

Theoretical-empirical Article

# Entrepreneurial Education for Amazon's Sustainable Development: An Evaluation of the Genesis Program

Educação Empreendedora para o Desenvolvimento Sustentável na Amazônia: Uma Avaliação do Programa Gênese



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## ABSTRACT

**Objective:** this article evaluates the Genesis Program, part of the Amazon Journey, created to awaken local entrepreneurial talents and strengthen the business ecosystem based on the forest's biodiversity. **Theoretical approach:** it argues that developing behavioral skills and fostering an active learning community are essential for this goal. **Methods:** the theoretical analysis is grounded in experiential learning, emphasizing the dimensions of action and reflection, experience and abstraction, and the principles of engagement in discovery activities, courage cultivation, associative thinking, and diversity, which are essential for innovation. The research uses questionnaires (n = 147) and interviews (n = 26) to collect participants' perceptions and analyze the program's evolution over time. **Results:** as a result, the Genesis Program recorded 7,177 enrollments across the nine states of the Legal Amazon, involving more than 160 municipalities and generating 585 new entrepreneurial solution ideas. **Conclusion:** it was found that there was a need to improve the engagement method, leading to the development and application of new training formats. The 37 local ambassadors were identified as essential for the program's reach and achieving objectives. The article shares lessons learned and seeks to inspire new research and initiatives for developing talents in entrepreneurship, innovation, and bioeconomy fields.

**Keywords:** experiential learning; entrepreneurial talents; biodiversity-based business; innovation; bioeconomy.

## RESUMO

**Objetivo:** Este artigo avalia o Programa Gênese, parte da Jornada Amazônia, criado para despertar talentos empreendedores locais e fortalecer o ecossistema de negócios baseado na biodiversidade da floresta. **Marco teórico:** Defende-se que o desenvolvimento de competências comportamentais e uma comunidade ativa de aprendizado são essenciais para esse objetivo. **Metodologia:** A análise teórica é fundamentada na aprendizagem experiencial, com ênfase nas dimensões de ação e reflexão, experiência e abstração, além das premissas de engajamento em atividades de descoberta, cultivo da coragem, pensamento associativo e diversidade, essenciais para a inovação. A pesquisa utiliza questionários (n=147) e entrevistas (n=26) para coletar a percepção dos participantes e analisar a evolução do programa ao longo do tempo. **Resultados:** Como resultado temos que o Programa Gênese registrou 7.177 inscrições nos 9 estados da Amazônia Legal, envolvendo mais de 160 municípios e gerando 585 novas ideias de soluções empreendedoras. **Conclusão:** Contudo, constatou-se a necessidade de aprimorar o método de engajamento, resultando em novos formatos de capacitação desenvolvidos e aplicados. Destaca-se também que seus 37 embaixadores locais foram identificados como essenciais para a capilaridade e alcance dos objetivos do programa. O artigo compartilha aprendizados e busca inspirar novas pesquisas e iniciativas para o desenvolvimento de talentos nos temas de empreendedorismo, inovação e bioeconomia.

**Keywords:** aprendizagem experiencial; talentos empreendedores; negócios baseados na biodiversidade; inovação; bioeconomia

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## INTRODUCTION

The Amazon rainforest, the world's largest tropical forest, holds exceptional global importance due to its rich biodiversity and the significant amount of carbon stored in the plants and soil, among other essential ecosystem services. However, advancing deforestation, forest degradation, and climate change threaten the stability of the Amazon (Flores et al., 2024; Nobre & Borma, 2009). By 2022, approximately 19% of the Brazilian Amazon had already been deforested (Projeto MapBiomias, 2023), replaced mainly by pastures. Moreover, despite its natural wealth, the states of Brazil's Legal Amazon — Amazonas, Pará, Tocantins, Maranhão, Amapá, Roraima, Rondônia, Mato Grosso, and Acre — show low human development indices (Programa das Nações Unidas para o Desenvolvimento [PNUD], 2015).

The bioeconomy has the potential to integrate the productive activities of 750,000 rural families into local economies (Empresa Brasileira de Pesquisa Agropecuária [Embrapa], 2023), besides contributing to an estimated annual injection of at least BRL 40 billion to the GDP of the Legal Amazon, starting in 2050 (Nobre et al., 2023). Despite the various definitions of bioeconomy, the Amazon's bioeconomy must be developed endogenously and implemented creatively to contribute to “saving tropical forests, addressing climate change, hunger, and inequality, while also valuing traditional peoples and local communities” (Costa et al., 2022).

To harness this unique potential for sustainable development in times of climate urgency and pressing social issues, it is essential to foster a talent pipeline for socio-environmental impact entrepreneurship (Anastacio et al., 2018), an entrepreneurship that actively, innovatively, and economically protects the forest. A crucial strategy for this is the implementation of teaching and learning activities that engage the university community in themes of bioeconomy, entrepreneurship, and innovation.

Entrepreneurship education is critical in preparing individuals to address the challenges of an increasingly complex and dynamic economy (Mahmudin, 2023). This education directly relates to entrepreneurial intent, fostering greater acceptance of entrepreneurship as a career option (Mikic et al., 2018). Various studies have sought to understand entrepreneurial education, assessing changes in entrepreneurship-related skills and suggesting the need for action-oriented, project-based teaching environments similar to the real-life experiences of entrepreneurs (see review by Vanessar et al., 2011). Different evaluation methods have also been proposed for assessing the outcomes of entrepreneurship education and training programs, with most relying on questionnaires (Purzer et al., 2016).

However, evaluations based on self-knowledge and changes in participants' metacognitive processes (Vanessar et al., 2011), entrepreneurial intention (Asghar et al., 2019), and, preferably, the creation of new businesses (Raposo & Paço, 2011) are more effective.

Despite the presence of actors and initiatives in the Amazon, the low connectivity among these actors, the disorganization of production chains, and limited support for new businesses hinder sustainable entrepreneurship in the region (Centros de Referência em Tecnologias Inovadoras [CERTI], 2020). To address these challenges, the Amazon Journey program (Jornada Amazônia, in Portuguese) was created with the goal of expanding business opportunities based on forest biodiversity. This article aims to present an evaluation of the Genesis Program (*Programa Gênese*, in Portuguese), a component of the Amazon Journey. The Amazon Journey encompasses programs tailored to each entrepreneur according to their different stages of maturity: activation, origination, and evolution. The Genesis Program is the activation stage, aiming to foster impact entrepreneurship by providing personal development opportunities and allowing participants' ideas to take shape. The evaluation presented here is based on program results and participant feedback collected through questionnaires (n = 147) and interviews (n = 26). Additionally, this article aims to present the program's evolution over time, including expansion into different formats based on observed results.

## THE GENESIS PROGRAM

In 2019, a survey of the innovation ecosystem in the Legal Amazon was conducted based on secondary data. A total of 2,754 higher education programs from educational institutions were identified (CERTI, 2020), including undergraduate programs that potentially create value for the forest. Additionally, 1,947 research lines were identified as potentially generating value-added technologies, products, or services for the forest (CERTI, 2020).

However, only 1,815 early-stage ideas were identified, ranging from minimum viable product (MVP) development to business model validation, with just 365 startups. Narrowing this to biodiversity-based enterprises that work directly with Amazon-origin products, the number decreases to 46 mapped enterprises. The data were gathered from public databases, including Abstartups (2018-2019), AmazôniaUp (2018), ClimateVentures (2018), Desafio Conexus (2018), Inovativa (2018-2019), Inovativa de Impacto (2018), Parceiros pela Amazônia (2018), Fundação Banco do Brasil projects (2016-2019), Sinapse AM (2016), and Startse (2019).

Despite the concentration of talent and knowledge, as well as 279 science and technology institutions (CERTI,

2020) and 49 mechanisms such as incubators, accelerators, and other similar entities, a need was identified for cohesion among the existing origination, ideation, acceleration, and incubation mechanisms, as well as the development of new programs based on the ecosystem's needs and potentials.

In response to the identified gaps and opportunities, the Amazon Journey program was launched in 2020. Its goal is to stimulate innovative and scalable bioeconomy businesses in the Amazon, promoting the competitiveness of both preserved and restored standing forests. Among the initiatives, the Genesis Program is aligned with the origination phase, working with talent and knowledge toward the common goal of valuing standing forests.

The primary premise of the program is the development of behavioral competencies within a learning community, creating a conducive environment for the flourishing of talent across the Legal Amazon. The program's target audience includes technical education talents, university students, and postgraduates from educational institutions in the Amazon region, as well as partner organizations involved in talent development and knowledge generation.

Participants in the program receive selected content related to entrepreneurship and bioeconomy, hear stories of and from entrepreneurs, and engage in activities designed to develop resilience, creativity, and self-directed learning skills. These activities include project-based work that

replicates some of the experiences of entrepreneurs, such as mentorship, project evaluation, and pitch presentations. The program focuses on creativity, identifying and leveraging local business opportunities, and impact businesses that seek to solve a social or environmental problem through a market mechanism. This reflects its approach to emphasizing the generation of positive impacts for Amazon.

The initial editions of Genesis were planned to be fully online via the Discord platform, forming a community focused on ideating impact businesses in the Amazon and training local multipliers. The program's methodology (Figure 1) comprises four distinct phases: (a) articulation; (b) registration; (c) learning cycles and experiences; and (d) community continuity. To qualify for the training certificate, participants must meet a scoring threshold based on activities within the community, such as participation in quizzes, live sessions, challenge submissions, self-knowledge activities, and peer interactions. These activities and interactions aim to provide essential knowledge and to cultivate qualities identified by Dyer et al. (2011) as differentiators of demonstrably innovative individuals. According to the authors, there are five essential discovery skills. Among these, only one is cognitive: the ability to associate things, facts, events, and phenomena. The remaining four are behavioral: observing, questioning, experimenting, and forming networks.

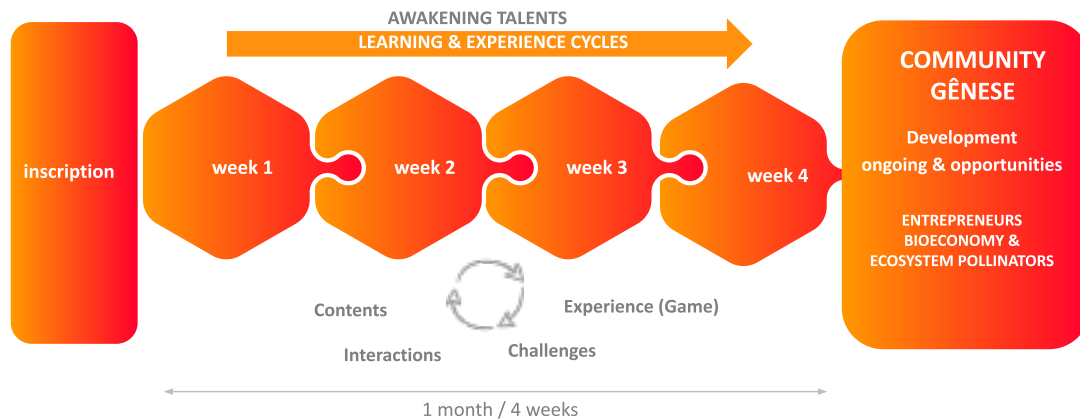


Figure 1. Methodology developed for the Genesis Program.

The community was hosted on an online platform. Over four weeks, participants engage in an environment that promotes youth leadership and impact entrepreneurship. Each week addresses a different theme, utilizing universal elements of adventure narrative (Campbell, 2008), as follows:

- Week 1: The Journey of Innovative Entrepreneurship — The Path
- Week 2: Innovation Ecosystem — The Allies

- Week 3: Investments & Impact Business — The Tools
- Week 4: Purpose & Next Steps — The Opportunity

The methodology encourages interaction with problems, opportunities, reports, news, and entrepreneurs from various bioeconomy sectors and impact entrepreneurship. This interaction fosters co-creation of solutions, and the authors of the most promising solutions are invited to participated in a simulated experience of the Journey of Innovative Entrepreneurship (game).

To provide a meaningful experience, these steps involve a desire for participation and opportunities to exercise altruism (Grant, 2013). The adventure context, with challenges, competition, and cooperation, facilitates connections, in team formation or friendships nurtured by the thrill and discovery process. Additionally, the subjects are practically applied through self-knowledge exercises (Anastacio et al., 2018), including personality tests (Varvel et al., 2004) and work profile understanding (Haines, 2016), as well as reflections on purpose, periodic quizzes to check learning progress, research activities, collaboration, and the proposal of innovative solutions.

Finally, the top-ranking participants are invited to submit a three-minute video application sharing their experience in the training community and why they should be selected for a trip to visit the Innovation Ecosystem of Florianópolis, in Southern Brazil. The best-evaluated participants are selected for the immersive trip and subsequently serve as program ambassadors, responsible for sharing the acquired knowledge and promoting the vision of bioeconomy entrepreneurship to preserve and regenerate the Amazon rainforest. This strategy also aims to develop and empower local actors, enabling them to take on increasing responsibilities in organizing and executing the program and preparing the groundwork for future methodological transfers. Ambassadors assist in promoting the program, participate in activities, and engage the community on the platform.

The methodology is inspired by experiential learning, as outlined by Kolb and Kolb (2009). Experiential learning theory is based on a learning cycle driven by resolving the dual dialectics of action and reflection, and of experience and abstraction, with over 35 years of research, dating back to Kolb's (1984) seminal work. The foundations of experiential learning theory are presented in six propositions (Kolb, 1984): that learning is best conceived as a process rather than in terms of outcomes; all learning is relearning; learning requires resolution of conflicts between dialectically opposed modes of adaptation to the world; learning is a holistic process of adaptation; learning involves synergistic transactions between people and the environment; and learning is the process of creating knowledge (Trindade et al., 2022).

Based on these premises, the experiential learning cycle (ELC) was developed, involving four phases: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb & Kolb, 2009). Concrete experience and abstract conceptualization are about how one interacts with new information, either by accommodating the experienced fact or by conceptually reflecting, constructing explanatory models, and theories on a given topic. Reflective observation and active experimentation

relate to how knowledge is already acquired. While reflective observation utilizes different perspectives, models, and pre-established hypotheses for reflection; active experimentation applies this practically, effectively testing hypotheses, knowledge, or explanatory models (Sertek & Asinelli-Luz, 2006).

Kolb and Kolb (2009) also posit that behavior is a function of both person and environment, which are interdependent variables. This conception involves situated learning, encompassing both physical and social aspects (Vygotksy & Cole, 1978), which can be structured in communities of practice (Wenger, 1998).

Socialization in a community of practice involves associations among individuals, identity formation, and knowledge sharing. In this sense, a community creates knowledge through joint experience and reflection, which is enhanced by an environment of care, trust, and commitment (Nonaka & Konno, 1998). These aspects relate to the experiences of the Genesis Program community, as practical activities are followed by observation and reflection, forming abstract concepts and generalizations, which, in turn, test the implications of new concepts in new situations.

Based on these assumptions, a pilot program was conducted in Pará in 2022. In 2023, three four-week-long editions were held. Each cycle included continuous improvement workshops to evaluate results and discuss the learnings and future directions for the program. Improvements implemented included expanding applications to young people aged 16 and up, integrated publicity partnerships with other entrepreneurship and innovation programs, enhanced engagement logic, and new partnerships offering participant benefits. The methods employed for evaluation are presented below, followed by the results and discussion.

## METHODS

To evaluate the conversion of program enrollments and training outcomes and their progression over time, enrollment and participation data from the 2022 pilot and the three 2023 editions were analyzed. Data were collected directly from the Discord platform, in addition to enrollment data from the program's website. Only participants who achieved a minimum score by completing the proposed activities on the platform were considered trained (and eligible for certification). The method of calculating this score and the program's format (initially fully online) underwent minor adjustments over the editions as part of the program's continuous improvement process.

For more extended programs, maintaining engagement over time can be challenging. To assess the

Genesis Program's duration and its ability to sustain engagement over four weeks, the number of participants engaging in program activities (quizzes, challenges, self-knowledge missions, community posts) was analyzed by week and program edition. Data were obtained directly from the Discord platform. Primary data were also used from the evaluation questionnaire filled out by participants at the end of each edition voluntarily and anonymously. The questionnaire included questions assessing the program and its activities (Table 1) and aimed to verify the achievement of program objectives and obtain insights for continuous

improvement. The objectives for verification were based on innovation literature by Dyer et al. (2011), who identify five skills associated with innovative people: associating, questioning, observing, networking, and experimenting.

The average responses for each edition were analyzed. For the 2023.1 and 2023.2 editions, respondents indicated their education level and field of study, allowing for analysis by these subgroups. Fields of study were grouped into 'economics and administration,' 'exact sciences,' 'agricultural and environmental sciences,' 'biological sciences,' and 'humanities.'

**Table 1.** Objective questions from the evaluation questionnaire for the 2022, 2023.1, 2023.2, and 2023.3 editions of the Genesis Program.

Question	Items for which the question is repeated	Response options
Overall, how would you rate your experience in the Genesis Program?		Wow, I'm really happy!
		Great, excellent experience.
		Good!
		Fair, I have some feedback.
Rate which aspects of the experience were the most meaningful.	Chat — Live with guests.	Awesome, the best part of the community!
	Weekly content.	Very good, essential for the community.
	Interactions Among Participants.	Okay! But I could do without it.
	Quizzes.	I'd remove it from the community experience.
	Magic Cube (Bioeconomy Forum).	I didn't participate in this experience.
	Weekly Challenges.	
	Collective Mentoring Sessions.	
	Startup Mundi Game.	
	Self-awareness.	
Special Mission — Pollination.		
On a scale of 1 to 10, how likely are you to recommend the Genesis Program?		0 to 10
Does Genesis meet the following objectives?	Engage in Discovery Activities.	Strongly agree
	Cultivate the Courage to Innovate.	Agree
	Practice Associative Thinking	Disagree
	Learn from Diversity.	Not sure

The evaluation questionnaire was sent at the programs' end and, therefore, does not capture information from users who dropped out. To gather this information, a qualitative survey was conducted in August 2023 before the 2023.3 edition, with group interviews with two types of users. Structured interviews were conducted with nine users who participated in some activities and then disengaged. The interview aimed to answer the following questions: What attracted and interested the user? Did they experience any platform issues? Why did they disengage? What would they like to see in Genesis?

Group interviews were also conducted with the 17 participants selected to become ambassadors in the first two editions of 2023. The first two questions were retained, while the last two were modified to "Do you have improvement suggestions?" and "What did you like most about Genesis that kept you so engaged?" Notably, as a qualitative study,

this survey involved only a few users and is intended to highlight trends for further analysis and testing.

Interview information was documented for each session, and records with similar themes were grouped. Among the identified themes, the main comments and points of interest were selected and presented in CERTI (2023). The highlights of these interviews are also presented in this study to identify trends, generate reflections and analyses, and to explain how they informed changes in the Genesis Program, including its diversification into other formats.

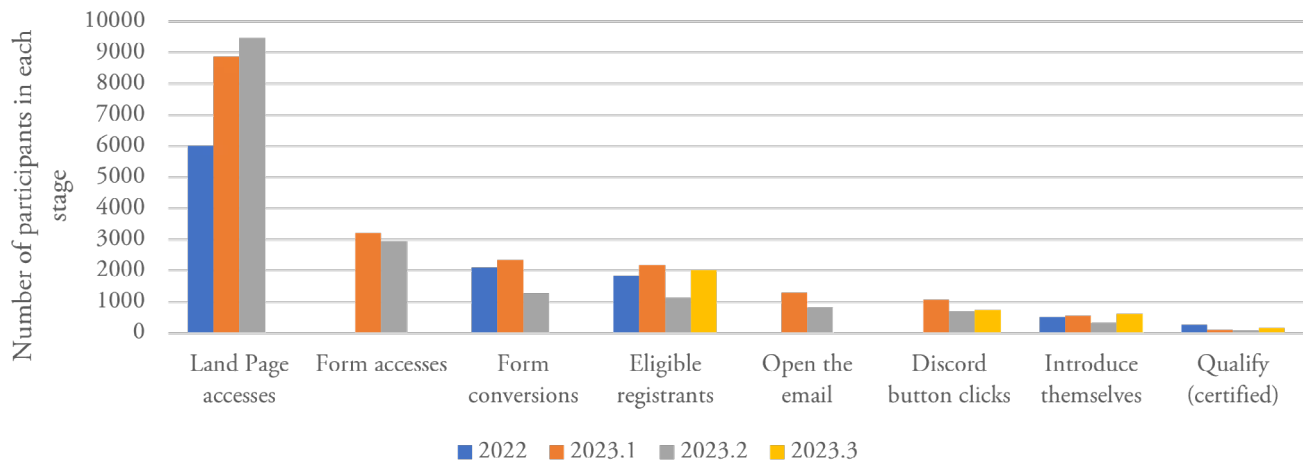
The program's regional reach was also analyzed based on the number of participants by state and municipality, for each program edition and format. Lastly, some cases of participants who became entrepreneurs and business ideas initially developed during Genesis that evolved into actual businesses are presented.

## RESULTS

### Conversion and retention

Across the pilot (2022) and the three 2023 editions of the Genesis Program, a total of 7,177 individuals

registered, with 1,999 participants (28%) actively joining the Discord platform, and 614 (9%) successfully earning their certificate (Figure 1). The 2022 pilot demonstrated the highest conversion rate, with 15% of registrants completing training and 53% of those joining Discord becoming trained. In contrast, the first 2023 edition recorded the lowest conversion rates (5% and 19%).



**Figure 2.** Number of people at each stage, from access to the landing page (LP), access and conversions on the registration form, to access and presentation in the Genesis community on the Discord platform, and final number of trained participants (people who received the certificate) by edition.

After enhancements, based on feedback from prior editions, the 2023.3 edition saw significant improvements: an 80% increase in community engagement and a 70% increase in content viewership. The improvements included simplified processes, a Genesis manual with infographics, direct WhatsApp support links, and proprietary content production.

Over the program's four-week period, general participation and activity completion rates tended to decline (Figure 3). Combining data from all four editions, we observed a 26% decrease in participants completing the Week 4 quiz compared to Week 1, a 40% drop in challenge submissions, and a 68% decrease in self-awareness task completions. However, total spontaneous engagement increased by 16%. Given the increasing weekly complexity and group work requirements, a reduction in challenge submissions is expected. This is likely also the explanation

for the reduction in self-awareness task submissions as participants dedicated more time to what they viewed as higher-priority activities.

An increase in engagement is also expected, as participants who remain engaged in the community get to know each other better and delve deeper into materials related to the bioeconomy. Protagonists who move the community forward in each edition also begin to appear.

The weekly drop and increase patterns are not consistent across all activities and editions, with 2023.3 showing the most variance — specifically, a sharp decline in self-awareness mission participation and consistently low but stable engagement. This is likely due to adjustments in the self-awareness tasks, which involved a new partner providing more intensive activities that required additional time and participant commitment.

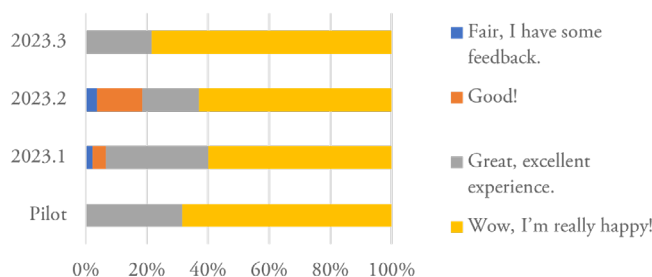


**Figure 3.** Number of participants in the Genesis Program who took part in the quizzes and completed the challenges and self-knowledge missions and number of spontaneous engagement actions (posting opportunities or content on the channels), by week and program's edition.

This online community approach also facilitates participants' socialization, identity formation, and knowledge-sharing. The 593 instances of spontaneous knowledge-sharing underscore a collective experience and reflection, as well as a perception of a supportive, trust-based, and committed environment (Nonaka & Konno, 1998). The 1,238 views of live and recorded sessions, 1,111 quiz interactions, and 1,622 participations in missions and thematic challenges engaged participants in observing content, both individual and collective reflection and the formulation of abstract concepts. This culminated in 585 new entrepreneurial ideas, which were tested within the community and in other entrepreneurial support programs, completing the experiential learning cycle (Kolb & Kolb, 2009).

### Evaluation questionnaire

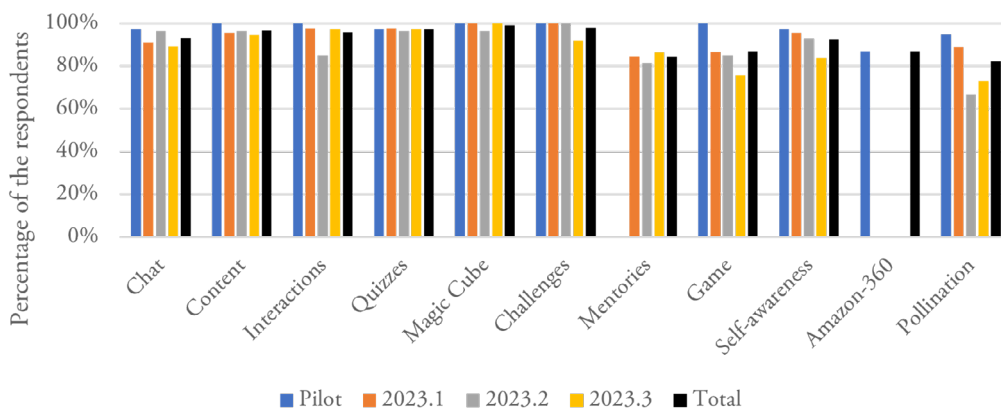
A total of 147 participants answered the evaluation questionnaire, with responses ranging between 27 and 45 participants per edition. Overall, 95% rated their experience as excellent, with complete satisfaction, a percentage that reached 100% in both the 2023.3 and pilot editions (Figure 4). These two editions also achieved the highest program recommendation scores (9.8), compared to a general average 9.7, and high ratings for objective fulfillment. Notably, 98.6% of respondents agreed that the program successfully achieved its goals of 'engaging in discovery activities,' 'cultivating the courage to innovate,' and 'learning through diversity,' with 98.0% affirming the program fostered "practicing associative thinking," in line with innovation skills identified by Dyer et al. (2011).



**Figure 4.** Respondents' general experience ratings for the Genesis Program by editions (answer to the question: "Overall, how would you rate your experience at Genesis?")

Participants rated the Magic Cube — a set of interaction channels focused on eight key bioeconomy sectors — as the top community activity (99% rating it as essential or best community feature), followed by challenges (98%) and quizzes (97%) (Figure 5). Lower positive ratings were given to activities like pollination, mentorships, and games (82%, 84%, and 87%, respectively), though still

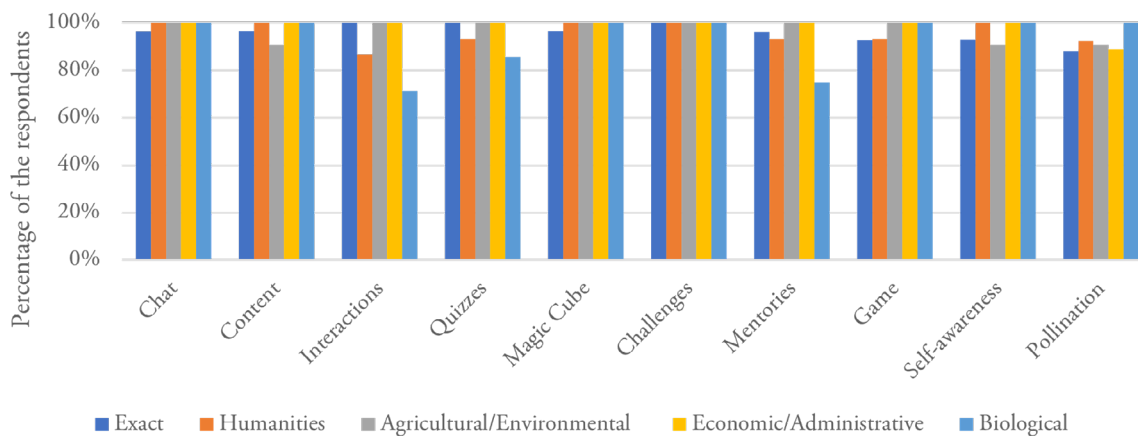
favorable. The overall positive evaluation, adding up all activities, was reduced throughout the editions, but this cannot be generalized to all activities (Figure 5). The pilot edition consistently received the highest ratings across activities, except for quizzes, which peaked in 2023.1. The lowest positive rating (67%) was given to the pollination activity in 2023.2.



**Figure 5.** Percentage of respondents by program edition who rated community activities as “Sensational, the best of the community!” or “Very good, essential for the community.”

For 2023.1 and 2023.2 editions, additional questions covered education and field of study, with responses from 72 participants. Results showed that participants from the biological, economic, and administrative fields were most likely to recommend the program (average score of 10). In contrast, exact sciences participants gave lower but still high scores (average 9.5). All agrarian and environmental, biological, economic, and administrative field participants agreed that the program met all its goals, while up to two respondents from exact sciences and humanities disagreed on at least one objective.

Regarding experience ratings, the pollination activity received the least favorable ratings among exact sciences and economic/administrative participants (only 88 and 89% of participants indicated that the activity is essential or the best of the community) and interaction received fewer positive ratings from humanities and biological participants (87% and 71%) (Figure 6). Biological field participants had higher negative evaluations of other activities, including mentorships (25%) and quizzes (14%).



**Figure 6.** Percentage of questionnaire respondents by field of study who rated community activities as “Sensational, the best of the community!” or “Very good, essential for the community” for 2023.1 and 2023.2.”



When considering education level, program recommendation scores were highest for technical course participants (10.0), followed by postgraduate (9.8), complete higher education (9.7), and incomplete higher education (9.4) participants. All technical course participants agreed that the program met all goals, while up to two respondents from other education levels disagreed on at least one objective.

As for the activities, pollination received the least favorable ratings among postgraduate participants (only 83% of participants indicated that the activity is essential or the best of the community), and the game was rated lowest by incomplete higher education participants (92%). Among complete higher education respondents, 91% positively rated interaction, mentorship, game, and self-awareness activities, while all technical course participants rated all activities positively.

## Interviews and development of new training strategies

Interviews revealed a strong interest among participants in entrepreneurship education, recognizing bioeconomy as a relevant topic with business opportunities. Many expressed a desire for practical guidance on bioeconomy ventures, seeking case studies of successful bioeconomy initiatives led by individuals like themselves. Additionally, they look for financial resources, inspiration, and business ideas (CERTI, 2023).

Observations of weekly disengagement identified key factors: limited time to engage in the program's activities, difficulty with the organic and less structured program format compared to other online training experiences, conflicts with synchronous session times, and an overwhelming initial information load. These findings suggest a need for supplementary program options for those who prefer shorter, structured, or in-person formats. The extensive mobilization effort, low conversion rates, and decline in engagement over time also indicate the need for program diversification.

In response, a one-day in-person workshop was introduced after the 2023 second edition to include an in-person training option, meeting a latent demand from the community in the post-pandemic context of the return of in-person activities. This workshop empowers ambassadors with facilitation tools to promote entrepreneurship locally. The workshop condenses the four weeks of the Genesis content into a single day, covering equivalent tasks and activities for program certification. The ambassadors, distributed so far in six states of the Legal Amazon (PA, AM, AP, AC, MT and RR), are trained to conduct face-to-face workshops in a decentralized manner.

Since August 2023, 33 workshops have been held across eight states, certifying 911 individuals. The strategy had a positive effect on training the local community, empowering ambassadors, strengthening the dissemination of the program, and engaging the community.

An online training course was also created, covering essential content with certification equivalent to the original Genesis community format. At the end of each module, participants are encouraged to engage with the Community for ongoing development in bioeconomy, entrepreneurship, and innovation. In 2024, the course reached its third version with 176 registered participants, 100 trained, with a completion rate of 56% and a net promoter score (NPS) satisfaction rate of 9.8.

Based on the questionnaire and interview insights, the original format of the program, which occurs online and simultaneously, has also undergone changes. The Genesis online community migrated to a new platform in 2024 and will only hold the edition in a synchronous format once a year. This will open up space for other training fronts: in-person workshops, online courses, and the Genesis Academy, which feed back into the online Community with a flow of participants engaged in participating in the original format.

Therefore, considering the four editions of the program (including the 2022 pilot), the workshops, and the Genesis course, 1,391 people were trained, 54.6% of whom were female.

A pilot program of teacher training (Genesis Academy) is under development in order to meet the demand of teachers interested in applying the content and active learning strategies in their classrooms

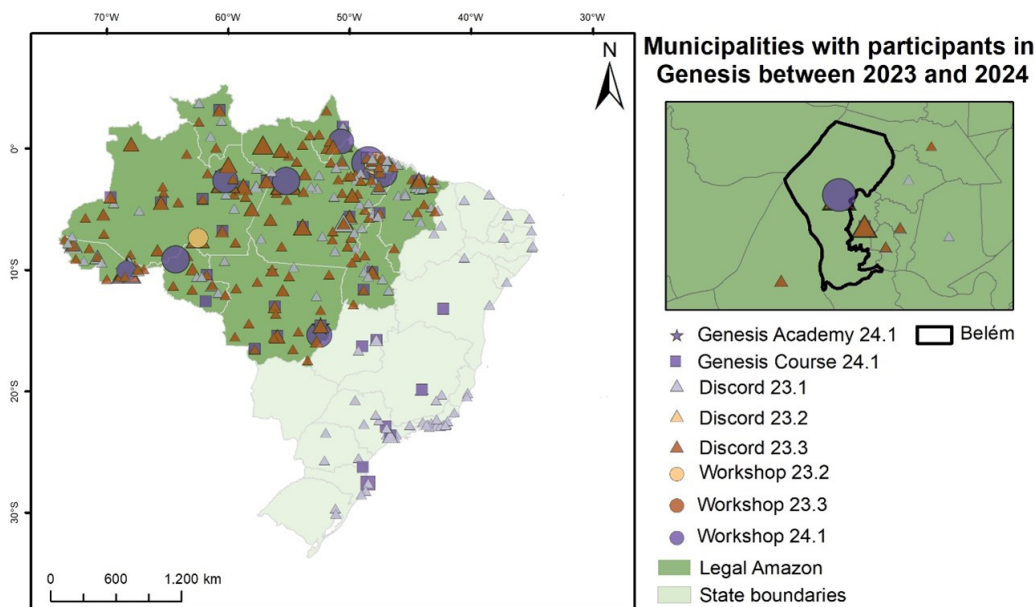
From this characterization, it is clear that entrepreneurial education also requires its programs to have entrepreneurial skills and an entrepreneurial attitude to offer teaching environments oriented to the demands of future entrepreneurs.

## Regional scope of the program

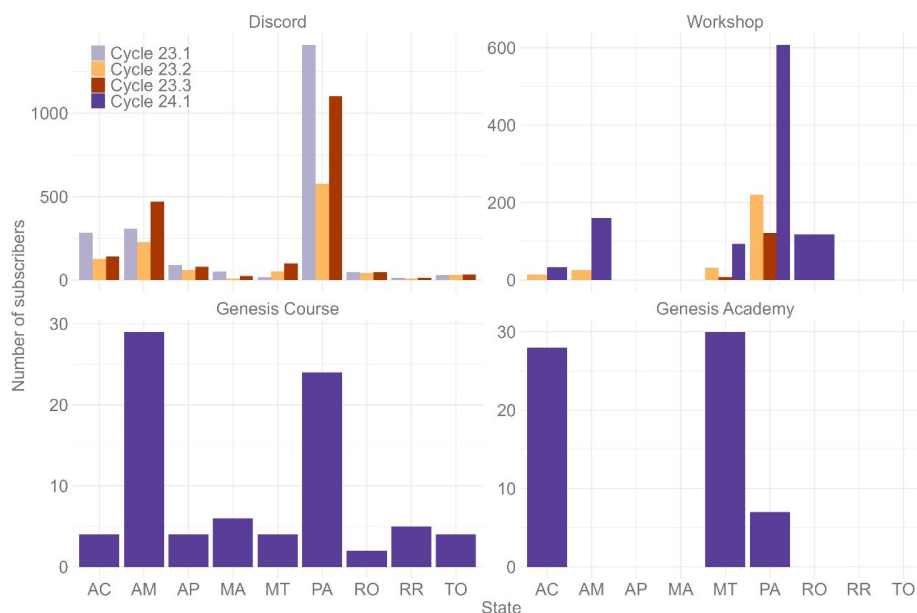
The outreach strategies and partnerships of the Genesis Program effectively reached the states within the Brazilian Legal Amazon through its two online components. The synchronous cycles on the Discord platform demonstrated a broad geographic reach, engaging participants from urban centers as well as remote and hard-to-reach areas, such as the Gavião Parkatêjê Indigenous Village, the Quilombola community of França (settlement founded by people of African origin), and the Tiningú Quilombo. Every Discord cycle in 2023, along with the Gênese course, had participants from all nine states in the Legal Amazon (Figure 7).

Different formats of the program stood out in different states. For example, The Pará state had the highest number of participants across all Discord cycles, followed by Amazonas. These two states also had the most participants in in-person workshops, likely due to their larger number of ambassadors (31 in Pará and 3 in Amazonas). The Genesis course recorded the highest number of enrollments in

Amazonas, followed by Pará. Meanwhile, the pilot of the Genesis Academy attracted the most participants in Mato Grosso and Acre (Figure 8). Therefore, the online program formats reached participants in all nine states of the Legal Amazon, while the in-person formats (workshop and Academia Gênese) only had reach in the states where the program is represented by ambassadors (Figure 8)



**Figure 7.** Distribution of participants registered in each component and cycle of the Genesis Program by municipalities.



**Figure 8.** Number of participants in each Genesis Program component and cycle by state.

Therefore, it is important to highlight the strategy for selecting and empowering local ambassadors for the program. Those who stand out in the community can apply to become ambassadors, assuming the purpose and responsibility of, based on their knowledge and specific contexts, taking action to promote bioeconomy, entrepreneurship, and innovation to help protect the forest.

A total of 37 ambassadors were selected based on their engagement, diversity of profiles, territories, and complementary skills. The ambassador's role involves promoting the programs in the community, mobilizing and partnering locally, applying ecosystem activation methodologies, such as workshops, in addition to cooperating in promoting the community, indicating and producing content, and participating in local events.

This strategy also aims to develop and empower local actors by preparing them for entrepreneurship and future opportunities for methodological transfer. This effect is evident from the concentration of registrants shown in Figure 3, encompassing major cities such as Belém (PA), Manaus (AM), Rio Branco (AC), and Macapá (AP), as well as non-capital areas such as Altamira, Cametá, Santarém, and Oriximiná in Pará; Barra do Garças in Mato Grosso; Presidente Figueiredo and Humaitá in Amazonas; and Rorainópolis in Roraima, all with active ambassadors.

## Cases of participant conversion into entrepreneurs

Participation in the Genesis Program has proven effective in fostering entrepreneurs committed to the sustainable development of the Amazon. An example is "Achei Amazônia," a digital platform created by three program participants. This project, conceived during Genesis challenges, has evolved into a marketplace dedicated to the Amazon's socio-bioeconomy. Achei Amazônia offers initiatives such as an online store and a club that promotes products that respect the region's biodiversity and empower local communities. This project strengthens Amazonian economies and emphasizes conscious consumption, supporting forest conservation and creating positive socio-environmental impacts.

Another success story is "Czer0," developed by two Genesis participants of the 2023.2 edition. Focused on bioeconomy solutions, Czer0 was accepted into the SinapseBio Program and received funding of R\$70,000 to further its development. Czer0 provides businesses with solutions to achieve net-zero emissions, supporting the shift towards more sustainable practices. The journey of the participants reflects the direct impact of Genesis

in shaping entrepreneurs with a focus on innovation and environmental conservation. Through university-acquired knowledge and Genesis support, they created a venture that promotes sustainability and bolsters Amazon's bioeconomy.

These cases highlight the program's ability to unlock participants' entrepreneurial potential and provide the tools to transform academic insights into business solutions for the region's socio-environmental challenges. Moreover, the program underscores the importance of entrepreneurial education in business creation, which is evident in participation in funding calls and access to entrepreneurial resources. For example, in the 2024 edition of the Bioeconomy Synapse (a program also of the Amazon Journey), 738 ideas were submitted, of which 70 were selected for grant funding; among these, 17 (24.29%) originated directly from Genesis participants, emphasizing the program's role in fostering entrepreneurship and converting academic knowledge into impactful bioeconomy solutions for the Amazon.

Furthermore, the experiential learning methodology, as presented by Kolb and Kolb (2009), was essential for the results achieved by participants in the Genesis Program. The learning cycle, which involves the phases of concrete experience, reflective observation, abstract conceptualization, and active experimentation, allowed entrepreneurs to experience and reflect on real challenges of the Amazonian bioeconomy. In the case of projects such as Achei Amazônia and Czer0, participants were able to initially experience practical situations, reflect on these experiences, build theoretical models based on them, and finally test their solutions in a concrete way.

## FINAL CONSIDERATIONS

The presented data reveal some of the challenges faced by the Genesis Program and the solutions implemented to address them. The program's diverse activities encompass various aspects of entrepreneurial development, including self-awareness, hands-on activities, teamwork opportunities, mentoring, and comprehensive content delivered in multiple formats. The high approval rate for the program—among participants from different cohorts, educational backgrounds, and fields of knowledge—and for each activity highlights the value placed on this diversity.

Furthermore, as noted by Fernandes et al. (2022), fostering entrepreneurship that supports the bioeconomy in the Amazon requires meeting the unique demands of local entrepreneurs, especially their collective, associative, and community-oriented nature. The Genesis Program's community platform provides an active space for individuals

from diverse Amazonian backgrounds to connect, enhancing entrepreneurship by fostering connections that respect sociocultural nuances and unique local potential.

This online community approach also allows for socialization between individuals, identity formation, and knowledge sharing. The 593 spontaneous knowledge-sharing actions reinforce joint experience and reflection, and the perception of an environment of care, trust, and commitment (Nonaka & Konno, 1998). The 1,238 views of live broadcasts and recordings, the 1,111 participations in quizzes, and the 1,622 participations in missions and thematic challenges involved the elements of content observation, personal and collective reflection, as well as the formation of abstract concepts in 585 new ideas for entrepreneurial solutions, which, in turn, test the implications of the new solutions in the community itself and other entrepreneurship incentive programs, thus completing the circuit (Kolb & Kolb, 2009).

The hands-on and reflective learning process, combined with constant interaction between entrepreneurs and the learning environment, led to the creation of innovative and sustainable businesses. Kolb and Kolb's (2009) holistic approach, which emphasizes the interdependence between individuals and their environments, was essential for Genesis participants to acquire and apply knowledge effectively, promoting positive regional impacts.

For the online program, the conversion rate indicates the need to reach a large audience, as on average, only one in 200 individuals who initially show interest (by registering on the platform) completes the course. As it is a medium-length course (four weeks), even among those who start the online course, only a small portion concludes. The new formats introduced aim to engage participants who face

challenges following a four-week course during specific times of the year, yielding significantly higher training conversion rates.

A primary limitation of this analysis is the low response rate to questionnaires and interviews relative to the total number of registrants. Additionally, the responses assess the program without directly evaluating whether the expected impact—increasing regional impact-driven entrepreneurship—was achieved. Future assessments will apply methodologies that measure changes in entrepreneurial intent, the creation of new businesses, and the metacognitive processes resulting from training across different formats. This will allow a broader evaluation of the program's objectives beyond participant feedback.

The program team employed continuous improvement analyses to evolve and adapt to diverse target audiences by diversifying the Genesis Program's formats without compromising its core mission of combining content with project-based learning and real-world project development experiences. In doing so, the program remains steadfast in mobilizing and empowering talent for entrepreneurship, bioeconomy, and innovation. In the upcoming semester, the next step is to extend training to teachers as multipliers of the program's successful methodologies.

Finally, programs aiming to develop entrepreneurship, innovation, and bioeconomy must focus on fostering entrepreneurial talent and developing skills beyond technical proficiency, encompassing broader aspects of human association (Sales & Guerreiro Ramos, 1981). Activating talent within local ecosystems strengthens the culture of innovation and drives the development of impactful new solutions.

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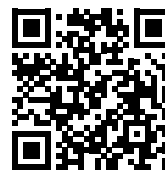
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