P11 **A HYBRID ONLINE WEATHER COURSE USING ARCHIVED FILES**

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1. ABSTRACT

The AMS Weather course was offered for the first time at CSULA during the fall quarter of 2006 and has been offered every quarter since, excepting summers. The course is a hybrid one combining online delivery of instructional materials and face-to-face laboratory meetings. Students meet once a week for the optional laboratory period to discuss chapter concepts and weekly assignments. Attendance for the optional meeting is very good and students attending usually do well in the course. Because our academic year begins in late September and the fall AMS course earlier that month, the online portion of the course resides on the university server with a unique Internet address. To make the semester-long, 12-week Online Weather course compatible with our 10-week quarter, the instructor archives most of the weekly files and squeezes 12 weekly assignments into ten weeks. Also, because of our shorter schedule, two chapters are twice covered in one week.

The course homepage, http://instructional1.calstatela.edu/sladoch/geog170.htm shows links to archived Online Weather assignments, the Datastreme Atmosphere homepage, the class syllabus, other useful weather links, and the instructor's webpage. Because of space limitations, previously posted assignments are removed, although they remain active for several weeks. Included among the assignments are additional online exercises such as a Hurricane Katrina activity. Popular and educational field trips to the local National Weather Service Forecast Office complement the course. Occasionally, NWS forecasters visit the classroom.

The advantages of our hybrid course compared to the traditional lecture and lab format means fewer on-campus hours for our mostly commuting, full-time working students. Increased computer literacy makes students more comfortable with online courses, as this mode of instruction becomes more common on our campus. However, the in-person laboratory does provide benefits. The CSULA student population consists of mostly minority students, many requiring remedial math, English or both. Face-to-face meetings allow students to finish assignments or get extra help. Students are also encouraged to work with partners or groups, which adds a social component to the mainly online course. Anecdotally, student performances are better in the hybrid course than in the traditional course. Student evaluations since 2006 showed that a majority found the instructor's overall teaching ability at either excellent or very good. Similarly, a majority of students would recommend the instructor to others. Several students stated that they liked the course online as it allowed more time for studying class materials and reading the textbook. Course enrollments have increased from about 20 in 2006 to approximately 40 today.

2. FALL 2009 ONLINE vs. TRADITIONAL COURSE

In fall quarter 2009, we had an opportunity to compare the online weather course with a course taught by the same teacher as a traditional lecture and lab course. While the instructor was the same, the two sections of the *Geography 170*: *Meteorology* course were different in several ways. The online hybrid course followed the Datastreme Atmosphere model using the AMS text and Investigations Manual, with weekly assignments delivered online and turned in by email. The other section used another textbook (Ahren's, Fundamentals of Meteorology Today) and the instructor's lab manual. Students in this section attended both lecture and lab periods, working on the labs in the classroom. In both sections, students were encouraged to work together on the lab assignments.

The in-person section also had an enrollment cap of 25 students as part of a new program for freshmen students called Learning Communities. These students would take two GE (general education) required courses together under a common theme. The premise was that students

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would work together, learn through collaboration, and complete their GE requirements earlier and with higher grades than other university students. The Learning Community (LC) theme for the meteorology course was *Los Angeles: Hazards City*. It was coupled with *Geology 158: Natural Disasters*, and emphasized meteorological and geological hazards, particularly in southern California. Although this was a first for LC themes and a first for the meteorology course, it was thought that students should do well in this environment.

The outcome of this experiment was unexpected. The LC students did not perform as well as the online hybrid students (see Table 1). Although the class size was smaller and received more in-person contact than the online section, the final grades were considerably lower. Perhaps a freshmen class, coming directly from high school and having less experience in college work, should be at a disadvantage compared to the other section with more upper division students.

Grade	LC	Online
A	0	4
B	5	8
C	16	16
D	4	0
Inc	0	5

Table 1. Comparison between grades for LC and Online courses.

3. HURRICANE KATRINA ACTIVITY

Both sections had a Hurricane Katrina lab as their last week's activity. The activity asked students to plot the storm track positions over the 6-day period on a Hurricane Tracking map, given the latitude/longitude positions every 6 hours approximately. Given the wind data and sea surface temperatures, students answered 6 questions dealing with the strengthening, then weakening of the hurricane (see Figure 1).

The Hurricane Katrina activity is available on the course webpage or at: http://instructional1.calstatela.edu/sladoch/geog170_files/Hurricane%20Katherine.doc and http://instructional1.calstatela.edu/sladoch/geog170_files/Hurricane%20Katrina-track.doc

4. DISCUSSION

The hybrid online meteorology course using the Datastreme Atmosphere model has worked

Figure 1. Classroom discussion during the Hurricane Katrina activity.

successfully at CSULA. The enrollment has increased and the student evaluations have been favorable. Comments from students have also been positive. Some students prefer traditional lecture courses and are less comfortable in distance-learning courses, but the majority appreciate the flexibility of working online, while having a lab session available each week to discuss course material.

The use of archived Datastreme files seems to work well, although it is more work for the instructor to upload files each week. The examples are still relatively recent so that students can recall some of the weather cases. Fitting a 12-week semester course into a 10-week quarter course doesn't seem to create any problems. The two chapters on winds are covered in one week, while either temperatures and pressure chapters, or humidity and precipitation chapters are combined in another week.

Midterm exams are given during the lab period. Midterms (2) and final questions are taken from the textbook content. Sample questions are also provided before exams.

5. CONCLUSION

The hybrid online meteorology course continues to work well as a GE science with lab course. Instead of the typical 3 hours lecture with 3 hours lab each week, students may choose one of two lab periods of 3 hours. All work can be done online, although exams are still on campus during the lab period. During fall quarter, a comparison was made between a traditionally taught lecture with lab course and the hybrid online course. Although there were marked differences between the two groups of students, the hybrid online class performed better on similar exams and labs. In a

time when the campus is under severe budget restraints, online courses may help both the university save on classroom costs and students in expediting their completion of required courses.

PDF | This paper aims to develop a novel hybrid system for wind and solar energy forecasting. The uniqueness or novelty of the proposed system is | Find, read and cite all the research you need on ResearchGate.Â weather changes. Wind and solar energy resources, unlike dispatchable central station generation, produce power dependable on external irregular source and that is the incident wind speed which does not.Â Wind velocity and wind direction are, of course, the most important parameters for the. wind power forecast. However, with the neural network approach it is easily possible to incorporate. The most extensive research on Geoengineering and Weather Modification experiments worldwide, with articles, maps, and timelines to fully expose the hidden world of Weather Control.Â It is unlikely that these problems will be solved by the expansion of present efforts, which emphasize the a posteriori evaluation of largely uncontrolled experiments. We believe the patient investigation of the atmospheric processes coupled with an exploration of the technological applications may eventually lead to useful weather modification, but we emphasize that the time-scale required for success may be measured in decades.â€ National Science Foundation â€“ Critical Issues in Weather Modification Research (2003). Fantazi W., Ezzedine T. (2018) Architecture of a Real-time Weather Monitoring System in a Space-time Environment Using Wireless Sensor Networks. In: Lee R. (eds) Computer and Information Science. ICIS 2017. Studies in Computational Intelligence, vol 719. Springer, Cham. https://doi.org/10.1007/978-3-319-60170-0_13. First Online 27 May 2017. DOI https://doi.org/10.1007/978-3-319-60170-0_13. Publisher Name Springer, Cham. Print ISBN 978-3-319-60169-4. Online ISBN 978-3-319-60170-0. eBook Packages Engineering Engineering (R0). Buy this book on publisher's site.