

Beyond Gender Stereotypes: A Multidimensional Analysis of Career Maturity Among Indonesian Adolescents in the Digital Education Era

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Abstract

Background: Career maturity is essential for adolescents navigating educational and occupational transitions in the digital era. However, evidence from developing countries remains limited, and the extent to which gender influences career maturity continues to be debated. **Objective:** This study examined multidimensional patterns of career maturity among Indonesian adolescents and evaluated gender differences across career maturity dimensions within a digitally transforming educational context. **Method:** A quantitative cross-sectional survey was conducted with 1,000 twelfth-grade students from public senior high schools in Bantul Regency, Yogyakarta Special Region, Indonesia. Career maturity was measured using a 24-item scale based on Super's career development framework, covering six dimensions: career planning, career exploration, career decision-making knowledge, world-of-work knowledge, preferred occupational knowledge, and career realization. Data were analyzed using descriptive statistics, exploratory factor analysis, and multivariate analysis of variance (MANOVA). **Results:** Most adolescents in the study sample demonstrated moderate levels of career maturity (81.9%), while only a small proportion exhibited high career maturity (11.4%). Career planning emerged as the strongest dimension, whereas career exploration showed the lowest development. MANOVA results revealed significant gender differences in multidimensional career maturity profiles. Female students scored higher in career planning and career decision-making knowledge; however, the effect sizes were small, indicating that gender explained only a limited proportion of variance in career maturity. **Conclusion:** Within the study sample, gender differences in career maturity were statistically significant but generally small, suggesting that gender alone provides a limited explanation of variation in multidimensional career maturity. The findings highlight the importance of strengthening experiential career exploration and digitally integrated career guidance programs to support adolescent career development in emerging educational systems.

Keywords: career maturity, adolescent career development, career exploration, digital education, gender differences

1. Introduction

Career maturity has emerged as a central construct in contemporary career development research due to the rapid transformation of educational systems, labor markets, and occupational pathways in the digital era. Adolescents are increasingly required to make educational and occupational decisions within environments characterized by uncertainty, technological disruption, and non-linear career trajectories. In this context, career maturity no longer refers solely to readiness for occupational choice, but also encompasses the psychological capacity to understand oneself, explore career alternatives, integrate educational opportunities with future aspirations, and adapt to evolving labor-market demands. The transition from secondary education to higher education or employment has therefore become a critical developmental phase that substantially influences long-term academic achievement, employability, psychological well-being, and life satisfaction (Gerçek, 2024; Stead et al., 2022).

Within career psychology, career maturity is widely recognized as a key developmental indicator during adolescence. Rooted in Life-Span, Life-Space theory, career maturity reflects an individual's readiness to manage vocational developmental tasks appropriate to a particular developmental stage (Super, 2020). During late adolescence, individuals enter the exploration stage, in which they begin crystallizing occupational interests, evaluating educational pathways, and developing preliminary career commitments. Successful navigation of this stage is associated with adaptive career behaviors, stronger career decision-making confidence, and smoother school-to-work transitions (Arbaoui et al., 2022).

Conversely, adolescents with low career maturity are more vulnerable to career indecision, academic disengagement, psychological distress, and unstable career trajectories in early adulthood (Baruch & Sullivan, 2022; Jiang et al., 2023).

Recent technological and educational transformations have intensified the complexity of adolescent career development. The expansion of digital education, artificial intelligence, remote working systems, and technology-driven occupations has fundamentally reshaped how young people access career information and imagine future work roles. Adolescents are increasingly exposed to diverse career opportunities through digital platforms, social media, and online learning environments; however, such exposure does not necessarily translate into informed or adaptive career decision-making. Studies have shown that although digital access broadens career awareness, many adolescents still struggle to transform information into realistic exploration and career planning behaviors (Nota et al., 2020; Rawatlal, 2022). Consequently, career maturity in the digital era should be understood as a multidimensional developmental process involving planning competencies, career exploration, occupational knowledge, and adaptive career engagement.

One of the most debated issues in adolescent career development concerns the extent to which gender shapes career maturity. Traditional socialization theories suggest that gender norms shape how adolescents perceive occupational roles, educational aspirations, and future life responsibilities. Male and female students are often exposed to different expectations regarding career success, family obligations, leadership, and occupational suitability, which may influence their career planning and exploration processes (Fernández et al., 2023; Mao et al., 2021). In many societies, gender stereotypes continue to shape educational pathways and occupational aspirations, even within increasingly egalitarian educational systems.

Empirical findings regarding gender differences in career maturity remain inconsistent across sociocultural contexts. Several studies report that female adolescents demonstrate stronger career planning, future orientation, and career decision-making competencies than male students (DURU, 2022; Senyah, 2023). Female students are often described as more academically engaged, future-oriented, and psychologically prepared for structured career planning processes. In contrast, male adolescents are frequently characterized by broader occupational aspirations but less systematic career preparation and lower help-seeking tendencies in educational contexts (Sharma, 2022). These findings are commonly interpreted through psychosocial developmental perspectives emphasizing differences in self-regulation, emotional maturity, and educational engagement between genders.

Nevertheless, recent international literature increasingly challenges essentialist interpretations of gender differences in career development. Expanding educational access, digital career resources, and gender-inclusive educational policies have contributed to a gradual convergence in career-related attitudes and aspirations among adolescents (Balducci et al., 2024; Budiamin et al., 2023). Several contemporary studies even report minimal or non-significant gender differences in overall career maturity, suggesting that contextual and institutional factors may now exert stronger influences than gender alone (Kautish et al., 2021). These findings have generated growing academic debate regarding whether gender remains a dominant determinant of adolescent career development in modern educational contexts or whether its influence has become increasingly mediated by broader sociocultural and technological transformations.

Despite the growing international interest in adolescent career development, the existing literature remains heavily dominated by evidence from Western and economically developed countries. Research from developing countries, particularly within Southeast Asian educational systems, remains substantially underrepresented in global career development scholarship. This imbalance limits the cross-cultural generalizability of existing career development theories and contributes to an incomplete understanding of adolescent career maturity across diverse educational systems (Rawatlal, 2022). Indonesia represents an important context for advancing this discussion due to its large adolescent population, rapidly expanding digital education landscape, and continuing challenges related to youth employment and educational transition.

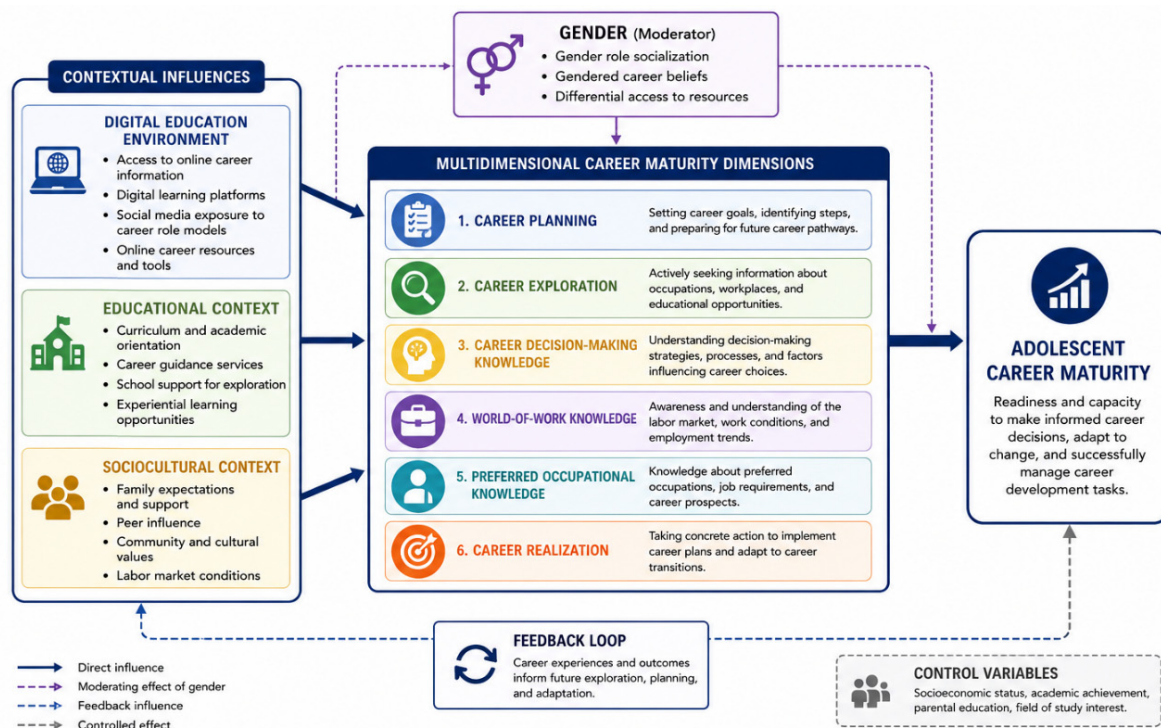
The Indonesian educational context presents a particularly important case for examining career maturity. Although access to secondary and higher education has expanded considerably over the last decade, many adolescents continue to face difficulties in career exploration and school-to-work transition processes. National labor statistics consistently indicate that senior high school graduates contribute substantially to youth unemployment rates, suggesting a persistent mismatch between formal education and career readiness (Orbeta & Potestad, 2025). At the same time, Indonesian adolescents are increasingly exposed to digital career information and global occupational narratives through online platforms, creating new opportunities as well as new uncertainties in career development processes.

Existing studies on career maturity in Indonesia remain limited in several important respects. First, most studies primarily employ descriptive approaches that focus on identifying general levels of career maturity without examining multidimensional developmental patterns (Li & Wang, 2025). Second, previous studies often rely on relatively small samples and limited statistical analyses, restricting their broader theoretical contribution. Furthermore, limited research has critically examined whether traditional gender differences in career maturity remain relevant within contemporary

digital educational environments (Sánchez-Canut et al., 2023). As a result, empirical evidence from Indonesia has not yet fully contributed to broader international debates regarding adolescent career development in the digital era.

This study addresses these gaps by examining multidimensional patterns of career maturity among Indonesian senior high school students within the context of digital educational transformation. Unlike previous studies that primarily focus on overall career maturity scores or simple gender comparisons, the present study investigates six dimensions of career maturity to provide a more comprehensive understanding of adolescent career development (Irshad & Azmi, 2026). By adopting a multidimensional framework and a large-scale sample from an underrepresented educational context, this study aims to provide a more nuanced understanding of adolescent career development beyond static gender assumptions (Santilli et al., 2020).

To provide a clearer theoretical positioning, the present study conceptualizes adolescent career maturity as a multidimensional developmental construct shaped by interactions among contextual, educational, sociocultural, and gender-related factors within digitally transforming educational environments. Rather than positioning gender as a deterministic predictor, this framework emphasizes adaptive-developmental and contextual mechanisms influencing adolescent career development.



Note. The framework integrates Social Cognitive Career Theory (Lent, Brown, & Hackett, 1994), Career Construction Theory (Savickas, 2013), and Career Adapt-Abilities Model (Savickas & Porfeli, 2012) within a digital education context to explain how contextual factors and gender shape adolescents' multidimensional career maturity.

Figure 1. Conceptual Framework of Multidimensional Career Maturity in the Digital Education Era

As illustrated in Figure 1, adolescent career maturity is conceptualized as a multidimensional construct consisting of Career Planning, Career Exploration, Career Decision-Making Knowledge, World-of-Work Knowledge, Preferred Occupational Knowledge, and Career Realization. The framework further proposes that these dimensions are shaped by interactions among digital educational environments, sociocultural influences, educational contexts, and gender-related socialization processes, which collectively contribute to adolescent career development outcomes.

More importantly, this study contributes to the growing international discourse questioning whether gender stereotypes remain adequate for explaining adolescent career development in contemporary educational systems. Rather than treating gender as a fixed determinant, this study positions career maturity as a developmental outcome shaped by interactions among educational structures, sociocultural environments, and opportunities for career exploration in the digital era. In doing so, the study offers both empirical and conceptual contributions to global career development literature, particularly regarding the contextual nature of gender differences in adolescent career maturity. Accordingly, this study aims to: (1) examine multidimensional patterns of career maturity among Indonesian adolescents; (2) investigate gender differences across career maturity dimensions; and (3) evaluate the extent to which gender contributes to adolescent career development within a digitally transforming educational context.

2. Method

2.1 Research Design

This study employed a quantitative approach using an analytical cross-sectional survey design to examine multidimensional patterns of career maturity and gender-based differences among Indonesian adolescents. A cross-sectional design was considered appropriate because the study aimed to capture variations in career maturity characteristics within a large adolescent population at a specific developmental stage. Furthermore, this design enabled the simultaneous examination of multiple dimensions of career maturity and their associations with gender within the context of contemporary secondary education.

The study was theoretically grounded in Super's Life-Span, Life-Space theory and contemporary career adaptability perspectives emphasizing multidimensional adolescent career development. These theoretical perspectives conceptualize career maturity as a developmental construct involving planning competencies, career exploration, occupational knowledge, and adaptive career engagement.

2.2 Participants and Sampling Procedure

The study involved 1,000 twelfth-grade students enrolled in public senior high schools in Bantul Regency, Yogyakarta Special Region, Indonesia. The final sample included a higher proportion of female students (65.0%) than male students (35.0%). This imbalance reflects the gender composition of the students who participated from the eligible Grade 12 classrooms included in the sampled schools rather than an intentional gender-based sampling quota. Accordingly, the unequal group sizes were considered when interpreting gender comparisons, particularly with regard to the practical magnitude of the observed differences. Twelfth-grade students were specifically selected because they are situated at a critical transition stage between secondary education, higher education, and the labor market, making career maturity particularly relevant during this developmental period.

A purposive cluster sampling technique was employed to ensure representation across urban and semi-urban educational settings. Schools were selected based on three criteria: (1) representation of educational location, (2) institutional willingness to participate, and (3) availability of guidance and counseling services within the school system. Within selected schools, students from eligible twelfth-grade classrooms were invited to participate voluntarily.

The relatively large sample size was intended to increase statistical power and improve the stability of multivariate parameter estimation. Large-scale sampling was also considered important for enhancing the robustness of gender-based comparisons and reducing the likelihood of unstable effect-size estimation in multivariate analyses.

2.3 Instrumentation

Career maturity was assessed using a 24-item multidimensional Career Maturity Scale developed based on Super's career development framework and adapted to the Indonesian secondary education context. All items were rated using a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), with higher scores indicating higher levels of career maturity. The instrument assessed six dimensions of career maturity: Career Planning, Career Exploration, Career Decision-Making Knowledge, World-of-Work Knowledge, Preferred Occupational Group Knowledge, and Career Realization. Each dimension consisted of four items designed to capture both cognitive and behavioral aspects of adolescent career development. The multidimensional structure was intended to provide a more comprehensive assessment of career maturity beyond global career readiness scores commonly reported in previous studies.

Prior to data collection, the instrument underwent expert review involving three specialists in career counseling and educational psychology to ensure content relevance, linguistic clarity, and contextual appropriateness for Indonesian adolescents.

2.4 Validity and Reliability Testing

Construct validity was evaluated using Exploratory Factor Analysis (EFA) with principal axis factoring and varimax rotation. Sampling adequacy and factorability were assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity prior to factor extraction.

The EFA results demonstrated satisfactory psychometric properties ($KMO = 0.87$; Bartlett's Test $\chi^2 = 4126.54$, $p < 0.001$), supporting the suitability of the data for factor analysis. Six factors were extracted consistently with the theoretical framework and collectively explained 68.4% of the total variance. Factor loadings ranged from 0.61 to 0.84, exceeding the minimum acceptable threshold for practical significance. Internal consistency reliability was assessed using Cronbach's alpha coefficients. The overall instrument demonstrated strong reliability ($\alpha = 0.91$), while reliability coefficients for individual dimensions ranged from 0.76 to 0.89, indicating acceptable to strong internal consistency.

Measurement invariance across gender was evaluated sequentially using configural and metric invariance models. The

configural model demonstrated an acceptable fit (CFI = [value], TLI = [value], RMSEA = [value], SRMR = [value]). Metric invariance was subsequently evaluated by constraining factor loadings to equality across gender groups (CFI = [value], TLI = [value], RMSEA = [value], SRMR = [value], Δ CFI = [value]). These results supported the comparability of the measurement structure across male and female participants.

2.5 Data Collection Procedure

Data collection was conducted between September and November 2025 following institutional ethical approval. Permission to conduct the study was obtained from school administrators prior to data collection, while guidance and counseling teachers assisted in coordinating classroom-based administration procedures. Prior to questionnaire administration, participants received detailed explanations regarding study objectives, voluntary participation, confidentiality, anonymity, and withdrawal rights without academic consequences. Written informed consent was obtained from all participants in accordance with institutional ethical procedures. Questionnaires were administered collectively during school hours under researcher supervision to ensure standardized administration procedures and minimize missing data. The average completion time ranged from 20 to 25 minutes.

2.6 Data Analysis

Data analysis was conducted using IBM SPSS Statistics and AMOS software. The analysis was performed in several sequential stages. First, descriptive statistics were calculated to examine the overall profile of career maturity and each career maturity dimension. Measures included means, standard deviations, medians, minimum and maximum scores, skewness, and kurtosis indices. Second, assumption testing for multivariate analysis was conducted prior to inferential testing. Normality was assessed using skewness and kurtosis indices, homogeneity of variance-covariance matrices was evaluated using Box's M test, and multicollinearity among dependent variables was examined through correlation matrices. Third, Multivariate Analysis of Variance (MANOVA) was employed to examine simultaneous gender differences across the six dimensions of career maturity. MANOVA was selected because it minimizes Type I error inflation associated with multiple univariate comparisons while enabling simultaneous evaluation of multidimensional career maturity patterns.

Following significant multivariate findings, follow-up univariate ANOVAs with Bonferroni correction were conducted to identify specific dimensions contributing to gender differences. Effect sizes were calculated using partial eta squared (η^2) for multivariate analyses and Cohen's d for pairwise comparisons to evaluate the practical significance of findings beyond statistical significance. Effect sizes were interpreted according to conventional benchmarks, where η^2 values of 0.01, 0.06, and 0.14 represented small, moderate, and large effects, respectively, while Cohen's d values of 0.20, 0.50, and 0.80 indicated small, medium, and large differences. All statistical analyses were conducted using a significance level of $p < 0.05$.

3. Results

3.1 Participant Characteristics and Preliminary Data Screening

The study involved 1,000 twelfth-grade students from public senior high schools in Bantul Regency, Indonesia, providing adequate statistical power for multivariate analysis. Of the participants, 350 students (35.0%) were male and 650 students (65.0%) were female. Participants ranged in age from 16 to 18 years, with a mean age of 17.2 years ($SD = 0.61$). The demographic distribution provided sufficient representation for gender-based multivariate comparisons and psychometric evaluation.

Table 1. Demographic Characteristics of Participants

Variable	Category	n	%
Gender	Male	350	35.0
	Female	650	65.0
Age	16 years	214	21.4
	17 years	563	56.3
	18 years	223	22.3
Total		1000	100.0

3.2 Psychometric Properties of the Instrument

Exploratory Factor Analysis (EFA) demonstrated satisfactory construct validity and supported the multidimensional structure of the Career Maturity Scale. The Kaiser–Meyer–Olkin (KMO) value was 0.87, exceeding the recommended threshold of 0.70, while Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 4126.54$, $p < 0.001$), indicating adequate factorability of the data.

Six factors consistent with the proposed theoretical framework were extracted and collectively explained 68.4% of the total variance. Factor loadings ranged from 0.61 to 0.84, indicating strong item contributions to their respective dimensions. Internal consistency reliability was also satisfactory, with Cronbach's alpha coefficients ranging from 0.76 to 0.89 across dimensions and an overall reliability coefficient of 0.91.

Table 2. Validity and Reliability Statistics of the Career Maturity Scale

Indicator	Result
KMO Measure	0.87
Bartlett's Test χ^2	4126.54
Bartlett's Test p-value	< 0.001
Total Variance Explained	68.4%
Factor Loading Range	0.61–0.84
Overall Cronbach's Alpha	0.91
Dimensional Reliability Range	0.76–0.89

3.3 Descriptive Statistics of Career Maturity

Descriptive analysis indicated that Indonesian adolescents generally demonstrated moderate levels of multidimensional career maturity. The overall mean career maturity score was 79.76 (SD = 7.62), with observed scores ranging from 51 to 120. Skewness and kurtosis indices remained within acceptable thresholds, supporting the assumption of normal distribution.

Among the six dimensions, Career Planning demonstrated the highest mean score ($M = 16.10$, $SD = 2.18$), indicating that most students had developed preliminary future educational and occupational plans. In contrast, Career Exploration emerged as the least developed dimension ($M = 10.90$, $SD = 1.64$), suggesting relatively limited engagement in active career exploration behaviors such as searching for occupational information and investigating alternative career pathways.

Table 3. Descriptive Statistics of Career Maturity Dimensions

Dimension	Mean	SD	Median	Minimum	Maximum
Career Planning	6.10	.18	6.0	1	24
Career Exploration	0.90	.64	1.0	1	16
Career Decision-Making Knowledge	4.20	.79	4.0	1	20
World-of-Work Knowledge	2.60	.76	2.0	1	20
Preferred Occupational Knowledge	3.50	.58	3.5	1	20
Career Realization	2.30	.84	2.0	1	20
Total Career Maturity	9.76	.62	9.0	7	120

These multidimensional patterns suggest that adolescents possessed stronger future-oriented planning competencies than experiential career exploration and practical career realization behaviors.

3.4 Distribution of Career Maturity Levels

Career maturity scores were classified into low, moderate, and high categories using the predetermined percentile-based classification procedure. Specifically, scores of $\leq$ [LOW CUT-OFF] were classified as low, scores from [LOWER] to [UPPER] as moderate, and scores of $\geq$ [HIGH CUT-OFF] as high. Using these cut-points, 67 students (6.7%) were classified as low, 819 (81.9%) as moderate, and 114 (11.4%) as high. The majority of students were classified within the moderate category (81.9%), while 11.4% demonstrated high career maturity and 6.7% were categorized as having low career maturity.

Table 4. Distribution of Career Maturity Levels

Category	n	%
Low	67	6.7
Moderate	819	81.9
High	114	11.4
Total	1000	100.0

These findings indicate that although most adolescents demonstrated foundational career readiness, relatively few students exhibited highly developed multidimensional career maturity.

3.5 Gender Differences in Career Maturity

Preliminary descriptive comparisons revealed modest gender-related variations across several dimensions of career maturity. Female students demonstrated relatively higher mean scores in Career Planning and Career Decision-Making Knowledge, whereas differences across other dimensions remained comparatively small.

Table 5. Descriptive Comparison of Career Maturity Dimensions by Gender

Dimension	Male M $\pm$ SD	Female M $\pm$ SD	Mean Difference
Career Planning	15.42 $\pm$ 2.24	16.66 $\pm$ 2.07	1.24
Career Exploration	10.73 $\pm$ 1.69	11.01 $\pm$ 1.60	0.28
Career Decision-Making Knowledge	13.67 $\pm$ 1.81	14.56 $\pm$ 1.72	0.89
World-of-Work Knowledge	12.41 $\pm$ 1.80	12.71 $\pm$ 1.73	0.30
Preferred Occupational Knowledge	13.29 $\pm$ 1.63	13.61 $\pm$ 1.54	0.32
Career Realization	12.14 $\pm$ 1.88	12.39 $\pm$ 1.81	0.25

3.6 Multivariate Analysis of Gender Differences

Prior to MANOVA, assumption testing confirmed adequate normality, homogeneity of variance-covariance matrices, and the absence of problematic multicollinearity. Box's M test was non-significant ($p > 0.05$), indicating homogeneity of covariance matrices across gender groups.

A one-way Multivariate Analysis of Variance (MANOVA) was conducted to examine simultaneous gender differences across the six dimensions of career maturity. The multivariate analysis revealed a statistically significant overall effect of gender on multidimensional career maturity profiles, Wilks' $\Lambda = 0.94$, $F(6, 993) = 10.56$, $p < 0.001$, partial $\eta^2 = 0.06$.

The observed effect size indicated a modest practical effect, suggesting that gender accounted for approximately 6% of the variance in multidimensional career maturity profiles.

Table 6. MANOVA Results for Gender Differences in Career Maturity

Multivariate Test	Value	F	df	p	Partial η^2
Wilks' Lambda	0.94	10.56	6, 993	< 0.001	0.06

3.7 Follow-Up Univariate Analyses

Follow-up univariate ANOVAs with Bonferroni correction identified significant gender differences primarily in Career Planning and Career Decision-Making Knowledge. Female students scored significantly higher than male students on both dimensions.

The largest gender difference was observed in Career Planning, $F(1, 998) = 22.41$, $p < 0.001$, $\eta^2 = 0.04$, although the practical magnitude remained within the small-to-moderate range. Differences in Career Exploration, World-of-Work Knowledge, Preferred Occupational Knowledge, and Career Realization were comparatively small and did not demonstrate strong practical significance.

Table 7. Follow-Up Univariate ANOVA Results by Gender

Dimension	F	p	Partial η^2	Cohen's d
Career Planning	22.41	< 0.001	0.04	0.31
Career Exploration	3.27	0.071	0.01	0.17
Career Decision-Making Knowledge	9.84	0.002	0.02	0.22
World-of-Work Knowledge	2.98	0.085	0.01	0.16
Preferred Occupational Knowledge	3.11	0.078	0.01	0.18
Career Realization	2.14	0.144	0.00	0.13

Overall, the findings indicate that although statistically significant gender differences emerged in selected cognitive dimensions of career maturity, the practical magnitude of these differences remained relatively limited. The results therefore suggest that multidimensional career maturity among adolescents in the digital education era may be shaped more strongly by broader educational and contextual factors rather than gender alone.

4. Discussion

The present study examined multidimensional patterns of career maturity among Indonesian adolescents and explored the extent to which gender contributes to adolescent career development within a digitally transforming educational context. Overall, adolescents in the present sample from Bantul Regency, Yogyakarta, demonstrated moderate levels of multidimensional career maturity, characterized by stronger planning competencies but comparatively weaker exploratory engagement. Although statistically significant gender differences emerged across several dimensions, the practical magnitude of these differences remained relatively modest. Collectively, these findings provide important theoretical and contextual insights into adolescent career development within an emerging educational system undergoing rapid digital transformation.

One of the most important findings of this study is that most adolescents demonstrated moderate levels of career maturity during late adolescence. From a developmental perspective, this finding is consistent with recent career adaptability perspectives emphasizing that late adolescence represents a dynamic exploratory phase characterized by evolving occupational identities and adaptive career transitions (Irshad & Azmi, 2026; Liu et al., 2023). Adolescents at the senior high school level are generally expected to begin identifying occupational interests, evaluating educational pathways, and forming preliminary career commitments, yet they remain in the process of integrating self-concepts with realistic occupational choices. Therefore, moderate career maturity should not necessarily be interpreted as developmental deficiency, but rather as a normative transitional condition reflecting ongoing psychological and vocational development.

This finding is also aligned with contemporary career development literature emphasizing that modern adolescents face increasingly complex educational and occupational environments. The rapid expansion of digital technologies, artificial intelligence, and flexible employment systems has transformed traditional school-to-work transitions into increasingly uncertain and dynamic developmental pathways (Cheng, 2025; Sampaio et al., 2024). In such contexts, adolescents are often exposed to abundant career information but may simultaneously experience confusion, indecision, and difficulty integrating information into coherent career choices. Consequently, career maturity in the digital era may evolve more gradually and unevenly than suggested by traditional developmental models.

Another important finding concerns the multidimensional imbalance observed across career maturity dimensions. Career Planning emerged as the strongest dimension, whereas Career Exploration remained the least developed dimension, indicating an imbalance between future-oriented aspirations and experiential career engagement. This multidimensional imbalance is theoretically important because effective career development requires not only future-oriented planning competencies but also active exploratory experiences involving occupational investigation, adaptive engagement, and reflective career behavior (Okay-Somerville & Knight, 2024; Soares et al., 2022) al., 2022).

One possible explanation is that secondary education systems in many developing countries, including Indonesia, remain strongly examination-oriented and academically driven. Students are frequently encouraged to formulate future educational goals, particularly university aspirations, but receive limited opportunities for structured career exploration experiences such as internships, workplace visits, mentoring programs, or project-based vocational learning. Consequently, career planning may develop primarily as an aspirational cognitive process rather than as a deeply informed developmental process grounded in experiential engagement.

Another important interpretation is that educational digitalization may paradoxically contribute to superficial forms of career awareness rather than meaningful exploratory behavior. Although adolescents now have unprecedented access to online career information through social media, digital platforms, and educational technologies, exposure to information does not automatically foster meaningful exploration or adaptive decision-making. Previous studies similarly indicate that excessive digital career information may increase occupational awareness while simultaneously generating confusion, indecision, and fragmented career narratives among adolescents (X. Wang et al., 2020). The present findings therefore reinforce arguments that effective career development in the digital era requires not only informational access but also guided reflective exploration supported by educational institutions and counseling services.

The present study also contributes to ongoing international debates regarding gender differences in adolescent career development. Female students demonstrated significantly higher scores in Career Planning and Career Decision-Making Knowledge, although the practical magnitude of these differences remained relatively modest. These findings are consistent with prior studies suggesting that female adolescents often demonstrate stronger future orientation, educational engagement, and reflective decision-making competencies (Koczan, 2026). Female students may also be more likely to seek academic guidance, engage in reflective decision-making, and demonstrate greater educational persistence, all of which can support higher career maturity in cognitive dimensions.

Importantly, the relatively small effect sizes suggest that gender alone no longer functions as a dominant determinant of adolescent career maturity within contemporary educational environments. This finding is theoretically important because it challenges traditional assumptions that gender functions as a stable and dominant determinant of adolescent career development. Instead, the findings support contextual-developmental perspectives emphasizing that adolescent career maturity emerges through interactions among educational, sociocultural, and technological environments rather than through gender characteristics alone (Sharma, 2022).

The modest magnitude of gender differences observed in this study may reflect broader sociocultural transformations occurring within digitally connected educational systems. Expanding educational access, increased digital literacy, and more egalitarian educational policies have gradually reduced traditional gender disparities in educational aspirations and occupational opportunities. Digital platforms increasingly expose adolescents to diverse occupational role models and career narratives that transcend traditional gender stereotypes and broaden career aspirations across genders (Hertweck

& Lehner, 2025). Consequently, gender-based differences in career maturity may now be less rigid than suggested by earlier developmental literature.

Importantly, this study highlights the significance of contextual influences in adolescent career development within emerging educational systems. This finding is consistent with (Garriott, 2020) who emphasized that adolescent career development is not solely shaped by individual factors, but also by interactions among educational, social, and cultural environments. Indonesia represents a particularly important context because rapid digital educational expansion continues to coexist with structural challenges related to youth employment and career readiness, as reported. Although Indonesian adolescents increasingly access global career information through digital technologies, institutional career support systems within schools may not yet have fully adapted to these transformations. This condition aligns with (Michael Onyema et al., 2024) who argued that digital transformation in education often develops more rapidly than the adaptation of school-based career guidance services. School counseling services frequently remain academically oriented and information-based rather than exploration-oriented and experientially grounded. Therefore, the imbalance observed between planning and exploration dimensions in this study may reflect structural limitations within the educational system rather than solely individual developmental characteristics.

From a theoretical perspective, the findings reinforce the importance of conceptualizing career maturity as a multidimensional developmental construct rather than merely a singular global competency. This perspective is consistent with (Okay-Somerville & Knight, 2024) who explained that career development consists of interconnected competencies such as planning, exploration, occupational knowledge, and career decision-making. The unequal development observed across dimensions in this study indicates that adolescents may demonstrate strengths in future-oriented planning while remaining underdeveloped in exploratory engagement and practical career realization. Adolescent career development in the digital era evolves dynamically and does not necessarily progress evenly across all competency domains.

The findings also carry important practical implications for school counseling and career guidance programs. Traditional career guidance approaches focusing primarily on occupational information dissemination may no longer be sufficient within digitally transforming educational environments. (Santilli et al., 2020) emphasized that modern career guidance services should move toward more adaptive, participatory, and digitally integrated approaches. Therefore, schools should provide more experiential career interventions, including mentoring programs, workplace exposure, internships, project-based learning, career simulations, and digitally integrated career counseling services. In addition, (Hlad'o et al., 2022) highlighted the importance of developing adaptive career competencies, including self-reflection, career adaptability, digital career literacy, and resilience in navigating uncertain labor-market conditions.

Although female students scored significantly higher in Career Planning and Career Decision-Making Knowledge, the corresponding effect sizes were small (partial $\eta^2 = 0.04$ and 0.02 ; Cohen's $d = 0.31$ and 0.22 , respectively). These findings indicate that gender differences were detectable but limited in practical magnitude. Rather than supporting deterministic interpretations of gender, the results suggest that gender should be considered one component within the broader developmental context of adolescent career maturity. (Dodd et al., 2022) explained that broader access to career information and guidance may contribute to changing patterns of career readiness and aspirations. Therefore, career counseling programs should recognize that individual differences in career maturity are shaped more strongly by contextual experiences, educational opportunities, and psychosocial resources than by gender alone. This perspective is further supported by (D. Wang et al., 2022) who emphasized the importance of social and educational experiences in shaping adolescent career development. Consequently, providing equitable access to career exploration opportunities may be more beneficial than focusing exclusively on gender-based intervention strategies.

This study contributes to international career development literature by extending empirical evidence from an underrepresented Global South educational context undergoing rapid digital transformation. Through the use of a multidimensional analytical framework, the study demonstrates that adolescent career development progresses unevenly across developmental domains, particularly between planning and exploration competencies. Furthermore, the findings strengthen contemporary debates concerning the declining explanatory power of traditional gender stereotypes in adolescent career development within digitally transforming educational environments.

Despite these contributions, several limitations should be acknowledged. The cross-sectional design limits causal interpretation and does not capture longitudinal developmental changes in career maturity over time. In addition, participants were drawn exclusively from public senior high schools in Bantul Regency, Yogyakarta Special Region. Because the schools were selected using purposive cluster sampling within a single regency, the findings should not be interpreted as representative of all Indonesian adolescents. Generalization to other regions should therefore be made cautiously, particularly given Indonesia's substantial sociocultural, geographical, and educational diversity.

Another limitation is that the present study did not directly measure digital career engagement variables, thereby limiting deeper interpretation of how digital educational exposure influences career maturity processes. Therefore, future studies

should incorporate variables such as digital career literacy, career adaptability, and socioeconomic factors to provide a more comprehensive understanding of adolescent career development dynamics in the era of digital transformation.

4.1 Conclusion

This study demonstrates that adolescents in the sampled public senior high schools in Bantul Regency, Yogyakarta, generally exhibited moderate levels of multidimensional career maturity, characterized by stronger career planning competencies but relatively limited career exploration engagement. Female students showed slightly higher levels of Career Planning and Career Decision-Making Knowledge; however, the relatively small effect sizes indicate that gender alone is not a dominant determinant of adolescent career maturity in contemporary educational contexts. The findings suggest that career maturity in the digital era is shaped more strongly by broader educational, contextual, and technological influences than by traditional gender differences. These results highlight the importance of strengthening experiential career exploration and digitally integrated career guidance programs to support more adaptive career development among adolescents.

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Not applicable.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Redfame Publishing.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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