# TEACHING-LEARNING OF MATHEMATICAL CONCEPTS THROUGH PODCASTS: AN ATTEMPT TO LINK HISTORY OF MATHEMATICS (HM) AND DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGY (DTIC)

### **Adriana DE BORTOLI**

Lins Technology Collegee- FATEC, Estrada Mário Covas Jr, s/n. CEP: 16400-000. Lins (SP), Brazil. <u>adrianadebor-</u>

toli1@hotmail.com

## Zionice GARBELINI MARTOS RODRIGUES

Federal Institute of Education, Science and Technology of São Paulo - Birigui campus, Rua Pedro Cavalo, Nº 709 - Residencial Portal da Pérola II - CEP:16201-407Birigui-SP - Brazil

zionice@ifsp.edu.br

## ABSTRACT

In this short paper, we aimed to make considerations about the researches that were made in the Mathematic Education field, whose aim will be to achieve an articulation between two teaching trends: History of Mathematics (HM) and Digital Information and Communication Technology (DTIC), aiming to promote reflections regarding Mathematics teaching in order to enhance the learning process of the discipline. For that purpose, we will present a description of the construction of a platform named Mathpods, whose virtual learning environment (VLE) consists of a platform developed by (three) 3 students from the course of Analysis and Development of Systems and Systems for the Internet in the form of a undergraduate research. The developer students are from a public college in the state of São Paulo/Brazil. Such virtual learning environment enhances the teaching-learning process of mathematical concepts through podcasts. We will present the creation process and its uses and describe the potential of this technological educational product. Furthermore, the choice of ma- thematical concepts guided by historical procedures (such as the equations of second degree by the false position method) and considerations of extension actions in which we propose courses for Basic Education students will be addressed. We concluded that the platform has been helping teachers and students in the teaching and learning process at a local level in the state of São Paulo/Brazil, as podcasts make the teaching methodology more flexible and meet the interests of students. In addition, the extension actions by the authors have enabled the interaction between the college/institute and state public schools, which is believed to have added additional possibilities in times of remote education. Besides this, one of the authors seeks to investigate the contributions of the podcast elaboration with undergraduates in Mathematics from an institute of education, science and technology in the northwest of the state of São Pau-lo, in two curricular components, namely the Laboratory of Mathematics Education and Non-Euclidean geometries. As preliminary results, we verified the students' interest in knowing mathematical concepts produced by other peoples, in addition to the desire to learn about new cultures, including the enhancement of a methodological procedure that consists of making available historically produced mathematical subjects forwarded through podcasts that were made available on the platform. Additionally, it was pointed out by

the participants of the audio productions that Podcasts contribute to inclusion regarding education (mainly for needs related to low vision) and that it stimulates those who are producing in various areas sine qua non for teaching practice, in addition to if it consists of a medium that becomes more accessible to the general public, as currently the appropriation of virtual resources successfully captures the attention of young people.

## 1 Introduction

In this paper considerations are described about researches, performed the scope of Mathematics Education, whose intention will be to concretize an ar- ticulation between two tendencies of teaching: Math History (MH) and Digital Technologies of Information and Communication (DTIC), aiming to promote actions of learning and teaching Math, in order to enhance these processes.Our standpoint speech is about a reality which the technology is starting to set in, in educational terms. While some of Brazilian federal government's programs have been historically invested on technologies, it is still needed a lot to approximate the DTICs and the Brazilian schooling. Authors, such as Javaroni (2015), Borba; Scucuglia & Gadanidis (2014) describe the paths and the Brazilian reality face on new tech challenges in classroom. Mendes, Fossa, Valdés (2006), they can observe how important is to recover the historical information from a specific subject, because it allows the student to develop by him/herself math and investigation abilities, and also, in special highlight, raise scientific awareness willing to intellectual autonomy. Moreover, this bibliographical review deliberates on a Brazilian author, Sousa (2020), who proposes a new alliance between Mathematics history, Digital technologies and Mathematics Investigation. We propose the usage of podcasts as a technological instrument in this background, in addition to those two fields of study, in order to improve the teaching/learning process. The podcast will be available on a digital platform called MathPods. The investigative point of this project consists of: is it possible to enhance how to learn and teach Math, using a method historically produced, and supported by podcasts?

To indicate answers, we based some arguments on a legal Brazilian document, the National Common Curricular Base (CNCB), which recommends using various investigation fields, such as approach and didactical propose: "Besides the different didactical sources, like abacus, graph paper, games, calculators, Electronic worksheets, and software of dynamic geometry, it is important to include the Mathematic History as a resource that can raise awareness and represent meaning-ful context to learn and teach math." (BRASIL, 2018, p. 296). Moreover, the International Evaluation Program of Students (IEPS) 2022 shows the importance of using smartphones as a resource to learn math.

The program emphasizes the usage of cellphones in math classes. In face of all this scientific literature, we have elaborated and taught a course of university extension offered to students of 9th grade of Brazilian elementary school, to present and use the platform that accommodates math podcasts in order to elicit the possibility of autonomy in studying mathematic conceptions.

## 2 The University Extension Course

We offered a course to 19 (nineteen) students from a public school, in the city of Lins, SP (Brazil), with the average age range around 14 years old. There were 3 meetings of 2 (two) hours long each one. Firstly, we administered a Prétest, to get a notion of the engagement from those students with the technology, and if they already had familiarity with podcasts. The method of false position was used to teach and learn 1st degree equa- tions in this extension act. The students had not had any previous contact with calculation and solving first degree equations by the current algorithmic pro- cedure. In the end, we administered a post-test willing to verify how the activ-ity was taken from the perspective of students. The results gotten to the fol- lowing questions: After listening this podcast about equations resolution by "false position" method, do you think this method/podcast turned the resolution easier for you?And the second was: Would you use podcast as a resource for studying math? According to the answers, it is seen that 74% of students affirmed that the activity provided them more easiness to solve de algebraic equations, and we also realized that they were for using podcasts to study math, because 84% of students affirmed yes to that question.

## **3** Concluding Remarks

It is concluded that the platform has been helping professors and students with the learning and teaching, in a local sphere in one inland region of the São Paulo state, Brazil, because the podcasts ease the teaching methodology, and appeal to the student interests. Therefore, the actions of extensions by the authors have allowed the interaction between the college and public schools, and it is believed that those schools have been well-completed with great new possibilities for this time of remote schooling. On the other hand, one of the authors investigates the contributions of pod-casts developing, cooperating with the under-graduate students, majoring in Mathematics. The developments and contributions are studied in two compo- nents: non-Euclidean geometries introduction, and in Education Lab of Math. It is verified in the preliminary results the interest from the students in com- prehending mathematic concepts produced by different peoples, aside from the appetite for meeting new cultures, and including the appreciation of a methodologic procedure which consists in listening to the podcasts about his- torical and technical math subjects, produced and uploaded in the platform application.

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