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BOLIVIA

**JAQUEMATE – TECHNOLOGY, DIGITAL SKILLS, AND SOFT SKILLS TO
BEAT MATHEMATICS**

(BO-T1297)

DONORS MEMORANDUM

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PROJECT SUMMARY

JAQUEMATE –TECHNOLOGY, DIGITAL SKILLS, AND SOFT SKILLS TO BEAT MATHEMATICS (BO-T1297)

Bolivia's software industry has developed over the last 15 years, with the city of Cochabamba as its epicenter. Universities are the greatest source of human capital for this industry, particularly information technology and systems (ITS) programs. Nonetheless, young graduates may lack the full set of skills required by industry: (i) sound logical reasoning ability for programming; (ii) soft skills such as the ability to manage time to meet delivery deadlines, work as part of a team, and communicate effectively; and (iii) a basic knowledge of English. This results in unmet demand for young people with the desired skill set.

Logical reasoning ability can be developed at school through the teaching of mathematics, as the basis of programming. Historically, math performance in Bolivia has been poor. This means that few high school graduates enroll in programs of study in science, technology, engineering, and mathematics (STEM), and even fewer complete them; the figures for women are even worse. Another result is that students underperform in higher education. In terms of soft skills, firms say workers also need improvement in core skills like self-esteem and self-motivation. Moreover, the ability to communicate with the customer in English is essential in an export-oriented sector.

The project will contribute to strengthening the school-university-work transition for mainly low-income young people in the software industry, emphasizing secondary school education as the basis for labor-force development. To do so, it will build on the experience of the [Jala Foundation](#) (the educational arm of Bolivia's largest software firm, Jalasoft) in Cochabamba since 2007. Specifically, it will consolidate the JaqueMate package, which will include: (i) training in mathematics, using the Khan Academy technology platform; (ii) soft skills, using agile methodologies; and (iii) English. As a result of the project, 70 schools (around 70% of which will be public and/or covenant schools) will implement the JaqueMate package in the last four years of secondary school, 45 of these doing so autonomously under the Jala Foundation's supervision. These schools will offer the JaqueMate package to 19,600 students (50% women); 70% of students with below average academic performance will improve their performance in each school year by at least 7%. The JaqueMate training will encourage 340 young people with the required interest and ability to continue higher education studies in STEM fields. For the university-work transition, 480 information technology and/or systems students at public and private universities in Bolivia will have access to specialist training programs in software development and testing. Additionally, 296 young people will be hired by Jalasoft.

The project will coordinate with loan 2828/BL-BO of the Bank's Education Division (EDU), which is funding the national high-school humanities and technical baccalaureate program in 55 municipios, including those in Cochabamba where the project is expected to operate. Synergies will be sought for implementing JaqueMate.

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ABBREVIATIONS

BTH	Bachillerato técnico humanístico [National high-school humanities and technical baccalaureate program]
CBTI	Cámara Boliviana de Tecnologías de Información [Bolivian Chamber of Information Technologies]
CEO	Chief Executive Officer
CIO	Chief Information Officer
CTO	Chief Technology Officer
DNA	Diagnostic needs assessment
EDU	IDB Education Division
EPDBs	Escuelas Populares Don Bosco [Don Bosco Community Schools]
ITS	Information technology and/or systems
KA	Khan Academy
LMK	IDB Labor Markets Division
PDES	Economic and Social Development Plan [Plan de Desarrollo Económico y Social.
SIMECAL	Sistema de Medición y Evaluación de la Calidad de la Educación [Education Quality Measurement and Evaluation System]
STEM	Science, technology, engineering, and mathematics
ToT	Training of trainers

EXECUTIVE SUMMARY

JAQUEMATE – TECHNOLOGY, DIGITAL SKILLS, AND SOFT SKILLS TO BEAT MATHEMATICS (BO-T1297)

Country and geographic location:	Department of Cochabamba, Bolivia, with the possibility of extension to other departments of the country.
Executing agency:	Jala Foundation
Focus area:	Knowledge Economy
Coordination with other donors/Bank operations:	<p>The project will coordinate with the Don Bosco Community Schools (EPDBs), which represent the educational work of the Salesian Congregation of Bolivia. The EPDBs comprise 338 “covenant schools”¹ located in five departments of the country (Cochabamba, Santa Cruz, La Paz, Potosí, and Chuquisaca), providing education to some 120,000 students. The project will also coordinate with the Bank’s Education Division (EDU) to identify synergies with loan 2828/BL-BO, which is funding the national high-school humanities and technical baccalaureate program (BTH) in 55 municipios, including those in the department of Cochabamba where the project is expected to operate. The project will coordinate with the Labor Markets Division (LMK) through the Program to Support Employment II (loan 3822/BL-BO) to publicize: (i) Jalasoft’s direct staffing requirements (without completing Foundation courses); and (ii) the Foundation’s university-level training programs for staff recruitment. It will also disseminate information on the Program to Support Employment II among young people in the programs offered by the Foundation (other than JaqueMate, which is for secondary students).</p>
Project beneficiaries:	<p>19,600 young people² (at least 50% young women) in the last four years of secondary school will improve their math performance and enhance their self-esteem and self-motivation; 340 of them will learn basic programming and/or robotics skills. Additionally, 480 university students will acquire basic and/or advanced skills for working in the software industry. Seventy schools will acquire the capabilities to implement the JaqueMate package independently as a supplementary educational resource for math learning, and around 70% of these will be public and/or covenant schools.</p>

¹ Covenant schools (“colegios de convenio”) are private religious establishments founded as nonprofits under private general administration. Under an agreement with the government, these institutions provide nearly-free schooling for children in low-income areas using teachers from the public sector.

² In this document, the term “young people” refers to both young women and men. The project will pursue equal opportunity and access between women and men across the board.

Financing:	Technical cooperation:	US\$ 600,000	50%
	Counterpart:	US\$ 600,000	50%
	Total project budget:	US\$1,200,000	100%
Execution and disbursement periods:	Execution period:	36 months	
	Disbursement period:	42 months	
Special contractual conditions:	Conditions precedent to the first disbursement: (i) MIF approval of the project Operating Regulations; and (ii) an agreement signed with the EPDBs to implement JaqueMate.		
Environmental and social impact review:	This operation was prescreened and classified according to the requirements of the Bank's Environment and Safeguards Compliance Policy (Operational Policy OP-703) on 23 May 2017. As the impacts and risks are limited, the proposed category for the project is "C."		
Unit with disbursement responsibility:	MIF staff at the Bank's Country Office in Bolivia (MIF/CBO)		

I. THE PROBLEM

A. Description of the problem

- 1.1 Education in Bolivia—and in Latin America generally—is not keeping pace with the new technological context of the twenty-first century, in which technology is transforming industry and, hence, the skills needed from the labor force. Technology, particularly the Internet, has rendered the need for memorization obsolete, since information is always available and easily accessible. Accordingly, the education system needs to refocus on developing reasoning skills that make it possible to discern information for practical application. In other words, in this new context, young people graduating from the education system need: (i) sound digital skills, including the ability to use computers to work, find information, communicate, and participate in a society where technology is essential; (ii) strong academic skills in core subjects such as mathematics, language, and science, which form the basis for specific knowledge that leads to employment in the jobs being created by technology; and (iii) soft skills that enable them to operate in a society characterized by economic globalization, the role of services, and teamwork (IDB, 2014).
- 1.2 Bolivia's software industry has developed over the last 15 years, and the Bolivian Chamber of Information Technologies (CBTI) now has 350 software firms registered nationwide.³ The epicenter of the industry is the city of Cochabamba,⁴ mainly because the largest software company in the country, [Jalasoft](#), is based there and has helped to develop a dynamic ecosystem of enterprises engaged in software development and related services.⁵
- 1.3 Firms in Cochabamba generally target the export market. Although most of them develop custom software solutions to meet the requirements of a specific firm, a growing number are developing and testing commercial software, i.e., developing and testing "closed" technology solutions to meet multiple needs, adopted partially or fully by several different firms. The required technical capabilities are similar for the development of both types of software, although a higher level of proficiency in programming languages is required for commercial software.
- 1.4 Universities are the greatest source of human capital for this industry, particularly information technology and systems (ITS) programs.⁶ Nonetheless, young graduates may lack the full set of skills required by industry: (i) sound logical reasoning ability for programming, together with digital skills; (ii) soft skills such as the ability to self-organize and manage time to meet delivery deadlines, work as part of a team, negotiate and communicate effectively; and (iii) a basic knowledge of business English. This results in unmet demand for young people with the desired skill set.
- 1.5 Logical reasoning ability needs to be developed at school through the teaching of mathematics, particularly the definition of variables and problem-solving, as the

³ [Enterprises engaged in software development and related services](#).

⁴ [Cochabamba is home to the largest number of small and medium-sized export-oriented software firms in Bolivia](#). The largest and most internationally oriented include: Jalasoft, [Piramide Informatik](#), [Software Andina](#), [Assuresoft](#), [Truextend](#), and [Intersoft](#).

⁵ [Rocabado, Claudia \(2013\). "Software Firms and Local Development in Bolivia"](#).

⁶ This is for software development. Manual testing of the software, which does not require any programming, can be performed by professionals in other fields.

basis of programming. Yet, historically, math performance in Bolivia has been poor⁷ (with marked differences between public and private schools). This means that few high school graduates enroll in programs of study in science, technology, engineering, and mathematics (STEM), and even fewer complete them; the figures for women are even worse, since there is a bias toward enrollment in more “traditional,” nonengineering majors). Another result is that students underperform in higher education.⁸

- 1.6 Firms say workers must have soft skills to perform well in the sector, and often need improvement in core skills like self-esteem and self-motivation. The ability to communicate with the customer in English is essential in an export-oriented sector where that language is used.

II. THE SOLUTION AND INNOVATION PROPOSAL

- 2.1 Responding to these challenges, the Jala Foundation, as the educational arm of the [Jala Group](#),⁹ has been working to build capacity among high school students (since 2015) and among college students (since 2007) in the city of Cochabamba, to smoothe the school-university-work transition. At the high-school level, it promotes the “JaqueMate” [“Checkmate”] initiative, which targets mathematics learning using the [Khan Academy](#)¹⁰ (KA) platform as a supplementary educational resource. The initiative has focused mainly on the fifth year of secondary education (grade 11) with curricular content that is crucial for progress in programming. In partnership with 30 private, public, and/or covenant schools, the Jala Foundation identifies content of the platform that can be applied within the national curriculum, synchronizes it with the teaching plan to reinforce learning, trains teachers and students in use of the platform, and tracks progress and performance. One of the most striking outcomes is the potential for equalizing academic performance between public and private schools. Moreover, the top students interested in pursuing higher education studies in systems engineering can attend free workshops and short courses given

⁷ For example, a 2000 study by the former Education Quality Measurement and Evaluation System (SIMECAL) found that in nearly one third of primary school third grade students had not developed the ability to solve simple, direct problems (Level Not Achieved); about 40% could only solve simple exercises (Level A); and about 12% could solve complex exercises (Level C). Ministry of Education (2004), [La educación en Bolivia: cifras y resultados](#) [Education in Bolivia: figures and outcomes]. More recent studies on school performance in Bolivia were not found.

⁸ Ministry of Education (2004), [La educación en Bolivia: cifras y resultados](#) [Education in Bolivia: Figures and outcomes]. p. 27

⁹ The Jala Group comprises Jalasoft, a technology production firm, the nonprofit Jala Foundation, and Industrias Jala, a hardware production firm serving the Latin American Market. Jalasoft is the largest software enterprise in Bolivia; it has a portfolio of at least 22 products and works exclusively on commercial software for export.

¹⁰ The Khan Academy platform is free-of-charge and accessed by over 10 million users per month worldwide. It has been designed specifically for school education (primary and secondary), and so includes gradual learning content in math, language, science, and other subjects that can be easily adjusted to the educational curriculum (other platforms offer separate courses and/or courses not designed to accompany school learning on an ongoing basis). The platform also allows “customization” of the type of exercises and levels of difficulty, and individual/group tracking of student usage and performance. The Jala Foundation has been working with this tool since 2015 (initially as a pilot) and has validated its relevance and effectiveness for strengthening the mathematics learning of the secondary student population.

by the Jala Foundation on basic programming and robotics ([Lego NXT - Mindstorms](#)).

- 2.2 The JaqueMate pilot, led by Jala Foundation facilitators, shows promising results: students generally improve their math performance, class participation, and communication skills. Teachers learn to use the platform and acquire the ability to guide use of the tool. Currently, the main challenge is to identify cost-efficient scalability formulas. The support of the Multilateral Investment Fund (MIF) is essential in this effort, given its experience in documenting methodologies and evaluating results. This project will develop a “training of trainers” (ToT) methodology, so that the schools can implement the initiative autonomously in stages with their secondary-level students, with the Jala Foundation providing oversight and technical assistance.
- 2.3 At the university level, the Jala Foundation supports ITS students,¹¹ mainly by offering free courses and advanced and intensive onsite training alongside their university education. Starting in their first semester, college students can specialize in two areas: (i) commercial software development; and (ii) manual testing and/or automation of commercial software testing.¹² The Foundation also strengthens their soft skills (such as self-esteem, self-motivation, leadership and communication) and provides training in English. The goal is to enhance their qualities as students to enter to the software industry. The programs serve as a gateway to Jalasoft or another software/technology company. In 2016, Jalasoft added all of the 79 young people who had completed Jala Foundation courses to their roster of engineers.

A. Project description

- 2.4 **Project objective.** The project will contribute to strengthening the school-university-work transition in the software industry, emphasizing secondary school education (grades 9-12) as the basis for development of a labor force that has the technical and soft skills required by the sector. It will work with high school and university students in the department of Cochabamba to meet training needs at all levels. The model, including the different levels (secondary, university, and employment) is also expected to be replicated and scaled up to other Bolivian cities.
- 2.5 **Target population.** The project will work with 20,080 young people: (i) 19,600 students in their last four years of secondary school (ages 15-18) at 70 schools, around 70% of whom will be from public schools and covenant schools.¹³ An agreement will be signed for that purpose with the the Don Bosco Community Schools (EPDBs) of the Salesian Congregation of Bolivia, which comprise 388 covenant schools located in five departments of the country (Cochabamba, Santa Cruz, La Paz, Potosí, and Chuquisaca). The number of EPDBs will be based on their location, number of students, access to infrastructure, and other factors.

¹¹ The Jala Foundation is also open to young people in other fields, to be trained in manual testing of software, which does not require programming.

¹² Click [here](#) for more on the programs offered by the Jala Foundation.

¹³ Covenant schools (“colegios de convenio”) are private religious establishments founded as nonprofits under private general administration. Under an agreement with the government, these institutions provide nearly-free schooling for children in low-income areas using teachers from the public sector. Although private schools in Bolivia vary considerably (for comparison, in the city of La Paz they can charge [monthly fees ranging from US\\$19 to US\\$685](#), when the national minimum wage in 2017 is 2,000 bolivianos, equivalent to US\$291), the intention is to work with low-income schools.

- (ii) 480 young people will be ITS students at public and private universities across the country,¹⁴ chosen for their outstanding academic performance, as well as their responsibility and commitment.
- 2.6 **Proposed intervention model.** The project will address the school-university-work transition in two stages: (i) strengthening the school-university transition to STEM studies in general, and to ITS studies in particular; and (ii) supporting the university-work transition in the software industry. To do so, it will build on the Jala Foundation's educational experience at the secondary school and university levels, targeting work with high schools to strengthen the school-university transition to STEM studies in general, and to software-related majors in particular.
- 2.7 Under the model, young people will receive integrated training (mathematics, digital skills, and soft skills) throughout their last four years of secondary school; and those who choose to pursue ITS studies will receive support during their university years.
- 2.8 At the secondary school level (school-university transition), young people in the last four years of high school will use the Khan Academy (KA) platform as a supplementary resource in their math education. During class time, the students will have access to the platform in the classroom for one hour a week, when they can reinforce the content studied in their regular classes with exercises on the platform. The platform allows unlimited access to its math content (and other subjects), so students can continue to learn outside of class schedules. The project includes actions to enhance equal access to technological infrastructure (computers, Internet) for young people who need it (access to Jala Foundation laboratories, equipment donations to strategic schools, either directly or through partnerships, and other actions).
- 2.9 Throughout their work with KA, the young people will be trained to improve their digital skills and gain an understanding of technology's potential, to facilitate their life paths (finding information, learning through free online tutorials such as YouTube, communities, safe use of social networks, etc.). They will also work on their soft skills, mainly self-esteem, self-motivation, leadership, teamwork, and communication, from the perspective of agile methodologies,¹⁵ e.g., using the "planning poker"¹⁶ technique to reach consensus as a team. "Girl Power" gender

¹⁴ The Jala Foundation's experience is that the majority (70%) of the college students they work with come from public universities (where tuition is free). Although the public university population is varied, between 60% and 70% come from low-income sectors and from public schools. [Universidad Mayor de San Simón \(UMSS\) \(Cochabamba's public university\) – Development Plan 2014-2019.](#)

¹⁵ Agile methodologies are used in technology-based projects (such as software development) and are at the heart of the "Jala philosophy". They are based on incremental and iterative developments that enhance the functionality of the software to be delivered. The agile methodologies [manifesto](#) is reflected in 12 principles: (i) satisfy the customer through the early and continuous delivery of valuable software; (ii) welcome changing requirements, even late in development; (iii) deliver frequently; (iv) work together; (v) motivated teams; (vi) direct contact with customers; (vii) measure progress, working software is the primary measure of progress; (viii) sustainable development, the sponsors, developers, and users should be able to maintain a constant pace indefinitely; (ix) continuous attention to excellence; (x) simplicity, the art of maximizing the amount of work not done; (xi) self-governing, the best architectures, requirements, and designs emerge from self-organizing teams; and (xii) regular review.

¹⁶ For more on this planning technique, see <http://albertoromeu.com/scrum-planning-poker/>.

workshops will also be held, to encourage interested women to continue their STEM studies.

- 2.10 Students in the last and second-to-last years selected for their performance and interests will be able to take free, two-week basic programming courses during the winter or final vacation (July or January), and then a robotics workshop (Lego NXT) and/or a three-month gaming course. These courses and workshops will nudge young people towards STEM careers, and ITS in particular.
- 2.11 At the university level (university-work transition), the young people who continue with ITS-related studies will be able to follow specialization programs throughout their course of study: (i) Softure Fundamentals¹⁷ provides a one-year training course on programming for first- and second-semester students; (ii) Softure, lasting three years, is similar to Softure Fundamentals but more intensive (four hours of programming per day); (iii) Commercial Software Development (DEV), lasting nine months plus a three-month internship, teaches intermediate-level programming in the C++, C#, and Java languages on .net and web platforms, among others; (iv) Manual Testing or Automation of Software Testing, lasting six months plus a three-month internship; (v) Applied Research is a research program lasting 9 to 11 months, to enhance scientific skills, the ability to innovate, and intellectual property production, paid on a part-time basis; (vi) Black Box teaches quality testing of software functionality. Each student can follow a different route, depending on their interests (programming or testing), skills, and time. A young person trained in the Foundation's intensive programs can find employment at Jalasoft.
- 2.12 **Innovation.** The project represents an interaction between the education system and the technology industry in Bolivia, to systematically incorporate supplementary technological resources into secondary education and support the students in their school-university-work transition. The fact that the initiative is led by a leading company (through its foundation) shows that the private sector has the flexibility and incentives to trial initiatives that can then influence practices in the education system. The project will also allow students to be trained in an integrated manner throughout their secondary and university education, gaining the technical skills needed to perform in technology professions, but also developing soft skills to help drive their performance. A replicable soft skills program for students will also be developed/documented under the project, based on agile methodologies. The Jala Foundation uses these methodologies to organize work teams for software development and has found them to be a very useful tool for working on soft skills.
- 2.13 **Component I: Development of the JaqueMate package.** This component's objective is to develop the integrated package (expanded from the Foundation's previous experience with KA) and a cost-efficient implementation methodology under which it is transferred to schools, allowing for its replication and scaling. This will make it possible to increase the number of beneficiary students from 2,100 accessing the KA platform in a single year, to 19,600 accessing JaqueMate over a four-year period. All components of the JaqueMate package will include: (i) a program to build awareness on the use and availability of technological resources for teaching/learning for schools (students, teachers, and principals); (ii) a program to develop soft skills and digital skills for students, based on the agile methodology;

¹⁷ Softure stands for "Software is the Future", a training program developed by the Jala Foundation.

and (iii) the development of academic skills in mathematics using the KA platform. The component will also develop a transfer methodology based on “training of trainers” (ToT), to enable the schools themselves to implement the JaqueMate package autonomously with the Foundation in the background as a second tier, providing technical assistance and supervision. Systematically documenting the package and transferring it under the new ToT methodology will allow coverage to be extended to more schools, and additional grades at each school. The component will also support the management of new and existing key partnerships to expand JaqueMate and narrow gaps in access to technological infrastructure (laboratories, computers, and Internet), so as not to exclude low-income schools. Two networks will be created: JaqueMate Schools and JaqueMate Friends. The first will bring together schools implementing JaqueMate for shared use of technological infrastructure and other resources. The second will pursue partnerships with institutions associated with JaqueMate, such as Internet providers, to make infrastructure and other resources available. It will also work on a gender strategy for JaqueMate and all the programs offered by the Foundation, focused on increasing the number of women interested in STEM at the educational and professional levels.

- 2.14 **Component II: Implementation of the JaqueMate package.** This component’s objective is to implement the JaqueMate package at 70 private, public, and/or covenant schools in Cochabamba, initially, and then in other Bolivian cities, reaching 19,600 young people in grades 9-12. The schools will be selected on the following criteria: (i) schools where collaboration is already under way; (ii) partner schools (EPDBs and others) with capacity to implement the project; (iii) open competitions using application forms. The open competitions will consider the following criteria: (i) long-term commitment¹⁸ to implement JaqueMate (agreements will be signed); (ii) number of students; and (iii) access to computer labs. Under this component, the Jala Foundation will provide technical assistance to schools, including: (i) immersion of teachers and students in the KA platform; (ii) monthly assignment of the topics to be worked on by the students using the platform, to supplement the teacher’s work in the classroom; (iii) conducting student internships in laboratories; (iv) regular reports for the different levels of educational supervision; and (v) technological assistance to solve hardware, software, or Internet problems. For schools without adequate infrastructure or Internet connections to make use of the technological platform, the project will make computer labs available to teachers and students at Jala Foundation facilities or through other arrangements (partnerships among schools and with authorities and/or private business). In addition, 340 JaqueMate students, who are outstanding for their abilities and interests, will be able to access more intensive training in basic programming and robotics, to encourage them to continue with engineering and/or technology-related studies and thus support their school-university transition.
- 2.15 **Component III: School-university-work transition.** The Jala Foundation has robust educational offerings that have been rolled out gradually since 2007 with good results. Since university education is the Jala Foundation’s core activity/specialty, MIF support in this component will strengthen competitive and

¹⁸ The Jala Foundation will determine the implementation commitment time frame, once the ToT transfer methodology has been developed.

recruitment processes for its programs offered to university students during their university career. The goal is to disseminate programs more widely and reach a larger number of young people in other departments of Bolivia. This component will also support a gender approach, adopted to encourage more women to participate in the Jala Foundation's programs and ultimately join the Jala Group (currently, only 30% of Jalasoft's engineers are women). In addition, support will be provided to disseminate the agile methodologies used by the Jala Foundation in the training of young people, applied to the strengthening of soft skills.

- 2.16 **Component IV: Strategic communication and knowledge management.** This component's objective is to learn lessons from the implementation of the JaqueMate package, in particular, but also from the Foundation's other programs, to publicize the experience and outcomes and document the model for scaling up to other departments of Bolivia or to other countries. Dissemination of outcomes will also focus on generating interest among key players (authorities, other schools, organizations with ties to the sector that might join JaqueMate) and consolidating the JaqueMate Schools and JaqueMate Friends networks. A communication strategy will be developed and implemented throughout the project's execution. The following activities are planned: (a) publicity and promotion of project activities in different cities; (b) presentation of the project and demonstrations of use of the platform to different audiences of educational authorities or educators; (c) visits to educational authorities for the addition of new schools; (d) development of case studies and documentation of the experience.

B. Project results, measurement, monitoring, and evaluation

- 2.17 The project will strengthen the school-university-work transition for young people mainly from low-income families, enabling them to acquire the core skills and specific skills sought by the software industry in Bolivia. For the school-university transition, 70 schools (around 70% of which will be public and covenant schools) will implement the JaqueMate package under the project in the last four years of secondary school, 45 of these doing so autonomously under the Jala Foundation's supervision. These schools will offer the JaqueMate package to 19,600 students (50% women), who will receive training in mathematics, soft skills, and English; 70% of students with below average academic performance will improve their performance in each school year by at least 7%. This JaqueMate training will encourage 340 young people with the required interest and ability to continue higher education studies in STEM fields; 615 scholarships will be offered for additional basic programming and robotics courses. For the university-work transition, 480 information technology and/or systems (ITS) students at public and private universities in Bolivia will have access to specialist training programs in software development and testing. Additionally, 296 young people will be hired by Jalasoft in the three years of the project.
- 2.18 The project will design a monitoring and evaluation system that also identifies strategies and responsibilities for gathering project information. The system will obtain data from: (i) the KA platform, on the progress and outcomes achieved by the young students; (ii) academic reports on the students from the schools; and (iii) the Jala Foundation's monitoring systems, on the students in its programs. The data gathered and indicators to be monitored on a six-monthly basis will be reported in the project status report (PSR). The project will undergo either a midterm or a final evaluation. Without purporting to be an impact assessment, the evaluation will seek

to measure quantitative and qualitative differences in the mathematics competencies and soft skills gained among students participating in the JaqueMate project, relative to those without access to JaqueMate, and in levels of satisfaction among teachers at the two groups of schools as to the usefulness of teaching mathematics through the KA platform and how comfortable they feel using the technology. This will take advantage of the relationship with the EPDBs, since not all schools will be part of JaqueMate at the time of project execution. The final results of the program will be reported in the project completion report (PCR).

- 2.19 This project is part of the MIF's Knowledge Economy pillar, since it improves the technical, technological, and human skills of the labor force in export sectors with unmet demand for skilled workers. It draws on lessons learned from earlier projects, such as adapting learning methodologies for jobs in the knowledge economy, incorporating the strengthening of soft skills and tech skills into learning methods, among other lessons. This project also prioritizes improving the employability of the new labor force (young people) in knowledge-intensive sectors, specifically targeting the inclusion of women and closing the gap between labor supply and demand. The projects already approved for the Dominican Republic, Guatemala, Costa Rica, Uruguay, and Argentina form a subset of operations that can be used to document knowledge for feedback to new operations, providing specific information on methodologies, technical elements, and scaling processes.

III. ALIGNMENT WITH THE IDB GROUP, SCALABILITY, AND RISK

A. Alignment with the IDB Group

- 3.1 The Bank's country strategy with Bolivia (2016-2020) call for supporting the policies promoted by the Bolivian government's Economic and Social Development Plan (PDES 2016-2020), as they relate to increasing productivity and diversifying the economy. As part of this, the lack of skilled human capital is seen as one cause of the low levels of productivity and innovation in Bolivia. The MIF's work in education to develop the human capital required to support commercial software development as an emerging industry in Bolivia contributes to diversifying the economy and increasing productivity.
- 3.2 The project will coordinate with the IDB Education Division (EDU) to identify synergies with loan 2828/BL-BO, which is funding the national high-school humanities and technical baccalaureate program (BTH) in 55 municipios, including those in the department of Cochabamba where the project is expected to operate.¹⁹ Additionally, the project will coordinate with the Program to Support Employment II (loan 3822/BL-BO) to publicize: (i) Jalasoft's direct staffing requirements (without completing Foundation courses); and (ii) the Foundation's university-level training programs for staff recruitment. It will also disseminate information on the Program to Support Employment II among young people in the programs offered by the Foundation (other than JaqueMate, which is for secondary students). Lastly, the project will coordinate with the Bank's Competitiveness, Technology, and

¹⁹ The program seeks to develop productive technical skills among Bolivia's high-school population, and finances the construction of technical-productive modules for implementation of the BTH.

Information Division (CTI), since the Jala Group is a key partner for strengthening of the innovation ecosystem in Bolivia.

- 3.3 The IIC has shown interest in the education sector in Bolivia. The project will keep the Corporation informed about its progress and possible lending opportunities.

B. Scalability

- 3.4 This project represents an effort to scale up the JaqueMate initiative, which the Foundation has been pursuing since 2015. This effort is based on three pillars, the first of which involves definition of a “training of trainers” (ToT) methodology for the Jala Foundation to work with a larger number of schools and more students at each school. Thus far, it has been implementing the initiative more or less directly at 30 schools with a single course (grade 11). With this change of implementation and supervision methodology, under which the schools themselves implement JaqueMate autonomously and the Jala Foundation provides technical assistance and supervision, within three years the initiative is expected to reach 80 schools and four courses (grades 9-12). Once the methodology is established, coverage could be expanded to more schools in Cochabamba and other departments of Bolivia.
- 3.5 The second pillar is forming strategic partnerships. The partnership with the EPDBs will first be formalized, to facilitate the alignment of several schools under a single administration and institutional affiliation to JaqueMate. Until now, the partnerships have mostly been made one school at a time. Working with networks that also have a national presence reduces the Jala Foundation’s costs in expanding the work to other Bolivian cities. Working with Fe y Alegría²⁰ will also be explored. Partnerships will also be pursued with Internet firms, telephone companies, and other private enterprises for providing technology to schools that need equipment. Issues relating to educational infrastructure and the prioritization of schools will be coordinated under the partnership with the Departmental Education Directorate and the Municipal Government of Cochabamba.
- 3.6 The third pillar involves the dissemination of project outcomes over the course of each school year, to publicize achievements and recruit partners (schools and others), and to place on the agenda the possibility and relevance of using the technology to improve students’ academic performance and sharpen their digital skills and soft skills. Events and knowledge products will be used to forge relationships with key players in the education sector generally.

C. Project and institutional risks

- 3.7 **Unequal access to technological infrastructure.** Two things are required for implementation of JaqueMate to work with the KA platform: (i) a computer or other device; and (ii) Internet access. In the current context of Bolivian education, some public or covenant schools (as well as private ones) do not meet these technological requirements. As a result, access to the project could be biased toward schools (and young people) that are better off economically. To mitigate this risk, the Jala Foundation is opening its facilities and technological infrastructure (computer labs) to schools that need them. In addition, the project will foster alliances (JaqueMate

²⁰ [Fe y Alegría](#) is an integrated community education and social promotion movement that targets its actions to impoverished and marginalized sectors, to foster their personal development and social engagement. It has 319 covenant schools nationally.

Schools Network) between private and public and/or covenant schools to allow for the use of technological infrastructure. For example, support will be provided in providing technology to schools (viewed as strategic owing to their location and/or size of computer labs) that make their labs available to other schools that need this. Partnerships will also be sought (JaqueMate Friends Network) with Internet providers and other private companies for contributing equipment. The project provides funding to manage partnerships and counterpart funding to equip and operate labs.

IV. PROPOSED BUDGET

- 4.1 The project has a total cost of US\$1.2 million. Of that amount, US\$600,000 (50%) will be provided by the MIF as a technical cooperation contribution, and US\$600,000 (50%) will be a counterpart contribution.

	MIF	Counterpart	Total
Project components			
Component 1: Development of the JaqueMate package	145,622	8,000	153,622
Component 2: Implementation of the JaqueMate package	241,679	483,742	725,421
Component 3: School-university-work transition	68,160	35,614	103,774
Component 4: Strategic communication and knowledge management	35,000	7,715	42,715
Project administration (execution unit costs)	40,339	64,929	105,268
Consulting to support procurement and financial management (DNA)	18,000	-	18,000
Midterm or final evaluation	32,200	-	32,200
Ex post reviews	19,000	-	19,000
Grand Total	600,000	600,000	1,200,000
% of Financing	50%	50%	100%

V. EXECUTING AGENCY AND IMPLEMENTATION STRUCTURE

A. Description of the executing agency/agencies

- 5.1 The Jala Foundation will be the executing agency of this project and will sign the agreement with the Bank. The Jala Foundation is the educational arm of the Jala Group, which develops commercial software for export with the long-term objective of creating technological intellectual property in Bolivia. Its mission is “to develop the software industry in Bolivia, investing in the early-stage training of Bolivians and enabling the country to compete at the highest levels worldwide.” Created in 2007 in response to the need to strengthen the human talent required by its industry, the Jala Foundation began working with university students in various programs, such as its Information Technology Academy endorsed by Microsoft and onsite training. In 2015, it ventured into work with high schools in the city of Cochabamba, focusing on mathematics, as a pilot for scaling up its educational work nationwide.

- 5.2 The [Jala Group](#) comprises Jalasoft, a technology production firm that began operations in 2001, the nonprofit Jala Foundation, and Industrias Jala, a hardware production firm serving the Latin American Market. Jalasoft is the largest software enterprise in Bolivia; it has a portfolio of at least 22 products and works exclusively on commercial software for export.

B. Implementation structure and mechanism

- 5.3 The Jala Foundation will set up an execution unit and the necessary structure to execute the project's activities and manage its resources effectively and efficiently. The Jala Foundation will also be responsible for delivering status reports on project implementation. Details of the structure of the execution unit and the requirements for the status reports can be found in Annex V of the technical files for this operation.
- 5.4 The execution unit will report to the Jala Foundation's Academic Office, which handles all programs offered by the Foundation, for smooth coordination among the different stages of youth training. The execution unit will also report regularly on the status and progress of the project, through the Academic Office, to the Jala Foundation's board, which includes all of Jalasoft's key executives (CEO, CIO, CTO, and the head of International Back Office), to ensure that the project remains aligned with the priorities and requirements of the industry. Such alignment is expected to make the training received by the young people more effective and relevant for continuing their studies and, ultimately, getting a job.

VI. FULFILLMENT OF MILESTONES AND SPECIAL FIDUCIARY ARRANGEMENTS

- 6.1 **Results-based disbursements and fiduciary arrangements.** The executing agency will comply with the MIF's standard arrangements for results-based disbursements, and with the Bank's policies on for the procurement of goods and works (document GN-2349-9) and consulting services (document GN-2350-9)²¹ and financial management,²² specified in Annexes V and VI.

VII. ACCESS TO INFORMATION AND INTELLECTUAL PROPERTY

- 7.1 **Access to information.** The project information is not under the Bank's Access to Information Policy, with the exception of the publication of strategic and marketing plans of the institutions.
- 7.2 **Intellectual property.** The Bank shall be the holder and owner of any and all intellectual property rights, including but not limited to copyright, in relation to and/or associated with all the deliverables to be developed.

²¹ Link to [Policies for the Procurement of Works and Goods Financed by the Inter-American Development Bank](#).

²² Link to [Financial Management Guidelines for IDB-financed Projects](#).