

“Student satisfaction with learning outcomes and intention to stay with current employers within dual education”

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STUDENT SATISFACTION WITH LEARNING OUTCOMES AND INTENTION TO STAY WITH CURRENT EMPLOYERS WITHIN DUAL EDUCATION

Abstract

The growing demand for practice-oriented workforce development has increased the importance of dual education in vocational education and training systems. The purpose of this study is to examine the relationships between students' satisfaction with learning outcomes and their intention to stay in their current job within dual education programs in the vocational education and training (VET) system in Kazakhstan. The methodological approach is based on a quantitative research design using survey data collected from 440 students enrolled in four VET institutions in Almaty. Structural equation modeling (SEM) with SmartPLS software was employed to test the proposed hypotheses and assess the relationships between the studied variables. The results demonstrate that enterprise internship satisfaction positively affects general learning satisfaction ($\beta = 0.380$), job involvement ($\beta = 0.274$), and intention to stay in the current job after graduation ($\beta = 0.142$). Job involvement has the strongest effect on intention to stay with the employer ($\beta = 0.416$) and significantly increases learning involvement ($\beta = 0.636$). However, general satisfaction with learning outcomes does not directly influence intention to stay in the current job. The findings indicate that practical workplace experience and active integration into the work environment are more important determinants of students' intention to stay with their current employer than general perceptions of educational quality. The study contributes to understanding the role of dual education in strengthening workforce retention intention and early career commitment in vocational education contexts.

Keywords

dual education, vocational education, employment, students' satisfaction, learning outcomes

JEL Classification

I23, J24, J21

INTRODUCTION

The relevance of the study is determined by the need to improve the quality of personnel training within the vocational education and training (VET) system of the Republic of Kazakhstan in the context of accelerating technological and socio-economic changes. Dual education was officially introduced into the VET system of Kazakhstan in 2012 to strengthen cooperation between educational institutions and employers and to improve the alignment between graduates' competencies and labor market needs. The model has been most actively implemented in technical, industrial, information technology, and business-related programs, while current VET policy priorities focus on enhancing graduate employability, reducing skills mismatches, and strengthening partnerships between educational institutions and industry.

The contemporary labor market imposes increasing demands on graduates' professional competence, practical skills, and their ability to adapt quickly to the work environment while effectively performing

job-related functions. In this context, dual education is considered a key model that integrates theoretical instruction with workplace-based practical training.

The effectiveness of the educational process is determined not only by the content of educational programs but also by students' satisfaction with learning outcomes, which reflects their perception of the quality, relevance, and practical applicability of acquired competencies. In addition, the issue of graduate employability and workplace retention intention is of critical importance, as it reflects the effectiveness of the transition from education to professional activity.

The scientific problem of the study lies in the insufficient understanding of the mechanisms through which dual education influences both subjective outcomes (learning satisfaction) and behavioral outcomes (employment intention and retention intention). It remains unclear how the integration of theoretical and practical learning shapes student satisfaction and the extent to which it affects their career intentions. Therefore, empirical examination of the relationships between characteristics of the dual education environment, perceived educational quality, and students' attitudes toward career choice and intention to stay with the employer is required.

1. LITERATURE REVIEW AND HYPOTHESES

The key feature of the German model of dual vocational education, implemented in many countries, including Kazakhstan, is the organization of on-the-job training. According to Achatz et al. (2022), this model assumes a wide range of interaction forms, including job rotation and mentoring, which go beyond traditional vocational training. In the scientific literature, dual education is also considered a combined form of training including education in an educational organization and in the workplace (Martínez-Izquierdo & Sanchez, 2022). Deissinger (2015) defines it as an apprenticeship system in which formal training is carried out simultaneously in an educational institution and in an enterprise, and the result is the acquisition of formal professional qualifications.

In the dual system, industrial practice is a mandatory part of the educational program, and the student is considered an apprentice. Training is carried out on two interconnected platforms – in an educational organization and in an enterprise, which provides a combination of theoretical training and the formation of practical competencies. Despite the difference in functions, the interaction of these sites is aimed at achieving a single goal – the training of a qualified specialist with practical skills and professional experience. The effectiveness of the system largely

depends on coordination between teachers of educational organizations and mentors at enterprises (Choy et al., 2018; Pilz & Fürstenau, 2019).

In Kazakhstan, dual education is regulated by the regulations of the Ministry of Education. According to the current rules, the system includes school-based education (SBE) and work-based education (WBE), while at least 60% of the educational process is carried out at the enterprise. During the WBE period, students work under the guidance of trainers, can receive remuneration, and their activities are counted in their work experience. The training is formalized by a tripartite agreement between the student, the educational organization, and the enterprise (Legislation of the Republic of Kazakhstan, 2016).

Empirical studies show that the introduction of the dual system in Kazakhstan has contributed to improving the quality of education, modernizing the material and technical base, and strengthening the interaction between the education system and business (Grollmann, 2018; Doskeyeva et al., 2024). However, a significant part of vocational education institutions still operates primarily in the SBE format, which limits the practical component of training. The main reasons for this are the lack of motivation of employers to participate in the dual education process and the growing preferences of graduates in favor of higher education (Ertl, 2020; Findeisen et al., 2022).

The development of dual education is considered a tool to reduce youth unemployment by increasing the practical skills and competitiveness of graduates in the labor market (Piopiunik et al., 2020; Doskeyeva et al., 2019; Kussaiynkyzy et al., 2021). International studies confirm that dual learning models contribute to increased employability and skill compliance with labor market requirements (Birkelund & Van de Werfhorst, 2022; Mora et al., 2022; Bolli et al., 2021). However, empirical evidence indicates that the effect of educational reforms is ambiguous: the expansion of vocational education does not always lead to a decrease in youth unemployment, since the results depend on the institutional context and the quality of program implementation (Bertrand et al., 2020; Eiríksdóttir, 2020).

Student satisfaction is one of the key indicators of the effectiveness of the educational process. Within the dual education system, it reflects both academic experience in an educational organization and practical learning in the workplace, influencing academic success and learning outcomes. A number of studies confirm that higher satisfaction is associated with an increased likelihood of successful completion of studies, as well as higher academic motivation and student retention in educational programs (Thao-Trang Huynh-Cam et al., 2024).

Empirical evidence indicates the influence of various factors on student satisfaction, including course content, teaching coordination, and organizational aspects of the educational process (Achatz et al., 2022; Mathur et al., 2024). At the same time, the role of demographic characteristics remains insignificant and insufficiently confirmed (Sachithanandam & Raju, 2019).

A separate area of research is related to the influence of students' expectations on their satisfaction. Despite the existence of various theoretical approaches, the nature of this relationship remains ambiguous: expectations can have both direct and indirect effects (Najimdeen et al., 2021; Rio Rama et al., 2021; Tukiran et al., 2021). Among the factors shaping satisfaction are the reputation of the institution, the structure of the program, the cost of tuition, and the quality of interaction with the educational organization

(Lee & Anantharaman, 2013; Khan & Hemsley-Brown, 2024). Additional research shows that intensive (immersive) learning models can affect student satisfaction, but the results remain mixed and depend on the discipline and format of study (Goode et al., 2024; Harwood et al., 2018; Whillier & Lystad, 2013).

Some studies have also documented complex relationships between student satisfaction, academic achievement, and educational intentions, including continuing education (Loder et al., 2024). This indicates the nonlinear nature of the influence of educational experience on students' behavioral attitudes.

The literature review shows that dual education is mainly considered a tool for interaction between education and business, increasing employment and reducing youth unemployment. At the same time, student satisfaction is more often analyzed as an independent indicator of the quality of education. At the same time, the relationship between dual training, satisfaction, and subsequent retention of graduates in the workplace remains insufficiently studied.

Thus, a research gap is identified related to the lack of a comprehensive analysis of the impact of dual education on the subjective (satisfaction) and behavioral (retention intention) outcomes of student training. This is especially true for the system of technical and vocational education in Kazakhstan, where the mechanisms of transition from training to sustainable employment require additional empirical justification.

This study aims to examine the impact of dual education on the satisfaction of VET institutions' students with the results of their studies and their intention to stay working in the company after completing their training. To achieve this goal, it is assumed to analyze the impact of satisfaction with learning in an educational organization, satisfaction with work practice, as well as levels of academic and work engagement on overall satisfaction with dual education and students' intention to stay in the workplace.

Based on the proposed research framework, the following hypotheses are formulated:

- H1: *School Learning Satisfaction (SLS) positively influences Enterprise Internship Satisfaction (EIS), Job Involvement (JI), and General Satisfaction with Dual Education (GS).*
- H2: *Enterprise Internship Satisfaction (EIS) positively influences Job Involvement (JI), General Satisfaction with Dual Education (GS), and Students' Intention to Stay in Current Job (ISCJ).*
- H3: *Job Involvement (JI) positively influences Learning Involvement (LI) and Students' Intention to Stay in Current Job (ISCJ).*
- H4: *Learning Involvement (LI) positively influences General Satisfaction with Dual Education (GS) and Students' Intention to Stay in Current Job (ISCJ).*
- H5: *General Satisfaction with Dual Education (GS) positively influences Students' Intention to Stay in Current Job (ISCJ).*

2. METHODOLOGY

To assess the impact of dual education on student satisfaction with learning outcomes and their intention to stay in their current workplace, a survey was conducted of students enrolled in dual education programs at four VET institutions: Almaty Automobile and Road College, Economic College at Narxoz University, Almaty State College of New Technologies, and Almaty State College of Energy and Electronic Technologies.

2.1. Sampling procedure and participants

The study was conducted in Almaty, the largest city in Kazakhstan, where dual education programs have been actively implemented in vocational education and training (VET) institutions since 2012. Almaty was selected because it hosts a substantial number of VET institutions participating in dual education initiatives and provides an appropriate context for examining students' educational and employment experiences.

The target population consisted of students enrolled in dual education programs in four VET

institutions in Almaty. Approximately 700 students were invited to participate in the survey. Participation was voluntary, and students were informed about the purpose of the study and the confidentiality of their responses.

A convenience, institution-based sampling approach was employed. Questionnaires were distributed to students attending dual education programs in the selected colleges. Of the approximately 700 students invited, 446 agreed to participate, resulting in a response rate of 63.7%. After data screening, 6 questionnaires were excluded because of incomplete or incorrectly completed responses. Therefore, the final sample consisted of 440 students.

The distribution of respondents across the participating institutions was as follows: 147 students from the first VET institute, 112 students from the second VET institute, 95 students from the third VET institute, and 92 students from the fourth VET institute. Among the respondents from the first VET institute, 24 students were under the age of 18.

The sample included students from various fields of study, including technical (41% of the sample), economic (21%), information technology (20%), and legal and other vocational programs (18%). The participating institutions therefore represented a diverse range of educational specializations within the dual education system.

Because a non-probability sampling method was used, the findings should be interpreted with caution and may not be generalized to all VET students in Kazakhstan.

To collect empirical data, a questionnaire was developed, including 29 questions aimed at assessing various aspects of the educational process and industrial practice (Appendix D, Survey questions). The questions covered such parameters as the quality of curricula, teaching methods, organization of work practice, working conditions and pay during practice, student involvement in academic and professional activities, general satisfaction with dual education, as well as the intention to continue working in the specialty after graduation.

To measure respondent perceptions, a four-point Likert scale was used without a neutral answer option, which reduced the likelihood of evasive assessments and obtained more definite positions of the study participants. The scale included the following categories: 1 – “totally disagree”, 2 – “disagree”, 3 – “agree”, 4 – “totally agree”.

Data collection was carried out by face-to-face questioning of students aged 16 to 19 years in the period from September 12 to November 9, 2025. A total of 446 questionnaires were collected, of which 440 were considered suitable for further analysis after checking the completeness and correctness of the filling.

For a preliminary assessment of the reliability of the research tool, a pilot test was conducted with the participation of 30 students. The results of the pilot study demonstrated an acceptable level of internal consistency of the scales: the values of the Cronbach's alpha coefficient for all designs exceeded the threshold value of 0.7. Following the results of the pilot testing, minor clarifications were made to the formulations of individual questions aimed at increasing the clarity and unambiguity of the questionnaire.

Table 1. Research design and data collection

Parameter	Description
Data collection method	Face-to-face survey
Study period	12 September – 9 November 2025
Total responses	446
Valid responses	440
Respondents' age	16-19 years
Location	Almaty
Institutions	VET institutions implementing dual education
Instrument	Structured questionnaire (29 items)
Pilot study	n = 30; Cronbach's alpha > 0.7

2.2. Data analysis

Quantitative data analysis was performed using the Smart PLS software. The 29 questionnaire items were grouped into 6 constructs: School Learning Satisfaction, General Satisfaction, Enterprise Internship Satisfaction, Learning Involvement, Job Involvement, and Intention to Stay in the Current Job.

Table 2. Constructs and variables

Construct	Code	Description
School Learning Satisfaction	SLS	Students' evaluation of curriculum, teaching methods, and academic support
General Satisfaction	GS	General perception of education quality and the dual education system
Enterprise Internship Satisfaction	EIS	Evaluation of the quality and conditions of workplace training
Learning Involvement	LI	Level of engagement in the academic learning process
Job Involvement	JI	Degree of engagement in practical workplace activities
Intention to stay in the current job	ISCJ	Intention to continue working at the same workplace after graduation

The aim was to build a model that demonstrates how these constructs interact and influence each other, thereby addressing the research questions.

The framework aligns with previous research methodologies (Liu, 2021) to ensure a rigorous approach to understanding the dynamics and influences within dual education contexts. This structured approach and hypotheses provide a clear path for analyzing the data collected, aiming to uncover insights into the effectiveness and satisfaction levels associated with dual education programs among young students in Almaty's VET institutions.

3. RESULTS AND DISCUSSION

Evaluation of the measurement model. The partial least squares method in structural equation modeling (PLS-SEM) was used to assess the reliability and validity of structures. The choice of PLS-SEM is due to its focus on predicting and explaining the variance of dependent variables, as well as the possibility of using it in the absence of a normal data distribution and relatively limited samples. In addition, this approach demonstrates high efficiency in the analysis of complex models with multiple latent constructions (Wong, 2013).

The results of the measurement model evaluation are presented in Table A1 (Appendix A). Most of the designs have demonstrated a high level of internal consistency and reliability. The values of the Cronbach alpha coefficient and composite reliabil-

ity exceeded the recommended threshold of 0.70. In particular, the design Enterprise Internship Satisfaction (EIS) showed good reliability indicators ($\alpha = 0.784$; $\rho_a = 0.796$; $\rho_c = 0.854$) and an acceptable convergent validity indicator – Average Variance Extracted ($AVE = 0.543$). Similar results were obtained for constructs of General Satisfaction (GS), Job Involvement (JI), Learning Involvement (LI), and Intention to Stay in Current Jobs (ISCJ). The School Learning Satisfaction (SLS) construct exhibited an AVE value of 0.477, which is slightly below the recommended threshold of 0.50. However, this value was considered acceptable because the construct demonstrated satisfactory internal consistency (Cronbach's $\alpha = 0.778$; Composite Reliability = 0.844), exceeding the recommended threshold of 0.70. According to Fornell and Larcker (1981), convergent validity may still be regarded as adequate when composite reliability is above 0.60, even if the AVE is marginally below 0.50. Therefore, the SLS construct was retained in the measurement model.

The indicator loadings were generally satisfactory, with most items exceeding the recommended threshold of 0.70 (Appendix C, Table C4). Several indicators (SLS3, SLS4, SLS6, EIS4, and EIS5) exhibited loadings slightly below the recommended level; however, they were retained because the corresponding constructs demonstrated acceptable composite reliability and theoretical relevance.

Discriminant validity was assessed using the Fornell-Larcker criterion and cross-load analysis. The square roots of AVE for all constructions exceeded the corresponding inter-structural correlations, which confirms a sufficient degree of distinguishability of latent variables (Appendix B, Table B1). The most pronounced correlations were found between Enterprise Internship Satisfaction (EIS) and General Satisfaction (GS) ($r = 0.614$), as well as between Learning Involvement (LI) and Job Involvement (JI) ($r = 0.636$). This indicates a close relationship between the quality of practical experience, the level of student engagement and their professional intentions.

Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT). As presented in Appendix B (Table B2), HTMT values ranged from 0.525 to 0.838, remaining below the recom-

mended threshold of 0.85 and well below the more liberal criterion of 0.90 for conceptually related constructs (Henseler et al., 2015). These results indicate that, although the latent constructs are theoretically related, they are empirically distinct and capture different dimensions of students' experiences in dual education. Therefore, the measurement model demonstrates satisfactory discriminant validity, supporting its suitability for subsequent structural model assessment.

Harman's single-factor test indicates that the first factor explains only 37.6% of the total variance, which is below the recommended threshold of 50%. Therefore, common method bias is unlikely to be a serious concern in the present study.

To verify multicollinearity, the variance inflation factor (VIF) was calculated. All VIF values were significantly below the threshold value of 5, ranging from 1.230 to 2.028 depending on the design, which indicates the absence of critical multicollinearity and confirms the stability of the model (Appendix C, Table C1).

The analysis of the effect size (f^2) allowed us to determine the relative contribution of individual variables to the explanation of dependent constructions. The most significant effect was found for the effect of School Learning Satisfaction (SLS) on Enterprise Internship Satisfaction (EIS) ($f^2 = 0.772$), as well as for the effect of Job Involvement (JI) on Learning Involvement (LI) ($f^2 = 0.681$). Job Involvement (JI) also had a positive effect on students' Intention to Stay in Current Job (ISCJ), although the effect was moderate ($f^2 = 0.128$). In contrast, the impact of General Satisfaction (GS) and School Learning Satisfaction (SLS) on the Intention to Stay in Current Job (ISCJ) was minimal. The results show that practical experience and professional engagement are more significant predictors of student retention than the overall assessment of the educational process.

The quality of the model's compliance was assessed using standard PLS-SEM indexes (Appendix C, Table C2). The SRMR value was 0.072, which corresponds to the recommended threshold (< 0.08) and indicates acceptable compliance of the model with the data. The Normed Fit Index ($NFI = 0.938$) also exceeded the recommended value of 0.90,

Table 3. Path coefficients

Construct Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Testing Result
EIS → GS	0.380	0.381	0.061	6.214	p < 0.001	Supported
EIS → ISCJ	0.142	0.144	0.061	2.338	0.019	Supported
EIS → JI	0.274	0.273	0.046	5.952	p < 0.001	Supported
GS → ISCJ	0.025	0.024	0.050	0.507	0.612	Not supported
JI → GS	0.044	0.043	0.058	0.761	0.447	Not supported
JI → ISCJ	0.416	0.417	0.070	5.975	p < 0.001	Supported
JI → LI	0.636	0.636	0.042	15.201	p < 0.001	Supported
LI → GS	0.242	0.244	0.054	4.491	p < 0.001	Supported
LI → ISCJ	0.122	0.126	0.058	2.111	0.035	Supported
SLS → EIS	0.660	0.661	0.037	17.888	p < 0.001	Supported
SLS → GS	0.143	0.142	0.063	2.274	0.023	Supported
SLS → ISCJ	0.029	0.026	0.067	0.436	0.663	Not supported
SLS → JI	0.479	0.480	0.044	10.885	p < 0.001	Supported

confirming the high quality of the model. Despite the statistical significance of χ^2 , this result is expected for models with a large number of parameters and does not indicate unsatisfactory model quality. In general, the results of the analysis confirm the reliability, validity and adequacy of the proposed measurement model.

The path coefficients, standard deviations, t-statistics, and p-values for the structural model were analyzed to assess the significance of the relationships between constructs. The results are summarized in Table 3.

The analysis of path coefficients, t-statistics, and p-values revealed several statistically significant relationships among the constructs in the structural model (Figure 1). Enterprise Internship Satisfaction (EIS) positively influences General Satisfaction with dual education (GS) ($\beta = 0.380$), Job Involvement (JI) ($\beta = 0.274$), and students' Intention to Stay in Current Job (ISCJ) ($\beta = 0.142$). However, the effect of general satisfaction (GS) on Intention to Stay in Current Job (ISCJ) was not statistically significant.

Job Involvement (JI) demonstrated the strongest positive effect on Intention to Stay in Current Job (ISCJ) ($\beta = 0.416$). In addition, Job Involvement (JI) was strongly associated with Learning Involvement (LI) ($\beta = 0.636$), indicating a close relationship between students' professional engagement and their academic participation.

Learning involvement (LI), in turn, positively affected both General Satisfaction with dual education (GS) ($\beta = 0.242$) and Intention to Stay in Current Job (ISCJ) ($\beta = 0.122$). School Learning Satisfaction (SLS) showed the strongest effect on Enterprise Internship Satisfaction (EIS) ($\beta = 0.660$) and was also positively related to General Satisfaction (GS) ($\beta = 0.143$) and Job Involvement (JI) ($\beta = 0.479$). Nevertheless, no statistically significant relationship was found between SLS and students' Intention to Stay in Current Job (ISCJ).

Figure 1 summarizes the estimated structural model and confirms that Enterprise Internship Satisfaction and Job Involvement are the main determinants of students' Intention to Stay in Current Job within the dual education programs.

For a more complete understanding of the inter-relationships between the constructions, the indirect and cumulative effects of the model were additionally analyzed. The results of the total effects analysis (Table 4) confirm that Enterprise Internship Satisfaction (EIS) has a complex impact on students' General Satisfaction (GS), Learning Involvement (LI), and Intention to Stay in Current Job (ISCJ). At the same time, General Satisfaction (GS) with dual education does not demonstrate an independent significant impact on the Intention to Stay in Current Job (ISCJ).

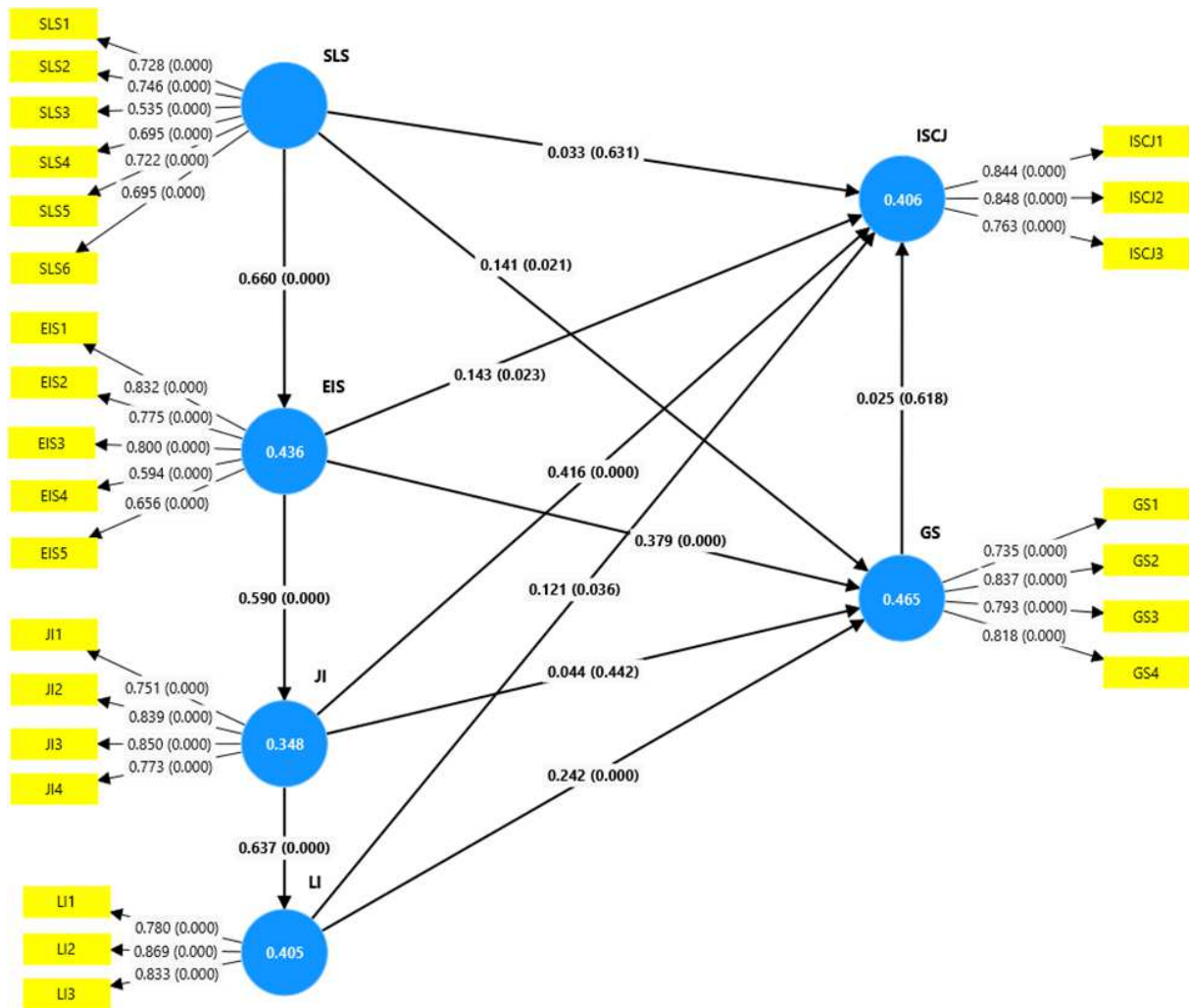


Figure 1. Structural model results

Table 4. Total effect

Construct Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
EIS → GS	0.434	0.435	0.055	7.851	p < 0.001
EIS → ISCJ	0.288	0.290	0.053	5.409	p < 0.001
EIS → JI	0.274	0.273	0.046	5.952	p < 0.001
EIS → LI	0.174	0.174	0.033	5.255	p < 0.001
GS → ISCJ	0.025	0.024	0.050	0.507	0.612
JI → GS	0.198	0.198	0.058	3.447	0.001
JI → ISCJ	0.499	0.501	0.059	8.425	p < 0.001
JI → LI	0.636	0.636	0.042	15.201	p < 0.001
LI → GS	0.242	0.244	0.054	4.491	p < 0.001
LI → ISCJ	0.128	0.132	0.056	2.273	0.023
SLS → EIS	0.660	0.661	0.037	17.888	p < 0.001
SLS → GS	0.524	0.525	0.048	10.833	p < 0.001
SLS → ISCJ	0.462	0.462	0.049	9.507	p < 0.001
SLS → JI	0.660	0.660	0.035	18.916	p < 0.001
SLS → LI	0.420	0.420	0.043	9.679	p < 0.001

Table 5. Total indirect effects

Construct Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STDEV))	P values
EIS → GS	0.054	0.054	0.019	2.891	0.004
EIS → ISCJ	0.146	0.147	0.033	4.449	p < 0.001
EIS → LI	0.174	0.174	0.033	5.255	p < 0.001
JI → GS	0.154	0.155	0.036	4.241	p < 0.001
JI → ISCJ	0.083	0.084	0.037	2.255	0.024
LI → ISCJ	0.006	0.006	0.012	0.491	0.623
SLS → GS	0.381	0.382	0.048	7.989	p < 0.001
SLS → ISCJ	0.433	0.436	0.050	8.663	p < 0.001
SLS → JI	0.181	0.181	0.033	5.533	p < 0.001
SLS → LI	0.420	0.420	0.043	9.679	p < 0.001

The total effects analysis demonstrates that Enterprise Internship Satisfaction (EIS) and School Learning Satisfaction (SLS) exert broader influences on Intention to Stay in Current Job (ISCJ) through both direct and indirect pathways. In particular, Job Involvement (JI) remains the strongest contributor to students' Intention to Stay in Current Job (ISCJ), highlighting its central role within the structural model.

The analysis of cumulative indirect effects (Table 5) additionally confirmed the predominance of positive relationships between the variables of the model, which indicates the systemic influence of practice-oriented components of dual education on student satisfaction and their professional intentions.

The indirect effects analysis confirms that Enterprise Internship Satisfaction (EIS) and School Learning Satisfaction (SLS) influence Intentions to Stay in Current Job (ISCJ) primarily through Job Involvement (JI) and Learning Involvement (LI). These findings indicate that student engagement serves as an important mediating mechanism linking educational experiences with employment intentions.

Overall, these findings emphasize that students' satisfaction and intentions to remain with employers are shaped not only by direct effects but also by complex indirect pathways. In particular, EIS and SLS play central roles in strengthening Job Involvement (JI), Learning Involvement (LI), and General Satisfaction (GS) within the structural model.

The analysis of the structural model, carried out using path coefficients, standard deviations, t-statistics, and p-values, revealed significant re-

lationships between 10 constructions selected to determine the degree of influence of the selected indicators on each other and test the five proposed hypotheses put forward by the authors. However, the analysis of path coefficients also showed that there were no significant correlations between the components: General satisfaction (GS) and the Intention to Stay in Current Job (ISCJ); Job Involvement (JI) and General Satisfaction (GS); School Learning Satisfaction (SLS) and Intention to Stay in Current Job (ISCJ).

For a deeper study of the influence of these indicators on each other, an analysis of the overall effect, indirect effect, and specific effect was carried out. According to the results of the overall effect analysis, there is a positive relationship between all components studied, with the exception of one: General Satisfaction (GS) did not significantly affect the Intention to Stay in the Current Job (ISCJ). In this regard, the results of the total effects analysis indicate that Hypotheses 1-4 were supported, while Hypothesis 5 was not supported.

The results of the indirect effects analysis showed a slight relationship between Learning Involvement (LI) and the Intention to Stay in Current Job (ISCJ), while all other constructs showed positive relationships. As for the specific indirect effects, the analysis results demonstrated fully significant positive relationships between the studied constructs (Appendix C, Table C3). The structural model supported most of the proposed relationships, while several direct effects were not statistically significant. Overall, the findings indicate that students' intentions to remain with employers are driven primarily by workplace-related experiences and active engagement in practical training

rather than by general satisfaction with the dual education program. Moreover, the total and indirect effects suggest that school-based learning contributes to intentions to stay in current jobs within the dual programs mainly through its positive influence on internship satisfaction and student engagement. These results highlight the complementary roles of academic and workplace learning and emphasize that the effectiveness of dual education in promoting graduate retention depends largely on the quality of practical training and students' professional involvement.

The results of this study are consistent with previous research that highlights the importance of internship satisfaction in influencing job engagement, overall satisfaction, and career intentions. In particular, our results demonstrate a significant positive relationship between Enterprise Internship Satisfaction (EIS) and key indicators such as General Satisfaction (GS), Intention to Stay in Current Job (ISCJ), Job Involvement (JI), and Learning Involvement (LI).

Similar to the findings of To and Lung (2020), this study confirms that satisfaction with internship programs positively affects overall job satisfaction and the intention to stay in the field. This relationship is crucial for understanding how learning experiences affect future career decisions and job satisfaction. In addition, our findings that Enterprise Internship Satisfaction (EIS) significantly affects Job involvement (JI) and Learning Involvement (LI) are supported by research conducted by Binder et al. (2015). They concluded that a positive internship experience is important for stimulating students' engagement in work and learning, which subsequently affects their career choice and job satisfaction.

The significant indirect effects observed in this study, such as School Learning Satisfaction (SLS) influencing the Intention to Stay in Current Job (ISCJ) through Job Involvement (JI) and Learning Involvement (LI), highlight the complex relationship between educational satisfaction and work-related outcomes. This is consistent with the results of a study conducted on Taiwan's dual vocational training policy, which emphasized that satisfaction with both educational institutions and internships significantly influences job recruitment

and retention intentions (Liu, 2021). Moreover, the role of work engagement as an intermediary between job satisfaction and the organization's obligations has been documented in detail. A study by Garcia et al. (2019) shows that job engagement significantly increases job satisfaction, which in turn promotes organizational commitment and reduces the likelihood of staff turnover.

Unlike previous studies, this study's results, based on an empirical analysis of the effects of the selected 10 constructs on each other, provide valuable information on how satisfaction with internship and learning experiences affects job engagement, overall satisfaction, and career intentions. These results highlight the importance of integrating practical internship experience with academic training to enhance job satisfaction and long-term career aspirations. The research contributes to a broader understanding of the factors that enhance work engagement and commitment to an organization, highlighting the crucial role of educational satisfaction in shaping career outcomes.

Based on the analysis, several recommendations can be made for the further development of dual education in the vocational education system of Kazakhstan.

First, our analysis of path coefficients shows that School Learning Satisfaction (SLS) does not positively correlate with the Intention to Stay in the Current Job (ISCJ). As mentioned earlier, this may be due to the growing popularity of higher education and the growing desire of young people to continue their studies in higher education institutions, rather than continuing to work in their specialty after graduating from VET institutes. On the contrary, students who are satisfied with their internship at the company and demonstrate high involvement in the work process are more likely to remain in their professional positions after graduation. Students who acquire solid professional skills through on-the-job training tend to be better prepared and adapt more easily during the transition from education to the labor market. In this context, it is important to provide students with the opportunity to work in different businesses, which allows them to develop different skills. This approach would help expand their professional experience and improve their career prospects in

the future. Ultimately, this could make vocational education more attractive to school graduates and help increase youth employment.

Secondly, the analysis of the career growth coefficient shows that General Satisfaction (GS) does not significantly affect the Intention to Stay in the Current Job (ISCJ). This may be due to the relatively poor working conditions and low wages offered to mid-level professionals with professional education at some Kazakhstani enterprises. This problem is further

aggravated by the significant shortage of mid-level technical specialists in various sectors of the Kazakh economy. To solve this problem, the Government, together with large manufacturing companies, should implement a comprehensive program aimed at improving the working conditions of middle-level specialists. Such initiatives would increase the attractiveness of vocational education, increase the number of students enrolled in the dual vocational education system, and help reduce the shortage of qualified mid-level professionals.

CONCLUSION

The study aimed to examine the relationships between students' satisfaction with learning outcomes and their intention to remain with their current employer within dual education programs in the vocational education and training (VET) system in Kazakhstan.

The results of the structural equation modeling revealed statistically significant relationships among the key constructs analyzed in this study. It was found that Enterprise internship satisfaction (EIS) has a positive effect on General satisfaction (GS) ($\beta = 0.380$), Job involvement (JI) ($\beta = 0.274$), and directly on the Intention to Stay in the Current Job (ISCJ) ($\beta = 0.142$). At the same time, General Satisfaction (GS) does not have a significant effect on ISCJ, indicating that students' overall perceptions of the learning experience play a limited role in shaping their intention to remain with their current employer.

The strongest predictor of the intention to stay with the employer is Job Involvement (JI) ($\beta = 0.416$), which also significantly affects Learning Involvement (LI) ($\beta = 0.636$). Learning Involvement, in turn, is positively associated with General Satisfaction with learning outcomes ($\beta = 0.242$) and, to a lesser extent, with ISCJ ($\beta = 0.122$), which confirms the presence of indirect effects in the model.

The analysis of path coefficients indicated that School Learning Satisfaction (SLS) had a pronounced effect on Enterprise Internship Satisfaction ($\beta = 0.660$), Job Involvement ($\beta = 0.479$), and General Satisfaction ($\beta = 0.143$), but it did not demonstrate a significant direct effect on the Intention to stay in the current job (ISCJ).

Overall, the results show that students' professional intentions are formed primarily through practical experience and involvement in the work environment, while academic satisfaction has a predominantly indirect effect. This confirms the key role of integrating educational and industrial components in the dual education system and the need to strengthen practice-oriented training.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Reliability and validity

Variable	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
EIS	0.784	0.796	0.854	0.543
GS	0.807	0.808	0.874	0.635
ISCJ	0.754	0.754	0.859	0.671
JI	0.817	0.821	0.880	0.647
LI	0.770	0.777	0.868	0.686
SLS	0.778	0.791	0.844	0.477

APPENDIX B

Table B1. Discriminant validity, Fornell-Larcker

Variable	EIS	GS	ISCJ	JI	LI	SLS
EIS	0.737					
GS	0.614	0.797				
ISCJ	0.480	0.409	0.819			
JI	0.590	0.517	0.610	0.804		
LI	0.470	0.531	0.484	0.636	0.828	
SLS	0.660	0.562	0.482	0.660	0.576	0.690

Table B2. Discriminant validity, HTMT

Variable	SLS	EIS	JI	LI	ISCJ	GS
SLS		0.838	0.817	0.741	0.622	0.701
EIS			0.744	0.610	0.629	0.765
JI				0.802	0.775	0.631
LI					0.630	0.672
ISCJ						0.525

APPENDIX C

Table C1. Variance inflation factor (VIF)

EIS1	EIS2	EIS3	EIS4	EIS5	GS1	GS2	GS3	GS4	ISCJ1	ISCJ2	ISCJ3	JI1
1.948	1.692	1.743	1.235	1.325	1.412	1.871	1.75	1.833	1.769	1.848	1.302	1.503
JI2	JI3	JI4	LI1	LI2	LI3	SLS1	SLS2	SLS3	SLS4	SLS5	SLS6	
1.865	2.028	1.637	1.420	1.798	1.680	1.535	1.509	1.230	1.415	1.555	1.418	

Table C2. Comparison of saturated and estimated models

Model Fit Index	Saturated model	Estimated model
SRMR	0.068	0.072
d_ULS	1.513	1.705
d_G	0.552	0.560
Chi-square	1366.216	1368.081
NFI	0.939	0.938

Table C3. Specific indirect effects

Construct Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
EIS → JI → LI	0.174	0.174	0.033	5.255	0.000
SLS → JI → ISCJ	0.199	0.200	0.038	5.226	0.000
SLS → JI → LI	0.305	0.305	0.038	8.109	0.000
SLS → JI → LI → GS	0.074	0.075	0.020	3.697	0.000
SLS → JI → LI → ISCJ	0.037	0.038	0.018	2.047	0.041
EIS → JI → LI → GS	0.042	0.042	0.012	3.506	0.000
JI → LI → GS	0.154	0.155	0.036	4.241	0.000
SLS → EIS → JI → LI → GS	0.028	0.028	0.008	3.317	0.001
JI → LI → ISCJ	0.078	0.080	0.037	2.091	0.037
SLS → EIS → GS	0.251	0.251	0.043	5.882	0.000
SLS → EIS → ISCJ	0.094	0.095	0.041	2.301	0.021
SLS → EIS → JI	0.181	0.181	0.033	5.533	0.000
SLS → EIS → JI → ISCJ	0.075	0.075	0.019	4.019	0.000
SLS → EIS → JI → LI	0.115	0.115	0.024	4.778	0.000
EIS → JI → ISCJ	0.114	0.114	0.027	4.231	0.000

Table C4. Factor loadings (outer loadings)

Construct	Item	Loading
SLS	SLS1	0.739
	SLS2	0.727
	SLS3	0.550
	SLS4	0.685
	SLS5	0.729
	SLS6	0.699
EIS	EIS1	0.836
	EIS2	0.783
	EIS3	0.801
	EIS4	0.580
	EIS5	0.653
JI	JI1	0.747
	JI2	0.833
	JI3	0.854
	JI4	0.779
LI	LI1	0.781
	LI2	0.864
	LI3	0.839
ISCJ	ISCJ1	0.850
	ISCJ2	0.868
	ISCJ3	0.735
GS	GS1	0.715
	GS2	0.838
	GS3	0.797
	GS4	0.832

APPENDIX D. SURVEY QUESTIONS

1. The college provides a variety of courses

- A) strongly disagree
- B) disagree
- C) agree
- D) strongly agree

2. The college curriculum will help me in the future
 - A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
3. After taking college courses, I had a flexible schedule
 - A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
4. I really like the college teaching methods and they correspond to my educational program
 - A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
5. The courses (disciplines) taught in college improve my professional skills
 - A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
6. The college provided me with support when I had problems during practical trainings
 - A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
7. Satisfied with the level and quality of college education
 - A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
8. The place of practical training meets the requirements for practice and the needs of students
 - A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree

9. The company where practical trainings are held provides jobs
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
10. Practical trainings are organized at the proper level
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
11. During the practical training period, students are paid a satisfactory salary
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
12. All safety measures are observed during practical trainings
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
13. I am satisfied with the level and quality of practical trainings that take place at enterprises (college production bases)
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
14. In my opinion, work increases my self-esteem
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
15. During practical trainings, I devote myself entirely to my work
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree

16. I am very interested in working during trainings
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
17. I am satisfied with the level of involvement in the work during the practical trainings
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
18. I freely participate in discussions during college classes
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
19. I take materials seriously during college classes
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
20. I listen attentively to college lectures
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
21. I am satisfied with the level of coverage of the educational process at the college
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
22. I have a positive attitude towards practical training within the framework of dual education
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree

23. I am satisfied with the quality of practical trainings during the dual training period
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
24. Dual education reduces the gap between theoretical college education and practical skills in the workplace
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
25. Generally satisfied with dual education
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
26. I intend to work in my specialty after graduating from college
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
27. After graduating from college, I intend to look for a job similar to the one I did during practical training
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
28. After graduating from college, I consider it an excellent choice to continue working at enterprises where I have completed practical training
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree
29. I am satisfied with the workplace that I had during practical trainings at enterprises and intend to continue
- A) strongly disagree
 - B) disagree
 - C) agree
 - D) strongly agree