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Assessing Industrial Engineers' Knowledge, Attitudes, and Practices (KAP) to the Code of Ethics in Industrial Engineering

Engr. Sharmaine M. Avila, Engr. Eldrick M. Fonollera, Engr. Marry sol Lare, Engr. Joefil C. Jocson

ABSTRACT:

The knowledge, attitudes, and practices (KAP) of industrial engineers regarding their Code of Ethics are assessed in this study. The research, which used a descriptive research approach and a thorough survey of 100 industrial engineers, reveals high levels of awareness and compliance with ethical principles in many areas. Still, it also identifies essential gaps, especially with accepting deceptive behavior under certain conditions and the non-disclosure of unsafe processes. The findings highlight the necessity of improved ethical training and continuous professional development to address these gaps and develop a strong ethical culture within the industrial engineering profession.

Keywords: Knowledge, Attitude, and Practices (KAP), Code of Ethics, Industrial Engineers, Ethical standards

INTRODUCTION:

Industrial engineers focus on optimizing intricate systems and developing efficient processes that integrate labor, money, time, materials, and information to generate tangible goods or provide services. In their field, following the highest standards of accountability, honesty, and public safety is the main objective. Therefore, in order to maintain the credibility and trust of their profession, it is necessary to know how effectively industrial engineers follow these ethical standards. According to Davis and Parker (1997), professionals must have a solid ethical foundation to effectively resolve challenging ethical issues at work.

To provide insight into industrial engineers' awareness, impressions, and actual implementation of ethical standards in their line of work, this research aims to evaluate the Knowledge, Attitudes, and Practices (KAP) of industrial engineers regarding their code of ethics. Launiala (2009), described KAP analysis (Knowledge, Attitude and Practice) to identify the gaps and reveal misconceptions that may help to develop targeted interventions.

This study wants to identify any gaps in industrial engineers' awareness of their Code of Ethics. The way industrial engineers understand their ethical guidelines affects the significance that they think ethics are to their daily jobs. Therefore, their attitudes towards these principles are equally important. Understanding those viewpoints may help organizations and higher education institutions in modifying their educational programs to promote an enhanced moral culture in the industrial engineering community. Treviño and Nelson (2011) highlighted that perceptions about ethics have a significant impact on moral behavior and ethical choices.

This research aims to add to the ongoing efforts to improve ethical standards in the profession by offering a comprehensive assessment of industrial engineers' knowledge, attitudes, and practices (KAP) regarding their Code of Ethics. The results will help professional

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organizations, universities and colleges, and officials to create policies that encourage moral conduct in the field of industrial engineering.

OBJECTIVES

This study aims to determine the knowledge, attitudes, and practices of industrial engineers based on their code of ethics. Specifically, it sought to answer the following:

1. To identify the demographic profile of industrial engineers participating in the study, including the following:
   1.1 Age
   1.2 Gender
   1.3 educational background
   1.4 years of experience
   1.5 current employment sector
   1.6 CIE passer
2. To determine the respondents' level of knowledge regarding the Code of Ethics in Industrial Engineering, focusing on their understanding of specific principles, standards, and guidelines.
3. To assess the respondents' attitudes towards the Code of Ethics in Industrial Engineering, including their perceptions of its importance and relevance to their professional conduct.
4. To determine the respondents' level of practices in adhering to the Code of Ethics in Industrial Engineering, including how frequently and effectively they apply ethical principles in their work.
5. To analyze the significant differences in knowledge, attitudes, and practices (KAP) regarding the Code of Ethics among industrial engineers when grouped according to their demographic profiles.
6. To provide recommendations based on the research findings to enhance the awareness, understanding, and adherence to the Code of Ethics among industrial engineers, promoting ethical standards and practices within the profession.

METHODOLOGY

This study uses a descriptive research approach to comprehensively understand the Industrial Engineers' Knowledge, Attitude, and Practices towards their code of ethics. This survey aims to evaluate respondents' understanding of the Code of Ethics, attitudes toward ethical practices, and self-reported behaviors in ethical decision-making scenarios. It will consist of multiple-choice and Likert-scale items. The survey is disseminated through online platforms and industry networks to ensure that there are various respondents for this research.

The ethical rules were strictly observed in this study. Complete privacy and anonymity were guaranteed to every survey participant, and involvement was entirely voluntary. All participants gave their informed consent before data collection to ensure that they understood the purpose of the study and their rights as participants. Only the study team had safe access to the data, which securely recorded to protect the privacy and validity of the respondents' information.

To accomplish these goals, the researchers used descriptive statistics—more specifically, frequency,percentages, and the Krystal-Wallis and Mann-Whitney Test—to

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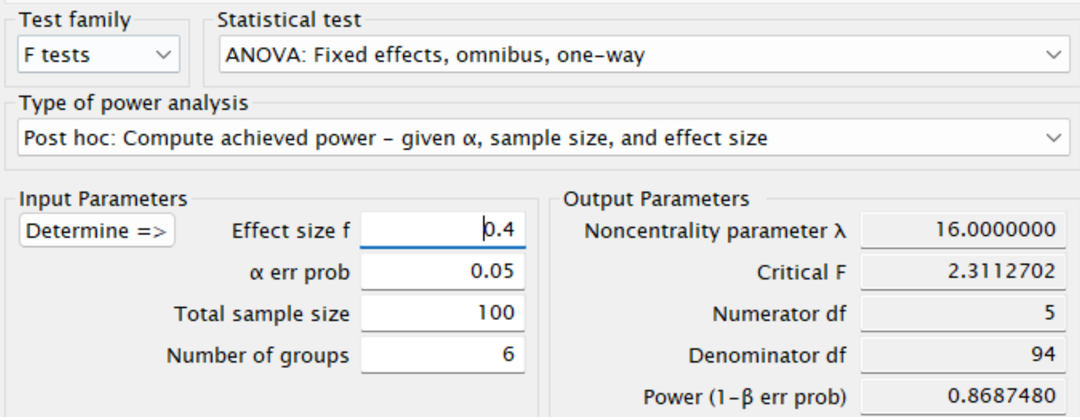
analyze the data and present a thorough picture of the Industrial Engineers' level of knowledge, attitude, and practice in their Code of Ethics.



Using the GPower Software, a total sample size of 100 Industrial Engineers were asked to provide their detailed responses to the research questions wherein results showed a large effect size of 0.4 and error probability of 5%, the resulting power of 87%.

RESULTS & DISCUSSION

Table 1. Demographic Profile of Respondents

Demographic Profile	Frequency (n = 100)	Percentage
Gender		
Male	63	63%
Female	36	36%
Prefer not to say	1	1%
Age		
21 to 25 years old	41	41%
26 to 30 years old	43	43%
31 to 35 years old	10	10%
36 years old and above	6	6%
Highest Educational Attainment		
Bachelor Degree	85	85%
Post Graduate	15	15%
Year Graduated In Bachelor/College		
2010 and below	7	7%
2011 to 2015	12	12%
2016 to 2020	43	43%
2021 to 2024	38	38%
Industry		
Construction	11	11%
Education	13	13%
Manufacturing	33	33%
Retail/sales	17	17%
Service Industry	24	24%
Others	2	2%
No. of Years Working		
5 years and below	63	63%

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6 to 10 years	27	27%
11 to 15 years	7	7%
16 years and above	3	3%
CIE Passer		
Yes	84	84%
No	16	16%

Table above shows the demographic profile of respondents. Specifically, the sample consists of 63 males (63%), 36 females (36%), and 1 individual who preferred not to disclose their gender (1%). The age distribution shows that the majority of respondents are between 21 to 25 years old (41%), followed closely by those aged 26 to 30 years (43%), with smaller proportions aged 31 to 35 years (10%) and those 36 years and older (6%). The graduation year ranges widely, with 7% graduating in 2010 or earlier, 12% between 2011 and 2015, 43% between 2016 and 2020, and 38% between 2021 and 2024. Professionally, the respondents are spread across various industries, including construction (11%), education (13%), manufacturing (33%), retail/sales (17%), service industry (24%), and others (2%). Regarding work experience, a significant majority have been working for 5 years or less (63%), while 27% have 6 to 10 years of experience, 7% have 11 to 15 years, and 3% have been working for 16 years or more. Finally, a notable majority of the respondents (84%) have passed the CIE (Certified Industrial Engineer) examination, whereas 16% have not.

Table 2. Industrial Engineers' Level of Knowledge on IE Ethics

Knowledge	Frequency (n = 100)	%	Rank
1. An Industrial Engineer should always prioritize the safety, health, and welfare of the public in their professional practice.	96	96%	5
2. It is appropriate for an Industrial Engineer not to disclose information regarding faulty or unsafe work processes if doing so would affect their own or their employer's image.	56	56%	9
3. An Industrial Engineer must report any discovered faulty, inefficient, or unsafe work systems to the appropriate authority, regardless of their involvement.	99	99%	2
4. Industrial Engineers are expected to uphold the principles of honesty and integrity in all their professional dealings.	99	99%	2
5. An Industrial Engineer should disclose any potential conflicts of interest that could influence their professional judgment or the quality of their services.	89	89%	8
6. The confidentiality of a client's or employer's business affairs and technical processes must be maintained by an Industrial Engineer at all times.	92	92%	7
7. Professional competence and adherence to ethical standards are essential for Industrial Engineers when performing their duties.	100	100%	1
8. Industrial Engineers should use their knowledge to improve workforce skills, recommend fair wages, and instruct on productivity enhancements.	96	96%	5

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9. An Industrial Engineer can engage in deceptive practices if it benefits the client or employer.	54	54%	10
10. In their relations with colleagues, an Industrial Engineer should build their reputation on the merit of their services and not engage in unfair competition.	99	99%	2
AVERAGE CORRECT (%)	88%		

Table above shows the respondents' level of knowledge on professional ethics for Industrial Engineers. Specifically, emphasizing the priority of public safety, health, and welfare, shows a high correct response rate of 96%, indicating strong awareness of this principle. Conversely, 56% of respondents incorrectly believe it is acceptable not to disclose faulty or unsafe processes to protect personal or employer image, suggesting a notable gap in ethical understanding. Regardless of involvement, reporting unsafe systems is widely recognized with a 99% correct response rate. Upholding honesty and integrity also garners a high correct response rate of 99%. Disclosure of potential conflicts of interest is correctly identified by 89% of respondents. Confidentiality of business affairs is acknowledged by 92%, while 100% correctly recognize the importance of professional competence and ethical standards. Improving workforce skills and recommending fair wages are acknowledged by 96%. However, 54% incorrectly believe deceptive practices are acceptable if beneficial to the client or employer, highlighting another ethical knowledge gap. Finally, 99% correctly understand the importance of building professional reputation on merit and avoiding unfair competition.

In summary, the respondents' level of knowledge on professional ethics for Industrial Engineers has overall mean score of 88%, indicating generally high with potential gaps on knowledge of professional ethics among Industrial Engineers.

Table 3. Industrial Engineers' Level of Attitude on IE Ethics

Attitude	Mean	Std. Dev.	Interpretation
1.Ensuring public safety, health, and welfare should be the foremost concern in all Industrial Engineering projects.	4.17	1.30	Agree
2.Maintaining honesty and integrity in professional dealings is more important than achieving project goals at any cost.	4.07	1.32	Agree
3.Disclosing conflicts of interest is essential, even if it might negatively impact my career or employer.	3.45	1.35	Agree
4.It is crucial to report any discovered unethical practices or unsafe conditions, regardless of potential personal or professional consequences.	3.93	1.22	Agree
5.Confidentiality regarding a clients or employers business affairs should be upheld, even when faced with pressure to disclose.	3.87	1.28	Agree
6.Professional competence should be prioritized over financial gain or personal advancement in Industrial Engineering practices.	3.76	1.24	Agree

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7.Using my expertise to improve workforce skills and promote fair wages aligns with my ethical responsibilities as an Industrial Engineer.	4.10	1.29	Agree
8.Engaging in deceptive practices can never be justified, even if it benefits the project or employer.	3.61	1.47	Agree
9.Building a professional reputation based on the quality of services rather than competitive tactics reflects good ethical practice.	4.07	1.26	Agree
10.Respecting and crediting the contributions of colleagues and collaborators is fundamental to ethical behavior in Industrial Engineering.	4.28	1.25	Strongly Agree
Overall Mean	3.93	1.30	Agree

Note: 1.00 - 1.8 = Strongly Disagree, 1.81 - 2.60 = Disagree, 2.6 - 3.40 = Neutral, 3.41 - 4.20 = Agree and 4.21 – 5.00 = Strongly Agree

Table above shows the respondents' attitude towards various ethical principles in Industrial Engineering. Specifically, the highest mean score of 4.28 (SD = 1.25) indicates that respondents strongly agree that respecting and crediting the contributions of colleagues and collaborators is fundamental to ethical behavior in Industrial Engineering. To support this, is closely followed by the belief that ensuring public safety, health, and welfare should be the foremost concern in all Industrial Engineering projects, with a mean score of 4.17 (SD = 1.30), and the importance of using one's expertise to improve workforce skills and promote fair wages, with a mean score of 4.10 (SD = 1.29).

Maintaining honesty and integrity in professional dealings is also highly valued, with a mean score of 4.07 (SD = 1.32). Similarly, the emphasis on building a professional reputation based on the quality of services rather than competitive tactics is reflected in a mean score of 4.07 (SD = 1.26). Respondents agree that it is crucial to report any discovered unethical practices or unsafe conditions, with a mean score of 3.93 (SD = 1.22), and that confidentiality regarding a client's or employer's business affairs should be upheld, even under pressure to disclose, with a mean score of 3.87 (SD = 1.28). The attitude towards prioritizing professional competence over financial gain or personal advancement is agreed upon, with a mean score of 3.76 (SD = 1.24). The importance of disclosing conflicts of interest, even if it might negatively impact one's career or employer, is also acknowledged, with a mean score of 3.45 (SD = 1.35). Lastly, engaging in deceptive practices is firmly rejected, as reflected in the mean score of 3.61 (SD = 1.47).

In summary, the respondents' attitude towards various ethical principles in Industrial Engineering, with an overall mean score of 3.93 (SD = 1.30), reflects a general agreement with ethical principles in Industrial Engineering.

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Table 4. Industrial Engineers' Level of Practices on IE Ethics

Practices	Mean	Std. Dev.	Interpretation
1.I ensure that the safety, health, and welfare of the public are prioritized in all my engineering projects.	4.58	0.75	Strongly Agree
2.I report any identified faulty, inefficient, or unsafe work systems to the appropriate authorities or supervisors.	4.57	0.71	Strongly Agree
3.I maintain honesty and integrity in all my professional dealings and communications.	4.73	0.53	Strongly Agree
4.I disclose any potential conflicts of interest that may influence my professional judgment or services.	4.04	1.04	Agree
5.I respect and uphold the confidentiality of a client's or employer's business affairs and technical processes.	4.57	0.74	Strongly Agree
6.I continually update my knowledge and skills to maintain professional competence in my engineering practice.	4.67	0.53	Strongly Agree
7.I use my expertise to improve workforce skills, recommend fair wages, and advise on productivity improvements.	4.62	0.63	Strongly Agree
8.I refuse to engage in deceptive practices, even if they could benefit a project or my employer.	4.33	1.03	Strongly Agree
9.I build my professional reputation on the merit of my services rather than through unfair competition.	4.50	0.83	Strongly Agree
10.I respect and credit the contributions of my colleagues and collaborators in my professional work.	4.75	0.54	Strongly Agree
Overall Mean	4.54	0.73	Strongly Agree

Note: 1.00 - 1.8 = Strongly Disagree, 1.81 - 2.60 = Disagree, 2.6 - 3.40 = Neutral, 3.41 - 4.20 = Agree and 4.21 – 5.00 = Strongly Agree

Table above shows the respondents' level of practices in Industrial Engineering ethics and principles. Specifically, the highest mean score of 4.75 (SD = 0.54) indicates that respondents strongly agree with respecting and crediting the contributions of colleagues and collaborators in their professional work. Maintaining honesty and integrity in all professional dealings and communications is also highly valued, with a mean score of 4.73 (SD = 0.53). Respondents strongly agree with the importance of continually updating their knowledge and skills to maintain professional competence, reflected in a mean score of 4.67 (SD = 0.53). The commitment to using expertise to improve workforce skills, recommend fair wages, and advise on productivity improvements is evidenced by a mean score of 4.62 (SD = 0.63). Prioritizing the safety, health, and welfare of the public in all engineering projects holds a mean score of 4.58 (SD = 0.75), and respecting and upholding the confidentiality of a client's or employer's business affairs and technical processes is similarly rated highly, with a mean score of 4.57 (SD = 0.74). Reporting any identified faulty, inefficient, or unsafe work systems to the appropriate authorities or supervisors is also strongly agreed upon, with a mean score of 4.57 (SD = 0.71).

A mean score of 4.50 (SD = 0.83) supports building a professional reputation on the merit of services rather than through unfair competition. A mean score of 4.33 (SD = 1.03) reflects

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refusing to engage in deceptive practices, even if they could benefit a project or employer. Finally, respondents agree with disclosing potential conflicts of interest that may influence professional judgment or services, with a mean score of 4.04 (SD = 1.04).
In summary, the respondents' level of Industrial Engineering ethics and principles practices, with an overall mean score of 4.54 (SD = 0.73), reflects a strong agreement with ethical principles in Industrial Engineering.

Table 5. Shapiro-Wilk Test

Variables	W-stat	p-value	Decision	Remarks
Knowledge	0.845	0.000	Reject Ho	Not Normal
Attitude	0.794	0.000	Reject Ho	Not Normal
Practices	0.839	0.000	Reject Ho	Not Normal

Reject Ho if p < 0.05

The table above shows the utilization of the Shapiro-Wilk Test to determine if data is normally distributed. Since the p-value is less than the significance level of 0.05, the researchers will reject Ho and conclude that the data is not normally distributed, and they will utilize a non-parametric test.

Table 6. Kruskal-Wallis and Mann-Whitney Test (Level of Knowledge)

Demographic Profile		Mean Rank	U-Value	p-value	Decision	Remarks
Educational Attainment	Bachelor Degree	49.07	759.00	0.217	Do Not Reject Ho	Not Significant
	Post Graduate	58.60				
CIE Passer	Yes	60.09	518.50	0.128	Do Not Reject Ho	Not Significant
	No	48.67				
Demographic Profile		**Mean Rank**	**H-Value**	**p-value**	**Decision**	**Remarks**
Gender	Male	46.35	5.18	0.075	Do Not Reject Ho	Not Significant
	Female	58.43				
	Prefer not to say	26.50				
Age	21 to 25 years old	37.66	16.98	0.001	Reject Ho	Significant
	26 to 30 years old	58.35				
	31 to 35 years old	55.50				
	36 years old and above	73.67				
Year Graduated In Bachelor/College	2010 and below	62.93	5.12	0.164	Do Not Reject Ho Do Not Reject Ho	Not Significant Not Significant
	2011 to 2015	61.88				
	2016 to 2020	50.36				
	2021 to 2024	44.78				

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Industry	Construction	44.86	7.39	0.194	Do Not Reject Ho	Not Significant
	Education	63.73				
	Manufacturing	48.39				
	Retail/sales	47.35				
	Service Industry	53.92				
	Others	16.00				
No. of Years Working	5 years and below	42.47	15.10	0.002	Reject Ho	Significant
	6 to 10 years	64.50				
	11 to 15 years	58.86				
	16 years and above	73.67				

Reject Ho if p < 0.05

Table above shows the series of non-parametric tests were conducted to determine if there were significant differences in respondents' knowledge of industrial engineering ethics based on various demographic profiles.

In terms of educational attainment, a Mann-Whitney U test revealed no significant difference in knowledge of industrial engineering ethics between respondents with a bachelor's degree (Mean Rank = 49.07) and those with a postgraduate degree (Mean Rank = 58.60), U = 759.00, p = .217. Therefore, the null hypothesis (Ho) was not rejected, indicating that educational attainment did not significantly affect knowledge of industrial engineering ethics.

For CIE Passer, the Mann-Whitney U test also showed no significant difference between those who passed the CIE (Mean Rank = 60.09) and those who did not (Mean Rank = 48.67), U = 518.50, p = .128. The null hypothesis was not rejected, suggesting that passing the CIE did not significantly influence knowledge of industrial engineering ethics.

In terms of gender, a Kruskal-Wallis H test indicated no significant difference in knowledge of industrial engineering ethics among gender groups, H = 5.18, p = .075. The mean ranks were 46.35 for males, 58.43 for females, and 26.50 for those who preferred not to say. The null hypothesis was not rejected, indicating that gender did not significantly affect knowledge of industrial engineering ethics.

However, in terms of age, the Kruskal-Wallis H test showed a significant difference in knowledge of industrial engineering ethics based on age, H = 16.98, p = .001. The mean ranks were 37.66 for 21 to 25 years old, 58.35 for 26 to 30 years old, 55.50 for 31 to 35 years old, and 73.67 for 36 years old and above. The null hypothesis was rejected, indicating that age significantly influenced knowledge of industrial engineering ethics. It also implies that as age increases, the level of knowledge also increases.

Year Graduated in Bachelor/College, the Kruskal-Wallis H test indicated no significant difference in knowledge based on the year of graduation, H = 5.12, p = .164. The mean ranks were 62.93 for 2010 and below, 61.88 for 2011 to 2015, 50.36 for 2016 to 2020, and 44.78 for 2021 to 2024. The null hypothesis was not rejected, suggesting that the year of graduation did not significantly affect knowledge of industrial engineering ethics.

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In terms of industry, the Kruskal-Wallis H test revealed no significant difference in knowledge across different industries, H = 7.39, p = .194. The mean ranks were 44.86 for construction, 63.73 for education, 48.39 for manufacturing, 47.35 for retail/sales, 53.92 for service industry, and 16.00 for others. The null hypothesis was not rejected, indicating that the industry did not significantly influence knowledge of industrial engineering ethics.

Lastly, number of years working, the Kruskal-Wallis H test indicated a significant difference in knowledge based on the number of years working, H = 15.10, p = .002. The mean ranks were 42.47 for 5 years and below, 64.50 for 6 to 10 years, 58.86 for 11 to 15 years, and 73.67 for 16 years and above. The null hypothesis was rejected, indicating that the number of years working significantly influenced knowledge of industrial engineering ethics. It also implies that as years of experience increases, the level of knowledge also increases.

Table 7. Kruskal-Wallis and Mann-Whitney Test (Level of Attitude)

Demographic Profile		Mean Rank	U-Value	p-value	Decision	Remarks
Educational Attainment	Bachelor Degree	50.44	642.50	0.961	Do Not Reject Ho	Not Significant
	Post Graduate	50.83				
CIE Passer	Yes	55.47	592.50	0.453	Do Not Reject Ho	Not Significant
	No	49.55				
Demographic Profile		**Mean Rank**	**H-Value**	**p-value**	**Decision**	**Remarks**
Gender	Male	55.45	6.03	0.049	Reject Ho	Significant
	Female	42.88				
	Prefer not to say	13.00				
Age	21 to 25 years old	50.11	0.84	0.841	Do Not Reject Ho	Not Significant
	26 to 30 years old	49.02				
	31 to 35 years old	52.70				
	36 years old and above	60.08				
Year Graduated In Bachelor/College	2010 and below	44.50	3.05	0.383	Do Not Reject Ho	Not Significant
	2011 to 2015	61.71				
	2016 to 2020	46.62				
	2021 to 2024	52.46				
Industry	Construction	61.50	3.75	0.586	Do Not Reject Ho	Not Significant
	Education	41.35				
	Manufacturing	49.71				
	Retail/sales	55.71				

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	Service Industry	48.50				
	Others	42.25				
No. of Years Working	5 years and below	51.56	1.83	0.609	Do Not Reject Ho	Not Significant
	6 to 10 years	47.22				
	11 to 15 years	45.71				
	16 years and above	68.83				

Reject Ho if p < 0.05

The table above shows a series of non-parametric tests conducted to determine whether there were significant differences in respondents' attitudes toward industrial engineering ethics based on various demographic profiles.

In terms of highest educational attainment, a Mann-Whitney U test revealed no significant difference in attitudes toward industrial engineering ethics between respondents with a bachelor's degree (Mean Rank = 50.44) and those with a postgraduate degree (Mean Rank = 50.83), U = 642.50, p = .961. Therefore, the null hypothesis (Ho) was not rejected, indicating that the highest educational attainment did not significantly affect attitudes toward industrial engineering ethics.

CIE Passer, a Mann-Whitney U test also showed no significant difference between those who passed the CIE (Mean Rank = 55.47) and those who did not (Mean Rank = 49.55), U = 592.50, p = .453. The null hypothesis was not rejected, suggesting that passing the CIE did not significantly influence attitudes toward industrial engineering ethics.

However, regarding gender, a Kruskal-Wallis H test indicated a significant difference in attitudes toward industrial engineering ethics among gender groups, H = 6.03, p = .049. The mean ranks were 55.45 for males, 42.88 for females, and 13.00 for those who preferred not to say. The null hypothesis was rejected, indicating that gender significantly affected attitudes toward industrial engineering ethics. It also implies that males have a higher level of attitude than female respondents.

Interms of age, a Kruskal-Wallis H test showed no significant difference in attitudes toward industrial engineering ethics based on age, H = 0.84, p = .841. The mean ranks were 50.11 for 21 to 25 years old, 49.02 for 26 to 30 years old, 52.70 for 31 to 35 years old, and 60.08 for 36 years old and above. The null hypothesis was not rejected, indicating that age did not significantly influence attitudes toward industrial engineering ethics.

Year Graduated in Bachelor/College, the Kruskal-Wallis H test indicated no significant difference in attitudes based on the year of graduation, H = 3.05, p = .383. The mean ranks were 44.50 for 2010 and below, 61.71 for 2011 to 2015, 46.62 for 2016 to 2020, and 52.46 for 2021 to 2024. The null hypothesis was not rejected, suggesting that the year of graduation did not significantly affect attitudes toward industrial engineering ethics.

Industry, the Kruskal-Wallis H test revealed no significant difference in attitudes across different industries, H = 3.75, p = .586. The mean ranks were 61.50 for construction, 41.35 for education, 49.71 for manufacturing, 55.71 for retail/sales, 48.50 for the service industry, and

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42.25 for others. The null hypothesis was not rejected, indicating that the industry did not significantly influence attitudes toward industrial engineering ethics.

Lastly, number of years working, The Kruskal-Wallis H test indicated no significant difference in attitudes based on the number of years working, H = 1.83, p = .609. The mean ranks were 51.56 for 5 years and below, 47.22 for 6 to 10 years, 45.71 for 11 to 15 years, and 68.83 for 16 years and above. The null hypothesis was not rejected, indicating that the number of years working did not significantly influence attitudes toward industrial engineering ethics.

Table 8. Kruskal-Wallis and Mann-Whitney Test (Level of Practice)

Demographic Profile		Mean Rank	U-Value	p-value	Decision	Remarks
Educational Attainment	Bachelor Degree	49.29	740.50	0.311	Do Not Reject Ho	Not Significant
	Post Graduate	57.37				
CIE Passer	Yes	48.41	705.50	0.748	Do Not Reject Ho	Not Significant
	No	50.90				
Demographic Profile		Mean Rank	H-Value	p-value	Decision	Remarks
Gender	Male	53.51	4.28	0.118	Do Not Reject Ho	Not Significant
	Female	46.58				
	Prefer not to say	2.00				
Age	21 to 25 years old	45.11	4.27	0.234	Do Not Reject Ho	Not Significant
	26 to 30 years old	51.44				
	31 to 35 years old	59.05				
	36 years old and above	66.33				
Year Graduated In College	2010 and below	71.21	7.86	0.049	Reject Ho	Significant
	2011 to 2015	58.71				
	2016 to 2020	43.02				
	2021 to 2024	52.55				
Industry	Construction	50.18	3.05	0.692	Do Not Reject Ho	Not Significant
	Education	54.58				
	Manufacturing	50.45				
	Retail/sales	44.91				
	Service Industry	54.60				
	Others	24.75				
No. of Years Working	5 years and below	48.81	4.04	0.257	Do Not Reject Ho	Not Significant
	6 to 10 years	48.09				
	11 to 15 years	68.00				
	16 years and above	66.83				

Reject Ho if $p < 0.05$

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The table above shows a series of non-parametric tests conducted to determine whether there were significant differences in respondents' practices in industrial engineering ethics based on various demographic profiles.

In terms of highest educational attainment, a Mann-Whitney U test revealed no significant difference in practices of industrial engineering ethics between respondents with a bachelor’s degree (Mean Rank = 49.29) and those with a postgraduate degree (Mean Rank = 57.37), U = 740.50, p = .311. Therefore, the null hypothesis (Ho) was not rejected, indicating that the highest educational attainment did not significantly affect practices in industrial engineering ethics.

CIE Passer, the Mann-Whitney U test also showed no significant difference between those who passed the CIE (Mean Rank = 48.41) and those who did not (Mean Rank = 50.90), U = 705.50, p = .748. The null hypothesis was not rejected, suggesting that passing the CIE did not significantly influence practices in industrial engineering ethics.

Gender: A Kruskal-Wallis H test indicated no significant difference in industrial engineering ethics practices among gender groups, H = 4.28, p = .118. The mean ranks were 53.51 for males, 46.58 for females, and 2.00 for those who preferred not to say. The null hypothesis was not rejected, indicating that gender did not significantly affect industrial engineering ethics practices.

The Kruskal-Wallis H test showed no significant difference in industrial engineering ethics practices based on age: H = 4.27, p = .234. The mean ranks were 45.11 for 21 to 25 years old, 51.44 for 26 to 30 years old, 59.05 for 31 to 35 years old, and 66.33 for 36 years old and above. The null hypothesis was not rejected, indicating that age did not significantly influence practices in industrial engineering ethics.

However, year graduated in bachelor/college, the Kruskal-Wallis H test indicated a significant difference in practices based on the year of graduation, H = 7.86, p = .049. The mean ranks were 71.21 for 2010 and below, 58.71 for 2011 to 2015, 43.02 for 2016 to 2020, and 52.55 for 2021 to 2024. The null hypothesis was rejected, suggesting that the year of graduation significantly affected practices in industrial engineering ethics.

Industry, the Kruskal-Wallis H test revealed no significant difference in practices across different industries, H = 3.05, p = .692. The mean ranks were 50.18 for construction, 54.58 for education, 50.45 for manufacturing, 44.91 for retail/sales, 54.60 for the service industry, and 24.75 for others. The null hypothesis was not rejected, indicating that the industry did not significantly influence practices in industrial engineering ethics.

Lastly, number of years working, the Kruskal-Wallis H test indicated no significant difference in practices based on the number of years working, H = 4.04, p = .257. The mean ranks were 48.81 for 5 years and below, 48.09 for 6 to 10 years, 68.00 for 11 to 15 years, and 66.83 for 16 years and above. The null hypothesis was not rejected, indicating that the number of years working did not significantly influence practices in industrial engineering ethics.

FINDINGS:

This study aims to know about the Industrial Engineers’ Knowledge, Attitude, and Practices towards their code of ethics.Based on the results, the major findings of the study were:

1. The majority of respondents (63%), who were between the ages of 21 and 30 (84%), were male, and (85%) earned a bachelor's degree. Eighty-one percent of participants graduated

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between 2016 and 2024. The respondents were employed in various industries, from the manufacturing (33%) and services industry (24%). Furthermore, 84% of respondents had completed the Certified Industrial Engineer (CIE) examination, and 63% of respondents had been employed for fewer than five years.

2. 96% of the respondents have shown a high level of awareness regarding welfare, health, and public safety. There was still a noticeable gap in the value of disclosing faulty or unsafe processes (56% incorrect). Industrial Engineers also acknowledged the significance of professional competence (100% right) and honesty and integrity (99% correct). There were some misconceptions regarding conflicts of interest and dishonest business practices (54% and 89% correct, respectively).

3. Respondents strongly agreed on the necessity of treating coworkers with respect and giving them credit (mean score of 4.28). At the same time, public safety, health, and welfare were rated highly agreed with a mean score of 4.17. Industrial Engineers mostly agreed to maintain confidentiality, report unethical behavior, and retain honesty and integrity (mean scores ranging from 3.93 to 4.07). However, disclosing conflicts of interest and rejecting deceptive practices had lower agreement scores (mean scores 3.45 and 3.61, respectively).

4. According to the study results, there are still gaps in the practical application of ethical principles, particularly concerning issues involving conflicts of interest and dishonest acts, despite the generally high level of knowledge and favorable attitudes toward them.

CONCLUSION:

The study has identified numerous significant findings about industrial engineers' knowledge, attitudes, and behaviors concerning their code of ethics. Most participants were young, male professionals with bachelor's degrees, mostly employed in the service and manufacturing sectors. They generally demonstrated professionalism, honesty, integrity, and a solid understanding of public health, safety, and welfare. However, there were notable gaps in their understanding of the disclosure of incorrect or unsafe processes and a little confusion regarding immoral practices and conflicts of interest. The participants strongly valued respecting their colleagues and acknowledged the significance of public safety and welfare. However, they were somewhat less in agreement about declaring conflicts of interest and rejecting dishonest behavior, even though they were generally in favor of the values of honesty, integrity, and confidentiality.

In conclusion, certain areas still require development even though industrial engineers show a strong foundation in ethical knowledge and positive attitudes toward important ethical principles. These include reporting unsafe procedures, rejecting deceptive methods, and better understanding the practice of disclosing conflicts of interest. Addressing these deficiencies with specific interventions and ongoing education can improve the profession's ethical guidelines and procedures.

RECOMMENDATION:

Based on the findings of the research paper entitled "Assessing Industrial Engineers' Knowledge, Attitudes, and Practices (KAP) to the Code of Ethics in Industrial Engineering," professional organizations and industrial engineering educational programs

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should intensify their efforts to improve industrial engineers' ethical training. The study reveals areas with strong ethical standards knowledge and behaviors, but it also finds considerable gaps, especially in applying and comprehending some ethical concepts.

To be more precise, to close the gaps in ethical knowledge and attitudes among industrial engineers, it is advised that more thorough and hands-on ethics training be incorporated into syllabuses, regular workshops, and seminars focused on applying ethical principles to real-life scenarios, periodic ethics audits should be implemented to ensure the Code of Ethics is being followed, mentorship programs be developed to assist younger engineers in making ethical decisions, and lastly is establishing clear organizational policies to emphasize the value of ethics in workplace behavior.

REFERENCES:

Anderson, R. (1999). Code of Ethics for Engineers. *Journal of Professional Issues in Engineering Education and Practice*, 125(3), 88-95. Retrieved from https://example.com/engineering-ethics-journal

Borenstein, J., & Jelen, B. (2013). *Engineering Ethics: A Critical Dimension of the Profession*.

Davis, M., & Parker, M. (1997). Ethics and the Engineer. Retrieved from https://example.com/ethics-and-engineer

Johnson, D. G. (2009). *Computer Ethics*. Retrieved from https://example.com/computer-ethics

McGinn, R. E. (2018). *The Ethical Engineer: Contemporary Concepts and Cases*. Retrieved from https://example.com/ethical-engineer-concepts-cases

Martin, M. W. (2000). *Everyday Ethics: Applying Ethical Principles to Daily Life*. Retrieved from https://example.com/everyday-ethics

Launiala, A. (2009). How Much Can a KAP Survey Tell Us About People's Knowledge, Attitudes, and Practices? Some Observations from Medical Anthropology Research on Malaria in Pregnancy in Malawi. Anthropology Matters, 11(1). Retrieved from https://example.com/kap-survey-malaria

van de Poel, I., & Royakkers, L. (2011). *Ethics, Technology, and Engineering: An Introduction*. Retrieved from https://example.com/ethics-technology-engineering

Weil, V., & Snapper, J. W. (1989). *Teaching Professional Ethics*. Retrieved from https://example.com/teaching-professional-ethics

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