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A Comparative Study on Problem-Solving Skills and Life Satisfaction among Engineering and Non-Engineering Students

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Abstract: The present research investigates the correlation between problem-solving ability (PS) and life satisfaction (LS) in engineering and non-engineering students and group differences between them. Conducted on a sample population of 120 university students (60 engineering, 60 non-engineering), the research seeks to ascertain whether engineering students gain more life satisfaction from problem-solving skills than non-engineering students. Results add to the evidence base concerning how discipline-specific skills impact well-being and have relevance for curriculum planning and student support services. The findings highlight the interaction between cognitive abilities and subjective well-being across disciplines, providing implications for policymakers and educators who aim to improve both skill acquisition and life satisfaction in higher education.

Keywords: *Problem-Solving Skills, Life Satisfaction, Academic Discipline, Higher Education, Undergraduate Education*

1. Introduction

Psychology is a broad discipline with a broad topic of study in between which problem-solving skills has been one of growing concerns in the last couple of years. Problem-solving skills have been found to play an important extent of influence on the quality of life of a person. To understand how good the quality of life of a person is, one has to research a lot of

psychosocial variables prior to it, and one of them is satisfaction with life. There may be a variety of reasons for a person's satisfaction with life and they may be the individuals with whom they are, nature of goals they have for their lives, how they perform academically, etc (Diener et al., 1985). Most importantly, according to research, one of the greatest predictors of life satisfaction is problem-solving ability (Heppner et al., 2004). A realization of why and how these skills will vary from one field of study to another is of keen interest because one can observe here, the extent to which engineering students are being provided with more lab and formal settings in comparison to their non-engineering peers and more diversity of experience being presented to them.

1.1 Problem Solving Skills

Problem-solving, as defined by Heppner and Petersen (1982), is "a cognitive–affective–behavioral process through which the individual strives to identify or discover effective or adaptive solutions to problems encountered in everyday living." The definition here focuses on the multi-faceted process of problem-solving, with thinking processes (cognitive), management of feelings (affective), and action (behavioral).

1.2 Life Satisfaction

Satisfaction is a Latin term that can be sufficiently translated as make or do. Satisfaction with one's own life assumes an acceptance or satisfaction with one's own life situation, or satisfaction of one's desires and needs for one's life in general. That is, satisfaction with life is an individual evaluation of the quality of one's life. Because it is itself a judgment, inferences about life satisfaction have a significant cognitive content (Diener et al., 1985).

Life satisfaction is more complex than it appears to be; sometimes the term is interchangeably used with that of happiness, but they are two distinct concepts. Life satisfaction is the assessment of one's life as a whole and not just the state of being happy at a particular point in time.

2. Methodology

The rationale for conducting a comparative analysis between life satisfaction and problem-solving skills in engineering and non-engineering students comes from a predilection to gain a greater comprehension of how distinct problem-solving skills impacts life satisfaction.

2.1 Design

The research design for comparing problem-solving skills and its correlation with life satisfaction among engineering and non-engineering is quantitative, descriptive and comparative in nature. The educational area (engineering or non-engineering) is the

independent variable, whereas problem-solving skills and life satisfaction are the dependent variables. A sample of 100 students were taken, 50 students from engineering and 50 from non-engineering with the help of stratified random sampling. The test and tools used are Satisfaction with Life Scale by Diener et al. (1985) and Problem-Solving Scale that consists of the problem-solving items from Rosenbaum's Self- Control Schedule (1980).

Inclusion Criteria: The research involves engineering and non-engineering undergraduate programs, preferably from academic level of second year or higher to make sure that the participants have certain degree of experience in problem-solving and educational exposure.

Exclusion Criteria: Individuals who have not recently enrolled with restricted educational experience as well as those with substantial life problems that highly influences their life satisfaction and academic achievement. Further, individuals who are not academically active, on leave or dropouts are also excluded.

3. Review of Literature

Malvaso and Kang (2022) found that personality traits, together with satisfaction in certain domains of life, explain 53% of overall satisfaction in life. Personality traits, domain satisfaction, and demographic traits are all accountable for overall satisfaction. Personality alone, as important as it is, is not more significant than satisfaction in domains of life. This research warrants an overall concept of life satisfaction.

Kumar and Chaturvedi (2018) research on life satisfaction of Indian final-year engineering students revealed significant positive correlations for social support, work-life balance, and stress. Social support is associated with improving balancing studies and personal life among students, thereby enhancing life satisfaction. Perceived stress is negatively related to life satisfaction, and work-life balance partially mediates this relationship. The results point to interventions in order to enhance the quality of life and mental health of the students, mitigating academic stress and professional pressures.

Wismath et al. (2014) uncovers that students' problem-solving skills were greatly enhanced in active learning. They became more confident, possessed metacognitive awareness, and strategic thinking, which made them analyze and solve intricate problems. They also enhanced communication skills, time management, and organizational skills. The reflective focus of the course enhanced metacognitive development, and this facilitated the students to gain transferable critical thinking skills, which could be transferred outside the academic realm.

These are essential to academic and professional success and underscore the need to prioritize active, reflective problem-solving pedagogy as an across-the-disciplines imperative.

Kirn and Benson (2018) explores how perceptions of problem-solving, motivation, and future career aspirations affect life satisfaction and academic performance. Students who viewed problem-solving activities as aligned with future professional goals were found to have higher intrinsic motivation, resulting in higher participation and life satisfaction. Task alignment with future intentions heightens purpose, optimism, and well-being. Problem-solving skills and academic performance are enhanced with collaborative learning environments. The blending of cognitive and affective factors in problem-solving is highly significant in learning technical skills and developing positive self-concept.

Gál et al. (2021) investigates in university and high school students across transitions to new learning environments social problem-solving, well-being, and life satisfaction relations. The standardized assessment research revealed a decrease in positive and increase in negative and avoidance orientation; negative orientation predicted lower school well-being and life satisfaction. The research offers empirical support for interventions that reduce negative self-efficacy to enable self-regulate and interpersonal skill and treatments to boost logical social problem-solving. Additionally, interventions recommended to boost well-being are structured after-school activities.

Khan et al. (2016) reported that thinking problem-solving style, based on intellectual judgment, objectivity, and reason, is positively predicting Islamabad university students with high life satisfaction. The intuitive style was enjoyed by female students but by male students for the thinking style. The general life satisfaction and other styles of problem-solving were not found to differ with gender. From the research, thinking problem-solving capability could enhance the well-being of students.

4. Results

Group Statistics

Group	N	Mean	Std. Deviation	Std. Error Mean
Problem-Solving				
Engineering	60	82.3	7.8	1.01
Non-Engineering	60	82.1	8.2	1.06
Life Satisfaction				

Engineering	60	7.1	1.2	0.15
Non-Engineering	60	5.9	1.5	0.19

Independent Samples Test

Variable	Levene's Test(F)	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI of the Difference	Cohen's d
Problem-solving	0.12	0.73	0.15	118	0.88	0.2	1.32	[-2.41, 2.81]	0.03
Life satisfaction	2.45	0.12	3.22	118	0.002	1.2	0.37	[0.47, 1.93]	0.65

Correlations for Engineering Students (n=60)

	Problem-Solving	Life Satis
Problem-Solving	1	0.58**
Life Satisfaction	0.58**	1

Correlations for Non-Engineering Students (n=60)

	Problem-Solving	Life Satisfaction
Problem-Solving	1	0.25*
Life Satisfaction	0.25*	1

Notes: ** $p < 0.05$, ** $p < 0.01$ (2-tailed).

Model Summary

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	0.65	0.42	0.39	1.12

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.2	3	18.07	15.2	<0.001
	Residual	74.8	116	1.19		
	Total	129.0	119	119		

Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
(Constant)	2.10	0.85	-	2.47	0.015
Problem-Solving	0.30	0.10	0.36	3.01	0.003
Group (ENG=1)	-0.85	0.55	-0.12	-1.55	0.12
PS × Group	0.25	0.07	0.28	2.89	0.01

5. Discussion

In this study, on engineering and non-engineering students, it was experimented whether problem-solving skill and satisfaction in life were related with a sample of 60 participants from each group. According to the findings, in both groups, life satisfaction was found to have a very strong positive relationship with problem-solving skill, and the relationship was far stronger in the case of engineering students.

Correlational analysis then also established that problem-solving ability significantly and positively correlated with life satisfaction among engineering students ($r = 0.58$, $p < .001$), as had already been indicated by research towards the predictive strength of cognitive ability to promote well-being. For instance, Demir and Arslan (2022) established that higher problem-solving ability among students correlated with higher life satisfaction and therefore postulated that such skills promote general well-being. Additionally, Khan et al. (2016) quoted that those university students who used effective problem-solving styles, the 'thinking' style, had higher life-satisfaction.

Conversely, the non-engineering team demonstrated a moderate yet robust correlation ($r = 0.25$, $p = .004$) between life satisfaction and problem-solving ability. This may be due to the fact that the type of education in engineering will be inclined towards analytical thinking and systematic problem-solving, and thus will have direct application towards daily life and, in turn, higher life satisfaction.

This conclusion was also validated by the results of regression analysis. The interaction term between the group membership variable and problem-solving ability was found to be statistically significant ($\beta = 0.25$, $*p = 0.01$), demonstrating that the influence of problem-solving ability on life satisfaction was higher among engineering students. This shows that the course curriculum and environment of engineering studies can strengthen problem-solving ability as a factor affecting students' satisfaction with life and thus contribute to it more highly.

Notably, the t-test comparison showed that there was no considerable difference between both groups' mean scores of problem-solving capabilities ($p = 0.88$), in the sense that both groups are as capable as each other at solving problems though not with equal effect on life satisfaction.

This may be as a result of variation in utilization or utility of such capabilities in respective fields of study.

Or, there existed a substantial gap in life satisfaction ratings, where engineering students scored higher than their non-engineering peers ($t = 3.22$, $p < .002$). This supports the work of Yadav and Thingujam (2015), who reported that higher hope and optimism were found among engineering students, and these same students also reported greater satisfaction with life, highlighting the role of cognitive as well as affective processing in contributing to well-being.

6. Conclusion

These findings have implications for schools. Incorporating problem-solving instruction into non-engineering subjects can improve the life satisfaction of students by enabling them to solve problems more effectively. Providing also a setting that respects and promotes the application of problem-solving skills in all domains can facilitate the bridging of student groups in life satisfaction.

Future studies should investigate longitudinal impacts and control other variables, including stress resilience and learning motivation, to gain a better understanding of determinants of relationships between problem-solving ability and life satisfaction in diverse education settings.

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