

A PROJECT PROPOSAL FOR THE
DEVELOPMENT OF A COMPUTER-
ASSISTED MANAGEMENT DEVELOPMENT
PACKAGE

A learner-controlled system for the integration of specialist
knowledge and the development of problem-solving ability in uncertain
environments

DRAFT

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October 1974

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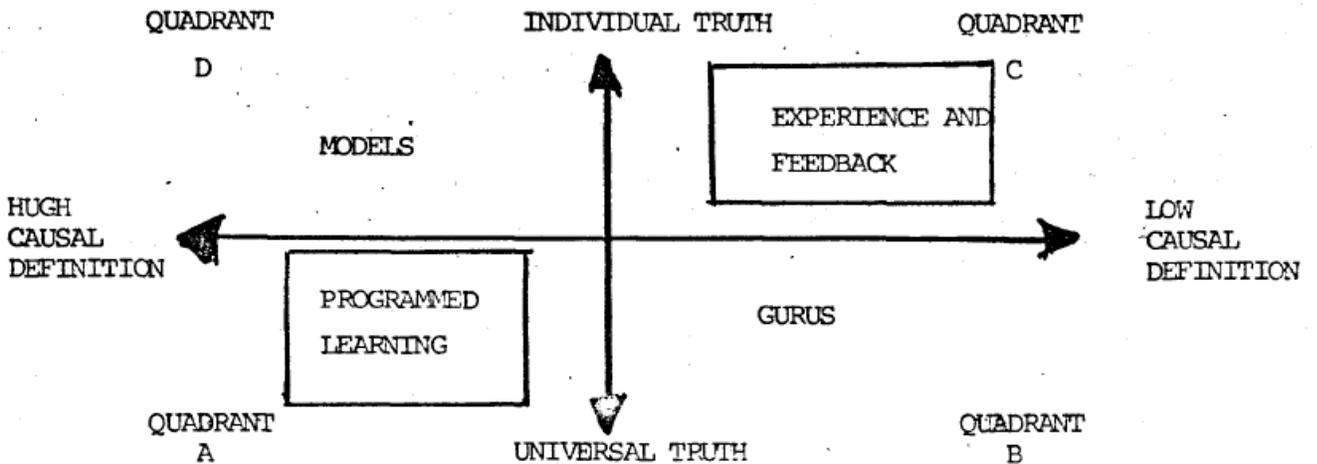
1. INTRODUCTION

INTRODUCTION

1.1 This project proposes the development of a computer-assisted simulation and a computer-based feedback method which together form a learning system. The simulation presents a number of managers with different sets of decisions which have to be made within competing companies. The computer is used to collect the decisions from all the managers in the different companies and to combine them. The feedback method helps the manager specify the concepts he uses in reaching those decisions, and the way in which he applies them in discriminating between different decision situations. It also helps him compare his own concepts with those of other managers. _

CAUSAL DEFINITION

1.2 Before looking at the learning system in more detail, it is necessary to look at the educational assumptions implicit in its construction. Fundamental to these assumptions is the concept of causal definition, by which is meant the extent to which cause and effect can be predicted. With high causal definition comes certainty about the effects of particular actions, and with low causal definition comes uncertainty. In areas of high causal definition cause-and-effect can be predicted by reference to a common body of knowledge, but in areas of low causal definition cause-and-effect "depends on the situation".



INDIVIDUAL VS UNIVERSAL TRUTH

1.3 Another assumption is that different people have different opinions on the general applicability of their particular world view. At one extreme lies the manager who believes that the knowledge he has acquired is universally true for all men in all situations. At the other extreme is the manager who believes his knowledge to be individually true for himself under specific circumstances. These two assumptions when put together form one categorization within which it is possible to place different learning systems. In the diagram above, the horizontal line represents the existing state of common knowledge and the degree of certainty with which it can predict cause-and-effect. The vertical line represents the manager's state of knowledge, and the degree of certainty with which he feels he can predict cause-and-effect.

PROGRAMMED LEARNING

1.4 If the quadrants are labeled A, B, C and D then in terms of learning systems quadrant A represents the realm of machines. Knowledge can be broken down into small pieces and their interrelationships absolutely defined. Because all managers in this quadrant expect to learn the same universal truths it is possible to programme their learning experiences with no allowance for individual variation.

LEARNING FROM EXPERIENCE

1.5 Quadrant C on the other hand represents the realm of men. Here there is no common body of knowledge but rather there are as many different ways of looking at situations as there are managers. The manager does not expect to find an "answer" to his problems and realises that his only hope lies in his own development. Learning systems therefore place the emphasis on obtaining a range of experience and giving the manager as much personal feedback as possible, the feedback often placing heavy reliance on the skills of trained observers.

MODELS

1.6 In Quadrant D the manager does not accept that universal truths exist and must therefore discover such truths for himself. Learning systems in this realm therefore abound with models and other tricky situations from which the manager is forced to discover the true nature of things in order to survive. This is also the realm of games, where the rules of play become the rules of life, and God reigns supreme.

GURUS

1.7 Quadrant B is the realm of gurus. Here the individual view is elevated to universal truth. The manager expects the learning system to supply him with a universal truth, and the learning system supplies it in the form of a person, often experienced in his field and accomplished in his method.

NO-MANS LAND

1.8 There is no reason why the manager should always expect either universal or individual truth. Inevitably he will be confronted by situations that will lie along the whole spectrum of causal definition. Ideally the manager should be capable of recognising the nature of a situation and deploying the methods appropriate to handling either certainty or uncertainty. For learning systems to encourage the manager to remain in either Quadrant B or D is therefore inexcusable because they encourage the manager to develop methods inappropriate to the problems he faces. Such systems are only useful insofar as they help the manager to move his perceptions of a situation from Quadrant D to C or from Quadrant B to A. In this sense therefore, Quadrants B and D are no-mans land.

THIS PROPOSAL

1.9 This proposal is concerned with developing a learning system which will operate in Quadrant C. Its objective is to provide the manager with manageable chunks of reality on which he can develop his own methods of handling uncertainty with the help of a feedback process. Further it is concerned with achieving this without the present heavy dependence on high staff-student ratios.

2. THE LEARNING SYSTEM

INTRODUCTION

2.1 Section 1 outlined the framework within which this learning system has been designed. Its objective is to develop in the manager the ability both to recognise uncertain situations and to evolve the methods necessary to cope with them. To achieve this the system presents the manager with chunks of reality which he has to manage and provides him with a mechanism by which he can better understand both his own and others' methods of coping. The system does this using technology more commonly associated with Quadrant A so that some of the economies of scale available in Quadrant A can be brought to Quadrant C.

TRANSFERENCE

2.2 A learning system designed to operate in Quadrant C must be capable of re-creating the specific situations that the manager encounters. Although some abstraction will be possible it must be kept to a minimum because it represents the introduction of assumptions about cause-and-effect which inevitably become models. In other words the manager must perceive the situations he encounters in the learning system as directly equivalent to the "real-life" situations he has to cope with. The simulation has been designed with this in mind therefore so that there is maximum transferability of methods between the simulation and the manager's "real-life".

THE SIMULATION

2.3 The simulation is designed to involve any number of managers exceeding four. An environment is re-created around the managers representing companies competing against each other in a market over an indefinite period. Each manager is given direct control over part of a company in the form of certain decisions that he can take. In the existing simulation these decisions are on pay, productivity, working hours, output and price. The manager is presented with absolute certainty about the effects of specific decisions. Either this is because the level of the decision allows it (for example one extra day's holiday means one less day's work) or because it is necessary to limit the number of areas of uncertainty in order to make the chunk of reality manageable (for example the market model which predicts the effects of any given pricing strategy). The computer is then used to combine all the decisions. With four companies competing in the simulation a total of 168 decisions are made at each round of the game. The manager is therefore faced with considerable uncertainty as to cause-and-effect, which he can only cope with by influencing, controlling and predicting the decisions of others. Because the two interest groups in the simulation are workers and managers, this means that the situations encountered provide experiences that have considerable relevance to industrial relations.

THE FEEDBACK SYSTEM

2.4 Faced with the situation created by the simulation, the manager is faced with several areas of uncertainty. He must predict what decisions he and others should make, how these decisions will affect the environment, and how this in turn will constrain his and others' future decisions. In this way he will evolve a strategy and particular tactics for coping with the situations he encounters. The feedback system is a computerised questionnaire and answer analyser. It presents the manager with a number of people, problems, case studies or any other group of elements representing a part of his environment, and asks him to discriminate between them using concepts. The manager discriminates by giving a position to each element on a percentage scale. The computer then analyses these

scales to discover the extent to which the concepts discriminate in the same way or differently to other concepts. Much of the job of an observer working in Quadrant C is to help the manager gain a greater insight into what assumptions he and others are making in a situation, and what implications they have for the processes that occur. The feedback system is designed to relieve the observer of this role, creating an agenda for the manager out of his own reactions to the situation. Given, this information in an environment where the manager is seeking to develop his own concepts and is aware of the relative effectiveness of different individuals' concepts, it is possible for him both to accelerate the trial-and-error process and to achieve a greater understanding of others' concepts.

THE ROLE OF TEACHER AND COMPUTER

2.5 The essential characteristic of this package is that it is learner controlled. The computer structures the interactions between managers, thereby causing the use of a set of concepts and skills. This experience is then used as the raw material for a feedback process in which the manager examines the terms in which he perceived the interactions, and the ways in which he discriminated between them. This information compared with equivalent information from other managers creates the agenda for a learning process where the managers learn from each other. The teacher therefore acts both as a catalyst and a resource, encouraging the managers to explore for themselves the implications of the feedback available to them, and to help in the process of interpretation where it is asked for. The computer is used not as a substitute for the teacher, but rather as an information processor, leaving the teacher free to concentrate on the more important learning processes.

TECHNICALITIES

2.6 The package took 10 man-weeks to develop, including 6 man-weeks of terminal time, and currently occupies 180K words of computer storage. Interface with the manager is by standard teletype or visual display terminals, and the package has been used both in-house and remotely over GPO lines. In design, the programming techniques allow expansion of the existing system to incorporate new features.

APPLICATION OF THE PACKAGE

2.7 The simulation has now been field tested on five courses over two-day periods. There were between fifteen and twenty participants on each occasion. The participants included junior management from Unilever, senior industrial relations managers from De La Rue, M.Sc. postgraduate students, and a cross-section of middle-management on two LBS short courses. The feedback system has been used on two courses by M.Sc. students to examine interpersonal perceptions and to understand the range of concepts being used on a case study course in comparison with the course teacher: It has also been demonstrated on several occasions. As a result, De La Rue, Unilever, the NCB and several internal LBS courses have expressed an interest in further use of the package.

3 THE PROJECT PROPOSAL.

DEVELOPMENT AREAS

3.1 The existing prototype package was created to field test the efficacy of the system design. In order to be able to use the package in a wide variety of institutional and corporate environments and to meet the design objectives fully it is proposed that this project should undertake the following areas of development:

The Feedback System

3.1.1 The methods of analysis of individuals' conceptual frameworks and decision processes need further study and refinement. The effects of the feedback on learning need to be studied and different forms of feedback presentation need to be developed.

The Simulation

3.1.2 The decisions required by the simulation reflect two interest groups. It should be developed to simulate further interest groups in a greater number of corporate environments. This is necessary in order to create the spectrum of output behaviour which is demanded by the feedback system.

The Package

3.1.3 The feedback system and simulation need further integration as a packaged learning system, and it will be necessary to develop teaching skills appropriate to the educational approach Of the package.

DISSEMINATION

3.2 In order to ensure that the package should be both relevant and applicable to different environments, it is further proposed that the project develops the package simultaneously in two or more institutions or corporations. At present Unilever and the NCB Staff College are prepared to consider such a project and the LBS is starting discussions with a Polytechnic along the same lines. In addition the Lancaster Management Teacher Development Unit is prepared to contribute to the validation of the learning system and later to run Teacher courses to aid the dissemination process. The institutions or corporations will contribute both to the funding of the project and the breadth of application of the package. This will provide a sound basis for the further dissemination of the package in the later stages of the project.

4. ORGANISATION

PROJECT CONTROL

4.1 The project will be supporting a number of subsidiary projects which will be developed in the interests of their parent organisations. Each sub-project will liaise with the main project which will supply coordination, technical resources, educational design, and feedback. The main project will therefore be concerned with project control, course development, technical coordination, educational coordination and course evaluation. Ultimate responsibility for the project will rest with the project leader. The main direction of development however will come from the sub-projects.

EVALUATION

4.2 The development area on which the learning system concentrates makes normal methods of evaluation and assessment difficult. For this reason it is proposed that the project use the special skills of the Management Teacher Development Unit at Lancaster, both for a major evaluation of the project after 12 months and for a continuous source of feedback. In addition this Unit will be useful in the later stages of dissemination by providing teacher training.

EDUCATIONAL COORDINATION

4.3 Each course will face particular development problems specific to its parent organisation. It will be the function of educational coordination both to help overcome those problems with the help of Lancaster, and to provide a means by which the solutions can contribute to the overall development of the package. These problems will include the form of the simulation and feedback systems as well as course design and content. It is crucial however, that in overcoming these problems the project maintains a common direction for the package.

TECHNICAL COORDINATION

4.4 Educational coordination of the courses will produce technical problems in the implementation of design recommendations. It will be the function of technical coordination to ensure that implementation is achieved if necessary with design modifications.

ADMINISTRATION

4.5 It will be necessary to make extensive use of the LBS computer resources as well as teaching faculty and audio-visual technology. In addition there will be seminars, publicity, documentation, course administration and preparation of course materials. Much of this work, being common to all the courses, will be done by the project team, although specific course administration in each organisation will be its own responsibility.

PERSONNEL

4.6 In order to achieve the level of development aimed at over the two years, the following personnel will be required:

Project Leader

4.6.1 The project leader will provide the main educational and technical thrust to the project. He will liaise with the course directors and will be responsible for the implementation, documentation and dissemination of the package.

Administrator/Secretary

4.6.2 The administrator/secretary will, in addition to providing the team with its secretarial requirements, act as the coordinator of documentation and minuting, and will maintain liaison between the different course directors.

Systems Analyst/Programmer 1 and 2

4.6.3. These personnel will be required for liaison on technical matters, to discuss design implications of different educational needs and to implement design recommendations. The two individuals will specialise in either the feedback system or the simulation, and provide all the necessary technical coordination and documentation.

5. PROJECT PLAN

MAJOR EVALUATION

5.1 The project has been planned to include a major evaluation of progress at the end of 12 months. The intention of this is not only to focus attention on the lessons and achievements at the first 12 months, but also to define and direct the second 12 months in greater detail.

OBJECTIVES FOR YEAR 1

5.2 The objectives for the first year of development are as follows:

Develop Simulation

5.2.-1 Develop the simulation to include further major functions within the company and their corresponding sets of decisions. These functions will be determined by the course directors, leading to an enlarged system design. The existing system will then be developed to incorporate the additional sets of decisions.

Develop Feedback System

5.2.2 Develop the analysis and presentation of feedback. The full range of analysis possible on the existing data collected by the feedback system has not yet been implemented. It will be possible to increase the flexibility with which the feedback system can be used and the range of analysis it can present.

Integrate Systems as Package

5.2.3 Integrate the package components as a course. The processes generated by the simulation depend largely on the structural constraints placed on the participants. In order to make full use of the feedback system the structural constraints will have to be evolved to generate processes most appropriate to the courses' learning objectives. In addition the operational details of running the package as a course need to be evolved through its application over successive time periods. The final package will therefore take the form of a general system with different sets of structural variables corresponding to different educational objectives.

Validate the Learning Process

5.2.4 Validate the efficacy of the feedback system and develop appropriate teaching methods. Inherent in the package are a set of assumptions about management behaviour and the learning process. These must be tested by their further application and the teaching methods appropriate to their application must be developed and made explicit.

OBJECTIVES FOR YEAR 2

5.3 The objectives for the second year of development will be as follows:

Fine Tune the Package

5.3.1 Study the relationships between the strategies used in coping with given system structures and the models used as identified by the feedback system and their implications for course design.

Prepare for "Hands-off" Operation

5.3.2 Finalise documentation and package system for "hands-off" operation. The final package must be operable independently. The final documentation on systems operation, structural variables and teaching methods should make this possible.

Dissemination

5.3.3 Disseminate:-the package and associated teaching methods to other institutions and corporations.

6 PROJECT COSTS

FIRST YEAR ESTIMATED COSTS

6.1 The following are the estimated costs over one year associated with the project proposal, showing the NDPCAL and LBS contributions to the project.

LBS		NDPCAL	
Notes	£	Notes	£
1	Analyst/Progr 1 <hr style="width: 50%; margin-left: 0;"/>	7	Project Leader Analyst/Progr 2 Secretary/Main <hr style="width: 50%; margin-left: 0;"/>
	3,500		4,500 3,500 2,000 10,000
	Overheads @.12½ %		Overheads @12½%
	440		1,250
2	Total Salary costs without increments <hr style="width: 50%; margin-left: 0;"/>	2	Total salary costs without increments <hr style="width: 50%; margin-left: 0;"/>
	3,940		11,250
3	Rent, heating, light Catering subsidy Recruiting, Hospitality, Postage, Telephone Computer <hr style="width: 50%; margin-left: 0;"/>	8	Travel Seminars, Publicity, Matls, Expenses <hr style="width: 50%; margin-left: 0;"/>
	5,000 1,000 1,000 4,000 <hr style="width: 50%; margin-left: 0;"/>		1,500 1,250 <hr style="width: 50%; margin-left: 0;"/>
	11,000		2,750
	Teaching <hr style="width: 50%; margin-left: 0;"/>	10 11	Lancaster Polytechnic <hr style="width: 50%; margin-left: 0;"/>
	4,000 <hr style="width: 50%; margin-left: 0;"/>		2,500 2,500 <hr style="width: 50%; margin-left: 0;"/>
	4,000		5,000
	FIRST YEAR TOTAL		FIRST YEAR TOTAL
	<hr style="width: 50%; margin-left: 0;"/> 18,940		<hr style="width: 50%; margin-left: 0;"/> 19,000

The total cost of the project is therefore estimated as £75,880, £38,000 of which will be funded by NDPCAL and £37,880 by the LBS.

Notes to Project Costs

1. This analyst/programmer will specialise in the simulation and be responsible for its further implementation.
2. These costs include pension and insurance overheads. It is proposed that the LBS and NDPCAL undertake to pay any increments on these salaries.
3. These are the estimated costs of providing office space and services for a project team of four people.
4. All meals at the LBS are subsidised to the extent of about £1 per meal.
5. The system currently occupies 180K words of storage and will occupy about 800K words in 12 months. Together with the use of terminals and limited terminal ports this represents a high opportunity cost to the LBS in computer facilities.
6. This estimate is for about 1 man-year of time contributed to the project in total by course directors. The LBS will be running two courses, one concentrating on developing the simulation, the other concentrating on the application of the feedback process. The system will be integrated at a later stage.
7. This analyst/programmer will specialise on the feedback system and be responsible for its further implementation.
8. This travel budget totals an estimated 15 man-weeks of travel for the project team and does not include attendance at special conferences or any travel abroad.
9. It is anticipated that there will be many expenses not attributable to any one course associated with publicity and dissemination, together with the normal administrative expenses associated with the project team.
10. This estimate caters for one half man-year plus expenses. It is expected that Lancaster provide for overhead costs and for the time allocated to the project.
11. It is proposed that a Polytechnic and the LBS bear the initial investment in course design for the feedback system. This will involve one half man-year of effort. It is proposed that NDPCAL bear this cost for the Polytechnic, and the Polytechnic bear all other associated costs.