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Econometric Evidence on the Impact of Language and IT Courses on Rural Employability in Uzbekistan

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Abstract: Rural unemployment is a significant issue among developing countries, especially in Uzbekistan, where a lack of industries other than agriculture restricts employment. There have been recent central and state government initiatives to fix the gaps through IT and language training but very little is known quantitatively about these initiatives. Very few such educational programs have been evaluated rigorously with respect to their economic impact on rural employability in Uzbekistan. It evaluates the effect of short-term IT and language training programs on employability and income in rural Uzbekistan. It provides strong evidence that IT and language training raises rates of employment by 45-65%, and high levels of attendance and internships lead to further increases in income. This is the first econometric assessment of these rural training programs in Uzbekistan, and it adds to prior literature in the domain of applied labor economics. The research highlights the need for specific educational programs and public-private partnerships to drive countryside growth and sustainable jobs.

Key words: *Rural Employability, IT Training, Language Education, Uzbekistan, Human Capital Theory, Employment Outcomes, Income Growth, Digital Skills, Internship Experience, Public-Private Partnerships.*

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INTRODUCTION

While this is a common reality for many of the developing countries the world over, the challenge of rural unemployment still remain as one of the most resilient test in the direction of opting for an inclusive economic growth. With almost 50 percent of the population living in rural districts in Uzbekistan, employment prospects are still limited by agricultural dependence and limited geographic access to post-school education. Although initiatives such as the and initiatives such as the Youth Strategy 2025 continue, rural youth unemployment remains considerably higher than youth unemployment in the urban centres [1].

Uzbekistan has boosted foreign language exposure and digital skills in recent years to cater to employability. Funded by these regional learning centers, combining public funds and private initiative to address the rural skill deficit itself. Nevertheless, despite policy enthusiasm, there have been relatively few studies quantifying the localized economic impact of these programs [2].

There have been a few early attempts to fill this gap. In Bulungur District, stated that participants of training were 48–62% more likely to be employed. Similarly, indicated that unemployment in Kimyogilar Mahalla was halved within a period of 2 years due to multi-skill initiatives, and that small educational institutions were a key driver for direct investment for moderate hourly wages and growing SMEs.

Drawing on this literature, the current paper presents a formal econometric analysis of the factors associated with employment and income outcomes after training. It identifies mechanisms attendance, internship experience, and course specialization that drive program impact, and it contributes quantitatively rigorous evidence in the context of rural Uzbekistan to the applied labor-economics literature [3].

2. Literature Review

2.1 Human Capital and Lifelong Learning

This research is based on the theory of human capital, where education is viewed as an investment increasing workers productivity and lifetime earnings. This relationship was formalised, and scoped at the macro level, by Such investments are particularly valuable in economies that are moving away from a stage of production characterized by service- and technology-based production [4].

Lifelong-learning frameworks build on this idea – it has become necessary to reskill constantly in a world where the technological landscape is continuously changing. Demonstrate that the unbundling of skills (more dynamic labor markets) means we need to sustain our investment in human capital throughout life. This framework is of special relevance to Uzbekistan, where issues of digital transformation policies and rural development have been putting emphasis on IT and language education [5].

2.2 Language and IT Training: Empirical Studies

Nevertheless, empirical evidence has consistently found that employability can be increased through training of skills which are in demand. Meta-analyses of active labor-market programs show powerful effects, especially when the skills and training content are targeted to the actual economic demand of the geographical area the labor has to go back and work in. Government-led digital-skills initiatives also increased rural employment by 55–63% in India and Indonesia, respectively [6].

Similar effects have been documented in fresh research within Uzbekistan. IT and English training, when combined, reduced the unemployment rate of Kimyogilar Mahalla from 16.7% to 8.2% For Bulungur, found that program graduates were employed twice as often as non-participants. Further, noted that language education programs had a positive impact in not only improving job opportunities, but also in creating connectedness to the community. The combined works highlight the multifaceted advantages associated with the learning of skills in rural settings [7].

2.3 Government Intervention and Investment

Overseas experience of government helping to improve training programs. Showed that subsidies for rural education centres reduced youth unemployment by 3 percentage points in two years, from 14% to 11% In a parallel vein faculty found the positives of direct investment in small educational institutions increased district-level wages by 5.7% and increased SME formation by 8%. Find that, internationally, social returns to education in developing countries tend to outweigh private returns, validating the need for public support of human-capital development [8].

This evidence base provides support for a two-tier model in which micro-level training initiatives and macro-level policy incentives affect opportunities for individuals to achieve inclusive labor-market outcomes. This study draws on that framework by providing quantitative evidence from rural districts of Uzbekistan [9].

3. Data and Methodology

3.1 Context and Data Sources

The study focuses on three rural districts of the Samarkand Region: Urgut, Bulungur, and Pastdarg‘om. Each hosts a private training center that began operations between 2021 and 2022:

- Ravon Muloqot (Urgut) – IT-specialized; employability ≈ 91%.
- Purpose Education (Bulungur) – vocational and language courses; employability ≈ 50%.
- Progress LC (Pastdarg‘om) – language and business-focused; employability ≈ 40%.

Administrative records and follow-up surveys from 300 participants provide data on post-training employment, monthly income, attendance rates, internships, tuition fees, and demographic characteristics. Average monthly income after training was UZS 3.8 million in Urgut, 3.2 million in Bulungur, and 2.8 million in Pastdarg‘om consistent with differences in infrastructure and curriculum design.

3.2 Econometric Models

Two models were estimated to assess the determinants of employment and income:

Model 1

Logistic Regression (Employment Probability)

$$Pr(\text{Employed}_i) = \frac{1}{1 + \exp\left(-\left(\beta_0 + \beta_1 IT_i + \beta_2 Lang_i + \beta_3 Attend_i + \beta_4 Educ_i + \beta_5 Intern_i\right)\right)}$$

Model 2

OLS Regression (Income Equation)

$$Income_i = \exp\left(\alpha_0 + \alpha_1 IT_i + \alpha_2 Lang_i + \alpha_3 Hours_i + \alpha_4 Attend_i + \alpha_5 Educ_i + \alpha_6 Age_i + \mu_i\right)$$

where *Employed_i = 1* if participant *i* was employed within six months post-training. District fixed effects were included to capture unobserved regional characteristics. Robust standard errors were used in all models [10].

3.3 Variables and Expected Signs

The key variables are presented in the table below to evaluate the impact of training on employability. The table provides definitions, hypothesized directions, and theoretical rationale for each of the variables; e.g. the positive influences of IT and language training, attendance, internship, education on employment outcomes with age utilised as a potential neutral variable (Table 1) [11].

Table 1

Variables, Definitions, Expected Signs, and Theoretical Rationale

Variable	Definition	Expected Sign	Theoretical Rationale
IT Course	Dummy = 1 if attended IT training	+	Digital literacy enhances employability (Soliev, 2024b).
Language Course	Dummy = 1 if attended language training	+	Expands access to broader labor markets (Soliev et al., 2025c).
Attendance Rate	% of sessions attended	+	Reflects motivation and skill mastery.
Internship	1 if completed an internship	+	Provides practical experience and employer connections.
Education Level	Ordinal (1–5)	+	Higher education increases marginal returns.
Age	Years	±	May capture experience or reduced flexibility.

3.4 Estimation Procedure

The logit model was estimated using maximum likelihood, while the income model employed OLS on logged income to correct for heteroskedasticity. Diagnostics indicated low multicollinearity (VIF < 2) and stable coefficients (DFBETAs < 0.5). Bootstrapping (1,000 replications) confirmed robustness. Model performance was adequate: Nagelkerke $R^2 = 0.34$ for the employment model and Adjusted $R^2 = 0.29$ for income [12].

4. Results

4.1 Descriptive Findings

Urgut's model, which required internships and emphasized applied IT training, achieved the highest employment and income outcomes. The strong positive link between attendance and earnings also suggests that commitment and participation are key predictors of success (Table 2) [13].

Table 2

Descriptive statistics, variables by district

Variable	Urgut	Bulungur	Pastdarg'om	Mean
Post-training income (UZS million)	3.8	3.2	2.8	3.3
Attendance rate (%)	78	69	61	69
Internship participation (%)	100	63	0	54
IT course share (%)	62	45	41	49
Language course share (%)	55	61	74	63
Employment rate (%)	91	51	40	61

4.2 Regression Results

The table 3 presents the estimated regression coefficients for employment and income outcomes based on key variables. It shows the positive effects of IT training, language courses, attendance, education level, and internships, with internships having the strongest impact on employment.

Table 3

Regression Coefficients for Employment and Income

Variable	Expected Sign	Employment (β)	Income (α)	Interpretation
IT Course	+	0.45 ($p < 0.01$)	0.33 ($p < 0.05$)	IT training significantly improves both employment and income.
Language Course	+	0.28 ($p = 0.07$)	0.18 ($p = 0.10$)	Moderate but positive effects.
Attendance Rate	+	0.016 ($p < 0.01$)	0.012 ($p < 0.01$)	Higher attendance leads to higher income.
Education Level	+	0.19 ($p < 0.05$)	0.13 ($p < 0.05$)	Education complements training benefits.
Internship	+	0.51 ($p < 0.01$)	0.25 ($p < 0.05$)	Internships have the strongest effect on employability.

Nagelkerke $R^2 = 0.34$; Adjusted $R^2 = 0.29$.

4.3 Interpretation

IT courses make it possible to be employed about 45% more often and to earn 33% more(emphasis added). They find language training to have smaller but nonetheless meaningful impacts, indicating that digital and linguistic competencies are complementary. Attendance has an ongoing positive impact: a 10-percentage-point increase in attendance is associated with roughly a 1.5% boost in income. The biggest bonus comes from completing an internship, a definite confirmation that hands-on experience will make the difference between training and a job.

The disparity at the district level reinforces the argument that design and quality are most significant in setting the stage for success. Pastdarg'om lacks the same infrastructure, which limits the scale of their impact, whilst the more detailed IT curriculum and the organizational nature of internships in Urgut leads to better outcomes.

5. Discussion

5.1 Theoretical Implications

These findings support the fundamentals of human capital theory, which states that education and training increase the productivity and potential income of each individual. The large marginal effects of IT and language training indicate that such short, focused programs can have a large labor-market payoff in the developing world. The results, however, coincide with the idea that there are quantifiable private and social returns of specific broad-based human-capital investments on a relatively small-scale [14].

Because technology and labor demands continuously change, lifelong-learning frameworks need to connect to the prescriptive models for constant skill up gradation which this study also seems to be in agreement with. The observed complementarity between digital skills and linguistic skills suggests that when students are trained in multiple skills, the overall potency of the education is enhanced. This hybrid

combination allows for local rural employment, but also remote and service industry options such as remote, online freelancing, translation, and tourism-based services in Uzbekistan.

5.2 Comparative Perspective

Relative to international effects, the effects uncovered in rural training programs run in Uzbekistan were of a similar size to those found globally. The Skill India Mission in India drove rural employability gains of around 55%, while Indonesia's Kampus Merdeka initiative achieved 63% improvements in graduate employability. Although the Uzbekistan intervention is smaller in scope, results land in this range, which highlights the consistency and replicability of thoughtfully designed skill-development interventions.

Furthermore, results confirm previous local studies indicating that public subsidies and private co-financing increase effectiveness of training. Institutional investments, like these but larger scale, and centres supported by the Government, as detailed in the, create at least sizeable amounts of social value. The only way to maintain educational outcomes is hence synergetic action of public and private actors [15].

5.3 Policy Implications

Several policy implications follow from the econometric evidence:

Integrate Training with Local Economies

IT and language modules may link into local employment sectors including agribusiness, tourism and rural services to help ensure relevant skill outcomes. Engaging with local employers can improve curriculum development and streamlining placement for graduates.

Invest in Digital Infrastructure

By enhancing broadband access and increasing available computer equipment in more rural areas, the quality and accessibility of training could be greatly improved, which would allow for replicable programs on a larger scale.

Enhance Gender Inclusion

Actually, Prove more gives that women have equal access to the benefits of language and IT training if they are provided equal access. Expanding flexibility in class schedules, childcare, and other support, such as scholarships, would help close any remaining gender gaps.

Institutionalize Internships and Employer Partnerships

Work experience in the form of an internship had the most significant measurable impact on employability. By embedding internships into curricula as part of partnerships with local businesses, schools and public institutions, these programs would help to institutionalize pathways from training to employment.

Sustain Financing Models

Community co-funding complemented by public subsidies (a form of blended financing) guarantees affordability while still allowing some degree of community accountability. Focus again: The case for investment in developing economies is not only high but in education return are social (good secondary education return is social almost as well as high and corporate both of secondary and higher education).

5.4 Limitations and future research directions

Although the results provide the strongest evidence to date of the effectiveness of the training, there are some limitations that should be noted. The data cover only three districts and a two-year observation period, which constrains long-term inference. Instead, longitudinal design might reflect the persistence of training effects across time.

Furthermore, there is a risk of self-selection bias as people who are more motivated or better education may tend to take up the training courses. Quasi-experimental study designs (e.g., difference-in-differences or instrumental-variable estimation, with eligibility rules or geographic distance from specialized services as instruments) could enhance causal inference in future research.

Lastly, future research could investigate heterogeneity by gender, age, and previous training, as well as the interaction between training quality and local economic structure. These analyses could provide greater understanding of the ways in which human capital development can lead to more inclusive rural development.

Conclusion

We present the first causal estimates of employability and income effects of short-term IT and language training programmes among rural populations in Uzbekistan. Our econometric results show that IT training raises the chances of employment by 45 per cent and increases earnings by one-third. Participation in attendance and internship becomes a strong mediator, while language training create supplementary visibility through communication and cross-market interaction.

The results as well as method substantiate for a wider hypothesis that small-scale human capital investments can bring economic returns in low-resource, agrarian circumstances. Uzbekistan could turn small community-based training centres into local growth and employment engines through integration of education policy with rural labour-market development, especially in areas of expansion of digital infrastructures, inclusive access and also sustained public–private financing.

References

[1] G. S. Becker, *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. University of Chicago Press, 1964. [Online]. Available: https://doi.org/10.7208/chicago/9780226041223.001.0001.

[2] D. Card, J. Kluve, and A. Weber, "Active labour market programmes for youth: Evidence from 133 evaluations," *World Bank Economic Review*, vol. 33, no. 2, pp. 314–341, 2019. [Online]. Available: https://doi.org/10.1093/wber/lhx015.

[3] Government of Uzbekistan, *Digital Uzbekistan 2030 Strategy*, Ministry for Development of Information Technologies and Communications, 2020. [Online]. Available: https://mitc.uz.

[4] R. Kumar and A. Singh, "Evaluating the effectiveness of India's skill development programmes," *International Journal of Vocational Education Studies*, vol. 8, no. 1, pp. 25–40, 2020. [Online]. Available: https://doi.org/10.5281/zenodo.3711962.

[5] OECD, *Employment and Skills Strategies in Indonesia*, OECD Publishing, 2021. [Online]. Available: https://doi.org/10.1787/9789264631531-en.

[6] H. A. Patrinos and G. Psacharopoulos, "Returns to education in developing countries," in *Handbook on the Economics of Education*, S. Bradley and C. Green, Eds., Academic Press, 2020, pp. 53–70. [Online]. Available: https://www.sciencedirect.com/science/article/abs/pii/B9780128153918000045.

[7] T. W. Schultz, "Investment in human capital," *American Economic Review*, vol. 51, no. 1, pp. 1–17, 1961. [Online]. Available: https://www.aeaweb.org/articles?id=10.1257/aer.51.1.1.

[8] M. Soliev, "Government's role in promoting language learning and IT courses in rural Uzbekistan with subsidies," *American Journal of Social and Humanitarian Research*, vol. 5, no. 10, pp. 343–348, 2024. [Online]. Available: https://globalresearchnetwork.us/index.php/ajshr/article/view/2291.

[9] M. Soliev, "Impact of IT and English courses on youth unemployment in Bulungur District, Samarkand," *American Journal of Economics and Business Management*, vol. 7, no. 8, pp. 499–503, 2024. [Online]. Available: https://globalresearchnetwork.us/index.php/ajebm/article/view/3088.

[10] M. Soliev, M. S. Hamroqulovich, N. Akhmadjon, M. U. Aslam, and T. T. Mirzabayev, "The impact of IT and language training on rural unemployment: A case study of Pastdarg'om, Uzbekistan," *World Journal of Agriculture and Urbanization*, vol. 4, no. 3, pp. 1–12, 2025. [Online]. Available: https://wjau.academicjournal.io/index.php/wjau/article/view/287.

[11] M. Soliev, A. Kazimov, V. Amrit, M. Khamraev, and S. Samiev, "The role of direct investment in small educational institutions as a driver of economic growth in Uzbekistan," *Vital Annex: International Journal of Novel Research in Advanced Sciences*, vol. 4, no. 8, pp. 332–341, 2025. [Online]. Available: https://innosci.org/IJNRAS/article/view/445.

[12] M. Soliev, S. Murodov, and M. Mamadiyorov, "Empowering rural Uzbekistan through language education," *American Journal of Education and Evaluation Studies*, vol. 2, no. 1, pp. 76–83, 2025. [Online]. Available: https://semantjournals.org/index.php/ajees/article/view/158.

[13] O. Valiente, Q. Capsada-Munsech, and J. P. G. de Otero, "Educationalisation of youth unemployment through lifelong-learning policies in Europe," *European Educational Research Journal*, vol. 19, no. 6, pp. 497–515, 2020. [Online]. Available: https://doi.org/10.1177/1474904119892936.

[14] N. M. Ibragimova, "Economic and educational benefits of mother tongue and second language use: Evidence from Uzbekistan," *TLC Journal*, vol. 9, no. 3, 2025.

[15] F. Xolmurotov, O. Khamidov, S. Davlatov, E. Ibadullaev, X. Xolmuratov, A. Sherov, and G. Arabova, "The impact of renewable energy consumption on unemployment rates in Uzbekistan: An ARDL approach," *Environmental Economics*, vol. 16, no. 1, pp. 78, 2025.