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The purpose of my original study was to examine the range of software simulations marketed for history students and to evaluate their individual worth as teaching aids in higher education. From the simulations that I had already seen in operation in schools and at exhibitions, I had formulated the hypothesis that history simulations (as distinct from, say, economic simulations) were not suitable for higher educational needs.

For example, at the 1986 'History and Computing' Conference at Westfield College, London, the simulation, 1914 (Cambridge University Press) was ondisplay. Based on the information received from the simulation program, the user/s make decisions that relate to a six weeks period of the First World War. They then study the consequences of their decision-making.

Even though users may notch up a considerable number of computer-allocated points through successfully engaging in battles, the outcome of 1914 is preordained by the realities of history. The program forces users into being an inevitable part of the French retreat. Thus users with no points, and those with a myriad of points, still find themselves with their backs up against the walls of Paris by the end of the game.

If the point of the exercise is to show students that the French were unsuccessful in their first major war of the century, a far less elaborate device would suffice. The skills that users may have acquired in the course of this simulation relate to military strategy and tactics: these, however, are scarcely requirements for a modern historian. The best pedagogic history use that could result from the game derives from its support material, the back-up in terms of maps and information sheets. Sifting through these parerga, students might become familiar with a few of the sources used by historians to study particular events or sequences - although these still very much lie within the sphere of the military historian. Furthermore, the introduction to such sources scarcely justifies requiring undergraduates a priori to operate a computerised simulation package for several hours.

Played as a game, this simulation might provide a point of interest beyond the tedium of the classroom for 12-15 year olds; thus school hi-story teachers might generate a more sympathetic reception to their lessons

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on historical sources and evidence. However, the ludicrous aspects of the simulation would initially be less attractive to a group of history under-graduates because they are already a well-motivated group possessing an understanding (however superficial) of the structure and nature of the subject. But, of course, one should never under estimate the role of game-play as a means to stimulate students of any age and level of ap-preciation.

History and Computing:
The Nature and Range of Historical Simulations

The Association for History and Computing has, during its first few years in existence, amply demonstrated the range of uses to which com-puterised databases can be put to facilitate traditional data processing ope-rations. The sifting of facts and figures is quite often the stock-in-trade of many quantitative and empiricist historians. The incorporation of IT has not only speeded up data processing but also allowed for a greater amount of hypothesis formation and testing.

Commercially, several data retrieval packages are available for student historians, usually containing census returns from the 19th century. (There are also data base programs on the English and Spanish fleets at the time of the Armada, the Domesday Book and the 1981 Census, plus several databases marketed as suitable to historical research, e.g. Superstore and Starbase.) These packages allow students to experiment with the methods used by professional historians and, because of computerisation, permit multiple hypothesis development and testing within a scheduled classroom period.

Drill and Practice packages are regarded with scepticism by historians in higher education who deplore the practice of learning lists of facts. While they may appreciate that the ability of computers to motivate stu-dents may counteract students' negative responses to fact learning, they cannot themselves overcome their own aversion to the pursuit of the pu-rely factual.

Spreadsheets are also used by professional historians, particularly eco-nomic historians, although there are few commercially marketed spreads-heet packages which claim to be dedicated to history students. In general, spreadsheets are incorporated into either database programs, e.g .Datapro-be or simulations, e.g. Railway.

Simulations fall into a number of categories. Re-enactment simulations have the least pedagogic credibility in higher education because they at-tempt to lead students along a particular path. (See my earlier description of 1914.) Although in the communication of facts they may have ad-vantages over other types of simulations, their emphasis on multiple-choi-

ce questions denies students the opportunity to engage in the decision-making process for themselves. The criticisms levelled at the factual emphasis of Drill and Practice programs would also be valid for re-enactment programs. Basically, students are asked to acquire factual knowledge.

The branching structure of replay simulations allows for greater participation and involvement. A pedagogic problem arises because students may depart from the events as they occurred and thus, via the computer, create 'counter-factual' history. Given that simulations must be used in conjunction with other sources, I can see a positive advantage to be gained from students at all levels constructing novel sequence structures and producing counter-established-factual evidence. The exercise is part of the dialectic of historical investigation in which one is constantly seeking to reconcile the contradictions of one's sources.

On the other hand, it is generally argued that the great attribute of replay simulations is the way in which they teach cause and effect. Since most students in higher education were offered places at an institution on the basis of their previous academic results or performance, 1 would maintain that it may be too late in the day to encourage simplistic computerised enquiries into cause and effect. Our history students come into our institution already aware, through their own experiences, of the principle of causality in its historical perspective.

History models which develop a context-for-action rather than dwelling on specific events in the past present far greater opportunities for the development of historical skills and perspectives. Empathetic understanding of problems such as Canal Building, Railway construction and early Victorian England brought about by simulation play may pave the way for better historical research into the industrial revolution. The study of economic history receives the greatest benefit from most of the available models which adopt a thematic approach, although simulated investigation exercises which help students to learn to cope with conflicting evidence, e.g. Murder or Godfrey, may serve all branches of history equally.

Towards the Future

Elsewhere can be seen the process by which 1 have questioned the semantics and pedagogy of simulations in general, and modified a list of criteria already used for evaluating software in schools, to theorise the construction of a template that might help assess the suitability of any type of historical simulation for degree-level work (Dunn 1989). Examples of the template being used to review simulation programs are also available (Dunn 1988; 1989). The purpose of this paper is to move the discussion on, to speculate upon some possible directions in which future historical si-

mulations may develop, and to consider some of the activities which would currently be reviewed in the template under its section entitled 'Versatility: a) Does the user control what the program does? b) Potential uses.'

As a minimum requirement for all simulations, one would expect to be able to bring into the simulation exercise information from other sources, thus extending and modifying the initial information contained in the program. After all, this is the process of synthesis in which our history students are continually being asked to engage. Thus it is only with the context-for-action type of simulation that 1 see any real future. At present however the shells of such simulations are still far too topic-specific (e.g. solving a murder case or opening up the American frontier). Future desig-·ners should concentrate on providing simulation exercises dedicated to the methodological structure of historical investigations - the processes through which historians approach analysing the past and not how people in the past might perhaps have approached solving their particular problems.

Such simulations must therefore either be adaptable to a variety of contexts or, preferably, be usable in any open-ended historical investigation (i.e. one in which there is not only no outcome prescribed by the programmer, but also no preset task such as in finding out 'whodunnit' or in establishing a community in the mid-west). Students must be free to develop and frame their own set of investigations.

Ultimately, computerised simulations need to evolve from empathetic evocations and reproductions of the conditions of the past into 'stimula-˙tions', programs that enable students to sympathise with and gradually assimilate the routine practices of present-day professional historians.

I foresee a time in the not-too-distant future when simulations (or pos-·sibly just the one dedicated 'context-for-history' simulation) would arrive complete with their own databanks; but they would have the potential for including the computerised databanks and information already existing within the purchasing institution (e.g. numeric and topic-specific databa-·ses, copies of historical texts, reading lists, theses, and library holdings). They would also be able to draw upon many of the on-line databases (census, bibliographic, abstracting...) that now exist and are continually being created around the world.

A simulation assisted historical exercise for a student might then operatcin the following way.

The basic computerised simulation model would present information in small units and in a random order, thus simulating the experience of an historian faced with a repository of uncollated data. Initially the student would 'browse'.

At any time, the student could develop a hypothesis, store the hypothesis in the computer, and, questioning the computer further about its own databases and on-line sources, begin to plan an investigation to test the hypothesis. The student would now be in a specific area of historical investigation, either/or/and thematic, temporal, geographic. For example, the student might be interested in prosecutions and sentencing under the Factory Acts in Victorian England and wish to test the hypothesis that magistrates were lenient in their sentencing of factory owners who offended.

The computer would work in response to the student's interrogations. ('Can you list articles on the Factory Acts?'. 'I am connected to the following abstracting and indexing databases: PAIS, Infotrac, ABl/ln-form./././.') Were the student in the Novice Mode, this could easily be followed up by advice on which databases the student might wish to look at first. ('Into which categories might your investigation fall: diplomatic history/social history/economic history/national/international?' And thereafter, 'I suggest you try the databases in the following order./././.') Were the student's key word/s, 'Factory Acts', not to produce satisfactory results from the databases, s/he would be reminded of other key words from the hypothesis.

Perhaps when some of the secondary article and book sources had been scanned, the simulation might produce a prompt enquiring whether the student wished to delve into some primary sources. Alternatively, having concluded the bibliographic searches, were the student to ask HELP, the computer might reveal that it could access a database (possibly one located at another institution but available via Janet) containing, for example, details of prosecutions and offenses in Lancashire of the period 1844-49.

At regular intervals the student would be encouraged to modify the original hypothesis and, should the student try to quit claiming (via the menu) that their original hypothesis was valid, the program would indicate areas which had not yet been searched to confirm or refute the hypothesis.

This form of interactive simulation which could call upon the vast reserves of research already undertaken by professional historians would benefit students of higher education in the following ways.

1) Students could be encouraged to explore new avenues of data quickly and comprehensively.
2) Time would not be wasted on repetitive empirical research. Data would already be stored and collated in databases which could be tapped by the simulation program.
3) Students could initiate and test their own (or group) hypotheses.
4) The skills of enquiry, investigation and synthesis would be developed far earlier in students' careers.

5) Interacting with other programs, e.g. spreadsheets, students could develop their creative skills in demonstrating their findings graphically.

6) Tutors would have more time to discuss individually with their students the products of each student's own research. Tutors would thus be better able to respond to individual students' needs.

All this is not to say that a student will not have, at some time, to leave the work station and enter a library - or even to be lectured. Yet, with the possibilities of newspapers and video being accessed directly onto the computer screen, the development of computerised books, and the computerisation not simply of lists of holdings but abstracts and also the materials themselves (not to mention the ability to call up original hardcopy via FAX) - each advance delaying the point at which a student is forced to wear out shoe leather - a more competent, time-efficient historian is produced. The computer, in common with the prevailing view of the role of what a history teacher should be, becomes an enabler.

The concept of interactive simulations is one that in other disciplines has already been taken up. Even so, the problem of transferability still remains largely unsolved. Personally, 1 do not believe in standardisation. However, compatibility between machines and programs is vital.

In Europe, we still tend to focus on the type of simulation that could just as easily be played as a board game; indeed the majority of simulations do start out life as precisely that. Gone are the days when we should waste time developing an antiquated style of computerised simulation out of a good board game. Any future simulation must have, at the very least, its own databases and spreadsheets; better still if it can tie into other databases and packages (e.g. word processing and computerised books and journals) thus strengthening the link between reading and writing, research and hypothesis formation.

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