Computational Thinking, Programming and Robotics in Basic Education: Evaluation of an in-service Teacher’s Training B-learning Experience

Novembro/2019
The Paper

This paper presents a training program for teachers and the procedures for its evaluation in the domain of computational thinking, programming and robotics in basic education.

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In Scope of Project

This training was conducted within the scope of Project KML II - Laboratory of programming and robotics technologies and learning for preschool and primary school (1st CEB)* and is expected to contribute for two of the project's main outcomes:

- conceive a training plan to include in the higher education of educators and teachers of the 1st ECB;
- the creation of a MOOC for initial and continuous training of these professionals.

* Project KML II is co-financed by FEDER through the COMPETE 2020 - Operational Thematic Program for Competitiveness and Internationalization (POCI) and national funds through FCT - Portuguese Foundation for Science and Technology under project reference number PTDC/CED-EDG/28710/2017.
This work have their origins in the studies on distance education (EaD), namely in the developments provided by the designated 3rd generation of EaD in which computer-mediated communication has allowed the emergence of new pedagogical scenarios giving rise to new training modalities either fully online or in blended learning format.

Some Authors and Theories

- Michael Moore's Transactional Distance Theory
- Garisson, Anderson and Archer Community of Inquiry Model
- Siemmens Connectivism
The Training Program

- In b-learning format (25 hours of face-to-face classroom activities and 25 hours of distance activities), lasting 50 hours;
- was held between June and October 2019;
- 114 teachers participated in the training, distributed in eight classes, representing 8 regions of Portugal*;
- the training curriculum was organized in a total of 11 learning sessions (five in-person and six at a distance), divided into three modules (Computational Thinking, Educational Robotics and Programming) and included two sessions for the preparation of a project and a final report.

* Algarve, Aveiro, Braga, Bragança, Évora, Lisboa, Setúbal, Viseu.
The choice of blended learning format

- The nature of the training to be developed: some activities, such as robotics initiation, involve the assembly and manipulation of robots, and so there is advantages in being developed in face-to-face situations.

- The target audience: we were dealing with an adult audience, geographically dispersed and for whom the principles of temporal and spatial flexibility, characterizing online communication and distance education, assume significative importance.

- The network of trainers and training spaces: there was a network of local trainers qualified in the area and available to ensure these moments of face-to-face training.

- The possibility of having a Virtual Learning Environment (VLE) that could integrate the entire training course, allowing autonomous work activities, making resources available, and virtually extending the moments of presential learning, enhancing the interaction between all involved.
The training assessment

Questionnaire

► Performed from October 1st to 13th;
► Online survey *(Google Form)*;
► 89 of the 114 trainees (78%) participated in the survey;
► 30 questions organized in 5 dimensions;
► Questionnaire dimensions:
  o characterization of the respondents and previous experience
  o satisfaction with the training
  o perceptions about the learning and involvement in the training
  o perceptions about the practical application of the training
  o criticisms and suggestions for improvement of the training program
Synthesis of Results

- 52% without experience in e-learning;
- 67% without experience in training in the theme;
- 42% never worked with these technologies;
- General satisfaction level with training above 90% (except for the item “evaluation process”);
- Positive highlight for the satisfaction with the performance of the trainers (attention point “lack of feedback to the works”);
- 85% satisfaction with VLE, highlighting the visual organization and performance of the trainers (Points of attention: activity proposals, deadline for performing tasks and low interaction in the forums);
Synthesis of Results

- 69% of respondents satisfied or very satisfied with the offer format (Note the high percentage that would like the offer to have more face-to-face time - 28%);
- 92% thought the communication was efficient;
- 68% considered the workload adequate (Point of attention: percentage of people who considered the workload excessive - 32%);
- 93% said that training contributes or contributes a lot to their classroom activities; 80% feel able to apply what they have learned to training in their classrooms.
Conclusions

The results obtained should allow the project team to collect indicators on the training profile that best suits the target audience, contributing to the planning and construction of a MOOC, which aims to broaden the scope of the training undertaken, with a view to encompass a wide range of teachers from the Portuguese education network.

Points of reflection:

- Learning Environment (VLE) used only as a resource repository and activity posting;
- Low interaction in the forums, with almost no mediation;
- Evaluation process without feedback and registration on the platform;
- Decentralized communication across multiple channels has weakened the role of VLE forums;
- Lack of collaborative activities and product sharing, which made the learning process more solitary and maximized the importance of face-to-face moments.
To know more...

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Projeto KML2 - Laboratório de Tecnologias e Aprendizagem de Programação para o Pré-Escolar e 1.º Ciclo de Ensino Básico em Portugal

2018 - 2021

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Universidade do Minho
Instituto de Educação

Instituições Parceiras

Consultores

Financiamento

Apoios