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The Resonant Insight into Problem-Solving Skills among University Students: A Numerical Analysis

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Original Article

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Keywords

Problem-solving skills; Pakistani university students; gender differences; academic discipline

Abstract

This study investigates problem-solving skills and gender differences among Pakistani university students. A survey assessed students' self-reported problem-solving abilities across ten areas. Results (University of Jhang sample) indicate students perceive strengths in critical thinking, problem identification, and plan development. However, areas for improvement include considering multiple approaches and handling complex challenges. While both genders perceive high problem-solving skills, males were rated slightly higher. These findings offer insights into gender-specific problem-solving tendencies and inform interventions to enhance these skills. The research highlights the importance of curriculum development that emphasizes critical thinking and problem-solving strategies. Additionally, interventions promoting self-reflection and complex problem-solving approaches can contribute to student growth. Future research should explore factors influencing problem-solving skills and validate self-reported measures with objective assessments.

1. Introduction

Problem-solving skills are fundamental in our everyday lives and vital to personal, academic, and professional success. These skills enable individuals to effectively identify, analyze, and resolve complex problems. In an ever-changing world that demands adaptability and innovation, problem-solving skills are increasingly valued, particularly among university students who are preparing to enter the workforce. This introduction aims to provide an overview of the importance of problem-solving skills among university students in Pakistan, drawing upon insights and findings from top journals in the field (Ahmed et al., 2017).

Problem-solving abilities have become essential for students as they navigate through academic, professional, and personal problems in today's fast-changing world. As educators and stakeholders in education, it is essential to thoroughly explore the many aspects that form and impact students' ability to solve problems. To create an environment where students can excel as skilled problem solvers, it is crucial to comprehend the complex relationship between personal characteristics, cognitive abilities, meta-cognitive skills, educational background, academic achievements, employability, career advancement, environmental influences, and assessment techniques (Asif et al., 2020).

The efficacy of problem-solving is rooted in the inherent characteristics of pupils. These qualities comprise a variety of characteristics, such as resilience, inventiveness, adaptability, and persistence. Students with these characteristics often have a tendency to confront issues directly, actively pursue creative solutions, and persevere in the face of obstacles. By acknowledging and fostering these innate attributes, students may greatly improve their ability to solve problems, allowing them to tackle assignments with assurance and ingenuity (Babar, et al., 2019).

The cognitive processes that regulate how pupils perceive, understand, and solve complicated challenges are fundamental to problem-solving ability. Students' problem-solving skills are significantly influenced by cognitive talents such as critical thinking, logical reasoning, pattern identification, and information processing. Through focused interventions and instructional techniques, educators may enhance students' cognitive processes, enabling them to deliberately and methodically solve complex issues. This approach promotes a deeper comprehension of fundamental ideas and principles (Hmelo, 2004).

Meta-cognitive abilities, such as self-awareness, self-regulation, strategic planning, and reflective thinking, are equally important in the process of problem-solving. Students with robust meta-cognitive skills have an enhanced ability to observe and assess their cognitive processes, appraise the effectiveness of their problem-solving strategies, and adapt as required. Through the cultivation of meta-cognitive awareness and the promotion of a growth mindset, educators may provide students with the required cognitive skills to effectively manage uncertainty, conquer challenges, and continuously improve their problem-solving abilities (Khan & Shafique, 2019).

The educational journey acts as a crucible for cultivating and honing students' problem-solving abilities. Classroom experiences, practical learning opportunities, cooperative projects, and real-life applications all contribute to developing students' problem-solving skills. Through the development of curricula that prioritize inquiry-based learning, experiential learning, and interdisciplinary exploration, educators can create an environment that promotes curiosity, experimentation, and innovation. This sets the foundation for students to become skilled problem solvers in various situations (Qaisar, et al., 2018).

The correlation between problem-solving skills and academic achievement, employability, and job success highlights the crucial importance of these abilities in influencing students' future paths. A high level of skill in problem-solving is not only associated with greater academic success, but also improves students' opportunities in the job market and their capacity to flourish in a quickly changing workforce. Employers place a growing importance on individuals that exhibit robust problem-solving skills, as they are more capable of navigating ever-changing work settings, creating original solutions, and achieving organizational success. Therefore, incorporating problem-solving abilities into educational systems is crucial not only for promoting academic achievement but also for equipping students with the necessary skills to navigate the problems and prospects they would encounter in their future professions (Manalo, et al., 2013).

The learning environment has a significant impact on the development of pupils' problem-solving abilities. Classroom culture, peer relationships, teacher assistance, and availability to resources are influential factors that may either enhance or impede students' capacity to effectively participate in problem-solving. Creating a conducive and all-encompassing learning atmosphere that encourages students to confidently engage in intellectual challenges, work together with their peers, and seek help when necessary is crucial for fostering a culture of exceptional problem-solving skills. In addition, giving students access to technology, engaging them in hands-on activities, and immersing them in real-world simulations may enhance their learning experiences and enhance their problem-solving skills (Allen & Dupuis, 2020).

Assessment functions as a diagnostic instrument to evaluate students' problem-solving aptitude and provide feedback for their development and improvement. Conventional evaluation techniques like standardized examinations often fail to fully capture the intricacy and subtlety of students' problem-solving skills. By adopting alternative assessment strategies like performance-based assessments, portfolios, projects, and case studies, educators can gain more genuine insights into students' problem-solving methods. This enables them to customize instruction to address individual needs and develop a more profound understanding of students' strengths and areas for improvement (Dunlosky et al., 2013).

1.1 The Significance of Problem-Solving Skills

Problem-solving skills are essential for individuals to navigate the challenges of the 21st century. They empower individuals to overcome obstacles, make informed decisions, and find innovative solutions. In the academic context, these skills are crucial for students to shine in their studies and become active contributors to their fields of study. Employers highly value professional candidates with strong problem-solving abilities as they contribute to organizational success and productivity. Furthermore, problem-solving skills foster critical thinking, creativity, and analytical reasoning, enabling individuals to tackle complex issues and contribute positively to society (Dunlosky et al., 2013).

1.2 The State of Problem-Solving Skills among University Students in Pakistan

Developing problem-solving skills among university students in Pakistan is a topic of growing interest among researchers. Several studies have shed light on the current state of problem-solving skills, identifying strengths, weaknesses, and areas for improvement. For instance, a study conducted by Qaisar, Ali, and Yasin (2018) explored problem-solving skills among undergraduate students in Pakistan and highlighted the need for curriculum enhancement to foster critical thinking and analytical abilities. Similarly, Khan and Shafique (2019) investigated problem-solving skills among engineering students and emphasized the importance of problem-based learning approaches to develop these skills effectively.

1.3 Statement of the problem

The ability to solve problems is a fundamental skill that helps students overcome obstacles, come up with creative solutions, and succeed in a variety of spheres of life. Still, there is a lack of knowledge on the variables that affect university students' ability to develop and apply their problem-solving abilities.

This knowledge gap makes it more difficult for teachers to develop students' problem-solving skills and get them ready for the demands of a world that is getting more complicated and dynamic by the day. The particular socio-cultural setting of the university area further complicates matters and calls for a more thorough investigation of the ways in which individual traits, cognitive processes, meta-cognitive skills, educational experiences, academic performance, employability and career success, environmental factors, assessment methods, interventions and

strategiesinfluence university students' capacity for problem-solving respectively. Research on the resonant insight into problem-solving abilities among students of the University of Jhang, Pakistan, is therefore desperately needed in order to improve student outcomes and the educational system at the university level.

1.4 Research Objectives

1. To investigate the impact of individual traits on the problem-solving abilities of university students
2. To explore the role of educational experiences in shaping the development of problem-solving skills among university students

1.5 Research Questions

1. What individual traits contribute most significantly to the problem-solving capabilities of university students?
2. How do educational experiences influence the problem-solving skills of university students?

2. Literature Review

This literature review aims to comprehensively analyze the existing research on problem-solving skills among university students. Through a literature synthesis, this review identifies critical findings and gaps in knowledge, offering insights for future research and interventions. Research on problem-solving skills revealed significant correlations between critical thinking use and study self-efficacy, locomotion, assessment, and independent self-construal, where Auckland students exhibited higher scores than Japanese student groups. Conversely, the Okinawa students demonstrated higher scores in interdependent self-construal compared to the other two groups. Reported critical thinking use did not differ significantly between the groups (Manalo et al., 2013).

The review examines the factors influencing problem-solving skills, the assessment methods used to measure problem-solving abilities, and the interventions and strategies employed to enhance problem-solving skills.

Motivation and self-efficacy play vital roles in problem-solving skill development. Students who are motivated to solve problems and have confidence in their abilities are more likely to persist in challenging tasks and employ effective problem-solving strategies (Kramarski&Michalsky, 2017). Motivational interventions, such as goal-setting and feedback, have been found to positively impact problem-solving skills among university students (Huang et al., 2020).

Problem-solving skills are essential for success in today's complex and dynamic world, particularly in the university context. Students encounter various academic, professional, and personal challenges that require practical problem-solving. Understanding the factors influencing problem-solving skills among university students is crucial for educational institutions to develop effective strategies for fostering these skills (Dunlosky et al., 2013).

2.1. Factors Influencing Problem-Solving Skills

2.1.1 Individual Traits

Cognitive abilities, such as critical thinking, analytical reasoning, and creativity, significantly influence problem-solving skills (Mayer, 2010; Zhang & Sternberg, 2005). Self-efficacy beliefs and intrinsic motivation are crucial in a student's problem-solving performance and persistence (Schoenfeld, 1992). Certain personality traits, such as directness to experience and tolerance for ambiguity, are positively associated with practical problem-solving skills (Zhang & Sternberg, 2005).

2.1.2 Cognitive Processes

Meta-cognitive processes, including problem representation, planning, monitoring, and evaluation, contribute to practical problem-solving skills (Hmelo-Silver, 2004). Efficient information processing supports successful problem-solving outcomes, such as attention control, working memory capacity, and cognitive flexibility (Jonassen, 2000). Using problem-solving heuristics and strategies, such as algorithmic and analogical reasoning, can enhance problem-solving efficiency and effectiveness (Jonassen, 2000).

2.1.3 Meta-cognitive Skills

Meta-cognition refers to an individual's awareness and control over their own thinking processes. Students who possess meta-cognitive skills can effectively plan, monitor, and evaluate their problem-solving approaches. Several studies have emphasized the role of meta-cognitive skills in enhancing problem-solving abilities among university students (Efklides, 2011). The development of these abilities may be facilitated by the use of meta-cognitive methods, which include think-aloud protocols and reflection exercises, among other things (Kroesbergen et al., 2016).

2.1.4 Educational Experiences

A well-designed curriculum that includes opportunities for active learning, problem-based learning, and authentic assessments can promote problem-solving skills (Prince, 2004). Various instructional approaches, such as scaffolding, peer collaboration, and reflective practices, have been found to enhance problem-solving abilities (Prince, 2004; Scott et al., 2004). Integrating technology tools and simulations into educational environments can provide interactive problem-solving experiences and foster critical thinking skills (Hmelo-Silver, 2004).

2.1.5 Academic Performance

Strong problem-solving skills have been associated with improved academic performance across various disciplines. A study by Muis et al. (2018) found a positive correlation between problem-solving skills and academic achievement among university students. Effective problem solvers are more likely to approach complex academic tasks with confidence and persistence, leading to higher grades and deeper learning (Arendasy et al., 2021).

2.1.6 Employability and Career Success

Employers highly value problem-solving skills, as they are crucial for navigating dynamic work environments and solving complex organizational challenges. Research indicates a strong relationship between problem-solving skills and employability among university graduates (Allen & Dupuis, 2020). Students who can demonstrate effective problem-solving abilities are more likely to secure internships and job offers and have successful careers (Wilpert et al., 2019).

2.1.7 Environmental Factors

The social context, including peer interactions, teamwork, and collaborative learning environments, can positively impact problem-solving skills (Prince, 2004). Cultural factors, such as individualism or collectivism, can shape problem-solving approaches and strategies among university students (Prince, 2004). Adequate academic and psychological support systems, including tutoring services and counseling, can facilitate problem-solving skill development (Prince, 2004).

2.1.8 Assessment Methods

Traditional assessment methods, such as written exams and problem-solving tasks, have been used to evaluate problem-solving skills (PISA, 2012). Performance-based assessments, including case studies, simulations, and real-world projects, provide more accurate and

comprehensive measures of problem-solving abilities (PISA, 2012). Self-report measures like questionnaires and surveys can capture students' self-perceived problem-solving skills and meta-cognitive awareness (PISA, 2012).

2.1.9 Interventions and Strategies

Cognitive and meta-cognitive training programs focusing on problem analysis, goal setting, and self-reflection have shown promising results in enhancing problem-solving skills among university students (Scott et al., 2004).

Summing Up, Various factors influence the development of problem-solving skills among university students in Pakistan. These factors encompass individual attributes, educational environments, teaching methodologies, and cultural influences. Individual attributes such as cognitive abilities, motivation, and self-regulation are crucial in shaping problem-solving capabilities (Ahmed et al., 2017). Furthermore, educational institutions significantly impact the development of these skills through curriculum design, pedagogical approaches, and the integration of real-world problem-solving experiences (Sultana et al., 2020). Moreover, cultural and societal factors influence problem-solving skill development by fostering or inhibiting critical thinking and creativity (Babar et al., 2019).

2.2 Strategies to Enhance Problem-Solving Skills among University Students

Recognizing the importance of problem-solving skills, universities in Pakistan have begun implementing strategies to enhance their students' problem-solving abilities. These strategies include curriculum revisions to incorporate problem-based learning approaches, integrating technology to provide interactive learning experiences, and including collaborative projects that promote teamwork and creativity (Asif et al., 2020).

Additionally, faculty training programs have been introduced to equip educators with the necessary tools and techniques to effectively nurture problem-solving skills among students (Mubarak et al., 2018).In conclusion, problem-solving skills are of utmost importance for university students in Pakistan, contributing to academic success, employability, and societal development. Understanding the current state of problem-solving skills, the factors influencing their development, and implementing effective strategies to enhance these skills are crucial steps toward equipping students with the necessary tools to thrive in an increasingly complex and dynamic world.

3. Research Methodology

The present research study was descriptive in nature, and a survey method was used for data collection.

The population of this research study consisted of public universities in Sargodha and Jhang, located in Punjab, Pakistan. Further study was delimited to the University of Jhang, and from this university, only four departments, English, Psychology, Education, and Sociology, were selected using a random sampling technique. A total of 216 students from these departments were selected with a purposive sampling technique. An adaptive questionnaire was used in the research of Wilpert et al. (2019), which was based on a five-point Likert scale for the data collected. The validity and reliability of the questionnaire wereanalyzed and then modified according to the situation. The researcher personally distributed the questionnaires and collected them after recording the responses. Furthermore, theresponse rate was 90%.

In this research, a set of ten self-administered (10) statements related to problem-solving skills was utilized to evaluate the capabilities of the participants. The collected data was analyzed with the use of SPSS V-22.0, and relevant tests such as mean, standard deviation, t-test, and p-value (Sign.) were applied. The t-test was employed to investigate gender differences in problem-solving

skills, as it allowed for identifying any significant differences between the two groups' means. The significance level (also denoted as the p-value) was used to indicate the probability of obtaining the observed difference in means (or a more extreme difference) if there is no actual difference between the two groups.

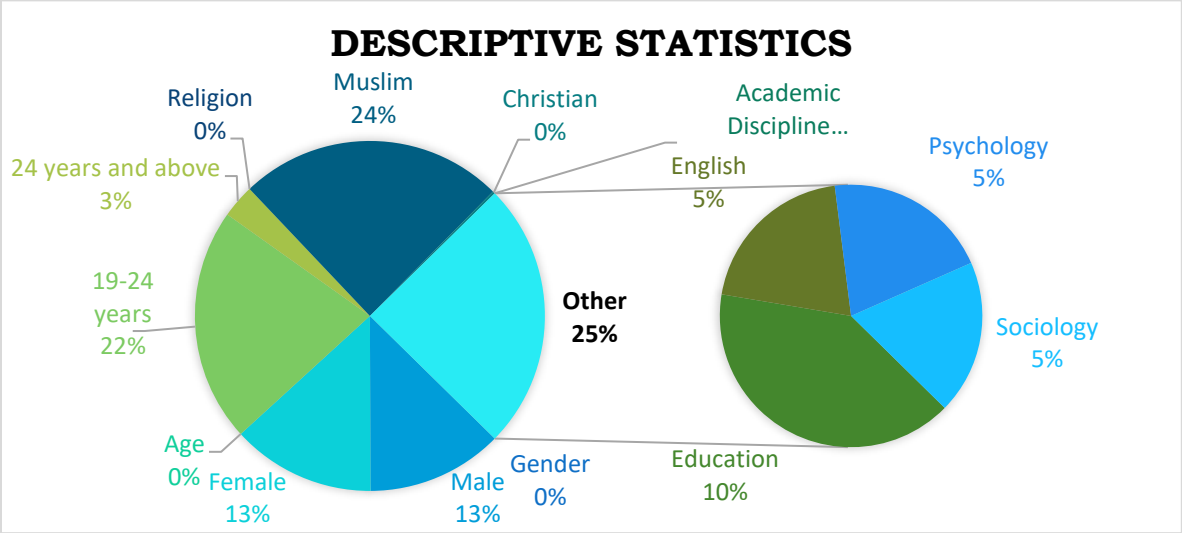
4.Data Analysis

4.1 Societal Statistics

Table 1 shows the participant demographics breakdownconcerning gender, age, and academic disciplines. Of the 216 students who participated in the survey, 110 were male (constituting 50.93%), while 116 were female (comprising 53.70%). Most respondents fell within the age range of 19 to 24 years (87.7%), while the remaining were 24 years or older (12.4%). The data on academic disciplines reveals that the education department had the highest number of respondents (40.3%), followed by English (20.4%), psychology (20.2%), and sociology (19.1%).

Table 1. Respondents' Demographic

Demographic Category	Number of Participants	Percentage of Participants
Gender		
Male	110	50.93%
Female	116	53.70%
Age		
19-24 years	189	87.7%
24 years and above	27	12.4%
Religion		
Muslim	214	99.1%
Christian	2	0.9%
Academic Discipline		
Education	87	40.3%
English	44	20.4%
Psychology	44	20.2%
Sociology	41	19.1%

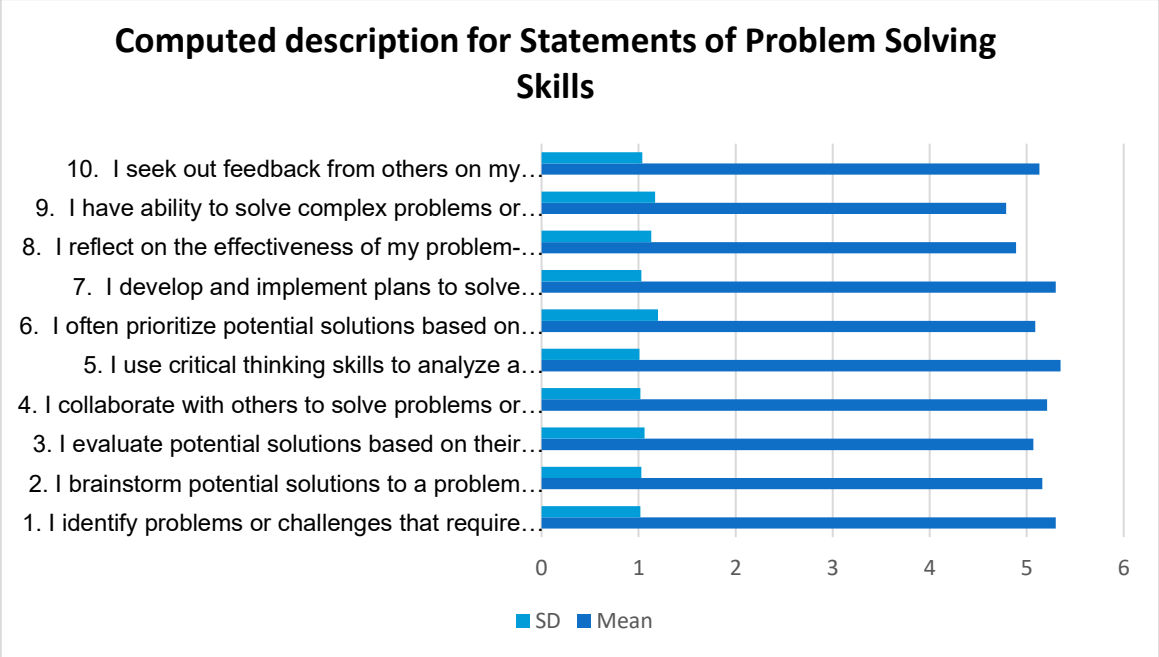


4.2. Insight into Problem-Solving Skills

These statements are related to problem-solving skills, and each one represents a self-reported level of proficiency or behavior related to problem-solving. The Mean score represents the average rating of the respondent's self-reported proficiency, and the standard deviation (SD) shows the variation in the data set.

Table 2. Computed Description for Statements of Problem-solving Skills

Statements	Mean	SD
1. I identify problems or challenges that require solutions.	5.30	1.02
2. I brainstorm potential solutions to a problem or challenge.	5.16	1.03
3. I evaluate potential solutions based on their feasibility, effectiveness, and impact.	5.07	1.06
4. I collaborate with others to solve problems or challenges.	5.21	1.02
5. I use critical thinking skills to analyze a problem or challenge and identify potential causes and effects.	5.35	1.01
6. I often prioritize potential solutions based on their urgency or importance.	5.09	1.20
7. I develop and implement plans to solve problems or challenges.	5.30	1.03
8. I reflect on the effectiveness of my problem-solving strategies and adjust them accordingly.	4.89	1.13
9. I have the ability to solve complex problems or challenges.	4.79	1.17
10. I seek out feedback from others on my problem-solving skills and strategies.	5.13	1.04



The table summarizes ten statements' mean scores and standard deviations of self-reported proficiency in problem-solving skills. The highest mean score was "I use critical thinking skills to analyze a problem or challenge and identify potential causes and effects" (5.35), with a standard deviation of 1.01. This suggests that the respondents felt proficient in using critical thinking skills to analyze problems or challenges. Critical thinking is an essential skill in problem-solving, as it allows for the identification of the root cause of a problem, which is necessary for finding an effective solution.

I identify problems or challenges that require solutions" received a high mean score of 5.30 with a relatively small standard deviation of 1.02. This suggests that the respondents felt confident identifying problems or challenges requiring solutions. This is an essential skill in problem-solving anda primary step in finding a solution to a problem. "I develop and implement plans to solve problems or challenges" received a mean score of 5.30 with a standard deviation of 1.03. This indicates that the respondents felt confident in developing and implementing plans to solve problems or challenges. This is a crucial skill in problem-solving, as it allows for translating potential solutions into actionable plans.

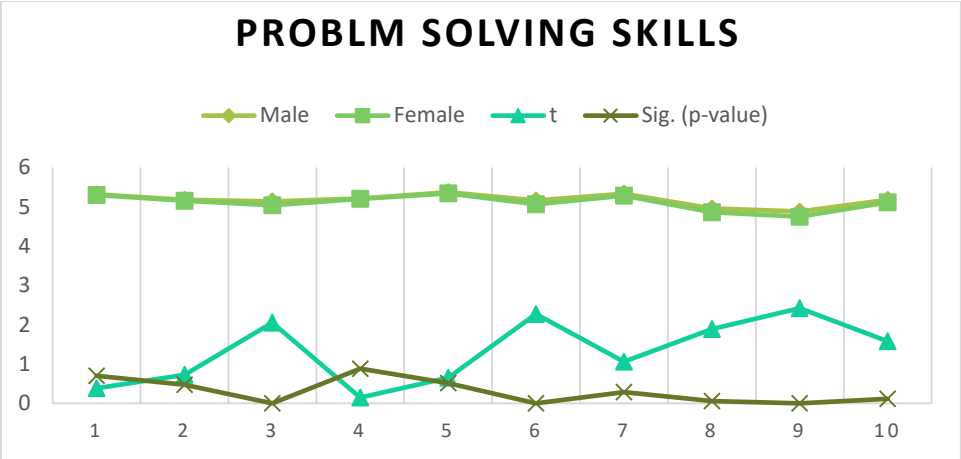
"I reflect on the effectiveness of my problem-solving strategies and adjust them accordingly" received a lower mean score of 4.89 with a relatively large standard deviation of 1.13. This suggests that the respondents were less proficient in reflecting on the effectiveness of their problem-solving strategies and adjusting them accordingly. This is a crucial skill in problem-solving, as it allows for refining problem-solving approaches based on previous experience. "I can solve complex problems or challenges" received the lowest mean score of 4.79 with a standard deviation of 1.17. This indicates that the respondents felt less confident solving complex problems or challenges. This is an essential skill in problem-solving, as it allows for resolving more complex and intricate problems. Overall, the standard deviations were relatively small, suggesting that there was not a significant amount of variability in the respondents' self-reported proficiency ratings for these problem-solving skills. These findings provide an overview of the similarities and differences in problem-solving skills and strategies between males and females based on the data presented in the table.

4.3. Differences in Gender on Problem-solving Skills

This table presents data on statements related to problem-solving skills and strategies, categorized by gender. The table provides the average scores (on a scale) for males and females separately and statistical values such as t-value and significance level (Sig.), also called a p-value, for each statement.

Table 3. Comparison of means between genders on problem-solving skills

Statements	Male	Female	t	Sig. (p-value)
1. I identify problems or challenges that require solutions.	5.32	5.30	.386	.700
2. I brainstorm potential solutions to a problem or challenge.	5.18	5.15	.725	.469
3. I evaluate potential solutions based on their feasibility, effectiveness, and impact.	5.14	5.04	2.052	.040*
4. I collaborate with others to solve problems or challenges.	5.21	5.20	.147	.883
5. I use critical thinking skills to analyze a problem's potential causes and effects.	5.37	5.34	.656	.512
6. I often prioritize potential solutions based on their urgency or importance.	5.16	5.06	2.268	.023*
7. I develop and implement plans to solve problems or challenges.	5.33	5.28	1.063	.288
8. I reflect on the effectiveness of my problem-solving strategies adjust accordingly.	4.96	4.86	1.888	.059
9. I have the ability to solve complex problems or challenges.	4.88	4.75	2.420	.016*
10. I seek out feedback from others on my problem-solving skills and strategies.	5.18	5.11	1.577	.115



Both males and females scored relatively high in identifying problems or challenges that require solutions, with males at 5.32 and females at 5.30. The variance between the two groups is statistically insignificant ($t = 0.386$, $p > 0.05$). The average scores for males (5.18) and females (5.15) are close in describing the brainstorming potential solutions. The slight difference is not statistically significant ($t = 0.725$, $p > 0.05$). Evaluating potential solutions of females scored slightly lower (5.04) than males (5.14). The difference is statistically significant ($t = 2.052$, $p < 0.05$), indicating that females tend to evaluate potential solutions less favorably. There is no significant difference between males (5.21) and females (5.20) when it comes to collaborating on problem-solving ($t = 0.147$, $p > 0.05$). Using critical thinking skills on males (5.37) and females (5.34) scored similarly high in applying critical thinking to analyze problems. The difference is insignificant ($t = 0.656$, $p > 0.05$).

For the prioritizing potential solutions, males (5.16) scored slightly higher than females (5.06). The difference is statistically significant ($t = 2.268$, $p < 0.05$), indicating that males prioritize potential solutions more than females. There is no significant difference between males (5.33) and females (5.28) in terms of developing and implementing plans ($t = 1.063$, $p > 0.05$). On reflecting on problem-solving strategies: Males (4.96) have slightly higher scores compared to females (4.86), but the difference is statistically insignificant ($t = 1.888$, $p > 0.05$).Females (4.75) scored slightly lower than males (4.88)in solving complex problems. The difference is statistically significant ($t = 2.420$, $p < 0.05$), indicating that males have a slightly higher ability to solve complex problems. Seeking feedback on problem-solving skills, there is no significant difference between males (5.18) and females (5.11) in terms of seeking feedback from others ($t = 1.577$, $p > 0.05$).

5. Discussion

Prior research has highlighted the importance of problem-solving abilities in several areas, stressing its impact on academic, professional, and personal achievements. Consistent with previous studies, the current research demonstrates that respondents had a strong degree of trust in essential problem-solving abilities, such as critical thinking and issue identification. These results support the previous research that emphasizes the significance of these fundamental competencies in efficiently managing complex difficulties (Huang, et al., 2020).

Furthermore, the discovery of regions with lesser competency, specifically in the areas of reflecting on problem-solving techniques and addressing complicated issues, is consistent with prior research indicating that these abilities are generally seen as more difficult or need intentional

practice to completely develop. Research has shown that engaging in reflective practices and using meta-cognitive methods significantly contribute to the improvement of problem-solving skills over a period of time. Hence, treatments focused on encouraging self-reflection and meta-cognitive awareness has the potential to tackle the noted discrepancies and cultivate stronger problem-solving capacities in people (Kroesbergen, et al., 2016).

The subtle distinctions between boys and females in certain areas of problem-solving aptitude align with prior studies investigating gender-related disparities in cognitive capabilities and problem-solving strategies. Although there are general similarities across genders, there are also small differences in some abilities, such as the ability to evaluate and prioritize viable solutions. These differences highlight the necessity of taking gender-specific elements into account when building treatments that cater to individuals' needs. In addition, the comparatively low variability in proficiency ratings indicates a high level of agreement among respondents evaluating their problem-solving skills (Kramarski & Michalsky, 2017).

The consistent nature of skill levels among the sample group indicates a steady perception, which in turn provides a dependable basis for targeted interventions and training programs. To summarize, combining the current results with prior research improves our comprehension of problem-solving ability and guides future study and practical applications. To enable people to succeed in various environments, schools, businesses, and legislators may target areas of poorer competence, use gender-specific techniques, and encourage reflective behaviours. Continued study may delve deeper into the intricate aspects that impact problem-solving abilities, eventually leading to the creation of more efficient treatments and techniques to improve problem-solving skills across different groups of people (Muis, et al., 2018).

6. Conclusion

The participants' demographics offer vital contextual information that aids in understanding the sample's makeup and its implications for generalizability. The relatively equal representation of males and females enhances the reliability of gender-related findings while focusing on young adults within a specific age range allows for a focused examination of problem-solving skills during this developmental stage. However, the small number of participants aged 24 years and above limits the generalizability of findings to older age groups (Paul, 2019).

The distribution of participants across various academic disciplines enables the exploration of problem-solving skills in different domains. The representation of Education, English, Psychology, and Sociology disciplines provides insights into potential variations in problem-solving approaches among students pursuing different fields of study. This diversity highlights the need for discipline-specific interventions and strategies to enhance problem-solving skills tailored to the unique demands of each academic discipline (Arendasy et al,. 2021).

This research advances knowledge about gender differences in problem-solving skills and strategies. While males and females demonstrate similar proficiencies in several problem-solving aspects, significant differences were identified in solution evaluation, prioritization, and complex problem-solving abilities. These findings highlight the importance of considering gender-specific tendencies when addressing problem-solving challenges. The implications of these findings can guide the development of inclusive and effective strategies for enhancing problem-solving abilities among individuals of all genders. Future research and interventions should explore and address these variations to promote equitable development and success in problem-solving endeavors. By recognizing and addressing gender differences in problem-solving, we can foster a more balanced and inclusive problem-solving environment, unlocking the full potential of individuals in various domains (Efklides, 2011).

By considering the demographic characteristics of the participants, researchers and educators can better understand the sample composition and its implications for the interpretation and generalizability of findings. These considerations contribute to the validity and applicability of research findings in problem-solving skills and guide the development of targeted interventions to enhance problem-solving abilities among diverse populations. By continuing to investigate and enhance problem-solving skills among students, educational institutions can better prepare them for the demands of the workforce and equip them with essential skills for personal and professional success (Zhang, et al., 2005).

7. Recommendations

Understanding gained from the research, a number of suggestions may be put up to improve problem-solving abilities in individuals:

1) Create and execute well-organized training programs that aim to improve critical thinking abilities, the ability to identify problems, and the skill of evaluating potential solutions. These programs are to include interactive exercises, case studies, and real-world situations to provide practical experience and promote the development of skills.
2) Promote the adoption of reflective practices among people by consistently assessing the efficacy of their problem-solving approaches and making necessary adjustments. Offering chances for self-evaluation and feedback may promote ongoing development in problem-solving skills.
3) Customize managements to target gender-specific disparities in problem-solving methodologies. Acknowledge and adapt to various cognitive types and preferences, guaranteeing that training programs and support activities are inclusive and easily accessible to all persons.
4) Highlight the significance of cooperation and teamwork in activities aimed at overcoming problems. Promote the act of people actively seeking feedback and opinions from others, using the aggregate knowledge available, in order to produce new ideas and efficiently handle challenging issues.
5) Provide teachers' with the essential resources, tools, and support systems to enable their problem-solving endeavours. Provide people with access to pertinent information, advanced technology, and mentoring opportunities in order to equip them with the necessary skills and knowledge to confidently and effectively address challenges.
6) Promote a culture that values ongoing learning and a mentality focused on personal development, where people are motivated to embrace difficult situations, gain knowledge from mistakes, and persevere in their efforts to solve problems. Emphasize resilience and flexibility as crucial characteristics for successfully managing ever-changing and unpredictable situations.
7) Promote the integration of different fields of study and the exploration of a wide range of viewpoints, academic subjects, and approaches to problem-solving. Interacting with many academic disciplines helps expand people' viewpoints and improve their capacity to tackle challenges from diverse perspectives.
8) Provide people with positive feedback and praise for their efforts and successes in problem-solving. Recognize and commemorate achievements, while also offering valuable criticism to support continuous learning and the enhancement of skills.

References

Ahmed, S., Qadir, M. J., Rizwan, M., & Ahmad, N. (2017). Influence of cognitive abilities, self-regulation and motivation on problem-solving skills of university students. Pakistan Journal of Psychological Research, 32(2), 349-370.

Allen, D., & Dupuis, M. (2020). The role of problem solving in graduate employability: A systematic review. Higher Education Research & Development, 39(4), 743-760.

Arendasy, M., Sommer, M., Sommer, J., & Paul, C. (2021). On the assessment of problem-solving competence in higher education: Evidence from a systematic review. Educational Research Review, 34, 100407.

Asif, M., Tariq, R., Khan, A., & Ali, M. (2020). Developing problem-solving skills in higher Education: Perceptions of teachers and students. Journal of Education and Educational Development, 7(1), 33-54.

Babar, M. E., Naqvi, S. H. H., & Aziz, S. (2019). Impact of cultural factors on problem-solving skills among university students: A comparative study of Pakistan and Australia. Pakistan Journal of Psychological Research, 34(2), 505-526.

Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. Psychological Science in the Public Interest, 14(1), 4-58.

Efklides, A. (2011). Interactions of metacognition with motivation and affect in self-regulated learning: The MASRL model. Educational Psychologist, 46(1), 6-25.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? Educational Psychology Review, 16(3), 235-266.

Huang, C., Wu, C. H., Lee, C. W., & Wu, H. C. (2020). Enhancing problem-solving abilities through motivational interventions: The role of self-efficacy and goal orientation. Journal of College Student Development, 61(2), 190-206.

Jonassen, D. H. (2000). Toward a design theory of problem solving. Educational Technology Research and Development, 48(4), 63-85.

Kramarski, B., &Michalsky, T. (2017). Metacognitive instruction in teacher education: The role of metacognitive instruction in developing student teachers' professional knowledge and self-regulation. Teaching and Teacher Education, 67, 89-103.

Kroesbergen, E. H., Van Luit, J. E., &Jonkman, L. M. (2016). The effect of the Singapore mathematics method on first-grade students' understanding of the part-whole concept in relation to their cognitive and metacognitive skills. British Journal of Educational Psychology, 86(4), 511-530.

Khan, S., & Shafique, F. (2019). Problem-solving skills of engineering students: An analysis of current practices and recommendations. European Journal of Engineering Education, 44(4), 540-558.

Muis, K. R., Winne, P. H., Shih, J. C., &Svec, D. A. (2018). Investigating the role of perceived complexity in university students' achievement goals, motivational experiences, and self-regulated learning. Journal of Educational Psychology, 110(4), 458-475.

Mayer, R. E. (2010). The role of domain-specific knowledge in creative problem solving. Handbook of creativity, 104-118.

Manalo, E., Kusumi, T., Koyasu, M., Michita, Y., & Tanaka, Y. (2013). To what extent do culture-related factors influence university students' critical thinking use? Thinking Skills and Creativity, 10, 121–132. https://doi.org/10.1016/j.tsc.2013.08.003

Mubarak, F., Muhammad, T., &Jaffar, A. (2018). Faculty training program to enhance problem-solving skills among university students. International Journal of Educational Excellence,

4(2), 143-158.

Paul, R. W. (2019). A taxonomy of critical thinking dispositions and abilities. In Critical Thinking (pp. 20-32). Brill Sense.

PISA (2012). PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy. OECD Publishing.

Prince, M. (2004). Does active learning work? A review of the research. Journal of Engineering Education, 93(3), 223-231.

Qaisar, S., Ali, S. A., & Yasin, G. (2018). Problem-solving skills of undergraduate students in Pakistan: An empirical analysis. Journal of Applied Research in Higher Education, 10(4), 467-482.

Schoenfeld, A. H. (1992). Learning to think mathematically: Problem solving, metacognition, and sense making in mathematics. Handbook of research on mathematics teaching and learning, 334-370.

Scott, S. G., Leritz, L. E., & Mumford, M. D. (2004). The effectiveness of creativity training: A quantitative review. Creativity Research Journal, 16(4), 361-388.

Sultana, R., Aslam, S., Arif, G., & Aslam, H. D. (2020). Enhancing problem-solving skills through curriculum design: Perceptions of faculty and students. Journal of Education and Educational Development, 7(2), 267-285.

Zhang, L. F., & Sternberg, R. J. (2005). A threefold model of intellectual styles. Educational Psychology Review, 17(1), 1-53.

Wilpert, J., Schreiber, J., Diab, N., &Ittel, A. (2019). Problem-solving skills as a determinant for early career success of young academics. Journal of Workplace Learning, 31(7/8), 489-503.