

Key words: *mechatronical epistemology, ontology and logics, top-down and bottom-up mechatronical perspectives, transdisciplinarity mechatronical learning and understanding knowledge, mechatronical training, simulation and learning environment.*

Abstract: The purpose of this paper is to describe the ongoing transdisciplinary way of establishing mechatronics as a paradigmatic teaching-learning process (epistemological mechatronics), as a socio-interactive way of living (ontological mechatronics), and as a reflexive communicational language (semiotical mechatronics) with a logical creativity and flexibility for the purpose of crossing barriers and the building of bridges between students and teachers, between students and the mechatronics as subject and between the students themselves, in a learning-understanding synergistic process, as active-reactive, extrinsic-intrinsic approach, with a functional-axiological evaluation of the achievement of mechatronical knowledge from the transdisciplinary perspective. The paper presents a transdisciplinary approach of the knowledge process through mechatronical learning. The type of the synergistic-significant process in a transdisciplinary context of learning in the knowledge based society explains the functional-informational integration at the level of structures, the logical-creative signification and the ethical-moral valuing of the entire spectrum of knowledge, including the spiritual dimension, using the top-down and bottom-up perspectives in mechatronical knowledge process. Due to this fact that the understanding of the present world cannot be accomplished within the framework of a single disciplinary research, transdisciplinarity is the only way of explaining complementarity both to multidisciplinary and crossdisciplinary research, in a codisciplinary context, being entirely distinct from them. Because multidisciplinary and crossdisciplinarity temporary cross disciplinary boundaries, remaining within the framework of a disciplinary context, they cannot explain the integrative mechatronical knowledge. Because of this very important reason the present paper is a better explanation, through the presented model, than the other existing models of the synergistic identity of mechatronics, in the context of a transdisciplinary approach.