REMOTE SENSING AND DIGITAL IMAGE PROCESSING TEACHING WITH VIRTUS

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ABSTRACT:
The learning environment makes appropriate use of a variety of media. Various learning styles are best engaged by using a variety of media to achieve learning outcomes. Selection of media may also depend on nature of content, learning goals, access to technology, and the local learning environment. This present paper proposes a teaching methodology of Remote Sensing and Image Processing, based on INTERNET technology and VIRTUS-UFPE project. Basic themes and applications can be used in engineering courses and others areas that need Remote Sensing resources. A material developed here provides a motivation in Remote Sensing and Image Processing teaching. In Classroom or in homework activities, this material is very efficient to stimulate the students to learning this discipline.

1. INTRODUCTION

1.1 Web-Based Learning
Web-based learning designs must consider the nature of content, specific context, desired learning outcomes and characteristics of the learner. Learner-centered strategies include modular, stand-alone units that are compatible with short bursts of learning. Learning modules may also be open, flexible and self-directing.

The learner is actively engaged. Active, hands-on, concrete experiences are highly effective. Learning by doing, analogy and assimilation are increasingly important pedagogical forms. Where possible, learning outcomes should relate to real-life experiences through simulation and application.

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Learning environments must include problem-based as well as knowledge-based learning. Problem-based learning involves higher order thinking skills such as analysis, synthesis, and evaluation while knowledge-based learning involves recall, comprehension and application.

Learning experiences should support interaction and the development of communities of interest. Learning is social and sensitive to context. Learning experiences based on interaction and collaboration support learning communities while building a support network to enhance learning outcomes.

Multiple interactions, group collaboration and cooperative learning may provide increased levels of interaction and simulation.

Some interesting URL in Portuguese that uses INTERNET in education are listed as following.

- Bernie Dodge
  Webquest: uma técnica para aprendizagem na rede internet
  (http://www.divertire.com.br/artigos/dodge1.htm)

- Edith Ackermann
  Ferramentas para um aprendizado construtivo: repensando a interação
  (http://www.divertire.com.br/artigos/eackermann1.htm)

- Jorge Fróes
  Educação e tecnologia: o desafio do nosso tempo
  (http://www.divertire.com.br/artigos/froes1.htm)

- José Armando Valente
  Informática na educação: instrucionismo x construcionismo
  (http://www.divertire.com.br/artigos/valente2.htm)

- José Manuel Moran
  Mudar a forma de ensinar e de aprender com tecnologias
  (http://www.divertire.com.br/artigos/jmoran1.htm)

- Sonia Zaitune
  Atividade lúdica, prazer e aprendizado
  (http://www.divertire.com.br/artigos/szaitune1.htm)

  (http://www.portoweb.com.br/PierreLevy/aemergen.html)

- Notas Sobre a Geografia do Ciberespaço - Cláudio Cardoso
  (http://www.facom.ufba.br/pretextos/claudio3.html)
1.2 Remote Sensing And Digital Image Teaching With VIRTUS-UFPE

Remote Sensing and Image Processing (Lillesand e Kiefer, 1994; Novo, 1992; Schowengerd, 1983) have their content in dynamic way with new sensors, new methodologies and applications among others.

Some authors like Sausen et al. (2001), Silva and Demattê (2001), Kirmann (1997), Santos (1998), Santos (1999), Florenzano and Santos (2001) developed resources in pedagogical teaching of these areas.

To teach disciplines like Remote Sensing and Image Processing, spatial, spectral and radiometric resolution of digital images are very important in a lot of applications and need to be cleared presented. On other hand, the interaction of these images with specific software need to be cleared presented too. A resource on-line can help in this case, specially when a result need be developed by the students or need to be presented in classroom. INTERNET resources are a good way to help in areas to obtain these kinds of resolution, software approach among others.

This present paper proposes a teaching methodology of Remote Sensing and Digital Image Processing based on INTERNET technology and a software developed at UFPE (Federal University of Pernambuco Brazil) called VIRTUS (http://www.virtus.ufpe.br/). Although this paper presents results dedicated to Cartographic Engineering and Geography courses, basic themes and applications can be used in others engineering courses and others areas that need Remote Sensing resources. In this paper, we analyze those features of WWW that are most interesting for educational purposes and show possible sophisticated pedagogical uses of the web. This paper shows a material to provide a motivation to Remote Sensing and Digital Image Processing teaching.

In Classroom or in homework activities, this material is very efficient to stimulate the students to learning these disciplines. The idea behind this approach is to offer a learning environment which implements didactic advantages of conventional classroom group work.

It would be possible to transform this approach in a distance teaching with some modifications. Via Internet, students are enabled to work more specifically transfer some results, put new sites in the web library, etc. in VIRTUS platform (Fig 1).
that are made with Software SPRING from INPE - Brazil (http://www.dpi.inpe.br/spring).

4. After this, results of each practical class were put on the VIRTUS platform.

5. Other kinds of activities like chat, web-library, activities of next classroom, advice among other things was made into VIRTUS system.

6. Image and other kinds of documents were repository into VIRTUS platform, like exercise lists, special documentation among others.

3. RESULTS

Below, in Figure 2 and 3 are presented the AVE developed to Remote Sensing and Image Processing discipline. This AVE can be accessed by using the URL: (http://www.projetovirtus.com.br/) with a key word (author or keywords of discipline) ex: candeias or sensoriamento remoto.

In Figure 3 there are links to some information, activities, companionship, web-library and edition edition.
4. CONCLUSION

In Remote Sensing like in Digital Image Processing area a book or some annotations about these topics stay old in a few time, because of the quickly advances of these areas. INTERNET resources can help in a special way to maintain these topics actualized.

Paper and transparences are not good to show some digital processing over an image. Results processed directly via web would be a nice kind of solution. Some transformation over them can be made on-line, with specific software. This methodology make easy the teaching and learning in this area. On the other hand, diskettes and CD-ROM can be let away because transfer can be made directly by INTERNET resources. Information activities of disciplines would be easy with VIRTUS system developed at UFPE.

Pedagogical resource of multimedia tools (VIRTUS system) is efficient in Remote Sensing and Image Processing classroom. With these resource is possible to stimulate the students to use new resources of technology and prepare them in INTERNET tools. Principal impact of to teacher Remote Sensing and Image Processing is to make possible to distribute on-line in INTERNET or INTRANET dynamic information about these areas and it is a good resource to manipulate image, data, documents among others.

5. REFERENCES


6. REFERENCES RECOMMENDED


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