RCMOS – Revista Científica Multidisciplinar O Saber. ISSN: 2675-9128. São Paulo - SP.
Ano VII, v.1 2026 | submissão: 24/07/2026 | aceito: 27/07/2026 | publicação: 30/07/2026

Reading the World through Scale Model Representations: An Account of the Experience with the Teaching Initiation Program/ICHS/UFOP

A Leitura de Mundo por meio de Representações por Maquetes: Relato da Experiência com o Programa de Iniciação à Docência/ICHS/UFOP

La Lectura del Mundo mediante Representaciones con Maquetas: Relato de la Experiencia con el Programa de Iniciación a la Docencia/ICHS/UFOP

Jacks Richard de Paulo – Universidade Federal de Ouro Preto, jacks@ufop.edu.br
Edina Andrade da Silva – Universidade Federal de Ouro Preto, edina.andrade@aluno.ufop.br
Pedro Henriky Assis – Universidade Federal de Ouro Preto, Pedro.assis@aluno.ufop.edu.br
Luciana Meireles Amâncio Santos de Oliviera – Universidade Federal de Ouro Preto, lu.meireles@aluno.ufop.br
Isabella Emília Alves de Souza – Universidade Federal de Ouro Preto, isabella.emilia@aluno.ufop.edu.br

Abstract: The Institutional Program for Teaching Initiation Scholarships (PIBID) holds immense potential to strengthen early elementary education, as it enables the implementation of new methodologies that prioritize meaningful learning for students. In this context, this experience report highlights a successful initiative—the Cartographic Literacy project—coordinated by the Area Coordinator in collaboration with the Supervising Teacher and PIBID students. It is also worth noting that the program benefits students while offering professional development opportunities for practicing teachers. This report demonstrates that PIBID represents an innovation in teacher training, capable of significantly impacting the pedagogical practice of future educators.

Keywords: Cartographic Literacy. PIBID. Elementary Education. Meaningful Learning.

Resumo: O Programa Institucional de Bolsa de Iniciação à Docência (PIBID) tem um enorme potencial para fortalecer o Ensino Fundamental I nos Anos Iniciais da educação básica, pois, permite a implementação de novas metodologias que primam por uma aprendizagem de forma significativa para os estudantes. Nesse viés de pensamento, o presente relato de experiência vislumbra a prática exitosa, articulada pelo Coordenador de Área, projeto Alfabetização Cartográfica, com a professora Supervisora e Alunos do PIBID. Ressalta-se também que o referido programa beneficia tanto estudantes quanto pode atualizar professores em exercício da regência. Pode-se evidenciar por meio deste relato de experiência que o PIBID se trata de uma inovação na formação do professor, capaz de proporcionar reflexos significativos em relação ao saber fazer pedagógico dos futuros educadores.

Palavras-chave: Alfabetização Cartográfica. PIBID. Ensino Fundamental I. Aprendizagem Significativa.

Resumen: El Programa Institucional de Becas de Iniciación a la Docencia (PIBID) posee un enorme potencial para fortalecer la Educación Primaria en los primeros años de la educación básica, pues permite implementar nuevas metodologías que priorizan un aprendizaje significativo para los estudiantes. En esta perspectiva, el presente relato de experiencia presenta una práctica exitosa, articulada por el Coordinador de Área del proyecto de Alfabetización Cartográfica, junto con la profesora supervisora y los estudiantes del PIBID. Se destaca también que el programa beneficia a los estudiantes y puede contribuir a la actualización de los docentes en ejercicio. Este relato evidencia que el PIBID constituye una innovación en la formación

docente, capaz de producir efectos significativos en el saber hacer pedagógico de los futuros educadores.

Palabras clave: Alfabetización Cartográfica. PIBID. Educación Primaria. Aprendizaje Significativo.

1. Introduction

The teaching and learning process for children involves different aspects that must be taken into account, such as the prior knowledge they bring from their life experiences regarding geographical knowledge. In this sense, one of the several actions developed within PIBID (Teaching Initiation Program/UFOP), in the area of cartographic literacy, is to enable future educators to experience practical activities in the classroom, under the guidance of a supervising teacher, such as constructing cartographic representations and using them as mediating tools to promote a reading of the world.

According to Chaves (2000), during teacher education, future teachers need to experience concrete proposals that can be adapted or used in full in their future classrooms. Therefore, we assume that developing strategies involving the production of a teaching resource together with children may represent a relevant moment in the pedagogical know-how of future teachers.

In view of the preceding propositions, these observations align with the purposes of the Teaching Initiation Program, which seeks to strengthen the relationship between the University and Basic Education schools by providing multiple experiences and theoretical-practical connections that can better substantiate the pedagogical know-how of future teachers.

According to Paulo (2015), when a teaching resource is constructed—for example, a scale model—great potential emerges for the teaching and learning process. The author further states that such a resource makes it possible to problematize different situations in the environment and, above all, to foster interaction among students regarding the content being addressed. A scale model can therefore promote pedagogical mediation from a perspective closer to the student's reality, since three-dimensional representations more accurately approximate what children experience in their daily lives.

In light of these observations, a scale model representing a volcano was built to subsequently simulate a volcanic eruption and its environmental consequences, using different types of recyclable materials in the process.

Based on the preceding propositions, this experience report reflects on an activity carried out within PIBID that used a volcano scale model to address pedagogical mediation with children in elementary education.

2. Theoretical Framework

2.1 Addressing the Potential of Teaching Resources

For a long time, Geography teaching was based solely on memorizing information about representations of the world, with little meaning for students' lives. This created a demand for new approaches to content, such as constructing teaching resources to mediate learning. In this regard, it is stated that:

> Geography teaching is currently undergoing constant innovation and has gained considerable visibility in school education. However, throughout history Geography has not always been viewed as a synthetic discipline that also encompasses other sciences; it was previously classified merely as a mnemonic and traditionalist discipline in which classes did not always prioritize dynamism or stimulate critical thinking. Today, however, it has gained ground in teaching as a geographical science and has been improved in ways that have consequently introduced new classroom practices, such as mental maps, field classes, and the construction of teaching materials (SOUZA and PAIVA, 2019, pp. 1983–1984).

According to Costa et al. (2026), schools must be open to implementing something new that encompasses new strategies for promoting contemporary teaching and learning, because:

> (...) in the current reality of public schools, we most often find learning centered exclusively in the classroom, where some teachers perform their work in such a way that learning remains restricted to that environment. These educators therefore do not use other approaches in their pedagogical practice to develop the teaching process, even though it could be developed through concrete practice, in which learning would become more meaningful and students would be responsible for constructing their own knowledge (COSTA et al., 2026, p. 2).

Among the various representations used to promote pedagogical mediation concerning environmental issues, the scale model plays a prominent role as a powerful teaching resource, since it can allow students to perceive the transformation of something abstract into something concrete and tangible.

RCMOS – Revista Científica Multidisciplinar O
Saber. ISSN: 2675-9128. São Paulo - SP.
Ano VII, v.1 2026 | submissão: 24/07/2026 | aceito: 27/07/2026 | publicação: 30/07/2026

The study by Souza et al. (2023, p. 2) points out that, in the classroom context, strategies are needed that can foster active participation in the knowledge-construction process, because:

> Seeking to overcome the distinction between academic and school Geography, while looking for methods and tools that assist in teaching content derived from scientific and theoretical knowledge learned in academia, the construction of scale models becomes an extremely valuable tool for building knowledge in a playful and interactive manner, contributing to the development of students' ability to interpret geographical phenomena.

According to Bacich and Moran (2018), active methodologies can drive significant changes in teaching, learning, and knowledge construction because they can provide an environment of interaction and exchange in which children occupy a prominent, leading role—that is, the center of the learning process.

According to Leite and Paulo (2025), children today encounter various technological resources in their daily lives, while schools are often far removed from this reality. It is therefore relevant and necessary for schools to adopt other, more dynamic teaching resources that can stimulate problematization, such as scale models.

2. Materials and Method

This essentially qualitative experience report sought to reflect on the experience of constructing a volcano scale model and simulating an eruption as a way of problematizing environmental issues. The qualitative approach was grounded in an interpretive perspective, enabling not only an understanding of the dynamics involved in producing teaching resources, but also deeper reflection on the multiple experiences acquired throughout the training process, which are indispensable in initial teacher education.

In addition, according to Lüdke and André (2013), qualitative research in education has contributed exponentially to revealing the object under analysis in multiple ways. This has intensified research and, above all, enhanced understanding of the various aspects that permeate teaching, learning, and knowledge-construction processes.

The materials used were a plastic container as a base, clay to sculpt the volcano cone, gouache paint, branches, leaves, vinegar, baking soda, and red dye.

The representation was constructed in the Pedagogical Practices Laboratory/ICHS/UFOP. This setting made it possible to plan the activity jointly with the PIBID Area Coordinator for Cartographic Literacy, the Supervising Teacher, and some students from the Teaching Initiation Program.

RCMOS – Revista Científica Multidisciplinar O
Saber. ISSN: 2675-9128. São Paulo - SP.
Ano VII, v.1 2026 | submissão: 24/07/2026 | aceito: 27/07/2026 | publicação: 30/07/2026

Finally, by adopting active methodologies, we follow the principle of placing the child at the center of the learning process. This makes it possible to sharpen investigation and collaboration and, above all, to develop problem-solving skills.

3. Results and Discussion

We become educators; we form ourselves as educators, permanently, through practice and reflection on practice.

Paulo Freire

According to Paulo (2015), teaching and learning can be greatly enhanced when geographical concepts are addressed with children through a representation such as a scale model, because numerous prompts and questions can be raised concerning the dynamics of geographical facts and phenomena. In this sense, the future educators produced a scale model representing a volcano and its surrounding landscape using various materials, plants, and branches (Figure 1).



Figure 1 – Volcano scale model with simulated eruption (Authors' archive, 2025).

Regarding the scale model, several authors note that it is a tool with enormous potential to stimulate children's learning and to create opportunities for dialogue and responses concerning the possible problems represented in it (PAULO, 2015; SOUZA and PAIVA, 2019). Such teaching proposals therefore carry a wide range of pedagogical possibilities, expanding opportunities for interdisciplinary work and, above all, the use of recyclable materials.

During the construction of the volcano scale model, the future teachers exchanged ideas with their peers, the PIBID Supervising Teacher, and the Area Coordinator. They discussed

positive aspects, challenges in the construction process, and the multiple possibilities for pedagogical mediation with children in the classroom.

Among the dialogues established during the construction and mediation process, the following statement stood out:

> Participating in the activity, I see it as something constructive and meaningful that contributes to our careers as students. Through practical experience, it gave us the opportunity to understand a reality and how it can be developed within basic education. Ultimately, the Cartographic Literacy subproject proposes children's development regarding environmental perception and notions of space.

According to the study by Magalhães Neto and Falcão (2024), scale models are a teaching resource that should be considered in children's learning process and can make a decisive difference in mediation. They can also contribute a genuine range of educational opportunities, because:

> Working with scale models is therefore an excellent strategy for promoting meaningful learning and active student participation. It is important to begin cartographic literacy work with students in the early grades because, from this stage onward, they begin to develop the ability to understand geographical space. Cartographic literacy is the process of acquiring the concepts and skills needed to read and understand maps and other cartographic products. It is essential for students to develop the following skills: location—the ability to identify and locate elements in geographical space; orientation—the ability to orient themselves in geographical space; and representation—the ability to represent geographical space (MAGALHÃES NETO and FALCÃO, 2024, p. 13).

In line with the preceding propositions, the study by Leajanski (2025) emphasizes that basic education requires methodologies that enable children's active involvement and, above all, meaningful understanding of content. Along these lines:

> (...) scale models are an important tool for supporting teaching. By enabling three-dimensional representations of phenomena, landscapes, and processes, scale models bring theoretical knowledge closer to students' concrete reality. Constructing and handling models can develop spatial thinking, observation, and interpretation of the relationships between society and nature, which are central aspects in forming geographical reasoning (LEAJANSKI, 2025, p. 2).

The activity fostered collective work and awakened the participants' creativity, but above all encouraged the exchange of ideas among peers, strengthening both the social and collaborative dimensions of the educational process.

Final Considerations

It is concluded that the scale model can be a powerful teaching resource because, in addition to representing space in three dimensions, it can enhance interdisciplinary work.

It was also observed that future teachers view the scale model as essential and fundamental to teaching, learning, and knowledge construction. However, it cannot merely be regarded as a self-contained teaching end, capable of explaining itself or being used in isolation from other content. Rather, it should be understood as a teaching resource capable of fostering problematization and, above all, creating opportunities for reflection and dialogue around problem solving.

It was further observed that constructing the volcano scale model stimulated peer collaboration, dialogue, and the division of tasks. Finally, this experience requires teamwork, planning, and creativity, whose interconnections can strengthen both interpersonal relationships and the sense of belonging to the educational process.

References

BACICH, L.; MORAN, J. Metodologias ativas para uma educação inovadora. 3. ed. Porto Alegre: Penso, 2018.

CHAVES, S. N. A construção coletiva de uma prática de formação de professores de Ciências: tensões entre o pensar e o agir. Tese de doutorado. Faculdade de Educação. UNICAMP. Campinas. 2000.

COSTA, Maria Adélia da. Políticas de Formação Docente para Educação Profissional: realidade ou utopia? Curitiba: Appris, 2016.

COSTA, M. S. P.; SANTOS, J. S.; NASCIMENTO, P. C. maquete como recurso pedagógico na construção do conhecimento interdisciplinar. GT-30. Didática e Organização do Trabalho Pedagógico. 2026. Acessado em: https://www.editorarealize.com.br/editora/anais/fiped/2012/71a58e8cb75904f24cde464161c3e766.pdf

LEAJANSKI, A. O uso de maquetes como metodologia ativa no ensino de geografia: potencialidades e desafios. In: XI CONGRESSO NACIONAL DE EDUCAÇÃO, 2025, Olinda - PE. Anais do XI CONGRESSO NACIONAL DE EDUCAÇÃO, 2025. v. 1. p. 01-11.

LEITE, B. R.; PAULO, J. R. A tecnologia como estratégia para um processo de ensino e de aprendizagem mais eficaz. EAD & TECNOLOGIAS DIGITAIS NA EDUCAÇÃO, v. 13, p. 206-220, 2025.

Lüdke, Menga. Pesquisa em educação: abordagens qualitativas /. Menga Lüdke, Marli E.D.A. André. - [Reimpr.]. - São Paulo: E.P.U., 2013.

MAGALHÃES NETO; E. da S.; FALCAO, M. T. . Produção de maquete como material didático para o ensino de Geografia na Escola Estadual 13 de Setembro em Boa Vista, Roraima. REVISTA ELETRÔNICA AMBIENTE: GESTÃO E DESENVOLVIMENTO, v. 17, p. 6-14, 2024.

PAULO, J. R. A construção de maquetes nas aulas de Geografia: contribuições para mudanças de concepções de ensino. In: SEMINÁRIO NACIONAL INTERDISCIPLINAR EM EXPERIÊNCIAS EDUCATIVAS, 2015, FRANCISCO BELTRÃO. SENIEE. FRANCISCO BELTRÃO: UNIOESTE, 2015. v. V. p. 795-805.

SOUZA, S. N.; PAIVA, A. C. O uso de maquetes como recurso didático na geografia escolar: (re)conhecendo o conceito de lugar no contexto da usina hidrelétrica de belo monte. Universidade Federal do Pará., [s]Campinas, 2019.

SOUZA, V. E.; GONCALVES, I. M.; COUTINHO, R. F.; FONTES, T. G. N. T. Oficinas de Maquete no Ensino de Geografia. In: X Fala Professor(a)! 2023, Fortaleza. Anais do X Fala Professor (a)! É preciso está atento e forte, 2023.

ACKNOWLEDGMENTS

We thank CAPES for funding the scholarships of the Teaching Initiation Program (PIBID/ICHS/UFOP).