ONLINE COURSE ON BASIC CONCEPTS OF ROBOTICS AND INDUSTRY 4.0 FOR STUDENTS FROM PUBLIC SCHOOLS IN MANAUS - AMAZONAS

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ABSTRACT

The present work aims to address the impact of STEAM teaching in public school students through an online course of basic robotics. Considering the increasing use of automation in Industry 4.0 in the city of Manaus, it is of utmost importance the process of training students who enter the academic context through a free and online course, which merges concepts of everyday life with topics from the universe of robotics, in order to bring students closer to this reality, as well as serve as a facilitating tool in the learning process.

KEYWORDS

Robotics Course, STEAM Education, Video Lessons

1. INTRODUCTION

In view of the advances in technology and their consequences on society, robotics has a great impact on sociocultural aspects. According to Schiavicco and Siciliano (1995), robotics is designated as the scientific mechanism in which the study of robots and the dynamics of the human relationship with robotic apparatuses is allocated. Robotics, in turn, elucidates its innovations in several fields, either by adapting certain employment modes or by creating new ones; in medicine, where doctors perform delicate surgeries at a distance; in war conflicts, and even in domestic use, as well as in social relations, besides the extensive use of robots on the factory floor, which, in turn, perform repetitive and precise tasks.

Continuing the exposed principles and entering the facilitating factors linked to the use of robotics in the teaching and learning process, Zilli (2004) says about the educational character of robotics, which is aligned in the extension and elaboration of valences estimated within the learning scenario, such as: The manual and aesthetic skills, the nuances of logical reasoning, the intrapersonal and interpersonal connections, the integrative elements of elaborative concepts acquired in the most diverse areas of knowledge for the constructive development of projects, as well as the investigation and understanding of representative nuances of communication.

In allusion to the structures arranged by the use of technological tools, it is worth mentioning to elucidate in a practical way, according to Brazil (2017), the Industrial Pole of Manaus (PIM), located in the city of Manaus, situated in a strategic area region, in the central axis of the Amazon, configuring itself as one of the most modern industrial and technological poles of all Latin America, currently bringing together more than 500 cutting-edge industries, concentrating on the margin of the optics of the growth of technological practices, with a view to greater market complacency in the production orders and maintenance of existing structural processes. Thus, establishing a dynamic demand for skilled professionals, with tendencies to increase this dynamic in relation to the demands presented by the market.

With this, the course 'Basic Robotics and Industry 4.0 Concepts' makes use of the precepts of everyday life, together with the topics of robotics, in order to facilitate learning and bring students into this reality, through classes and real-life situations associated with the course content.

2. METHODOLOGY

Within a modern context, it can be evidenced that the demand for qualified labor is becoming increasingly assiduous, thus, this course aims to provide high school students through free online classes available on YouTube, in order to make accessible the convergence of socially esteemed knowledge.

Based on these elements, the course has as content subjects related to programming and basic robotics using programming tools in blocks by the Blockly platform, as well as expanding the conceptual notions involving Industry 4.0. The learning capital generated through the expository lectures ranges from the fundamental understanding of introductory concepts of the elaboration and systematic operation of everyday robotic functions to the explanation about the programmatic structuring in blocks. The didactics employed is configured as a great differential of the course, in which, in all classes, associations of the contents presented are made with situations analogous to the real ones of everyday life, with the insertion of examples inherent to the contexts currently experienced, with a basic principle of facilitating the students' understanding, allowing a more qualitative and assertive learning dynamic.

Following the above guidelines, the course was taught by students from the Amazonas State University (Figure 1), with a workload of 10 hours, with a certificate available after the conclusion of the course. To obtain the certificate it is necessary that the students attend and assimilate all the classes and subjects taught, performing at the end a questionnaire through the Google Forms platform, which provides an evaluation with multiple choice questions with a maximum score of 130 points, being necessary to reach 70 points to receive the certification.

Figure 1. Recordings from the online course

3. RESULTS

The results related to the number of students enrolled and certified in this course are available in table 1.

Table 1. Status and number of students participating in the course

Status	Quantity
Enrolled students	**310**
Certified students (approved)	**158**
Failed (dropouts)	**152**

Upon completion of the course, it was possible to observe that 310 students attended all classes, while 158 students were certified. As this is an online course, the numbers found were classified as satisfactory, with respect to possible difficulties encountered during the course.

According to Santos & Silva (2017) the evasion of students in online technical courses can reach up to 75%. The course presented here showed an evasion rate of less than 50%.

4. CONCLUSION

In this way, it is evident the great value of the contents addressed throughout the methodological process of the course, which addresses various areas of technology, through the introduction to the constructs of robotics and its inferences within the educational parameters, as well as the social results. It is possible to notice that the inherent course seeks to establish a certain academic bond with the high school students, configuring proximity bonds with the theoretical and practical processes of topics related to technology, which are not very frequent in the conventional high school contexts.

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