

SOME GAME INFORMATION SYSTEMS EXPERIENCE

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In the September/October 1977 issue of Simulation/Cam-jag, David Fritzsche called for a sharing of experiences in the area of applying information systems methodology to computer based games [1]. This paper recounts some of the experiences of the Department of Quantitative Methods at Georgia State University in this area from 1970 to the present. Two areas of application and several games have been involved in the effort.

The initial (and continuing) area of application is in Decision Sciences courses, principally at the masters level. Two parallel and interacting paths of evolution can be seen here. One path represents a move from application of general library programs for such traditional OR/MS models as linear programming, Monte Carlo simulation, and multiple regression, through custom-tailored versions of such models, to completely specialized packages suited to only one version of one game. The other path represents a move from a large, central time-shared computer facility to minicomputer systems.

The other, and in some respects more productive, application area is Continuing Education. Although GSU has used several versions of the SIMQ game in continuing education programs since 1971, the first information system efforts date from the acquisition of WANG 3300's in 1971. Since use of the central computer for this purpose is difficult and uneconomical (most continuing education programs are held at remote sites), all subsequent MIS development for short courses has been based on relatively portable minicomputer systems. The WANG 3300's were replaced by IBM 5100's, which are now augmented by WANG 2200 PCS II's.

CONTINUING EDUCATION

Since most of our development work in the area of information systems serving games has been motivated by Continuing Education courses, these courses provide a useful framework for tracing the path of that development work. GEMS (Georgia Executive Management Seminar) is a one week course for middle managers with a history tracing back to the 1950's. The SIMQ [2] game has provided the basic fabric for GEMS since 1971. AEDP (Advanced Executive Development Program) is a course for upper middle and top executives, which has used the OPSTAC [3] game since its inception in 1972. AEDP is comprised of two 2 week segments, the second of which

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is mostly game-based. Other courses are offered by either the Continuing Education Division or consortia of faculty for individual companies or industry groups, but AEDP and GEMS are the courses in the mainstream of gaming and MIS development.

The first SIMQ based offering of GEMS was in 1971, just prior to the arrival of our first mini-computer. The only non-manual decision aid used in that offering was a repair simulation that ran on a WANG 380, a rather advanced, but cranky desktop calculator. Two months later, at a short course offered for the American Accounting Association, a very limited set of programs including a cash flow analysis, a linear programming algorithm, and time series analysis programs were made available to participants. Several were actually written on-scene in response to player needs! The following year's GEMS offering included a rather general package of programs [4] which had been written for the use of students in academic courses. Of the 12 programs in the package, two were specifically adapted to the SIMQ environment and two had absolutely no applicability to the game. All required some technical understanding of their respective underlying models in order to use them at all. See Figure I for Table of Contents.

Figure I

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The group most involved with game development and use at Georgia State was (and is) mostly composed of faculty in the Quantitative Methods Department. Not too surprisingly, the role the QM group perceived for themselves at first was the teaching of quantitative methods. You may never have tried to teach a group of middle managers the intricacies of linear programming, multiple regression

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analysis, stochastic inventory theory, Monte Carlo simulation, and traditional time series analysis in a one week course in which they are also studying marketing, finance, accounting, personnel, legal environment, and policy, while making game decisions. If not, you have missed out on an experience which is difficult to believe even while it is happening. Surprisingly, the QM instructors had moderate success and got good ratings in the participants' evaluations.

Over the next several years a process of evolution took place. The earliest trace of that evolution is visible in the MIS materials for the first (1972) offering of AEDP. Although those materials represented a rush job of the most ulcer-generating sort, since only one month was available for MIS development for the OPSTAC game, all programs were specifically designed as decision aids for the OPSTAC environment. While crude by our present standards, that one fact made them a much more significant advance than we were aware of at the time. The same factors which made analysis programs game-specific (e.g. having players input only "right hand side" values in a linear programming routine instead of entering the entire initial tableau) also shift the focus away from technique and toward managerial interpretation of model results.

We began to see that we could get away with less emphasis on technique and theory, and over the next several years learned to capitalize on that understanding. Since technique was not a viable objective for this type of course, our whole approach to continuing education courses underwent a gradual metamorphosis. Whereas in 1972 the motive for developing specialized programs was to reduce inputs to cut down on essentially clerical operations, by 1976 the intent was to reduce the "overhead" of game decision making in order to permit both a more managerially oriented viewpoint and to allow emphasis on critical ideas. In particular, the packages intended (and still do tend) to encourage "what if" thinking on both the strategic ("What if we diversify into another product line?") and the tactical ("What if we cut our prices three percent?") levels. By early 1977, we were also beginning to see that gaming provides a suitable environment for teaching generalized problem-solving skills, and as a result some Kepner-Tregoe [511 based material began to creep into the course [6]. Since an underlying thread of the Kepner-Tregoe material is the limited information- processing capacity of the human manager, the use of packaged programs fits nicely in parallel as an example of how one can avoid wasting this capacity on tasks for which machines have a comparative advantage.

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The next major step was taken in 1977. In 1976 we had replaced the WANG 3300 equipment with IBM 5100's, with significantly better file manipulation capabilities. Once we had accumulated enough experience with the 5100 to be confident that it could be done, the first conventional MIS was attempted for the 1977 offerings of AEDP. Based on a relatively large file of facts, assumptions, and tentative decisions, "Big Mac" [7] projects most operations and their accounting consequences for a quarter of operation of the simulated firm. See Figure II. The user may then examine any sub-system of the firm in detail, the whole firm in general, or all sub-systems in detail as desired. "Big Mac" development is continuing, and a more sophisticated version should be operating on our latest equipment, WANG 2200 PCS II's, by April, 1978.

The next logical advance is to a system in which game files are accessible to the MIS. The first steps in this direction have been taken; both OPSTAC and SIMQ are run- fling routinely on a WANG 2200 VP. This machine has drives for the same type of "floppy disks" used by the 2200 PCS II, although these drives are presently inactive during game runs. In time it should become feasible to utilize these drives to abstract the relevant game file information to a form usable by "Big Mac" or its successor. At that point it should be possible to reach the ideal of limiting user input to assumptions and tentative decisions, thus making the thorough exploration of alternative "futures" a relatively efficient proposition.

ACADEMIC COURSES

Regular academic courses have been the motivation for a limited amount of game-related MIS work, but have mostly been the fortuitous beneficiaries of the Continuing Education developments. Where GEMS and AEDP have been the wellsprings of major direction changes, academic courses have spawned a cash flow program here and a price optimization program there. They have unquestionably had less impact on game MIS development than have the short courses.

On the other hand, it would also be fair to say that the game MIS development has had significant effect on the regular academic courses. When something works well in one context, it is natural to look around to see if there are other places where it might be useful. In some cases this has simply meant parallel development of programs on both the mini-computers for short course use and on the large time sharing machine for academic use. In other cases, however, academic courses have essentially evolved out of the Continuing Education materials when a need and a capability came together at just the right time.

FIGURE II

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CONCLUSION

We originally moved toward MIS-like programs for a variety of reasons. One, now obsolete, was as a vehicle for teaching technique. Another was in attempt to reduce the overhead of gaining by reducing the amount of routine work the player is faced with.

Given the relatively limited capacity of mini-computers and the fact that programs must be developed regardless of whether they are general or special-purpose, the situation favored a move toward an MIS-like approach. A yet more important factor was the non-specialist orientation of most of the short courses, which are directed toward the rising manager, not toward an OR/MS specialist. As experience with these factors accumulated, an evolution took place toward miniature MIS systems. An end result of these development efforts is that the MIS packages originally developed for short courses are now heavily used in academic courses as well.

The present (1977) versions of these packages require the keyboard entry of substantial amounts of data. This is satisfactory for academic courses, but for short courses it does cut into decision-making time more than we would prefer. Since both of our currently active games, SIMQ and OPSTAC, have been converted to the WANG 2200 VP, the next obvious stage of development would seem to be direct data base construction from the game files themselves. Although a great deal of effort will be required to implement this, it undoubtedly will be one of our next efforts.

ACKNOWLEDGMENTS

Although the author has been involved with the developments reported here from a very early point in the process, he has been only one of many contributors. It would be cumbersome, perhaps impossible, to identify all who have contributed significantly, specially since many students and short course participants have given valuable insights. At the very minimum, however, the Georgia State University authors mentioned in the references had major roles in the development process related here.

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