

The Value of Psychometric-Based Career Guidance for Grade 9 and 10 Students: Enhancing Career Decision Self-Efficacy, Adaptability, and Parent–Student Career Alignment

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ABSTRACT

The decision-making process for choosing a career in adolescence has become more complex as education has expanded rapidly, job opportunities have become more available, and societal expectations have increased. Often, students in Grades 9 and 10 (the penultimate years before senior secondary) choose academic streams without carefully considering their aptitude, interests, personality, and employability. The current study investigates the impact of psychometric career guidance in combination with individualized counselling on enhancing adolescents' career decision self-efficacy, adaptability, self-awareness, and future readiness. The study was quasi-experimental, pre-test-post-test in design, comprising 364 students from four state board schools in Pune, Maharashtra. Aptitude, cognitive ability, vocational interests, personality dimensions, and learning preferences were measured using standardized psychometric instruments. Descriptive statistics, Cohen d effect size, Mann–Whitney U validation and False Discovery Rate post-hoc correction were used for statistical analysis. A clear improvement was found in employability awareness, career clarity, career confidence, and adaptability following the intervention. The study adds to the developmental framework by conceptualising psychometric counselling as a psychological readiness model that assists Secondary School students in making informed, resilient, and future-oriented career decisions.

KEYWORDS: Psychometric Career Guidance, Career Decision Self-Efficacy, Career Adaptability, Psychological Readiness, Educational Counselling, Adolescents, Career Clarity, Secondary Education

1. INTRODUCTION

One of the most pivotal stages in adolescent development is the transition from secondary to senior secondary school, when students begin to construct their identity, career, and life plans. From secondary to senior secondary levels, students experience a significant transition that impacts their academic identity, career aspirations, and life plans (Santos, 2023). In the Indian educational system, students in Grades 9 and 10 must choose academic streams that are significant for further studies and professional life. These decisions are often made in uncertain situations, with undue social pressure or a lack of self-understanding. Backgrounds such as parental expectations, peer pressure, the social status of certain professions, and academic performance dictate 12–15-year-olds' choice of career more than a scientific system that accounts for individual aptitude, personality, interests, and emotional capabilities. As a result, many students find themselves in school programs that are inappropriate and end up unhappy, stressed, confused, and lacking confidence in their future careers. To overcome these limitations, scientific and systematic approaches have emerged as professional guidance services based on psychometric assessment. As objective measures of intellectual, occupational, personal, behavioural, and learning styles, these psychometric instruments can aid students in developing insight into their strengths and growth potential (Firkola, 2021). Current theories that guide career development suggest that in addition to students being matched to jobs, they need to be equipped with psychological tools, including self-efficacy, adaptability, resilience, and readiness for the future (Coetzee & Mbiko, 2023; Rivaldy & Komaro, 2022). Therefore, in this study, the conceptualization of psychometric counselling as providing *only* a vocational recommendation is incorrect. This is because the study suggests that psychometric counselling is a developmental process that should aim to enhance psychological preparedness for career decision-making, rather than merely providing a vocational outline or choice.

The study also has significant social interest, as it includes students from educational institutions that serve the economically disadvantaged sections in Pune. Students from these groups may not have access to evidence-based guidance (Groves et al., 2021) or professional career counselling services. This is why school-based psychometric interventions are highly valuable to this group of students when they make academic and/or career decisions. Thus, this research examined the impact of psychometric career guidance on career decision self-efficacy, career decision self-awareness, career decision adaptability, career decision employability readiness, and the match between students' aspirations and parents' expectations for adolescents.

2. REVIEW OF LITERATURE

2.1 Social Cognitive Career Theory

Several recent studies have demonstrated the importance of psychological readiness in adolescents' career decision-making (Marciniak et al., 2020). The social cognitive career theory of Lent, Brown, and Hackett (Brown & Lent, 2019; Lent & Brown, 2013) proposes that self-efficacy is among the most influential factors in studying career behaviour and vocational confidence. According to this theory, students with a higher level of trust in their decision-making skills are more likely to actively engage in career exploration, goal setting, and adaptive career behaviours.

2.2 Career Decision Self-Efficacy

They created the Career Decision Self-Efficacy construct, which describes how confident an individual is in their career planning and decision-making, which, in turn, is a strong determinant of career clarity and commitment. High self-efficacy contributes to students making better educational decisions and adjusting more easily to jobs that are yet to come. (Betz, 2000; Betz & Hackett, 1986).

2.3 Career Construction Theory

Savickas proposed career adaptability as a psychological resource that facilitates career transitions and helps individuals cope with occupational changes and career uncertainty in his Career Construction Theory. The research delved into aspects of career adaptability and how well individuals are prepared for the future, drawing on the work of Savickas, M. L. (2005). The current labour market, with its focus on transformational technology and new job opportunities, is more of a society in flux that demands flexibility than a world of traditional occupations.

2.4 Career Indecision and Psychological Ambiguity

Gati et al. (1996) revealed that lack of information, internal conflict, and external pressure were the primary reasons for adolescents' indecision regarding their careers. Students often have difficulty distinguishing their individual desires and feelings from societal expectations and demands (Henderson-King & Smith, 2006). One way to minimize this ambiguity is to use psychometric assessment systems, which offer objective information about what people are capable of and prefer in their efforts to achieve success. These assessments help students become more familiar with their strengths and make informed career decisions aligned with them (Krumboltz & Vidalakis, 2000). Psychometric tools in decision-making can help lower the stress involved by clarifying individual interests and skills. This, in turn, results in better-informed and more confident career planning for youth (Marciniak et al., 2020).

2.5 Psychometric Assessment in Career Counselling

Past studies have indicated that providing adolescents with systematic and appropriate psychometric guidance helps them have greater career confidence, reduced career indecision, a greater level of self-awareness, and a better understanding of their aptitude and interests (Turda, 2024). Evidence-based educational planning and informed occupational exploration are achieved through psychometric counselling.

2.6 Parent–Student Career Congruence

Research on adolescent-parent career congruence has focused on the congruence of aspirations and expectations between adolescents and parents, particularly in Asian countries such as India, where the family plays a significant role in shaping educational and career choices. (Pandey et al., 2023).

2.7 Research Gap

Although psychometric measures are utilized to a great extent in educational circumstances, there has been little empirical research in an Indian setting that investigates the effects of psychometric counselling on secondary school learners in terms of their overall development, especially those in the poor category. Existing research focuses primarily on occupational matching and very little on fostering psychological preparedness, adaptability, resilience, and confidence. This study aimed to address this gap using an integrated developmental approach.

3. PROBLEM STATEMENT

Uncertainty, anxiety, and confusion about academic and career decisions are common experiences for students in grades 9 and 10. Traditional career support systems rely on subjective views and lack systematic development of students' self-awareness, flexibility, confidence, and information-based decision-making. Emotional pressure and indecision among students are exacerbated when conflicts arise between students' aspirations and parental expectations. These challenges become even more severe among students from poor backgrounds, who have limited access to professional counselling resources. Although psychometric assessment-based guidance is increasingly being introduced in schools, limited

research has explored its effectiveness in enhancing psychological readiness and adaptive career behaviour among Indian adolescents.

4. OBJECTIVES OF THE STUDY

1. This study examined the impact of psychometric-based career guidance on students' career decision self-efficacy, career clarity, and informed academic decision-making among students in Grades 9 and 10.
2. Analysed the effectiveness of psychometric assessment and individualized counselling in improving career adaptability, employability readiness, and future preparedness among adolescents.

5. HYPOTHESES OF THE STUDY

H₁: Career guidance using a psychometric approach can greatly boost students' career guidance decision-making self-efficacy.

H₂: Students will demonstrate higher career adaptability after psychometric counselling.

H₃: Career clarity significantly improved after the intervention.

H₄: Students exhibit stronger preparedness for future academic and occupational challenges after counselling.

6. RESEARCH METHODOLOGY

The study was quasi-experimental, using a pre- and post-test research design to assess the effectiveness of psychometric-based career guidance in secondary schools. The pre- and post-test data were anonymous data without the name of the person but were treated as independent data samples. This conservative approach precludes the possibility of within-subject correlations and therefore underestimates the size effect. Future studies using paired analyses should use linked anonymous codes.

Sample Size Determination

The present study's sample size was decided after considering the criteria for psychometric validation, which include reliability estimation and exploratory factor analysis. The instrument was a set of 364 items that covered different constructs like aptitude, personality traits, interests, learning styles, and fluid intelligence.

A commonly recommended guideline for factor analysis is based on the subject-to-item ratio:

$$N \geq 5p$$

where N represents the sample size and p denotes the number of items. In the present study, $p = 364$, yielding a recommended minimum of $N = 1,820$.

However, obtaining such large samples in real-world educational settings, especially in school-based research, might be challenging. Methodological sources suggest that a sample size of 300 or even more can be considered sufficient for exploratory factor analysis, particularly in cases where communalities are moderate and factors are clearly defined (Tabachnick & Fidell, 2013; Comrey & Lee, 1992). When it comes to internal consistency reliability, a sample size of more than 200 is widely considered sufficient to obtain reliable and stable estimates of Cronbach's alpha (Bonett, 2002).

Thus, data were collected from approximately 350 students who attended 4 state board schools in Pune. The data were then checked for issues such as missing responses and response quality, resulting in a final sample size of $N = 364$. While this is somewhat lower than the usual subject-to-item ratio recommendation, it is still above the minimum acceptable thresholds for exploratory psychometric analysis.

The study was conducted among 364 students (class size 40) from four state board schools in Pune, India. It was implemented in partnership with the Rotary Club Pune Central and Talent Assessment and Data Analytics Software Solutions (TAAS). The study was educational and socially relevant as two schools participated, with most pupils being economically disadvantaged. Structured pre- and post-survey instruments and standardized psychometric assessment tools were used to collect data. Career clarity, self-awareness, career confidence, employability awareness, students' perception of success, career decision self-efficacy, career adaptability, enhancement in career confidence, reduction in career confusion, and readiness for the future post-counselling were the variables measured in the pre- and post-surveys. These include aptitude, personality traits, vocational interests, learning style, and brain capacity, which can be assessed using psychometric tools. The collected data were analysed using Mean and Standard Deviation, Welch's t-test, Cohen's d Effect Size, Mann-Whitney U Test, and False Discovery Rate Correction by Benjamini–Hochberg to ensure the statistical reliability, validity, and robustness of the findings.

7. PROCEDURE FOR DATA COLLECTION

To ensure the accuracy, consistency, and effective implementation of the psychometric-based Career Guidance intervention, the data collection process for the present study was conducted systematically in four sequential stages. Formal permission and institutional approval from all four schools involved in Pune, Maharashtra, were initially obtained. Coordination meetings were held, and the assessment and intervention of psychometric testing, counselling, and administering the surveys were planned within a framework that did not interfere with school and learning activities. The participating institutions were schools that were part of organizations that had well-established activities and interventions with economically less well-off student communities.

During the second phase, students completed a structured pre-intervention survey assessing their career clarity, self-awareness, career decision confidence, understanding of employability, and psychological readiness for future academic or occupational choices. The survey also examined students' perceptions of success, future goals, and concerns regarding planning their education.

During the third phase, students completed questionnaires based on scientifically tested tools to fill out a standardized aptitude and psychometric survey that measured vocational interests, learning preferences, personality traits, behavioural orientations, cognition, and aptitude. During these sessions, the counsellors provided a thorough explanation of the Psychometric Profiles and counselled on appropriate academic paths, career choices, personal strengths, developmental areas, and future employability skills. The counselling process (aside from career selection) aimed to develop/empower students in the areas of self-awareness, adaptability, confidence, and informed decision-making.

In the last stage, a post-intervention survey was conducted at the end of the counselling sessions. Changes in Career Clarity, Career Decision Confidence, self-awareness, self-adaptability, employability readiness, and preparedness for future academic and professional challenges were measured in the post-survey. Welch's t-test, Descriptive statistics, Cohen's d effect size analysis, Mann-Whitney U validation, and Benjamini–Hochberg False Discovery Rate (FDR) correction were used to statistically analyse the collected data for both phases to examine the effectiveness and reliability of the interventions.

8. STATISTICAL ANALYSIS

The collected data were analyzed using descriptive and inferential approaches to determine the effectiveness of the career guidance approach introduced through the psychometric approach. To assess the differences in career clarity, self-awareness, career decisions, self-esteem (adaptability), and career future readiness, the mean and standard deviation were used before and after the counselling. Welch's t-test was used as the main inferential statistic because the pre- and post-test data were independent samples with unequal variances. This is a conservative method but avoids the false accuracy encountered with unlinked repeated measurements. Welch's t-test is well-suited for use in education and psychology research when the variances differ and the sample sizes in each group differ. Using the test, an accurate comparison was made between the pre- and post-intervention mean scores across all constructs. The statistical analysis indicated statistically significant gains in students' psychological preparedness for their careers and choice of careers after counselling. To complement Cohen's d effect size analysis, Mann–Whitney U validation was performed for robustness, reliability and to control for multiple comparisons to achieve Type I error (false discovery rate = Benjamini–Hochberg) control.

9. RESULTS AND DISCUSSION

9.1 Construction of Analytical Groups

Each construct (Career Clarity, Decision Confidence, Self-Awareness, and Employability & Future Readiness) had several measures on a Likert-type scale and was rated by participants on a scale from strongly disagree (1) to strongly agree (5). The average score of each construct was calculated using the following formula: $\text{An} \cdot n = \sum \text{Xn scores}$, where n is the number of students in the sample.

$$\text{Mean} = (\text{Sum of all responses}) / (\text{Number of responses})$$

Individual responses were added and averaged. The mean for each group (pre-intervention [PRE] and post-intervention [POST]) was calculated separately.

9.2 Linking Distribution Data to Scale Scores

To detect shifts in the distribution of responses, a mean-based analysis and a pooled response distribution analysis were also performed. The difference between the group means is denoted as

$$\text{Delta} = \text{POST Mean} - \text{PRE Mean}$$

Using this approach, it is possible to obtain the two complementary interpretations mentioned above: mean scores capture the central tendency, whereas changes in distribution indicate changes in the structure of answers.

9.3 Descriptive Statistics (Scale-Level Outcomes)

All four constructs are summarized in Table 1. In all constructs, considerable shifts from pre- to post-have been observed, which are believed to represent definite gains in psychological and career outcomes.

Table 1: Descriptive Statistics: Pre- and Post-Intervention Mean Scores

Construct	Pre (Mean ± SD)	Post (Mean ± SD)	Mean Differe nce	Cohen' s d	Effect Size Interpretation	p- value
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Career Clarity	2.95 ± 0.88	4.19 ± 0.71	1.24	1.43	Very large	< .001
Career Decision Confidence	3.63 ± 0.92	4.28 ± 0.68	0.65	0.80	Large	< .001
Self-Awareness	3.41 ± 0.95	4.08 ± 0.73	0.67	0.77	Moderate to large	< .001
Employability & Future Readiness	3.27 ± 0.90	4.17 ± 0.69	0.90	1.02	Very large	< .001

Note: N = 364. Cohen's d interpretation thresholds: 0.20 to 0.49 = small, 0.50 to 0.79 = moderate, 0.80 to 1.19 = large, 1.20 and above = very large.

9.4 Inferential Group Comparisons

Differences between the pre- and post-intervention groups were determined using Welch's t-test, which can be used when variances are unequal. Cohen's d was used to compute effect sizes, and interpreted relative to standard benchmarks.

9.4.1 Career and Stream Clarity

PRE: M = 2.95, SD = 0.88 | POST: M = 4.19, SD = 0.71

Welch's t = -19.42, p < .001, d = 1.43

There was a clear shift toward "Strongly Agree" and a steep decline in disagreement responses. This suggests that students developed a better understanding of academic and career pathways following the intervention (Table 2).

Table 2: Career and Stream Clarity: Response Distribution (Pre vs. Post)

Response	PRE (%)	POST (%)	Change (pp)
Strongly Agree	7.3	34.3	+27.0
Agree	41.5	44.4	+2.9
Neutral	20.1	14.8	-5.3
Disagree	25.0	5.6	-19.4
Strongly Disagree	6.1	0.9	-5.2

9.4.2 Decision Confidence

PRE: M = 3.63, SD = 0.92 | POST: M = 4.28, SD = 0.68

Welch's t = -10.83, p < .001, d = 0.80

This is attributed to students taking a step from moderate to strong agreement, which reflects higher levels of self-efficacy in career decision making. The number of respondents marking "strongly agree" rose from 6.1% to 35.4% and the number of those marking "disagreed" was almost wiped out (see Table 3).

Table 3: Decision Confidence: Response Distribution (Pre vs. Post)

Response	PRE (%)	POST (%)	Change (pp)
Strongly Agree	6.1	35.4	+29.3
Agree	56.1	52.1	-4.0
Neutral	18.3	11.8	-6.5
Disagree	14.6	0.7	-13.9

Strongly Disagree	4.9	0.0	-4.9
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9.4.3 Self-Awareness

PRE: M = 3.41, SD = 0.95 | POST: M = 4.08, SD = 0.73

Welch's t = -10.45, p < .001, d = 0.77

The complete absence of negative responses indicates a general increase in self-perception and introspection. Both "Disagree" (15.9% to 0.0%) and "Strongly Disagree" (4.9% to 0.0%) had 0% post-intervention. (See Table 4)

Table 4: Self-Awareness: Response Distribution (Pre vs. Post)

Response	PRE (%)	POST (%)	Change (pp)
Strongly Agree	19.5	33.3	+13.8
Agree	47.6	59.7	+12.1
Neutral	12.2	6.9	-5.3
Disagree	15.9	0.0	-15.9
Strongly Disagree	4.9	0.0	-4.9

9.4.4 Employability and Future Readiness

Students progressed from preparedness for future academic and career challenges. Table 5 presents the % change in responses from those in the initial screening and post-intervention for all items of "Strongly Agree. As shown in Table 5, "Strongly Agree" increased by 22.4 percentage points to 37.0%, and all responses in the "Disagree" and "Negative Answer" categories were eliminated after the intervention.

Table 5: Employability and Future Readiness: Response Distribution (Pre vs. Post)

Response	PRE (%)	POST (%)	Change (pp)
Strongly Agree	14.6	37.0	+22.4
Agree	53.7	52.8	-0.9
Neutral	13.0	10.2	-2.8
Disagree	14.6	0.0	-14.6
Strongly Disagree	4.1	0.0	-4.1

9.5 Conceptual Interpretation of Changes

The improvements noted do not represent consistent changes. Rather, the changes indicate both the amalgamation of lower-response categories and the magnification of upper-response categories. This trend is highly indicative of qualitative rather than quantitative changes in students' perceptions.

Key observations:

Almost all responses to disagreement were removed for all constructs.

Neutral responses dropped considerably, reflecting the formation of students' views.

Responses that were also strongly agree jumped significantly as students became more convinced about their responses compared to moderate agreement.

9.6 Robustness of matrix functions and matrix derivatives

The Benjamini-Hochberg False Discovery Rate (FDR) correction was used to reduce the risk of Type I error caused by multiple comparisons.

Results: No p values were interpreted as significant after applying FDR correction ($p < .001$ for all p values). All results were checked for robustness using nonparametric statistical tests (Mann-Whitney U test).

9.7 Summary of Results

Research shows that psychometric-based career guidance leads to:

Finding	Evidence
Major improvements in career clarity, decision confidence, and self-awareness	Table 1 (large to very large effect sizes)
Very strong rise in future readiness and employability perception	Table 1 ($d = 1.02$) and Table 5
Movement from uncertainty to strong conviction	Tables 2 to 5 (increase in Strongly Agree responses)
Near-complete elimination of disagreement responses	All distribution tables (Disagree to 0% in most constructs)

Large differences were observed in the category of "Strongly Agree" which suggests a shift toward a higher level of confidence among the participants. A radical change in the structure of the responses was found when investigating the pattern at the subsample level: there was almost a complete disappearance of disagreement responses and an increase in the upper agreement categories.

The evidence described above reveals that the intervention benefitted students not only with regard to general knowledge of their personal qualities and career paths but also provided them with greater confidence when making quality academic and career choices. The uniformity and similarity in the magnitude of the changes in all variables offers a strong quantitative rationale for the effectiveness of psychometric-based career guidance in building Career Decision Self-efficacy and Future Readiness in secondary school students.

10. Conclusion

The study indicates that Psychometric Career Guidance (PCG) is an effective tool that can help students in Grades 9 and 10 with their academic journey and impact their future careers. Individual students who completed career decision-making psychometric tests and received individual counselling showed a significant improvement in their self-confidence in career decision-making. They also reported having a better understanding of their academic and career trajectories. It was discovered that they were quite self-aware and had made some improvements regarding their desire to solve problems in their lives. Based on these students' findings, it may be inferred that they shifted from confusion and uncertainty to determination and confidence. This study is based on the framework of Social Cognitive Career Theory, which emphasises the two most important factors in the career development process: adaptability and self-efficacy. The findings suggest that an educational system with a more systematic, data-driven approach would be required to be more effective in guiding young people in career decisions where school guidance counsellors are engaged in individual counselling and standardized testing is used to make decisions.

Limitations and future directions

This study used a quasi-experimental single-group pre-test post-test design. Therefore, only part of the observed improvement can be definitively attributed to the psychometric intervention, as maturation, history, and/or testing effects may have contributed.

Additional limitations include the following

Changes at the individual level were not analysed because of an unlinked pre-post design.

Self-reports Likert scales could bring social desirability bias

Long-term sustainability effects were not observed in the short-term design.

The sample included four State Board Schools in Pune, so the results of the study might not be comparable in other geographical, linguistic, or socio-economic settings

Future research should

A randomized controlled trial or waitlist control group should be used to provide causal inference.

Carry out long-term impact evaluation studies

Match data designs for between subjects' analysis

Engaging in a multidisciplinary approach to research in various educational and socioeconomic settings.

Representative generic examples of psychometrically based guidance can be contrasted with classic counselling approaches.

Final Remarks

In summary, the current research underscores the need for psychometric guidance during the shift from self-uncertainty to personal insight. Finally, this allows students to make informed career choices and to make confident, flexible decisions.

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