Evaluating Rwanda Polytechnic Graduates' Self-Assessment on The Application of Soft Skills in The Workplace

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Abstract

The global appreciation for graduates possessing strong soft skills is evident, especially in the evolving nature of the engineering workplace. However, studies across the world highlighted a disconnect between employers' expectations and the soft skills of entry-level engineers, impacting their employability. This research evaluated the Rwanda Polytechnic graduates' self-assessment regarding the application of soft skills in the workplace. A survey on 107 graduates, after piloting soft skills and career development training, utilized a semi-structured questionnaire with a 5-point Likert scale and open-ended questions. Data analysis included descriptive statistics, graphs, and thematic analysis. The results indicated that graduates attested a high application of professional ethics and time management skills (M=4.38, SD=0.66) and communication skills (M=4.29, SD=0.70). On the other hand, professional writing, management, leadership skills, and interpersonal abilities scored a moderate level of application (3.41<M<4.20). Qualitative responses underscored the importance of soft skills in determining the level of graduates' performance in the workplace. However, it was also emphasized that there is a need to reinforce computer literacy, collaboration skills, and time management skills. The findings of the present study underscored a meaningful connection between soft skills needed in the current and future engineering workplace and soft skills applied by the graduates. It is recommended that training institutions collaborate with industries to identify the precise soft skills needed to plan for effective training. Future researches in the form of experimental and correlational studies are recommended for getting a clear impact of specific soft skills on the graduates' performance in the workplace.

Keywords: time management, performance, self-assessment, soft skills, workplace

1. Introduction

In the current workplace, there is a sudden and significant paradigm shift in relation with engineers' employment perspectives (Kaushal & Vaghela, 2023). In the past, business owners needed an engineer with a strong command of hard skills, who could perform duties in a technically sound manner. However, the modern labour market favours engineers who can coordinate multiple competencies to accomplish a goal (Passow & Passow, 2017). Many entry-level engineers come with the desired technical skills but, at work, the difference in their performance comes from how they are equipped with soft skills (Hirudayaraj et al., 2021). In fact, hard skills are not being considered as the conclusive indicators of engineering graduates' performance in the workplace. A survey in four universities in Lebanon indicated that even engineering graduates know that their personal attributes and non-technical skills would play a great role in employers' decision about their employment (Itani & Srour, 2016).

Globally, to compete in the workplace of today, students must learn high-level technical skills that are expected for positions in their fields as well as the soft skills that will allow them keep these positions or advance to better ones. Franco-Ángel et al. (2022) stress that both hard skills and soft skills are important for undergraduate students, but emphasize how soft skills lead their performance to a greater

extent. Learning and utilizing an array of soft skills can assist someone in landing a job, advancing in a position within the company, and having a longer career (Afroze et al., 2019, p. 26). One study in the mining engineering found that soft skills training increase the decision latitude and social support of employees (Molek-Winiarska & Kawka, 2022). It was also observed that soft skills affect the engineering graduates' first job experience (Diokno & Peprah, 2021).

Among the future-ready workforce top skills projected for 2025, creativity and innovation skills, problem-solving skills, leadership and social influence as well as flexibility and critical thinking skills make the list (Li, 2022). However, although there is a growing demand of soft skills in the engineering workplace, several studies show that the application of these skills in the workplace is not yet very satisfying. For example, Dubey et al. (2022) showed that there is a gap of soft skills in the information technology sector. Another survey on US engineering organizations revealed that there is a difference between employers' highly rated important soft skills and the level of entry-level engineers' proficiency in the same skills, with communication skills being the worst (Hirudayaraj et al., 2021). Moreover, in Bangladesh, it was reported that entry-level engineers are good at technology and numerical problem solving but show low performance in terms of communication, time management, teamwork and leadership skills (Afroze et al., 2019, p. 29). A moderate level of application of skills like communication, moral, professional ethics and life-long learning was also recorded in Malaysian Polytechnics (Esa et al., 2014).

Given the purported mismatch between employers' expectations in the workplace and graduates' soft skills, the future workforce in African countries may be even worse. It is projected that 11 million young people will be entering the labour market each year until 2030 (USAID, 2021). This shows that the workplace is becoming very competitive in Africa. Particularly in Rwanda, the tracer survey on Rwanda Polytechnic (RP) graduates revealed that graduates still need to improve their communication skills, ability to work under pressure, negotiation skills and leadership skills (RP, 2021). Another survey in Kigali revealed that many job seekers fail to appear on shortlisted candidates due to their poor curriculum vitae and cover letters presented (Iradukunda, 2022). In the same survey, it was also found that candidates fail during the interview process due to their poor public speaking and low level of idea articulation. This indicates that, even in the Rwandan context, employers' expectations on the graduates' soft skills are not at a desired level.

Among different solutions under implementation in Rwanda, Kepler College Kigali initiated a soft skills training programs in partnership with RP. In this line, a pilot training program for soft skills and career development (SCAD) was carried out at the Integrated Polytechnic Regional College (IPRC) Gishari in 2021. The current study aimed to evaluate IPRC Gishari graduates' self-assessment on the effective application of acquired soft skills in the workplace. The study provides valuable insights into the effectiveness of the acquisition and application of soft skills in engineering. It also offers actionable data for refining educational curricula and training programs about soft skills, ensuring that graduates are better prepared to meet the employers' expectations.

The present study rests upon the identical elements theory, which posits that the effectiveness of skills transfer from a training environment to the real workplace is greatly enhanced when the training environment closely mirrors the conditions and requirements of the workplace (Jaidev, 2014). Aligning with this theory, the current study estimates that IPRC Gishari graduates' experiences and expectations during the training were met in the workplace. Therefore, carrying out an evaluation on their self-assessment about the effective application of acquired soft skills, the study helps to understand how these graduates relate the soft skills training and the performance in the workplace.

2. Method

The present study employed a case study research design in order to get an in-depth and multi-facet understanding of RP graduates' self-assessment of the effective application of acquired soft skills in the workplace. The study population was composed by 146 graduates who were trained about soft skills in the first cohort in SCAD. Sampling procedure was done through simple random sampling whereas the Yamane sampling formula was used to determine the sample size at 95% confidence level.

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$$n = \frac{N}{1 + N(e)^2} \qquad (1)$$

Referring to (1), n stands for the sample size, N is the population size whereas e is the acceptable sampling error which is related to the confidence interval. After calculations, the sample size of the current study was n=107 at e=0.05.

To collect data, a semi-structured questionnaire was administered to 107 graduates working in different domains after completing the training. The questionnaire involved twenty-five 5-point Likert scale items covering five domains of soft skills. These are communication skills, management and leadership skills, professional writing skills, professional ethics and time management skills and interpersonal skills. For each domain, five items were developed in line with the research objective and based on the existing body of literature about soft skills in the engineering workplace.

On the other hand, two open-ended questions intended to uncover IPRC Gishari graduates' self-assessment on the usefulness of soft skills applied in the workplace and what additional soft skills are needed. Data analysis involved descriptive statistics, use of graphs and thematic analysis. The scoring range in Table 1 was used as a reference for classifying the graduates' self-assessment scores. The calculations of average scores and standard deviations was performed using the built-in functions in Microsoft excel.

Table 1. Scoring range for the five-point Likert scale data

Description	Value	Range
Strongly Disagree (SD)	1	1.00-1.80
Disagree (D)	2	1.81-2.60
Neutral (N)	3	2.61-3.40
Agree (A)	4	3.41-4.20
Strongly Agree (SA)	5	4.21-5.00

Source: (Sözen & Güven, 2019)

To ensure that all ethical issues are addressed, before administering the online survey to the graduates, a clear introduction on the purpose of the research was made. Additionally, researchers explained how the personal identifications are kept anonymous and that the data collected are only used for the research purpose. Moreover, it was explained that the participation was voluntary and that at any time one was allowed to cancel his or her responses.

3. Results and Discussion

The primary aim of the present study was to evaluate the self-perceived efficacy of soft skills application among graduates from IPRC Gishari within actual workplace environments. A central research query revolved around understanding how these graduates assess themselves about their effective application the soft skills they acquired during the training. To capture sound insights, data from the respondents were collected using Likert scale items, the outcomes of which are meticulously detailed across multiple tables: Table 2, Table 3, Table 4, Table 5, and Table 6. Additionally, to provide a comprehensive understanding of the findings, a graphical representation is depicted in Figure 1. Beyond quantitative metrics, qualitative responses from the participants underwent thematic analysis. This qualitative exploration allowed for a deep understanding of the graduates' perspectives, shedding light on their experiences and perceptions related to the practical application of acquired soft skills in diverse workplace scenarios. By juxtaposing quantitative and qualitative data, the study endeavours to offer a

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holistic perspective on application of acquired soft skills by IPRC Gishari graduates within real-world professional contexts.

Data presented in Table 2 indicate that, on average, IPRC Gishari graduates strongly agree that they communicate effectively in the workplace (M=4.29, SD=0.70), with a particular highest level in oral presentation skills (M=4.45, SD=0.66). However, in areas like detailed explanations, negotiation, and the use of polite language, the self-assessment shows that things are good but there is a need for reinforcement. The results imply that IPRC Gishari graduates exhibit high confidence in applying communication skills, acquired during SCAD training. This study aligns with a prior study by Hirudayaraj et al. (2021), highlighting the importance of communication skills for entry-level engineers. There is also a consistence with this study that, some challenges in face-to-face communication persisting in both cases, possibly are influenced by the chosen medium of communication.

Table 2. Communication skills in the workplace

Questions	M	SD
I communicate well according to the needs, in various situations.	4.41	0.64
I make detailed explanations, presentations based on important content as well as influencing and persuading others	4.22	0.69
I am able to handle effective negotiation activities with various parties such as workmates, clients/customers, or other stakeholders.	4.18	0.70
I always use polite language in face-to-face or virtual communication with my supervisors and workmates	4.17	0.78
I am able to prepare and deliver an oral presentation of the offered services to the clients or customers, stakeholders, etc.	4.45	0.66
Average	**4.29**	**0.70**

Table 3. Management and leadership skills in the workplace

Questions	M	SD
I give clear and good direction to the group members in fulfilling a given task/duty.	4.03	0.85
I often guide, give guidance, and motivate team members at the workplace.	4.21	0.80
At the workplace, I often work well with team members.	4.39	0.72
At the workplace, I practice various methods of solving problems in the team.	4.13	0.73
At the workplace, I always solve problems in completing the various tasks/assignments given.	4.10	0.80
Average	**4.17**	**0.78**

On the part of management and leadership skills, the overall score shows that respondents moderately rate themselves in being able to apply these soft skills in the workplace (M=4.17, SD=0.78). As it is indicated in Table 3, it is clear that graduates are very good at giving guidance and motivation to workmates and working well with them. However, there is a small deviation from the rating in giving clear direction which falls in the category of "Agree". On the other hand, a low average standard deviation suggests that there is a consistent perception of effective application of soft skills in the workplace. Management and leadership skills have also been rated as very significant employment factors for engineers (Itani & Srour, 2016).

Table 4. Professional writing skills in the workplace

Questions	M	SD
I often provide paperwork such as reports, memos, meeting minutes, and official letters in the correct format.	4.11	0.78
My Curriculum vitae (CV)/Resume I submitted to the company/ institution is complete according to a professional format.	4.31	0.68
I am able to express ideas, thoughts, and feelings effectively in writing at the workplace.	4.05	0.72
At the workplace, I often submit reports to my supervisor without exceeding the deadline.	4.19	0.71
I often communicate with my supervisor/ manager by sending him/her an email or SMS in case of any improvise issues such as apologizing for absenteeism, lateness, etc.	4.10	0.86
Average	**4.15**	**0.75**

Table 4 shows that, on average, the graduates' self-assessment on the application of professional writing skills in the real-world workplace scenarios lies in the moderately positive agreement range (M=4.15, SD=0.75). Notably, these graduates showed a very positive rating of their confidence in producing professional resumes or curriculum vitae. These data link graduates' perceptions with existing literature on the importance of professional writing skills in the real workplace like Passow and Passow (2017), who found that engineers spend more than half of their work day communicating. Engineering students also shown expectation that communication and writing skills will be among factors which will determine their employability in relation with industry and career (Itani & Srour, 2016).

Table 5. Professional ethics and time management skills in the workplace

Questions	M	SD
At the workplace, I always practice the concept of integrity in my duties.	4.20	0.68
At the workplace, I use time effectively and efficiently to fulfil my tasks and duties.	4.36	0.64
At the workplace, I often focus on tasks and make an effort to avoid inefficiency.	4.30	0.69
I always arrive at work on time and make a calendar for day-to-day tasks as well as meeting the deadline.	4.88	0.75
At the workplace, I always accept new challenges and additional responsibilities.	4.14	0.56
Average	**4.38**	**0.66**

As it is presented in Table 5, professional ethics and time management skills have got very positive rating by IPRC Gishari graduates with a viable consistency (M=4.38, SD=0.66). Graduates report strong agreement on the application of task scheduling, effective use of time and task-focus practices. However, results for professional ethics like integrity and responding to new challenges and responsibilities show that there is a need of reinforcement. The findings in this section are consistent with some previous studies. For example, the systematic review about the competencies which should get much attention in undergraduate engineering, planning and time management received the highest ranking (Passow & Passow, 2017). In the workplace, engineers should be conscious in their actions and decisions with ethical perspectives (de Campos et al., 2020). However, similar to the current study, Esa

et al. (2014) found moderate score for the application of moral and professional ethics in civil engineering department.

Table 6. Interpersonal skills in the workplace

Questions	M	SD
At the workplace, I always show flexibility when asked to take on other's tasks.	4.18	0.66
At the workplace, I am friendly and approachable to my workmates.	4.26	0.70
At the workplace, I collaborate with others in identifying their potential contribution to the shared goal of the company or institution.	4.03	0.88
At the workplace, I treat everyone with dignity, trust, and respect.	4.14	0.67
At the workplace, I have the ability to listen to and respect others when fulfilling a given duty/ task with my workmates.	4.15	0.66
Average	**4.15**	**0.71**

The rating on the application of interpersonal skills, as presented in Table 6, reveals that graduates' self-assessment falls in a moderately positive range (M=4.15, SD=0.71), with only one dimension related to friendliness and approachability in the workplace standing in the highly positive rating (M=4.26, SD=0.70). This shows that the application of these soft skills has not yet reached an excellent level. These results are similar to those reported in Bangladesh about teamwork skills (Afroze et al., 2019) and in Malaysia about moral skills (Esa et al., 2014). In these two cases, the application of these interpersonal skills in the workplace were also at low level. It means that these are aspects of soft skills which need to be addressed by all parties including students, universities and organizations.
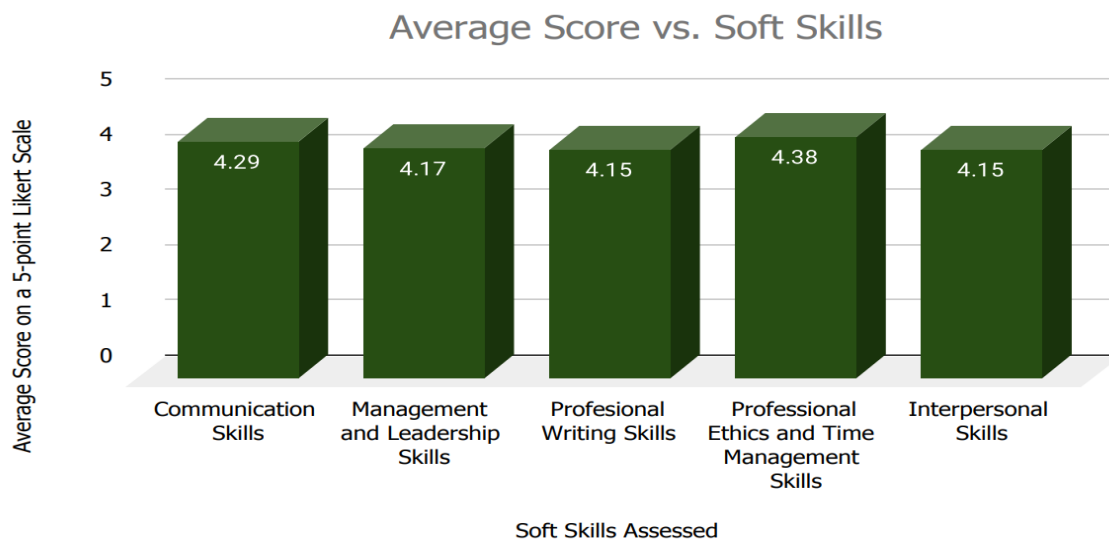

Figure 1. Graduates' self-assessment scores on the application five soft skills

Previous discussions have focused on individual soft skills for having a wide picture of soft skills application in the workplace from the graduates' self-assessment, up do different dimensions. Now, Figure 1 presents the overall view of these results for a flexible evaluation of IPRC Gishari graduates' self-assessment on their effective application of soft skills in the workplace. Based on the scoring range presented in Table 1, Figure 1 indicates that there is a difference in overall IPRC Gishari graduates' self-assessment on the effective application among the five soft skills. It is clear that both professional

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ethics and time management skills and communication skills are highly rated for being applied in the workplace. This show that these are the mostly needed soft skills for entry-level engineers.

These results can be linked to the engineering workplace environment's demand for employees. Research suggests that engineers spend between 55% and 60% of their work day practicing communication (Passow & Passow, 2017, p. 491). This shows how entry-level engineers must be highly engaged in communication for being successful at work, and for those already trained in SCAD, it explains why they are much applying communication skills. Similarly, the results align with the common view in different studies and reports that time management skills are the core skills in the 21-first century workplace (Hirudayaraj et al., 2021; Kaushal & Vaghela, 2023; Mookim, 2021).

On the other hand, skills including management and leadership, interpersonal skills and professional writing skills fall in a moderate rating. One can say that these graduates are putting an average effort in applying these skills. Linking this with some previous studies, de Campos et al. (2020, p. 2147) observe that engineering employers have a relatively low need of teamwork and leadership skills, given that having work groups has become common in different organisations. It is also claimed that some soft skills like active listening and emotional intelligence are losing their high preference due to the industry 4.0 revolutions (Li, 2022). However, Molek-Winiarska and Kawka (2022) confirmed that self-management and leadership skills improve decision latitude in the workplace. In Freeman and Salzman's (2018) study, one employee attested that having skills in writing procedures help in successful accomplishment of management tasks in the engineering workplace.

Through thematic analysis technique, an evaluation of IPRC Gishari graduates' qualitative responses from two open-ended questions about the application of acquired soft skills in the workplace and related gaps, was carried out. From 8 responses about the helpfulness of the assessed soft skills in the workplace and 5 responses regarding other soft skills which are not assessed but that may help, performance in the workplace and soft skills for reinforcement emerged as the main themes. All responses reflect on how the acquired soft skills helped the graduates to perform at work. Very importantly, teamwork, collaboration or friendship environment is a dimension which was mentioned by 4 of 8 responses. For example, one respondent said "Yes! team work and collaboration and reporting they are very crucial and help someone as employees to become the best employee" whereas another said "soft skills help be accommodative and enhance teamwork spirit at the workplace. They also make good environment at the job". Others also pointed out the role of communication and time management in their success at work like one saying "Yes! Communication help someone to fulfil his/ her duties at workplace".

In terms of essential soft skills that should be incorporated into training programs, one participant highlighted the importance of computer proficiency, saying "yes! computer literacy such as google drive, google suit and the use of google calendar". This graduate' suggestion may stem from the fact that the modern workplace requires an extensive use of computers as tools to facilitate tasks, aligning with the ubiquitous integration of information and communication technology (ICT) across various sectors of work. Interestingly, graduates called for special focus on leadership skills, effective communication, and problem-solving skills. The recurrence of these specific skills in their feedback underscores their importance and suggests a pressing need for focused attention during soft skills training initiatives.

The analysis of qualitative responses showed that the performance at work for IPRC Gishari graduates is a result of the acquired of soft skills. This is in agreement with one research by Molek-Winiarska and Kawka (2022) who emphasize that soft skills training about teamwork, communication, self-motivation and conflict-resolution skills help in coping with stressful environments. In overall, the results show that there is a successful transfer of skills from SCAD training to the workplace in line with the identical element theory (Jaidev, 2014). According to Khartite (2022), the training environment can determine the application of soft skills in the workplace.

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4. Conclusion

The objective of the present study was to evaluate IPRC Gishari graduates' self-assessment on the effective application of soft skills in the workplace. From the data collected, data analysis and discussions undertaken, this objective was achieved. Quantitative data have successfully shown the levels of graduates' self-assessments about how they apply the acquired soft skills in the workplace. Professional ethics, time management skills and communication skills scored very high levels whereas management and leadership skills, professional writing skills and interpersonal skills scored moderate levels of application. Qualitative data showed how IPRC Gishari graduates perceive their performance at work according to the application of acquired soft skills and thus pointing out which soft skills can be reinforced or newly introduced for improving their performance. Although graduates of IPRC Gishari self-report that they are very proficient in some soft skills areas, the way in which these talents are applied differs greatly across these areas. Certain domains exhibit remarkably elevated application levels, indicating a strong proficiency in specific soft skill sets. Other domains, however, only show moderate application levels. This unequal distribution highlights the possibility that graduates may need additional development in some soft skills while excelling in others. While the study successfully met its objective, it is essential to acknowledge certain limitations that warrant consideration for future research and training. Firstly, one of the primary constraints pertains to the scope of soft skills assessed within this study. The research did not encompass the entirety of the soft skills landscape. This limitation implies that there might be a number of aspects of soft skills that remain unexplored within the parameters of this study. Secondly, another noteworthy limitation is the exclusive reliance on graduates' self-assessment as the sole source of data collection. In light of these limitations and insights drawn from the study findings, few recommendations emerge and are provided respective to concerned bodies.

Rwanda Polytechnic and other similar higher learning institutions: Training institutions are recommended to collaborate with industry stakeholders for insights on relevant and specific soft skills nedded, focusing on real-world like avenues during training, getting real-time feedback from both graduates and employers. It is recommended also to prepare soft skills trainers and engage them in capacity building about soft skills training pedagogy.

Soft skills trainers: Soft skills teachers can take several steps including diversity in assessment methods like peer evaluations, instructor observations, and real-world projects; contextualize the curriculum by integrating varied scenarios and case studies; encourage student self-reflection to enhance self-awareness and continuous learning;

Future work: It is recommended that future work can explore different contexts of engineering workplace and find out which specific soft skills are demanding for specific engineering fields. Future researchers are also recommended to undertake experimental or correlational studies to find out which specific soft skills are determining the graduates' performance in the workplace.

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