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ABSTRACT

Major reforms brought about in July 1969 at the Free University of Berlin in its organization, planning, and decision making are reviewed. Specific problems are addressed, such as plans for introducing an information system on technical data and space use, plans for an information system on personnel employed by the university, and plans for an information system on students in connection with a new student registration procedure. The utilization of capacity models in these areas is discussed. It is concluded that universities will more often have to be measured in terms of objectives and the degree to which they are met. The size of groups, teaching techniques, rules concerning teaching obligations, proportions of time spent in different activities, area ratio factors, etc. must be considered. There is also the problem of deviations from normal practices of study and the popularity of different establishments, which is difficult to define statistically. (LBH)

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PRACTICAL PROBLEMS IN CONNECTION WITH THE PLANNING AND INTRODUCTION OF INFORMATION SYSTEMS

technical report

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- THE FREE UNIVERSITY OF BERLIN -

PRACTICAL PROBLEMS IN CONNECTION WITH THE PLANNING AND INTRODUCTION OF INFORMATION SYSTEMS

by

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PREFACE

What role should be assigned to the universities in the design of the future post-secondary education structure? What are the major curricular and pedagogical innovations needed by the universities consistent with the growth of knowledge and the social requirements of specific skills? What techniques and methods of management can be introduced within the university environment which will enable the institution to plan its activities adequately and to use the available resources effectively? These are some of the major issues facing the universities, and the OECD's current programmes in the field of higher education are concerned with all of them. The present series of publications arises from one of CERI's programmes concerned with the problems of university management.

In CERI's programme on institutional management in higher education, eight universities were brought together to set up teams within their institutions to work on their respective pre-selected problem areas.(1) These teams have worked over varying lengths of time, none of which exceeded two years. The results of their work, together with the results of the in-house research of the Secretariat will be presented before a wide audience of university executives and managers and Government representatives from the OECD Member countries at the Evaluation Conference scheduled for November 2nd-5th 1971.

The programme's work has now produced analyses of the major problem areas of university management and the general directions in which solutions to these problems must be sought. By concentrating the effort in selected university environments the approaches developed may not have the attraction of generality, but this has been more than offset by the demonstration of concrete ways of tackling the specific problems of university management.

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(1) These universities are The Free University of Berlin, University of Bradford, University of Copenhagen, Technical University of Gothenburg, University of Lancaster, University of Nijmegen, University of Novi Sad, Université de Paris-Ouest Nanterre. The Copenhagen University Project was, however, carried out by the team from the Technical University of Denmark.

In my view, the body of effort represents significant contributions in, at least, five areas:

First, conscious of the fact that universities have become major consumers of financial resources, it has been possible to indicate methods for evaluating the requirements of resources and their costs not only for the university as a whole but especially for its different components. This has involved the use of the budget as a planning tool by linking the expenditures, as far as possible to the objectives of the programmes for which these expenditures have been incurred.

Second, it has been possible to demonstrate the costs and the consequences of different decisions concerning selected university matters both for current operations and for expansion, in order that policy-makers may choose desired courses of action. Such an approach offers an opportunity for effectively reducing the arbitrariness of decisions concerning the allocation of resources, and thereby improving the general efficiency of operations.

Third, from early in the development of the programme it was found that the basic information requirement for university-wide management was either lacking or was too dispersed among various bodies for its effective utilisation by decision-makers. It was possible, in the programme, to carry out pilot exercises not only to determine information availability and requirements, but also to propose the creation of an information base within the university geared to the needs of the decision-makers.

Four, computer-based mathematical techniques and models have been constructed and tested to demonstrate their potential usefulness in providing a range of results quickly and efficiently, not only for the specific problems of the university for which they were constructed, but also for similar problems in a large number of different universities.

The work of the eight universities and the CERI central staff is a basis for a more widespread effort to improve the management of universities. Universities will remain vital institutions of our societies, offering ideas and skills which are necessary prerequisites for healthy social and economic progress. They must nevertheless respond to the need to ensure the effective management of their resources, and it is hoped that the study now completed will contribute to a management movement throughout the university systems of the Member countries.

The Free University of Berlin team is not formally linked to the programme, but its work forms a part of the total picture. Representatives of the Berlin team have participated in the meetings of the project leaders and other centre-based activities arranged by CERI.

This report surveys the main reforms of the Act of 16th July, 1969 which has brought sweeping changes in the organisation, planning and decision-making at the Free University of Berlin. It then addresses a number of specific problems, namely; the planning on introduction of an information system on technical data and space use, the planning of an information system on personnel employed by the University, and the planning of an information system on students in connection with a new student registration procedure. The paper concludes with a brief investigation of the results of the foregoing as regards the utilisation of capacity models.

We wish to acknowledge the support of President Rolf Kreibich, who encouraged the close cooperation between the Berlin team and the CERI programme.

1. Introduction

In my contribution I propose to touch on a number of practical problems with which we have to deal on the President's planning staff at the Free University of Berlin with regard to the planning and introduction of information systems.

What I have to tell you in connection with information systems is certainly neither new nor unique. However, there are a few aspects of the background to our activity at the Free University of Berlin, which are, I hope, worth reporting:

- aspects of interest to specialists whose task it is to develop the new methods and models for managing a university:

- aspects of interest to routine administrative staff in universities and ministries who expect perfectly efficient information systems and are mostly disappointed.

Everything will, of course, be very much seen from the angle of the Free University of Berlin or at least in the light of the situation in Germany. But as the Free University enjoys a particular reputation in the student movement or more generally as regards university policy not only in Germany but also in other countries, this is perhaps justified.

Under the pressure of a strong student movement an attempt was initially made in West Berlin - before the other Federal Länder - to introduce legislation for a radical reform of the Universities. Similar legislation has since been adopted in various other Länder.

A thoroughgoing reform has already taken place in connection with:

- organisational structure

- personnel structure

- decision-making procedures

The reform in study courses and teaching methods, research planning and university administration has not yet been completed.

I propose to begin by briefly describing the institutional side of the university reform and its objectives, which will perhaps have a fairly wide appeal in view of the panel discussion on Wednesday on democracy and participation in universities. I will then follow up with a number of practical experiences and problems:

(a) in the planning and introduction of an information system on technical data and space utilization: this project is practically completed:

(b) in the planning of an information system on university personnel:

(c) in the planning of an information system on student data this we are now preparing to introduce.

The conclusion of the paper will deal with the consequences of the above factors in determining the training capacity of universities.

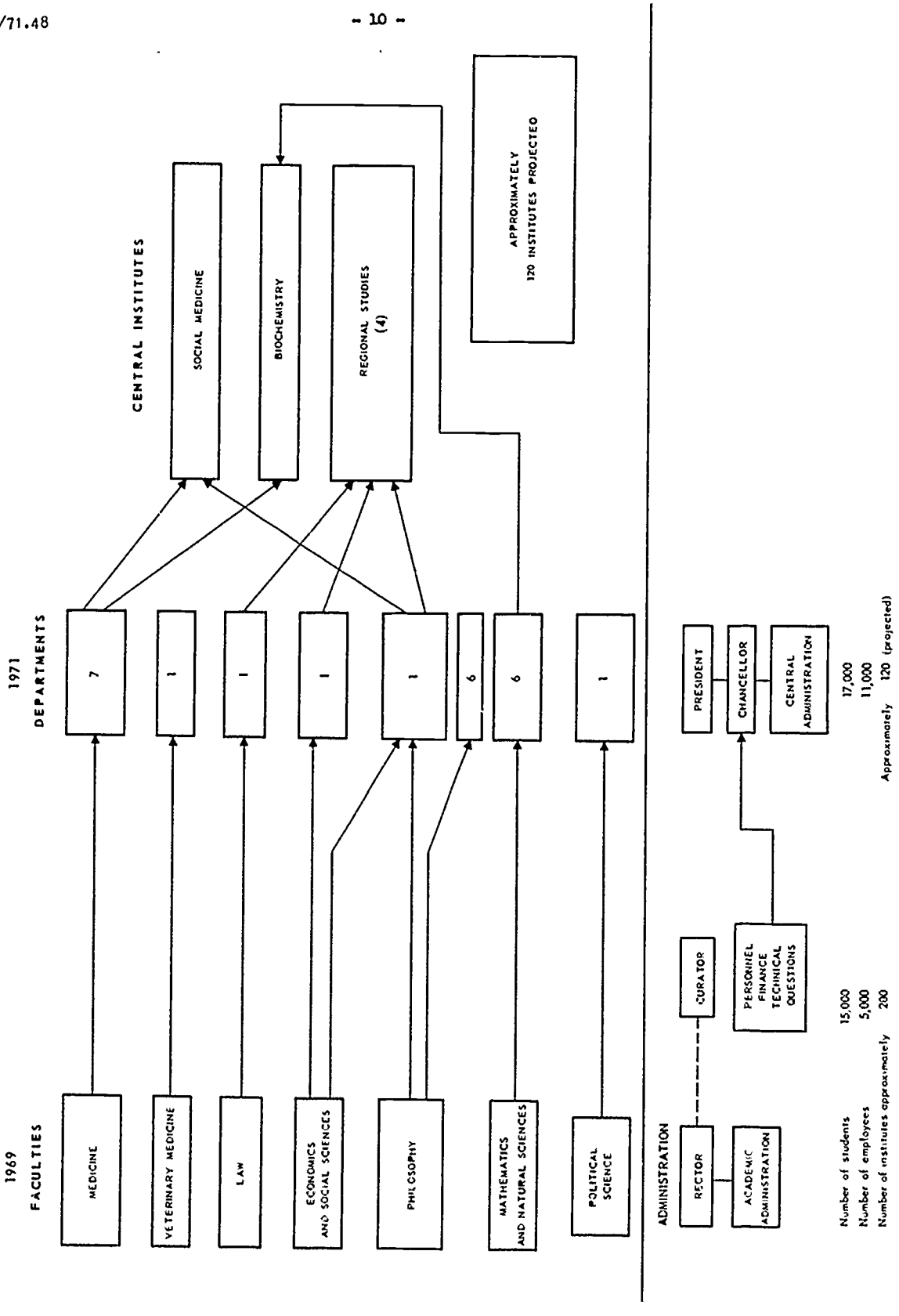
As far as the above three projects are concerned, it may be added that we are working in close consultation with the central German institution in this field, i.e. the Hochschul-Informations system GmbH. This institution which is now 2½ years old, operates in Berlin but is also represented in many other university districts. It has cooperated in the preparation of the projects and has taken over most of the programming work.

2. Changes in organisational and personnel structure at the Free University of Berlin

2.1 Organisational structure

Let me begin with a brief survey of changes in the organisational structure of the Free University of Berlin (Figure 1).

Figure 1
CHANGES IN ORGANIZATIONAL STRUCTURE



In 1969 the Free University of Berlin consisted of six faculties and a number of special establishments of varying sizes (the smallest faculty had about 300 students while the faculty of philosophy was the largest with just under 6,000 students).

The central administration was divided into

- a small academic administration headed by the Rector;
- an administration for personnel, finance and technical questions which was responsible to the Curator and negotiated fairly independently on matters of management with the approximately 200 institutes and 250 regular professors.

In 1971, the six faculties were replaced by 24 conveniently sized study sectors and six establishments for interdisciplinary research and teaching which had their own administration and were thus able to cater and plan for themselves. There was no provision for this in the former faculties. Essentially, the faculties were responsible only for tasks of coordination.

At the same time the central administration was concentrated under a president with considerable institutional powers and its responsibilities to the government were considerably extended.

The changes in the organisational structure were accompained by a considerable increase in the number of employees due to:

- the entry into service of a big modern clinic (with 1500 beds);
- the taking-over of a number of other infirmaries where medical and clinical training was already provided and the personnel were particularly concerned by the participation clauses in the university legislation.

The reforms which affect the two lowest levels of the university structure, i.e. the institutes and their medical and clinical sub divivisions, have not yet been completed.

Up to recently there were not only 280 "chairs" i.e. the smallest teaching units, run by a principal professor (ordinarus who was fairly independent in all respects together with about 200 institutes i.e. the smallest research units, mostly administered by the principal professor in addition to his other duties. In future the institutes are to have a definite minimum size and teaching and research will be organised by a collective managing board.

2.2. Personnel structure

As we have already noted the previous personnel structure was highly differentiated (Figure 2).

In addition to the comparatively small but influential group of permanent professors holding the title of "Ordinarius", there was another equally differentiated group of professors of lower status.

A considerable proportion of the teaching and research was in the hands of the large group of academic auxiliary staff who generally had four-year contracts but also included persons with permanent teaching functions at the University.

Finally, there was the group of tutors largely consisting of students used to reinforce the teaching staff in major or subsidiary subjects who were at the same time the main pivots of the curriculum reform, particularly when it came to replacing amphitheatre lectures by small working groups.

The object of the structural reform was:

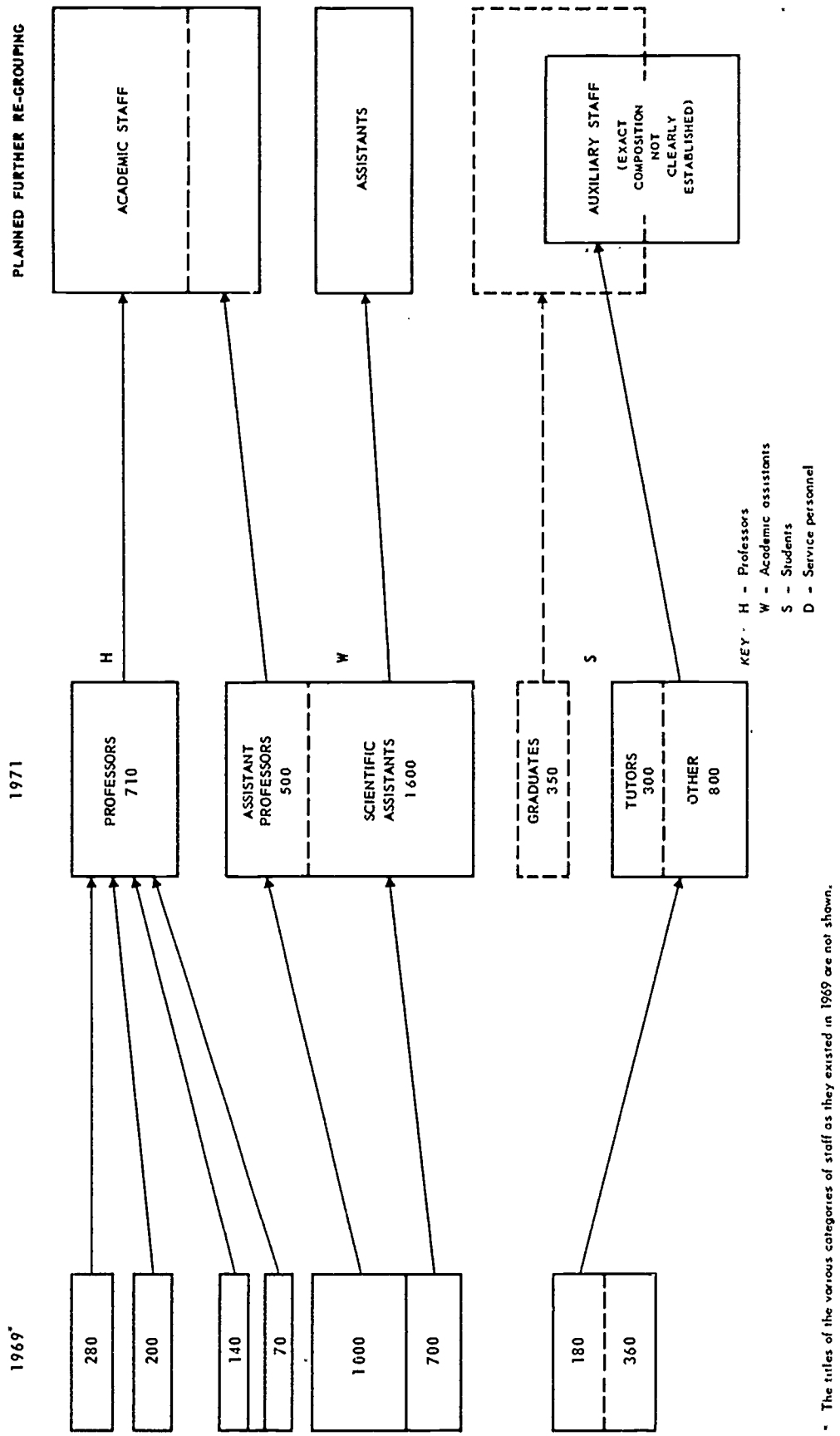
- to expand the teaching staff considerably so as to improve the inadequate teacher/student ratio;

- to abolish existing differences in the status of the teaching staff (apart from salary there is now no difference in posts and functions);

- to ensure a long-term increase in the reservoir of young academics so that teaching chairs are in future awarded for qualifications and not for adaptability or tenacity.

Figure 2

CHANGES IN STAFF STRUCTURE



* The titles of the various categories of staff as they existed in 1969 are not shown.

One of the disadvantages which of course had to be accepted in creating a uniform academic staff was that a number of persons became university teachers without any particular qualifications. However, in the light of existing legislation and policy, this could not be avoided.

Figure 2 shows the situation as it stood in 1969-1971 and the plan for the further development of the personnel structure. Uniformity has now been achieved among academic staff, and their total numbers are to be increased at the expense of the other groups. The new group of assistant professors was created within the assistant group; under the Federal legislation now being prepared this group will belong to the category of university teachers (but temporary contracts will still be retained). The academic auxiliary staff are to be increasingly limited to service functions. There is to be a reinforced graduate programme to improve facilities for the training of future academic staff. What is still not clearly established is how far a supplementary course of study can be combined with certain teaching functions.

3. Decision-making procedures

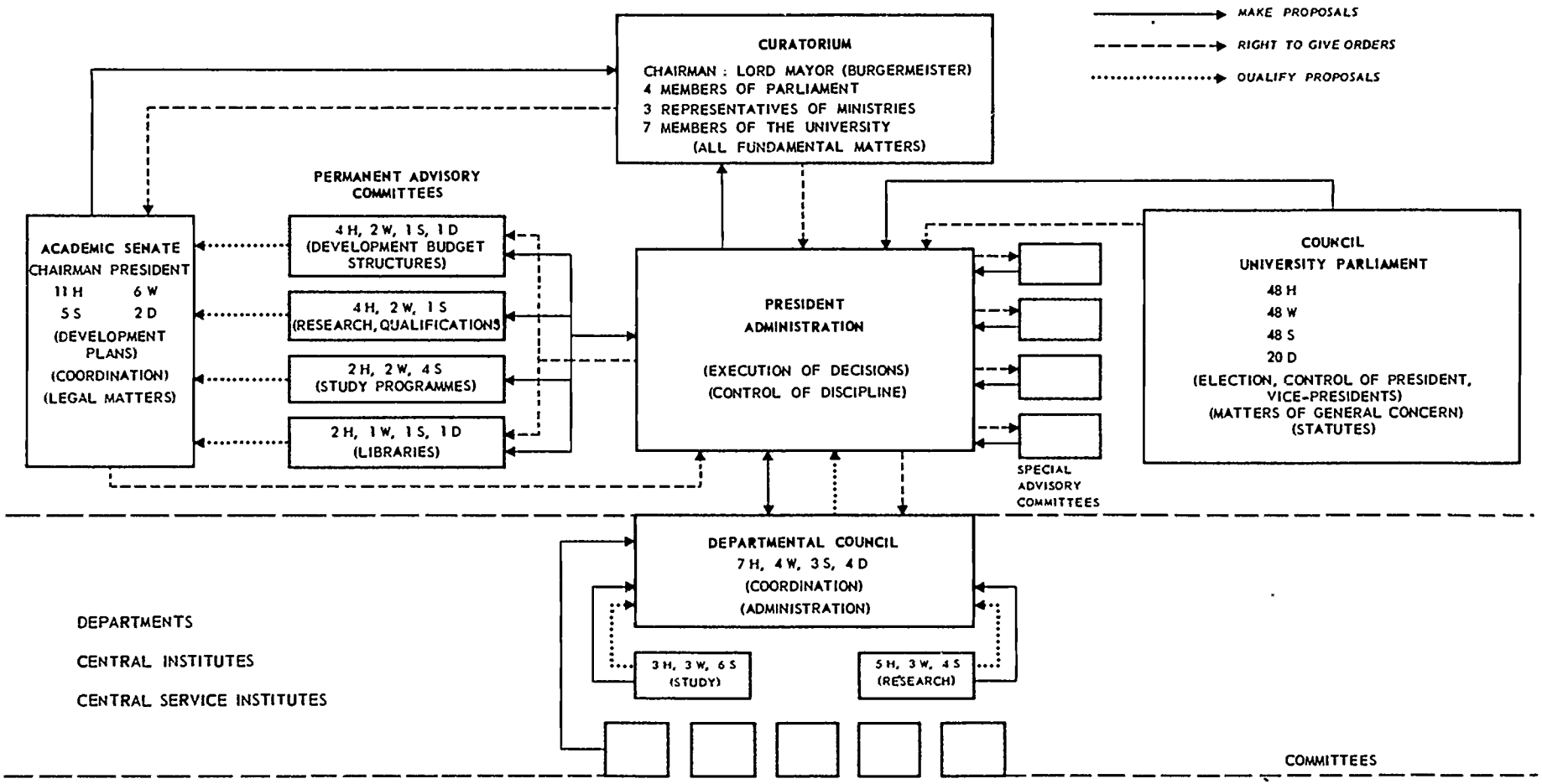
The essential innovation of the 1969 university legislation was a far-reaching change in decision-making procedures. In practically all managing boards all four categories of university members are now represented (see figure 3). In figure 3, H represents professors, W represents academic assistants, S represents students and D represents service personnel.

The composition of these boards, which was long the subject of stubborn controversy, varies according to their function: the group of professors (see personnel structure) can invariably be outvoted by the other groups except in questions relating to research, examinations and recruitment.

However, at the present time i.e. after two years' experience and in some cases considerable changes in the personnel structure, the question of group membership is actually becoming less and less important. What is tending to be increasingly decisive is membership of political groups inside and outside the university.

Figure 3

NEW DECISION STRUCTURE



INSTITUTES

(Headed by board of directors representing all professional staff and students)

KEY H - PROFESSORS
W - ACADEMIC ASSISTANTS
S - STUDENTS
D - SERVICE PERSONNEL

In the Council which at present has 164 members there are three roughly equal political parties (not reflected in group distribution, which varies).

These are a left-wing liberal party which is the largest, a socialist party and a conservative-liberal party which generally votes together as in parliament.

The essential functions of the Council are to elect a president and vice-president and vote the statutes.

The highest and most important body is the Curatorium, in which half the seats are held by the university. This body ultimately decides matters relating to the development and the budget of the university.

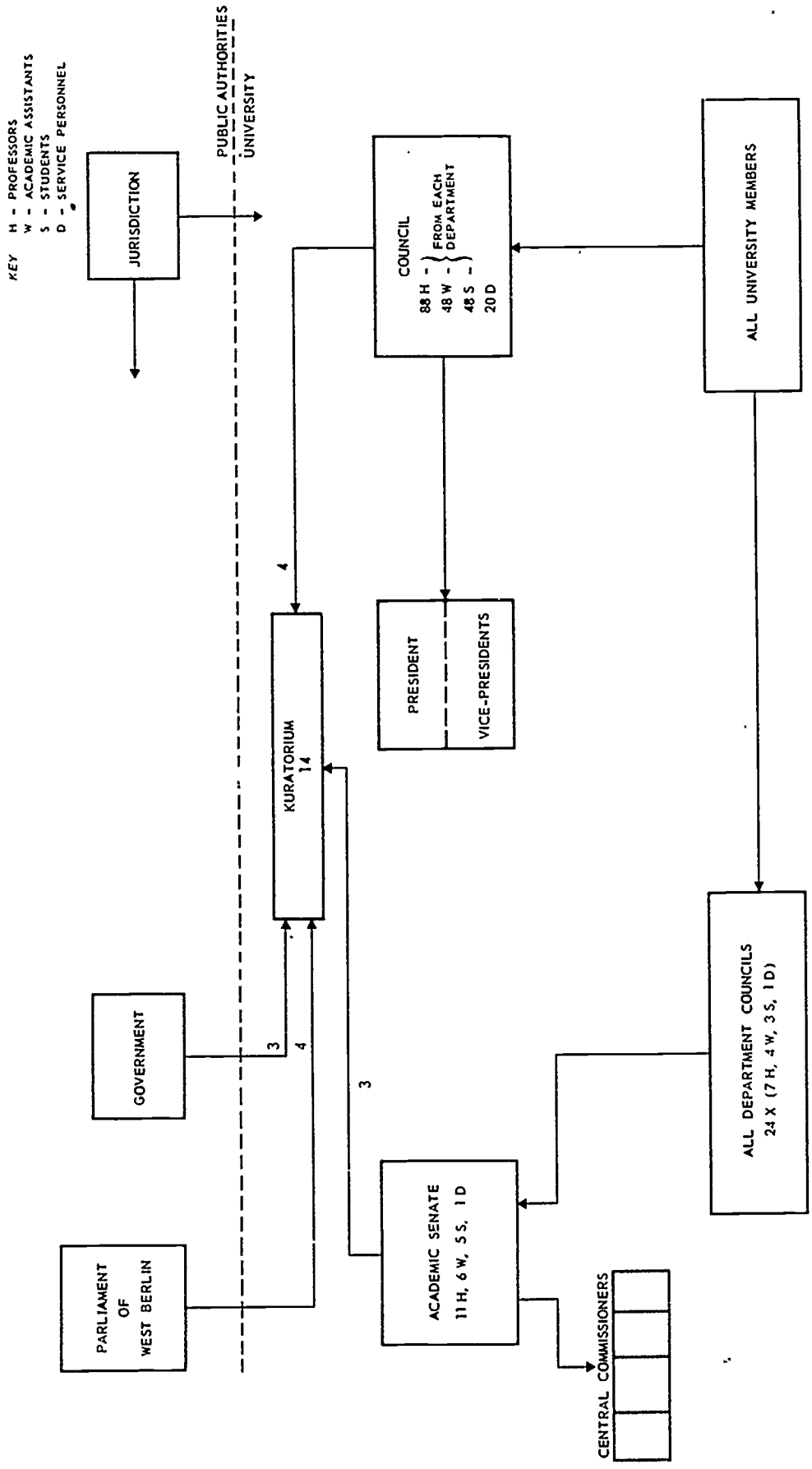
In contrast, the Academic Senate, which is under the chairmanship of the president of the university, mainly has a coordinating function. It has a number of permanent advisory committees. It should be noted in this connection that the student group both as members of the university and in their separate disciplines, has particularly strong participation rights. This group has as large a number of representatives as the university teachers and academic staff together.

As far as the relations between the central administration (president) and the academic departments are concerned, it should be added that the president's powers of decision are restricted to a few formal matters and do not of course extend to academic matters themselves. But on the other hand, proposals concerning personnel in the academic departments have to be implemented by the president, except in very special circumstances.

The next figure (Fig.4) shows the voting system. Members of the university vote only in the context of their academic department and within their group. All members of the university participate directly in the election of the Council, the Academic Council and its Committees, and the Institute managing boards.

Figure 4

SYSTEMS OF ELECTIONS



4. Objectives of university reform

Now that I have described the more external results and effects of university reform at its present stage, I now propose to consider briefly the objectives of this reform. At the same time I shall touch on the background of the conflicts which have brought the Free University of Berlin into prominence outside the frontiers of Germany.

(a) The claims of society.

The acquisition and transmission of knowledge are determining factors in a highly industrialised society and are decisive for its productive capacity. The educational process must be true to its function and at the same time be a source of emancipation. It is obvious that an educational policy which embodies this fact in its teaching and research will encounter considerable resistance, particularly in such fields as political economy and social medicine.

(b) Academic freedom and self-government.

The acquisition of knowledge as a factor of emancipation and the free development of the educational process are only possible when the right of self-determination and self-government is safeguarded by the state.

(c) Democratisation and transparency.

As it is a principle that the affairs of a university concern all its members, the discussion and decision processes must be organised on an open democratic basis. Group interests and professional competence must be taken into specific account when the decision-making structure is established.

After years of widespread crisis in the universities and the academic world, these general objectives were designed to bring about the following practical results:

- University reforms, affecting syllabuses (supplementing and restructuring of existing courses, new courses) accompanied primarily by a reform in teacher training, affecting methods and teaching, and affecting organisation

(differentiation of courses and examinations) proficiency checks and standardisation of the tertiary educational sector. Approaches have already been made to a considerable number of problems.

- The determination of essential fields for research.

- The reform of university administration.

The universities - not to speak of the teaching hospitals attached to them - are equivalent to big businesses and these can no longer be run by laymen as in the past with traditional methods and resources.

Moreover, the syllabus reform, the determination of essential fields for research and the integration of the whole tertiary educational sector will make big demands on planning capacity and procedures for the distribution of resources which was never the case in the past when growth was more "natural".

Against this background the first task was to collect data for planning and the distribution of resources and to ensure that this information was kept up to date.

Where the above data are really based on administrative procedures and are designed to influence these procedures in their turn, we may be said to have an information system.

5. An Information system for technical data and space utilisation

What was the situation with regard to space distribution and planning? The facilities of the Free University of Berlin are housed in some two hundred buildings (5000 rooms excluding hospitals) spread over a large area of the city. Rented houses are used to a considerable extent. No one in the university had so far made a survey of the position.

In the past, space distribution and planning were generally discussed only in connection with the appointment of permanent professors. With the changes in the structure of the university , bottlenecks occured at many points. Requests for improvement took the form of letters and then unanimous resolutions and finally protest demonstrations.

Against this background, what should be the objectives of a computerised information system for space utilisation purposes?

(a) For the administration: the provision of a conspectus of the current situation of technical data and space utilisation, and the achievement of uniformity in the administrative procedures through which changes are effected and recorded;

(b) For internal university planning: Analysis of the use of specific available accommodation (lecture rooms and study rooms) and the possibility of functional space distribution;

(c) For supra-regional university planning: Comparison between the space requirements of the different universities and specific disciplines and the establishment of standards.

The facts were as follows. The incentive and obligation to carry out an analysis of the current space situation came from outside early in 1970. The Research Council had undertaken the task of centralising the planning of university building. It is not surprising that objective (c) was the only one underlying the survey questionnaires issued at that time.

Even so, the occasion was taken by the HIS GmbH (1) and several universities, including the Free University of Berlin, to build up a practicable information system on the results of their census - in other words, to organize not merely this one survey but its continuous up-dating.

The first step was too transform the questionnaire into a card for a space utilisation card index, directly usable by the administration. But a series of difficulties and design deficiencies came to light in the survey itself which could have been avoided if more than just one objective had been considered. For example, the detailed classification of academic subjects adhered too closely to the traditional university categories and made no provision for additions. Conversely, there was no way for universities to include the characteristics of their own structure. Further, no provision was made for checking the occupation of accommodation by persons, equipment or organisations (cross totals). Occupation forecasting is not possible in any systematic manner from a space data base, since such information is obtained more efficiently at the source,

(1) University Information System

in this case from personnel administration and teaching schedules.

We have attempted to remedy these shortcomings as far as possible or to take the necessary parallel action (in order to arrive at current occupation data).

The conclusions we have been able to draw from the now practically concluded project are as follows:

(a) Only a few "hard" data are usable on a continuous basis i.e. data incapable of further interpretation such as occupying institutes, area in m^2, technical data defining the type of surface, and a general occupation classification.

(b) The original "soft" data also provided, i.e. occupation by persons of specific categories, and the extent to which the accommodation is used over time, can hardly be utilised generally even when repetitive individual surveys are carried out. Specific purpose-designed investigations are more efficient.

(c) The main deficiencies described above also make interpretation difficult for supra-regional comparisons. Many analyses probably contain substantial inaccuracies since input errors themselves cannot be discovered. The implications for such central institutions as the Science Council or the OECD, is that they need to take greater account than previously in the many surveys they carry out of the interests of those surveyed; they would reap the benefit of this in the results themselves.

6. An Information system with regard to the staff employed at the university.

People are the most significant input factor in a university operation. Personnel costs represent nearly 60% of the university budget. What was the situation in the field of personnel administration?

Originally, nearly 250 bodies had been dealing directly with the central administration on personnel employment. There was a complicated system of employment conditions ranging from indefinite civil service-type contracts to short-term period and project contracts to meet the special flexibility and mobility requirements of the university.

In addition there was the basic change in personnel structure, already referred to, designed to ensure a uniform group of university teachers and the abolition of the numerous intermediate steps to an appointment as university teacher and of other private contract conditions with members of the university. With the formation of the study sectors new methods, some of which were laid down by law, were introduced for determining personnel requirements and how individual posts were to be filled.

Finally the new organisational structure of the university brought with it a series of classification problems and in particular that of dual classification in the case of interdisciplinary institutes and establishments outside the faculties. The new administrative procedures included the transfer of wage and salary calculation to electronic data processing equipment, irrespective of specific university problems.

In this situation, what were the objectives of an information system with regard to university personnel.

(a) For the administration: The preparation of personnel data, a general conspectus of occupied posts, the pooling of a number of separate card indexes in a single data processing system capable, inter alia of preparing the complicated procedures for the election of the managing boards.

(b) For university planning a clear picture of personnel employment, fields of study, research projects, interests.

(c) For supra-regional university planning: Comparison of personnel employment in universities or specific study courses and the establishment of standards.

Here again the problem arose of the absence of a more exact description of the last objective, although shortly very precise legally-binding regional requirements were going to have to be met. Such requirements were in regard to personnel structure, the identification of fields of activity and the quantification of each activity as a proportion of the whole.

A further point under objective (b) is that the individual universities themselves would need to define and describe the current allocation of staff, on the basis of a specific education and research programme, before any distribution procedure could follow.

One attempt in this direction was the survey which we carried out on the scope and structure of teaching activity, which elicited replies from just under 60% of the 3,000 teaching personnel approached. The results were of limited application for determining the minimum teaching obligation and the allocation problems this raises in terms of each discipline.

Models can only be used as a solution if the university has in fact developed a coherent education and research programme, which in our case is only likely in 2 to 4 years' time. The only objective this left was that of the administration (a) above; in other words a conventional organisational problem.

7. Reorganisation of student population statistics Information system with regard to student data banks

Student numbers are usually the basis for calculating university expansion goals, staffing requirements and accommodation requirements. But the question is whether such figures - at least in the current state of Germany's university system - meet these requirements. Two factors must be considered. First, the statistical survey method is inexact and far too slow to allow decisions based on the data it provides to be taken early enough. Second, university membership on its own often has no significance with regard to the use of university facilities.

With regard to the first point, student statistics had been collected at various points within the university by different administrative bodies, faculties and institutes, libraries, electoral rolls and official statistical services.

The result was that even total figures showed considerable differences. Classifications by organizational units, courses of study and final objectives were not absolutely clear and were also subject to considerable inaccuracy. The final result of this situation was to slow down the statistical recording process in courses where entry was unrestricted in order to spread the workload evenly throughout the administration. Further there was no sense of urgency to acquire

the statistics at Federal level, this finally led to the consolidated statistics being several years behind in some cases. Regarding the second point above, the organisation of studies in Germany is very different from that in other countries. Except in technical and in some natural science subjects, there are no clear-cut syllabuses and even where they do exist they are not compulsory, a fact that is easily discernible from the length of studies.

In the humanities there are, at best, general examination regulations. Liberal entry conditions and the extensive waiving of fees have finally made it worthwhile to register as a student purely to obtain the tax and insurance advantages. It is true that a trend is emerging for periods of study to be defined more strictly but in most subjects individual students will continue to be allowed considerable latitude, which is probably a very good policy.

Given this situation, what are the objectives of an information system with regard to student statistics? The following four can be defined:

(a) the precise definition of the subjects studied and normal practices of study, so that some conclusions can be drawn concerning the pattern of demand for teaching facilities, at least with some statistical probability;

(b) the rationalising and centralising of all statistical records at one point, which can only be achieved if this is decided quickly (if possible, before the start of the semester) and if students realise its results are helpful to them;

(c) the creation of a reporting system by which changes in student statistics are registered automatically, which can best be achieved by making the keeping of separate card indexes pointless or else prohibiting them;

(d) the satisfaction of the requirements of supra-regional statistics.

The result of our joint discussion with HIS GmbH was an organisational procedure which largely meets the requirements of these objectives and a programme system relieving the administration of all routine processing.

The most difficult task of persuasion in this connection was that of explaining to the administrative staff which processes and instructions continued in fact to have significance and which had not been done away with by a pure oversight.

8. Concluding note

In the future, universities will have to be measured more and more in terms of objectives and the degree to which these objectives are met. The goal of the universities is to turn out a specific number of students at regular intervals with specific qualifications. Upon what does this figure depend. Undoubtedly on the number and quality of the teaching personnel and the size and equipment of the premises. But these are purely basic figures that have to be tailored to individual curricula by means of a series of structural data. The size of groups, teaching techniques, rules concerning teaching obligations, proportions of time spent in different activities, area ratio factors, etc., must all be considered.

Additionally, there is the problem of deviations from normal practices of study and the popularity of different establishments which is difficult to define statistically. The reason for this is that (fortunately) students have noticed substantial differences in the quality of the teaching provided. What are the consequences regarding the use of models intended to provide a generalised description of the operation of universities? For the time being, these will be suitable only for relatively global assessments and for inter-university comparisons. In the university itself however, models will not give satisfactory answers, particularly in important decisions such as the determination of numbers to be admitted. Instead, the organization of studies will have to take careful account even of the way in which each of the major courses of study proceeds. This is precisely why it is necessary to start with comprehensive and up-to-date statistical material which can be extracted from information systems.