Chapter 47
Learner–Centered Approach With Educational Robotics

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ABSTRACT

The chapter introduces educational robotics as a learning tool to foster learner-centered approach in classroom. It provides tips for successful implementation of learner-centered learning using educational robotics learning tool. The chapter explains how teachers can use educational technology with a learner-centered approach, using examples from 4th grade robotics unit as part of the science curriculum. Pre-school teachers commonly use learner-centered approach that build upon students' interests, curiosities and inquiries. Somehow, the practice shifts gradually into teacher-centered pedagogy once students start to transition into upper grades. Providing a learner-centered learning environment promotes students' ability to build independent, active learner skills throughout their school experience, benefiting and enhancing their educational experience in post-secondary education and beyond. Educational robotics is a powerful learning tool that enables teachers to create learner-centered learning environments for students and promote learner-centered pedagogy in schools.

INTRODUCTION

When students reach college, we all assume that they will be well-prepared for the post-secondary level education and have the skills necessary for independent learning. But the reality is that many students do not take initiative with regard to their learning. They expect professors to provide them everything they need to 'pass' a course. They are 'educated' to be more passive, dependent learners than active, independent learners, through the current system of education. Students expect professors to identify what they need to learn, decide the learning or 'delivery' methods, and determine what and how to assess their work (Boud, 2012). They believe their final grade is given to them by a professor, rather than they earn the grade that reflects their work and learning. They believe that professors 'have to' tell them everything they need to know in order to complete a course with successful grade, including the number of pages or words their assignment should contain, the size of font they should use, whether the list of

references is necessary and how many references are adequate. They become very upset if the professor does not give them enough guidance. They become even more upset if it is left for them to decide all of the details! Weimer (2002) shared her experience with students:

They don't want teachers who expect them to come up with the examples, do the problems, or explain concepts to each other. That's the teacher's job, and it's what "good" teachers are supposed to do, more than one student has pointed out to me. (p.71)

Throughout K-12 schooling, students are educated to become receptive learners. They are almost always provided with academic tasks, instructions on how to proceed with assignments, or even with whom to work on an assignment (Zimmerman, 2002). They are rarely given an opportunity to discuss and decide a specific goal of their academic work or study strategies. The assessment of their work is always done by the teacher, and are not asked to even think about assessing their work for themselves.

Undergraduate faculty always struggle with the resistant attitudes of passive students who not only have no clue what to do but also become indignant when asked to make decisions about their own learning (Weimer, 2013). Professors wonder, "How can these students be in college and yet be so unmotivated to learn?" (Weimer, 2013, p.37). Something needs to be done to solve the problem! There is an urgent need to nurture active, self-directed, autonomous, independent learners while students are still in K-12 schools.

This chapter aims to introduce educational robotics as a learning tool that encourages the use of a learner-centered teaching approach in classroom. It provides tips for successful implementation of learner-centered learning using educational robotics learning tool.

LEARNER-CENTERED APPROACH

Learner-centered approach to teaching and learning has roots in constructivist's approach focusing on children's interests, such as Piaget and Dewey in early twenties century. Learner-centered approach also has its connection with other existing theories including critical pedagogy, feminist pedagogy, and transformative learning (Weimer, 2013). It focuses on student learning as motivated by student interests and decision-making. It is the direct opposite of an authoritarian, teacher-directed approach. With Piaget's view, knowledge is actively constructed through children's own experience in life and interactions with their environment:

Knowledge is not a commodity to be transmitted. Nor is it information to be delivered from one end, encoded, stored and reapplied at the other end. Instead, knowledge is experience, in the sense that it is actively constructed and reconstructed through direct interaction with the environment. (Ackermann, 1996, p.27)

Piaget emphasizes that children hold onto their worldviews with very specific reasons that support them. Young children rarely let go of their views simply because someone else tells them that they are wrong (Ackermann, 2001). Piaget's theory suggests that teaching should never be direct (Ackermann, 2004). Information that is simply delivered to children will not stick with them. Rather, children construct knowledge onto the prior knowledge that they hold. In other words, children interpret or translate 'what they hear' into 'what makes sense to them,' in relation to their prior knowledge and experience. Weimer

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