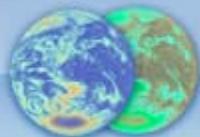




# E-learning in Remote Sensing and Geoinformation



WORKSHOP ON

Group on Earth Observations

## CAPACITY BUILDING



# History

## Presential Courses

- **1972 – Master’s Degree program in Remote Sensing and short-term courses (internal and external)**
- **1985 – Specialization: The International Course on Remote Sensing and Geographic Information Systems (9 months), coordinated by Dr. Tania Sausen.**
- **1998 – Doctoral program in Remote Sensing**



# History

## Presential Courses

- **Short-Term Courses**
  - **July of 1998 - 40 hours course for elementary and high school in-service teachers from both public and private schools:  
The school use of remote sensing for environmental studies**
  - **1999 – Image Processing Division (DPI/OBT), in partnership with SELPER-Brazil (Society of Latin-American Specialists in Remote Sensing): courses aimed at supporting the use of geotechnology in Brazil:**
    - **Geoprocessing Concepts and SPRING; Remote Sensing; Geographic Databases; Image Digital Processing; Spatial Analysis of Geographic Data; Digital Terrain Modeling**



# History

## Short-Term Courses

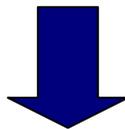
### Support the use of Geotechnologies in Brazil

From 2000 to 2005	
Internal Courses	103
External Courses	90
Total Number of Students Trained	1948



# Scenario

- Increasing demand
- Limitation in the number of instructors available for teaching as well as suited facilities.
- Students' limited financial resources
- Necessity to provide the means for accessing information



- Redesigning the educational outreach program
- Defining new methods: replacing traditional classroom learning environments → e-learning
- Implementation of distance education courses



## e-learning courses

- The first e-learning course - May, 2004:  
**The Use of Remote Sensing for Environmental Studies for Undergraduate Professors**
- Objectives: disseminating remote sensing as part of the curriculum and pedagogical resource to teaching science topics in universities. Encouraging teachers (multipliers) to spread what they have learned among students and colleagues.



## e-learning courses

- Increasing demand: not only by undergraduate professors but also by technicians and researchers from environmental institutions around the country → 2005 – **Introduction to Remote Sensing**
- 2006 – New approach → **Hybrid Courses**: presential classes with continuous distance support (TelEduc)



# Materials

- **Distance education managing system called TelEduc (free software UNICAMP-SP)**
- **Instructional materials:**
  - **Book: “Satellite Images for Environmental Studies” (Florenzano, 2002)**
  - **Interactive educational CD-ROM: “Remote Sensing: Applications for Preservation, Conservation and Sustainable Development of the Amazon (Dias et al., 2003)**
  - **Specially well-organized tutorials for guiding students on digital image processing techniques including procedures for image registration, enhancement, segmentation, and classification (Mello et al. 2004)**
  - **A supplemental video - prerecorded lecture, covering image processing techniques**



# Methodology

- **Student selection criteria: geographic location, less access to information**
- **8 weeks (1 class - 8 hours per week), 1 chat per week**
- **6 instructors (Facilitators)**
- **30 students**
- **Mandatory classes, activities, and complementary and optional readings, weekly chats with instructors.**
- **Follow up activity: development of a project proposal incorporating an environmental theme addressed by a remote sensing technique.**



# Program

1. **How to use TelEduc and prepare a thematic or educational project proposal**
  2. **Basic environmental concepts**
  3. **Remote sensing principles**
  4. **Image Interpretation**
  5. **Image processing**
  6. **Examples of remote sensing applications**
  7. **Proposal preparation help through distant student advisement**
  8. **Final evaluation and course assessment.**
- 
- **Students were encouraged to use the software SPRING and gather data for their own study areas among the several public sources available (CBERS and LANDSAT images, digital maps, SRTM data, etc.).**



# Results and discussion

<b>COURSE</b>	<b>CAND.</b>	<b>SELEC.</b>	<b>ENROLLED</b>	<b>CONCLUSION</b>
1	61	18	14	11 (78%)
2	96	30	22	14 (63%)
3	65	32	24	18 (75%)
4	180	40	36	33 (92%)
5	140	40	27	18 (66%)
6	129	42	26	20 (77%)
<b>TOTAL</b>	<b>671</b>	<b>160</b>	<b>149</b>	<b>114</b>

Number of students that applied (Candidates), were selected and enrolled, and successfully completed each course.

According to the literature, the average dropout of distance education courses is near 30%.



## Results and discussion

- **Widespread participation of students from all regions of Brazil with different backgrounds (Engineering – Civil, Agronomic, Agriculture, Environmental and Fishing, Geography, Biology, Architecture, Chemistry, Physics and Geology)**
- **From course 3 onwards, it was decided to also accept two Latin-American students per course. In course 4, there was a Brazilian (PhD student at Michigan State University), and one student from Angola.**



# Conclusions

- **Positive outcome: most students had good performance in the tasks proposed and were able to learn the concepts, principles and processes associated with this technology.**
  - **Wide range of topics covered**
  - **The lack of background by most students**
  - **Diversity of the student population**
  - **Learning about image interpretation and processing is feasible through e-learning.**



# Conclusions

## SUCCESS

- Quality of the materials provided to students**
- Support given to students by each instructor (assisting the students in their progress and immediately respond to their learning needs)**
- Dedication to learning demonstrated by most students**



# Issues and Challenges

- **Update and improve didactic material (tutorials)**
- **Interaction (the challenge is to explore new ways of improving and encouraging student participation with synchronous activities)**
- **Creation of new e-learning advanced courses – main issue:**
  - **Overcoming resistance to invest in this new methodology**
- **Encourage hybrid courses**



**THANK YOU!!**

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