceptional performance in this classification task, achieving perfect accuracy. All 125 instances were correctly classified, resulting in zero incorrect classifications. The Kappa statistic of 1 further confirms the model's strong agreement with the ground truth. While the error metrics provide additional insights into the model's performance, the overall results indicate that the random forest model is well-suited for this particular classification problem.

5.1.2 Detailed Accuracy

As shown in Table 5 presents the performance metrics for a classification model evaluated on two classes: "Low and High." Each metric achieves a perfect score of 1.000, indicating the model's outstanding accuracy and balance across various performance measures.

Table 5. Detailed Accuracy by Class

Class	TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	PRC Area
Low	1.000	1.000	1.000	1.000	1.000	1.000	1.000
High	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Weighted Average	1.000	1.000	1.000	1.000	1.000	1.000	1.000

5.1.3 Confusion Matrix

Table 6, shows the evaluation of the performance of classification models, providing a clear representation of how well the model predicts the actual class labels. It breaks down the predictions into four categories: true positives, true negatives, false positives, and false negatives. In this case, the matrix shows that the model correctly classified all 6 instances of "Low" and all 119 instances of "High," resulting in 100% accuracy. It states there are no misclassifications, indicating the model's ability to perfectly distinguish between the two classes on the training dataset.

Table 6. Confusion Matrix

	a = Low	**b = High**
a	6	0
b	0	119

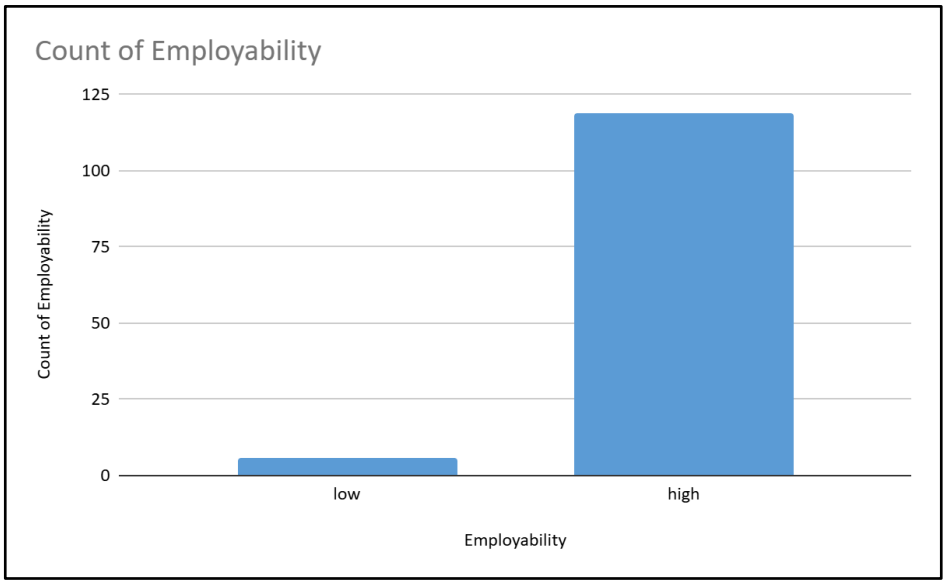

Figure 4. Numbers of Low and High Employability

Figure 4 shows the number and percentage of students' employability who completed courses covering mathematics and analytical skills, technical and engineering skills, design and production skills, financial and economic skills, operational and risk management skills, safety and regulatory knowledge, communication skills, management and leadership skills, ethical and cultural awareness, and psychological and behavioral understanding.

Table 5 and 6 shows great performance, as indicated by the metrics in both tables. Table 5 shows the “Low” and “High” achieved scores of 1.000 across all evaluation metrics. This indicates that the algorithm classified the categories correctly. Table 6 supports these findings by showing that the algorithm specifically correctly classified 6 “Low” instances and 119 ”High” instances are classified correctly.

5.2 Proposed Improvements

To enhance the employability of Industrial Engineering graduates from Higher Education Institution (HEI), it’s crucial to focus on the top-ranked skills identified in the analysis: communication, design and production, and management and leadership. Since communication skills are ranked highest, Higher Education Institution (HEI) could incorporate more opportunities for students to improve in this area, such as through workshops, group activities, and presentations that build confidence and clarity in both written and verbal communication. Strengthening design and production skills is also essential; updating coursework to include hands-on projects that simulate real-world design challenges can help students apply theoretical knowledge to practical situations, making the graduates more adaptable to industry needs. Developing management and leadership skills through group projects, team-building exercises, and role-playing scenarios will also prepare students to handle responsibilities effectively in a work environment.

Additionally, integrating ethical and cultural awareness, operational and risk management skills, and basic financial and economic knowledge into the curriculum will provide students with a well-rounded skill set. These skills, while not ranked at the very top, still play an important role in employability and can be strengthened through activities like

case studies, simulations, and ethical discussions. Industry partnerships can offer students real-life experience with these attributes by providing internships or apprenticeships where students gain exposure to operational risks, financial planning, and safety regulations. Finally, creating a strong alumni network for mentorship and feedback can help students understand current industry practices and gain guidance on building successful careers. By prioritizing these high-value skills, Higher Education Institution (HEI) can ensure that its graduates are well-prepared for the demands of the industrial engineering field.

5.3 Validation

The model *Table 4* achieved outstanding results in predicting employability-related skills for Industrial Engineering graduates at Higher Education Institution(HEI), with 100% accuracy and zero misclassifications across 125 instances. A Kappa statistic of 1 further supports the model's strong agreement with actual outcomes, while minimal error metrics, such as a Mean Absolute Error of 0.022, underscore its reliability.

The random forest model serves as a reliable tool for validating the importance of enhancing communication, design and production, and management and leadership skills in Higher Education Institution(HEI) curriculum. These skills have been identified as critical for employability, and the model's performance confirms the reliability of this analysis. By focusing on these competencies, HEI can optimize its curriculum to better prepare graduates for industry demands.

6. Conclusion

Employability has become a critical focus in higher Education Institution (HEI), reflecting the capacity of graduates to obtain and maintain employment, as well as succeed in their careers. According to Arshad (2014), employability encompasses a range of attributes, skills, and knowledge that graduates need to enter and thrive in the labor market. As industries evolve, the demand for graduates equipped with both technical and soft skills, such as problem-solving and communication

This study has carefully examined the employability of Industrial Engineering graduates from the Higher Education Institution (HEI) 2018 curriculum, identifying key factors that influence their readiness for the workforce. By analyzing historical alumni data and leveraging tools like WEKA for thorough analysis, this research has provided valuable insights into the trends and patterns in the employability of these graduates.

Research indicates that a well-rounded curriculum is essential for developing employable graduates. Andrews and Higson (2008) emphasize the importance of curricula that integrate technical knowledge with essential soft skills, preparing students to meet diverse industry needs. Additionally, school-industry partnerships play a vital role in providing students with practical, real-world experience.

The findings shows the importance of a well-rounded curriculum that balances technical knowledge with essential soft skills such as problem-solving and communication. The study highlights that integrating school-industry partnerships is vital for giving students practical, real-world experience that complements their academic learning. This alignment not only enhances the employability of graduates but also ensures these students are well-prepared to meet industry demands.

The use of analytical tools like WEKA in assessing employability factors has been validated by several studies. WEKA is a widely-used data mining software that allows for thorough analysis of large datasets. Leveraging such tools can provide valuable insights into trends and patterns in graduate employability, ensuring that recommendations are based on reliable and accurate data.

Moreover, the study has validated the effectiveness of using analytical tools like WEKA in assessing employability factors, ensuring that the recommendations are based on reliable and accurate data. The emphasis on continuously updating the curriculum to meet the evolving demands of the industry, as guided by the standards set by the Commission on Higher Education (CHED), is crucial for maintaining the competitiveness of Higher Education Institution graduates in the global market.

The study also highlighted the role of Higher Education Institutions in preparing their students for successful careers in industrial engineering. The institution's commitment to quality education, combined with its efforts to adapt its curriculum to international standards, has significantly contributed to the employability of its graduates. The

importance of combining academic activities with practical skills training cannot be overstated, as it equips students with the versatility needed to thrive in a dynamic job market.

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Biographies

Aeron Vince Fajardo is a fourth-year Industrial Engineering student at the Technological Institute of the Philippines. Passionate about technology and innovation, Aeron has cultivated expertise in software development and data analysis, with a focus on data science. He is proficient in applying machine learning techniques to solve complex problems, analyze trends, and derive actionable insights. Committed to leveraging his skills to contribute to advancements in technology and data-driven decision-making.

Jahmeer Leemuel P. Garlit is a dedicated student leader with years of experience in various academic and extracurricular roles at the Technological Institute of the Philippines (TIP), where he has been actively involved since 2018. Currently, He serves as the President of the College-Y Club (CYC) of Technological Institute of the Philippines Quezon City for the 2024-2025 academic year, and his leadership experience spans across numerous organizations. He was previously the President of the Organization of Industrial Engineering Students (ORIENTS) for the 2023-2024 academic year and the Multimedia Guild President in 2022-2023. He also held the role of Business Manager for Bayanihan Youth for Peace (BYP) and served as the Head and Director for External Affairs in Documentation at the Philippine Institute of Industrial Engineers – National Student Chapter (PIIE-NSC) in 2022-2023. His passion for arts and community engagement began early, as he was a member of the Philippine Women's University Vocal Ensemble (PWU-VE) during his senior high school years and a member of the Campus Integrity Crusaders (CIC) in junior high school. Beyond leadership roles, He is an active participant in advocacy campaigns, contributing to educational efforts on topics such as voting rights, HIV/AIDS awareness, mental health, and self-defense. These experiences have significantly enhanced his ability to collaborate and communicate with diverse groups, shaping him into a well-rounded leader committed to creating positive change both within and outside his academic community.

Jen Lyanne Gomez is a fourth year Industrial Engineering student at Technological Institute of the Philippines. She initially pursued Electrical Engineering before shifting to Industrial Engineering, where she found her passion for improving processes and systems. Her academic journey is marked by her commitment, represented by her and other team members' feasibility study on a salt-water powered flashlight, which highlighted her innovative approach to sustainability and practical engineering solutions. Driven and resourceful, she is committed to make meaningful contributions to the field of Industrial Engineering.

Daphney Jenelle B. Labestra is a fourth-year Industrial Engineering student at the Technological Institute of the Philippines (TIP). She has been actively involved in various organizations. Last year, she was a member of the Junior Data Science and AI Association of the Philippines (JDSAAP). Currently, she is part of the College Y-Club, where she continues to contribute her skills and knowledge. She completed her senior high school education at Our Lady of Fatima University, taking the Science, Technology, Engineering and Mathematics (STEM) strand, which laid a strong foundation for her current studies in engineering.

John Luiz Rafael G. Rebancos is a fourth-year student at the Technological Institute of the Philippines, where he is pursuing a degree in Industrial Engineering. Passionate about both academics and extracurricular activities, he enjoys playing basketball and engaging in computer games. These interests not only provide enjoyment but also help foster teamwork, strategic thinking, and problem-solving skills. Known for his creativity and quick learning abilities, he consistently strives to approach challenges with an innovative mindset. His time at the university has allowed him to develop a well-rounded skill set, blending technical knowledge with a dynamic approach to learning and problem-solving. As he approaches the final stages of his academic journey, he is eager to apply his talents and continue growing as a professional.

Vincent Gabriel R. Vicente is a fourth-year engineering student at the Technological Institute of the Philippines in Quezon City. He graduated from Senior High School at Arellano University - Andres Bonifacio Campus. He is pursuing a degree in Industrial Engineering. Known for his analytical mindset and passion for improving systems. Outside of his academic work, he is involved in TIP QC's student organizations, where he collaborates with peers on projects that aim to enhance student learning and community involvement. In his free time, He likes to engage in outdoor activities like hiking and biking, which help him unwind from his demanding coursework. After graduation, he hopes to work in operations management or industrial consulting, with the long-term goal of contributing to more efficient, environmentally-friendly industrial practices.

Ma. Romelle Lynne M. Mendezabal is a fourth-year Industrial Engineering student at the Technological Institute of the Philippines, Quezon City. She embodies a willingness to learn and a genuine passion for her field. She is characterized by her curiosity and eagerness to explore new concepts and methods. Her commitment to academic excellence is evident in her consistent effort to understand complex topics and seek opportunities for growth.

Christian James G. Madrid Engr Christian James Madrid is a full time Industrial Engineering Faculty Member and he is also currently the CEA OJT Coordinator. He finished his Bachelors Degree in Industrial Engineering and his Professional Science Master's Degree in Engineering Management in TIP QC. He is also a Certified Six Sigma Yellow Belter and a Safety Engineer.

Jan Louis M. Cruz is an accomplished professional with a strong academic foundation in industrial engineering and engineering management. He holds a Bachelor of Science in Industrial Engineering and a Professional Science Master's Degree in Engineering Management at Technological Institute of the Philippines, Quezon City, equipping him with a well-rounded expertise in both technical and managerial aspects of engineering. Throughout his academic journey, he developed a deep understanding of process optimization, systems analysis, and strategic planning, which has allowed him to contribute effectively in various engineering contexts.

Maricar M. Navarro holds the esteemed titles of ASEAN Engineer (AE) and Professional Industrial Engineer (PIE) accredited by the ASEAN Federation of Engineering Organizations (AFEO) and the Philippine Institute of Industrial Engineers (PIIE). She currently serves as a Professor in both the Undergraduate and Graduate School Programs of the Technological Institute of the Philippines, bringing over 17 years of combined experience in industry, academia, and research. Her expertise spans optimizing production processes, facility layout design, warehouse operations, and service delivery. Dr. Navarro's current research interests focus on financial optimization and decision-making in operations research. She earned both her master's and Ph.D. in Industrial Engineering from MAPUA University. As an active associate member of the National Research Council of the Philippines (NRCP) and member of PIIE, Dr. Navarro contributes significantly to advancing research initiatives and professional standards in Industrial engineering and related fields. Her dedication and expertise make her a pivotal figure in both academic circles and national research endeavors.