

Utilization of Conductive Ink Pen to Enhance Understanding of Electricity

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The typical building systems course taught in construction management curriculums have only cursory reviews of mechanical, electrical, plumbing and fire suppression components. Most courses are less than 5 credit hours and serve only to introduce the undergraduate student to the concepts of building systems, allowing only a few weeks allotted to each division of systems. This condensed time frame typically allows for a few lectures and a single laboratory to cover only the basics. Additional techniques are needed to engage the student more effectively in the classroom, thereby creating an experience not likely to be forgotten. A relatively new and inexpensive technology has emerged, the conductive ink pen. This pen, known as Circuit Scribe, utilizes ink to serve as the conductor in an electrical circuit. When combined with an energy source and a light bulb, the resistive circuit is completed using this ink. The research objective is to determine whether or not introducing this technology into the building systems laboratory affects the retainage of electrical theory more effectively than other methods. The hypothesis is that student engagement will increase and additional yearning for systems knowledge will be ignited. Trade and specialty construction, and specifically electrical contracting, is not the primary choice for a graduate of a construction management degree program. However, these specialty trades are becoming increasingly interested in hiring well rounded project managers and superintendents. The methodology contains elements of student interaction, where laboratories are performed using the Circuit Scribe and compared against laboratories conducted with traditional methods on similar subject matter. Two classes are used, a freshman level Introduction to Construction Management and a junior level Building Systems course. The introductory class serves to introduce the student to electrical contracting as a career option and the systems class is to understand electricity use in construction. Both classes are given surveys before Circuit Scribe is introduced, to establish a baseline in their interest. The freshman level class will conduct a single resistive circuit and take an additional survey after completion. The systems class is given two labs, the first utilizing standard wiring methods, and the second with the Circuit Scribe technology. The expected outcome is that interest will be higher in electrical contracting after comparison is made. Gauging the long-term retention of electrical knowledge is still hard to predict, but the expected results are that this laboratory will have a positive effect on the undergraduate learning experience. The impact of the research is twofold. First, the immediate gains in construction education efficiency will be felt, and the dissemination to other construction management programs will be provided to enhance learning regionally and nationwide. Secondly, the increased awareness of additional opportunities stemming from this field of study only supports long term growth of our industry.

Key Words: Electrical Contracting, Subcontracting, Trade Construction Knowledge, Student Engagement, Building Systems