

TC Document

I. Basic Information for TC

▪ Country/Region:	DOMINICAN REPUBLIC
▪ TC Name:	AI Education
▪ TC Number:	DR-T1295
▪ Team Leader/Members:	Naslund-Hadley, Emma Ingrid (SCL/EDU) Team Leader; Biehl, Maria Loreto (SCL/EDU) Alternate Team Leader; Tamagnan, Marie Evane (SCL/EDU) Alternate Team Leader; Lopez Gelb Loren Viviana (SCL/EDU); Cristia, Julian P. (RES/RES); Olivares Greta (SCL/EDU); Blasco, Ivana (SCL/EDU); Moreno, Michelle Leonor (ITE/IPS); Landazuri-Levey, Maria C. (LEG/SGO)
▪ Taxonomy:	Client Support
▪ Operation Supported by the TC:	.
▪ Date of TC Abstract authorization:	05 Dec 2023.
▪ Beneficiary:	Ministerio de Educación de la Republica Dominicana (MINERD)
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	Japan Special Fund Poverty Reduction Program(JPO)
▪ IDB Funding Requested:	US\$800,000.00
▪ Local counterpart funding, if any:	US\$90,000.00 (In-Kind)
▪ Disbursement period (which includes Execution period):	36 months
▪ Required start date:	01 October 2024
▪ Types of consultants:	Consultancy Firm
▪ Prepared by Unit:	SCL/EDU-Education
▪ Unit of Disbursement Responsibility:	SCL/EDU-Education
▪ TC included in Country Strategy (y/n):	No
▪ TC included in CPD (y/n):	Yes
▪ Alignment to the IDB Group's Institutional Strategy 2024-2030:	Diversity; Environmental sustainability; Gender equality; Persons with Disabilities; Productivity and innovation; Social inclusion and equality

II. Objectives and Justification of the TC

2.1 In the 2022 PISA test, the Dominican Republic demonstrated some improvement compared to its previous results. However, the country still faces significant challenges, particularly in mathematics, where it scored 339 points, one of the lowest scores among participating nations (Ortiz et al, 2024). This score is approximately 100 points below the expected average. A strong correlation exists between poverty and academic performance, with students from lower socioeconomic backgrounds consistently underperforming in mathematics. An alarming 98% of students from low socioeconomic status (SES) households scored within the lowest proficiency levels, while achieving higher proficiency levels was extremely rare. The proportion of low-performing students was 17 percentage points lower among those from high SES households, underscoring the impact of economic disparity on educational outcomes. Against this background, the Government of the Dominican Republic has requested technical assistance from the Bank to explore if Artificial Intelligence (AI) can be used to improve learning among los SES students.

- 2.2 **Artificial Intelligence.** The use of applications based on AI has risen exponentially since the launch of Chat Generative Pre-Trained Transformer (ChatGPT) in 2022. In the education sector, discussions surrounding AI often emphasize concerns about cheating and data privacy. As a result, the use of AI to enhance learning processes has been limited. In the US, by late 2023 and early 2024, only 18% of primary and secondary school teachers were using AI to teach at least once a week (Diliberti et al., 2024). In the UK, a report by the Department for Education (DfE, 2024) shows that by November 2023, only 7% of primary and secondary teachers had incorporated Generative AI into their lessons. In education across Latin America and the Caribbean, the experience in the use of AI in education is incipient.
- 2.3 Despite the limited empirical evidence on AI use in education, AI theoretically holds the potential to be a powerful educational resource. It can facilitate personalized learning experiences, adaptive tutoring, and comprehensive data analysis, fostering a more inclusive and dynamic educational environment. By leveraging AI's capabilities, educators can tailor instructional approaches, address diverse learning needs, and instill critical 21st-century skills, preparing students for the challenges of a rapidly evolving digital landscape.
- 2.4 The UNICEF definition of AI is “machine-based systems that can, given a set of humans -defined objectives, make predictions, recommendations, or decisions that influence real or virtual environments. AI systems interact with us and act on our environment, either directly or indirectly. Often, they appear to operate autonomously and can adapt their behavior by learning about the context” (UNICEF, 2021, p. 16). Globally, Japan is spearheading an AI Education (AI-ED) revolution by incorporating AI into its educational framework. While the strategic blueprint is still emerging, the core of Japan's Ministry of Education's vision is to empower students in advancing their critical thinking, problem-solving abilities, and creativity—attributes deemed indispensable for navigating the intricacies of the digital economy.
- 2.5 Regarding the types of AI-ED systems, there are many classifications described in the literature. For example, Holmes and Tuomi (2023) propose a taxonomy of AIED systems considering the main end user of the application (student, teacher or institution) and the type or purpose of the system (Table 1).

Table 1 A taxonomy of AI-ED systems

Students	Teachers	Institution
<ul style="list-style-type: none"> • Intelligent tutoring systems • AI assisted Apps • AI-assisted simulations • AI to support learners with disabilities • Automatic essay writing (AEW) • Chatbots • Automatic formative assessment • Learning network orchestrators • Dialogue-based tutoring systems (DBTS) • Exploratory learning environments (ELE) • AI-assisted lifelong learning assistants 	<ul style="list-style-type: none"> • Plagiarism detection • Smart curation of learning materials • Classroom monitoring • Automatic summative assessment • AI teaching and assessment assistant 	<ul style="list-style-type: none"> • Admissions (e.g., student selection) • Course-planning • Scheduling Timetabling • School Security • Identifying Dropouts and Students at risk • e-Proctoring

Source: Holmes and Tuomi (2023, p. 550)

- 2.6 To prepare this TC and facilitate the dialogue with the Ministry of Education in the Dominican Republic, the project team is conducting a mapping of the first two end users of the Holmes and Toumi taxonomy (students and teachers), financed with in house and administrative resources.
- 2.7 In the category of student focused AI-ED tools, the IDB mapping identified 25 intelligent tutoring system tools. In practice, unequal access to tutoring services has often widened learning gaps among different groups of students. Students from low socioeconomic status (SES) households often face barriers to accessing the same high-quality tutoring and educational resources as their more affluent peers. Limited financial resources may prevent low SES students from enrolling in costly private tutoring programs or accessing specialized educational support services. Additionally, students from low SES households may attend schools in rural or underserved communities where it is hard or impossible to hire high-quality tutors. Although novel and not yet put to the test, AI tutoring has the potential to play a crucial role in leveling the playing field for low-income students by providing them with access to high-quality educational support and resources. The benefits of AI tutoring include: (i) personalized learning experiences tailored to the specific needs and learning styles of individual students. This individualized approach helps bridge learning gaps and addresses the diverse educational requirements of students, regardless of their socioeconomic status; (ii) AI tutoring platforms are often available round the clock, enabling students to access educational resources and assistance at any time; (iii) AI-powered tutoring platforms address the challenge of finding local tutors, making high-quality tutoring more accessible to students in rural and disperse contexts; and (iv) AI tutoring has the potential to facilitate remote learning, allowing students to access educational materials and tutoring sessions from the comfort of their homes or local community centers, reducing the need for expensive travel or additional logistical costs.
- 2.8 The mapping of student focused AI-Ed tools also identified 13 utility tools and writing assistants, including tools to improve writing itself and to practice. Some AI-ED tools also include guidance in paraphrasing, “voice tone”, among other writing recommendations.
- 2.9 In the category of AI-ED teaching platforms, the mapping identified 11 lesson planning and content creation tools that assist teachers in developing lesson plans, generating instructional content, and creating other educational materials. Some of them can be used to automate the creation of differentiated learning activities, writing prompts, and multimedia resources. In the category of teacher assistant tools, the mapping also identified 6 assessment assistant tools that can automate grading, provide detailed feedback on student work, and assist in evaluating student performance.
- 2.10 The mapping also included more sophisticated AI chatbots, such as Chat-GPT, capable of engaging in complex, interactive conversations with students and teachers. These chatbots could offer students and teachers tips, feedback, solutions to problems, and guidance during the learning process. On the other hand, teachers can receive support to create lessons, solve doubts, receive ideas for assessments, and more. They are designed to handle a broader range of inquiries and provide more nuanced responses. The mapping reviewed 6 such chatbots.
- 2.11 The mapping is currently assessing the following dimensions of the identified tools: functionality; availability; teacher interface; student interface; curriculum coverage;

pedagogical support; technical support; language; accessibility; technology; hardware; internet requirement; operating system; price and market. Based on the comprehensive review of available AI-ED tools, the next step will be for the Ministry of Education to select a handful of tools for demos and testing, and ultimately narrow it down to one AI-ED tool for student end users; and one AI-ED tool for teacher end users.

- 2.12 **Beneficiaries.** Although the Dominican Republic has seen an improvement in their economy in the last decade, poverty rates still stand at around 22.8% with an additional 40% of Dominicans living in precarious circumstances, susceptible to falling into poverty (WFP, 2023). Poverty rates are higher for certain vulnerable groups, including youth. Gender disparities exacerbate the situation, as women in poverty outnumber their male counterparts. The educational landscape further underscores the challenges faced by vulnerable groups. Secondary education completion rates vary starkly between socioeconomic quintiles, with a 90% rate among the wealthiest quintile and a mere 28% in the poorest quintile. As a result, only 61% of young people aged 20–23 have completed secondary education.
- 2.13 In the context of these disparities and uplift the socioeconomically disadvantaged, this TC aims to target approximately 2,000 secondary school students in low SES settings as direct beneficiaries of the intervention. In coming years, additional cohorts of students will benefit from the teachers trained in the use of AI. By focusing on this vulnerable demographic, the program seeks to mitigate the impact of poverty on educational attainment, fostering a more equitable and inclusive learning environment. The final beneficiary of the TC of course is the broader population, including communities and the economy, which will eventually benefit from a better-educated workforce and reduced inequality.
- 2.14 **Objectives.** The proposed TC aims to enhance numeracy learning of low achieving secondary education students. The specific objectives are to: (i) develop and implement an AI education program for some 2,000 students in secondary education with low levels of mathematics achievement; (ii) conduct a rigorous evaluation of the effectiveness of AI education; and (iii) disseminate the results.
- 2.15 **Strategic Alignment.** The TC is consistent with the IDB Group Institutional Strategy: Transforming for Scale and Impact (CA-631) and is aligned with the objective of reducing poverty and inequality by evaluating an operation that seeks to close learning gaps for vulnerable students. Likewise, the project is aligned with the development challenge of Productivity and Innovation as it seeks to use AI technology to increase learning of underperforming students. The TC is also aligned with the operational focus area of gender equality and inclusion of diverse population groups such as persons with disabilities (GN-2800-13) it as AI education software offers a differentiated instruction approach to education, making it appropriate for closing gender learning gaps because it supports an inclusive and personalized learning environment. By addressing individual learning styles, providing varied instructional strategies, and fostering engagement through multimedia resources, digital educational tools have the potential to contribute to a more equitable educational experience for all students, regardless of gender or their special education requirement status. It is also consistent with the Sector Framework Document for Skills Development (GN-3012-4) by measuring high-quality learning opportunities. The project is aligned with the IDB Group Strategy in the Dominican Republic (GN-3084) under the objective of “Strengthening of human

capital,” through actions aimed at improving the quality of education for all children and youth, especially by providing options to support youth integration into the labor market.

III. Description of activities/components and budget

- 3.1 **Component I-AI Education Program Development (US\$140,000 in JPO resources and US\$50,000 in resources in kind).** The TC will finance the development of an AI-ED program in the Dominican Republic with two different treatment models: one AI-ED tool for student end users and one AI teaching platform. The AI-ED tools will be selected from those identified in the mapping describes above in Section II. Resources will be used to hire a consultancy firm to design and support the implementation of the two AI-ED models for some 2,000 secondary students from low SES households in the Dominican Republic. MINERD has identified secondary schools in low SES communities that are equipped with education technologies and access to internet. The AI-ED teaching platform will support teachers in the use of AI tools to analyze students' learning patterns and abilities, identify students with special education needs, providing individualized learning materials and adaptive assessments. This will allow teachers to tailor instruction to individual students' needs, ensuring a more effective and targeted learning experience. The AI-ED student tool will directly help students, supporting different learning styles, using Natural Language Processing (NLP) capabilities that can understand and respond to students' questions and input in a conversational manner, and tracking each student's progress. The timeline for developing the program is 12 months, including 9 months for program development and 3 months for validation.
- 3.2 **Component II- AI Education Program Implementation (US\$380,000 in JPO resources and US\$20,000 in resources in kind).** The objective of the component is to evaluate the cost-effectiveness of AI education, including tutoring, in a low Socio-Economic Status (SES) context in the Dominican Republic. The TC will finance the piloting of two AI education tools in the Dominican Republic. The pilot will be designed for school-based implementation together with AI coordinators in each school who will manage groups of teachers and students for a total of some 100 hours of AI education. Resources will be used to hire a consultancy firm to implement the two models in a group of schools offering secondary education, including contracting, training, and local transportation of AI coaches. Training will include face-to-face training sessions, coaching visits, and training on AI-ED tools and best practices for using AI-ED within their lesson plans.
- 3.3 **Component III- Assessment of children's mathematical abilities (US\$220,000 in JPO resources and US\$20,000 in resources in kind).** The objective of the component is to assess children's mathematic abilities, perceptions of and sense of belonging in mathematics. The TC will use resources to hire a consulting firm carry out a diagnostic assessment of all students to help develop their individualized learning plans and conduct two evaluations of AI education to assess children's skill development; and teacher pedagogical practice. This student assessment will include sections on cognitive abilities as well as skills essential for success in the 21st-century landscape. The assessment of teachers will include teacher engagement in reflective practices, sensitivity and awareness of students' individual learning needs and progress. The TC will follow an experimental approach in which program participants are secondary school students. They will be randomly assigned to treatment and control groups. This will allow for comparison of results between the groups of participants at the end of the program and, based on this, to conclude about the effectiveness of the intervention.

- 3.4 **Component IV- Dissemination of findings (US\$20,000 in JPO resources).** Once the experimental evaluation is completed, the results will be broadly disseminated through an academic publication, presentations in the education community in Dominican Republic, and direct engagement with key government officials. This process aims to increase awareness, guide policymaking, and potentially expand the AI education intervention by using the evidence collected during the study. This component will finance the contracting of a firm for the production of dissemination videos. The TC will also fund non consulting services for the dissemination of findings through a publication, presentations, and dialogue with the authorities. Specifically, the dissemination will include the development of two videos, publications, and a workshop in the Dominican Republic on the results from the pilot experimental evaluation. The workshop will take place once the evaluation of the pilot has been completed. The generous support of the Government of Japan will be promoted in all dissemination products.
- 3.5 **Component V- IDB Supervision and Technical Assistance (US\$ 40,000 in JPO resources).** The TC will finance the travel of IDB staff to monitor program implementation and dialogue with authorities.
- 3.6 **Funding.** The total cost of the TC is US\$890,000, of which US\$800,000 will be charged against the resources of the Japan Special Fund Poverty Reduction Program (JPO) and US\$90,000 will be provided by the counterparts in the form of hours worked by government employees in MINERD. The compliance with the counterpart contribution will be estimated based on the time dedicated to the project of teachers and central level MINERD officials. In accordance with JPO guidelines, the following expenditures are not included in the requested JPO amount: (i) government employees' salaries and travel costs; (ii) Bank staff salaries; (iii) training from non-beneficiary countries; (iv) study tours; and (v) land acquisition. In agreement with JPO guidelines, 5% of JPO resources will be used to cover expenses related to enhancing project execution, including IDB staff travel costs to provide technical assistance.

Indicative Budget, in USD

Activity/Component	Description	IDB/JPO	Counterpart Funding in kind by MINERD	Total Funding
Component I – AI Education Program Development	The development and validation of two AI education models and the development of handbook	140,000	50,000	190,000
Component II – AI Education Program Implementation	Lesson implementation for teachers and coaching for caregivers.	380,000	20,000	400,000
Component III – Assessment of children’s mathematical abilities	Impact evaluation design, implementation, and analysis	220,000	20,000	240,000
Component IV – Dissemination of findings	Video, editing, graphic design, and dissemination workshops	20,000	0	20,000
Component V – IDB Supervision and Technical Assistance	Supervision visits	40,000	0	40,000
Total		800,000	90,000	890,000

3.7 **Monitoring.** The Project Team will be responsible for the review of all technical and financial reporting. The Team Leader will be responsible for monitoring activities in the field, and continuous progress meetings with MINERD counterparts.

IV. Executing agency and execution structure

- 4.1 The Inter-American Development Bank (IDB) through the Education Division (SCL/EDU) in collaboration with the country office (CID/CDR) will execute this TC. The Government has requested that the Bank execute the TC based on its long experience in conducting experimental evaluations in early childhood education and scaling them. The IDB has a solid history of scaling learning models: (i) Intercultural Bilingual Preschool Education (PN-T1224) has been scaled to all preschools and 1st grade in Panama’s largest indigenous comarca, and to Peru; (ii) Tikichuela Preschool Math (PR-T1092) was scaled to 1st-3rd grade; (iii) Visible and Tangible Math (BL-T1049), was scaled nationwide at the primary and secondary levels. If the proposed AI Education model is cost-effective, it would provide the government with evidence to scale it.
- 4.2 The justification is consistent with 2.2 (iii) of Appendix 10 of the Operational Guidelines for Technical Cooperation Products (as modified Annex 2 of GN-619-4) criteria for contracting by the Bank, which establishes that Bank execution is justified when it helps ensure independence. In this case, the credibility of the evaluation of a government program is enhanced when conducted by an impartial entity.
- 4.3 As the executing agency of the TC, the Bank will be responsible for: (i) coordinating the actors involved in the activities of the initiative/project; (ii) identify the studies and technical work necessary to carry out the TC; (iii) select and contract consultants to provide the necessary services; (iv) supervise the consulting services to which the

beneficiary provides technical inputs; and (v) manage the execution and provision of consulting services.

- 4.4 **Execution and disbursement period.** The TC will be executed through the UDR SCL/EDU over a period of 36 months and disbursed over a period of 36 months as of the date of approval.
- 4.5 **Procurement.** All procurement to be executed under this Technical Cooperation have been included in the Procurement Plan (Annex IV) and will be hired in compliance with the applicable Bank policies and regulations as follows: (a) Hiring of individual consultants, as established in the regulation on Complementary Workforce (AM-650) and (b) Contracting of services provided by consulting firms in accordance with the Corporate procurement Policy (GN-2303-33) and its Guidelines.
- 4.6 All deliverables and any other material prepared under this TC are the sole and exclusive property of the Bank, and as such, the Bank has title, rights (including copyrights) and exclusive interests in the ownership of said products.
- 4.7 **Results.** The results of the TC include: (i) approximately 2,000 secondary school students from low SES households benefitting from an educational intervention that leverages AI tools to enhance learning (Component I); (ii) The AI-based education intervention evaluated through an experimental study, focusing on understanding the intervention's cost-effectiveness. The study assesses whether the educational benefits of incorporating AI technology justify the associated costs, providing valuable data on the financial efficiency of using AI in education (Component II); (iii) After completing the experimental evaluation, the findings will be shared widely through an academic publication, presentations at educational conferences, and direct dialogue with relevant government authorities. This will help to raise awareness, inform policy decisions, and potentially scale the AI education intervention based on the evidence gathered (Component III); and (iv) Throughout the project, the implementation of the intervention will be closely monitored by the Bank team. This will ensure that the project follows its intended course, identifies potential issues early, and adapts as necessary to improve effectiveness and ensure the initiative meets its objectives (Component IV).

V. Major issues

- 5.1 The risks to project execution are reduced by being directly executed by the IDB. The execution of a pilot based on an experimental design in a context such as the Dominican Republic presents logistical challenges. However, the IDB has many years of experience in working with schools in remote geographic areas, including the delivery of education technology programs in rural and urban marginalized schools. To mitigate risks associated to logistics, the project includes enough resources to ensure additional travel time for tutor coordinators when needed. Another risk is connectivity problems in schools. To mitigate this risk, applications that can be used offline are being identified through the mapping exercise.

VI. Exceptions to Bank policy

- 6.1 There are no exceptions to Bank policy.

VII. Environmental and Social Aspects

- 7.1 This Technical Cooperation is not intended to finance pre-feasibility or feasibility studies of specific investment projects or environmental and social studies associated with them; therefore, this TC does not have applicable requirements of the Bank's Environmental and Social Policy Framework (ESPF).

Required Annexes:

[Request from the Client_56799.pdf](#)

[Terms of Reference_960.pdf](#)

[Procurement Plan_33185.pdf](#)