EDTC 817: Needs Analysis-Robotics Blended Online Learning Course

Assignment #3

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Introduction

For key learning and comprehension in the science, mathematics, engineering, and mathematics (STEM), robotics education offers an exciting, diverse, and appealing path to a career. This path can divert into the many career fields such as Computer Science, Engineering, Sciences, Professional Studies, and Education. The curriculum is rich in detail and builds connections the STEM fields. For example, the mathematics language in programming and sequencing applies directly to the motion of a robot.

Institution Description

The institution, New Jersey City University (NJCU), Jersey City, NJ needs analysis for this course targets an audience of students who are pursuing a degree in STEM or Computer Science. This introductory course offers insight and overview into the world of robotics. The course is constructed as a blended learning module with onsite and online learning environments. The institution is located within the heart of a diverse population and easily accessible to major metropolitan cities. Offering this course through this institution will increase the enrollment in this institution since there is not a course covering hands-on applications with robots within this range of curriculum (Piña, & Huett, 2016).

Current Status

The current practices at this institute lacks a course in the area of robotics. In the Computer Science area, there are very few courses which touch on the application and diversity of robotics in different fields of study which can offer students value insight and exploration creating a valuable opportunity to seek out passions and interests. With these hands-on activities offered in a blended environment, the students experience the importance of diversification in lab activities combined with online collaboration as team members. Both are essential skills required

out in the global job market. This course helps students gain knowledge and understanding about the different fields which involve robotics and pursue further on in their educational career. There is a downside to this in which the equipment for the robots and virtual software is an expense. But, the need at this institution to offer an introductory course in the Computer Science and Technology Education curriculum outweighs the financial costs.

Students will be discovering robotics differently with hands-on activities, which is not offered through this university. Emphasis is on the examination of the activities, applications, and practices of robotics by exploring the theory of designing, controlling, and operation. Students will be exploring research topics such as motion, vision, mechanics, kinematics, and sensors as they are related to robotics. Also, this course will touch on some of the current happenings in robotics, which includes current robot lab research, and applications, including robots in the news and future global work environment. Throughout the course, students will be involved in constructing robots driven by a unit called a microcontroller, with each project reinforcing the basic principles developed in the online instructional video. Group work structure is three real-world jobs: an electrical engineer, a mechanical engineer, and a computer scientist. Groups are usually self-formed except for the first lab.

Desired Outcome

This introductory course, Robotics 101, offers an exciting and engaging insight and overview into the world of robotics. The course is a blended learning design module composing of onsite and online learning units. The emphasis is on the exploration of the activities, functions, and practices of robotics by exploring the theory of designing, controlling, and operation of a robot. Goals of this course provide students with an introduction to the principles and foster a passion for robotics. By exploring robotics in a blended learning design environment, this course

creates an exciting platform filled with onsite hands-on and online virtual learning experiences. Blended Learning design offers diversity and engagement for all learners (Horn, Staker, & Christensen, 2017). The curriculum gives a perspective of the field of robotics and applications within the global workforce. The student outcome delivers excitement and passion for venturing out into different areas in which robotics is or can be an intriguing segment of the curriculum. The university's outcome would be an increase enrollment and retention in Computer Science, Sciences, and Education (Piña, & Huett, 2016; Dunn, & Fox-Turnbull, 2013).

Technology Requirements

The technology requirements for this course are (a) familiar with technology (receive and send email and attachments; (b) able to navigate the internet; (c) familiar with Windows or Apple; (d) proficient in applications (Microsoft, Google); (e) Blackboard; and (f) ability to download and retrieve required textbook companion and robotic software. This course covers peer-to-peer learning and availability of the online course material at any time (Piña, & Huett, 2016). Also, familiarity with linear algebra, basic programming concepts (including how to program in C), and a willingness to learn independently would be helpful the students' success in the course.

Training Requirements

There are two barriers to be considered by NJCU stakeholders before offering this course. They are experienced and knowledge of the specialized field and experienced in online learning. The training requirements are one barrier which the institution will need to overcome. Since this is an introductory course, the facilitator should be versed in applications, software, programming, and mechanics of robots and robotics. Piña, & Huett, (2016) stated that facilitator needs to have

"experience of online learning before" which is another barrier to be considered before this course is to be offered to students (p. 47).

Potential Issues & Solutions

Robotics education is a specialized field which requires hands-on materials for the students to experience and simulate real-world problems and create solutions. To experience these outcomes, the university will have to supply the robotics kits and other peripherals for the students. In addition, to maintain the virtual onsite presence, the university has to invest in a specialized online virtual robotics world program. All these issues cost money. A few ways the university can address these financial issues are (a) apply for grants; (b) donations from stakeholders and alumni; or (c) add in the student lab fees.

References

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