Application of interdisciplinarity in the northern region

Aplicação da interdisciplinaridade na região norte

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ABSTRACT

Interdisciplinarity is one of the tools at the disposal of teaching, learning and research in the context of Brazilian education. The objective of this study was to analyze the applicability of the theme under study, in the articles published by 11 Higher Education Institutions, in the last five years (2017-2021) in the North region. The method employed was inductive, with qualitative scope, and observational nature. To obtain and select the literature, access was made to their repositories, as well as specialized electronic journals with free access. The analysis of the statistical data was carried out using electronic spreadsheets contained in the...
Excel software, version 2013, and application of Descriptive Statistics. The data obtained and analyzed allowed the identification of interdisciplinarity in these academic productions \((n = 26;100\%)\), and in the areas of knowledge established by CAPES, most frequently the association occurred between Environmental Sciences - Humanities (CAMB-CH, \(n = 4.0;15.4\%\)). In quantitative terms, little was produced \((\bar{x} = 2.36)\) in this period, and the largest volume was identified at UFPA \((n = 7.0;27\%)\); the smallest, in six \((n = 1.0; 3.8\%)\), among which, UEPA. With this, it can be verified that there is still much to be done for interdisciplinarity to be more applied in the HEIs of the northern region.

**Keywords:** learning, education, research.

**RESUMO**

A interdisciplinaridade é um dos instrumentos à disposição do ensino, da aprendizagem e da pesquisa no contexto da educação brasileira. O objetivo deste estudo foi analisar a aplicabilidade do tema em estudo, nos artigos publicados por 11 Instituições de Ensino Superior, nos últimos cinco anos (2017-2021) na região Norte. O método empregado foi indutivo, com escopo qualitativo e natureza observacional. Para obter e selecionar a literatura, foi feito o acesso aos seus repositórios, bem como revistas eletrônicas especializadas com acesso gratuito. A análise dos dados estatísticos foi realizada utilizando planilhas eletrônicas contidas no software Excel, versão 2013, e aplicação de Estatísticas Descritivas. Os dados obtidos e analisados permitiram identificar a interdisciplinaridade nessas produções acadêmicas \((n = 26,100\%)\) e nas áreas do conhecimento estabelecidas pela CAPES, mais frequentemente a associação se deu entre Ciências Ambientais - Humanidades (CAMB-CH, \(n = 4.0;15.4\%\)). Em termos quantitativos, pouco se produziu (; nesse período, obteve-se o maior volume na UFPA \((n = 7.0; 27\%)\); o menor, em seis \((n = 1.0; 3.8\%)\), entre os quais, a UEPA. Com isso, verifica-se que ainda há muito a ser feito para que a interdisciplinaridade seja mais aplicada nas IES da região Norte.

**Palavras-chave:** aprendizagem, educação, pesquisa.

**1 INTRODUCTION**

Interdisciplinarity shows itself as a form of association with the fragmented process of the current Brazilian educational context, due to the absence of methodologies that have this conduct (COSTA et al., 2018; PARENTE; NOVAIS, 2017). It should be applied at all three levels of education so that there is training, in fact and in law, of citizens who are really prepared for a daily reflection about the problems that surround it, and is capable of presenting proposals with feasible solutions, and this will only be possible if interdisciplinarity is integrated into school curricula (LIMA; OLIVEIRA, 2018; RIBEIRO; ALVES; RESQUE, 2018).

These performances must be published, especially in scientific articles, so
that the academic community and the population can learn about them and discuss them. In this sense, this research was developed, whose objective was the quantitative analysis of articles published in electronic journals, and resulting from investigations, studies, research and other forms of analysis coming from Higher Education Institutions (HEIs) in the North region, in the last five years: 2017 to 2021.

2 MATERIAL AND METHODS

The method employed was inductive because Rodrigues, Keppel and Cassol (2019) sintersized that, in this type of method, it is possible to know the subject of the research, in this case, interdisciplinarity. As for the approach, the quantitative and qualitative approach was used, since according to Pereira et al. (2018), we collected quantitative data that generated a mass of them and then analyzed statistically, and qualitatively so that we can analyze the way of applying the central theme of this research. To obtain the data, digital platforms such as the Periodicals Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES), Repositories of Higher Education Institutions were accessed, and this choice resulted from an effectiveness as to the data stored in their repositories (Table 1).

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The time cut-off was in the last five years: 2017 and 2021, so that more recent information could be obtained. The selection of past data was carried out in three steps for better allocation of time and efficiency (Figure 1).

Figure 1 - The three steps and the actions developed in each of them, to select the past data.

For contextualization of the study with the selected literature, in the Table of Knowledge Areas (CAPES, 2020) and verification of the use of interdisciplinarity, the title of the article was taken as the basis, in order of composition, and the acronyms of these major areas were used: Exact and Earth Sciences (CET), code: 1.00.00.00-3; Biological Sciences (CB), code: 2.00.00.00-6; Engineering (E), code: 3.000 4.00-9; Health Sciences (CS), codes: 4.00.00.00-1; Agrarian Sciences (CA), code: 5.00.00.00-4; Social and Applied Sciences (CAS), code: 6.00.00.00-7; Humanities (CH), code: 7.00.00.00-0 and Linguistics, Letters and Arts, code: 8.00.000.000.00.00.00000.0000-2. It is worth noting that Environmental Sciences (CAMB), is already recognized by Area 49 (CAPES, 2019), however, does not yet have code.
The allocation of the interdisciplinary components was carried out based on the association between the discipline of the field of knowledge (mathematics, physical biology) and that curriculum (Nature Sciences; Applied Social Sciences, among others), according to Olga Pombo (2008). After obtaining the data, statistical analysis was performed using spreadsheets contained in the Excel software, version 2013 (MICROSOFT CORPORATION, 2013). To this end, Descriptive Statistics was applied, where values were calculated for arithmetic mean, standard deviation, absolute and relative frequencies. Finally, graphs and tables were constructed for their better exposure and discussion (IBGE, 1993).

3 RESULTS AND DISCUSSION

3.1 SELECTION OF LITERATURE

After analyzing the selected data, it was found that, of the 81 articles previously selected, the minority of them ($n = 26.0; 32.0\%$) met steps 2 and 3, of the previously established method, with a higher frequency for those published in electronic journals and distributed by the 11 HEIs researched (Figure 2).

![Figure 2](image)

In Figure 1, it was observed that the teachers of the different HEIs have already started interinstitutional research (UNIR/UEMA/UFRO; UFPA/GSAT). It was also shown that UFPA (1.4±1.5) was the most prolific in publications with the highest concentration in the year 2021 ($n = 6.0; 23.0\%$). Then, UFOPA (1.0±1.0) with four publications ($n = 15.4\%$) in the five years analyzed. The data obtained also indicated that 2020 (0.5±0.6) and 2021 (0.5±1.1), were similar in relation to
the quantitative of publications ($n = 6.0; 24.0\%$). This may have occurred as a result of the advance of the pandemic that isolated academic life, and hence more time dedicated to research and textual composition.

On the application of interdisciplinarity, the analysis of the data obtained allowed the identification in the researched sections of the selected literature. The large area "CH" houses the sub-area "Education" and, as a result, it was perceived a higher frequency ($n = 12; 100\%$), their association with the others. As for the form of the association of disciplines (CET; CH), in Itaituba-PA, Almeida, Brito e Collins (2019) and Manaus-AM, Passos e Nicot (2021) it was effective. In the first, the authors studied integrating projects (AIA; water reuse; materials for water systems and facilities) in basic sanitation, and concluded that there are still adjustments to be made. In the second, the research involved the use of quadratic function in the teaching of biology, physics and chemistry, and concluded that this improved the assimilation of the application of this function in the three disciplines. For the relation (CET;CB;CH), in Rio Branco-AC, Moura et al. (2019), involved the use of Science, coupled with the application of Physics and Chemistry from the study of soap bubble and the retention of air, colors, dimensions, among other interdisciplinary analyzes, which facilitated the learning of their concepts.

In the following association (CAMB;CH) two approaches allowed the identification of the use of interdisciplinarity: in the first, in Parauapebas-PA, by Fernandes, Kvitko and Roehrs (2019). The first authors analyzed the Bachelor of Environmental Sciences course as to the focus of this research, and concluded that they have not yet undertaken an interdisciplinary connectivity when it comes to the environment. In the second approach, they applied interdisciplinarity to the structuring of a Science Fair, and concluded that this improved the learning of the students of the Production Engineering course from the elaboration of projects that benefit the community and present low cost, such as in the reuse of discarded packaging as "garbage".

In terms of learning to environmental conservation, there were similar conclusions as described by Lima and Monteiro (2019), where they summarized that one can promote integration between disciplines, regardless of the number, and break the barriers that still persist to the application of interdisciplinarity, as carried out in the research carried out in Ilha das Onças-PA, by Rodrigues and
Palheta (2019), which used an environmental resource (water), and socialized with the community of Furo Conceição, the rational use and conservation of it as a finite resource in potability. This line of application was followed by Sadala and Brasileiro (2021), who wrote about the use and conservation of the Amazon floodplain, based on a balanced relationship between man and the Amazon environment, especially the floodplain.

For the association (CSA;CH), the selected literatures expressed that interdisciplinarity is a tool for application in the relationship, both in the formal and informal space of learning. Study carried out at the Specialized Reference Center of Social Assistance (CREAS), in Belém-PA, by Jorge e Ponte (2017) about the social relationship between professionals from different areas, concluded that, regardless of the area of activity, Sociology, Pedagogy and Psychology, exercise in associative functions is passive of application, however, this still does not occur in this place. In the association (CB;CET;CH), the interdisciplinarity was identified in the research carried out by Parente e Novaes (2017), in the municipality of Santarém-PA, which involved the pedagogical procedure in the teaching of Sciences in 53 schools and 19 teachers in that locality. They concluded that the participants were unable to elaborate a concept or a difference for the term in research. Already in Acara, Pinheiro, Silva and Neves (2021), they carried out studies with teachers of that municipality, and concluded that they managed to relate Sciences, Mathematics, Geography and History, from the context of Language and, with this, improved the understanding of the communities of educators of that locality.

In the other association between (CB;CH), the selected literatures are the result of research carried out by Silva et al. (2020), in Santarém-PA, and Ribeiro, Alves and Resque (2018), in Belém-PA. Both focus on learning in science, on the relationship between learners/learners, and their surroundings. In the first, there was the application of the Interdisciplinary Action Program and it expanded the vision as to the transmission of educational knowledge, whose emancipation and liberation does not depend on large investments, but rather on a multiple vision of the facts. Then in the second, the authors concluded that the application of interdisciplinarity is difficult, but not impossible, and is already carried out by professors who reported this to the researchers.
For (CB;CET), the study carried out by Martines, Dutra and Borges (2019), in Porto Velho-RO, focused on the interdisciplinary work of the EDUCIÊNCIA group, which involved Biological, Chemical, Physical and Informatic Sciences. They concluded that training-research is already dissipating new concepts and attitudes as to the method-approach dichotomy for the component disciplines of it, which elevates learning and deepens the teacher-student relationship.

In the context of the association (CA;CH) and (CA;CH;CAMB), the selection of the literature was made with the articles produced by (1) Costa et al. (2018); (2) Santos et al. (2017), and (3) Souza et al. (2021). (1) In Cametá-PA, research was carried out on the inclusion of the deaf, via science, and with the use of linguistics, however, the results are still not satisfactory due to barriers of the contradictory apprehended by the teacher; (2) in Castanhal-PA, the authors concluded that the content apprehended in graduation, can be associated with other disciplines and expand the vision of more holistic knowledge, and thus improve the solution of problems via Sciences; (3) in Itupanema-PA, the interdisciplinarity was achieved with the construction of a school garden, which raised the understanding as to: soil, water, air, production and consumption of food without the use of agrochemicals, and increased the human-nature relationship.

As for the association (CH;LLA), it was identified in the revisions of literature written by Almeida and Amador (2020) and Pereira et al. (2018), where authors sought data about the use of Literary Language as support for the teaching of history. They concluded that the former is the best support for the latter, due to the report of various factors, among them habits, feelings, ideologies, among others, and that interdisciplinarity is intrinsic to language. For (CH;CSA), Sardinha, Reis and Gushiken (2020), they addressed the Humanities (Geography, History, Philosophy) and the Applied Social Sciences (Communication) in Stricto sensu programs and, being them, this improved the guiding-guiding relationship, as well as allowed a broader view of the student in this academic stage and, finally, their literary production.

In the context of the association (CS;CH), what called attention to interdisciplinarity was the content of the literature review produced by the authors of the literature of the Bandeira, Oliveira and Miléo (2021), which associated Health and Education, and concluded that this is an association of high complexity,
especially because it involves public policies, and that it will only be solved with joint management. In the research carried out in Belém-PA, by Freire et al. (2020), on equotherapy with the purpose of re-educating individuals with cerebral palsy, the authors found that this association promoted an improvement in the individuals who made use of it. Furtado, Silva and Brito (2021), also in Belém-PA, researched remote classes and the teaching of Physical Education, Philosophy and Sociology, and that is, during or after the COVID-19 pandemic, one must rethink the context of individuality for the collective and the well-being of the learner/educator and the vision of what they have around them.

Finally (LLA;CH) this association was verified in the study carried out by Rocha and Malheiros (2021) and Sousa, Barros and Matos (2020) in Boa Vista-RR, as investigative experimentation in a science club, and the expression of the students about their universe, via drawings about forests, indigenous peoples, animals, among others about the involvement of the pedagogical context and the interdisciplinarity from the design and writing of the students, which improves the teacher-student approach, therefore, its application in the teaching of Science and Sociology is valid.

4 CONCLUSION

Interdisciplinarity, both in undergraduate and postgraduate courses, is in the phase of being implanted in the HEIs of the northern region. However, in some of them, the application in both teaching and student research was identified, in particular, in the environmental area. The interinstitutional dialog actions are already taking place, however, there is a need for further dissemination of this action because the current volume of production in this line, is still insufficient when one observes what is explained by past information on this subject. The data contained in this study may support future research for evidence of an evolution or involution in the higher education institutions analyzed here.
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