

SURVEY: COMPUTER USAGE IN DESIGN COURSES

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WE REPORT HERE THE results of a survey of chemical engineering departments regarding computer usage in senior design courses. All chemical engineering departments in the United States and Canada were polled, and two-thirds responded. That the sample was representative was verified by checking the number of schools reportedly using FLOWTRAN (12) against the actual number (18): (Personal Communication, Prof. J. D. Seader, University of Utah, CACHE Corp.).

FINDINGS

A. COMPUTER USAGE

1. Use of Process Simulators

Forty seven of the ninety eight schools responding used process simulators. The most popular were: CHESS (15), FLOWTRAN (12), CHEMSHARE (5), GEMCS (4), ASPEN (2).

2. Student-Written Programs

Fourteen schools responded that the students write programs in the design courses.

3. Faculty-Written or "Canned Programs"

Four of the five schools using canned

programs included CSMP on their list.

Many schools use mixtures of the above, as follows

- 1. + 2. Number of Schools = 7
- 1. + 3. Number of Schools = 4
- 2. + 3. Number of Schools = 25
- 1. + 2. + 3. Number of Schools = 30

Only seven schools do not use the computer in the senior design courses.

B. Cost of Computer Usage

The schools were asked how much they spend on computing per student, and whether the funds came from "soft" or "hard" sources. The replies were

Soft Money

- \$ 10 - 30 : 13 schools
- 31 - 70 : 12 schools
- 71 - 150 : 18 schools
- 151 - 300 : 9 schools
- 301 - 500 : 6 schools
- 501 - 1500 : 3 schools

Average: \$178/school

Average for Schools Using Simulators:
\$221/school

Hard Money

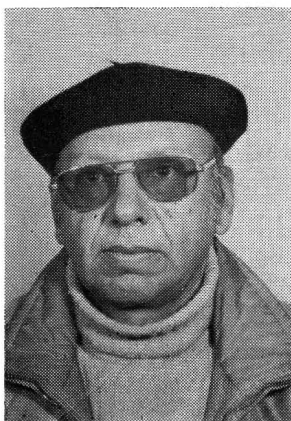
- \$10 - 30 : 4 schools
- 31 - 100 : 7 schools (4, partial soft)
- 331 : 1 school (partial soft)
- 500 : 1 school

C. Available Software

One of the questions was whether the schools had software they would share with other schools. This produced the list shown in Table I. Entries 14-17 reflect the recent decision of the four major purveyors of industrial-level simulators to make their products available to Universities. Except for the case of ASPEN, only load models are being provided. These, of course, are computer dependent.

CONCLUSIONS

The use of large simulators in senior design courses is clearly established. Over sixty five percent of the schools will be using them in 1983. Computing costs are high. Unmonitored student use can easily result in expenditures of over \$1,000/student. □



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TABLE 1. Programs Offered

NAME	UNIVERSITY	DESCRIPTION
1. Dr. R. D. Weir	Royal Military College of Canada	CALYPSO—Neutron Diffusion Code
2. John A. Meyers	Villanova University	Activity coeff. from data. Tray efficiency Antoine constants from data HTU in packed column. Multipass ht. exch. Non-ideal binary x-y. Linear and non-linear regression. Tray by tray by relaxation. Multicomponent distillation.
3. Jim Douglas	University of Massachusetts	Process synthesis programs (in preparation)
4. John H. Erbar Jan Wagner	Oklahoma State University	PAS, MINISIM (General purpose simulators similar to CHESS, FLOWTRAN, etc.)
5. Paul Babcock	University of Connecticut	GEMS, FLOWSIM under restrictive agree- ments
6. R. L. Motard	Washington University, St. Louis	CHESS (\$1000/school)
7. M. V. Svrcek	University of Calgary	HYSIM, HYDIS, (property of Hydrotech Ltd. of Calgary)
8. W. D. Seider	University of Pennsylvania	GIBBS, Chemical and phase equilibrium. HETDIS, three-phase distillation
9. B. A. Finlayson	University of Washington	DISTIL—Shortcut distillation
10. E. J. Henley	University of Houston	BCOST—Equipment costing and economic analysis
11. Alberto I. LaCava	City College of City University, NYC	Parametric Estimation. Dynamic Simulator. Nonlinear Equation Solver.
12. John L. Potter	New Mexico State University	Economic Evaluation. PCS (written by J. Erbar)
13. R. F. Benenati	Polytechnic Institute of New York	Comprehensive collection covering unit ops suitable for microprocessors (Fall, 1982)
14. Vickie Jones	CACHE, #3062MEB University of Utah	FLOWTRAN (Load Module Only)
15. Larry J. Lesser	CHEMSHARE, P. O. Box 1885, Houston, TX 77001	DESIGN/2000 (Load Module only)
16. Jim Byrne	Simulation Sciences, Inc. 1400 North Harmor Blvd. Suite 250, Fullerton, CA 92635	SIMSCI (Load Module only)
17. Margaret Butler	National Energy Software Center 9700 South Cass Ave., Argonne, IL	ASPEN (IBM, UNIVAC and VAX Ven- sions)