

Art, Design and Technology in education: development of animatronics as learning objects for the study of robotics

Keywords

Animatronics, Art, Design and Technology, Education, Learning Objects.

This work presents the results of a transdisciplinary project between the areas of Art, Design, Electronics and Informatics, whose objective is to develop techniques for the construction of animatronics to apply them as learning objects in robotics teaching. The project was designed to integrate, in its team, teachers, researchers, social educators and students. The conceptual axis was proposed by researchers in the areas of Art, Design and Electronics, based on the concern of teachers and students regarding the high retention and dropout rates in the technical course in Electronics, in a technical and technological education institution in the city of Belo Horizonte, Brazil. It started from the hypothesis that concrete materials and playful tools can stimulate cognitive functions to promoting more dynamic and meaningful teaching and learning. The highlight is that the animatronics were built by the institution's own students, with low-cost materials, with a view to being used as Learning Objects also in other basic education schools and non-school spaces. The methodological procedures were characterized by an exploratory approach since the project was in the experimental phase of application. The actions were outlined by: (i) selection of students, bibliographic survey, document analysis, scheduling of meetings, application of preliminary questionnaires and observations, data collection through questionnaires; (ii) development of the electronic and mechanical structure of the prototype, records, and observations of implemented actions; (iii) reflection based on the analysis of the results obtained and

dissemination. The materials chosen to compose the physical structure consisted of expanded polystyrene (EPS), paper, PVA glue, PVA putty, acrylic paint, and metallic paint, since they can be easily found in stationery stores or material stores for artistic or design projects. In the mechanical part, a servomotor was chosen, which consists of an electromechanical machine that presents movement proportional to a command, like closed-loop devices. The monitoring of the participants and the construction of the animatronic took place in weekly meetings with adjustments, revision and adaptation of work plans aiming at the co-production of knowledge and successive cycles of critical reflection. The first public presentations of the project took place at two academic events, with the target audience composed mainly of elementary and high school students. The results indicated that the dialogue between art, design, and electronics in the construction of Learning Objects stimulated the interest of children and adolescents around complex knowledge in a spontaneous and ludically way. The activities experienced around the project gave rise to the possibility of building knowledge under a new perspective. For the proposing team, the experience provided evidence that the popularization of scientific knowledge can be articulated with unofficial knowledge and practices and even in non-school contexts, in a playful way. The next step is to create educational kits, produce booklets, video classes, offer courses and train teachers and monitors, including theoretical discussions and practical application perspectives inherent to the area.