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A Successful Experiences Report in Scientific Initiation: The Use of Interdisciplinary and Teamwork

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ABSTRACT
The objective of this work is to describe and reflect on two interdisciplinary scientific initiation experiments, developed together by two instructors from different scientific areas (health and technology), at a Higher Education Institution. The research describes the methodological path taken in the two projects that occurred in 2015 and 2018. The relationship and linkage between the instructors and the students from different areas are discussed. The results of this partnership, i.e., a digital atlas for tissue study and an educational game (*serious game*) about Schistosomiasis demonstrate the importance of the development of collaborative and interdisciplinary works fostering exchange of experiences, information and developing skill as well as in the creation of educational tools that meet the technological innovation demands from present-day higher education.

KEYWORDS
Research projects. Interdisciplinary approach. Interpersonal relations. Higher education.

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Relato de Experiências Exitosas na Iniciação Científica: O Uso da Interdisciplinariedade e do Trabalho em Equipe

RESUMO

Este estudo teve por objetivos relatar e refletir sobre duas experiências interdisciplinares na iniciação científica, desenvolvidas em conjunto por dois docentes que atuam em áreas distintas do conhecimento(saúdee tecnologia), em uma Instituição de Ensino Superior. Trata-se de uma pesquisa que descreve a trajetória metodológica dos projetos orientados, nos anos de 2015 e 2018. Discute-se a relação da integração e articulação ocorrida entre os docentes e, destes, com os discentes das duas áreas. Os produtos obtidos desta parceria, isto é, um atlas digital para o estudo de tecidos e um jogo educativo sobre a esquistossomose, do tipo *serious game*, demonstram a importância do desenvolvimento de trabalhos colaborativos e interdisciplinares na promoção de trocas de experiências, informações, desenvolvimento de habilidades e criação de ferramentas educativas que atendam às demandas de inovação tecnológica da educação contemporânea no ensino superior.

PALAVRAS-CHAVE

Projeto de pesquisa. Abordagem interdisciplinar. Relações interpessoais. Educação superior.

Relato de Experiencias Exitosas en la Iniciación Científica: El Uso de la Interdisciplinariedad y del Trabajo en Equipo

RESUMEN

Se trata de uno trabajo con un alcance descriptivo y reflexivo acerca de la trayectoria metodológica de proyectos en la iniciación científica, desarrollados en conjunto por dos docentes que actúan en áreas distintas del conocimiento (salud y tecnología), en una Institución de Enseñanza Superior, en los años 2015 y 2018. Además, se discute la relación de la integración y articulación ocurrida entre los docentes y de éstos, con los estudiantes de las dos áreas. Los resultados obtenidos de esta asociación, es decir, un atlas digital para el estudio de tejidos y un juego serio sobre la esquistosomiasis, indica la importancia del desarrollo de trabajos colaborativos e interdisciplinarios en la promoción de intercambios de experiencias, información, desarrollo de habilidades y creación de herramientas educativas que atiendan a los avances tecnológicos en la universidad, en los últimos años.

PALABRAS CLAVE

Proyecto de investigación. Enfoque interdisciplinario**.** Relaciones interpersonales**.** Enseñanza superior

Introduction

In the current scenario, where changes in the profile of the students who enter higher education occur, a more integral and generalist education is required (AUDY, 2017), and the university teachers are requested to look for knowledge integration (EMMEL and KRUL, 2017). The new challenges lead to a need to re-signify all activities that are developed in the university environment, including in this context, the research.This, within a program that can initiate the students into the scientific field, will contribute to an academic environment based on a systematic and permanent knowledge building (LAMPERT,2007).

As explained by Fava-de-Moraes and Fava (2000), the scientific initiation programs in higher education present a broad spectrum of contributions to science and country development. These authors, when describing the advantages of scientific initiation for students, also called attention to the role of mentor tutors, as they point out the importance of the guidelines taken by them, and the support for developing certain skills in the tutees.The interaction with the researcher's experience allows them to be in touch with an updated science, even in the undergraduate course. Pinho (2017), taking into consideration the trinity high school teachers - students and the course itself, mentioning the benefits that can be achieved through scientific initiation, such as stimulus to problematization, research lines creation, the legitimization of production of new knowledge, among many others.

With this vision, it was prioritized the planning and execution of two scientific initiation projects that allowed a symbiosis among all participants and advances in social, personal, interpersonal and professional dimensions.

Methodological Path

This work is a report of two teaching experiences developed in the scientific initiation, between undergraduate courses in health and computing, in a Higher Education Institution in Salvador, Bahia. It describes and discusses the pedagogical practices that were employed and the results obtained in both experiments. Each project lasted two semesters and occurred following the norms established by the scientific initiation edict of the Higher Education Institution without financial support (initiation grants). The selection of interested students happened through inscriptions and interviews, with the participation of the two advisors involved in the projects: a specialist professor in histology and a doctor in pathology (health field) and a professor specialist and doctor in computational modeling (computing area). After the selection, were created by the mentor teachers/mediators, “exclusive groups” for questions and information sharing, with the selected students, using tools such as WhatsApp, Facebook and Google drive, in the current semesters. After completing all steps of the projects, the oral presentation of the product generated was made in an institucional event: the Scientific Initiation Symposium (SIUNI), for dissemination of the results with the academic community and it´s evaluation by examining board composed by the mentor teachers and some other researchers of the Initiation program.

The elaboration of a digital atlas for the study of normal and altered tissues

These project was our first interdisciplinary attempt. It had happened in the year of 2015, with undergraduate students from the Information Systems course and Nursing without financial support. The aim was to create a digital resource (digital atlas) in the institutional virtual platform, that allowed the students to know a normal histological structure of the different organs and recognize histopathologically the main aggression mechanisms involved in various diseases. At first, meetings were held to integrate the group and to clarify the didactic proposal. For Information Systems students, two visits were scheduled to the microscopy lab so they could understand what the digital atlas would provide to health care students. Thus, for the first time, they observed histological slides under the microscope and were able to visualize how photomicrographs would be obtained for availability in the atlas. As it was a very heterogeneous group, the meetings conducted by the supervising teachers were weekly, inserting the students in the necessary theorization for the project development. From then on, the contributions of each component were highlighted, aiming at bibliographic research, the definition of the type of software to be employed, survey, monitoring, and updating of project requirements and conducting navigability tests of the digital resource created. The construction detail of the atlas and its pedagogical importance as a tool was published in an indexed scientific journal on education by Miranda et al (2017). Access to the atlas is available at a link from the institution where the project was developed (Figure 1).

The construction of a digital educational game for the prevention of Schistosomiasis

This project was developed in the year of 2018 with the purpose of creating an educational computer game that would be able to give basic information about the form of contagion of Schistosomiasis (a very common disease in Brazil) to children and young people, in a playful and fun way. Through weekly meetings, under the guidance of the two teachers involved, the team worked on a feasible script to raise suggestions about scenarios, characters, soundtracks, and the installation and configuration of the software development environment. The game “Water Belly” (Figure 2), named by the team of the serious game development, is available for free on Google Play through the link https://play.google.com/store/apps/details?id=com.Unijorge.barrigadagua. It is intended to use the game as a learning tool in public schools in the city of Salvador, in elementary school, to carry out an educational intervention in disease prevention.

Figura 1. The main screen of the histological Atlas

Source: the authors

Figura 2. Some screens of the game Water Belly

Source: the authors

Results and Discussion

The application of a group work strategy in the scientific initiation, with students and teachers from the health and computing areas, allowed the integration of distinct knowledge and synergistic actions. Anastasiou and Alves (2007) point out the challenges and benefits of group strategies, calling attention for the teacher's action regarding the planning of the objectives and the necessary referrals for the establishment of intra and interpersonal relationships. These last ones, regarding conversation skills. In both experiences, the communication that was established in the research groups allowed an advance in the educational and technical-scientific process due to the decentralization of knowledge and the visibility of the importance of the projects for all involved: the first experience, developed with the intention of articulating knowledge in higher education between the areas of histology, pathology, and technology has been successfully applied in the construction of a virtual atlas that can be used by anyone who accesses the institutional link created. The second, designed for preventive health education purposes, leads to a possibility of interventionist actions in society.

According to Fazenda (2011), the integration of knowledge liberates us from the fragmentation of education. The ways to be followed must involve partnerships, allowing the production of knowledge (Fazenda, 1991). Still, as a conquest of our experiences, we must consider here the constructivist proposal that was developed in the two initiation projects, since the students were challenged to mobilize knowledge, both pre-existing and newly incorporated, for the development of cognitive, technological, socio-affective and metacognitive competences. Custódio *et al* (2013), explains that it is important to work on educational constructivism with the prior knowledge of the students, putting them in the discussion, in order to generate cognitive conflicts. It is from this context that one has significant learning. Our pedagogical proposal was of respect for the ideas raised by the students, encouraging them to develop autonomy, creativity, collaborative work, living values, and knowledge building. It is important to say that it was not just a cooperation work. The researchs went beyond the boundaries of its specialized knowledge fields, allowing a plural view to understanding what it was intended to do. This differential made possible to all the involved getting a wider point of view, going beyond their areas of knowledge, being the starting point of interdisciplinarity.

Also, it must be mentioned that there is flexibility in the scientific initiation program of the educational institution where the research was developed since the current rules did not limit the number of mentors, students and the establishment of partnerships between areas of study. knowledge in the registered projects. We were allowed to innovate.

Final Considerations

The search for interdisciplinarity between health and computing has been achieved in both experiences. As a confirmation of the success of these established partnerships, we base ourselves on the products obtained through the work done: the construction of a virtual atlas and the educational game "Water Belly". These two experiences allow us to contemplate the importance of investing in information exchange and partnerships among different knowledge fields, even between those not considered related. We believe that there are no limits when it comes to work aimed at breaking barriers of skills, knowledge and so many other difficulties that may arise to achieve the goals of contemporary education: the union of knowledge through interdisciplinarity and the development of individual and collective skills in the students, to practice in personal, social and professional life.

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