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Psychological and pedagogical conditions, DEI perception, and career agency among university students in Kazakhstan

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Introduction: Labour-market restructuring and the growing emphasis on diversity, equity, and inclusion (DEI) have increased interest in how universities support students' social mobility and career development.

Methods: This cross-sectional study examined associations among perceived psychological and pedagogical conditions, DEI perception, and career agency in 300 university students aged 18–24 from four cities in Kazakhstan. Analyses included descriptive statistics, correlations, group comparisons, hierarchical regression, bootstrap mediation, and assessment of common method variance.

Results: Perceived psychological and pedagogical conditions were weakly associated with DEI perception ($r = 0.158$, $p = 0.006$), whereas neither construct was significantly associated with career agency. The proposed indirect association through DEI perception was not supported. Differences by gender, educational level, and field of study were small.

Discussion: The findings suggest that students' perceptions of institutional support and inclusion are distinct from career agency. Positive DEI perceptions may therefore not translate directly into career-related action. Given the cross-sectional and self-reported design, causal interpretations are not warranted. Longitudinal studies should incorporate validated measures and behavioural or objective career outcomes.

KEYWORDS

diversity, equity, inclusion, social mobility, youth

1 Introduction

Digitalisation, labour-market restructuring, and increasingly fragmented career pathways have changed how young adults access social mobility. Formal educational credentials remain important, but career progression also depends on information, networks, practical experience, and the ability to recognise and use available opportunities.

At the same time, organisations increasingly frame employment practices through diversity, equity, and inclusion (DEI). Universities therefore face two related tasks: preparing students for uncertain career transitions and helping them understand how

inclusive organisational practices operate. Yet, career support, DEI awareness, and career agency are often examined separately.

This study aimed to examine the associations among students' perceptions of psychological and pedagogical conditions, DEI culture, career agency, and readiness to use social mobility mechanisms.

The specific objectives of the study are as follows:

1. To explore the conceptual and theoretical foundations of social mobility mechanisms and DEI culture within a pedagogical framework.
2. To examine which characteristics of the educational environment are associated with career agency among young people.
3. To conduct an empirical study on students' perceptions of corporate DEI culture and their readiness for career mobility.
4. To examine associations among psychological and pedagogical conditions, career agency, and inclusion-related attitudes.
5. To formulate practice-oriented recommendations derived from the observed patterns without attributing causal effects to the measured conditions.

Previous research has examined career agency, career adaptability, inclusive education, organisational inclusion, and educational support, often at separate analytical levels (Arthur and Rousseau, 2015; Hall and Chandler, 2005). The present framework specifies proposed statistical relationships among these constructs in a pre-employment context. Psychological and pedagogical conditions represent perceived access to career resources, DEI perception reflects students' interpretation of inclusion and fairness, and career agency captures purposeful career orientation. The cross-sectional design allows these dimensions to be examined jointly but does not establish their temporal or causal ordering.

The proposed relational model was tested through four hypotheses.

H1. Perceived psychological and pedagogical conditions are positively associated with career agency.

H2. Perceived psychological and pedagogical conditions are positively associated with DEI culture perception.

H3. DEI culture perception remains associated with career agency after perceived psychological and pedagogical conditions are statistically controlled.

H4. Psychological and pedagogical conditions show an indirect statistical association with career agency through DEI culture perception.

These hypotheses concern patterns of covariance. They do not imply temporal precedence, causal mediation, or intervention effects.

Because the study is cross-sectional, the term “predict” refers to statistical prediction rather than temporal or causal influence.

2 Literature review

The concept of the “social elevator” (or social lift) in contemporary scholarship is understood as a set of institutions,

mechanisms, and practices that enable an individual's vertical mobility—the transition from one social status to another (Smelser and Swedberg, 2005; Sorokin, 1927). Classical works by V. Pareto, P. Sorokin, and R. Dahrendorf emphasised the stratified nature of society and the possibilities for movement between its hierarchical levels (Dahrendorf, 1959).

Contemporary research (Akpanova et al., 2025) distinguishes between formal (education, professional certification, government support programmes) and informal (family ties, social capital, personal networks) mobility channels. Young people, who are in the phase of professional formation, are particularly sensitive to the presence or absence of such opportunities. Studies by Matamoros-Lima et al. (2023), Londoño-Vélez et al. (2022), and González-Monteagudo et al. (2024) suggest that the subjective sense of being able to “move upward” is directly linked to the system of educational and career guidance.

A significant refinement in recent years has been the shift from the concept of mechanical elevators (institutionally embedded trajectories) to that of agent-initiated elevators, where upward mobility is determined by an individual's proactivity and self-determination competencies (Appadurai, 2004; Gambetta, 1987).

The term DEI entered international managerial and academic discourse following the onset of institutional reforms in the United States and European countries aimed at eliminating systemic discrimination and enhancing inclusivity (Ansell and Gash, 2008). According to Harvard Business Review (2022), DEI culture is a systemic approach to building a work environment that ensures access to opportunities and recognises difference as an organisational asset.

In academic literature, three levels of DEI are distinguished:

- Diversity: the actual presence of variation (gender, ethnic, age-related, etc.);
- Equity: the structural provision of equal opportunities, as opposed to merely “equal treatment”; and
- Inclusion: the involvement of each individual in decision-making processes, communication, and recognition (Ferdman, 2014; Shore et al., 2011).

From the perspective of youth policy, DEI culture within organisations is becoming one of the key factors in career inclusion: it broadens the boundaries of what is possible and reduces the impact of one's initial social status (Financial Times, 2024). In the context of increasing diversity in professional identities and digital forms of employment, inclusion is perceived not only as a value but also as a new type of social elevator.

At the same time, empirical studies (Grossman et al., 2025; Iniesto and Bossu, 2023) indicate a low level of DEI literacy among students, which reduces the effectiveness of corporate programmes and necessitates pedagogical support.

In Russian pedagogy, the concept of “psychological and pedagogical conditions” is understood as a set of educational environment factors specially organised to achieve a specific outcome (Serikov, 1999; Yasvin, 2001). In this study, pedagogical conditions are defined as institutional, value-based, and practice-oriented elements of the educational process that

promote the development of young people's orientation towards conscious career mobility (Gomelsky Haiby, 2024).

The key pedagogical factors include:

- the availability of career services and mentorship;
- the development of soft skills (communication, self-presentation, teamwork);
- the incorporation of the principles of inclusion, equity, and agency into the academic curriculum; and
- a motivational and value-based environment that supports student agency and initiative (Wofford, 2023).

Studies such as Gregorová et al. (2024) and Naseer et al. (2025) emphasise that the self-perception of being able to influence one's own future is shaped not so much through theoretical coursework as through participation in project-based, volunteer, and professionally oriented activities (Villalba García, 2021). This aligns with international models of career readiness (National Association of Colleges and Employers (n.d.); Savickas, 2013; Yoon et al., 2018), which focus on the development of meta-skills for adaptability and self-growth among youth.

Contemporary research confirms that the education system continues to play a central role in creating conditions for vertical social mobility (Breen and Müller, 2020; Yew, 2021). At the same time, the subjective perception of fairness and accessibility of career advancement mechanisms by young people is gaining importance. As Fehr (2024) emphasises, this perception significantly influences their motivational readiness to engage with such processes.

A study by Wu et al. (2025) adds to this perspective, highlighting the critical influence of cultural and ethnic factors, which can modify the effectiveness of even formally accessible social mobility channels.

The identified theoretical gap lies in the fact that most international studies are primarily focused on the macro-sociological level of analysis (stratification, class mobility), whereas the psychological and pedagogical determinants of young people's readiness to use social mobility channels remain underexplored.

DEI has gained considerable attention in academic and organisational research. Research by Ferdman (2020), Shore et al. (2011), and Mor Barak (2015) demonstrates the positive impact of inclusive practices on employee satisfaction, engagement, and performance—especially among individuals from vulnerable social groups (Ferdman, 2016; Society for Human Resource Management and Harvard Business Review Analytic Services, 2022). In turn, Verwijns and Russo (2023) emphasise that DEI not only reduces the likelihood of discrimination but also fosters the unleashing of innovative potential among youth in the corporate environment.

Nevertheless, Smith (2024) note that for members of Generation Z, DEI values often remain abstract and insufficiently internalised, particularly among students and young professionals who lack experience in such programmes.

Career adaptability research emphasises individual resources, whereas inclusive education and organisational inclusion focus on access, belonging, and institutional climate (Ainscow, 2020; Ryan and Deci, 2017; Savickas, 2013; Trujillo and Renée, 2015). These traditions rarely examine perceived educational support,

DEI perception, and career agency within a single pre-employment framework. The present study tests their associations in a Kazakhstan student sample without treating the constructs themselves as novel.

Foundational work by Ryan and Deci (2017), as well as Savickas (2013), highlights the importance of satisfying basic psychological needs (autonomy, competence, and relatedness) and consciously designing one's life and career path as critical conditions for developing an active agentic stance among youth. Research by Tomlinson et al. (2021) and Zacher and Frese (2009) shows that characteristics such as metacognition, flexibility, and future orientation are significant predictors of career adaptability (Henry et al., 2017; Hou et al., 2020). Meanwhile, Wang and Degol (2016) provide evidence that an inclusive educational environment, which fosters a sense of belonging and psychological safety, promotes increased motivation and career awareness.

According to Ainscow (2020) and Trujillo and Renée (2015), the implementation of inclusive educational policy requires strategic leadership and institutional change aimed at ensuring equal access to opportunities (Trujillo, 2016). The OECD report (2023) affirms the importance of the pedagogical environment as a mechanism for reducing social barriers; however, it primarily addresses the structural aspects of educational inclusion, without delving into deep pedagogical practices.

Existing research addresses only parts of the proposed relationship. Career adaptability models focus on individual resources for managing transitions. Inclusive education research examines access, participation, and belonging, whereas organisational inclusion studies usually concern employees who have already entered the workplace. Educational environment models describe institutional support but rarely connect it with pre-employment mobility.

The present framework distinguishes three functions: psychological and pedagogical conditions represent perceived access to career resources; DEI perception reflects how students interpret fairness and inclusion; and career agency captures purposeful career orientation. Its contribution lies in examining whether these dimensions are empirically related rather than treating their integration as inherently established.

3 Research methods and materials

3.1 General methodological framework

The study is structured within an integrative approach, combining both theoretical-analytical and empirical-diagnostic levels. The methodology is based on the principles of the system-activity approach (Leontiev, 1978; Serikov, 1999), as well as on the ideas of agent-based pedagogy (Selevko, 1998; Sergeev, 2004) and the theory of career adaptability (Savickas, 2013). Special attention is given to the operationalisation of the concepts of career agency, psychological and pedagogical conditions, and perception of DEI culture through the lens of socio-psychological and pedagogical analysis.

The rationale for selecting the empirical research design is grounded in the need to examine the subjective perceptions, value orientations, and behavioural attitudes of students as a

target group in the context of developing readiness to use social mobility mechanisms. The primary method of data collection was a survey-based questionnaire study, followed by a statistical analysis aimed at identifying correlations among key variables.

3.2 Study setting, eligibility criteria, recruitment, and sample

The study employed a cross-sectional quantitative design and was conducted in 2025 among students enrolled at higher education institutions in Almaty, Karaganda, Ust-Kamenogorsk, and Aktau, Kazakhstan. S. Amanzholov East Kazakhstan University coordinated the research and ethical review. The remaining partner institutions were identified by city in the anonymised research documentation available for the present analysis.

A purposive stratified sampling strategy was applied to include students from different educational levels and fields of study. Eligibility criteria were: (1) age between 18 and 24 years; (2) current enrolment in a bachelor's or master's programme, or completion of the final undergraduate year; (3) enrolment in a humanities, technical, or socio-economic programme at one of the participating institutions; (4) ability to understand the questionnaire instructions; and (5) written informed consent.

Students were excluded when they were outside the specified age range, were not enrolled at a participating institution, declined informed consent, submitted a duplicate questionnaire, left one or more study scales incomplete, or provided responses outside the permitted Likert range. These criteria were defined before the statistical analysis.

The final analytical sample comprised 300 students. It included 174 women (58%) and 126 men (42%). By educational level, 189 respondents were bachelor's students (63%), 75 were master's students (25%), and 36 were completing their final undergraduate year (12%). The distribution by field of study comprised 128 humanities students, 94 technical students, and 78 students enrolled in socio-economic programmes. Because the sample was purposive rather than probability-based, it was designed to represent variation across student groups but not to provide nationally representative prevalence estimates.

3.2.1 Sample size sensitivity analysis

Because data collection had been completed before the present analysis, sample adequacy was evaluated through a sensitivity analysis rather than a retrospective observed-power calculation. With $N=300$, a two-sided significance level of $\alpha=0.05$, and a statistical power of 0.80, the study could detect correlations of $|r| \geq 0.161$. For a one-way ANOVA with three groups, the minimum detectable effect was Cohen's $f=0.180$, corresponding to $\eta^2=0.031$.

For the regression model containing the two focal predictors, the minimum detectable effect was $f^2=0.032$. A covariate-adjusted model containing seven predictors, including demographic contrast terms, would detect the effects of $f^2 \geq 0.049$. The sample was therefore adequate for small-to-moderate associations, although weaker relationships may have remained undetected.

3.3 Recruitment and data collection procedure

Participants were recruited in person at the four study sites within the purposive strata defined by educational level, field of study, and gender. Students received a standardised explanation of the research purpose, questionnaire structure, voluntary nature of participation, confidentiality safeguards, and right to withdraw. Participation had no effect on academic assessment or access to university services.

Before completing the questionnaire, each participant reviewed the study information and provided written informed consent. The survey was administered in an educational setting and required approximately 10–12 min. Respondents completed the questionnaire independently. Members of the research team were available only to clarify procedural instructions and did not interpret individual items for the participants.

No names, student identification numbers, telephone numbers, email addresses, or other direct identifiers were entered into the analytical dataset. Each questionnaire was assigned a numerical code. The archived dataset contained 300 uniquely numbered and fully completed records. Thus, the completion rate within the retained analytical sample was 100%. The total number of students initially exposed to the invitation was not recorded in the consolidated database; consequently, an invitation-based response rate and non-response rate could not be calculated retrospectively.

3.4 Measures and instrument adaptation

The survey comprised three 10-item measures: the Career Agency Scale, the DEI Culture Perception Scale, and the Psychological and Pedagogical Conditions Scale. All items were rated on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). For each construct, the item scores were summed and divided by 10. Scale scores therefore ranged from 1 to 5, with higher values indicating stronger career agency, more positive perceptions of DEI culture, or greater perceived availability of psychological and pedagogical support.

Career agency was assessed using a student-oriented adaptation of the Career Decision-Making Self-Efficacy framework developed by Taylor and Betz (1983). The adapted instrument addressed awareness of career pathways, understanding of career infrastructure, access to information and mentorship, confidence in competitive settings, self-presentation, active career search, perceived equality of opportunity, university support, and confidence in personal professional value.

Perception of DEI culture was assessed using a 10-item instrument adapted from DEI-related organisational survey materials associated with SHRM and Harvard. The scale measured respect for social differences, perceived fairness, understanding of diversity, equity, and inclusion, awareness of corporate DEI mechanisms, willingness to enter an inclusive organisation, and the perceived contribution of DEI practices to career mobility.

Psychological and pedagogical conditions were measured with an author-developed 10-item scale based on the socio-pedagogical environment approach and agency-oriented education. Its items assessed career-centre availability, encouragement of student initiative, access to career counselling, soft-skills development, internships, interaction with employers, support for résumé and portfolio preparation, awareness of career trajectories, integration of equal-opportunity principles, and motivation for professional growth.

Adaptation was conceptual rather than limited to literal wording. Employment-oriented items were reformulated for students preparing to enter the labour market. References to internal promotion, organisational tenure, and established employee roles were replaced with references to career entry, internships, university resources, anticipated employment, and pre-employment mobility. The final item sets were checked for correspondence with the operational definitions of the three constructs and for consistency of response format.

The available research archive confirms that adapted student-oriented versions were used but does not contain a separate translation log or an independently documented forward- and back-translation protocol. The manuscript therefore does not claim formal back-translation or cross-language equivalence testing. This aspect is reported explicitly to avoid overstating the degree of cross-cultural validation.

3.5 Preliminary testing and reliability

A separate pilot dataset was not preserved in the consolidated research archive. Accordingly, no independent pilot sample size or pilot-specific psychometric estimates are reported. Procedural feasibility was evaluated through questionnaire completion time, item completion, response-range inspection, and the usability of the final data structure. The retained respondents completed the instrument within approximately 10–12 min, and all 30 items produced valid responses within the permitted range of 1–5. No item-level omissions were found.

Internal consistency was recalculated using the complete analytical dataset. Cronbach's alpha was 0.988 for the Career Agency Scale, 0.996 for the DEI Culture Perception Scale, and 0.990 for the Psychological and Pedagogical Conditions Scale. These coefficients indicate very high internal consistency. At the same time, values approaching 1.00 may reflect substantial similarity among some items and should not be interpreted as sufficient evidence of construct validity without factor-analytic assessment.

Preliminary structural evidence was examined through principal component analysis with varimax rotation. Three components had eigenvalues above 1.00 and jointly explained 93.27% of the total variance. The first, second, and third components accounted for 37.26%, 29.50%, and 26.51%, respectively.

The rotated solution corresponded to the three intended measures. Career Agency items loaded between 0.824 and 0.990 on their primary component, DEI Perception items between 0.886 and 0.994, and Psychological and Pedagogical Conditions items between 0.910 and 0.985. Absolute cross-loadings did not exceed 0.122.

These results provide preliminary evidence that the item sets represent distinguishable dimensions. However, principal component analysis does not establish full construct validity. The very high internal consistency coefficients also suggest possible item redundancy. Independent confirmatory factor analysis, convergent and discriminant validity testing, and measurement-invariance assessment remain necessary.

3.6 Data screening, missing data, and statistical analysis

Data were processed in IBM SPSS Statistics, version 26. Before analysis, the database was screened for duplicate respondent codes, blank cells, invalid values, incomplete scale records, and responses outside the predefined range. The final dataset contained 300 unique respondent records and 9,000 valid item-level observations: 300 respondents $\times$ 30 items. No missing, non-numeric, or out-of-range values were identified.

Because the analytical dataset was complete, no mean substitution, multiple imputation, pairwise deletion, or listwise deletion was required. All analyses were conducted on the same complete sample of 300 respondents. Scale scores were computed only after confirming that all 10 items belonging to the relevant construct were present.

Before a parametric analysis, composite scores were examined for distributional shape, standardised outliers, and linearity. Skewness ranged from -0.425 to 0.002 , and excess kurtosis ranged from -1.472 to -0.898 . No observation exceeded $|z| = 3.29$. Shapiro–Wilk tests were statistically significant for all three scores, indicating departures from normality. Given the bounded nature of the Likert-based composite scores and the sample size, these results were considered together with skewness, kurtosis, outlier screening, and non-parametric sensitivity analysis.

Scatterplots and quadratic regression terms were used to evaluate linearity. Spearman's rank correlations were calculated as robustness estimates. Agreement between Pearson and Spearman results was used to assess whether the substantive conclusions depended on the parametric correlation assumption.

A descriptive analysis was performed, included the mean, standard deviation, minimum, and maximum for each item and composite scale. Cronbach's alpha was used to assess internal consistency. Pearson's correlation coefficient was applied to examine linear associations among career agency, DEI culture perception, psychological and pedagogical conditions, and anti-stereotype orientation. The coefficients were interpreted as weak at $|r| = 0.10$ – 0.29 , moderate at $|r| = 0.30$ – 0.49 , strong at $|r| = 0.50$ – 0.69 , and very strong at $|r| \geq 0.70$.

Group differences were examined by gender, educational level, and field of study. A one-way analysis of variance was used for comparisons involving three educational or disciplinary groups. Tukey's Honestly Significant Difference (HSD) procedure was applied when the omnibus test was statistically significant. Effect magnitude was evaluated using eta squared (η^2) and partial eta squared (partial η^2), accompanied by 95% confidence intervals derived from the non-central F distribution. In the present one-way ANOVA models, η^2 and partial η^2 were numerically identical. Values of approximately 0.01, 0.06, and 0.14 were

interpreted as small, medium, and large effects, respectively. For two-group comparisons, Cohen's d was calculated using the pooled within-group standard deviation. Cohen's d was also reported for statistically significant Tukey-adjusted pairwise contrasts in analyses involving three groups. Values of 0.20, 0.50, and 0.80 were interpreted as small, medium, and large standardised differences. Confidence intervals for Cohen's d were derived from the non-central t distribution. Statistical significance, effect magnitude, and interval precision were considered jointly. Statistical significance was evaluated at $p < 0.05$. Because the study was cross-sectional, the results were interpreted as associations and group differences rather than evidence of causality or temporal effects.

Potential common method variance was assessed because all constructs were measured simultaneously through self-report items presented in the same questionnaire format. Harman's single-factor test was performed by entering all 30 items into an unrotated principal component analysis. Components were extracted from the correlation matrix, and the variance explained by the first component was evaluated against the conventional 50% threshold. This test was treated as a diagnostic procedure rather than definitive evidence that common method variance was absent.

To test the predictive and indirect relationships specified in the conceptual model, hierarchical multiple regression and mediation analysis were conducted using composite mean scores. Career agency was treated as the outcome variable. Psychological and pedagogical conditions were entered as the primary predictor, whereas DEI culture perception was examined as an additional predictor and potential mediator.

In the hierarchical regression, psychological and pedagogical conditions were entered at Step 1, followed by DEI perception at Step 2. Model evaluation included R^2 , adjusted R^2 , change in R^2 , the F statistic, standardised regression coefficients, 95% confidence intervals, tolerance, and variance inflation factors.

The indirect effect of psychological and pedagogical conditions on career agency through DEI perception was estimated using 10,000 bootstrap resamples. Mediation was considered statistically supported when the 95% bootstrap confidence interval for the indirect effect excluded zero.

An observed-variable path model was also estimated. Psychological and pedagogical conditions were specified as the exogenous variable, DEI perception as the mediator, and career agency as the outcome. Model fit was assessed using the chi-square test, comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR).

Observed composite scores were used instead of a latent-variable SEM because an independent confirmatory measurement model had not been established. The partial-mediation model was saturated; therefore, global fit indices were evaluated for the nested full-mediation model.

All regression, mediation, and path estimates were interpreted as associational. The terms “predictor,” “outcome,” “direct effect,” “indirect effect,” and “path” are used as statistical conventions and do not indicate temporal order or causality. Cross-sectional mediation can describe whether an observed covariance pattern is compatible with an indirect model, but it cannot demonstrate a causal mechanism.

3.7 Ethical approval and data protection

The research protocol, questionnaire instruments, and written informed consent materials were reviewed and approved by the Ethics Committee of S. Amanzholov East Kazakhstan University, Ust-Kamenogorsk, Republic of Kazakhstan (Protocol No. 16, dated 22 September 2025). The approval authorised the empirical phase of the project and the use of anonymised findings for scientific publication.

All participants were legally competent adults aged 18 years or older. Written informed consent was obtained from every respondent. Participation was voluntary, and refusal or withdrawal involved no sanctions, academic disadvantages, or other adverse consequences. The study did not intentionally recruit vulnerable groups and involved no intervention affecting participants' physical, psychological, or social wellbeing.

Anonymity and confidentiality were maintained throughout data collection and analysis. Direct personal identifiers were not collected. The dataset was stored in anonymised numerical form, access to research files was restricted to the research team, and results were reported only at aggregate level. The research procedures complied with the applicable legislation of the Republic of Kazakhstan and institutional requirements for psychological and pedagogical research.

3.8 Study limitations

Several limitations constrain the interpretation, reproducibility, and generalisability of the findings. First, the cross-sectional design measured all constructs at a single time point. It cannot establish temporal precedence, developmental change, or causal direction. The observed relationships may reflect reverse associations or unmeasured third variables. Regression, mediation, and path coefficients should therefore be interpreted as descriptions of covariance rather than evidence of causal mechanisms.

Second, the study relied exclusively on self-reported perceptions and orientations. The measures capture how students evaluated their career agency, DEI culture, and educational conditions but do not independently verify actual institutional provision, behavioural engagement, or career performance. Responses may also have been influenced by recall error, acquiescence, consistency motives, and differences in familiarity with DEI terminology.

Third, socially desirable responding remains possible. Participants may have overstated their support for diversity, fairness, inclusion, career initiative, or socially approved educational practices. No dedicated social desirability scale, indirect questioning procedure, or external informant assessment was included. Consequently, the comparatively high ratings of respect for difference and inclusion should be interpreted as stated attitudes rather than verified behavioural commitments.

Fourth, all constructs were measured concurrently using the same questionnaire format and response scale. This design creates a risk of common method variance. Harman's single-

factor test showed that the first unrotated component explained 37.26% of the total variance, below the conventional 50% threshold. However, this test has limited sensitivity and cannot exclude method-related covariance. Future studies should introduce temporal separation, different response formats, independent data sources, or a marker variable.

Fifth, the sample was limited to 300 university students aged 18–24 from urban institutions in Kazakhstan. The purposive sampling strategy and the absence of a recorded invitation-based response rate restrict population-level inference. The findings should not be generalised to rural youth, students in other regions, young people outside higher education, employed graduates, or the wider youth population of Kazakhstan.

Sixth, transferability to other educational systems is uncertain. University career services, labour-market entry routes, institutional understandings of student support, and the status of DEI differ across countries. The observed patterns may therefore depend on the organisational and policy context of Kazakhstan and may not reproduce in systems with different admission structures, career guidance models, labour regulations, or inclusion policies.

Seventh, the study did not include longitudinal validation. It remains unknown whether career agency, DEI perception, and evaluations of psychological and pedagogical conditions are stable over time or predict subsequent educational and employment transitions. Differences between bachelor's, master's, and final-year students represent comparisons between separate groups rather than within-person developmental change.

Eighth, psychometric evidence for the adapted instruments remains preliminary. Internal consistency was very high, and exploratory principal component analysis identified three distinguishable dimensions. Nevertheless, coefficients approaching 1.00 may indicate item redundancy. The study did not conduct independent confirmatory factor analysis, convergent and discriminant validity testing, criterion validation, measurement-invariance analysis, or full cross-linguistic validation. The scale structure therefore requires replication in an independent sample.

Ninth, the study did not include behavioural, administrative, or objective career outcomes. It did not measure internship completion, job-search activity, applications submitted, use of

career services, mentoring participation, employment entry, income, occupational status, promotion, or actual upward mobility. Career agency should therefore not be interpreted as demonstrated mobility behaviour or future career success.

Tenth, the analytical strategy only partially reflects the complexity of the proposed theoretical model. The study extended bivariate correlations through hierarchical regression, bootstrap mediation, and observed-variable path analysis, but the models were based on composite scores and cross-sectional data. They did not include a validated latent measurement model, measurement error, multi-level institutional effects, longitudinal ordering, relevant control variables, or alternative competing models. Accordingly, the analyses test a simplified associational representation of the framework rather than its full theoretical structure.

Future research should use larger probability-based or multi-site samples, validated multilingual instruments, longitudinal or quasi-experimental designs, and multiple data sources. Latent-variable SEM, multi-level analysis, measurement-invariance testing, and objective educational and career indicators would provide a stronger test of the proposed framework.

4 Results

4.1 Descriptive results

Career agency was moderately high overall ($M = 3.76$). Confidence in personal value, active career search, and awareness of career pathways received the highest ratings. University support and access to mentoring received the lowest, indicating a gap between students' self-reported career orientation and perceived institutional support (Table 1).

DEI perception was generally positive ($M = 3.87$). Respect for differences and perceived fairness received the highest ratings, whereas knowledge of specific DEI mechanisms was lower. This pattern distinguishes normative support for inclusion from procedural understanding (Table 2).

At the same time, understanding of the substantive content of DEI ($M = 3.59$) and awareness of specific programme mechanisms ($M = 3.28$) remain at a moderate level. Knowledge

TABLE 1 Mean scores on the career agency scale ($n = 300$).

No.	Indicator	Mean (M)	Std. deviation (SD)	Min	Max
1	Awareness of career paths	4.01	0.84	2	5
2	Understanding of career infrastructure	3.74	0.96	1	5
3	Confidence in competitive settings	3.68	1.01	1	5
4	Access to information	3.93	0.89	2	5
5	Access to mentorship	3.21	1.12	1	5
6	Self-presentation skills	3.79	0.90	2	5
7	University support	3.15	1.18	1	5
8	Activity in career search	4.05	0.82	2	5
9	Belief in equal opportunity	3.88	1.01	1	5
10	Confidence in personal value	4.11	0.77	2	5

Compiled by the authors.

TABLE 2 Mean scores for perception of DEI culture ($n = 300$).

No.	Indicator	Mean (M)	Std. deviation (SD)	Min	Max
1	Inclusion and potential realisation	4.21	0.72	2	5
2	Respect for differences	4.34	0.65	3	5
3	Opportunity for self-actualisation within DEI	3.88	0.83	1	5
4	Willingness to choose a DEI-oriented company	4.05	0.77	2	5
5	Understanding of the DEI concept	3.59	0.92	1	5
6	DEI as a mechanism of social mobility	3.71	0.85	1	5
7	Awareness of DEI programme mechanisms	3.28	1.01	1	5
8	Engagement through DEI	3.93	0.79	2	5
9	Differentiating equity from equality	3.62	0.94	1	5
10	DEI as a condition for career fairness	4.10	0.70	2	5

Compiled by the authors.

TABLE 3 Assessment of pedagogical conditions ($n = 300$).

No.	Indicator	Mean (M)	Std. deviation (SD)	Min	Max
1	Career support centre	3.43	0.97	1	5
2	Encouragement of student initiative	3.98	0.78	2	5
3	Availability of counselling support	3.35	1.01	1	5
4	Development of soft skills	4.02	0.75	2	5
5	Engagement in internships	3.27	1.09	1	5
6	Meetings with employers	3.49	0.91	2	5
7	Support for career self-presentation	3.22	1.12	1	5
8	Awareness of career trajectories	3.76	0.86	2	5
9	Presence of DEI principles	3.12	1.05	1	5
10	Motivation for professional and personal growth	4.08	0.69	2	5

Compiled by the authors.

of DEI terminology and programme mechanisms received lower ratings than general support for fairness and inclusion. This pattern may justify further assessment of students' applied DEI knowledge, but it does not establish that a specific educational intervention is required or would be effective (Table 3).

Perceived psychological and pedagogical conditions were moderately favourable ($M = 3.57$). Motivation for development and soft-skills support were rated most highly. DEI integration, internships, counselling, and career self-presentation support received lower ratings, suggesting uneven institutional provision (Table 3).

Lower ratings for DEI integration, counselling, internships, and career self-presentation indicate that respondents perceived these forms of support less favourably than motivation and soft-skills development. The data do not determine whether these differences reflect actual service provision, limited awareness, unequal access, or individual expectations.

Students expressed strong support for respect and inclusion, but their ratings of procedural DEI knowledge were lower. This contrast suggests that normative acceptance of diversity does not necessarily imply an operational understanding of equity and inclusion mechanisms.

Selected DEI items addressed respect for differences, fairness, and inclusion. Their descriptive scores reflect respondents' stated attitudes but do not demonstrate how stereotypes influence identity, career decisions, or institutional behaviour. These mechanisms require a separate measurement and a qualitative examination.

4.2 Common method variance assessment

Harman's single-factor test was conducted using all 30 questionnaire items. Unrotated principal component analysis identified three components with eigenvalues above 1.00. The first component had an eigenvalue of 11.18 and explained 37.26% of the total variance. The second and third components explained 29.50% and 26.51%, respectively; together, the three components accounted for 93.27% of the variance.

The first component remained below the 50% threshold, and no single factor dominated the solution. Thus, common method variance was unlikely to account for most of the observed covariance. Nevertheless, this result does not eliminate method-related bias because the variables were measured concurrently through self-report scales without temporal separation or an independent marker variable.

4.3 Relationships between the study variables

To determine the nature of the relationships between the key variables of the study, a Pearson correlation analysis was conducted, including three aggregated indicators (Table 4):

1. The total score on the Career Agency Scale;
2. The total score on the Perception of DEI Culture Scale;
3. The total score on the Pedagogical Conditions Scale;

The average score on the DEI scale items reflects attitudes towards overcoming cultural stereotypes and biases (Items 2, 3, 6, 9) (Table 4).

Pearson and Spearman analyses produced the same substantive conclusion. Career agency was not associated with either DEI perception or psychological and pedagogical conditions. A weak positive association was observed between DEI perception and psychological and pedagogical conditions. The corresponding confidence intervals indicate that the two associations involving career agency were compatible with effects in either direction.

4.4 Group differences

Group differences by gender, educational level, and field of study were examined using the procedures specified in Section 3.6 (Table 5).

Gender accounted for 1.6% of the variance in career agency and 2.2% of the variance in DEI culture perception. Both effects were small. Women reported higher career agency than men [$d = 0.254$, 95% CI (0.023–0.484)], and more positive DEI perceptions [$d = 0.300$, 95% CI (0.069–0.530)].

The gender difference in psychological and pedagogical conditions was not statistically significant. Its confidence interval included zero [$d = 0.211$, 95% CI (–0.019 to 0.441)]. Thus, the results indicate limited gender differentiation rather than a substantial divide between male and female students.

Gender explained 1.6% of the variance in career agency and 2.2% in DEI perception. Educational level explained 3.6% and 3.2%, respectively, whereas field of study explained 2.2%–3.4% across the three outcomes. All omnibus effects were small. The complete Tukey analysis identified four significant contrasts, but substantial score overlap remained across all groups (Table 6).

Educational level explained 3.6% of the variance in career agency and 3.2% of the variance in DEI perception. These effects were statistically significant but small. Tukey-adjusted comparisons showed that master's students reported higher career agency than bachelor's students [$d = 0.450$, 95% CI (0.180–0.720)]. They also demonstrated more positive DEI perceptions [$d = 0.424$, 95% CI (0.154–0.693)]. Both standardised differences were small to moderate.

Graduates did not differ significantly from either bachelor's or master's students after adjustment for multiple comparisons. Educational level explained only 1.4% of the variance in perceived psychological and pedagogical conditions, and the

TABLE 4 Correlations and robustness estimates among the study variables ($N = 300$).

Variable pair	Pearson's r (95% CI)	p	Spearman's ρ (95% CI)	p
Career agency–DEI perception	0.060 [–0.054, 0.172]	0.298	0.031 [–0.083, 0.144]	0.589
Career agency–psychological and pedagogical conditions	0.043 [–0.071, 0.155]	0.455	0.049 [–0.065, 0.161]	0.401
DEI perception–psychological and pedagogical conditions	0.158 [0.046, 0.266]	0.006	0.179 [0.067, 0.286]	0.002

Confidence intervals for correlation coefficients are 95%. All tests were two-sided. Source: Authors' calculations.

TABLE 5 Gender differences with effect-size estimates ($N = 300$).

Variable	Men, M ($n = 126$)	Women, M ($n = 174$)	$F(1, 298)$	p	η^2	Partial η^2 (95% CI)	Cohen's d (95% CI)
Career agency	3.62	3.85	4.71	0.031	0.016	0.016 (0.000 to 0.054)	0.254 (0.023 to 0.484)
DEI culture perception	3.71	4.00	6.58	0.011	0.022	0.022 (0.001 to 0.064)	0.300 (0.069 to 0.530)
Psychological and pedagogical conditions	3.44	3.66	3.25	0.073	0.011	0.011 (0.000 to 0.045)	0.211 (–0.019 to 0.441)

Positive Cohen's d values indicate higher mean scores among women. In a one-way ANOVA, η^2 and partial η^2 are equivalent. Source: Authors' calculations.

TABLE 6 Differences by educational level with effect-size estimates.

Variable	Bachelor's M ($n = 189$)	Master's M ($n = 75$)	Graduates M ($n = 36$)	$F(2, 297)$	p	η^2	Partial η^2 (95% CI)
Career agency	3.67	3.98	3.83	5.62	0.004	0.036	0.036 (0.004–0.083)
DEI culture perception	3.81	4.09	3.93	4.88	0.008	0.032	0.032 (0.002–0.076)
Psychological and pedagogical conditions	3.49	3.73	3.66	2.11	0.122	0.014	0.014 (0.000–0.047)

In a one-way ANOVA, η^2 and partial η^2 are numerically equivalent. Complete Tukey HSD comparisons are reported in Table 8. Source: Authors' calculations.

omnibus effect was not significant. The findings therefore indicate a localised difference between bachelor's and master's students rather than a uniform increase across successive educational levels (Tables 7, 8).

Cohen's *d* confidence intervals are unadjusted effect-size intervals. Statistical significance of pairwise differences is determined from the Tukey-adjusted confidence intervals and *p*-values.

The complete Tukey analysis localised only four pairwise differences. Master's students reported higher career agency and DEI perception than bachelor's students. Humanities students reported higher career agency than socio-economic students and higher DEI perception than technical students. All remaining pairwise comparisons were non-significant after adjustment.

Although the omnibus test for psychological and pedagogical conditions by field of study was significant, no individual contrast survived Tukey correction.

Field of study explained 2.5% of the variance in career agency, 3.4% in DEI perception, and 2.2% in perceived psychological and pedagogical conditions. All three omnibus effects were small.

Humanities students reported higher career agency than students in socio-economic programmes [$d = 0.350$, 95% CI (0.067–0.633)]. They also reported more positive DEI perceptions than technical students [$d = 0.408$, 95% CI (0.139–0.676)]. These differences were small to moderate. Other pairwise contrasts did not remain statistically significant after Tukey adjustment.

Although the omnibus test for psychological and pedagogical conditions was significant, no individual pairwise comparison

TABLE 7 Differences by field of study with effect-size estimates.

Variable	Humanities M (<i>n</i> = 128)	Technical M (<i>n</i> = 94)	Socio-economic M (<i>n</i> = 78)	<i>F</i> (2, 297)	<i>p</i>	η^2	Partial η^2 (95% CI)
Career agency	3.87	3.69	3.66	3.88	0.022	0.025	0.025 (0.000–0.066)
DEI culture perception	4.06	3.75	3.81	5.21	0.006	0.034	0.034 (0.003–0.079)
Psychological and pedagogical conditions	3.71	3.48	3.49	3.33	0.038	0.022	0.022 (0.000–0.061)

Pairwise *p*-values are adjusted using Tukey's HSD procedure. The significant omnibus result for psychological and pedagogical conditions was not localised to an individual pair after multiplicity adjustment. Source: Authors' calculations.

TABLE 8 Complete Tukey HSD pairwise comparisons.

Outcome	Comparison	Mean difference	Tukey 95% CI	Adjusted <i>p</i>	Cohen's <i>d</i> (95% CI)
Career agency by educational level	Master's–Bachelor's	0.310	(0.089 to 0.531)	0.003	0.450 (0.180 to 0.721)
	Graduates–Bachelor's	0.160	(–0.135 to 0.455)	0.408	0.232 (–0.125 to 0.590)
	Master's–Graduates	0.150	(–0.179 to 0.479)	0.530	0.218 (–0.181 to 0.616)
DEI perception by educational level	Master's–Bachelor's	0.280	(0.068 to 0.492)	0.006	0.424 (0.154 to 0.694)
	Graduates–Bachelor's	0.120	(–0.163 to 0.403)	0.578	0.182 (–0.175 to 0.538)
	Master's–Graduates	0.160	(–0.156 to 0.476)	0.458	0.242 (–0.157 to 0.641)
Career agency by field of study	Humanities–Technical	0.180	(–0.012 to 0.372)	0.071	0.300 (0.033 to 0.568)
	Humanities–Socio-economic	0.210	(0.007 to 0.413)	0.041	0.350 (0.067 to 0.634)
	Technical–Socio-economic	0.030	(–0.186 to 0.246)	0.943	0.050 (–0.250 to 0.350)
DEI perception by field of study	Humanities–Technical	0.310	(0.067 to 0.553)	0.008	0.408 (0.139 to 0.677)
	Humanities–Socio-economic	0.250	(–0.007 to 0.507)	0.059	0.329 (0.046 to 0.612)
	Technical–Socio-economic	–0.060	(–0.334 to 0.214)	0.864	–0.079 (–0.379 to 0.221)
Pedagogical conditions by field of study	Humanities–Technical	0.230	(–0.010 to 0.470)	0.063	0.307 (0.039 to 0.575)
	Humanities–Socio-economic	0.220	(–0.033 to 0.473)	0.103	0.294 (0.011 to 0.577)
	Technical–Socio-economic	–0.010	(–0.280 to 0.260)	0.996	–0.013 (–0.314 to 0.287)

Mean differences are expressed as the first group minus the second group. Tukey confidence intervals and *p*-values are adjusted for family-wise multiple comparisons. Cohen's *d* confidence intervals are 95%. *Post hoc* comparisons were not performed for outcomes with non-significant omnibus ANOVA results. Source: Authors' calculations.

survived correction for multiple testing. This result should therefore be interpreted as weak evidence of overall group heterogeneity rather than as proof that humanities students consistently receive stronger institutional support.

Across the three measures, personal motivation and general support for inclusion received higher ratings than mentoring, university career support, applied DEI knowledge, and explicit inclusion within the educational environment.

4.5 Predictive and mediational analysis

The conceptual relationships were examined using hierarchical multiple regression, bootstrap mediation, and observed-variable path analysis. Career agency was specified as the outcome, psychological and pedagogical conditions as the predictor, and DEI culture perception as the proposed mediator (Table 9).

Neither predictor was independently associated with career agency. The confidence intervals for both coefficients included zero. The estimated indirect association through DEI perception was $B = 0.006$, 95% bootstrap CI (-0.007 to 0.021), and was therefore not statistically supported.

Psychological and pedagogical conditions alone explained 0.2% of the variance in career agency, and the first regression model was not statistically significant [$F(1, 298) = 0.559$, $p = 0.455$]. Adding DEI perception increased the explained variance by only 0.3%. The final model remained non-significant [$F(2, 297) = 0.717$, $p = 0.489$, $R^2 = 0.005$]. Thus, the two predictors jointly explained less than 1% of the observed variation in career agency.

Nevertheless, acceptable global fit should not be interpreted as evidence of mediation. The indirect effect was non-significant, and both paths leading to career agency were weak. The fit indices mainly indicate that the small observed covariance between pedagogical conditions and career agency did not require an additional direct path.

Only H2 received statistical support: perceived psychological and pedagogical conditions were weakly associated with DEI culture perception. H1 and H3 were not supported because

career agency was not significantly associated with either construct after adjustment. H4 was also not supported because the bootstrap confidence interval for the indirect association included zero. The findings do not confirm a causal pathway from educational conditions through DEI perception to career agency.

The group comparisons supplement the correlational findings by identifying limited variation within the present sample. Because the effect sizes were small and the study did not evaluate any intervention, these differences should not be used alone to determine programme content or target groups.

The analyses provided support only for H2. The remaining hypotheses were not supported, and the results do not validate the proposed developmental or mediational mechanism. This section is devoted to formulating systemic recommendations addressed to various levels—from educational institutions to corporate HR departments and youth policy structures.

The findings support targeted and testable recommendations rather than broad claims of programme effectiveness. Universities could prioritise accessible career counselling, mentoring, applied DEI literacy, employer contact, and transparent information about career pathways. Employers could provide structured internships, visible selection criteria, and opportunities for students to engage with inclusive workplace practices.

Institutional initiatives should be evaluated through participation and behavioural indicators rather than programme availability alone. Relevant outcomes include career-service use, internship completion, mentoring participation, knowledge of recruitment procedures, and the development of individual career plans. Table 10 presents candidate interventions and outcomes for future evaluation.

The findings do not provide direct evidence for institutional or national policy effectiveness. They identify perceived differences that may inform the design of future pilot studies. Universities and employers could consider testing career counselling, mentoring, applied DEI education, and transparent career information, but these activities should be evaluated before wider implementation.

TABLE 9 Hierarchical regression models predicting career agency ($N = 300$).

Model summary	Predictors	R	R^2	Adjusted R^2	F	p	ΔR^2	ΔF	p for ΔF
1	Psychological and pedagogical conditions	0.043	0.002	-0.001	0.559	0.455	—	—	—
2	Psychological and pedagogical conditions; DEI perception	0.069	0.005	-0.002	0.717	0.489	0.003	0.875	0.350
Final model coefficients									
Predictor	B	SE	β	p	95% CI for B	Variance Inflation Factor (VIF)			
Constant	3.507	0.218	—	<0.001	(3.077 to 3.936)	—			
Psychological and pedagogical conditions	0.023	0.039	0.035	0.555	(-0.053 to 0.099)	1.025			
DEI perception	0.046	0.049	0.055	0.350	(-0.051 to 0.143)	1.025			

TABLE 10 Proposed interventions and outcomes for future evaluation.

Proposed area	Possible activity	Outcome to be evaluated
Career support	Career counselling, résumé support, and employer meetings	Career-service use and perceived accessibility
DEI literacy	Cases, seminars, and curriculum modules	Knowledge of DEI concepts and procedures
Soft skills	Communication and self-presentation training	Self-presentation confidence and career planning
Mentoring	Academic, alumni, and employer mentoring	Mentoring participation and perceived support
Institutional transparency	Career maps and published opportunity criteria	Awareness of career pathways and perceived fairness

The activities are prospective recommendations. Their effects were not tested in the present cross-sectional study.

Policy implications should remain provisional. The present purposive student sample cannot establish national needs, regional disparities, programme effects, or the likely consequences of accreditation reform. Broader representative and longitudinal evidence is required before recommending national implementation.

4.6 Proposed framework and illustrative evaluation scenario

Based on the descriptive gaps identified in the study, an integrative framework is proposed for future evaluation. The framework was not implemented or experimentally tested in the present research. It links four prospective areas: career support services, DEI literacy, soft-skills development, and mentoring.

A future intervention could include baseline assessment, curriculum and support design, structured implementation, and repeated outcome measurement. Its evaluation would require temporal separation, predefined outcomes, a comparison group, and analysis of change. Career agency, DEI literacy, use of career services, and perceived institutional accessibility could serve as outcome indicators.

The framework should therefore be regarded as a practice-oriented hypothesis rather than an evidence-based intervention. The present cross-sectional results identify areas that may warrant institutional attention but do not demonstrate that the proposed activities would improve career mobility (Figure 1).

The following implementation structure and numerical examples are illustrative. They were not derived from the cross-sectional dataset and do not represent observed intervention effects. Their purpose is to demonstrate how the proposed framework could be implemented and evaluated in a future longitudinal or quasi-experimental study.

The proposed framework comprises four prospective stages. The diagnostic stage would establish baseline levels of career

agency, DEI perception, and perceived educational support. The design stage would specify intervention content, delivery procedures, comparison conditions, and measurable outcomes. The implementation stage could include career guidance, mentoring, DEI literacy modules, and self-presentation training. The evaluation stage would compare repeated measurements across intervention and comparison groups. These stages describe a future research design rather than procedures completed in the present study.

A future implementation of the psychological and pedagogical support framework could operate at three interconnected levels: strategic, institutional, and operational. Each level would involve distinct objectives, responsible actors, delivery tools, and monitoring procedures, as outlined in Table 11.

The proposed implementation process would comprise five stages. First, an institutional audit could examine the visibility of DEI principles, access to career support, mentoring opportunities, and students' awareness of available resources. Surveys, interviews, and pedagogical mapping could be used to identify perceived barriers and institutional assets.

Second, the design stage would adapt the framework to the resources, disciplinary profile, and student population of each institution. Career guidance, applied DEI literacy, mentoring, employer engagement, and soft-skills development could be incorporated into curricular or extracurricular formats.

Third, institutionalisation would involve formal responsibilities, internal guidelines, delivery schedules, and coordination among university administration, academic departments, career centres, and external partners.

Fourth, structured delivery could include mentoring, career workshops, employer meetings, case-based DEI modules, project work, and support for career self-presentation. These activities should be specified in advance and delivered consistently across the intervention period.

Finally, evaluation would compare baseline and follow-up outcomes. A comparison group, repeated measurements, predefined behavioural indicators, and adjustment for baseline differences would be required. The evaluation should examine not only self-reported perceptions but also service use, internship participation, mentoring engagement, and career planning behaviour.

The data obtained were used to adapt the model and to introduce targeted changes into its substantive and organisational components (Table 12).

The implementation of the model was not universal; in each educational institution, variable practices were applied, adapted to available resources, the profile of training, and the level of DEI maturity.

In parallel, a system of methodological support was introduced, including:

1. Teaching manuals for faculty with a DEI glossary, facilitation practices, and case studies;
2. Mentorship protocol—a guide for accompanying students; and
3. Scenarios for reflective sessions—designed to help students comprehend their individual progress.

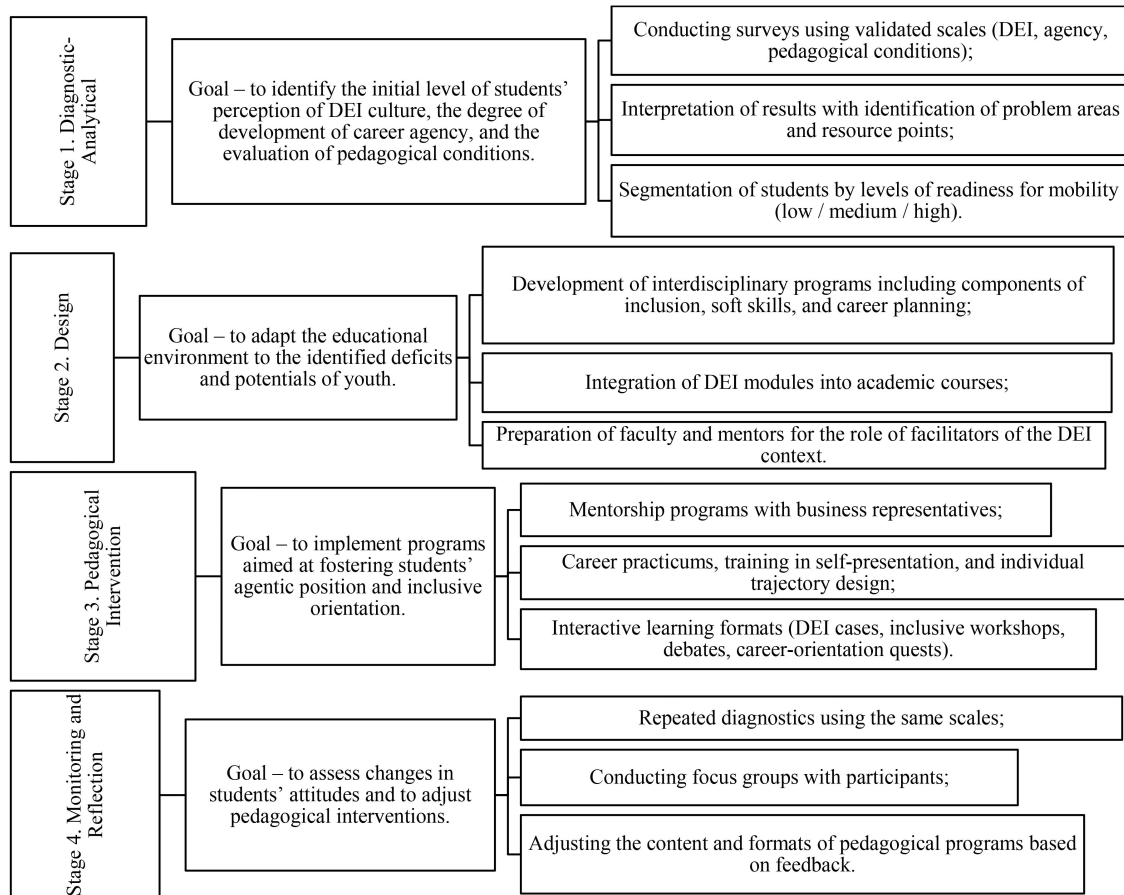


FIGURE 1

Proposed stages for future evaluation of the integrative framework. The framework presents prospective stages for future testing and was not implemented in the present cross-sectional study.

TABLE 11 Proposed levels for future implementation of the psychological and pedagogical support framework.

Level	Objective	Key actors	Implementation tools	Monitoring form
Strategic	Institutionalisation of the model within the university's development strategy	Administration and Academic Council	Integration of the model into curriculum plans, DEI strategy, and departmental Key Performance Indicators (KPIs)	Meeting protocols and implementation reports
Institutional	Creation of enabling conditions within the educational environment	Career centres, departments, and mentors	Soft-skills modules, meetings with employers, and coaching	Activity logs and student surveys
Operational	Specification of the model at the level of "student–teacher" interaction	Faculty members, advisors, and mentors	Practical case studies, project-based learning, and mentoring	Individual trajectories, self-assessment, and questionnaires

The table presents a prospective implementation structure. These procedures were not conducted in the present study.

TABLE 12 Proposed implementation and evaluation matrix.

Stage	Content	Methods	Responsible Actors	Proposed outputs
Diagnostic	Identification of deficits	Surveys and focus groups	Social psychologists and methodologists	Analytical report
Design	Adaptation of the model	Module development	Methodological committees and deans	Updated curriculum plan (UMP)
Institutional	Consolidation of the model	Regulatory formalisation	Administration	Orders and regulations
Practical	Implementation of practices	Mentoring and training	Advisors and HR professionals	Career cases and training sessions
Evaluation	Evaluation of implementation and outcomes	Follow-up surveys	Quality assessment centre	Potential framework refinement

The matrix describes a prospective implementation sequence. No stage was implemented or evaluated in the present cross-sectional study.

Thus, the integration of the model into the educational process did not occur spontaneously but emerged as the result of a comprehensive pedagogical transformation, supported institutionally and accompanied by methodological resources. This mechanism not only enhanced students' career agency but also transformed the educational environment towards inclusivity, value enrichment, and a focus on sustainable youth mobility.

To evaluate the effectiveness of the proposed model of Integrative Pedagogical Support for Inclusive Career Mobility of Youth, a comparative analysis was conducted before and after its implementation. The monitoring covered key indicators measured using the three previously validated scales: career agency, perception of DEI culture, and pedagogical conditions. A follow-up survey was conducted six months after the pedagogical intervention with a sample of students from control universities ($N = 300$).

4.6.1 Illustrative outcome scenario

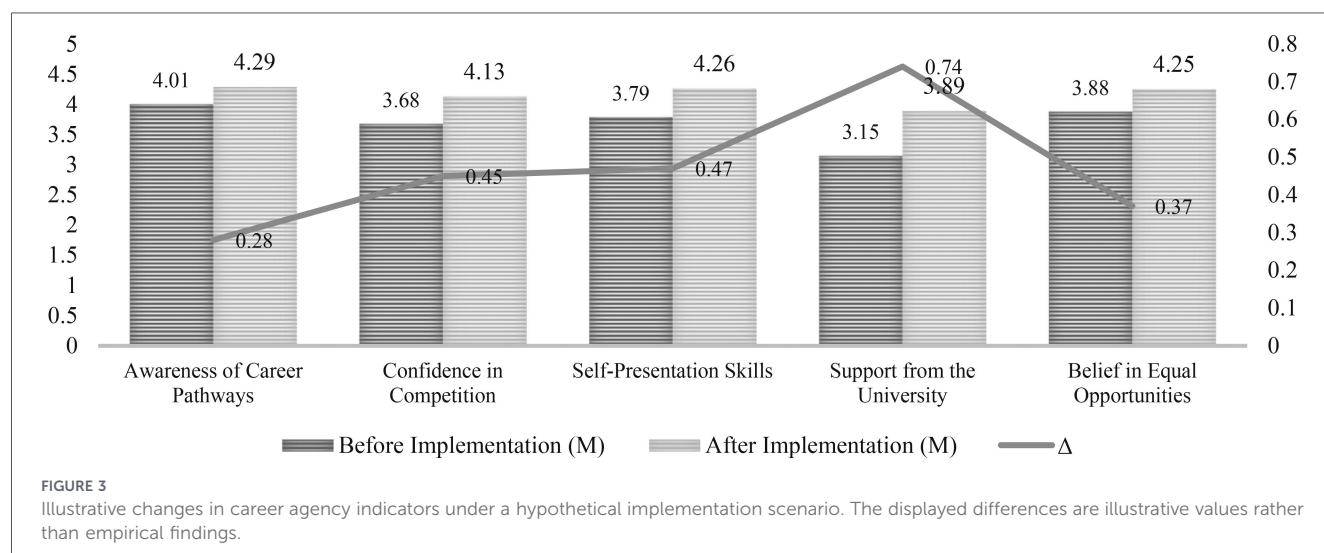
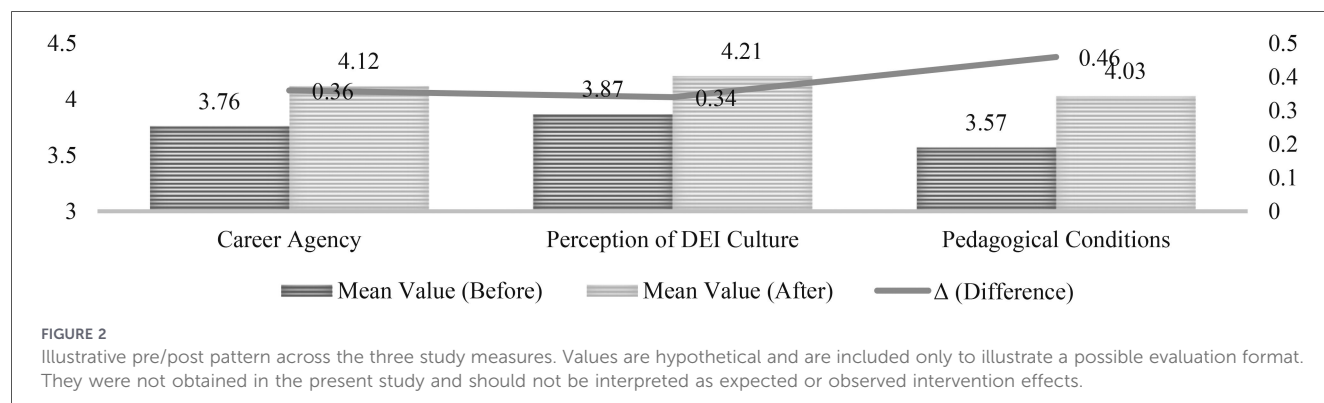
To demonstrate how a future pre/post evaluation could be reported, Figures 2–5 present hypothetical numerical values. These values are not empirical estimates, forecasts, effect sizes, or results from the current sample. They serve only as visual

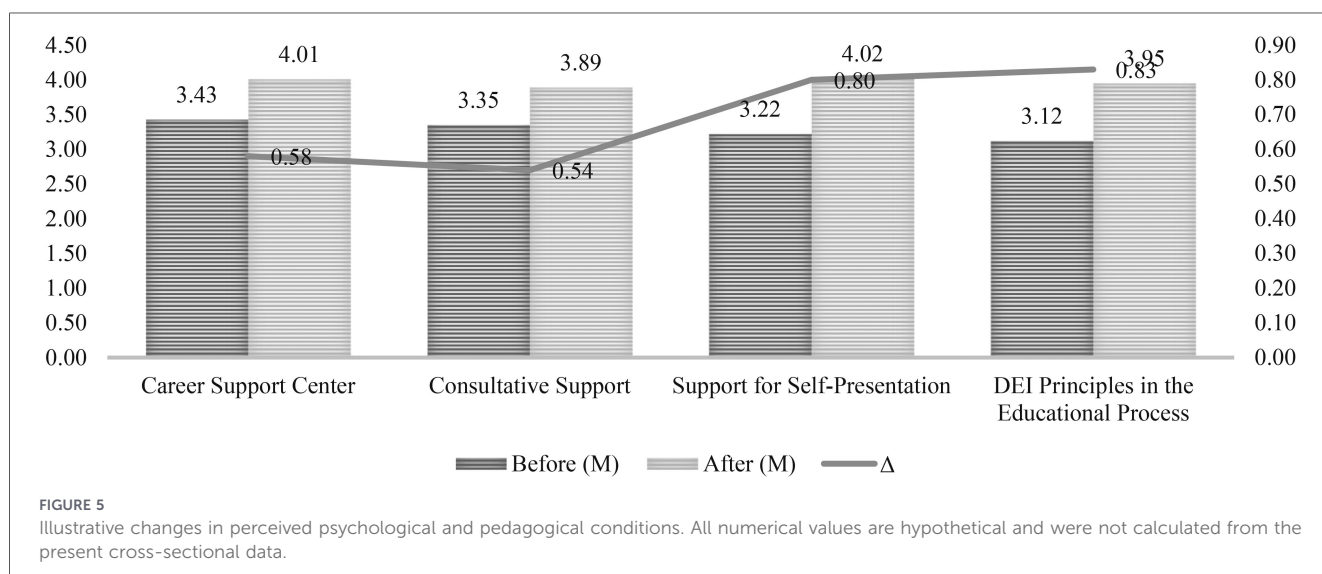
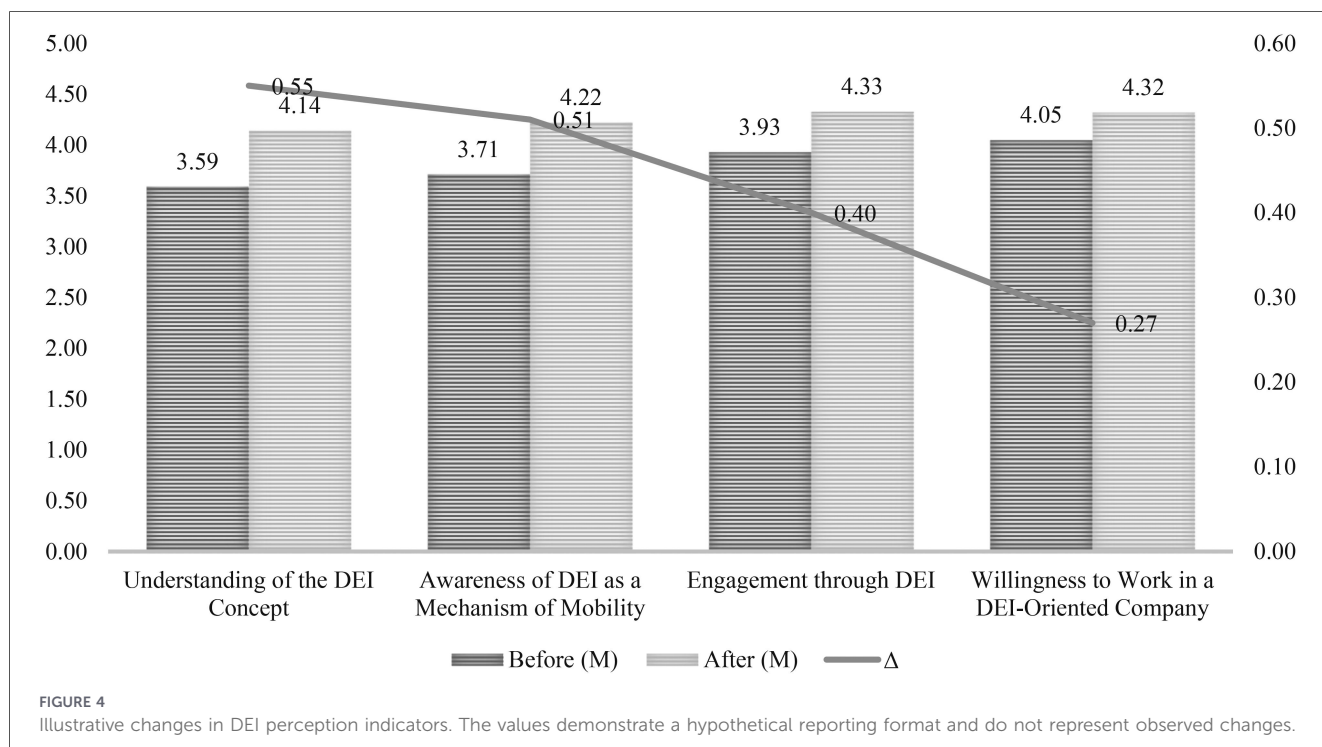
examples of the outcome structure that could be examined after implementation. Any future analysis would require actual baseline and follow-up data, uncertainty estimates, a comparison condition, and formal statistical testing.

In this illustrative scenario, the displayed changes represent how improvements in career agency, DEI perception, and perceived educational support could be visualised following a future intervention. The numerical differences are not evidence of programme effectiveness. Actual changes may be smaller, absent, or operate in another direction and would require statistical comparison with a control or comparison group (Figure 2).

The figure illustrates how item-level changes could be examined in a future evaluation. For example, university support, career path awareness, and confidence in competitive settings could be treated as separate outcomes. The displayed value for university support is hypothetical and does not establish that the proposed framework would produce such a change (Figure 3).

A future evaluation could examine whether students' normative support for inclusion, procedural DEI knowledge, and understanding of equity change differently over time. The hypothetical pattern shown in Figure 4 illustrates this analytical distinction but does not indicate that DEI





literacy would necessarily improve after implementation (Figure 4).

Figure 5 illustrates how a future study could compare changes in perceived counselling, mentoring, internship access, career support, and DEI integration. The displayed increase in value-oriented educational content is an illustrative value only. It does not confirm institutional transformation or the effectiveness of the proposed framework.

The illustrative figures specify the outcomes that could be assessed if the framework is implemented in future research. They should not be interpreted as evidence that the proposed activities improve career agency, DEI perception, or educational conditions. A valid evaluation

would require prospective registration, baseline equivalence, repeated observations, a comparison group, attrition analysis, effect sizes, confidence intervals, and objective behavioural outcomes.

5 Discussion

The findings provide partial support for the proposed relational framework. Perceived psychological and pedagogical conditions were positively associated with DEI culture perception, but the relationship was weak. Neither educational conditions nor DEI perception was significantly associated with

career agency after statistical adjustment, and the proposed indirect association was not supported. The results therefore suggest that institutional support, inclusion-related perceptions, and career agency are related dimensions of pre-employment preparation, but they should not be treated as a single developmental sequence.

The weak association between perceived educational conditions and DEI perception is theoretically meaningful. Students who evaluated educational conditions more favourably also reported more positive DEI perceptions. This pattern is compatible with theories linking educational climate and inclusion-related perceptions, but the present data do not show whether one precedes or changes the other. This interpretation is consistent with inclusive education research, which emphasises access, belonging, and psychological safety as conditions through which students evaluate institutional opportunities (Ainscow, 2020; Wang and Degol (2016)). It also corresponds with organisational inclusion scholarship, where inclusive climates are understood primarily as shared perceptions of respect, participation, and equitable treatment (Ferdman, 2020; Mor Barak, 2015; Shore et al., 2011). In the present sample, students who perceived stronger university support also tended to evaluate DEI principles more positively. However, the small effect indicates that educational support was only one of several possible sources of DEI-related attitudes.

The absence of a significant relationship with career agency was unexpected. Career adaptability and agency theories commonly assume that supportive contexts facilitate career planning, confidence, and adaptive action (Savickas, 2013; Tomlinson et al., 2021; Zacher and Frese, 2009). The present findings do not directly reproduce this pattern. One explanation is that career agency may be more strongly connected to accumulated experience than to general perceptions of the educational environment. Employment experience, internships, family resources, socio-economic position, perceived employability, and direct contact with employers may provide more immediate information about available career options. These factors were not included in the model.

A second explanation concerns the difference between access to resources and their active use. Students may recognise that career services, mentoring, or inclusive principles are present without engaging with them intensively enough to alter career behaviour. In this sense, institutional availability is not equivalent to resource activation. Career support may become relevant to agency only when students perceive it as personally applicable, trustworthy, and connected to realistic employment opportunities. This distinction is compatible with career guidance research, which treats professional support as effective when it is individualised, sustained, and integrated with practical decision-making rather than limited to information provision (Bimrose and Brown, 2014; Bridgstock, 2009).

The lack of mediation through DEI perception also requires theoretical reconsideration. The original model assumed that educational conditions could be associated with stronger agency partly because they helped students interpret opportunities as fair and accessible. The data did not support this indirect pattern. DEI perception may represent a value-cognitive orientation rather than an action-generating resource. Students can endorse diversity, equity, and inclusion without possessing the experience, networks, strategic knowledge, or perceived

control needed for career action. This interpretation is consistent with studies suggesting that DEI values among younger populations may remain abstract when they are not connected to concrete organisational practices (Smith, 2024).

The descriptive gap between positive attitudes towards inclusion and limited knowledge of specific DEI mechanisms further supports this interpretation. Students appeared more prepared to endorse respect and fairness than to identify how inclusive procedures operate in recruitment, promotion, mentoring, or accommodation. DEI literacy may therefore have at least two levels: normative acceptance and operational competence. The present instruments captured both, but positive normative attitudes were not sufficient to explain career agency. Future models should distinguish between general support for inclusion, procedural knowledge, direct experience of inclusive practices, and confidence in using institutional protections.

The group differences also require restrained interpretation. Women, master's students, and humanities students reported higher scores on selected outcomes, but the effect sizes were small. These findings partly align with research linking educational exposure, reflection, and sensitivity to social justice with inclusion-related attitudes. However, the observed differences cannot be attributed directly to gender or disciplinary training. They may reflect self-selection, prior interests, age, employment experience, curriculum content, or unequal exposure to DEI terminology. The predominance of within-group variation indicates that demographic categories alone provide a weak basis for designing interventions.

Taken together, the results refine the proposed theoretical model in two ways. First, they distinguish an institutional-perceptual relationship from an agentic pathway. Educational conditions may be associated with how students evaluate inclusion without being directly associated with career agency. Second, they suggest that career agency may require an additional conversion mechanism. One possibility for future testing is that institutional resources become relevant to career agency only when students recognise, trust, and actively use them. Such a process could involve perceived employability, practical experience, mentoring quality, social capital, or perceived control. These variables were not measured in the present study; therefore, this explanation remains theoretical.

The practical implications should therefore be treated cautiously. Universities should not assume that the presence of career centres, DEI modules, or mentoring automatically strengthens career agency. Institutional provision should be evaluated through participation, continuity, perceived usefulness, and behavioural outcomes. Useful indicators may include actual use of career services, completion of internships, development of career plans, applications submitted, mentor contact, and knowledge of recruitment procedures. DEI education should also move beyond value statements towards applied cases involving selection, workplace communication, reasonable accommodation, bias recognition, and transparent career pathways.

The findings also question the value of uniform interventions. Because the associations and group effects were small, broad mandatory programmes may have limited impact unless they address specific barriers. A more defensible strategy would combine universal access with needs-based support. Future intervention studies could examine whether students with

different levels of employer exposure, procedural DEI knowledge, or perceived support respond differently to internships, career navigation, mentoring, or applied DEI modules. The present results do not identify which students would benefit from each approach. Students who already report high motivation but limited institutional support may need mentoring and direct access to professional networks rather than additional motivational content.

For employers, the results indicate that formal endorsement of DEI may be insufficient for students preparing to enter the labour market. Transparent recruitment criteria, visible career routes, accessible internships, and contact with employees from varied backgrounds may make inclusive principles more concrete. University–employer partnerships should therefore be assessed not only by the number of activities offered but also by whether students understand and use the opportunities created.

These interpretations remain subject to important constraints. The cross-sectional design does not establish temporal or causal ordering, and voluntary participation may have produced self-selection bias. Concurrent self-report measurement also creates risks of social desirability and common method variance that Harman's test cannot fully exclude. In addition, the Kazakhstan-specific urban university sample limits cross-national and population-level generalisation, while the meaning of DEI may vary across cultural and institutional contexts. Most importantly, the study measured perceived readiness rather than objective employment or mobility outcomes. Longitudinal research should link validated measures with internships, career-service use, employment entry, occupational status, and subsequent mobility.

Overall, the study does not confirm a direct pathway from educational support through DEI perception to career agency. Its contribution lies instead in identifying a more differentiated structure. Perceived educational conditions were related to the interpretation of inclusion, whereas career agency appeared comparatively independent of both constructs. This distinction redirects attention from the simple availability of support towards the processes through which institutional resources are recognised, trusted, used, and converted into career action.

The analytical models also represent only a simplified test of the theoretical framework. Composite-score regression and cross-sectional path analysis cannot account for measurement error, institutional clustering, temporal ordering, or alternative structural relationships. The proposed model therefore requires confirmation through latent-variable, multi-level, and longitudinal analysis.

6 Conclusion

This cross-sectional study examined the relationships among perceived psychological and pedagogical conditions, DEI culture perception, and career agency in a sample of 300 university students. Perceived pedagogical conditions were weakly associated with DEI perception. However, neither pedagogical conditions nor DEI perception was significantly associated with career agency after adjustment, and the proposed indirect association was not supported.

Group differences by gender, educational level, and field of study were small. They describe variation within the sample but do not establish that demographic or educational characteristics produced the observed outcomes.

The findings therefore provide partial support for the coexistence of institutional and inclusion-related dimensions but do not confirm a causal mechanism linking them to career agency. The proposed educational framework should be treated as a prospective model requiring independent evaluation rather than as a validated intervention.

The findings are limited to self-reported associations within a purposive sample of university students in Kazakhstan. They do not establish temporal change, causal effects, or actual career mobility and may reflect self-selection, cultural specificity, and residual common method bias.

The present analyses should be regarded as an initial associational test rather than a comprehensive validation of the theoretical model.

Future research should use longitudinal or quasi-experimental designs, repeated measurements, comparison groups, and behavioural or institutional indicators. Such designs are needed to determine whether changes in career support or DEI-oriented educational practices precede changes in students' career agency and mobility-related behaviour.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study was approved by the Ethics Committee of S. Amanzholov East Kazakhstan University (Protocol No. 16, dated 22 September 2025), and written informed consent was obtained from all participants.

Author contributions

YB: Writing – original draft, Formal analysis, Conceptualization, Methodology, Investigation, Writing – review & editing. RT: Supervision, Conceptualization, Validation, Writing – review & editing, Project administration, Methodology. NL: Formal analysis, Validation, Writing – review & editing, Supervision, Methodology. LN: Resources, Writing – review & editing, Validation, Data curation. ID: Data curation, Writing – review & editing, Validation, Investigation, Formal analysis, Writing – original draft, Visualization.

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Conflict of interest

LN was employed by Kazzink LLP.

The remaining author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was used in the creation of this manuscript. Generative AI tools were used only for language editing, formatting support, and preparation of submission-related statements. The authors reviewed, verified,

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2026.1873320/full#supplementary-material>

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