

## Original Article

# Distance Education and scientific initiation: research opportunities in online pedagogy programs

*Educação a Distância e iniciação científica: possibilidades de pesquisa no curso de pedagogia EAD*

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## Abstract

This study aims to identify the benefits and highlight the opportunities for conducting Scientific Initiation (SI) in Distance Education (DE) programs. Initially, the relevance of SI and its benefits were discussed, emphasizing student involvement in research activities for the development of scientific skills. Subsequently, the feasibility of SI in the DE context was addressed, discussing how technologies and communication tools can facilitate interaction between students and advisors. Finally, we will present a case study of a student's experience in conducting research within the DE context. We also point out opportunities for contributing to knowledge production and for enhancing the quality of education. In conclusion, SI in DE plays a prominent role in students' academic training. By fostering an investigative spirit and the development of scientific competencies, scientific research contributes to the construction of a more critical, innovative, and evidence-based society.

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## Resumo

Este estudo tem como objetivo identificar os benefícios e destacar as possibilidades de realizar a Iniciação Científica (IC) nos cursos de Educação a Distância (EAD). Inicialmente, foi abordada a relevância da IC e seus benefícios, ressaltando o envolvimento dos estudantes em atividades de pesquisa para o desenvolvimento de habilidades científicas. Posteriormente, foi abordada a viabilidade da IC no contexto da EAD, discutindo como as tecnologias e as ferramentas de comunicação podem proporcionar a interação entre estudantes e orientadores. Por fim, apresentaremos um relato de experiência de uma estudante sobre a produção de pesquisa no contexto da EAD. Também apontamos as oportunidades de contribuição para a produção de conhecimento e para a melhoria da qualidade do ensino. Em conclusão, a IC na EAD desempenha um papel de destaque na formação acadêmica dos estudantes. Ao fomentar o espírito investigativo e o desenvolvimento de competências científicas, a pesquisa científica contribui para a construção de uma sociedade mais crítica, inovadora e fundamentada em evidências.

## 1. Introduction

Distance Education (DE) in higher education has become an increasingly relevant and accessible alternative for students worldwide. Through this modality, students can pursue their educational goals regardless of geographical barriers or time constraints. DE offers flexibility and autonomy, and it also broadens access to higher education, enabling students who face financial hardships, work commitments, or other personal responsibilities to seek academic training (SILVA; MELO; MUYDER, 2015).

Despite its rapid growth, DE is still considered a relatively new approach, resulting in a scarcity of in-depth studies on its pedagogical and management aspects (EBERT; TOMELIM, 2014).

Scientific Initiation (SI) plays a crucial role in the academic and professional formation of students. It provides a unique opportunity for

active engagement in the research process, developing skills such as critical thinking, data analysis, problem-solving, and scientific communication. Participation in research projects also offers the chance to collaborate with experienced professors and researchers, expanding horizons and establishing significant professional contacts. SI also plays an important role in training future researchers and skilled professionals, contributing to the scientific and technological advancement of society as a whole (FAVA-DE-MORAES; FAVA, 2000).

In this study, we will present a case study on the Scientific Initiation (SI) conducted by a student in the Distance Education (DE) Pedagogy program. The aim is to identify the benefits of this experience and to highlight the possibilities of conducting SI in DE courses.

Initially, we will address the relevance of SI and its benefits, emphasizing the importance of student involvement in research activities for the development of scientific skills, such as critical analysis, academic writing, and the pursuit of knowledge. Next, we will provide a brief context on the DE modality, highlighting its growth and relevance in the current educational landscape.

Subsequently, we will discuss the feasibility of SI in the DE context. We will explore how technologies and communication tools can facilitate interaction between students and advisors, making it possible to conduct research even remotely. Additionally, we will highlight the importance of an adequate structure and institutional support to promote SI in DE courses.

Finally, we will present a student's experience report on conducting research in the context of Distance Education (DE). This report will share her experiences, challenges faced, and the advantages that this experience provided in her academic development. Opportunities for contributing to knowledge production and improving the quality of education will also be highlighted.

## 2. Scientific initiation as a learning opportunity

According to Vigotski (2007), we are shaped by our experiences and interactions. From this perspective, participation in Scientific Initiation (SI) during the initial training process is crucial to stimulate and develop research capabilities in students, as well as to contribute to the formative process of mentor teachers. Through this experience, students have the opportunity to understand how the research process works in practice, with the guidance of an experienced teacher who acts as a partner in this process.

As Paulo Freire (2017) points out, knowledge is not limited to those we deem to know, but is formed in the relationships between humans and the world, in transformative relations, and is enhanced through the critical problematization of these relations. In this context, it is important to emphasize that the guidance process developed throughout SI is proposed in a dialogical and respectful manner, promoting a mutual learning environment between advisor and student.

SI is widely recognized as a valuable opportunity for students. According to Fava-de-Moraes and Fava (2000), the first achievement for students participating in this program is the opportunity to break away from routine and curricular structure, as they can engage with professors and curriculum components that arouse greater interest and affinity. This allows for the development of differentiated skills, both in oral and written expression, as well as in manual skills.

During Scientific Initiation (SI), students have the opportunity to enhance their critical reading skills by learning to perform bibliographic searches with discernment. The exchange of knowledge and experiences with mentors enriches the critical reading process, providing students with a broader and deeper understanding of the topic under study. This contributes to the development of a more analytical and reflective approach to reading literature, strengthening students' ability to discern relevant and well-founded information.

It is important to emphasize that, despite the general quality of teaching at any institution, having a careful approach to the selection of

mentors is crucial for the success of the SI program. Finding individuals of merit to guide students is the first step in ensuring the success of this program (FAVA-DE-MORAES; FAVA, 2000).

SI offers new possibilities and experiences in the academic routine, the ability to critically analyze literature, and the awareness that knowledge must be constantly questioned and evaluated.

Fava-de-Moraes and Fava (2000) emphasize that students gain a range of benefits from experiencing Scientific Initiation (SI). By learning autonomously under the supervision of a mentor, students develop skills that enable them to interpret situations and discern whether they can resolve them or if they need to seek assistance. This prepares them to handle the challenges that may arise throughout their professional lives, recognizing the importance of humility in acknowledging their limitations and seeking additional knowledge.

SI plays a fundamental role in the training of researchers, providing a practical and enriching experience that complements academic education. According to the National Association of Graduate Studies and Research in Education (ANPED, 2004), participation in SI programs allows students to develop research skills, critical analysis, scientific communication, and problem-solving abilities, in addition to encouraging them to engage in knowledge production activities early in their academic careers.

Through SI, students have the opportunity to work on research projects under the guidance of qualified professors, which exposes them to scientific investigation methods, laboratory techniques, and methodological approaches specific to their field of study. Furthermore, SI encourages the pursuit of knowledge autonomously and stimulates critical, creative, and innovative thinking, preparing students to face the challenges of academic research and professional life in the future.

Scientific Initiation (SI) represents the first contact of students with the universe of scientific research during their undergraduate studies. According to Ebert, Netto, and Torres (2015), SI plays a fundamental role in shaping a student's learning, forming an important part of their academic formation. Within the structure of Higher Education Institutions,

both research and extension are essential components. Developing research projects for undergraduate students is crucial to consolidating an attractive and effective educational model. Ebert, Netto, and Torres (2015) emphasize that students who adopt differentiated teaching practices tend to perform better than those who stick to conventional learning models. The integration of teaching and research promoted by SI is effective because it allows the practical application of knowledge acquired in the classroom, enabling students to gain a deeper and more meaningful understanding of academic content.

Furthermore, SI provides the opportunity to contribute to curricular improvements in undergraduate courses. The knowledge and insights gained during the research can serve as a thermometer to assess the quality of the course, the performance of the professors, and the suitability of academic programs. In this way, students become active collaborators in the continuous advancement of education.

According to Ebert, Netto, and Torres (2015), the introduction of SI in universities represents an opportunity to narrow and strengthen the relationship between theory and practice. Evidence shows that students who have experiences in scientific investigation, in addition to participating in extension activities and tutoring, are able to acquire more in-depth academic knowledge and seek qualified professional insertion after graduation. Moreover, many of them aspire to continue their research by enrolling in postgraduate courses, whether at a specialization (*lato sensu*) or at a master's and doctoral level (*stricto sensu*).

Another evident benefit is the distinction and recognition that students of Scientific Initiation (SI) receive, as well as their ability to perform better in selection processes for postgraduate programs. These students often complete their studies more quickly and develop skills in teamwork, public speaking, and adaptation to future didactic activities. It is important to emphasize that SI is not exclusively aimed at training scientists. Even if a student chooses to pursue a professional career, they still benefit from the skills acquired during the program, such as critical analysis, intellectual maturity, and the discernment to face challenges (MUAZE; MAGALHÃES, 2014).

Given all the advantages discussed here about scientific research, it is relevant to consider implementing SI actions in Distance Education (DE) courses. Our experience has shown that these are feasible and should be included in the modality.

### 3. Distance education in higher education

According to Silva, Melo, and Muyder (2015), Distance Education (DE) has emerged as a significant trend in the educational sphere, particularly in higher education. While this modality is no longer novel in the educational world, with its first instances identified as early as 1728 with a correspondence course in Boston (United States), the focus today is on "interaction." This shift is due to advancements in communication technologies, which allow for increasingly fluid and effective interactions in the context of DE.

Testa and Freitas (2002) characterize DE by the physical and spatial separation between teachers and students, and the use of technology that facilitates interaction during the teaching-learning process. Ronchi (2011) defines it as a comprehensive field of non-traditional education where communication systems are employed to connect resources, students, and instructors. Moore and Kearsley (2008) understand DE through a systemic perspective, which considers not only the educational institution but also political, economic, social, and other factors.

Silva, Melo, and Muyder (2005) note that in Brazil, DE originated with the foundation of the Instituto Rádio Monitor and the Instituto Universal Brasileiro in 1939 and 1941, respectively. However, it was not until 1996, with the enactment of the Law of Guidelines and Bases of Education - Law No. 9.394, dated December 20, 1996, that DE received legal backing. This law established the possibility of using DE in all modalities and levels of education. In 1998, Decrees No. 2.494 and 2.561 were published, dealing with the development and dissemination of DE programs and the release of accreditation for professional technical level courses in DE. These decrees were later repealed by Decree No. 5.622, dated December 19, 2005, which conferred national validity to diplomas and certificates from distance courses and programs issued by accredited and registered

institutions, as provided by law. As a result, policies of quality assurance, accreditation, monitoring, supervision, and evaluation were established, with quality standards defined by the Ministry of Education (MEC).

Despite the growing prominence of Distance Education (DE) in the educational market, it is important to highlight that this form of education presents unique challenges in terms of implementation and management compared to traditional education. According to Frantz and King (2000), one of the problematic aspects of this teaching modality is related to it being an open system, susceptible to environmental influences, especially when involving the use of the internet in the teaching-learning process.

In this context, it becomes relevant to identify the critical success factors related to DE, which contribute to the development of this modality and assist in identifying the inherent problems, always striving to achieve excellent performance. The literature already includes studies that reference the best ways to implement and manage DE in Higher Education Institutions (CASTRO; LADEIRA, 2010).

## 4. Scientific initiation in distance education

Scientific Initiation (SI) within Distance Education (DE) offers a wide range of possibilities and benefits for students. By participating in research projects in this context, students have the opportunity to explore the production of scientific knowledge virtually, broadening their academic perspectives.

One of the main advantages is flexibility. Students can conduct research and collaborate with their advisors and peers asynchronously, adapting to their schedules and personal commitments. This allows for a more efficient reconciliation between studies, work, and other responsibilities, providing a more accessible and inclusive research experience. Furthermore, more timely guidance can be scheduled in advance and conducted on online platforms remotely, optimizing travel time and allowing for real-time exchange and guidance.

DE provides a vast array of digital and technological resources that can enrich the research process. Students have access to virtual libraries,



databases, scientific journals, online collaboration platforms, and data analysis tools, allowing for a comprehensive search of bibliographic references and a more in-depth analysis of the results obtained. This digital infrastructure not only facilitates the research activities but also integrates students into a global academic community, enhancing their learning and networking opportunities.

Distance scientific research also fosters academic internationalization. Through online collaboration, students have the opportunity to connect with researchers and institutions around the world, expanding their contact networks and exchanging experiences with peers from different cultural and scientific contexts. This global interaction contributes to a diversity of perspectives and enriches the research process.

Another relevant aspect is the possibility of developing research projects that address specific challenges of Distance Education (DE). Students can investigate issues related to online teaching, digital learning methodologies, the use of educational technologies, and strategies for engaging students in virtual environments. These researches have the potential to generate knowledge and contribute to the continuous improvement of DE.

Scientific Initiation (SI) in Distance Education (DE) creates an ideal environment for the development of innovative research, enhances collaboration and internationalization, addresses the specific challenges of online modalities, strengthens student skills, provides a rich academic experience, and broadens the opportunities for contributions to scientific production (VEDOVATTE *et al.*, 2019).

The research by Muaze and Magalhães (2014) highlights that less than 1% of students at the studied institution were involved in Scientific Initiation (SI) programs as scholars. The authors identified several reasons for this situation, including the complexity of guiding semi-presential students in research practices, the difficulty in selecting semi-presential scholars due to many being workers, which complicates the grant of scholarships, and the impossibility of controlling work hours and monitoring the quality of remote production (MUAZE; MAGALHÃES, 2014).

In our case, we observed that the fact that the student obtained a scholarship to conduct SI was a significant motivator for the development of the research. Our guidance process occurred entirely remotely, with regular synchronous meetings to align the progress of the project. Despite the course being entirely DE, this opportunity for synchronous interaction between the instructor and the student was extremely enriching for both and allowed the SI to advance satisfactorily.

## 5. Student perspective experience report on scientific initiation

In the second semester of 2021, a student had the opportunity to be awarded a Scientific Initiation (SI) scholarship funded by the University S.C., where she studies Pedagogy in a Distance Education (DE) format. From the beginning, conducting this research was her personal desire, and even before the call for applications was announced, she took the initiative to contact professors whose interests aligned with hers. Upon submitting the project and being awarded the scholarship, she was pleasantly surprised, as it dispelled her initial fear that research in DE might be undervalued or underestimated. Unfortunately, DE is still viewed with some prejudice, as if it were an option for those who do not wish to fully dedicate themselves to their undergraduate studies. This experience report is directed at those who believe in the potential of conducting science in the virtual environment of DE.

Under the guidance of Professor M.V., who holds a Master's degree, the student was able to explore the topic of Environmental Education and Inclusion, aiming to develop proposals for environmental education from an inclusive perspective, aligned with the principles of Universal Design for Learning. During the SI period, distance was not a limitation. Regular online alignment meetings were held, weekly communication was maintained via a messaging app, numerous revisions were made, and throughout the project, reflections and dialogues added new viewpoints and directions to the research.

While writing was challenging, one of the student's greatest challenges was the in-person presentation, which followed an innovative

and dynamic format, inspired by the TEDx style, at the I Seminar on Environmental Education of REDAGUA (held in Niterói/RJ). This presentation allowed her to not only share her findings but also gain confidence and experience in public speaking, further enhancing her academic and professional skills.

Participating in the Scientific Initiation (SI) project significantly contributed to the student's professional and personal development. Throughout the process, she enhanced various skills, including scientific writing, synthesis, and coherence in drafting sections of the paper for conference submissions, public speaking during presentations, familiarity with calls for papers, critical analysis, and the ability to meet academic demands such as internship reports and the final thesis. Moreover, she had the opportunity to strengthen her relationship with her advisor and explore different opportunities in her field of work. The student reports that this experience was a crucial boost for the continuation of her academic journey and believes it will facilitate her entry into master's and doctoral programs.

In addition to completing the SI project, we also managed to disseminate the project at various events in the fields of inclusive education and environmental education. Participating in both in-person and online events provided an enriching experience for the student. According to Fava-de-Moraes and Fava (2000), participating in academic events during SI is crucial for the growth and appreciation of the work performed. This participation offers a diverse range of benefits, from publicizing and receiving feedback on the research to the opportunity to establish professional connections and enhance skills for her academic, professional, and personal trajectory.

## 6. Final considerations

Scientific Initiation (SI) plays a fundamental role in the context of Distance Education (DE), offering numerous possibilities for research and academic development for students. Throughout this chapter, we have highlighted the relevance of SI and the advantages of its

implementation in DE courses.

One of the main contributions of SI in DE is the opportunity to promote a more comprehensive and in-depth education for students, stimulating skills such as critical thinking, data analysis, problem-solving, and scientific communication. Through this experience, students have the chance to explore specific areas of knowledge, contribute to the production of new knowledge, and establish important professional contacts.

The DE modality provides a conducive environment for conducting SI, allowing interaction between students and advisors through technologies and communication tools. Even from a distance, it is possible to develop quality research, share knowledge, and expand the academic horizons of students.

Moreover, Scientific Initiation (SI) in Distance Education (DE) contributes to the training of future researchers and qualified professionals, driving the scientific and technological advancement of society as a whole. The research projects carried out can result in significant contributions to knowledge production, positively impacting the quality of education and promoting innovative solutions to current challenges.

Given this, it is essential that educational institutions value and encourage the conduct of SI within the context of DE, providing students the opportunity to actively engage in the research process and contribute to the advancement of knowledge in their respective areas of study. For this, the establishment of appropriate policies and structures is necessary, as well as institutional support that promotes the quality and excellence of research in DE.

In conclusion, SI in DE plays a prominent role in the academic formation of students, enriching their educational experience and preparing them for the challenges of research and the job market. By fostering an investigative spirit and the development of scientific competencies, scientific research contributes to building a more critical, innovative, and evidence-based society. Therefore, it is imperative that educational institutions value and strengthen this modality of research,

allowing students the opportunity to explore and expand the boundaries of knowledge, whether in person or at a distance.

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