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RESEARCH DESIGN IN CONTINUING TEACHER EDUCATION IN DISTANCE LEARNING: ANALYSIS OF A LEARNING PATH IN THE MOODLE/IFRN

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ABSTRACT

The design of learning activities has been advocated for processes that are mediated in distance learning, due to the curricular integration of digital information and communication technologies. This article aims to understand the process of supervising research projects carried out by lato sensu postgraduate students in the distance learning modality, based on the elements of learning activity design: discourse, design, production and distribution. This is qualitative research, of documentary analysis, whose data will be collected in the virtual learning environment – Moodle/IFRN, which analyzed three didactic tasks aimed at the elaboration of the research project. The theoretical framework was based on the concepts that articulate design and education (Laurillard, 2003), on the theory of design of learning activities (Simão Neto; Hesketh, 2009), articulated by the studies of Social Semiotics by Kress and Van Leween (2001). The partial result showed that: in the first task, the multimodal discourse facilitated the understanding of the descriptive elements of the research theme in 90% of the submitted works, while in the second and third tasks, the individualized monitoring forum helped the theoretical-methodological construction in 73% of the works Despite this, problems related to the methodological design of the projects still need adjustments in the subsequent phase of the research, together with the supervisors.

Keywords: Instructional Design; Online Learning Activities; Research Methodology; Social Semiotics.

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DISEÑO DE INVESTIGACIÓN EN FORMACIÓN DOCENTE CONTINUA EN MODALIDAD A DISTANCIA: ANÁLISIS DE UNA RUTA DE APRENDIZAJE EN EL ENTORNO VIRTUAL DE APRENDIZAJE MOODLE/IFRN

RESUMEN

Se ha abogado por el diseño de actividades de aprendizaje para procesos que se desarrollan vía educación a distancia, debido a la integración curricular de las tecnologías digitales de la información y la comunicación. Este artículo tiene como objetivo comprender el proceso de orientación de proyectos de investigación realizados por estudiantes de posgrado lato sensu en educación a distancia, a partir de los elementos del diseño de la actividad de aprendizaje: discurso, diseño, producción y distribución. Se trata de una investigación cualitativa, de análisis documental, cuyos datos serán recogidos en el entorno virtual de aprendizaje – Moodle/IFRN, en el que se analizaron tres tareas didácticas encaminadas a la elaboración del proyecto de investigación. El marco teórico se basó en los conceptos que articulan diseño y educación (Laurillard, 2003), en la teoría del diseño de actividades de aprendizaje (Simão Neto; Hesketh, 2009), articulada por estudios de Semiótica social de Kress y Van Leween (2001). El resultado parcial demostró que: en la primera tarea, el discurso multimodal facilitó la comprensión de los elementos descriptivos del tema de investigación en el 90% de los trabajos entregados, mientras que, en la segunda y tercera tarea, el foro de seguimiento individualizado ayudó al análisis teórico-metodológico. la construcción en el 73 % de los empleos. A pesar de esto, los problemas relacionados con el diseño metodológico de los proyectos aún necesitan ajustes en la fase posterior de la investigación, junto con los supervisores.

Palabras clave: Diseño Instruccional; Actividades de Aprendizaje en Línea; Metodología De La Investigación; Semiótica Social.

O DESIGN DE PESQUISAS NA FORMAÇÃO CONTINUADA DOCENTE NA MODALIDADE A DISTÂNCIA: ANÁLISE DE UMA TRAJETÓRIA DE APRENDIZAGEM NO MOODLE/IFRN

RESUMO

O *design* de atividades de aprendizagem tem sido defendido para processos que se mediam na modalidade a distância, em virtude da integração curricular das tecnologias digitais da informação

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e comunicação. Este artigo tem por objetivo compreender o processo de orientação de projetos de pesquisa realizados por estudantes de pós-graduação *lato sensu* na modalidade a distância, a partir dos elementos do design de atividades de aprendizagem: discurso, *design*, produção e distribuição. Trata-se de uma pesquisa qualitativa, de análise documental, cujos dados serão levantados no ambiente virtual de aprendizagem – Moodle/IFRN, que analisou três tarefas didáticas voltadas para a elaboração do projeto de pesquisa. O referencial teórico se fundamentou nas concepções que articulam *design* e educação (Laurillard, 2003), na teoria do *design* de atividades de aprendizagem (Simão Neto; Hesketh, 2009), articulados pelos estudos da Semiótica Social de Kress e Van Leeuwen (2001). O resultado parcial demonstrou que: na primeira tarefa, o discurso multimodal facilitou a compreensão dos elementos descritivos da temática de pesquisa em 90% dos trabalhos entregues, enquanto na segunda e terceira tarefas, o fórum de acompanhamento individualizado auxiliou a construção teórico-metodológica em 73% dos trabalhos. Apesar disso, problemas relacionados ao delineamento metodológico dos projetos ainda precisam de ajustes na fase subsequente da pesquisa, junto aos orientadores..

Palabras clave: Design de Atividades de Aprendizagem; Projetos de Pesquisa; Metodologia da Pesquisa; Semiótica Social.

1. INTRODUCTION

Design is considered an applied science in various fields of human activity, promising innovation and following the history of society. According to Bürdek (2010, p. 11), "the life of most people is no longer imaginable without design." However, its recognition as a science is linked to industrialization since the 18th century, advancing in the 20th century with Information Technology, as it integrated into products and services in this sector (Cardoso, 2008). Thus, design solidifies itself as a science applied to social life, including the educational field.

In this field, Laurillard (2013) argues that education has shifted from merely transmitting knowledge to addressing cultural and technological transformations, requiring a new educational attitude: the production of knowledge. With the presence of digital technologies in all aspects of human life, these technologies have been incorporated into the educational process and curriculum guidelines as an essential competency throughout Basic Education, highlighted in the National Curriculum Parameters (1998; 2000) and the National Common Curricular Base – BNCC (Brazil, 2017). This competency has been actively developed with public school students for just over 20 years.

Moreover, the emergence of the third generation of distance education, based on digital technologies, has strengthened the connection between design and education. In this context, the present article explores the design of learning activities, which, according to Simão Neto and Hesketh (2009), focuses on the contextualized creation of didactic activities, considering the complexity of knowledge, human interactions, and human-technology interactions. The main objective is the

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exploration of didactic research conducted in teacher training courses or programs at educational institutions.

In distance education, the design of activities aligns with the multimodal discourse of Kress and Van Leeuwen (2001), who define the production of knowledge as socially constructed and mediated by different media formats. The authors state: "We see the multimodal resources available in a culture used to create meanings in every possible sign" (Kress; Van Leeuwen, 2001, p. 4). Considering this, the research guiding this article seeks to understand how the design of activities contributes to meaningful outcomes in research projects, investigating processes carried out by distance postgraduate students, with a focus on the elements: discourse, design, production, and distribution.

Thus, the structure of the article presents the theoretical concepts adopted, describes the methodological framework, and presents the results obtained from the analysis of the virtual learning environment. It is expected that this analysis will contribute to a clearer understanding of the principles of activity design and its applicability in distance education.

2. THEORETICAL FRAMEWORK

Distance education expanded throughout the second half of the 20th century, democratizing access to higher education in several countries, driven by advancements in information and communication technologies, which innovate models, methodologies, and forms of teaching and learning (Lacerda Santos, 2024). This phenomenon has transformed traditional teaching approaches, requiring new knowledge, values, and attitudes for the teaching profession, in accordance with quality standards for distance higher education (Brazil, 2007) and with the demands of a culturally diverse audience.

In this context, the science of design stands out as a facilitator of educational processes mediated by digital technologies, considering that:

> Precisely because of its potential to change education without being asked, it is imperative that teachers and lecturers position themselves in a way that enables them to master the use of digital technologies, harness their power, and put them at the service of education (Laurillard, 2013, p. 2).

The mastery of technologies is conceived by researchers such as Herring, Mishra, and Koehler (2016) as something that can be achieved through training guided by design. Although the concept of learning through design is recent in the educational field, the fact is that, since the 1950s, it has been associated with the production of teaching materials, often even mistakenly, by limiting it to aesthetic issues (Costa; Stoltz; Silva, 2020). In this sense, teaching approaches art, as the teacher, during their practice, seeks to reshape social reality so that the curricular knowledge becomes accessible to students (Laurillard, 2013). When a teacher creates theory, they do so as a researcher of the teaching and learning process, with the aim of continuously transforming their reality.

This articulation between design and education, however, is challenging, especially due to the

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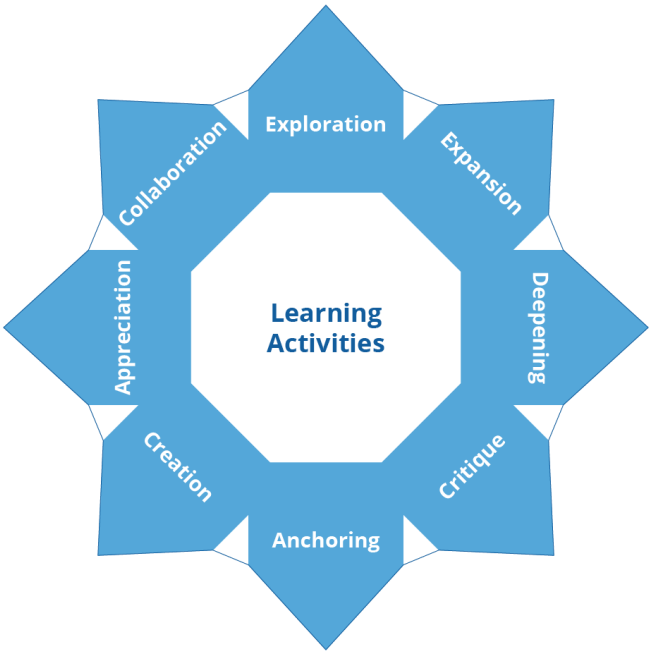
tensions between educational theories and design methods. For example, the term instructional design is often associated with behaviorism and, as a result, rejected by some educators (Andrade; Santos, 2020). However, this perception reflects limited ideas, as design also encompasses materials and courses based on more contemporary pedagogical theories (Romiszowski; Romiszowski, 2005).

In other contexts, instructional design evolves with technological advancements and engages with modern theories, such as constructivism and its variations (radical constructivism, socioconstructivism, social constructionism, among others). These approaches adjust teaching to the interactive possibilities of technologies, although the integration of technology into curricula is not always smooth. Emerging technologies, such as artificial intelligence, increase the complexity of learning activity design and raise ethical concerns regarding academic authorship and assessment.

In light of these aspects, the design of learning activities proves to be essential, as it takes into account both the social context of the educational act and the planned pedagogical approach. According to Simão Neto and Hesketh (2009), it is a field that "focuses on the creation, development, and provision of a series of actions that students perform during their learning journey in a course" (Simão Neto; Hesketh, 2009, p. 97). Therefore, the design of activities includes the methodology, the design attitude, and the process of conceiving the elements that structure learning. This field has been subdivided by these authors into eight general categories or cores, according to the degree of complexity of knowledge, as presented in the diagram below:

Diagram 1 – Typology of Learning Activities



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Source: elaborated by the authors based on Simão Neto and Hesketh (2009).

This way of classifying learning activities, according to the level of complexity of the knowledge developed throughout a course or subject, can be applied within the context of a scaffolding strategy (Antonio Jiménez; Troncoso Pantoja, 2008), where the student receives support information during the process. This strategy has the advantage that the teacher can decide whether to work cyclically

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or focus on the skills of specific cores. In the case of distance learning courses, this decision is influenced not only by what is outlined in the syllabus (or Course Plan) but also by diagnosing the students' prior knowledge and, especially, by the resources available in the virtual learning environment to facilitate the interactional processes (Simão Neto; Hesketh, 2009).

What is at stake in these processes of producing the research project text, mediated by digital information and communication technologies, are two important elements: the production of meaning, which emerges from interactions in the virtual learning environment, and the mediations necessary for the development of teaching and learning. In this sense, Vygotsky's (2019) historical-cultural theory of activity offers a valuable perspective by articulating concepts such as the zone of proximal development (ZPD) and the linguistic sign as the primary interactive mediator. Vygotsky argues that activity is mediated by signs and tools to solve problems (Cenci; Damiani, 2018). Complementing this theory, Leontiev (1978) emphasizes the collective nature of activity, while Engeström (2015) addresses its continuity in social work contexts.

In the case of activities aimed at research prospecting, they fall under creation activities, described as those that "[...] point to the future, stimulating creative, inventive, and projective thinking, as well as the ability to plan and solve problems and challenges" (Simão Neto; Hesketh, 2009, p. 104). However, when planning these activities, it is essential that teachers and designers consider the norms of scientific methodology, in Brazil governed by the Brazilian Association of Technical Standards (ABNT).

These activities are also based on the academic-scientific genre, with specific textual characteristics. In this regard, Kochhann (2021, p. 14) states: "For the movement of academic production, it is necessary to focus on elements of conception, meanings, and constructions of scientific knowledge." Thus, the research project should reflect these textual specificities, articulated with reflection on the researcher's object of investigation within their field of knowledge.

In this context, Social Semiotics presents itself as an effective analytical tool, as it understands the text as an element in constant construction within the communicative process. In the current stage of technology, this communication integrates images, sounds, and moving images (Kress; Van Leuwen, 2001). Social Semiotics focuses on four domains or strata of social practice: discourse, design, production, and distribution, with the latter being responsible for the articulation and interpretation of messages. From this perspective, design is no longer an isolated science but becomes directly related to the production of meanings. In distance learning activities, these four strata need to be integrated, considering the importance of technology in overcoming the space-time separation between students and mediators in the teaching and learning process.

3. METHODOLOGY

The research was implemented through a qualitative approach which, according to Flick (2009), encompasses characteristics such as the appropriateness of methods and theories, incorporates the participants' point of view, and emphasizes the reflexivity of the researcher, in addition to working with methodological variety. According to Minayo et al. (2016), the focus of qualitative research in the social context is on "the universe of meanings" that can be observed in the phenomenon under investigation, which includes values, beliefs, concepts, etc. However, the descriptive aspects of the

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investigated phenomenon are valued (Gil, 2022).

As for the procedures, it is defined as bibliographic research, with a focus on document analysis, considering documents in their multiple formats: videos, films, photographs, posters, etc. However, as an analysis, its focus is on the content made available by these media (Lima Junior et al., 2021). Thus, it proposes a documentary analysis of the sequencing of learning activities, which materialize in media such as text files, instructional guidelines in forums, videos, among others, which assist in the learning and development of the research project.

Study Universe: The Research Methodology course is part of the curriculum matrix of the Graduate Program in Teaching Portuguese Language and Mathematics from a Transdisciplinary Perspective, offered in distance learning mode at the Federal Institute of Education, Science, and Technology of Rio Grande do Norte (IFRN). Five research lines were defined for this course: Line 1: Reflection on the Conceptual Foundations of Disciplinarity, Interdisciplinarity, Multidisciplinarity, and Transdisciplinarity; Line 2: Transdisciplinarity and Complexity as a Methodological Pathway for Teaching Portuguese Language and/or Mathematics; Line 3: Analysis and/or Production of Teaching Materials for Portuguese Language and Mathematics from a Transdisciplinary Perspective; Line 4: Experience Reports from a Perspective of Interconnection Between Knowledge; and Line 5: The Transversality of Ethics and Citizenship in Teaching Portuguese Language and/or Mathematics.

The development of the research project was the main activity of the course and, therefore, its primary objective. This activity was planned in three stages or tasks: in the first stage, students were asked to provide a thematic description of the research, linking it to one of the research lines mentioned above; in the second stage, the theoretical framework was developed; and finally, the methodological framework was created along with the research schedule, culminating in the finalization of the project. The technological, didactic, and communicative design of each task will be the focus of analysis in this study.

The entire activity was conducted in the virtual learning environment (AVA-Moodle) during the 2023.2 academic semester, from September 14, 2023, to November 18, 2023, with the participation of 23 students, of whom 19 were approved (82.6%). The data analysis was carried out using textual analysis techniques proposed by Severino (2017), which include interpretive analysis, problematization, and content synthesis.

The intersection between the textual analysis techniques mentioned above and the four strata—discourse, design, production, and distribution—clarifies the real objects that will be analyzed within the scope of the tasks. For instance, the object of interpretive analysis, which is intended to be analyzed within the discourse stratum, is, as indicated in Table 1, the texts taken within their contexts. Below, this table provides an overview of the intersection between the strata and the elements of the textual analysis techniques:

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Table 1 – Analysis Categories Panel Based on the Strata of Social Semiotics and Textual Analysis Categories

Strata of Social Semiotics	Interpretative Analysis	Problematization	Synthesis
Discourse	Texts taken in their contexts	How is discourse articulated with the pedagogical perspective? Is it imperative? Is it constructive? Is it dialogic?	Identification of the types of discourse that support the didactic-communicative process.
Design	Element that articulates between discourse and production	Which aspects of planning/ design are sensitive to the communicative and didactic process?	Does the activity require personalized or collective support?
Production	Resources that articulate discourse and design	Which media were necessary to articulate the discourse within the design proposal?	Characterization of internal and external tools; online and offline.
Distribution	A semiotic mode; of meaning-making construction	How do students and the instructor reshape the initial text until they reach the final product? Which elements are discarded, and which are validated throughout the communicative process?	Limits and communicative possibilities provided by media, which add meanings to the other strata.

Source: Prepared by the authors, based on Kress and Van Leeuwen (2001).

Thus, each task was analyzed according to the objects of each stratum, questions, and concepts resulting from the intersection with the elements of textual analysis. The discussions inferred from these relationships represented partial developments in light of the theoretical framework constructed in this field.

4. RESULTS AND DISCUSSIONS

The mapping of learning activities in the Research Methodology course, implemented during the 2023.2 semester in the IFRN's AVA-Moodle virtual learning environment, revealed that these activities are part of a didactic sequence with thematic units arranged by levels of complexity regarding knowledge production. The main activity in this sequence is the creation of the research project. The table below illustrates this sequence in the sections of the page, as well as the connections between specific topics, activities, and resources, presented along the horizontal line of each section.

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Table 2 – Thematic Sections of the Page, Study Units, Activities, and Resources

Age Sections	Thematic Units	Activities	Resouces
Section 1	Webinar Space Announcements Forum	• Opening Webinar • Webinar 2	• Streamyard for live streaming and recording on YouTube; • Announcements Forum; • Text: Research Lines.
Section 2	Course Information Wall	• Reading the texts: syllabus and research lines; • Open participation in the doubts forum..	• Doubt Forum; • Course Syllabus; • Text: Research Lines of the Program; • Text: Activity Schedule; • Textbook (Carvalho Neto; Palhano, 2021); • Student Guide; • Tools: Anti-plagiarism, language review, and reference generator.
Section 3	**Thematic Unit 1** Scientific Knowledge • Types of Knowledge • Scientific Research • Ethics in Research	• Thematic discussion; • Evaluative activity: Development of the problematization of a freely chosen research topic. The topic should already aim at the production of the final paper (TCC).	• Forum on the reading of Chapter 1 of the Textbook (Carvalho Neto; Palhano, 2021); • Video Lecture: Types of Knowledge; • Mini-course: ABNT in Word; • Supplementary texts; • Texts: Instructions for the Research Project.
Section 4	**Thematic Unit 2** Scientific Research and Research Project	• Thematic discussion; • Reading and video consultation; • Development of the Theoretical and Methodological Framework of the Research.	• Individualized forums for discussion of topics proposed by students; • Base text: Chapter 3 of the course material; • Video: Ethics Committee in Research – Types of Research that Do Not Need Approval; • Video Lecture: The Research Problem; • Resource: Research Project Template; • Task (text submission tool).
Section 5	**Thematic Unit 3** Data Analysis in Scientific Research	• Methodological development of the research; • Submission of the Research Project for the Final Paper (TCC).	Base text: Research Methods; Supplementary text: Synthesis on Literature Review.

Source: created by the authors, based on the Ava-Moodle interface (IFRN).

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As already mentioned, the activity of developing a research project falls within the general core of creation activities (Simão Neto; Hesketh, 2009). It is important to consider, however, that this level presupposes a set of prior knowledge that is mobilized in the development of the previous activity cores, built throughout the course, including the activities of expansion, deepening, and critique. For this reason, the activity was carried out through three tasks, distributed across the three thematic units, mobilizing various actions, as we will see later.

This distribution aligns with the activity theory developed by Leontiev (2021), which is based on the studies of Vygotsky. It emphasizes that activity and action are not synonymous, as the motive behind an action may not directly coincide with the goal of the activity (Eidt; Duarte, 2007). An example of this relationship can be observed in the case of a cursory reading of instructional or informational texts, which indirectly contribute to the activity. For instance, reading an informational text about the thematic construction of a research project does not necessarily mean that the student will be able to carry out the activity without significant difficulties, hence the need for mediation.

Furthermore, Leontiev demonstrates that action and task or operation cannot be confused: "By operation, we understand the mode of execution of an action. The operation is the essential content of every action, but it is not identical to the action" (Leontiev, 1975, p. 303). The question that arises for the designer or teacher is to determine how many operations are necessary for the student to achieve the learning objective set for the activity. In our case, the activity could be broken down into three tasks, interconnected with one another, each requiring the corresponding actions to be understood by the students in order to properly complete the activity.

The first element observed within the strata proposed by Social Semiotics is discourse, which, according to Kress and Van Leeuwen (2013), consists of socially developed knowledge, shaped in specific contexts and in accordance with the interests of the interlocutors. In this sense, the discourse that emerges within the scope of the activity must take into account both the formative and professional contexts of the interlocutors. In the case of the participants in the course under analysis, they are teachers from basic education, graduates in Portuguese Language, Mathematics, and Pedagogy, who are engaged in the context of continued academic training.

Thus, we analyze the discourse in three dimensions: the first, in the guiding documents of the activity; the second, in the dialogue between students and the teacher; and finally, in the product (text) to be submitted in each thematic unit. It is important to note that, within the scope of the instructional documents of the first task, the discourse is clearly multimodal, as it appeals to various forms of representation: text, image, sound, and video, in addressing the conceptual field related to the thematic description of a research project. The discourse is didactic by nature of the task, with the intention of motivating students toward the activity, as, according to Fairclough (2001), discourse has the power to change the world and people.

For this activity, four documents were important: the first, the recording of the opening webinar along with its respective PowerPoint presentation; the Student Guide, which is a summarized booklet outlining the course syllabus and its methodology; the textual document describing the

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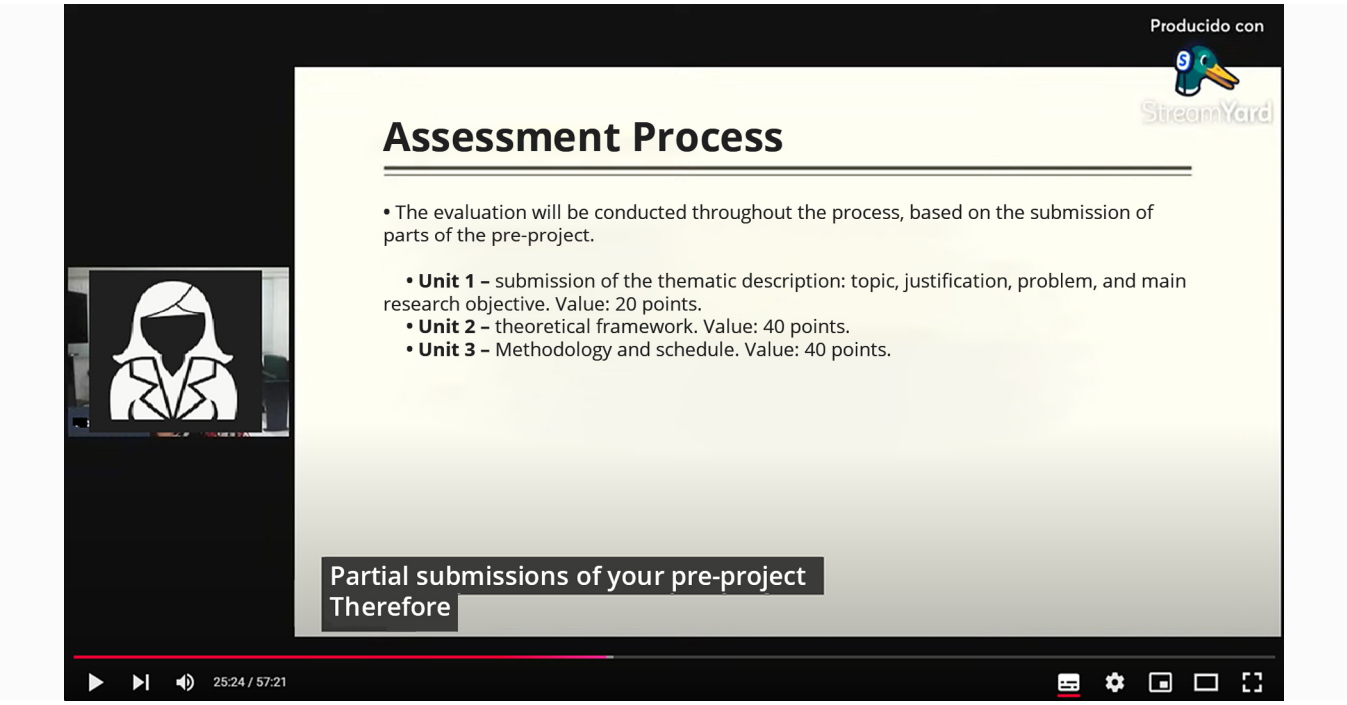
research lines of the course; and finally, a schedule in infographic format.

In the case of the opening webinar video, the explanation of the first task begins at 25'24", with a general overview of the three tasks, and ends at 46'48", which means a little over 20 minutes dedicated to explaining the task. It is clear that the element linking discourse and production, that is, the design, aimed to use sound, image, and text to convey information as comprehensively as possible. The initial scene of this activity is presented below.

Image 1 – Initial image of the instructions for the three tasks [didactic activities]



Source: Sequence of scenes from the opening webinar of Research Methodology – Moodle/IFRN, 2023.

The Student Guide (2023) presented the sequence of tasks for the activity in the form of a simple flowchart, as the purpose of this guide is merely to "remind" what needs to be done. Finally, each task is accompanied by a visual representation of the schedule, so that the student has a temporal reference that allows them to understand that the actions related to the tasks must be completed within the specified deadlines.

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Image 2 – Infographic of the research stages and their schedule

Source: Research Methodology Task Schedule – Moodle/IFRN, 2023.

Thus, once the proper instructions have been provided, based on the student's thematic proposal and its problematization, it becomes possible for the course instructor to assess the prior knowledge the student already possesses, and then guide further deepening of knowledge, situating this moment within the Zone of Proximal Development (Vygotsky, 2019). Therefore, it is not enough for the student to simply understand the instructions; it becomes crucial that, during the process, the student recognizes the need for assistance. According to Rodrigues Matta (2003, p. 3): "This is the space of potential learning, that is, of educational and formative activities," and within this space, direct dialogue between the interlocutors – teacher and student – becomes essential. The design solution found to fulfill this objective was the use of the forum tool.

The result of this task proved to be satisfactory, as 21 out of the 23 students enrolled in the course submitted the complete thematic description. In this first phase, the professor reviewed each text and made observations in specific areas of each one where adjustments were needed. Two main issues were observed: the first referred to the inadequacy of research objectives, which were often confused with lesson objectives; and second, the justification was not based on recent studies but rather on the author's personal opinion. However, all students were given the option to continue receiving individualized guidance if they recognized the need for it. This decision would be indicated by the student in a forum, in which they could participate in stages (2nd and 3rd tasks) or submit the finalized project within the specified deadline.

The second task required the achievement of the objective of deepening the thematic lines

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developed by the students. As mentioned earlier, the forum was the means through which the dialogue between the professor and the students took place. It is important to note, however, that based on the students' professional and academic experiences, personal interests, and the research lines of the course, each student proposed specific topics. In this case, the forum tool could not be opened in a general manner, that is, with a single discourse for all. In the "general forum" configuration, it was possible to textually explain the purpose of the forum and create links for each student, thereby offering individualized guidance. This approach allowed participants, upon entering the forum, to identify their name and access their exclusive guidance area.

This space, characterized by its asynchrony, helped track the textual construction at the pace of each student, according to their specific needs. The initial message of the forum included observations about the first task the student completed, along with explanatory notes to guide the corrections. An example of this is found in the professor's message: "- Dear... Attached is the text with the observations. The topic is still broad, that is, insufficiently defined. However, I believe that by the end of the writing process, you will have made the necessary adjustments. The corrections focus more on the objectives. If you have any questions, feel free to post them in this forum, and we will continue." (sic). It is noted that the text from the first task was attached, containing comments on the student's work and suggestions for corrections. In this case, understanding the discourse depended on what was written in the body of the forum and the internal comments of the attached document.

Analyzing the forum of one of the students, whom we will refer to as "Mr. X," the proposed topic was: *An analysis of a 7th-grade mathematics textbook in search of interdisciplinary aspects*, with the general objective: "To investigate, using a mathematics textbook, the use of resources and aspects that provide an interdisciplinary approach to the mathematics content" (sic).

In the example above, the author of the text considers one of the specific objectives to be: "To analyze, based on the observed suggestions, which subjects are addressed through this process" (sic). Regarding the "observed suggestions," it can be inferred from the previous objective that these refer to the "interdisciplinary activities" the student aims to identify throughout the textbook. Thus, the textual form is closer to a procedural approach than to a specific objective of the study. On the other hand, the idea that the suggestions themselves (which will be subject to scrutiny) will be used to identify which subjects will be incorporated, is something that moves beyond the general objective of the research.

Given the content that was somewhat vague and not closely related to the theme of the paper, the professor made the following observation in the body of the work:

> You do not conduct the analysis based on the suggested activities. The analysis should be based on the theories that support the use of the textbook. In this case, you need to create the analytical parameters based on interdisciplinarity. An example of this can be found in the text below (you should download it): https://www.researchgate.net/publication/372373786. The author presents tables of parameters for evaluating textbooks, and I believe number 3 relates to your topic [on pages 6 and 7]. (Course Instructor, 2023).

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Based on the professor's comment, the student reorganized their thinking and wrote a new objective: "- To clarify which interdisciplinary relationships can be established based on the activities found" (sic), significantly improving the text.

The example above presents one of the structural elements of the research project that is difficult to construct for most students, namely: the formulation of research objectives. In the forum, this issue was recurrent in 97% of the submitted papers. For teachers accustomed to lesson planning and coming from a background that does not always prioritize scientific initiation, it is common to confuse research objectives with learning objectives. Another common mistake is to formulate them in a vague, imprecise manner, or to confuse them with methodological actions. According to Gil (2022), the general objectives of a research project are linked to the type of research selected by the researcher when addressing their object of investigation. When the relationship between theme, problem, and research objective is not understood, it is common to make such mistakes. This confusion is likely related to the particularities of research in education, which, according to Gatti (2012), remains a methodological issue in the field of educational sciences.

The development of the methodological framework continued in the same forum for individualized guidance, for those students who adjusted the text of their project in the theoretical framework. In addition to issues related to the approach and type of research, including its methods, data collection instruments, and stages, three other elements were also addressed: the detection of plagiarism, compliance with ABNT standards, and linguistic revision. As this is a project, these last three elements could be verified using specific technological tools, such as plagiarism detection tools (e.g., Plagium, Copyspider, etc.), linguistic revision tools (e.g., Language Tool), and reference generators, all chosen by the students and with procedures carried out by them.

The result of the submitted works, by research line, can be seen in Graph 1. In this regard, the works from lines 1 and 2, theoretical reflection and teaching methodology, respectively, accounted for 69% of the total submissions. This type of research is already expected, considering the lack of requirement for processing through the Ethics Committee, due to the limited time available for developing the product, which is the scientific article. It is also worth noting that 14 students (73.68%) of the 19 course completers opted for individualized guidance.

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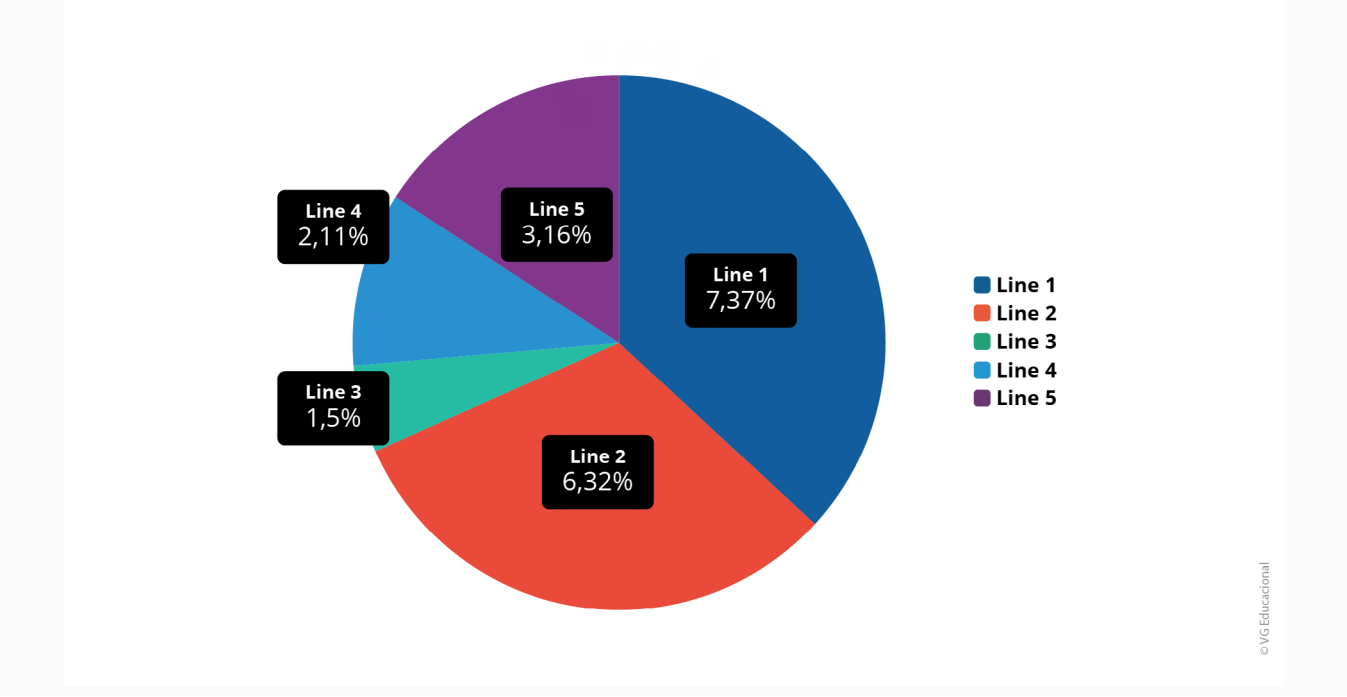
Graph 1 – Works by Research Line



Source: Prepared by the authors (2024)..

One of the problems detected in the methodological development was the fragmentation of knowledge related to the type of research and its approach. It became evident that there was a limited understanding of how the interfaces of research are articulated: approach, type of research concerning objectives, and concerning technical procedures. An example extracted from one of the projects: "This work is exploratory, conducted through research on the internet, books, and dissertations" (sic). Here, exploratory research is confused with the technical procedures of bibliographic research. In this regard, the writing on methodology should consider the particularities of the research and clarify the type of research, whether it is exploratory, descriptive, or explanatory. Furthermore, "it is also important to clarify the type of design to be adopted" (Gil, 2022, p. 162).

The third type of problem found in the projects is a certain lack of concern with data collection instruments, specifically questionnaires. About 20% (4 projects) mentioned the use of questionnaires in their research, but without the proper recognition that they required content validation from their advisors and, in most cases, given that it involved research with human subjects, approval from the Research Ethics Committee. In all the cases anticipated, the questionnaire was presented as linked to qualitative research, even when the proposed data analysis suggested otherwise.

According to Richardson (2012), one of the most common mistakes made by novice researchers is selecting research instruments that are inappropriate for the formulated problem. This type of problem is not easily resolved within the scope of a short-term course, even though various resources are provided that address these ethical aspects of research. This leads us to consider that

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it is a conception of research whose alteration involves not only conceptual issues about research but also attitudinal ones, which have been shaped throughout the student's academic training—an issue that goes beyond the objectives initially outlined here.

5. FINAL CONSIDERATIONS

The partial results from the analysis of the research project development activity showed that the integration of digital technologies into the multimodal discourse facilitated communication and mobilized efforts toward achieving the main objective of the Research Methodology course. In the example drawn from the forum interaction, it was also observed that individualized guidance significantly contributed to helping the student resolve doubts and establish clearer research outlines. Furthermore, the exchange of versions of the research project text allowed for its continuous remodeling, resulting in a more complete and assertive version.

This study also reinforced the idea that research design is essential for teacher training in scientific initiation, especially in the context of continuing education in distance learning. The importance of this design line is linked to the results sought within a curricular component, due to its didactic flexibility. Furthermore, it is crucial that formative processes focusing on teaching practice in distance education seek to integrate research design into the training of these facilitators. As Herring, Mishra, and Koehler (2016) state, learning through design mobilizes knowledge, skills, experiences, approaches, and techniques that teachers need to have in their "training repertoire" in order to solve learning problems as soon as they encounter them.

On the other hand, we need to deepen our understanding of the multiple representations that mobilize multimodal discourse, as we are dealing with a diverse audience in terms of their sociocultural, affective, and cognitive experiences. In this context, there are many ways to express dissatisfaction, one of which is the procrastination of completing the proposed activities, which may be perceived as difficult or even impossible to accomplish. We need to move beyond the limitations of our written texts and improve the connections with other sources of knowledge that align with the learning objectives. Thus, we aim to deepen our knowledge in this field and enhance future pedagogical practices in the distance learning modality.

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