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CONTENTS

EDITORIAL

Our first two issues have been well received by our discerning readers. We are now happy to present before you this third issue (1986), which includes articles offering a range of perspectives on different aspects of technical and vocational education.

The General Articles Section in this issue contains four articles on different themes. The one on Computer Technology and the Curriculum questions some of the assumptions underlying the educational use of computers and their possible effects on the curriculum. The need for a newer conceptual, methodological and value perspective for an educational system to be responsive to future demands of the clients is emphasised in the article on 'Perspectives in Management of Education'. The article on 'Basic Concepts of the System' emphasises the need for solving educational problems by systems thinking and provides a framework of concepts for its application to educational planning. The changing roles of women in developing countries which are related to changes in technology and education are highlighted in the succeeding article.

This issue also includes two research reports — one on Evaluation of Bilateral Education and Training Projects and the other on a Study of the Relationship between Teaching Ability and some Selected Non-cognitive Characteristics of Technical Teachers. The first paper seeks to raise the awareness of some of the major issues confronting those involved in evaluating educational projects. In the second paper, the findings of the correlational study are compared to those of similar studies involving teachers of other systems to raise certain issues concerning technical teachers which demand further investigation.

The Innovative Programmes and Projects section has an article on 'Locally based Management Development for Technical and Vocational Education Institutions', exploring how management development can be undertaken 'within the college' and the advantages which this innovative approach is seen to possess.

We hope that this issue lives up to the expectations of our readers. We look forward to the continued support and guidance of scholars and practitioners concerned with technical and vocational education system in different countries by way of contributing articles and valuable suggestions for fostering the growth of the Journal.

JOURNAL OF TECHNICAL AND VOCATIONAL EDUCATION: AIMS AND STRUCTURE

In recent years, many countries have concentrated upon improvement and expansion of their systems of Technical and Vocational Education to keep pace with their programmes of development. This has been achieved through several innovations, projects and programmes and there is a need for sharing such experiences among countries of the world. In this context, an important and challenging task is to provide an effective means of communication between all those involved in this system of education. The 'Journal of Technical and Vocational Education' is intended to serve this purpose. This journal will be published from Technical Teachers' Training Institute, Madras, India and will have two issues in a year.

Objectives

The objectives of the Journal will be:

1. To share experiences in respect of national policies norms and standards, course patterns and structures, resources and expertise, trends and issues relating to technical and vocational education in different countries.

2. To publish major advances and innovative ideas and report on current trends in the theory and practice of technical and vocational education.

3. To exchange experiences in the design, development, implementation and evaluation of all types of technical/vocational teacher education programmes.

4. To report case studies and research findings on various aspects of the system in different countries.

5. To promote the recognition and understanding of the interaction of technical and vocational education with other collaborating agencies such as industry, Government and society.

6. To project and report on the emerging trends and futurological studies in the technical and vocational education system.

Main Sections

Each issue of the Journal will have the following four main sections:

1. *General Articles Section:*

    Dealing with articles of evaluative and/or synthetic nature in all areas of technical and vocational education.

2. *Research Reports Section:*

    Dealing with research findings relating to researches in technical and vocational education system. The emphasis in this section will be on publication of applied and application-oriented research of national/international interest.

3. *Innovative Programmes and Projects Section:*

Dealing with reports on developmental work and innovative practices in technical and vocational education system.

4. *Notes, News and Review Section:*

Dealing with information about on-going projects and programmes, news about conferences, meetings, seminars, symposia/workshops and reviews of books and other resources in the area of technical and vocational education.

<div align="right">EDITORS</div>

Computer Technology and the Curriculum: Some Questions

SHANNON A.G.

ABSTRACT

The rapid inclusion of computer technology within the world of education is seen by some as an unwarranted instrusion and by others as inevitable progress. Progress presupposes a desired direction; this paper questions some of the assumptions underlying the educational use of computers and their possible effects on the curriculum.

Introduction

To discuss various issues which pertain to the curriculum and computers, several distinctions need to be made at the outset. In any consideration of the curriculum one must clearly distinguish means and ends, and this imperative is very urgent when the role of computer technology is under consideration because of the momentum of the computers in schools movement.

We must distinguish why we want computer technology from what computer technology (hardware and software) is available. To do this we need to distinguish amongst teaching or learning

- about computers
- computing
- by computers
- through computers
- with computers

Each facet raises different questions for the curriculum, and we shall discuss aspects of each.

A number of issues are raised here in a preliminary manner. To assess and evaluate would require more evidence than is currently available in reasonably objective or replicable form. It is hoped though that an awareness of the questions outlined here will help to channel the energy and resources currently being expanded on computer technology into directions where the various goals (when they have been articulated) are compatible within the framework of the total curriculum.

Curriculum Issues

Teaching about Computers

Learning and teaching about computers can include a spectrum of courses ranging from information technology and computer science through programming languages to courses on computer literacy and computer awareness.

To start with the last types of courses, several questions suggest themselves: What is really being attempted? What are the criteria for achieving it? To what extent are schools in richer areas better able to implement programs?

Shannon and Hortle (1983) suggest that "some criteria for computer literacy include (a) being at ease in computing situations in everyday life, (b) being aware of the social changes caused by computing technology, (c) having a working competence with computing skills related to the foreseeable needs of the ordinary citizen and (d) having a basic understanding of

1

the scope and limitations of computers. . . this literacy must be viewed in the context of the total curriculum". The general educational level of the community is at issue here as we move to an era of information technology. The wider curriculum is involved as educators must be concerned not only with access to data but also with the critical utilization of information.

At the Third International Symposium on World Trends in Science and Technology Education in Brisbane in December 1984, there were many papers about courses on "Science, Technology and Society". Such courses, if computer literacy and historical perspectives are involved, can be another source of integrating the curriculum. Students whose career goals might be narrow can contribute to such courses: the history student, the technical student, the science student, the mathematics student, the computer buff, and so on, all have points of view and skills to put into such courses. A big difficulty is that they require an organisation of the school day other than the factory method, and realistically that is not always easy. Trial courses on a semester basis are feasible — long enough to make some real headway but not impossibly long to organise. Such courses though need teachers who can act as coaches, are able to utilise the students' knowledge acquired elsewhere, to guide, co-ordinate and collate rather than to be the dispenser of knowledge. This has implications for the selection, education and development of teachers.

Teaching Computing

The integration of computers into the curriculum offers the possibility — not the certainty — of enriching it, without stretching it. The addition of new courses such as computer programming is another issue unless like Logo, or Prolog or even APL, they are part of a wider educational environment.

One suspects at times that a principal reason for teaching programming is that

it is easier than integrating the computer into the curriculum.. If not, what is the role of programming as a subject? Is mastering a computer language equated with programming?

What are the criteria for choice of a language? The popularity of BASIC looks suspiciously like convenience. BASIC has some advantages; it also has many disadvantages. The point at issue though is: should we choose a programming language because the machines are available with it and a few teachers know a version or two of it? Should we not ask ourselves: what are the benefits of programming for students? to learn to think more logically? to become better problem solvers? to improve proficiency in subjects with quantitative components? to learn hypothesis testing? What evidence is there of the benefits of computer programming at school level?

For instance if one is concerned with the importance of nomenclature, notation and language as tools of thought one might argue for APL as an educational programming language: after all, it is primarily a notation which can be implemented on a computer (Iverson, 1980). It is a high-level language, easy to learn, (unless one has first learned BASIC!) and it is easy to debug. The only real problems are some of the difficulties that its character set causes in graphics/printer interfaces. Not that I am arguing the case for APL or against BASIC: I am pleading that we put the horse before the cart and work out what languages if any, should be taught at different stages of the school curriculum on educational grounds, not for the sake of the computing industry.

"The great diversity of programming languages makes it impossible to rank them on any single scale. There is no best programming language any more than there is a best natural language. "I speak Spanish to God, Italian to women, French to men and German to my horse," said Charles V (presumably in French). A programming

language too must be chosen according to the purpose intended." (Tesler, 1984).

The inclusion of computing studies, or even computing science, as a separate subject involves the answering of analogous questions. The least convincing answer educationally is job-preparation; not that one should go to the other extreme and avoid any taint of vocational foundations, but predicting detailed trends in the computer industry is notoriously difficult because of rapid development in implementation of its technology.

Teaching by Computers

Learning and teaching by computers includes those programming languages which are used as part of the learning process in other subjects rather than in their own right, and it includes computer-based learning.

Here too, one must ask: what are the crtieria for selecting software, given that the hardware is often purchased before defining the educational goals and values that the computer is supposed to serve?

Computer Assisted Instruction, CAI, has many implications for the curriculum. In passing it should be noted that CAI tends to be the U.S. terminology whereas Computer Assisted Learning, CAL is preferred in the U.K. CML, Computer Managed Learning, differs from CAI in that it is more concerned with testing student performance, advising students on their routes through structured courses, reporting on performance and progress, and quality of tests. The differences between CML and CAI will probably disappear in time.

Leiblum (1977) provides a useful discussion of the rationale for using CAI. Broadly speaking the effective use of CAI requires a clear delineation of its strengths and weaknesses and the purpose to which it will be put. The latter might be to

reduce the amount of time for staff/student contact, to provide basic remedial instruction of a tutorial type for students of varying entry level, to supplement or to replace traditional instruction.

Hooper (1977) compares CAI and CML (the poor man's CAI!) in an article reproduced from the Bulletin of the Centre Imago of the Catholic University of Louvain, a cooperative development on media-based educational systems in higher education. According to Hooper, the major problem with CML is the large amount of the curriculum development and media production that a sophisticated individualised learning system involving the computer requires, although ICL's CAMOL, Computer Assisted Management Of Learning, has kept costs low by running in batch as opposed to interactive mode.

Hooper's distinction between CAI and CAL is interesting. He sees the former in the tradition of programmed learning and teaching machines, whereas the latter uses the computer as a learning resource in simulation and modelling situations. While not denying the importance of these latter modes, the distinction can be blurred because even a programmed learning approach to CAI can, with a bit of effort, take advantage of the sorting and randomising capabilities of the computer.

Hooper (1976) distinguishes two dominant traditions in CAI — the computer as a tutor and the computer as laboratory (simulation, problem solving, calculation, data bases). The latter derives from the changing nature of certain academic disciplines as a result of the impact of computer technology. Of course, there are combinations of the two roles in various institutions.

Hooper favours the computer as laboratory because of its superiority in bringing home to the student the effects of altering the parameters of a problem and because it cannot compete with the

3

superiority of a human teacher as an extremely sensitive, adaptive control system.

The objectives of much CAI are content-oriented and not educational process-oriented. As well as a model of computation, there needs to be built in some adaptivity to the learner if CAI is to have a useful tutorial role. Hooper sees CAI as a subset of CAL.

A useful review by Harding (1980) of nine major CAI studies in the '70's, while acknowledging the danger of "a technology in search of an application", included among the advantages of current work in CAI, the fact that most of the development has been initiated by teachers rather than educational theorists and that it has forced people who work in education to think more about how we teach. Harding includes a perceptive analysis of transferability. He acknowledges that programs and packages are the prime candidates for transfer, but feels that to give the student more freedom to capitalise on the powers of the computer, less constraint should be imposed by the software. To this end he feels that ultimately it is necessary to expect the student to write at least some of the program. In saying this he is not confusing learning about computers and learning *with* computers, but arguing that the educational documentation, including the problems that the student studies, are of prime interest.

Thus the usual distinction in computers and education is between the teaching of computing and teaching with computing, whereas some advocate the teaching of programming as a means of learning the algorithmic approach to problem solving and developing the student's capability for logical reasoning.

The main questions that must be considered before CAI is introduced are listed by Nievergelt (1980) who also summarises a number of projects in a useful review article to which is appended an annotated bibliography. The author traces the development of CAI from an outgrowth of the programmed instruction movement to the current proliferation of "smart" machines, each containing a microcomputer, keyboard and screen. In between there has been a period when the early optimism was dampened and Nievergelt lists a number of reasons to explain this. Thus the antagonism of the problem-solving exponents towards CAI is explained historically by the author as a reaction against the trivial use of computers as "electronic page turners". He then outlines what one needs to consider before getting started in CAI, and claims that today it makes no sense to start a CAI project unless one is willing to write most of the necessary courseware. The article finishes with considerable discussion of strategic considerations and a manual of style for the design of instructional dialogues.

Perhaps a few words about authoring languages and their role in curriculum development and computers are appropriate at this point. An authoring system is a set of programs which permits the teacher to create a computer-based curriculum or courseware without programming. Kearsley (1982) surveys the development and characteristics of authoring systems in the domain of computer-based education. The authoring system automatically generates the debugged code which corresponds to the specifications of the content to be taught and the instructional strategy to be used. The writer distinguishes instructional languages such as LOGO and SMALL TALK which are primarily designed to facilitate the use of the computer by students as a learning tool, rather than by teachers to develop curriculum. With a few exceptions, such as PILOT, author languages are just as complex as any other programming language. The writer outlines three major types of authoring systems: macro-based, form-driven and prompting, and illustrates each. There is also a comprehensive list of references covering the principal literature on the subject.

Teaching through Computers

Computers can play an integrating role in the curriculum by means of modelling and simulation. To paraphrase Spanier (1981), the characteristics of such programs involve the following requirements:

(a) a focus on problem-solving;

(b) experience in both oral and written communications;

(c) familiarity with cognate disciplines;

(d) exposure to paradigms of inductive and deductive reasoning;

(e) confidence acquired in open-ended problem situations.

The emphases would vary with the maturity of both the teachers and the learners.

For instance, in mathematics the advent of the computer has changed "the attitudes of mathematicians to the idea of what a solution is. Before the computer came, the ideal was to 'solve' a differential equation in the form of a 'closed' formula involving familiar functions, or infinite series. Now, it is often more informative to have the computer print the solution in graphical form, or to display it visually to be modified by a light-pen, or even to make a film to show how solutions change with time. This change in the form of a solution leads to changes in the questions asked; now one often deals with 'discrete' mathematics rather than the 'continuous' model of classical mathematical physics." (Griffiths and Howson, 1974).

These issues are now generating fierce debate at the undergraduate level about the composition and balance in degree level mathematics [Ralston (1984)]. The arguments at the tertiary level will no doubt eventually spill over into the secondary school: should we wait for this to happen or should we continue to get away from the old top-down approach to curriculum development?

In bringing the computer into the curriculum we have to distinguish between solving an educational problem and merely shifting the problem. In mathematics it is now possible to offer students a wide range of interesting and realistic problems which, in fact, require less mathematical knowledge than current high school courses. The difference is that until now mathematics at both the secondary and the tertiary levels has concentrated on finding explicit closed-form solutions (i.e. a formula involving a combination of algebraic and elementary functions) to a class of fairly well circumscribed problems. Any problem without such a solution was considered to be 'insoluble' and to be avoided, certainly at high school level. This emphasis has inculcated in students an approach to mathematics which leads them to view the subject as the manipulation of symbols and mysterious techniques rather than as an approach to the analysis of complex situations. Problem-solving with the computer can become more than the reapplication of rules. It involves what might be called "qualitative mathematics".

In the past, numerical calculation was a lengthy and tedious task, so that any mathematical problem whose solution could not be expressed in terms of a formula involving simple algebraic formulae or the tabulated elementary functions was the job of the specialist.

Now students have access to simple-to-use computing power which until recently was reserved for research mathematicians and engineers. Numerical methods can now be moved closer to the centre stage of high school mathematics. The computer will make irrelevant much, but not all, of the traditional type of mathematics based on formula solutions. It is not that computing methods will supplant mathematics so much as enrich it by permitting an emphasis on qualitative ideas, shrewd guessing and analytical reasoning. The purpose of school mathematics can then be the education of students through

mathematics rather than the training of them for tertiary courses. (a byproduct might be that those who do go on for further study will be better prepared.)

The challenge to mathematical educators of open-ended problems is unpopular, but if the emphasis in mathematics continues to be on shoving symbols around, students will become even more alienated from the subject. They will be perplexed by the fact that they are doing, albeit in a roundabout fashion, what can be done more efficiently by a computer.

Comments along similar lines can be made about other school subjects and particularly the inter-relation between subjects: computers can be a genuine integrating force in the school curriculum. They are certainly not the special preserve of the mathematicians, not that I apologise for using mathematics as an example. The recent Blackburn Report notes:

"Mathematics, taken broadly, is a language having relevance comparable with that of literacy. Very few, if any, studies in higher education or other vocational fields can now be taken successfully by those having only basic arithmetical competencies."

"The relevance of mathematical concepts to all technical and technological studies is obvious, but statistics and a grasp of quantitative reasoning are also required in most areas of the humanities, and in social and behavioural sciences. Those lacking such a base are at a disadvantage in many aspects of living." (Lyons, 1985).

The Blackburn Report recommends that all students in Victoria in Years 11 and 12 study at least one three-unit sequence in each of the arts-humanities, science-technology and mathematics as part of a two-year 14-unit course.

The (at least) occasional integration between subjects offers the opportunity for simulation games with classroom computers. Here educators can respond to, rather than react against, the fascination of video games for children. Simulation can bring an air of reality to many problems. The role playing that they encourage can also develop facets of students' intellectual and emotional development which are not readily measured in formal examinations. As a learning tool, simulation offers opportunities for cooperation in genuine group learning situations. The indiscriminate use of simulation is not without dangers and difficulties and teachers would generally require some specific preparation in their use. (cf Kohl, 1977).

Teaching with Computers

The computer has the capability of storing large amounts of data, about an individual or about a system, which is available for almost instantaneous retrieval. It is this property of the computer — an efficient and effective instrument for identifying, collecting and summarising data — that makes its use possible to assist in the management of the educational process. Apart from the usual tasks such as budgeting and planning and timetabling that a computer can handle, proving a boon to harassed educational administrators, it can aid in counselling and monitoring student progress as well as making education less labour-intensive.

Computer-managed learning and associated computer-information resources, including test item banks, have a role to play in incorporating the computer into the total curriculum. This is the subject of teaching and learning supported by computers. It involves the tricky question of whether to purcahse an all-purpose computer or horses for courses? Finance is a major constraint, of course, but much of the firmware for the business and support work of the school may be incompatible with what is most appropriate for the strictly academic goals of the school.

A project for a computer-managed learning system is described by Bladon and Bailey (1981). Student progress is continuously monitored by multiple-choice question tests. These produce reports for each student with scores and advice, and reports for each lecturer with individual and class progress. The details of the system are listed as is a frank appraisal of the project. The mechanics of the system are based on PILOT (Process of Individual Learning by Objective Testing) which was derived by Heriot-Watt University in Scotland from the American Teaching Information Processing System (TIPS).

Dellow and Poole (1984) describe microcomputer applications for the educational administrator in such functions as financial analysis, planning, record keeping and report writing. While written with community colleges in mind, it provides useful ideas for any educational administrator.

Related Issues

Sociological effects

The increasing use of computers in society has profound sociological effects on patterns of employment, and opportunities for leisure as well as modes of education. The social implications of computer technology for the curriculum cannot be ignored. In this context two of the recommendations of Shears and Dale (1983) are pertinent:

"Each state should establish an Education and Industry body to monitor changes in the workforce due to the increasing use of technology and to support modifications in the educational goals for computers in education to keep abreast of these changes. (12)

Special education should be given a priority in funding because of the unique potential of computer equipment to assist learning for students with mental or physical disabilities (13)."

Teacher Preparation

Pirie (1982) has a number of useful ideas on this topic, and Anderson (1984) summarises the needs in the teacher training area:

"A continuing issue is the adequate preparation of teachers already in schools to use computers with confidence in their regular teaching. This need is unlikely to diminish in the near future since many teachers, after an initial introduction to the new technology, wish to further their knowledge about computers and their use.

An associated issue is the preservice education of teachers. The United Kingdom experience is that, while nationally funded schemes make some impact as far as increasing awareness of teachers in schools is concerned, preservice education is harder to change and lags behind. The importance of this factor depends on whether teacher employment is in an expanding or declining phase."

Shears and Dale (1983) address this issue too:

"In tertiary institutions preservice teacher education on the use of computers in education should be based on the needs of schools, and developed after a clear statement of educational goals has been prepared. Generalist trainee teachers should not all be required to learn programming, and the main focus of their computer education should be on the uses and limitations of computers with CAI/CAL and computers in the curriculum.

An investigation should be undertaken of the cost, efficiency and acceptability of the chain reaction model of teacher training. This involves in-depth preparation by tertiary institutions of specialists who in turn prepare schoolbased consultants, who with a tea approach in schools, develop

appropriate computer programmes for students."

Much is being done now in the area of teacher education, but a concern is that these courses maintain a balance amongst basic technical skills, relevant developments in computer technology, and production of teaching materials.

A lot of the last named is being done by teachers and commercial programmers, partly to fill a vacuum, but mainly for a quick profit. Not that there is anything wrong with making money! The extent to which educational needs and priorities, classroom trials, and hidden assumptions are taken into account is often dubious if one judges the finished product. In this respect, some recommendations of the N.A.C.C.S. (1984) are pertinent:

"Because of the shortage of specialists, software developed in each state should, in the first instance, be done through centrally or regionally established teams of curriculum specialists, programmers and educational technologists. (10)

Computers should be introduced into primary and secondary schools, but on the basis of previously locally determined and understood educational purposes and not because of the availability of local funds or discounted equipment (8).

A National Clearing House for Computer Information should be established to facilitate the interchange of hardware and software information between States and the cooperative development of appropriate high quality software (6).

Cooperative mechanisms should be established at the National and State levels for ongoing evaluation and review of all aspects of the use of computers in educational institutions and programmes of teacher preparation, in-

cluding an assessment of the development of positive attitudes among teachers. (7)."

One would hope too that purposes and policies for computer technology and the curriculum would loom largely in teacher education so that the excitement of the action does not obscure their reason and role. Amongst recent authors to address the ways computer technology might respond to overall curriculum needs is Pogrow (1983). He also attempts to balance the articulation of curriculum policy with its implications for the classroom professional.

Evaluation

We have been concerned here with some questions for curriculum reform as they affect courses and teacher education, but we have not raised the urgent issue of evaluation, particularly into how work might split up differently and the implications for educational research on the accompanying policy, sociology and psychology issues.

In many ways, Slatyer outlined the salient features for such research when he said:

"The long-term ability of the Australian community to cope most effectively with change — to use technology to benefit society as a whole — depends crucially on education. . . it means education that enables the community to understand and use technology, to look ahead to possible social changes, to take initiatives which influence our future directions and to develop flexibility and interests that enhance the value of work and leisure. How relevant is our education system to meet these challenging demands?" (Slatyer, 1983).

The questioning of the use of computers in the class room referred to earlier should not be ignored when discussing their place in the curriculum.

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Perspectives in Management of Education

ADHIKARI T.B.

ABSTRACT

The emerging role of an educational administrator in the context of changing goals of institutional organisations and consequent stresses in the structure has been analysed in relation to current management concepts. The author attempts to establish the need for a newer conceptual, methodological and value perspective in order for the system to be responsive to future demands of the clients.

Introduction

Education in the past was mainly concerned with the handing down of a limited set of well-tried knowledge and skills from the older generation to the newer generation. The knowledge was highly structured around well-defined disciplines. The organisational structure was built around a few noted masters of the discipline. As these systems became sophisticated during the renaissance, the centres for learning for learning's sake, which was considered as real education, became available only to a small number from the elite group and the productive and professional type of education was relegated to a lower status. The context of learning was considered more important than the content and the concept of accountability was anathema to such a model of the educational enterprise.

Subsequently, with the advent of an industrial society, educational systems had to tackle the manpower needs for the varied production systems on a mass base, with stress on the current needs of the market place society, where the individuals are producers and consumers at the same time. The context is here and now. The content is dictated by the environment or community. The goal of the institutional organisation is to maximise the functional competencies of the youth population. Therefore, it became necessary to define the objectives of the enterprise in terms of specific measurable outcomes, so that the external sponsors could assess the effectiveness and efficiency of the system.

However, a point has now come, when it has become necessary to plan for imparting knowledge and skills that would be needed in the future. Since the pace of change is much faster now, a person trained and educated today, will, of necessity, have to change his orientation to reality and adapt to newer life skills several times in his own career. This may mean a qualitative change in terms of concepts, methods etc., rather than just improvement in efficiency and effectiveness of old systems.

The implications of this change of stance in education are that the institutions become instruments of social change. The problem here is that, unlike in the past, the new directions cannot be uniquely identified and fitted into formal disciplines. Much of the plan is bound to be open-ended and ad hoc, and the skills required may be a kind of creative choice among alternatives that the future might make available to us (Toffler 1970), in anticipation of the consequences of such choices for shaping the quality of life of

future citizens. The implications in terms of manpower needs and the consequent form of contingency planning are also required to be examined.

There is a general consensus among all the countries that the education and training of personnel for the future should address to several societal problems, viz. food and agriculture, housing, health and sanitation, preservation of the environment, industrialisation, mass employment and humanisation of the production system, development of renewable sources of energy, aiding cultural development, recreation etc.

There is also an apparent dilemma in the poor and developing countries that in the case of most of the newly developed technologies, the system is more complex and capital-intensive, whereas the resources are scarce and manpower with lower skills are plentiful. Perhaps, in the case of several new technologies, the pay-off for the nation may outweigh other disadvantages in terms of faster and more efficient attainment of national goals.

To be alive in such an endeavour, the educational institutions may have to adopt a new strategy to work hand in hand with the R & D centres, industry and the community, which will demand a new form and structure of the organisation having a multigoal relationship with the environment. Many such goals cannot even be articulated at the time of planning, while at the other end, several practices can be fully data-based and amenable to performance auditing. However, no model is likely to emerge from which one can prescribe a role set for the educational administrators which can take into account all such future contingencies.

Research Perspective

In the earlier days, educational administrators were supposed to be men of letters, having good character and upbringing. Much of it is also relevant today. But during the first quarter of this century, Taylor's scientific management theory (1911) had its due impact on education as well. "Good Managers should know exactly what they want to be done and see to it that it gets done in the best and cheapest way. The Managers take away from their workers the responsibility for planning their work. They are in authority to provide appropriate incentives to stimulate their workers' efforts, for, otherwise, they will not do anything" (Cubberly 1916). That was the concept of human behaviour. However, the concept of data-based management, in which various techniques of optimisation of objective functions for different system models are now efficiently employed through the use of modern electronic data processing systems, owes its origin to this theory.

During the second quarter of this century (Yauch 1949), the human relations view in school administration became predominant. It was believed that all individuals who are supposed to be affected by any decision should have a share in determining its character and form. Although this school of thought appears antithetical to the former, there were certain commonalities in their import. The basic premise was that the administration is a vocation or trade, and not an academic field of study. The methods are prescriptive and not analytic.

During the mid-century, another altered view of educational administration emerged. (Getzels et al., 1968). The function of administration was viewed as a part of the sociological or socio-psychological process. These theorists found the prevailing prescriptions ambiguous and contradictory and that there was a need for a consistent and more fruitful administrative theory.

In the entire first half of the century, research studies were mainly undertaken in the form of survey of opinions and current status of the systems. Later the interest shifted to logical inferences and testing of hypotheses based on the rigour

of controlled experiments, which could bring about predictable changes in the structure and outcome of Educational Administration (Knezevich, 1969). In the earlier era of scientific management theory, or human relations theory, much of the basic assumptions did not have empirical validity of sufficient generality. It is only now, when a consensus is discernible, that research can provide a foundation for problem solving in a changing society.

Alongside, with the concern for accountability the principles of econometry were applied to processes of educational decision-making. The institution was viewed as a production system and quantitative methods were applied to ascertain the quantity or gain for a given investment, both for the nation and the individual consumer of education. The methods had a profound effect on educational planners concerned with the optimisation of allocation of resources. With the advent of newer educational technologies, such resources became available in various forms, which tended to compete with the traditional resources, both material and human. In this context, development and dissemination of educational knowledge and establishment of data banks based on R & D in these fields, became a necessity.

On the other side, another approach to view administration as a philosophical system started gaining currency (Hodgkinson, 1978). It stressed the general nature and pathology of administration, and attempted to interrelate administration with the organisation and the value system. While other models and research dealt with the lower levels of Maslow's hierarchy, this approach was concerned with metavalues, e.g. morality and justice in relation to power, authority, empirical data on practices and phenomenology. Shaping life through an organisation was the central theme, and the questions e.g. good or bad, right or wrong were attempted to be answered with the emerging models of reality manifold.

Of late, a contingency theory is being conceived in order to take into account the uncertainties of the future both in the external and internal environments and value systems. The need was aptly described long ago by Tolstoy (War and Peace). "A Commander-in-Chief never finds himself at the beginning of an event, the position from which we always contemplate it. The general is always in the midst of a series of shifting events and so he can never, at any point, deliberate on the whole import of what is going on. Imperceptibly, moment by moment, an event takes shape in all its bearings and at every instant of this uninterrupted, consecutive shaping of events, intrigues, cares, contingencies, the C-in-C is continually obliged to reply to innumerable, often mutually contradictory questions".

The administrator of an educational institute may not have much control over the external environment, e.g. cultural, political, economic, informational, technical or physical, although he aims to influence them in the future, when turbulence, randomness, diversity, scarcity etc. might still be the order of the day. Forecasting, strategic planning for alternative routes, policy planning, technical planning, development of scenarios, simulations etc. may be the repertoire of important management skills of future educational administrators. The choice may be either minimax for pessimistic risk-takers and maximax for optimistic risk-takers in the jargon of the game theory as applied to operations research (Hanson, 1979).

Models of Educational Systems

Such models derive their structure and content from the perceived goals of the society, education, technology of the process, bureaucratic history and leadership philosophies. Contemporary goals of education in a pluralist society like the U.S.A. may be summarised as follows: Skills in reading, writing, computation; to feel good about self as a human being; to be able to make value judgments; to be healthy and active; to have an interest in learning and working which would be life-long and rewarding to self and society;

understanding and respecting differences in people, yet maintaining individuality; having skills for earning a living in future etc. All these are important (Cronin, 1968).

The problem here in prioritising the goals is that many such items are not complementary and in the cost-benefit model we may have to account for missed opportunities as well (Bowman, quoted in Thomas 1971).

In this context, planning becomes the central function of the administrator, that may lead to a concept of meaningful organisational structure. Beeby in UNESCO (1969) defines educational planning as the exercising of foresight in determining the policy, priorities and cost of an educational system having due regard for economic and political realities, for the system's potential for growth and for the needs of the country and of the pupils served by the system.

Planning is therefore the culmination of a long series of adjustments and compromises in which the implementing authority is involved. Diagnosis and needs assessment are therefore an inbuilt component of the structure of educational administration.

However needs assessment often leads to confusion between problems and solutions. Expressed needs, which may be better termed as wants, tend to choose solutions known to them, instead of articulating the problems and consequent deficiencies. In one school of thought, need is a measure of discrepancy between the desired and observed performance (Kaufman et al., 1979). This may be termed as the deficit model. However there can be a developmental model as well, in which further enhancement of performance to meet future contingencies may also be visualised. It is not necessary that the system should be deficient to be able to benefit from planning. In Alpha planning, philosophical questions about appropriate organisational purposes in the light of external factors are considered. In Beta planning, a systems approach assuming the validity and appropriateness of current purposes is proposed. Educational organisations have been more conservative in their own functions, and most of the new knowledge about the educational process has not been adopted in general even in the educationally advanced countries. "Unless the educators begin to catch up, they may be forced to wear the image of the witch doctor vigorously shaking his rattles at his students, and then wondering where they went" (Mager, 1981). The present generation has already started looking elsewhere outside the formal education system for a rewarding career in future.

At the delivery side of the system, the task of assessing the organisational output poses many problems. In one such frame work (Immegart et al., 1970), several dimensions of such output have been identified as follows:

1. Productivity
   - Product Utility
   - Service Utility

2. Integration potential
   - Self actualisation
   - Group decision-making
   - Individual flexibility to change

3. Organisational health
   - Adaptability
   - Identity sense
   - Capacity to test reality

4. Feedback
   - Desirability of
   - Penetration of

If the educational institution is viewed as a production system several quantitative models can be developed (Adhikari, 1979). The production function of an institution may be

(a) *Administrative*, which deals with the utilization of student hours and other inputs in space, teacher time, equipment and supplies, to determine the overall performance of students, staff etc., in quantitative terms.

(b) *Psychological*, which deals with the change of behaviour of individuals in the cognitive, affective and psychomotor domains· against the services and their attributes.

(c) *Economic* which deals with the value added in terms of investment to the system and rate of return.

It is important to note here that many administrators with some background of industrial management, tend to think of the system whose products are the qualified students (numbers) and the consumers who are the employers of these persons. This fascist meta-physics has been discarded in educational systems. Here, the students are the clients and their achievement in the programme is one of the outcomes.

The production model discussed earlier is based on certain assumptions as follows:

(a) Performances in education can be measured within known limits of accuracy, with the help of many tools standardised for the purpose.

(b) There exists a production function which relates output to inputs. Symbolically, in the case of psychological production function which is of immediate concern to teachers, $P_1 - P = f(x_1, x_2 \ldots x_5)$, where $P_1 - P$ is the performance increment over a specified time t and $x_1 = $ Student hours, $x_2 = $ Teacher hours, $x_3 = $ Equipment hours, $x_4 = $ Space hours, $x_5 = $ Overhead and other tangible hours.

(c) If all other things are equal, increases in x_1, x_2 etc. are associated with increases in $P1 - P$ (measured through achievement tests, e.g. pre-test and post-test).

Under the above circumstances, several types of inquiries are possible (Thomas, 1971), viz. marginal analysis, cost-effectiveness, capital output ratio etc. depending on the micro or the macro economic system under study.

The study also leads to strategies for resources allocation for the future, and suggests appropriate technology for certain well-defined functions. Consequently, based on such thinking, techniques of management by objectives (MBO) and planning, programming, budgeting systems (PPBS), zero-based budgeting etc. have also been conceived for educational systems. However, many of these models fail to accommodate the value questions of educational enterprises. It is quite possible to develop a commercially successful feature film, providing for all the ingredients as per assessed audience needs but it is a different matter whether it would be a creative piece of art for the posterity.

Educational Leadership Behaviour

Leadership theories have also been studied in educational management context to a very large extent. The leader as a policy-negotiator, co-ordinator and preserver of values has been seen as more important than a methodological consultant in specific areas. Often a parochial, opinionated, impulsive leader has succeeded better than the fair, democratic, reflective and restrained leader. The basic findings of the contingency model are that task-motivated leaders perform generally best in very favourable situations, i.e. either under conditions in which control, power and influence are high or low. Relationship-motivated leaders tend to perform best in situations in which they have moderate power, control or influence (Fielder, 1965).

However, such orientations may be dictated by the situational forces. In the path-goal theory, directive, supportive, achievement-oriented and participative behaviours of the leader against the con-

15

tingency variables, subordinate characteristics and environmental factors are emphasized (Burlingame, 1979). Here, the behaviour is seen against the forces in the manager, in subordinates, in the situation and in the environment. The emotional isolation of the administrator in the organization vis-a-vis the social skills he is required to exhibit has also been the subject of such studies.

Some studies have also examined the concepts that whether for the routine functions, a closed stable mechanistic pattern of responses may be adequate, and conversely for creative options, whether a set of open, adaptive, organic (i.e. differentiated — integrated resource systems) responses may be useful. In the contingency model, the leadership sub-system has been shown as central to teaching, student maintenance and guidance subsystem, within the environmental super-system and the transactions between them may be either routine or situation-specific.

The educational institutions form a bridge between the family culture and the productive culture in the different future fields of occupation. While the former is native and ancient, the latter is more westernised. This role conflict for the institutional culture has not been studied in the Indian context. The culture may vary between the accepting, nurturing and supportive orientation, based on *loco parentis* and filial piety at one end, and that of the efficient, competitive, amorphous, new industrial society at the other. In these situations, the leader may be viewed as a substitute parent for the significant other or a boss of a productive undertaking or everything at the same time.

Transactional analysis has gained some currency in the last decade as a form of social psychological inquiry into the effectiveness of leadership behaviour and deals with leader's feelings arising out of his efforts to relate with others. The direc-

tion of influence in the bureaucratic hiearchy has also been studied in relation to leadership effectiveness. It is hypothesized that an upward or external orientation of people down the line in an organization system decreases the entropy of the system, thereby increasing the potential for contribution and growth. Conversely, looking inward or downward, or face-to-face at points along the line for problem solving or conflict resolution, may increase the entropy, thereby reducing the potential of the system.

Now that the administration or educational system has become an academic field of study, a large amount of detailed study is undertaken mainly to understand the system. Naturalistic and ethnographic (Cultural-anthropological) case studies are powerful tools which help the researchers to understand what the people feel, say or do, and why they do so, in their own specific situation. The approach is more phenomenological and may lead to many insights into a problem, which will otherwise defy a rigorous statistical research design. However, this requires professional handling, and such expertise is yet to develop in this country.

Conclusion

Two parallel strands of development are discernible in the present discussion-one, in which the goals, processes and outcomes and the consequent roles and functions can be exactly and rationally specified and related to each other, and the other, in which the data are in the future and the decision process is dialectical. The former may be more concerned with efficiency and survival, while the latter, with creativity and growth. The methodology in the former case can be generalised and formalised, and people can be trained to operate such data-based management systems. The latter stance recognizes the uniqueness of the history, philosophy and cultural environment of the institutional system and often a responsive potrayal of the situation may reveal several alternatives, some of which

may be acceptable to the value perspective of the concerned people.

In the final analysis, education is concerned with the creation of values by which a generation can judge the consequences of their thoughts and actions.

The role of educational management in this context may therefore be to link the past with the future, the known to the unknown in which new values are allowed to emerge as a developmental process of resolution of the eternal conflict between the two.

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Basic Concepts of the System*

KULKARNI P.D.

ABSTRACT

The author emphasises the need for solving educational problems by systems thinking. The paper attempts to explain the fundamental concepts of a 'System'. A thorough understanding of these concepts is necessary to help us apply them systematically to educational planning.

Introduction

Innovations in education can not be designed, developed and implemented in isolation. Every polytechnic or institution is a part of the total environment which assigns a special function to the institution. The Institution derives (output) objective from the environment, gets input from the environment and develops a process to transform the input into the output. All the four aspects are inter-dependent and any change in one affects the others.

Renowned educationists like Coombs, Kaufmann and Romiszowski insist on solving all educational problems by adopting systems thinking. This approach helps the designer to look to the system as a whole, understand the effect of any change in one variable on the inputs, outputs, processes and environment before designing a new system. There are educational problems to be solved at the classroom level, institution level and State level. Any change proposed at one level must take into account corresponding changes needed in not only the various components at each level, but also at other levels. This emphasises the importance of systems thinking.

This paper attempts to explain the fundamental concepts of the 'System' to facilitate their application to educational planning.

System — An Overview

Any system of interest is the organisation of a process consisting of inter-related parts (consisting of man/machine unit, team, sub-systems etc.) designed to transform a certain input from the environment into an output desired by the environment. This inter-relation among various components of the system is brought about by a well-designed communication network which enables everyone to know its job in relation to the total objective of the system and execute its own part (institution's goals versus individual goals). The system maintains its adaptability through a well-designed control system with a feedback mechanism (Figure 1).
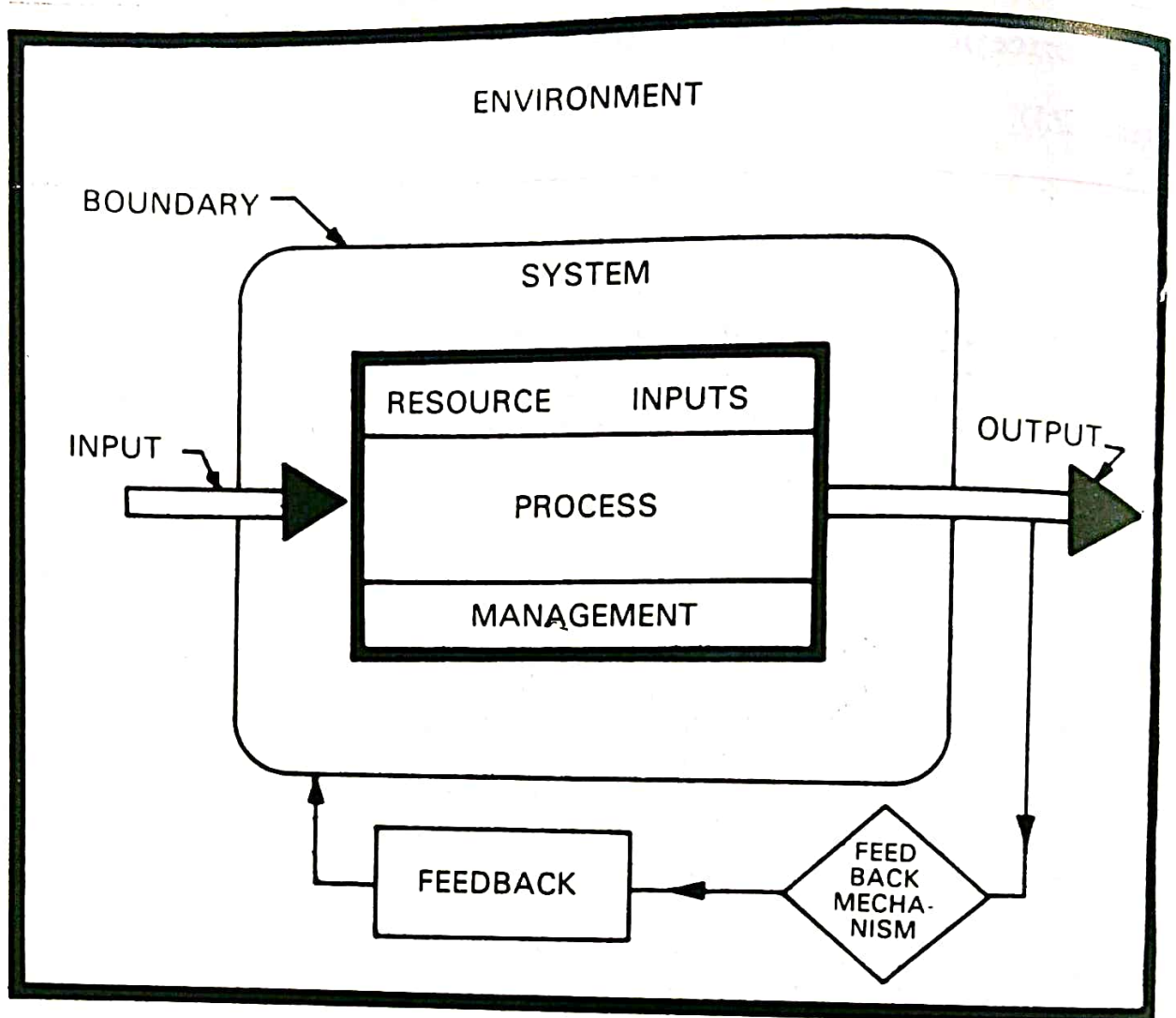
Figure 1 : Graphic Representation of the System Model

Types of Systems

For a conceptual understanding, three typologies of systems are identified, namely rational system, natural system and open system.

Rational System

It is an organisation oriented towards relatively specific goals and exhibiting a highly formalised structure. Industrial firms are characteristic examples of this type of system. They have a specific goal producing something and the process is designed for this purpose. The main characteristics of such a system are — functional rationality, stable environment

and task-related behaviour of the whole system. Such systems are *designed* and *do not evolve.*

Natural System

It is a collectivity, where the participants are little affected by the formal structure or official goals, but share common interests in the survival of the system. The participants engage in the collectivity, informally structured to secure ends. Professional organisations established to maintain professional standards and ethics are typical examples of such a system. The characteristic features of this system are — dynamic organisation, dominance of individual behaviour and attitudes.

Such organisations *evolve* and are *not designed.*

Open System

It is an organisation of shifting interest groups that develop goals by negotiations and is structured by coalition. System goals and activities are strongly influenced by the environmental factors. This type of system combines certain characteristics of both rational and natural systems. While its goals are determined by the needs of the environment, its survival is also yet another goal. Its structure is organised partly on the basis of functional rationality and partly for maintaining the dynamic interaction with the environment. The system boundaries are partly defined and partly amorphous. It is this type of system that every social organisation is trying to develop and hence its importance to an educational system.

Open versus Closed System

A system is said to be closed, when its organisation is designed to achieve present ends and ignores or minimises the perturbation and opportunities posed by connections to wider environment. Closed system logic assumes that the goals are known, processes are repetitive, the output of the process somehow disappears and the resources are uniform in quality. Variety and uncertainty that is associated with an organisation's openness to its environment are assumed non-existent or wished away.

Open system logic, however, develops most effective and efficient structures for developing connections between environmental demand and organisational response. These are mediated by designers or managers to develop adequate arrangements to cope with environmental complexity and create co-ordinating mechanisms to manage the requirement of information processing.

System Concepts

On a close examination of the definitions of open and closed systems, we come across the following basic concepts which need a thorough understanding.

* System of interest
* Environment
* Desired system output
* Systems input
* Process of transformation (Technology, Resource Inputs & Management)
* System evaluation through feedback.

We will now attempt to explain these concepts in detail.

System of Interest

When the society wants certain output to be achieved, it develops a social organisation to manage it, which we call a 'System'. This social organisation consists of groups of people working together to achieve the specified goal. Such groups of people are termed variously as man/machine units, teams, sub-system and system depending upon the level of the total system at which the group is working, each component taking part of the responsibility (sub-goal) of achieving the total goal. The cumulative effect of all these outputs by each sub-component leads to achievement of the systems goal. A system designer has to study and design not only the system as a whole, but also its component parts. In doing so, he has at any one time focus his attention on one component to analyse, synthesise and evaluate the performance of each unit of the system as well as the system as a whole. Each time he focuses his attention on any one level of organisation, he arbitrarily tries to separate the organisation from the other parts of the system, to which it is related. The system so isolated from the rest for the purpose of detailed study is called 'System of Interest'.

Environment

For a given system of interest, the environment is the set of all objects, events and ideas, the change in the

21

attributes of which affect the behaviour of the system and which are themselves changed by the system behaviour. What is understood by the environment of a system is as much a function of the organisation, its participants and information system, as it is of the external situation. We need to take into account the characteristics of the organisation in order to evaluate what aspects of external situations are likely to be salient. One can not describe an environment objectively without a knowledge of the organisation itself. There should be a blue print, an image of the environment which provides a basis for formulating the response of the organisation. The system has to codify the environment to reduce its complexity and relate itself conceptually to the codified environment, taking into account the causes for interdependence.

Desired System Output

The desired output of the system is expressed in terms of goals which serve the following purposes:

- to direct the behaviour of the whole system;
- to motivate people to work together for a common purpose;
- to justify behaviour to the outside worker;
- to evaluate performance.

In any system, every individual has to contend with both (a) individual goals and (b) system goals. Most of the time, these goals are in conflict with each other and tend to bring instability within the organisation. The delicate balance between the two goals has to be maintained for the organisation's progress.

Systems Input

Systems input is that aspect which is fed to the system for being transformed into a new form (output). System processes materials into equipment, people into people with new knowledge, skills and attitudes, raw information into new format of information etc. The performance of a system depends upon the characteristics of the input which are — sources of availability and quality and quantity of input. These aspects determine the nature of the technology process, optimisation techniques and their effectiveness and also affect the quality of the output.

Process of Transformation

Process of transformation of given input to desired output consists of technology, resource inputs and management.

TECHNOLOGY

Technology is a way of doing things. As a process of transformation in a system, it is a mechanism for transforming input (material, people and information) into output (equipment, people with modified behaviour and processed information). It is built up of (a) hardware, (b) human resources with requisite knowledge, skills and attitudes and (c) information resources to create communication networks to organise inter-connections among various components.

RESOURCE INPUTS

Resource inputs are those inputs which are introduced into the system to build up processes. These are physical resources, information resources, human resources, energy resources and financial resources. Each specific organisation presents a particular combination of resource requirements. Mobilisation of resources is an important aspect of a system for the pursuit of common goals.

A pre-requisite for system efficiency is to make careful system design in which all inter-related components are suitably considered: output, input, environmental factors, technology, social structure etc. For the outputs desired of the sub-systems, team and man-machine systems are derived and their component elements designed. Thus the entire system is designed through systems analysis at

various levels. Once the design stage is complete, development stage starts, during which resource mobilisation becomes important. The third stage is management, during which the manager of each level sets the system at its own level in *action*. The fourth stage, involves watching and evaluating the system's working at each level. The information resulting from this evaluation is fed into the system for corrective measures.

MANAGEMENT

We can surmise that the total role of a manager at each level is system design, system development, system implementation and system evaluation, so that the system works effectively and efficiently. In simple words, the management gets the work done by the participants according to certain pre-designed technology to transform the inputs into a desired output.

System Evaluation through Feedback

System Evaluation is to be done against set criteria for effectiveness.

Under a rational system, criteria emphasised focus on the number and quality of outputs and economies realised in transforming inputs into outputs.

Under natural system, the criteria used emphasize measures of participant satisfaction and morale, interpersonal skills of managers and survival itself.

Open system perspective bases its criteria on the ability and flexibility of the system and their contribution to the wider system environment.

Evaluation is central to the control of performance and effectiveness is assessed against set standards, which may be based on outcomes, processes and structures.

In assessing on the basis of outcomes, knowledge of cause-effect relationship is necessary. The problem of quality of input is difficult to resolve. Difficulties of output-environment should also be considered when assessing effectiveness. The timings of the assessment measures is yet another difficulty of outcome-based assessment. In view of these difficulties, effectiveness is often measured in terms of processes and structures.

Process measures focus attention on the quality of activities carried out by the organisers. These measures assess efforts rather than effects. One disadvantage of process measures is the goal displacement. Further, information gathering of processes is more problematic, expensive and reactive.

Because of these difficulties, effectiveness is many times measured on the basis of structures. Structural indicators which are organisational features or participant characteristics assess the capacity of an organisation for effective performance. Structural indicators, however, are far removed from outcomes and assessment based on them may prove an effective barrier to innovation.

Conclusion

The systems approach brings about clarity in looking at problems of development and solving educational problems by considering all aspects of the system. A clear understanding of the basic concepts of a system, as explained above, is necessary for any one to apply them to educational systems at all levels.

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The Changing Roles of Women in Developing Countries: A Perspective on the influence of Technology and Education

JANE A. LIEDTKE

ABSTRACT

The author describes the changing roles of women in developing countries, which are related to changes in technology and education. Technology and its changes can be seen as the saviour of women in developing nations, but, without careful guarding of the process of their integration into the work force, they can become victims of unfair labour practices. The education of women (although it continues to lag behind) has been an important factor in bringing about changes in their roles and status. The focus of international efforts in this area has been to help the change from domestic organisation as the primary function of women in society to that of a participating equal. The women's roles are definitely being enhanced through major influences of technology and education.

Introduction

The focus of this article is on the changing roles of women which have occured as a result of, or are related to, the changes in technology where they live. The intent is not to provide the complete scope of changing roles of women, but to limit the discussion to the topics relative to technology and education. It is important to note that many factors influence women's lives today that are not related directly to technology but to sociological and familial relationships which are in transition.

Women in developing nations have traditionally held the role of domestic organizer, food producer, child rearer, and subservient person. As changes in technology occur (for better or worse) due to development projects and modernization, the influences on the women's role, especially in the household, are destined to change.

Impacts of Changing Technology and Education

A technological revolution is taking place throughout the third world. In some instances it is quiet, while in others it is heard loud and strong. Have women become a part of this revolution? Ward (1970) contends that for the most part the technological revolution is not an exclusively male preserve. According to Ward, "We are all in it together" (p. 93). Despite this, the prevailing division of labour between males and females makes it clear that in most parts of the world there are certain aspects of technological change which potentially are of more direct importance for women than for men.

Domestic organization remains primarily a female responsibility. As it changes for women, it will certainly affect men. Developments and inventions that have direct impact on domestic life are appliances such as refrigerators, electric irons, and the Pill (as well as other contraceptives).

Contraceptives, for example, have had an influence to only a minimal degree. No matter what their effectiveness has been in any given country, the mere fact that such technology exists has probably a greater immediate impact on these women of the third world than their use. Despite the availability, the use of contraceptives is related to a more important issue, that being the traditional family. Anderson (1979) indicated that to bear more children in order to provide extra hands to cultivate the land and eventually to care for them in old age is for many women today the primary focus of life. Until that focus changes, the introduction of contraceptive technology will not change birth practices among women.

A study of the changing roles of women in Asia by Ward (1963) gave some vivid illustrations of the impacts of modern transportation on the lives of women in developing countries. A Thai woman provided the following example:

"A journey which took her grandfather two months on elephant-back and her father two weeks by train and on foot could now be accomplished in a few hours by fast car" (p. 94).

Modern means of transport have been one of the most liberating influences even upon women in full seclusion. Changing transportation makes emigration possible. Where, in the past, the migration of workers was mainly a man's affair and women were left behind to carry on the home, now movement of entire families is possible.

Not only people, but goods and ideas, are being distributed more freely. The spread of books, newspapers, telephone, radio, cinema, and television marks a whole series of social revolutions related to technology. Ward (1970) indicated that in education, the arts, and entertainment influences produced new knowledge, new concepts, new and modified social attitudes, new ways of passing time, and a variety of employment.

There remains a gap between women and men in terms of education. During the years in which schooling is becoming universal, the gap remains inevitable. As the education of girls in many countries lags behind that of boys, women are likely to remain greater sufferers for a long time to come. Anderson (1979) reports that in third world nations the number of women who neither read nor write far exceeds the number of men. He suggests that the imbalance is indicative of attitudes based on the view that education is unnecessary for women because their role should remain solely domestic. Table 1 provides such a comparison of education enrollment for males and females. Illiteracy among women is perpetuated by many women because they are unwilling to send their daughters to schools taught by men.

TABLE 1: Percentage of children aged 6–11 in 1975 expected to be in school in 1985.

Regions	Sex	
Developed Countries	Male	49%
	Female	39%
Less-Developed Countries	Male	11%
	Female	7%

Source: The United Nations.

According to Ward (1970), the education of women (eventhough it continues to lag behind) has been the most important factor in bringing about changes in their roles and status. Education helps women take advantage of the many technological developments that can provide them with material goods and save them from time consuming labor. Literacy gives women more access to urban life by aiding them in coping with printed

instructions, shopping, and public transportation.

The products of technology (goods and household equipment) are contributing to other aspects of changing roles of women. Sewing machines speed the making of garments and provide a source of income. Mass produced kitchen utensils are to be found all over the world. Soap and toiletries are on sale almost everywhere. For people in towns, foods are now available in stores. Even the addition of electricity and water to the home has had an impact on women. Obviously, there are places where these items have yet to exist; but, where they do exist, their effect upon women's lives can hardly be exaggerated. This technological evolution has improved health and life expectancy, personal income, and more leisure time. Despite improved health, women's health, according to Islam (1980) is still poorer than that of men.

The villagers with a new awareness of the society and technology have taken to leaving the countryside for more populated centers of manufacture. It is in towns that women are more likely to find employment. Most migrant women who take employment in cities do so as a response to the economic necessity they find pressing on them upon arrival. Ward (1970) presented that it is sometimes argued that the organizational problems that outside work poses for women are more easily dealt within countries where the extended family exists or where servants are available. Otherwise, it would seem hard to imagine the women with a large family being able to leave the domestic duties of home and family for work.

There are negative aspects of technological change. The large proportions of people who migrate to towns and cities live there below poverty level. It is reasonable to look at technological change as depressing as well as elevating standards of living. Women are increasingly entering the third world's labor force,

yet they are confined to unskilled tasks and remain on the bottom rungs of the technological ladder.

"Industrialization efforts in the Third World are closely linked to how quickly women can gain access to modern technology" (Islam, 1980, p. 40).

Islam (1980) reports from a United Nations bulletin warning that although the economy in most third world countries has come to rely on the presence of large numbers of women in the work force, little consideration has been given to the medical and social effects on women and their families. Women's working conditions are often deplorable. The developing countries, the report warns, are likely to reproduce the health crisis of the industrial revolution in 19th-century England, with women as the most vulnerable victims.

Technology and its changes can easily be seen as the savior of women in developing nations but without careful guarding of the processes of integration into the workforce, women can easily be the victims of unfair labor conditions and complete exploitation. A fair example of this is available in the United States today with the use of illegal aliens and migrant workers for the production of clothing and food. Little is done to guard their health and safety as well as their economic security.

African Example

Pala (1977) expressed that the problems facing African women today, irrespective of their national and social class affiliations, are "inextricably bound up in the wider struggle by African people to free themselves from poverty and ideological domination in both intra' and international spheres" (p. 9). She contends that it cannot be stated too often that research on African problems has been greatly influenced by intellectual trends from outside the continent. Pala presents a view by a peasant woman in rural

Kenya when asked what development meant to her:

"During the anticolonial campaigns we were told that development would mean better living conditions. Several years have gone by, and all we see are people coming from the capital to write about us. For me the hoe and water pot which served my grandmother still remain my source of livelihood. When I work on the land and fetch water from the river, I know I can eat. But this development which you talk about has yet to be seen in this village" (p. 13).

This view of development and coming technology hits the roots of the peasant society — the obtaining of food and water being the basic stuff of life, not the ideologies of the urban people. Yet from where does one see such technology and development stemming? It comes from the metropolitan areas with their different values and influences.

Bekele (1980) explains that African countries are today experiencing a process of rapid transition from rural subsistence economies toward the mechanized modes of production, industrialization, and urbanization. This apparently is taking place despite the fact that Africa's potential of human and natural resources are considerably under or misused. The question is whether African women, who are in a strategically weaker position than men, will have equal opportunity to contribute the skills they possess to the development challenge on a fair basis.

In terms of educational trends, social statistics available from The United Nations on African women provide a female enrollment ratio (enrollment of all ages at the primary level as a percentage of the perspective primary school-age population) that is the lowest in the world — 52% compared to 77% in Asia, 106% in South America, 107% in North and Central America, and 100% in Europe. Life expectancy at birth for all Africans is reportedly only 43.5 years compared to 56.0 for Asians, 71.5 for Europeans, and 62.3 years for South Americans. In Africa the life expectancy for males is higher than that for women. This is usually not the case, but, in this instance, can be related to the difference in responsibility and workload assigned to women.

According to Bekele (1980), female participation rate in the modern, industrialized, and urban sector are not readily available. Studies done in Kenya indicate that women with higher educational levels have a greater probability of gaining employment. Highly educated women, and wealthier women, who also have good connections are usually able to get work. But the under-educated masses of people (women in urban areas) remain in daily or seasonal (low) wage employment, domestic work, and prostitution.

Despite the gloomy picture of employment and education in Africa, women there have made progress in the last twenty years. Even under the iniquitous system of apartheid, black women are held in high esteem within family and community. As women grow older, their wisdom and counsel are sought and respected. Many render a lifetime of service, attending births of infants and giving postnatal care. Women still have the major reponsibility for family health care and most satisfy the family's food and nutritional needs. However, it is usual for the husband or father to dominate social and family life. African women regard themselves as fully engaged in economic and social tasks which already contribute to whatever development is taking place. However, the development policies in the agricultural sector do not reflect women's special concerns and needs. In some countries women have limited access to land, for example. Often these women's health status is endangered by high fertility. The effect on women's physical and emotional health due to poverty, overwork and great responsibility, added

to high fertility, has not been adequately studied, reports Bekele (1980).

The issues in Africa, and other developing areas, are clear. Fundamentally women and men must work against poverty. What is special for women and their roles is that for this to succeed they must be full participants. Women have the potential skills and experience which can be employed for the benefit of the society.

Conclusion

The International Women's Year had great impact throughout the world on the status and roles of women. Many institutions and development strategies for including women in development have grown from this United Nations concern. Three priority concerns were reported: (1) development of women's skills and income-earning capacity through appropriate education and training with special attention to neglected areas such as science and technology; (2) improvement of the health status of women and their families by enhancing their knowledge about health and health care and ensuring access to appropriate services; and (3) mobilizing women to participate acti-

vely in the decision-making process as a way of overcoming negative attitudes and ensuring that women are not left in a position of dependence.

The thrust of the International Women's Year was to approach the problems remaining for women and help the change from domestic organization as the primary function of women in society to that of a participating equal. As a member of the United Nations International Women's Organization for the last decade, this author has seen the progress reported in the journal by women in developing countries. There is no doubt that this has been a slow-placed effort which has met with expected conflict by men and women alike. One can only anticipate that the introduction of technology in a reasonable manner (purposeful and thoughtful transitions), women's roles will be enhanced and not depressed.

International efforts associated with technological and educational advances should regard their impacts on society and especially the roles of women as having serious consequences. Small and insignificant changes to a member of a development team may result in major influences for the community.

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Evaluation of Bilateral Education and Training Projects— Some Problems and Issues

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ABSTRACT

This paper highlights the increased concern about the effectiveness and efficiency of aid projects in general and educational projects in particular. The injection of a certain idealism and the consequent strengthening of the move towards accountability have provided a more professional, systematic approach to the whole process of aid administration. However, this genuine desire for better conceived and managed projects has revealed a number of conflicts and this paper seeks to raise the awareness of some of the major issues, confronting those of us involved in evaluating educational projects.

Introduction

"All aid is politically motivated".
This view has been expressed many times but whilst this statement may still be basically true, the past ten years has seen some significant changes in the way in which aid projects are appraised, designed, implemented and evaluated. Perhaps these changes are the result of a younger, more idealistic breed of aid administrators assuming responsible government positions. Whatever the reason, the total project process from identification to completion is now much more rigorous with the primary focus being on the question of efficiency and effectiveness of the project. Invariably, detailed economic analysis is conducted and systematic procedures for project design are adopted.

There has been a very significant world-wide trend in the last fifteen years towards accountability in public systems of education which was initially triggered off in the West to some extent by the economic recession which followed the dramatic hike in the price of oil in 1973. This trend has affected developing countries too, as they have become increasingly aware of the need for accountability in education, especially so in the case of technical and vocational education, due to its capital-intensive nature. In fact the focus on project evaluation really preceded the focus on project appraisal and design and this has led to a number of problems. This paper attempts to delineate some of the fundamental problems and issues associated with the evaluation of training projects. The author's awareness of these problems comes as a result of actual experiences gained as a member of project evaluation teams evaluating bilateral projects in a number of S.E. Asian countries. It should be stressed that the observations recorded in this paper are personal views and should not be construed as criticism of any particular organisation or country.

Problems and Issues

Project Objectives

A major problem of project evaluation is the frequent lack of an adequate project design document. In many cases the

31

project appraisal and design phases are conducted without the same professional inputs as those later allocated to project evaluation.

There could be a number of reasons for this situation; political pressure to approve the project and time and manpower constraints may be the more common explanations. Whatever the reasons, this is frequently the case, and this poses considerable difficulties at the project evaluation stage. The principal difficulty arises out of the frequent lack of clarity of project objectives. This issue may be clouded still more due to the fact that the stated objectives are not the real or only objectives of the project. This is really a question of motives, a donor country has its motives for aiding a particular project whilst the recipient country may also have its own latent motives. A further complication is that the project executing agency, often private companies of the donor country, is motivated by a natural desire to survive and grow and they may also try to influence the project objectives. This effect is commonly manifested in changes to the project objectives during implementation usually to incorporate additional objectives written in 'global' terms. In the absence of clear project objectives, one of the first tasks of an evaluation team then is to reach a consensus with the clients and key parties involved on what the project objectives should have been. This may well present some considerable difficulties. Certainly much of these problems could be avoided or at least minimised if, at the project formulation stage, a systematic procedure, such as the use of the Logical Framework Matrix, was used. This matrix, first used by USAID[1] personnel and now used quite extensively by other aid agencies, is providing an invaluable tool, both from the point of view of project monitoring and evaluation and also a better understanding of the impact of the project especially in terms of inter-relationships of various project components. An illustrative example of the use of a Logical Framework Matrix is shown in Table 1.

This matrix establishes linkages between inputs, outputs, project purpose and project goal and identifies indicators of attainment at each level. It also shows how each indicator can be measured and states any major assumptions on which successful achievement of project objectives depends.

Composition of Evaluation Team

Perhaps an important pre-requisite to this question is the answer to another question and that is. . . what is the ultimate purpose of the evaluation? Here two basic possibilities occur to me:

End of project evaluation to assess extent of achievement of project objectives with the assumption that it is too late to take corrective measures.

OR

Evaluation of the project during its implementation, where corrective measures are still possible.

For educational projects we are more likely to be concerned with latter situation described above.

If this is so, then it is essential that the evaluation findings have not only credibility but also a climate of commitment to accept and implement the findings. In such a situation a mixed team of insiders and outsiders might be preferable. However a very real problem is finding acceptable persons with sufficient expertise to be capable of performing evaluation tasks.

The evaluation exercises that I have been involved in have always used a joint team approach; that is a team from the donor country and a counterpart team from the recipient country. Frequently this leads to a somewhat unequal partnership due to lack of expertise but nevertheless has proven valuable since the counterparts are able to locate and gain access to information that outsiders may not be able to do.

TABLE 1: **The Logical Framework Matrix** — an illustrative example.

Narrative Summary	Progress Indicators	Means of Verification	Assumptions
GOAL Greater contribution to rural development both in technical and socio-economic terms.	– Productivity charges – Income changes – Life-style changes (education, housing, spending)	Base line data established for a sample with subsequent follow-up studies on impact.	That the organisations/programmes are highly relevant to the needs of the rural communities and that the training programmes greatly contribute to the success of such programmes.
PURPOSE Enhance the training capacity and capability of the organisation.	– Number of training programmes conducted – Quality of programmes.	– Records – Reports of evaluative studies.	That training is accorded high priority within the organisation & the training officers are given adequate support.
OUTPUT 1. Development of a workable Master Plan for training within the organisation.	– Small team comprising key staff & specialist formed. – Plan developed. – Plan discussed at all levels & revised as necessary. – Plan adopted as policy & steps taken towards implementation.	Reports, minutes of meetings Policy Statements Reports.	That there is a desire and commitment on the part of the organisation towards the implementation of the emergent proposal.

Narrative Summary	Progress Indicators	Means of Verification	Assumption
2. Development of the organisational structure of the organisation to facilitate co-ordination of training activities and increase training effectiveness by strengthening the training capacity of the training and field operation centres.	– Workable organisational structure developed. – Proposed organisational structure discussed. – Organisational changes with any necessary amendments adopted.	– Report by Specialist. – Organisation's documentation.	That the organisation is willing and able to implement organisational changes which are felt necessary to increase the effectiveness of training activities.
3. Development of the organisation's training officers in critical aspects of instructional design, delivery and evaluation.	– Training plan for training officers designed. – Implementing team identified and contracted. – Key staff identified and sent for overseas training – Materials developed for workshops. – Monitoring and evaluation conducted.	– Reports by Specialist/the organisation. – Use of pre and post tests. – Results of monitoring and evaluative studies.	That physical and human resources will be made available as and when required to implement the project. That this type training will result in more relevant and effective training programmes within the organisation.
INPUT *Recipient Country* 1. Provision of physical facilities for implementation of staff development programme	Physical facilities made available to the project.	Report by Specialist.	That the human physical and financial resources will be sufficient and made available at the right time to implement the project as planned.

2. Provision of human resources for:		
– co-ordinating committee	– Co-ordinating committee formed.	– Reports
– staff development working committee	– Staff development working committee formed.	"
– participation in staff development programme	– Staff development participants identified.	"
– trainees for try out of training officers programme.	– Target groups of trainees available.	"
	– Project funds available.	Reports & documentation.
3. Budget to cover in-country costs associated with:		
– hiring personnel to work on staff development working committee		
– consumables for in-country staff development programme activities.		
– per diems of trainers, trainees.		
Donor Country		
1. Provision of technical assistance for project duration (15 person months).	– Training Specialist appointed.	Donor Govt.
2. Provision of overseas training awards (4×2 person months).	– Funds allocated	"
3. Budget allocation for provision of limited training hardware/software.	– Funds allocated.	"

35

Project Evaluability

In theory it is possible to evaluate anything but in practice this may not be so; for example, if no agreement can be reached on the project objectives, proper evaluation cannot proceed. Also evaluations tend to be expensive. Stake[2] once said "an evaluation seems to cost whatever the funding agency can afford", adding that large projects using conventional summative evaluation methods might cost 2% of project value with smaller projects costing around 5%.

Thus the question 'is it worth it?' needs to be resolved. There is no point in spending $ 100,000.00 to evaluate a $. 50,000.00 project!

Project Objectives and Evaluation Objectives

Suppose we have a vocational training curriculum project, if the project aim is to improve the trainee performance and the aim of the evaluation is to assess the effectiveness of the curriculum in doing this, then we can say there is harmony between the project and evaluation objectives. However, if the aim of the evaluation was to assess teacher performance then clearly there is discord between the aims of the project and the evaluation. Rutman[3] acknowledged this problem too and cited similar examples.

Lack of Base-Data

This is a very common problem where there is no systematic recording or monitoring of training activities, no job descriptions exist for the trainees and no trainee competencies have been properly identified. If at all criteria of acceptable performance have been identified, this is often without due consideration to local conditions and constraints. On one Australian project the Australian trainers were attempting to judge trainee performance based on what Australian apprentices could achieve after the same length of programme. This is clearly an irrelevant and unjust comparison when one compares local conditions and con-

straints to conditions in Australia. I remember a colleague of mine teaching Physics in a Pacific Island country and after explaining for some considerable time the operation of a lift he asked if there were any questions. The first question came......"What is a lift"? This was a perfectly logical question when one considers that neither a lift existed nor was needed in this particular country. Thus in assessing the extent of achievement of training objectives, the evaluation team have to set up meaningful criteria of acceptable performance.

Evaluation Design: Time and Effort Devoted

Frequently evaluation teams are identified and team members are mailed their respective terms of reference. They may meet prior to the actual evaluation but usually only to clarify own roles, and agree on administrative and financial arrangements, such as departure dates, flights, hotels, etc. Rarely is sufficient opportunity provided for the team as a whole to sit down and design an evaluation strategy and associated instruments in a systematic manner to enhance the objectivity, credibility and utility of the exercise. In terms of educational projects the eleven models of evaluation described by Eraut[4] could prove very useful.

Reporting the Results

According to most definitions of the term evaluation, an evaluation should present information in a manner that is useful for judging the worth or otherwise of a project. In other words, the client takes decisions not the evaluators. In practice there is a great temptation for evaluators to take decisions.

Another related issue is whether or not an evaluation report should make conclusions and recommendations. It has been the policy of many aid agencies when commissioning evaluations to ask the evaluators to make specific recommendations. Of course, it can be argued that the final decision to accept or reject

such recommendations still rests with the client. The proponents of the illuminative evaluation approach argue strongly against conclusions or recommendations.

Evaluation v. Inspection

This is a very real problem associated with the evaluation of educational projects. Invariably, educational institutions do have an inspection system which is seen by staff members to be largely punitive in nature and more concerning itself with issues like promotion/demotion, maintenance of confidential reports, salary increments, etc. Since such inspection systems have been in force much longer than evaluation in this context, there frequently exists a negative attitude towards evaluation since it is seen more as a threat and no different from inspection. The problem is excerbated further by an attitude that education need not be accountable. However the last few years have seen an encouraging trend in the softening of these die-hard attitudes.

Conclusion

The general philosophy of an evaluation study is that it should:

* question the relevance of the project itself

* challenge all aspects of the project design

* examine performance and adequacy of inputs, implementing agents and administrative structure

* measure progress towards achieving

objectives at the project, sector and national levels

* result in redesign and replanning of future activities.

In terms of what evaluation is we can say the following:

* based on judgement and not finite or definitive conclusion produced mechanically or statistically.

* impossible to undertake in a totally value-free manner.

* concerned with achievement and performance of an organisation

* capable of examining the contribution that individuals make to the performance of an organisation

* a technical process involving people.

In order to satisfy the philosophical aspects, the evaluation needs to be carefully and systematically designed and the implementation requires skilled persons who command the respect of the project personnel. Certainly the task of the evaluation team is made much easier if the project formulation and design phase has been given sufficient attention with the use of proven design techniques such as the Logical Framework Matrix. However the human aspects of evaluation are crucial to the success or failure of the conduct of any evaluation, no matter how well it has been designed. This is particularly true of educational projects since the development of a conducive attitudinal climate is essential to the effective implementation of evaluative decisions.

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A Study on Teaching Ability of Technical Teachers as a Function of Personality, Emotional Maturity and Teaching Experience

MUKHOPADHYAY B.

ABSTRACT

The paper presents the findings of a study conducted by the author to investigate the relationship between teaching ability and some selected non-cognitive characteristics of technical teachers. It is reported that while the correlation between teaching ability and teachers' personality is significant, that between teaching ability and emotional maturity and between teaching ability and years of teaching experience are not significant. The author compares the findings with those of similar studies involving teachers of others systems and asserts that certain facts concerning technical teachers that emerge from this study demand further investigation.

Background

One of the significant factors in the process of education is the personality of the teacher. Getzels and Jackson (1963) have remarked that the educational impact of an Ichabad Crane, a Mark Hopkins, a Mr. Chips or a Socrates, is surely not due solely to what he knows, or even to what he does but in a real sense to what he is. Impressive number of studies have been conducted in this field within the last decade or so but still no simple generalization can be drawn at present about the personality characteristics of teachers who make an educational impact.

Flanagan (1961) conducted a study on the teachers' personality. He concluded that the Minnesota Multiphasic Personality Inventory (MMPI) has potential usefulness in aiding the prediction of success of teachers. Morgan (1962) tested relationships between teacher values and their verbal behaviours. After confirming some of the relationships, the author cautioned that common-sense assumptions about the relationships between teacher values, personality factors and teachers' verbal behaviour need to be tested empirically.

Ryans (1964) observed that good mental health or emotional maturity, seems to be a requisite for satisfactory teaching performance. Ringness and others (1964) in their investigations of the first year teachers with measures of self concept, measures of security and measures of anxiety, observed significant relationships among the self perception scores.

Gagne (1965) concluded that a review of literature at the present time suggests five global characteristics which appear to be components of effective teaching. These characteristics are warmth, cognitive organisation, orderliness, indirectness and problem solving ability. Turner (1965) through his empirical investigation modified the earlier proposition by adding that both the personal — social and problem solving characteristics of teachers are relevant to the performance of the body of teaching tasks.

Several other investigators have attempted to find out the relationships between

39

characteristics of teachers and their teaching behaviour patterns (Barr 1952, Mitzal 1960, Ryan 1960, Getzels and Jackson 1963, Biddle and Ellena 1964, Rosenshine 1971, Gage and Winne 1975).

Some studies are also available in India which highlight the relationships between teachers' personal characteristics and teaching effectiveness.

Suraj Balaram (1965) conducted a study to find out the relationship existing among the teacher trainees' intellectual efficiency, self acceptance and teaching skill. Samanta Roy (1971), in another study, observed a positive relationship between the variables viz. teacher adjustment and teaching efficiency. Debnath (1971) attempted to find out the determinants of teaching efficiency. Mehta (1972) in his study observed that high-achieving teachers were more conscientious, venture-some, tenderminded and experimenting. Nair (1972) conducted one study to see the effect of certain sociological factors on teaching ability. Grewal (1976) studied the main predictors of teacher effectiveness. In another study, Gupta (1976) appraised teacher effectiveness through personality tests. Singh (1976) observed that the needs of superior, average and inferior teachers were clearly distinct from each other.

Gupta (1977) in his investigation found that success of teaching was highly related to personality characteristics. The result of the study conducted by Singh (1981) showed that high effective teachers were assertive, venturesome, controlled, emotionally stable and trusting in comparison with low effective teachers. Raina (1983) observed that science teachers were more shrewd, experimenting, self-sufficient, humble, reserved and sober.

In India, no study is available so far which aimed to find out the relationship between teaching efficiency and non-cognitive characteristics of technical teachers. Therefore the present study emerged from the felt need.

Objectives

The objective of the present investigation is to study the relationship between teaching ability and some selected non-cognitive variables and years of experience. The objectives are specified as follows:

(i) To study the relationship between personality and teaching ability

(ii) To study the relationship between emotional maturity and teaching ability

(iii) To study the relationship between years of teaching experience and teaching ability.

Methodology

Sample: Twenty-five teacher trainees were chosen from a group of thirty-five teacher trainees who came for long-term courses during 1983–84 at TTTI, Madras. Of the thirty-five teacher trainees, four were female and six were deputed shortly after their recruitment and they did not have much teaching experience. Therefore the twenty five teacher trainees who had two to three years' minimum teaching experience and of the same sex (male) were considered for the present investigation. Purposive sampling technique was used, as a very limited number of teacher trainees were available in TTTI, Madras undergoing a particular course which required a certain entry qualification.

Tool: The Multivariable Personality Inventory (MPI) and Emotional Maturity Scale (EMS) were used for the present investigation. The reliability coefficient and validity index for MPI are reported to be 0.72 and 0.77 respectively and that for the EMS they are reported to be 0.75 and 0.64 respectively. For measuring teaching ability, Howsam (1960) reviewed various kind of rating scales and discussed four kinds viz. self-ratings, peer ratings, student ratings, and supervisors'

ratings. For the present investigation, supervisors' ratings were used with a maximum score of fifty. The rating was done on the basis of observation of macro-teaching sessions of trainees by a team of supervisors.

Procedure

The Multivariable Personality Inventory and Emotional Maturity Scale were administered in groups for two consecutive days. Teaching experience data for teacher trainees were collected from the admission forms. The teaching ability was measured by a team of supervisors after observing a series of micro-teaching sessions followed by one macro-teaching lesson presented by each teacher trainee. A maximum score of 50 was taken for scoring teaching ability on the basis of the macro lesson presented by each teacher in the sample.

The Multivariable Personality Inventory and Emotional Maturity Scale were both scored for negative orientation. On the basis of the scoring scheme, the higher the score, the greater was the prevalence of negatively oriented traits. The rank order coefficient of correlation was computed for interpretation of relationships.

Results

The scores obtained on Multivariable Personality Inventory, Emotional Matur-

ity Scale, Teaching ability and teaching experience were converted to ranks. The coefficient of correlation obtained between teaching ability and personality was found to be 0.467 (Table No. 1). This indicated high positive correlation between teachers' personality and teaching ability. Therefore greater the personality higher is the teaching ability. Further the result is significant at 0.05 level which confirms the proposed hypothesis that there is a significant relationship between teachers' personality and teaching ability.

The coefficient of correlation between teaching ability and emotional maturity, when computed, came to be 0.285. This indicates moderate positive correlation between teaching ability and emotional maturity. This means, greater the emotional maturity, the higher is the teaching ability. However, the result is not significant. This does not come in support of the proposed hypothesis that there is a significant relationship between teachers' emotional maturity and teaching ability.

The coefficient of correlation between teaching ability and years of experience was found to be 0.105. The positive correlation indicates that higher the teaching experience, greater is the teaching ability. The obtained result is not significant, which refutes the proposed hypothesis that there is a significant relationship between teaching experience and teaching ability.

TABLE 1: Coefficient of correlation and level of significance between two variables.

Variables	Coefficient of correlation	Degrees of freedom	Level of significance
Teaching Ability and Personality	0.467	23	0.05*
Teaching Ability and Emotional Maturity	0.285	23	NS
Teaching Ability and Years of Experience	0.105	23	NS

* Significant at 0.05 level, NS = Not Significant.

Discussion

The high positive correlation and the significant relationship obtained between teachers' personality and teaching ability is supported by several other investigations in the field. Ryans (1964) observed self-confidence as a dominant trait among efficient teachers. Suraj Balaram (1965) in his study obtained a significant relationship between self-acceptance and teaching skills. In another study, Debnath (1971) observed that sympathetic attitude and friendliness are important correlates of teaching efficiency. Samonta Roy (1971) obtained a positive relationship between teacher adjustment and teaching efficiency. Grewal (1976) found out that among the main predictors of teacher effectiveness, total adjustment, dominance, submission were also important. In the present investigation, MPI which was used to measure personality of teachers, takes care of the variables like self-confidence, empathy, ego ideal, pessimism, introversion, neuroticism, need-achievement, dogmatism and dominance in measuring personality.

Gupta (1976) attempted to predict teacher effectiveness through personality. He observed that highly effective teachers had more ego-strength, more self-confidence, were less suspicious, less guilt-prone, warm-hearted and highly-self-controlled. Gupta (1977) in a different study concluded that success in teaching is highly related to personality. Singh (1981) through his study showed that highly effective teachers were assertive, venture-some and controlled.

In the light of the present findings with regard to technical teachers it may be safely said that for effective teaching, personality of the technical teacher is no less important than any other interacting variables. Only a further study can explore the extent that personality as a variable contributed to teaching ability.

In the present investigation, moderate positive correlation was obtained between teaching ability and emotional maturity. Ryans (1964) in his study observed that emotional maturity is one of the requisites for satisfactory teaching. Grewal (1976) obtained emotional adjustment as one of the main correlates of teacher effectiveness. Gupta (1977) obtained high relationship between emotional stability and success in teaching. The result of the study conducted by Singh (1981) showed that highly effective teachers were emotionally stable. All these findings come in support of the present finding.

Gupta (1976) in a different study observed that in comparison to average effective teachers, high effective teachers were significantly emotionally stable and had higher self control. However, in the present investigation the relationship between emotional maturity and teaching ability was found to be not significant. The immediate reason may be the small sample size. A high correlation may probably be obtained if a larger group of teacher trainees were available.

Ryans (1960) in another study observed that lower emotional maturity scores were obtained by teachers who (i) said their memories of childhood were unhappy (ii) seemed not to prefer active contact with others (iii) expressed distrust of intentions and reasonableness of parents and their pupils (iv) were directive, (v) were cautious in attitudes expressed towards their pupils. In the present investigation no case study was conducted; otherwise, that could further explore the possibilities of non-significant relationship. In this area, Ringness and others (1964) obtained a different result. They observed that, two emotions, namely, sense of security and anxiety were not significantly related to overt teaching behaviour.

On the basis of the trends in results in studying teaching ability as a function of emotional maturity, though a significant relationship was not obtained in the present investigation, still it can be concluded that emotional maturity plays an important role in teaching ability.

Positive but low correlation between teaching ability and years of experience was obtained in the present investigation. The result was found to be not significant. The results obtained in several studies in this area seemed to be controversial.

Ryans (1960) in his study observed that scores in teaching ability for teachers of fifty five years and above showed to be at a disadvantage when compared with young teachers. Fattu (1962) and Howsam (1960) both reviewed the research on predictor criteria and teacher effectiveness and concluded that such research had failed to substantiate links for such characteristics as age and experience. Peterson (1964) observed that teachers seem to recognize a 'best teaching period' while they were still young and vigorous and a decline beginning at the age of thirty five or forty. It has been suggested that age may determine relationship between teachers and students and therefore the effectiveness of teachers.

Debnath (1971) in his study on teaching efficiency observed that age and teaching experience were significantly related to teaching. In another study Nair (1974) observed that a positive relationship existed between age and the teaching ability which comes in support of the present finding.

Though it does not always mean that higher the age, the greater is the teaching ability, still it can be concluded that long teaching experience may have some impact on teaching ability.

Due to the small size of the sample and lack of control over certain extraneous variables, it may not be wise to generalise the present findings, yet the present investigation highlights certain unique facts concerning technical teachers which demand further investigation.

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Locally Based Management Development for Technical and Vocational Education Institutions

Rob Cuthbert, John Pike and Vernon Trafford

ABSTRACT

So often management development is viewed, and operates as, an activity which is undertaken 'away from the College work place'. This article describes a research project which explored how management development could be undertaken 'within the College'. It explains the Locally Based Management Development approach by illustrating the activities which would be involved and the advantages which this approach has been seen to possess.

Introduction

Management development can occur as a result of many varied events and practices. Amongst these, the practice of Locally Based Management Development has traditionally, within the United Kingdom, not received as much attention as the more established forms of course attendance or self development packages. This applies particularly to the range of opportunities available to members of College Senior Management Teams within the technical education system. However, it was felt that despite the absence of literature on this subject, or the formal encouragement of such development processes, considerable management development activity does occur within individual colleges at the institutional level.

This belief resulted in a one year project being funded by the Further Education Unit — a section within the national Department of Education and Science. The project was undertaken between February 1985 and January 1986. The intentions of the project were:

(a) to identify and test a range of modes of promoting organizational and management development in Colleges of Further Education;

(b) to document details of the models, tasks, activities, training materials and case studies of aspects of managerial practice in a sample of Further Education Colleges in order to provide guidance to the system on potentially fruitful approaches to management development.

The completion of the project resulted in the production of a book which contains observations upon, and guideline material to assist in, Locally Based Management Development in Colleges of Further Education. This paper outlines the methodology used and the philosophy of the approach and indicates its potential use in technical and vocational education systems outside the United Kingdom. However, it does not seek to provide a detailed explanation of the procedures, practices and approaches to enable the reader to undertake Locally Based Management Development.

Methodology

Fieldwork was undertaken in four colleges. The selection of these Colleges was made so that between them they combined, or reflected, the following characteristics:

* metropolitan/urban/rural;

* single site/split site;

* mixed levels of advanced and non-advanced further education

* tertiary/monotechnic;

* emphasis on changing forms of college structure and provision;

* close to other Colleges and providers/isolated geographically;

* large/medium/small size.

Each of the participating Colleges entered into the project with an expectation of two particular outcomes. Firstly, that by taking part they were contributing to, and assisting in, a process of dissemination on management development to other colleges. Secondly, that the project team would assist and guide the colleges in their own management development.

The size and scope of a one year part-time investigation into the management development activities of just four Colleges can hardly be described as representative of the immense diversity of further education provision across the country. The methodology for investigation sought to overcome that particular problem. It was neither pure research nor pure consultancy. Instead, it combined appropriate methodologies of process consulting, structured questionnaires, open-ended discussions and use of documentary sources. These methods were used to collect evidence on locally based management development activities in the participating Colleges. It was recognised that each of the Colleges was faced with environmentally specific demands, issues and problems which differed. However, it was apparent that, generically, each College displayed similar managerial activities in order to meet and discharge its responsibilities and obligations. Thus, the development of managers in those Colleges drew upon similar needs, processes and activities irrespective of the context of the individual College. The methodology of investigation was, in this way, able to generate usable materials which could meet such

management development in the Colleges who provided a highly experienced and critical 'laboratory' in which to 'test' these materials.

Apart from the above methods of investigation, the project contained three quite distinctive features. At the outset, and conclusion of the project, representatives from the Colleges met with the project team on residential workshops. These two events gave opportunity for extended discussion of the many theories and practices associated with management development. From the first workshop, each College was able to determine what it wanted to gain from the project. This was expressed in contracts which became the basis for the relationships between each member of the project team and the individual College. As a means of disseminating news of what each College was 'doing', occasional Newsletters were prepared and circulated between the project team and the Colleges. Thus the workshops, the contracts and the Newsletters each sought to exemplify the nature of locally based management development in colleges. In this way it was intended that the findings and outcomes from the project had both practical and contemporary validity as judged by members of the technical education system itself.

The Context

Senior managers in Colleges now face a range of changes in which they have little or no precedent to guide them. The explosion of technical and vocational education in terms of student demand and the number of providing institutions, together with changes in the nature and style of the curriculum, changes in the configuration of funding patterns, changes in the ability of colleges to recruit high calibre staff, and changes in the role of Colleges related to industrial and rural development, have profound implications for the way Colleges are managed. Despite these pressures for change or perhaps because of them, Colleges have been involved in an unprecedented level of

local initiatives, making positive and creative responses to these problems and opportunities.

These new circumstances for College management call for a review of the process of management development in Colleges, and the identification of those modes of activity which are most likely to support and facilitate College management in its new context. It is quite likely that appropriate modes of development will also entail those elements of negotiation, local initiative and inter-institutional co-operation which typify recent curriculum change in the Colleges.

What is Management Development?

Definitions in this area are notoriously difficult, but it is important to be clear what is being considered, and what is to be done. Management development may be defined as 'an attempt to improve managerial effectiveness through a planned and deliberate learning process'. This process may be viewed in a variety of ways but one that has been found helpful is to see it as a four stage reiterative process containing the elements: Policy, Needs, Action and Evaluation.
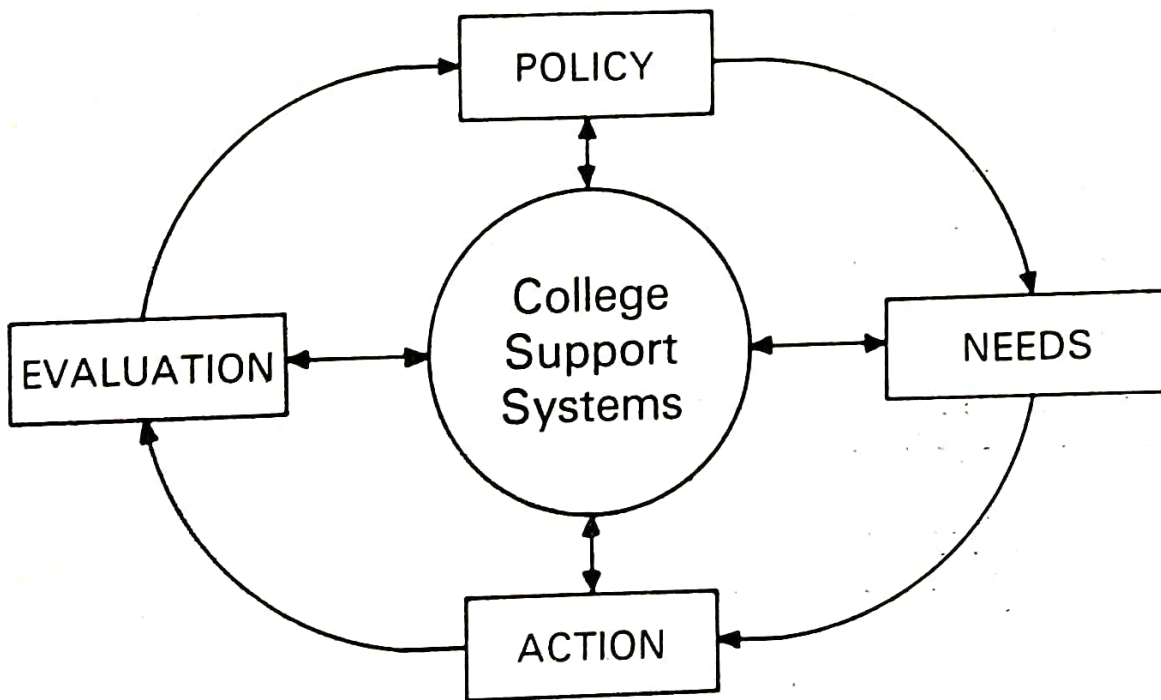

Figure 1 : The Management Development Process

The Policy Formation process is one for each College to determine for itself. An explicit policy statement on Management Development has many benefits, not least of which is a clear indication of what the College expects its senior managers to do in the realm of promoting improved managerial performance. The second stage in the process is the identification of management development needs.

These needs may be categorised into those which will

- improve the way the College is managed as a whole;
- improve the performance of individual managers in their current jobs including their ability to make changes which affect their current circumstances;

— prepare individuals for their career development.

Colleges will need to examine the range of different approaches for identifying these needs, for example, whether or not a staff approval scheme is desirable for this purpose.

When the needs have been identified, a choice of action to meet these needs will have to be made. At the local level many things can be done both efficiently and effectively. The final stage of this four phase mandate is evaluation. Evaluation of each of the stages may be considered, including the evaluation of the policy itself and the policy making process, the needs identification process and of the actions taken to meet these needs. Even the process of evaluation could be evaluated.

In a broader context, management development might also be seen to encompass a range of additional activities including recruitment and selection, appraisal, promotion, managerial succession planning and so on.

In general, the test of a mature institutional commitment to management development may be the extent to which everyday problems are seen, not just as issues needing to be tackled, but also as opportunities for planned and deliberate managerial learning.

Aims and Purposes of Management Development

Management development aims to improve practice in colleges by helping managers change, or helping them change what they do and how they do it. Its fundamental purpose is, therefore, to improve educational practice by improving managers' performance. There is now widespread acknowledgement that change and development depend not only on changing the curriculum and helping the professional development of teachers, but also on developing the organization and

management of technical education provision.

The arguments for management development are in many respects the same as the arguments for staff development. Over the years, staff development itself has become generally accepted in the technical education sector for the contribution it has to make to the furtherance of individual and College objectives. However, the arguments for management development have not yet received the full recognition that has been given to them by industry and other parts of the public sector.

These attitudes are rapidly changing as managers come to terms with completely new challenges, which call for a much greater emphasis on such issues as:

— clarifying Colleges' objectives, strategies and sense of corporate mission;

— identifying and encouraging leadership;

— re-examining the appropriateness of existing values and the College culture in the light of new demands on the system.

It is understandable and appropriate that the purposes of management development should be interpreted in the light of current concerns: coping with new curricula; meeting the needs of new client groups; improving effectiveness, efficiency and value for money. These are indeed the trigger for the new opportunities which are arising.

But management development, like any other form of educational activity, should also be seen in a broader context, as an activity which helps, not only in improving the way the College is managed in times of change but also in:

— the personal development of individual managers;

– the creation of a positive working environment in colleges;

– the process of problem identification and resolution;

– the exploitation of new managerial skills and techniques;

– the continuing development of the Technical and Vocational Education System.

In this sense, management development represents an essential contribution to the life and activity of a technical and vocational education institution.

Who are the College Managers?

It is apparent that the term manager is open to wide interpretation with the Technical Education System. In addition to the Principal, others may not be generally recognised in a formal sense, but nevertheless undertake roles and responsibilities of a managerial nature. In this category can be included:

* course tutors/course development leaders;

* deputy heads of departments;

* domestic service managers;

* heads of technical services/learning resources;

* industrial liaison officers;

* marketing/public relations co-ordinators;

* section heads;

* special project co-ordinators;

* staff tutors;

* subject team leaders.

All these people fulfil roles which embrance some aspects of College-based managerial activities.

Given this wider delineation of the managerial group within the College, it follows that any College-based initiatives related to management development, should not be simply confined to members of the management team. This being so, it should be recognised that whilst the responsibility for management development policy formation, needs identification and the preparation and implementation of management development activities rests with the management team, the participants for whom such activities are designed could also include members of this wider group.

Locally Based Management Development

This project described above, was undertaken in the belief that many of the most effective management development activities start from local definitions of needs, priorities and approaches. Successful change comes from managers' personal commitment to the need for change, and involvement at every stage of the developmental process.

It follows that national definitions of needs and shortcomings in the management of the Technical and Vocational Education System are useful only as broad guidelines. Effective action to improve practice may well be based on locally devised programmes which tackle real local needs, rather than centrally devised training schemes which are too often perceived as irrelevant by their supposed clients. Management development programmes, in other words, should meet just those criteria of relevance and responsiveness which are applied to Technical and Vocational Education courses in general.

Managers develop throughout the course of their managerial careers. This is largely due to the activities in which they become engaged. In other words, managers learn by doing.

However, the concept of management development implies something more than *ad hoc* exposure to different kinds of work

experience. Leaving things to happen just by chance may not be enough. The distinctive feature of management development is that is is planned and systematic. It aims to provide managers with selected opportunities to acquire the knowledge and skills which have been identified as relevant to their effective performance in the current and future jobs.

Frequently it is assumed that these selected opportunities are nothing more than attendance on either a lengthy award-bearing programme, or a series of short courses, away from the job. Not often enough is it recognised that the scope for locally based planned experiences, within the College, may be even more effective in providing developmental experiences. Locally based management development may often have clear advantages over off-the-job course-based activities. A locally based approach may be:

* able to take full account of local constraints and circumstances;

* easier to monitor, evaluate and control;

* easier to transfer the learning to the job;

* focussed more closely on individual, team and college development needs;

* less disruptive of work schedules;

* College and self directed in its learning orientation;

* cost effective;

* problem centred;

* relevant to the culture and style of management of individual Colleges.

The type of activities involved in Locally Based Management Development might include the following:

* Briefing sessions on issues of importance;

* Circulation of issue papers for comment and/or information;

* Coaching;

* Consultancy undertakings and assignments;

* Counselling and mentoring;

* Debriefing following attendance on courses (including in-house), or at conferences;

* Deputising for others;

* Guided reading;

* In-College seminars, workshops, films and videos;

* Job rotation;

* Organization development programmes;

* Participation in committees and working parties;

* Participation in, and membership of, external bodies;

* Quality circles;

* Research into, and development of, specific aspects of college activity;

* Rotation of chairmanship duties;

* Self-development activities;

* Self-directed study;

* Task group participation;

* Undertaking specific college-based projects;

* Visits to other Colleges, educational bodies and industry;

* Voluntary positions of responsibility.

Depending on an individual's identified management development needs, a planned programme of experience could quite easily be designed, and agreed, based on a selection of activities drawn from the above items. This does not, of course, prevent individuals from attending off-the-job courses, or programmes, where these are considered more appropriate to meet their identified management development needs.

Management Development and Staff Development

All Colleges are likely to have provision for staff development. This can take many

forms but it is likely to recognise, and then be based upon, at least three areas of staff activity, namely;

- pedagogic skills in teaching/learning;

- development of subject or discipline knowledge;

- awareness of current practice in relevant industries or employment sectors.

These three areas are connected in the processes of curriculum development, planning and review and are of course directly concerned with the primary educational mission of the College. But the delivery of an educational programme depends on a wide range of activities which create structures, systems, procedures and processes which enable the teaching/learning process to flourish. These activities can be collectively described as managing: getting things done through other people.

The process of management is essentially non-routine in nature. It is primarily concerned with devising appropriate responses to the ever changing environment of the College, whilst at the same time maintaining the stability required to carry out the College's current obligations and responsibilities.

A recent classification of College-based managerial activities is as follows:

Organizational: management of

* finance
* plant and equipment
* staff
* pastoral care of students

Curricular: management of

* curriculum design, development, implementation and support
* curriculum review
* monitoring and evaluation of effectiveness

* staff development
* curricular guidance for students

External: management of relationships with

* maintaining authority, regional and national planning and regulating bodies, examining and validating bodies
* clients
* unions.

Staff development is concerned with the teachers who deliver the College curriculum along with the educational support staff and administrators who facilitate this activity. Management development is concerned with the staff who manage the system which enables and supports the prime educational activities. These two groups of staff will overlap, but there is usually a differentiation of functions and responsibilities, to the point where a management hierarchy is apparent and clearly recognisable.

Given the existence of an identifiable group of staff with managerial responsibilities, it is important to recognise that they may have special needs arising from their special role. Management development should be seen as providing for these special needs, in the context of a broader College programme of professional development for staff at all levels. Thus it can be seen that management development is a particular aspect of staff development which justifies special attention.

Constraints on Management Development

The most obvious constraint on new activity is the pressure of existing work and the limits on time and resources available. It is normal professional practice for managers to invest much of their own time and efforts in developmental activities, but this professional commitment should not be too readily taken for granted. An institutional commitment to

management development demands that its priority over some other existing activities should be established. This can be represented and symbolised either by a switch of spending, or by planning activities in such a way as to give them automatic priority over simultaneous events.

Providing management development opportunities has as much to do with attitudes as it has to do with budgetary provision. In other words, extra money may not always be necessary. This, of course, is the kind of 'encouragement' which Colleges receive all too often from local and national government. It is usually true that a little extra money helps, but it is worth starting by recognising that often the major cost of management development activities is managers' time. This time is already paid for, but it is also usually already spoken for. This emphasises the need to establish priorities at the outset.

A further constraint may be the lack of clearly defined responsibilities for management development. One suggestion is that a senior member of staff, usually the Principal or Vice-Principal, should take explicit responsibility for management development in the College. This will be appropriate for many Colleges, but it cannot be a complete answer. There will be a need for a broader framework which can make proper provision for the most senior staff, especially the Principal, and also exploit opportunities for inter-institutional arrangements and activities. There will also sometimes be economies of scale in regional co-ordination for some activities and this should be explored.

Conclusions

There are now unprecedented opportunities for Colleges to expand their management development activity. Although this will not be easy, because it involves sacrificing some other activities, it should be worthwhile, because it is widely recognised that the quality of

management in the Technical and Vocational Education System is a crucial determinant of the system's overall educational effectiveness.

Every national technical education system may be presumed to have policies for the development of its staff. The extent to which such policies will be capable of meeting the particular developmental needs of individual managers in their institutions will vary. This will depend upon the procedures whereby needs are identified, the resources which are available to meet those needs and the opportunities for individuals to apply their newly acquired attributes. National and regional management development programmes, however, frequently contain quite broad assumptions regarding 'the type of development' which is required, 'how people actually learn', and the way by which 'learning is transferred to the place of work'. Such programmes may not be capable of providing 'follow up' or 'support' after the learning has occurred Thus, although the national or regional programme will be of value, its full potential may not be achieved due to a variety of factors.

The Locally Based Management Development approach offers an opportunity for national systems of manager development to be extended from 'off-the-job' activities into 'on-the-job-and-within-the institution'. This approach recognises that individuals, and the institutions within which they work, have a particular set of development needs and contain also the opportunities for such needs to be met. By seeking to meet these needs 'on-the-job', this approach can be easy to operate; it need not interfere with day to day operations; it is flexible to use and its relevance to individuals and institutions is quite immediate. Apart from these advantages, it is also cheap to operate, since staff who use it will not normally consume any additional resources apart from time. Thus, the approach can be seen to have wide applicability across national systems of technician education.

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RESEARCH ABSTRACTS

TTTI, MADRAS, Optimising Effectiveness and Excellence in Polytechnics — A Case Study, 1986.

Objectives

A case study of certain selected polytechnics in the Southern Region of India was undertaken with the following objectives:

1. To develop strategies on the basis of the experiences of these polytechnics coupled with related theory and practices adopted elsewhere for optimising effectiveness and excellence in the technician education system through replication, adoption and adaptation of such strategies by other polytechnics.

2. To make use of this data base and the outcome of the study for reorganising the programmes and activities of the Institute (TTTI) with necessary shift in emphasis, focus and direction.

3. To utilise the outcome for formulating appropriate schemes and mechanisms for channelising the support and inputs forthcoming from the State and Central Governments with particular reference to the New Education Policy.

Methodology

A set of attributes with relevant criteria were identified for considering effectiveness and excellence. These related to students; faculty; course offerings; resource utilisation; linkages with industry; linkages with community; finanaces; management; autonomy and accountability.

Five polytechnics in the Southern Region were selected for the study to represent the different categories of institutions in the region and based on the attributes identified for effectiveness and excellence.

Data collection was done using a questionnaire developed on the basis of the identified attributes and criteria. A faculty team visited the selected polytechnics and personally collected the data using the instrument developed. The team also held informal discussions with the Principal and a cross-section of the faculty. The data were analysed to formulate area-wise profiles and prepare case studies of each polytechnic. From the analysis of case studies, the following Key Effectiveness areas were identified:

- Curriculum Implementation

- Resource Utilisation

- Staff Development and Deployment

- Interaction with Industry and Community

- Student Personnel Administration

- Institutional Management

From this, inferences were made regarding devices and strategies adopted for progressively attaining perfection and excellence in performance of the institutions together with implications in terms of measures required to be taken to improve the efficacy of these devices and strategies for enhancing their durability and universality of application.

Findings

The study highlights the devices and strategies adopted by the polytechnics for

progressively attaining perfection and excellence in their performance. These relate to:

- improving the curriculum implementation processes effectively;

- improving progressively the adequacy, modernity, upkeep and utilisation of resources;

- improving the development, deployment, motivation and commitment of the staff;

- managing the problems of students to provide a conducive, peaceful and productive atmosphere for trouble-free functioning of the institutions;

- improving the efficacy of institutional management;

- abilities required of the Principal in providing leadership and direction for continuous growth and development of the institution.

In order to systematise and institutionalise the various strategies and devices for their application on a continuing basis, the study recommends the establishment of certain mechanisms at the polytechnic level. These mechanisms assume the form of Committees, Centres, Cells, Units for Planning, Scheduling and Monitoring the identified activities with specific output and target orientation. Some of these are a Management Committee, a Quality Improvement Cell, a Staff Development Cell, a Guidance and Counselling Centre and a Servicing & Maintenance Unit. The study also highlights the type of activities which the TTTI has to increasingly undertake as a facilitator and the nature of administrative and financial support that the State and Central Governments have to provide for this purpose. ☐

NAGARAJ G.S. AND BHAT N.R., A Comparative Study of Effectiveness of Teaching Machine Drawing by using Chalk Board only and using a Model, TTTI Madras, 1985.

Objectives

The objectives of the study were:

1. To develop a teaching method involving the use of an appropriate model to teach the topic.

2. To study the effectiveness of the new method in bringing about an improvement in:

   (a) drawing skills; and

   (b) attitude of students for drawing

Methodology

This research study focussed on the development and tryout of a new method of teaching machine drawing to the mechanical engineering diploma students. The new method involved the use of models, instead of relying only on the chalk board. This was an experimental study conducted in one polytechnic. The teaching method was the independent variable and the dependent variables were (i) attitude to drawing and (ii) achievement in drawing skills.

For the purpose of the study a sample of twenty two students of the II Year Mechanical Engineering Diploma Course from the polytechnic were selected. They were divided into two almost equal groups randomly. One group which had 12 students served as the control group and the other with ten students formed the experimental group.

The control group of students were taught the topic 'Knuckle Joint' using chalk board only as is commonly followed. For the experimental group a wooden model was used.

Tools and Techniques

For the two dependent variables — viz. drawing skills and attitude of students for drawing, two tools were administered to them. The Attitude scale developed using Likert's method which had 30 items (15 favourable and 15 unfavourable items) was used with a five point scale. Their attitude was measured in terms of the total score obtained on this scale.

An achievement test was used to measure students' achievement in drawing and their total scores on this test were taken for analysis.

Findings

(i) The students of the experimental group performed better in the achievement test, showing that the new method has a good potential for improving the performance of students in drawing skills.

(ii) The students of the two groups did not differ significantly in their attitude to drawing after the experiment. This is probably due to the short duration of study. There is a need to try this method for a longer duration by using it to teach a number of topics in the subject making provision for the required models. □

KUPPUSWAMY A. AND PILLAI S.S., A Comparative Study of the Performance of Day Scholars and Hostellers in the Technical Board Examination, TTTI, Madras, 1986.

Objectives

The major objective of the study was to see the effect of hostel life as compared to home life on academic performance of students. In this connection, the performance of dayscholars and hostellers were compared in respect of:

(*i*) their mean scores in the achievement test

(*ii*) the proportion of successful students in the first year Board Examination.

(*iii*) the effect of environment on their performance

(*iv*) the community of the successful students

(*v*) the proportion of successful students on the basis of their parents' monthly income

(*vi*) the previous highest educational attainment of the successful students and

(*vii*) the relationship between their SSLC total marks and achievement scores.

Methodology

The polytechnics in and around Coimbatore (India) were taken into consideration. A sample of 207 students who were studying in the first year diploma courses from four polytechnics — two Government and two privately managed were chosen. The sample consisted of 134 boys and 73 girls. A questionnaire was adopted to elicit personal information about aspects such as their environment, community, parent's monthly income and the previously attained highest educational qualifications. Also their achievement in a test prepared and used by the investigator was scored. The achievement test consisted of five questions each in the main subjects: English, Mathematics, Physics, Chemistry taught in the first year

diploma course and general knowledge. The analysis related to comparing the performance of 105 day scholars and 102 hostellers. The result in the first year Board Examination was taken as the indicator of the performance of the sample selected.

Findings

The major findings of the study were:

1. Hostellers performed slightly better in the achievement test conducted although the difference between their performance and that of dayscholars was not significant.

2. Day scholars fared better than hostellers in the first year Board Examination irrespective of their sex.

3. Day scholars fared better than hostellers irrespective of the environment from which they come. It was found that day scholars hailing from rural areas performed better than their urban counterparts.

4. Day scholars belonging to the backward communities fared better than hostellers of the same community. Also scheduled caste and forward community students seemed to do better when they stayed in the hostels.

5. Hostellers whose parental monthly income was less than Rs. 500 p.m. seemed to fare better than the day scholars.

6. The correlation coefficient between the S.S.L.C. total marks and achievement score was positive and moderate.

The study recommended organising supervised study schemes in hostels to enable the students to utilize their time for improving their performance in examinations. □

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NOTES FOR CONTRIBUTORS

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