Creating an Informal Engineering Education Experience: Interactive Manufacturing Exhibit

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Contemporary American youth are avid consumers of manufactured products. They are very familiar with a wide variety of available consumer products due to the efforts of marketing campaigns, advertising media and their own use of the Internet. However, as they buy and use today's products, they most likely hold no concept of how these products came to exist or how they were made. This knowledge gap indicates a need to educate the general public about what constitutes modern manufacturing.

An exemplary effort to bridge the technological literacy gap is currently under way at the NSF Engineering Research Center for Reconfigurable Manufacturing Systems (ERC/RMS) at the University of Michigan. To extend its educational reach to the non-university population, the ERC/RMS has invested in designing and developing a museum exhibit that offers visitor-centered experience highlighting the principles of modern manufacturing. This paper discusses the conceptual design and development of the exhibit and presents approaches deployed for content translation and assessment of its educational impact.

The exhibit station consists of two main components: a set of interactive computer games and an exhibit kiosk, constituting physical display environment and housing the computer equipment.

The gaming software was developed with the aim to appeal to the target audience (K-12 students) and its contents takes into account such audiences' perspective and level of understanding. It is a tripartite educational media consisting of interconnected, interactive games of *Design*, *Manufacturing*, and *Business*, outlining the main processes in any product development. These processes are presented through the development cycle of an example product, a customizable pen. Choice of a pen as an exemplary product was deliberate: because it is a simple product, it is well understood, and yet it enables to present more complex concepts related to its design and manufacture. These concepts are presented through interactive parts of the game, where user is lead through the market research, design selection, manufacturing and marketing steps. Upon completion the user is also subjected to a brief test.

The kiosk design, providing an external environment in support of the gaming software, is an essential part of the project that guarantees the involvement of the visitor with the software content and provides background information. To stand out in a museum environment and create an attraction point competing with other exhibits, the kiosk design has an appearance directly related to the software content. The physical form of the kiosk is derived from everyday objects (e.g., a mug containing pens and rulers in it). The distinctive appearance creates a visual focus by leveraging these objects in exaggerated scale and colored brightly. Additional board space is filled with background materials, complementing the contents of the games.