Educational innovation: Integration of face-to-face and online in teaching and learning in higher education

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ABSTRACT
This study aims to analyze the results of the Learning Program for the 3rd Millennium (A3M), developed by the University of Brasília (UnB) to identify, promote and disseminate innovative educational actions in the institution and its integration between face-to-face and online. Part of the problem: what is the potential for educational innovation in the projects identified and developed in the A3M Program and the possibilities for the convergence of modalities? The result points to the use of active methodologies, the consideration of new educational spaces, the use of digital information and communication technologies (DICT) in didactic strategies, the understanding of teaching as pedagogical mediation and of the student as an active subject of their learning. Educational practices suggest possibilities for convergence of modalities and the use of blended learning.

Keywords: Educational innovation, Active methodologies, Digital technology.

1 INTRODUCTION

Among the challenges faced by teachers, students and parents in this third millennium, one of the most relevant is how to educate and educate oneself in a meaningful way, considering the different social contexts and the scientific and technological transformations that have occurred in recent decades, capable of re-signifying the educational process. In this scenario, Prensky (2018, p. 1) argues that young people must be adequately educated for this imminent future and that a civilizational change in education is needed. Among other actions, it is necessary to break with the dichotomy between theory and application, taking advantage of the transformations and possibilities that arise in the context of digital culture.

Digital information and communication technologies (ICTs) can be used to facilitate this process. One response to the need for transformation in education would perhaps be to focus on individuals – rather than on technology, the world, or professions – not least because some of them

may disappear and others may reconfigure themselves in a short period of time as we see demographics, the environment, geopolitics, and the technologies themselves transformed.

Moran (2000, p. 137-138) understands that technology, by itself, is not the answer to the problems and challenges of education: "[...] Teaching and learning are the greatest challenges we face in all times and, particularly now, [...] we advance more if we know how to adapt the planned programs to the needs of the students, creating connections with everyday life, with the unexpected [...]".

The new teaching possibilities, which value the use of DICT and are focused on the application of theory, consider research and the transformation of the classroom into a community of inquiry. But educational transformation, with this intent, needs to bring about a shift in the focus of education from learning to thinking. In which students "think for themselves, and don't just learn what other people have thought." (LIPMAN, 1995, p. 44). It is in this context of educational innovation and meaningful learning that the experiences promoted by professors at the University of Brasília (UnB), supported by the Learning for the 3rd Millennium Program (A3M), are situated.

The study presents the actions developed in face-to-face classes at UnB as proposals for educational innovation aimed at reflecting on the levels of performance, satisfaction and engagement of students. It aims to analyze the potential for educational innovation in the projects identified and developed in the A3M Program in 2018 and the possibilities for the convergence of modalities. It is of a qualitative nature, carried out through an action research based on Minayo (2001), Ghedin and Franco (2008), Thiollent (2011), for whom this is a social research with an empirical basis, conceived and carried out in close association with an action or with the resolution of a collective problem, in which the researchers are involved in an operative or participatory way.

In this study, the projects are monitored through semi-structured interviews, observation, videos and events in which the project coordinators present their results. Through content analysis, we sought to categorize the projects submitted to the second A3M funding notice, considering the area of knowledge and the results achieved.

The structure of the study is divided into sections and subsections. The first is the introduction, the second deals with the meanings of educational innovation in the context of the A3M Program, at which point a brief look at its foundation is made. The third section presents the experiences developed within the scope of the A3M Program.

2 EDUCATIONAL INNOVATION IN THE CONTEXT OF A3M

Educational innovation can be understood as a process that involves a set of actions that break with conservative educational practices (linear, objective and decontextualized vision) for the development of active, contextualized teaching and learning, focused on meaningful learning. Saviani (1995, p. 30) understands educational innovation as an action that puts the educational experience at

the service of new purposes. Educational innovation is defined as a process of changes in educational practices, not as a simple change, but as something contextualized to the student's reality, in which learning is sought as its main objective through the mediation carried out by the teacher.

Based on Fullan (2007), we sought to understand the dimensions related to pedagogical innovation, which presuppose: the use of new didactic materials or diversified technological resources, the search for strategies that facilitate/redirect the teaching and learning process, observing that innovation is not a simple change, but requires modifications in the way of thinking about pedagogical practice, with a view to resizing it. Innovation requires that, in the educational context, the teacher and the management team are willing to investigate the learning processes with the use of new resources, pedagogical strategies, means and behaviors. It is considered that innovation, as well as all real change, involves rethinking about conceptions of the world and behaviors, aiming at their redirection.

As Behrens (1999, 2007, 2012, 2013) states, innovation requires a paradigmatic change, it is necessary for teachers to reflect on pedagogical practice, to change from a linear view to the paradigm of complexity, of teaching by research, that is, to review their concepts and conceptions. According to the author, her experience with university professors showed that "[...] Few teachers reflect on their teaching action. And that, when given the opportunity to do so, awakens the responsible teacher who yearns to modify his pedagogical practice, but does not know how to change it" (BEHRENS, 1999, p. 383).

For Libedinsky (2014, p. 3), educational innovation is Inter-related with technologies and with the use of innovative resources in teaching practice, in which creativity and ruptures and continuities in relation to these practices are present. We agree with the author's question: "What kind of innovations can we think of? Does innovating in education imply many and varied things?" Innovating, therefore, does not only mean using mobile technologies, such as the internet and its applications, but also understanding the new forms of learning that these technologies can provide, and which are considered as new ecologies of learning (COLL, 2009). In this sense, teaching is considered hybrid because it allows flexibility in planning and application in connected spaces, forming the learning ecology.

From DICT, the teaching and learning processes can be expanded and stimulated by the ease of connection, the possibilities of synchronous and asynchronous interactions, through resources and tools derived from technology. The use of the internet, and in particular mobile connectivity, facilitates access to the activities promoted by the teaching and learning process. The ability of devices and groups to connect to each other (interconnectivity) enables new learning formats, new scenarios are instituted in which "[...] learning is, and will be, increasingly shaped by digital ICTs and more specifically by digital information and communication technologies" (COLL, 2013, p. 4).

In these interconnected environments, there is integration between spaces and times, between the face-to-face and the online. This way of learning is called by Wong and Looi (2011) as "seamless learning", which consists of increasing the student's learning capacity in their own environment, including in movement. Sharples (2015) points out that learning can be intentional, conducted by the teacher in the classroom and can have continuity beyond school spaces.

Interconnectivity enables greater integration between the classroom and virtual environments, and is of fundamental importance for the university to dialogue with the world and bring the world into the academic community (BACICH; MORAN, 2015). It is considered, in agreement with the cited authors, that educational institutions have always been mixed, hybrid, combining various spaces, times, activities, methodologies, audiences and cultures. Currently, there is talk of processes that aggregate mobility and connectivity, which are more noticeable, forming open and creative ecosystems.

According to Barron (2004), it is a set of activities in which physical or virtual spaces are connected, providing opportunities for the development of learning by those involved. These contexts of activities are "[...] those provided by social networks, virtual worlds and environments, virtual communities of interest, learning practices and online games in general, created by digital ICTs" (COLL, 2013, p. 40).

The new learning ecologies, therefore, constitute contexts of activities that provide opportunities for interaction between people, resources and tools for communication and knowledge construction, enabling collaborative teaching and learning, attribution of new meanings and obtaining new learning. They represent the personalization of actions as an act of learning. For Coll (2013, p. 33), "[...] The personalization of learning is a growing need, it is already a reality imposed on schools and systems, it is a trend that is announced". These changes result from the current social configurations that produce significant transformations in the way of teaching and learning, in the context of the society of digital culture. It also requires a rethinking of the organizational structures of educational institutions, education systems, methodologies, curriculum, and teacher training.

In this scenario, the need to incorporate the possibilities brought by digital technologies, such as flexibility, sharing, communication, etc., in face-to-face and distance education, is considered, in order to create more personalized itineraries. (MORAN, 2017, p. 1). In the discussion about Of In the context of educational innovation, it is also relevant to use forms of active and collaborative learning, considering teachers and students as subjects Diligent of the process of teaching and learning. Teaching takes place through pedagogical mediation and learning considers different resources, including DICT, research and the students' own productions. It is on these aspects that A3M is founded.

2.1 A3M: PEDAGOGICAL MEDIATION ACTIONS

A3M was started at UnB in 2017, with the aim of valuing the educational experiences of university professors and building, based on these experiences, a portfolio of methodological and/or technological resources for the university's courses.

In its third year of operation, A3M developed extension, research and innovation activities, providing opportunities for the construction of new educational methodologies, exchange of experiences and teacher training. In order to identify innovative educational practices, two public notices were made to support such practices, especially in undergraduate education at UnB. A total of 140 innovative initiatives were identified, of which 56 are being implemented. These actions cover the nine areas of knowledge of the National Council for Scientific and Technological Development (CNPq), as illustrated in Graph 1.

Graph 1 - Distribution of projects in the three areas of knowledge and in the areas of CNPq
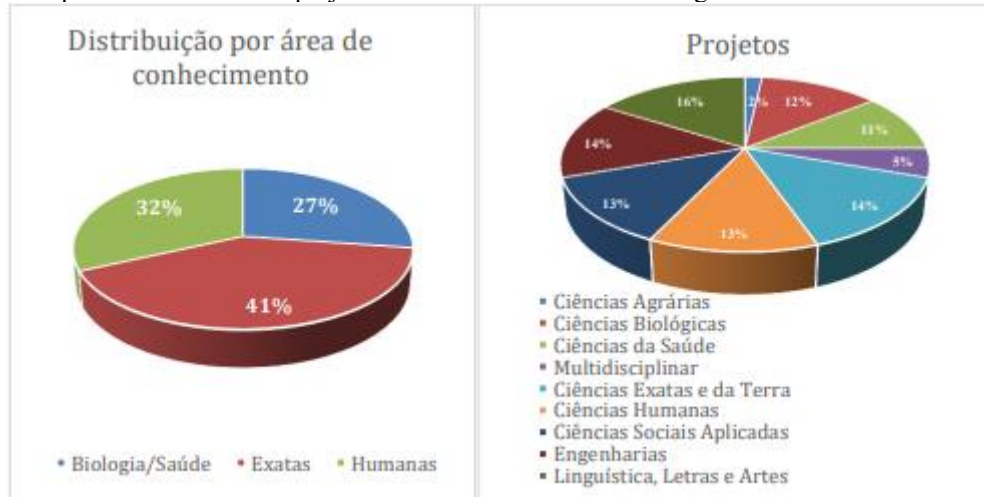
Source: Based on A3M DE 2019 reports and documents.

The projects aim to develop and disseminate innovative educational resources (methodologies or didactic resources) for the various areas and courses of UnB, with a focus on improving learning, levels of satisfaction and student involvement. Chart 01 shows the data related to the projects submitted to the public notices.

Table 1 - identification of innovative experiences at UnB – 2017 and 2018 Calls for Proposals

Editais e ano	Propostas submetidas	Propostas aprovadas	Propostas em desenvolvimento
1º Edital 2017	91	80	22
2º Edital 2018	50	47	34

Source: Based on A3M/CEAD documentation from 2017 and 2018

In the first call for proposals, 91 proposals were submitted, 80 were classified and 12 received funding. 10 other projects Were carried out without direct funding. In the second notice, 50 proposals were registered, 47 classified and 34 Performed of which 12 were without direct funding. In Figure 1, it is possible to observe the space of the A3M website called the Resources Tab (a space for socialization of the didactic resources and methodologies developed by the project teams), as illustrated in Figure 1.

Figure 1- A3M Virtual Environment – Resources Tab

Font: A3M (2019).

In the virtual environment space, CEAD provides information about the A3M projects in progress, such as projects presented and educational resources produced – didactic materials in the form of methodologies and/or pedagogical didactic resources. Interested people (teachers from any part of Brazil and/or the world) can access and use the resources disclosed, with or without adaptation. Thus, it is intended to value the didactic material developed at the university and enable its use by the academic community, according to the interests and needs of each teacher or student. Here's the information about the A3M projects identified through the 2018 Call for Proposals and made available on the website.

Table 2 - A3M projects – Categories of analysis

Name of the projects	Categories	
	CNPq Area	Didactic/pedagogical material
1. To whom does the city belong? Reflective exercises in social criticism and political imagination in the classroom	Humanities	Methodology: workshops and didactic materials to support the reapplication of the methodology. The results (resources) of the project, such as texts, articles, experience reports, as well as short videos, are available on the project's website
2. Web application as a didactic tool for learning and disseminating Brazilian Sign Language at UnB: Game-Libras	Linguistics, Literature and Arts	Creation of the Game Libras application, in order to mediate the process of teaching and learning Brazilian Sign Language (Libras) through games, in addition to offering adequate material with the visuospatial modality of the language to deaf and non-deaf students enrolled in the disciplines of Brazilian Sign Language (LSB) Basic and LSB Basic EAD

3. Modernization of the evaluation system of the discipline Probability and Statistics	Applied Social Sciences	Didactic resource: Bank with 300 questions to feed the platform "Bank of questions in RNW format" containing: statement, functions that generate the alternatives, description of the solution and specification of the procedures for generating random values. R Software.
4. Fluid simulation with Blender program	Exact and Earth Sciences	Use of illustrations, animations and interactive resources for use in Physics classes, using Blender software
5. OEB: Poiese e dissenso	Humanities	Creation and gamification of the discipline Organization of Brazilian Education with the use of virtual resources and creation of poetic learning objects, with the target audience of undergraduate students at UnB.
6. Instrumental English: Development and improvement of a blended course	Linguistics, Literature and Arts	Improvement of Instrumental English 1 and 2 subjects through the development of audiovisual and digital materials, such as the creation of video lessons, development of thematic glossaries; repository of digital texts; electronic bank of texts and questions.
7. Lesson study and the production of video lessons: a possibility for the initial training and professional development of mathematics teachers	Exact and Earth Sciences	Systematization of a methodology for the training of mathematics teachers; didactic material: repository of mathematics video lessons on curricular topics of Basic Education.
8. The Portfolio: a didactic tool in teaching calculus to engineers	Engineering	Construction of Portfolios by the students themselves, using the free software Edmodo. Applicable in any area of knowledge.
9. Cognitive ecologies in the training of Physics teachers	Exact and Earth Sciences	Laboratory, project and infrastructure to enable distance learning.
10. Computerization and visual communication of the database of the collection of the Museum of Geosciences of UnB as a tool for disciplines of geosciences and related courses	Exact and Earth Sciences	Increased visibility and accessibility of the Museum of Geosciences of UnB through the updating and supply of the online and offline database of the collection, through the production of audiovisual media of the main pieces, preparation of folders and generation of QR code with online and offline access with information of each piece and production of identification plates in braille.
11. Technologies for Active Learning and Student Support	Exact and Earth Sciences	Development of tools (one material tool and two digital ones) to promote more element to the three active and student support methodologies: King and Queen of the Derivative (mobile board), Summâe (website) and Three Hundred (app)

Fonte: Adapted from A3M (2019).

The use of digital technologies is predominant in the development of A3M projects and reveals the importance of these resources in the teaching and learning process in the context of digital culture, as pointed out by Bacich and Moran (2018), Moran (2017), Boll, (2013), among other researchers. Different learning contexts were also observed, such as the 3D environment, virtual and face-to-face spaces, that is, the presence of new educational ecologies and hybrid teaching (BARRON, 2004; COLL, 2013).

In general, the 56 projects identified by A3M are subdivided into all areas of knowledge of CNPq. It is considered to be only the projects available on the A3M website, which cover five areas of knowledge, with a predominance of the area of Exact and Earth Sciences. In relation to the results of the projects, methodologies and other didactic resources are identified; In some of them, both forms of educational resources are observed.

In the projects highlighted in Chart 02, the presence of active methodologies and hybrid methodologies (denominations given to this way of teaching) can be seen in all cases. The use of active methodologies is also observed in the conception of Bacich and Moran (2015; 2018), in which teachers are pedagogical mediators between the student and the object, for the active construction of knowledge. According to Moran (2013, p. 6):

> Methodologies are major guidelines that guide the teaching and learning processes and that are materialized in concrete, specific, differentiated strategies, approaches and techniques. Active methodologies in a connected and digital world are expressed through hybrid, blended teaching models, with many possible combinations. Some components are fundamental to the success of learning: the creation of challenges, activities, games that really bring the necessary skills to each stage, that ask for pertinent information, that offer stimulating rewards, that combine personal paths with meaningful participation in groups, that are inserted in adaptive platforms, that recognize each student and at the same time learn from the interaction, All this using the right technologies.

Some of the methodologies proposed in the aforementioned projects exemplify the combinations pointed out by Moran (2013, p. 9-10):

1. Use of games, illustrations: P1 - Game Libras Application"; P4 – "illustrations, animations and interactive resources for use in physics classes"; P5 – "OEB: Poiesis and dissent"; P11 [1] - "Active learning";

2. Scripted classes with the language of games (gamification) – P 5 – "Gamification of the discipline"; P 11 – "Active learning[2] ";

3. Problem-based learning (PBL) – P11 – "Active learning";

4. Personalised, collaborative and guided learning with the support of advanced digital technologies: in almost all projects, highlighting:– P1; P2; P3; P4; P5; P8; P10; P11.

The Project (P11) – "Technologies for Active Learning and Student Support", in the use of its three methodologies, uses "collaborative peer learning", addressed by Moran (2013, p. 4). In general, the projects contemplate the use of active methodologies. The use of strategies, differentiated approaches and specific didactic techniques is observed through DICT.

Teachers opt for active methodologies, inserting the educational process in a connected and digital world. The practices developed, for the most part, seek to express themselves through hybrid teaching models and their possible combinations, such as the projects mentioned, specifically the project (P5) "OEB: Poiesis e dissenso". This project aims to promote the use of digital information and communication technologies, gamify the Moodle platform and develop Art-based learning objects. P5 aims to create avatars of Brazilian educators (Figure 2), a virtual learning trail, simulating a board

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1   The methodologies are explained in the project – the teacher uses flipped classes, gamification.
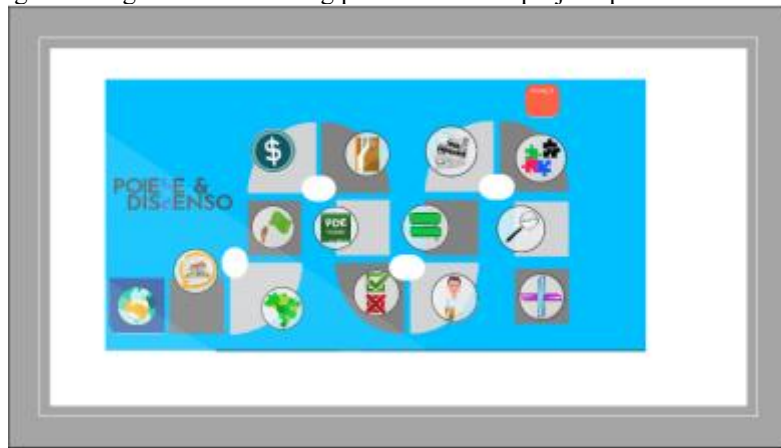2   Ditto

game" (Figure 3), combining aesthetic experience, virtual learning objects and digital technologies in didactic strategies.

Figure 2: Avatars built in the OEB project: poiesis and dissent

Source: A3M, OEB Project: poiesis and dissent

Figure 3: Digital trail – learning path of the OEB project: poiesis and dissent

Source: A3M, OEB Project: poiesis and dissent

Teachers promote possible combinations of resources and didactic strategies that constitute fundamental components for active learning. It is possible to observe the development of challenges in the educational process, of activities that seek to vary didactic instruments and strategies of welcoming and approaching real life. According to Moran (2013), generations accustomed to playing need a language of challenges, rewards, competition and cooperation to feel stimulated.

Collaborative and individual games, competition integrated with collaboration, the use of strategy with well-defined stages and skills are increasingly frequent in classes, present in areas of knowledge and in the various teaching modalities. Problem-based learning (PBL) also stands out. Also according to Moran (2013), one of the most interesting paths of active learning is through inquiry, in which students develop the ability to raise questions and problems with the help of the teacher.

The following are excerpts from interviews with the coordinators of A3M Projects, carried out in the presentations of their projects, which may corroborate the analysis developed here:

> We really want to welcome people... Students need a warm welcome... We intend to go directly to the student's doubt, the platform is an opportunity to review high school subjects, the executors are the students... We use several tools, videos, applications on the internet (simulators), the differential is the direct service to the student, preventing him from getting lost.... it is the incentive for him not to give up the course (Teacher 1).
> ... we leave the classroom space and go outside (Teacher 2).
> The student is much more technological... He's a different student. So, we, teachers, must also teach in a different way and bring new technologies to teaching (Teacher 3).
> [...] knowledge is no longer centered in the figure of the teacher, it starts to be shared and built with the students (Teacher 4)
> The use of an active methodology, which in this case is playful, is a little out of the traditional, with comics there is a great return on the active participation of students (Teacher 5).

It is possible to infer the purpose of modifying educational practices: the teachers of the projects recognize the need to focus on student learning, understand the advantage of games, playfulness and the use of new spaces and tools in higher education, regardless of the discipline and/or area of knowledge.

When dealing with the concept of educational innovation, teacher 6 deals with the need for teachers, in addition to students, to learn to work together:

> [...] Innovative education lies in the fact that teachers learn to work together in these projects, it's not just a matter of students learning, teachers also need to work together [...] the goal is to integrate. It is an action of activities by projects that aims to integrate areas of knowledge (Teacher 6).

Another understanding present in the teachers' statements is that educational innovation goes beyond the introduction of new technologies, as it implies a transformation in action Didactic-pedagogical, requiring the capacity for critical reflection by peers, as discussed by Moran (2017), Ramos and Rossato (2017), among others. These authors emphasize the need to rethink teaching and learning in higher education and other modalities. The focus on the student's active learning is another characteristic pointed out in the teachers' speech. There is recognition that the teacher is not the only holder of the information and knowledge to be transmitted. The statements reveal a change from teaching by transmission to pedagogical mediation.

> The students are writing the material, the texts that will accompany these experiments. They are deciding, they discuss with me which experiments they think are most appropriate, most appropriate, that they feel most comfortable with (Teacher 7).
> In this methodology, the greatest effort is made by the student and not by the teacher. (Teacher 8).
> I see that the student becomes much closer and they also allow themselves, as the theme is creativity and implies a little bit in thinking, leaving the borders, getting out of the box, proposing new things, daring, having courage, the students are more available, the dialogue becomes easier (Teacher 9).
> The participation of the students is fundamental, they know how to tell us what we need to advance in the new tools (Teacher 10).

In summary, the projects reveal that there are innovative initiatives carried out by UnB professors, in which the concern with the active and meaningful learning of students and the resignification of learning spaces and educational practices is central. They are innovative in their environments (use of comic books, portfolio in mathematics disciplines), use of DICT in various situations, connecting face-to-face to online, mixing different environments, using technologies that have often been adopted for years, but which, in that context, and supported by didactic strategies, become an innovation in teaching, a new way of teaching and learning in which both are active subjects of the process.

Based on the above, it is possible to understand that institutional actions that promote the institutionalization of new practices and learning spaces, such as the A3M Program, are relevant to break with the limitations of traditional teaching and situate teaching/learning in the context of the new millennium, in the scope of digital culture, information and knowledge age. These can be relevant strategies for the convergence of face-to-face and distance learning modalities and the constitution of new learning ecologies.

3 FINAL CONSIDERATIONS

The A3M Program identified different proposals for educational innovation at UnB. The analyzed projects develop innovative teaching practices, with the aim of doing things differently, of seeking creativity through various tools so that the student is motivated and learns. A3M's methodologies – and their products/results – are, in fact, only innovative because they add to teaching and learning, through technologies, the elements of interconnectivity, mobility, hyperlink, the productive relationship with knowledge and its objectives, the plastic character between knowledge, technique and reconstruction of knowledge (knowledge-fluid), etc.

In these projects, the focus of teaching as transmission turns to pedagogical mediation and the increasingly strengthened convergence between face-to-face and online teaching. The teachers investigated revealed awareness of the social transformation brought about by the digital context, of the need to change the focus of teaching to the student's active learning process and of the insertion of digital technologies in the organization of classes, of innovation. The use of DICT has become increasingly imperative in the process of mediation (teaching) and active learning.

Most of the projects used digital technologies in the educational process, considering them in the development and learning of students, and corroborated the discussions of the authors who present DICT as relevant for the delineation of educational and pedagogical practices, being imperative its use in the digital age and present in the new millennium that begins.

The experiences were of professors in the face-to-face modality, who seek to differentiate their practices and integrate these physical spaces with the virtual one, configuring connected teaching and

learning environments, and the hybrid approach and/or teaching can be considered as a practice in use at UnB.

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