

USING TECHNOLOGY-MEDIATED INSTRUCTION TO INCORPORATE CULTURALLY BASED TRAINING MATERIALS

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Abstract—This paper discusses integrating culturally based training materials with customizable software and shows how it can be used to improve learning outcomes for women in the engineering sciences. By incorporating the strategic use of images, metaphors and analogies to promote a sense of familiarity with targeted electronic resources. Learning styles specific to women are highlighted and discussed in the context of designing instructional training materials that produce successful learning outcomes. How to construct electronic engineering information resources by embedding language/idiom, and shared experiences relevant to the targeted learning community is highlighted. The ABC's of developing electronic learning environments by using Technology-Mediated Instruction to add value-added features is explained and readers will come away with an understanding of value-added features that should be standard in a technology-mediated instruction environment. These features improve learning outcome objectives by simplifying the learning process through ease of database manipulation.

Index Terms-- culturally based training materials, learning styles, technology-mediated instruction, women in the engineering sciences

To electronically create a level playing field for women in the engineering sciences, the technology we use to teach with should be easy to use, adaptable to different learning styles, and inclusive of training materials that are culturally based. Just as teachers have had to adjust to the learner's needs and abilities in order to be successful, so too must we change the technology, images, metaphors, and analogies we use to provide instruction. The intent of this paper is to show how integrating culturally based training materials with customizable software can improve learning outcomes for women in the engineering sciences. This article will explore the creative use of Technology-Mediated Instruction (TMI), to enhance engineering resources that mirror the diversity of women in the engineering sciences.

Technology-Mediated Instruction

For the purposes of this essay the terms Customizable Software and Technology-Mediated Instruction are used interchangeably, with TMI being preferred. In some instances the term Customizable Software is simply more illuminating, and therefore is used for purposes of clarity.

TMI can be defined as customizable instructional tools designed to enhance the development and delivery of course content. Although purists would argue that once upon a time a paper clip was considered a new technology. Baby boomers can probably recall handing in college research papers, where the left corner tip was bent backwards about a ½ inch, with two slight incisions made into the fold, and the paper between the incisions then bent backwards to keep the pages intact. This was done all because a stapler was not readily available. Yet, for the purposes of this discussion, technology refers to computer hardware and software exclusively.

Culturally Based Training Materials

To create culturally based training materials for women in the engineering sciences a basic profile identifying the major learning characteristics of this group must be compiled and meaningfully incorporated into the training materials via technology. Learning theorists suggest that the learning styles typical of the majority of women are characterized by collaborative activities, and demonstrated by the discourse styles of interchange and attenuation [1]-[29]. In general, most women tend not to rely on aggressive technical vocabulary or an abstract problem-solving approach [1]-[29], and these two pervasive characteristics lend themselves to being easily incorporated into training materials.

Integrating culturally based training materials with customizable software that makes it easier for the user to access information can improve learning outcomes for targeted audiences by creating successful learning experiences. Training materials that reflect diversity and connect with the targeted audience in tangible ways are considered culturally based. Traditionally in the engineering sciences, metaphors and analogies have reflected a male perspective. According to Katy Campbell, there is an over reliance on action-oriented, arcade-style software designed to promote competitiveness which may exclude women in undesirable ways [1]-[29]. Yet the point here is not to replace the traditional male perspective but to enrich it with diverse images and content more representative of the larger community.

Value-Added Features

Currently, TMI is being used to incorporate value-added features such as spell check, multiple representations of

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materials, seamless interfaces, faculty/student instant interaction, and software with multilingual display capabilities through simple drop down menus. These features help to provide successful learning experiences by accommodating multiple learning styles, improving instructional strategies, and increasing learning outcomes.

In my own anecdotal experience dealing with undergraduate chemical engineering students I have discovered that learning outcomes, which can be enhanced by culturally based training materials, include:

1. Locating and using information resources, equipment and technology efficiently
2. Learning and applying critical thinking skills to organize and synthesize information
3. Comprehending the availability of content in various types of media

Electronic Learning Environments

Successfully setting up electronic learning environments requires three major components: simple interface design, learning resources designed for targeted audiences, and a moderator. The most compelling interface design solutions are those that are simple, easy to use, and in tune with users' needs and experiences. Designing gender-neutral tools to get around interfaces would be preferred to traditional tools such as the "carpenter's toolbox" or the "mechanics tool chest". The point is not to replace these toolbox visual analogies with "sewing kit" icons but to replace them with gender neutral representations that does not psychological privilege one group over the other.

Secondly, creating a successful electronic learning environment for women requires the inclusion of culturally based training materials and an understanding of the technical and design challenges associated with developing these types of resources. When designing electronic learning environments we must consider the audience and develop effective course content, study questions, graphics, interactivity, and assessments that are culturally neutral and meet the audience's learning needs, some of who may not be native English speakers.

Librarians as Moderators

Finally, these electronic environments must be moderated to keep them "live" and "current", which is where librarians can be helpful in troubleshooting the inevitable technical woes, such as trying to establish the status of web links. It is during these times that one may start to feel as if one has been reduced to being a mere cyberspace operator. Nothing

is more frustrating than clicking on a link and getting a screen that says Netscape/Internet Explorer is unable to locate the server, please check the server name and try again. This is the cyberspace equivalent to "the number you have dialed is no longer in service, if you feel you have reached this message in error please try dialing the number again." This is what happens when web masters do not bother to monitor and update their links.

Listservs

Librarians can also serve as moderators for Listservs which, when strategically incorporated into electronic communities, can be used as a tool to both encourage and inform. Another component that Listservs can be used for is electronic mentoring programs. The advantage of being web-based is that you do not have to reinvent the wheel at every turn and groups can instead spend their time tying into other organizations that are doing similar things. For instance, it would certainly be more effective and efficient for groups of women in engineering who want to participate in electronic mentoring programs to tie into WEPAN's mentoring network.

Conclusion

For the most part the tools to create electronic environments supportive of women in the engineering sciences are plentiful and readily available. These communities can be set up and maintained by engineering librarian subject specialists or class instructors. Once established, images that depict women in the sciences, metaphors, free shareware and analogies can be easily constructed or imported off of the Internet. The concept that has to stay paramount when constructing these environments is that they should be supportive and should seek to be inclusive rather than exclusionary. The goal is not to duplicate what currently exists but rather to create inclusive electronic communities that encourage multicultural experiences and which showcase these experiences in a real way. Only then do we create a level electronic playing field for women in the engineering sciences by seeking to meet their information resource needs in a manner that creates a successful learning experience.

References

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