Teach Your Best – A Handbook for University Lecturers

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Teach Your Best – A Handbook for University Lecturers

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IKO – Verlag für Interkulturelle Kommunikation

Deutsche Stiftung für Internationale Entwicklung (DSE)
German Foundation for International Development
Institute for Socio–cultural Studies (ISOS)
University of Kassel, Germany
TEACH YOUR BEST
A Handbook for University Lecturers
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Die Deutsche Bibliothek – CIP–Einheitsaufnahme

Teach your best: a handbook for university lecturers/German Foundation for International Development; Institute for Socio–cultural Studies (ISOS), University of Kassel, Germany.

Ed. by Barbara Matiru ... – Frankfurt am Main: IKO – Verl. für Interkulturelle Kommunikation, 1995

ISBN 3–88939–076–5

NE: Matiru, Barbara [Hrsg.]; Deutsche Stiftung für Internationale Entwicklung

Impressum

Published by:	German Foundation for International Development (DSE) Education, Science and Documentation Centre Hans–Böckler–Straße 5 D–53225 Bonn Institute for Socio–cultural Studies (ISOS) University of Kassel, D–37213 Witzenhausen
©1995	DSE
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Title:	Teach Your Best: A Handbook for University Lecturers

Typesetting and Design: Integrated System, Ltd.
P.O. Box 76231, Nairobi
Herstellung: Fuldaer Verlagsanstalt, 36037 Fulda

FOREWORD

Throughout Africa, institutions of higher learning are in a state of crisis. Universities are bursting at the seams due to the ever increasing student numbers. They are starved of resources and their libraries are experiencing an acute book famine. These woes are not only threatening to lower academic standards but the very existence of the universities themselves.

In the face of such serious problems, it is becoming more and more evident that the quality of staff is a crucial element in ensuring universities retain their traditional mission of discovering, transmitting and preserving knowledge. Sadly, staff development has received little attention, being measured by the mere advancement up the academic ladder. Currently, only a handful of lecturers have been professionally trained in the art of teaching. The assumption has all along been that the possession of a PhD degree was all that an aspiring lecturer needed in order to be able to teach in a university. The rest one imbibed through osmosis.

That is not the case today. All over the world, it is now recognized that excellence in teaching must be nurtured. To that end, this Handbook hopes to improve university teaching and learning in Africa. It deliberately emphasizes research and teaching, which the authors consider to be the twin pillars upon which excellence in higher education rests.

The German Foundation for International Development (DSE) became interested in staff development for a number of reasons. Firstly, it realized that university education had fallen far short of expectations. For example, it was accused of having failed to apply research to the problems of national development. Secondly, universities were producing graduates for non−existent jobs, while failing to meet the changing manpower requirements in key areas of national development, such as agriculture, health, engineering and economics. Indeed, there was a mismatch between university training and manpower requirements.

Thirdly, as DSE put it, 'The economic recession in most African countries on the one hand, and the rising number of students, resulting in the need for extra finances, on the other hand, has had a marked effect on the quality of education offered by the universities. This situation has been aggravated by the scarcity, obsolescence or neglected condition of technical equipment in many tertiary institutions. In addition, textbooks, references, teaching aids, laboratory equipment, scientific literature and periodicals are all in short supply.

Since universities have little control over basic economic and political conditions, their task is to take up the challenge for providing excellent education in the prevailing situations and use their most valuable resource, their staff, to plan and execute structural reforms. It, therefore, follows that the rather complex system of generating and transmitting knowledge requires the university to have a sound understanding and a technical mastery of their staff's teaching, research and consultancy functions. This is the essence of staff development.'

The authors constitute a task force that is committed to ensuring the continuous training of their peers. They are also acutely aware of the low status given to effective teaching in universities. And yet, students and parents expect good quality university education particularly in view of the recently introduced cost−sharing policy.

This Handbook has commendable characteristics. Its style is friendly and warm. It is well illustrated, well−spaced and with adequate summaries. University lecturers, particularly those at the beginning of their career, will appreciate the suggestions proposed as to how to improve their teaching. In particular, the practical sections should spur them on to generate their own strategies.

Finally, the handbook is the product of a joint effort between DSE and Eastern and Southern African universities. This initiative is highly commendable and I hope marks the beginning of many more similar ventures. Such co−operation will enhance African capability in the task of revamping university education on the continent.

Nairobi, November 1993

Francis J. Gichaga
Vice Chancellor
University of Nairobi

INTRODUCTION

OVERVIEW

In this introduction to the Handbook, the editors offer some explanation and guidance.

In her part, written in June 1995, Ruth Schlette discusses:

- the genesis of this Handbook and the merits of the people who made it;
- some facets of the Handbook's story;
- future strategies and the role of the readers are hoped to play;
- the responses to the draft version of the Handbook.

She adds an annotated bibliography of books on professional staff development and on higher education in Africa respectively in the South, all of which are easily accessible.

Barbara Matiru and Anna P. Mwangi direct the reader to:

- the possible uses of the Handbook;
- its structure;
- special features

TEACH YOUR BEST: A PLEA FOR ENHANCING LEARNING IN UNIVERSITIES IN AFRICA

Ruth Schlette

ON THIS BOOK AND ON THE PEOPLE WHO MADE IT

It takes a village to raise a child.
African saying

Books have fates of their own. The genesis of this Handbook is a confirmation of this ancient saying. Not only did almost five years pass by since the first discussions on a guide to better learning and teaching in universities in Africa; over long periods it was not even certain whether it ever would be presented to a larger public. The reasons for the delay are explained in the section about the Handbook's story.

The Handbook has many fathers and, particularly, mothers. Some of them are discernible, namely the authors of the following chapters. Others remain in the background, like the true "editor–in–chief", Barbara Matiru. Without her devotion and tenacity, without her steady companionship to the authors, the book would never have been completed. Assisted by Anna Mwangi, Barbara Matiru underwent the trying exercise of assembling the individual contributions, adapting them to the overall frame and editing them. It is again the merit of Barbara Matiru to have convinced the Kenyan artist, Frank Odoi, to enrich the Handbook by his illustrations. The outer appearance is *her* work and a result of her professional expertise in editing manuals.

Mention should also be made of those who were sharing ideas and experiences with the authors and editors, e.g. Debbie Gachuhi, Shashi Ball, Andreas Depping, Hans–Joachim Schade, Matthias Wesseler.

Neither can one omit in this honors' list the participants in a series of workshops on professional staff development in higher education. The experts from fourteen universities in East and Southern Africa, were the first to formulate the need for a manual written 'out of Africa' and being available to a large number of African academics.

By facilitating in 1991 and 1992 three subsequent meetings of authors and editors and the further editing process up to the completion in 1993 of a draft version of the Handbook, the German Foundation for International Development (DSE) provided the organisational and financial base. In 1995, the Institute for Socio−cultural Studies, University of Kassel, with the committed and sovereign assistance of Susanne Bierwirth, engaged in producing the final version. For that purpose, the author of this introduction was asked to do some additional editing and to acquaint the reader with some specifities of the book. It was decided then that contents and format of the draft copy should be preserved. We even abstained from eliminating overlappings between some chapters.

Thus, the Handbook is 'the result of the collective efforts of many people, who willingly contributed their ideas and time' (B. Matiru). Many obstacles had to be overcome and not all objectives could be met. Not only for the sake of explaining some shortcomings, but also as an illustration of the manifold problems to be mastered in any cross−national venture in higher education in Africa, the story of the Handbook's genesis seems to be worth telling.

THE HANDBOOK'S STORY: A PATH ACROSS PASTURES, DESERTS AND JUNGLES

African Academics Articulate the Need for a Manual

The Handbook developed out of a series of three sub−regional workshops entitled “Towards Academic and Professional Excellence in Higher Education”, organized between 1989 and 1991, which were part of the German Foundation's for International Development (DSE) *Medium−Term Programme on Staff Development in Eastern and Southern African Universities.* Participants came from partner universities in Ethiopia, Kenya, Malawi, Sudan, Tanzania, Uganda, Zambia and Zimbabwe. There were also observers from Botswana and Mozambique.

With these workshops, DSE wanted to support the partner universities in the empowerment of their most precious resource, their academic staff. It was hoped that participants would be encouraged to stimulate within their institutions attention to the role of lecturers as teachers, researchers and extra−mural consultants, and to make a contribution to the process of institutionalizing the professional development of staff. Another, equally important issue was the establishment of linkages between the universities in the area of professional staff development, aiming at a network for mutual exchange of experiences. Originally, the workshops held in Harare (1989), Witzenhausen and Berlin (1990), Kariba and Harare (1991), were to elaborate on the whole range of topics related to the professional performance of university lectures, from teaching and learning to research, out−reach consultancy, organization and management. Yet, according to needs articulated by the participants who themselves were deciding about the priorities of the workshops' agenda and through their delegates were involved in shaping the programmes, the widest space was devoted to teaching and learning issues.

During the workshops it became evident that there was a scarcity of materials on professional staff development in Africa. Moreover, none of the manuals known to the participants were paying attention to the specific environment influencing the daily work of academics in Africa. Like most university textbooks, guides for better teaching, handbooks for lecturers, faculty development resource books, curriculum design theories, are conceived, edited and printed in Europe or North America. They consider neither the cultural, nor the social, political and economic context of higher education in Africa.

It was, therefore, recommended that a reference book should be authored for this purpose, mainly written by workshop participants. DSE agreed to support this activity. Since this soon proved to be a rather time−consuming exercise, another outcome of the sub−regional workshops was published separately. In 1992, M. Wesseler and Wudassie Yohannes edited experiences and insights 'On Innovative Teaching', as represented by participants in one of the sub−regional workshops.

Developing the Concept

The path towards the Handbook commenced in January 1991 in Berlin, with a group of experts from various parts of Africa and from Germany deliberating on contents, format, procedures. The team of authors, editors and organizers wanted to produce a manual for university lecturers in Africa that was to take into account the socio−cultural background and the economic situation of higher education particularly in the countries South of the Sahara. There was also agreement that the emerging book should not be just a sequence of individual articles, but transcend the compilation format by the cohesiveness of the contributions. Although each author would be fully responsible for his or her chapter, the *joint approach* was to impregnate all essays, in the visible structures as well as in the immanent logic. Each article should be based on every day experience, with examples from practical work. This was not meant to exclude theory, but facilitate the manual's use and its applicability. A wealth of illustrations were to serve the same purpose.

The conviction that the Handbook team was clearing new ground, and the wish to support the innovative forces in African education, gave wings to the participants in that inaugural meeting. It was this initial inspiration that helped them overcome considerable difficulties. However, since the authors lived in Addis Ababa, Nairobi, Kisumi, London, Harare, Kampala, the editors worked in Nairobi, and administrative support as well as logistics were based in Bonn, it was not easy to reconcile the group's vision of the Handbook with geographical obstacles, communication problems, and individual time constraints.

Work in Progress: The Writer's Workshops

In order to bridge the geographical and psychological distances between the authors and to approach the high−stretched goal of collaboration, authors and editors met again in so−called 'writers' workshops', taking place in Mombasa (September 1991) and in Naru Moru, Kenya (October 1992). Both meetings were to foster a process of settling different views, of establishing a basic coherence among the articles, and of rendering possible mutual advice and criticism.

Again, enthusiasm was at work. The contours of the joint venture became clearer. Everybody seemed to profit from the companions' knowledge and experience. First drafts were reviewed mutually. The editors advised on writing styles, logical order, illustrations and bibliographical references. They wished to obtain as much coherence among the chapters as possible, without wiping away the individuality of each author.

It must be admitted, however, that this intention could not be fully achieved. There were manifold reasons for this. Not all authors were able to attend each meeting. Others abandoned the project and had to be replaced by newcomers. Some sticked to the deadlines, others needed more time. Since synchronism had been the basic assumption both for the writing and editing processes, these 'irregularities' proved to threaten not only the progress, but also the completion of the whole project. The path seemed to be lost in a jungle of problems.

Yet the editors in Nairobi did not surrender. Encouraged by DSE, they decided to rather accept certain deficiencies than to abandon the project. Those chapters which had been submitted in time, received, for example, more editorial attention than those which came in with considerable delay. Furthermore, the original idea of testing the draft edition in practical work and rewriting them afterwards, was given up.

Towards Publication

Almost three years had passed since the first meeting of the Handbook team, when the draft reached DSE in December 1993. In 1994, copies were sent to the authors who were asked to comment on the draft and make suggestions for smaller changes or corrections of their contributions. But at this time it was difficult to cater for everybody's viewpoint. Only two authors submitted proposals for improvement; the rest said − or made us believe by their silence − that they felt their chapters did not need to be changed.

There was, however, a very encouraging echo from another target group to whom the draft had been sent. Former participants in DSE's staff development workshops, as well as higher education specialists from Africa and other continents, found the Handbook helpful. Some even said it was unique and deserved wide circulation. Some pointed to certain weaknesses and made valuable suggestions for improvement.

As it proved to be difficult to anew bring together the editors and, particularly, to win the authors over to another review of their contributions, it was decided to publish the Handbook without major changes. Mistakes have been corrected and cross−references inserted, in order to draw the reader's attention to more detailed presentations of certain topics in other chapters, or to elucidate duplication. This introduction was added in order to give some directional comment.

WAS THE CHALLENGE MET?

The preceding pages have thrown some light on the initial inspiration, on the collaborative process and on the constraints experienced by the people who made the Handbook.

The outcome is not perfect. It is just a first step towards the aim of writing a guide truly inspired and directed by thought and practice at universities in Africa. It is true, the Handbook comes 'out of Africa'; it is authored by men and women who are teaching in African institutions of tertiary learning, or have spent many years within such institutions. But readers looking out for elements of specific teaching and learning traditions may be disappointed. Yet the integration of such cultural elements had formed part of the original concept.

Perhaps this and other shortcomings are to inspire other people, other groups, to go on. Before winding up some critical comments which reached DSE during the past year, and my own reflections, it might serve clarity to stress my conviction that the future fate of this book lies in the hands of its readers.

The Readers Decide on the Future Handbook

Those who make practical use of the Handbook will be the authority to judge on its usefulness and its shortcomings. By giving feedback to the Institute for Socio−cultural Studies of the University of Kassel (the address is to be found at the bottom of the introduction) readers and users will influence the further development.

Today, it is not yet clear whether a second edition will be initiated. If the echo confirms the need, preliminary ideas on carrying on the issue will be more firmly pursued. In case DSE or another institution of higher education cooperation in the North is to prepare an improved edition, it has to analyze the feedback received and investigate into the impact of the present edition. It might most likely also mean bringing together physically a group of authors in another joint writers' workshop.

From my own point of view, it would be ideal if the whole project were taken over by Africans. That does not exclude support from external donors, but it would mean that responsibility and initiative were exclusively in African hands. Why not think about a different manual which, though starting from the analysis of this Handbook, envisages a new book? Why not look out for an African institution to take the lead?

An African Handbook: What Does this Mean?

To me, the intended African character of the Handbook has become a crucial and controversial issue. No doubt, most contributions reflect the authors' experience in universities in Africa. The authors give evidence of the hardships of teaching in times of financial constraints, with limited resources and in overcrowded classes. They allow for an insight into structural and organizational conditions prevailing in their institutions. They are mindful to the situation of their students. They demonstrate inventiveness in responding to their social and cultural environment.

Yet the prevailing pedagogical and psychological theories behind their deliberations, and a good deal of the practical advice how to teach one's best, rely on Anglo−Saxon research in education and higher learning. Thus the claim to integrate teaching and learning traditions prevalent in different places in Africa has been met only peripherically.

Perhaps, the discourse among African intellectuals on the role of universities − which in the eighties seemed to yield to more pragmatic challenges and which is now given more space again − will enliven discussion on the role of teachers in academia. Perhaps, new sights will not emerge from economic pressure only, but more so from the recurrence to cultural values.

Against the background of globalization, the claim for cultural diversity is gaining ground. The recent international discourse is far from opting for the mere reconstruction of tradition; it is bound to muster a balance to the world−wide uniformity created by the impact of new technologies in production and, particularly, in communication. Only intellectuals in Africa can answer the question whether a genuine African approach to higher education exists, and if so, which would be the key elements to be included in a handbook for lecturers in African universities.

Recently, the Association of African Universities (AAU) initiated a series of research studies on African experiences in higher education. The outcome of these studies certainly will incite the desirable discussion.

Some Critical Comments Rehearsed

The feedback to the draft version of this Handbook has yielded a variety of valuable suggestions for improvement. It was stated, for instance, that some relevant topics were missing, like out−reach consultancy, or organization and management. − Respondents expressed the hope that a later edition of the Handbook should explicitly deal with student problems: How to promote learning? How to strengthen communication skills? How to establish student support programmes? As a matter of fact, promotion of the faculty and promotion of students may be viewed as two sides of the same medal. One comment suggested that the 'Handbook for University Lecturers' be complemented by a 'Handbook for University Students'.

Other comments were concerned with the overlap between some Handbook sections. There is indeed duplication, particularly between Chapters 3 (Learning Processes) and 5 (Methods of Teaching and Learning). Overlappings will also be noted between Chapters 2 (Needs Assessment) and 7 (Evaluation). But individual readers will probably react in different ways to overlappings. When the Nairobi editors decided not to delete duplication, they did it for the sake of the integrity of every chapter. They felt that most readers will not read the Handbook consecutively, but rather select those chapters which are most likely to provide answers to their own questions. (Just read their instruction 'How to Use this Handbook'.)

It has also been correctly observed that in spite of the editorial target not every chapter is providing practical examples.

The editors are aware of differences in style and in viewpoints expressed by the authors; they deliberately did not try to eliminate them. There are many voices in the choir of the Handbook. They join in their efforts to foster learning in African universities. They are concerned with strengthening the central pillar of learning, namely teaching. They uphold their vision of the role universities can play in African societies. They do all this in their individual pitch, with different modulation. The harmony might be sometimes accentuated by a strong individual voice, but it is never really threatened, I believe. The protagonists want to share their enthusiasm with everybody who wants to listen them.

'Teach your best', above all, is an invitation to those who are educating the future generation. Implicitely, it is also an appeal to university leaders to give more consideration to teaching and learning. It is up to them to create an environment in which initiative towards new forms of learning and teaching can develop. That's why for conclusion, I recur to a significant experience, told by a distinguished American educationist:

> *One way to impart more joy to a teacher's life as a teacher is to allow him to give full range to his imagination and inventiveness. I will always be grateful to the department chairman who, even before I received my Ph.D., came into my office one day and said, 'We need another course next year. You know what we are doing now. Think something up and let me know what you want to do.' That invitation at the beginning of my teaching career launched me into a course outside my area of expertise.*

Frederick Rudolph

(Rudolph, F. 'Dirty Words: Leadership and Liberal Learning'. *Change. The Magazine for Higher Learning.* April 1980, 18−23)

SUGGESTIONS FOR FURTHER READING

The following titles have been selected with two intentions: Some of them are complementing the introductory essay; others are meant to introduce to the ongoing international debate on higher education in the South, particularly in Sub−Saharan Africa.

Another criterium is their availability. Being aware of the difficulty to obtain most of the books referred to in the Handbook, I choose titles which were published by institutions where they can be ordered free of charge.

Association of African Universities (AAU). *Consultative Meeting on Professional Development for Academic Staff of African Universities.* Accra, November 1994. Report. Accra, Ghana: AAU, 1994.

For copies: AAU Secretariat, P.O. Box 5744, Accra−North, Ghana.

Association of African Universities (AAU). *The University in Africa in the 1990s and Beyond.* Summary Report of a Colloquium jointly organised by: Association of African Universities; Donors to African Education/Working Group on Higher Education; National University of Lesotho. Maseru, Lesotho, January 1995. Accra: AAU, 1995.

For copies: as above.

Burchert, L. and K. King (eds.). *Learning from Experience: Policy and Practice in Aid to Higher Education.* The Hague: Centre for the Study of Education in Developing Countries (CESO), 1995.

A critical review of the World Bank paper of 1994 'Lessons of Experience', insisting particularly on unanswered questions. Of particular interest: N. F. McGinn's statement on the implications of globalisation for higher education: B. Olson's comparison of the recent higher education papers by the World Bank and UNESCO.

For copies (probably charged for): CESO, P.O. Box 29777, NL−2502 LT The Hague, Netherlands.

Coombe, T. *A Consultation on Higher Education in Africa.* A Report to the Ford Foundation and the Rockefeller Foundation. New York: Ford Foundation and Rockefeller Foundation, 1991.

Based upon widespread inquiries with African policy−makers, higher education officials, members of universities, scientific academies, research institutes and networks, with representatives of international university associations, intergovernmental organizations and donor agencies, the paper discusses a perspective on African universities and designs a strategy to be pursued by donors to higher education in Africa. Attention is given to an agenda for research in higher education.

For copies: The Ford Foundation, Office of Reports, 320 East 43rd Street, New York, New York 10017, USA.

Gachuhi, D. and B. Matiru (eds.). *Handbook for Designing and Writing Distance Education Materials.* Bonn: DSE, 1989.

This book has become a "runner". Its suggestions pertain not only to distance education, but to any textbook writing project.

Matiru, B. *Towards Academic and Professional Excellence in Higher Education. Parts I to III.* Reports on the Sub−Regional Workshops from 1989 to 1991. 3 vols. Bonn: DSE, 1990; 1991; 1992.

This documentation is the forerunner of "Teach your best". It covers all subject areas dealt with in the Handbook, though less extensively. As the presenters are not in every case identical with the Handbook authors, they make use of different approaches. − But the workshop reports include as well other topics, e.g. country reports on staff development; functions and competencies of facilitators in staff development; discipline−oriented teaching skills; publication and materials development.

Matiru, B. (ed.). *Join us in a Participatory Approach to Training, Learning and Production.* Bonn: DSE, 1993.

The Action Training Model presented in this guide grew out of the need to assist trainers and development workers to cope with specific tasks for which they are not prepared or have no training. The experiences reflected here can easily be adapted to teaching situations beyond non−formal education.

Northern Research Review Advisory Group (NORRAG). *NORRAG NEWS, no. 16.* Special Theme: 'Higher Education: The Lessons of Experience'. Comments from Around the World on the World Bank's Higher Education Paper. Edinburgh and Geneva, 1994.

For copies (probably charged for): Michel Carton, Institut Universitaire d'Etudes du Développement (IUED), Post Box 136, CH−1211 Geneva, Switzerland.

Rottenburg, R. *New Approaches in University Staff Development. Training for Efficiency in Teaching, Research and Management.* Report on the International Conference in Berlin, December 1987. Bonn: DSE, 1988.

The conference reported on was to establish linkages between DSE and those universities in Africa which wanted to join in DSE's Medium Term Programme on Staff Development. The report presents an overview of staff development activities at Universities in Africa and on donors' priorities in higher education.

UNESCO. *Unesco Sources,* no. 32, December 1991. Focus: 'Does Old Alma Matter? Rethinking Higher Education'. Paris: UNESCO, 1991.

For copies: Unesco Sources, Place de Fontenoy, F–75700 Paris, France.

UNESCO. *Policy Paper for Change and Development in Higher Education.* Paris: UNESCO, 1994.

Focusses on the need for responses of higher education to a changing world. Discusses a variety of quality aspects, the need for renewal of methods of teaching and learning, and the need to integrate and develop research. Underlines the importance of academic freedom for the universities' service to society.

For copies: UNESCO, 7 place de Fontenoy, F–75700 Paris, France.

Wesseler, M. and Wudassie Yohannes (eds.). *On Innovative Teaching. Experiences and Insights from Eastern and Southern African Universities.* Frankfurt/M.: Verlag für Interkulturelle Kommunikation, 1992.

This booklet is an outcome of the workshop series Towards Academic and Professional Excellence in Higher Education', organized by DSE. It highlights topics such as students' backgrounds and needs; the interrelation between teaching and research; teaching large classes in sciences; team teaching in law; project work; the Action Training Model in non–formal education; the lecturer's role in creating a conducive learning environment; new approaches to autonomous learning.

For copies: Institute for Socio–cultural Studies; see address below.

World Bank. *Education in Sub–Saharan Africa: Policies for Adjustment, Revitalization and Expansion.* Washington D.C.; The World Bank, 1988.

For copies: The World Bank, 1818 H Street, NW; Washington D.C. 20433, USA.

World Bank. *Higher Education: The Lessons of Experience.* Washington D.C.: The World Bank, 1994.

For copies: see above.

ADDRESSES

Any feedback to the Handbook should be sent to:

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D–37213 Witzenhausen/Germany
Fax no. 0049–5542–981309

DSE publications can be ordered free of charge at:

German Foundation for International Development (DSE)
attn. Dr. W. Gmelin
P.O. Box 30 04 62 D–53184 Bonn/Germany
Fax no. 0049–228–4001–111

HOW TO USE THIS HANDBOOK

Barbara Matiru and Anna P. Mwangi

If you are an academic and want to improve teaching and learning at the university, this book is intended for you. You are not expected to read it from cover to cover since it is a handbook.

This Handbook aims to:

- improve teaching and learning at universities in Africa;
- promote staff development;
- assist teaching staff to cope with the daily problems and constraints they face in their work;
- equip university lecturers with basic management skills;
- enable university lecturers to optimize their resources;
- encourage research and community service by university instructors.

Uses of the Handbook

The handbook is a reference which you could consult for ideas and turn to as a source of inspiration. It may be used in a variety of situations. You might find it suitable:

- as a personal companion for individual reference;
- for training purposes during staff development seminars;
- for the induction and orientation of new lecturers;
- as a guide for those faculty members who are not professional educators.

Structure of the Handbook

In order to use the Handbook effectively, you should know how it is organized. It has eight chapters. The first one presents the many roles that the university lecturer is required to fulfil. Each of the subsequent chapters covers an important aspect of what makes you a professional. All chapters have a similar structure.

OVERVIEW	They begin with an overview of the content.
SUBJECT MATTER	This is followed by the subject matter which has been divided into suitable sections.
QUESTIONS	As you study the sections, you will frequently find questions that help you to reflect on what you have just read. You can identify them easily as they are highlighted in a grey box.
ACTIVITIES	There are also activities for you to do. These give you a chance to apply the new knowledge or skills you have been introduced to. In some of them you may need to involve your students or colleagues. They, too, are highlighted in a grey box.
ILLUSTRATIONS	Illustrations have been included to support important points or to help you understand certain key concepts. A number of illustrations are there to make you think and to awake your sense of humour.
TABLES	Tables have been used to present new information in a compact way for easy reference.

EXAMPLES	There are many examples taken from actual university teaching experiences. Some of these are good models for you to follow, while others have been selected for you to criticize and improve.
CONCLUSION	Each chapter has a conclusion which summarizes the main ideas.

Special Features of the Handbook

This reference is interdisciplinary in nature. Lecturers in sciences, arts and professional disciplines should find it relevant to their needs. Examples have been drawn from, among others:

Chemistry	Literature
Biology	English Language
Geography	Medicine
Engineering	Education.

The authors themselves have experience in a variety of fields. Their pooled efforts in this Handbook provide you with a wealth of information.

Each chapter is based on a sound theoretical framework. From this, practical advice is drawn as a guideline for you to follow. Actual classroom activities as well as some easy evaluation techniques, have also been suggested for you to try out. In this way, the handbook closely links theory and practice.

To facilitate your acquisition of new knowledge and skills, wide margins have been provided where you may write information. Do not hesitate to make use of these by:

☐ jotting notes	☐ making lists
☐ highlighting key points	☐ drawing sketches
☐ making remarks	☐ outlining steps
☐ scribbling reminders	☐ illustrating ideas
☐ noting references	☐ summarizing.

The conversational style of the handbook should make It easy to follow as should the clear headings and sub−headings. The latter make important topics stand out and alert you to what is coming next. Like the overview, they act as an advance organizer, but this time within the chapter.

To find the topic you want to read about, refer to the detailed table of contents that has been provided. You may also refer to the overview of the relevant chapter.

We hope the warm approach adopted by the authors and editors will ensure that this reference becomes your best companion. Nevertheless, the handbook is only a start. It does not claim in any way to be the last word in university teaching. It is only an initial step and will, no doubt, benefit from your feedback.

CHAPTER 1 – THE ROLES OF A UNIVERSITY LECTURER

Sam T. Bajah

OVERVIEW

In this chapter we shall discuss the roles of a lecturer as:

- an authority in the discipline taught;
- a planner and manager of time;
- an academic guide to students;
- an adviser and counsellor to students;

• a researcher;
• a consultant.

INTRODUCTION

A university functions most efficiently when the necessary human and material resources are available. There is no point setting up a university and then starving it of necessary means of support. Institutions of higher learning usually require a lot of local resources and because of that, they are a relatively expensive venture, more so in developing countries. Yet, despite these facts, the important role of universities 'to prepare and support people in positions of responsibility, in government, in business, and in the professions' (World Bank, 1988), has been generally accepted in Africa.

FUNCTIONS OF UNIVERSITIES

As you are well aware, higher education is of paramount importance in the process of development in Africa. High−level manpower must be trained and quality research carried out if development policies are to be correctly formulated, programmes appropriately planned and projects effectively implemented (World Bank, 1988).

Therefore, in our attempt to identify and then describe the roles of a university lecturer, we must very clearly spell out the expectations of many African countries in building and supporting universities. In a way, these expectations could be regarded as the contributions universities in Africa must make to needed development. You, the university lecturer, must then act as an important agent of change in the development process. Consequently, the contributions or functions of universities in Africa may be considered as threefold: training, research and public service.

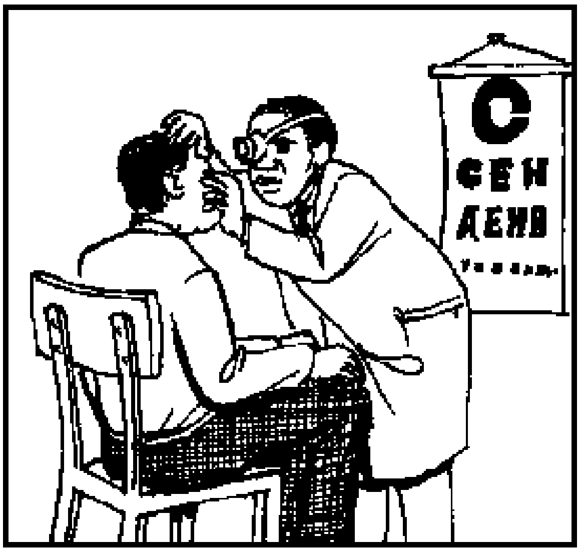


Figure 1.1 Public Service

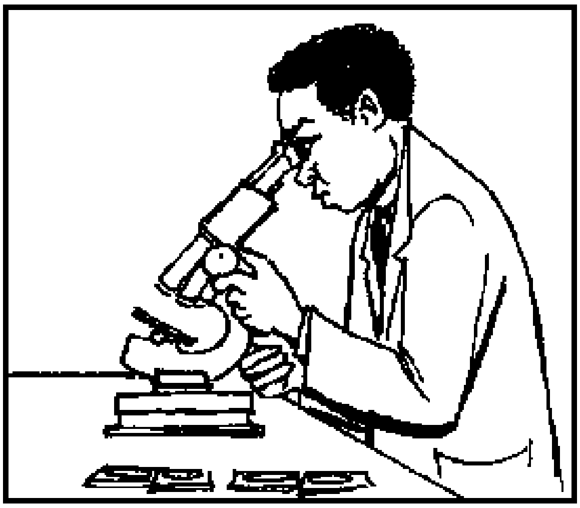


Figure 1.2 Research

Development of Personnel (Training Function)

African governments expect the universities to prepare the needed personnel to fill high level scientific, technical, professional and management jobs. Described as the indispensable core of national capacity, the products of African universities are perceived as the leaders in Africa's battle against intellectual colonization. Therefore, one of your most important roles, as a university lecturer, is to produce graduates capable of performing such jobs.

Development of Knowledge (Research Function)

African governments expect the universities to generate the knowledge and innovations needed for development through indigenous scientific research and technical know−how as well as to disseminate this information. Being a university lecturer, therefore, you are expected to initiate and carry out research that will generate knowledge and contribute to development. You are also expected to encourage your own students in their research efforts, as well as guide and supervise them.

Provision of Necessary Services (Public Service Function)

African governments look forward to universities rendering needed high−skill services to the community by the staff involving themselves in local activities. The universities constitute reservoirs of expertise which can be tapped by the government and private sector. Your community members, therefore, expect you to lead them in their developmental activities by sitting on various committees and boards. You should be ready to provide consultancy services to them.

FUNCTIONS OF UNIVERSITY LECTURERS

University lecturers in an African setting are expected to play several roles singly and collectively so that investment in institutions of higher learning can have the desired effects. This imposes a major responsibility on you. There is no doubt that you may find the present university environment very different from the one you were exposed to in your student days. In a way, that is how it should be because change is always a welcome phenomenon in a growing system. You should, therefore, reflect on the changes you have noticed in your university setting and see how you can meaningfully prepare both yourself and the students you teach to face the challenges of today.

Moreover, the students with whom you interact in your normal teaching activities are young and impressionable. Class size has increased even in areas like medicine and engineering that used to be exclusive, creating an imbalance in staff/student ratios. Facilities for teaching are becoming inadequate for the student population they serve. The result of all these factors is that teaching and research, two major functions which you perform as a university teacher, have suffered some setbacks. However, you will notice that most of your students are highly motivated and are thirsty for knowledge, two factors that can turn teaching and learning into a very rewarding venture. Therefore, the concept of teaching your best means that you are also expected to do your best even under the sometimes difficult circumstances you are working in. Your success is the success of the system in which you work.

This chapter explains in some detail the specific role of a university lecturer in Africa. As you read through it, stop to reflect on your own experiences to see which of these roles you carry out.

The Teacher as an Authority in his Discipline

You are probably familiar with the ways university students talk about their lecturers. Here is an example of a dialogue between two students who take courses from two different university lecturers.

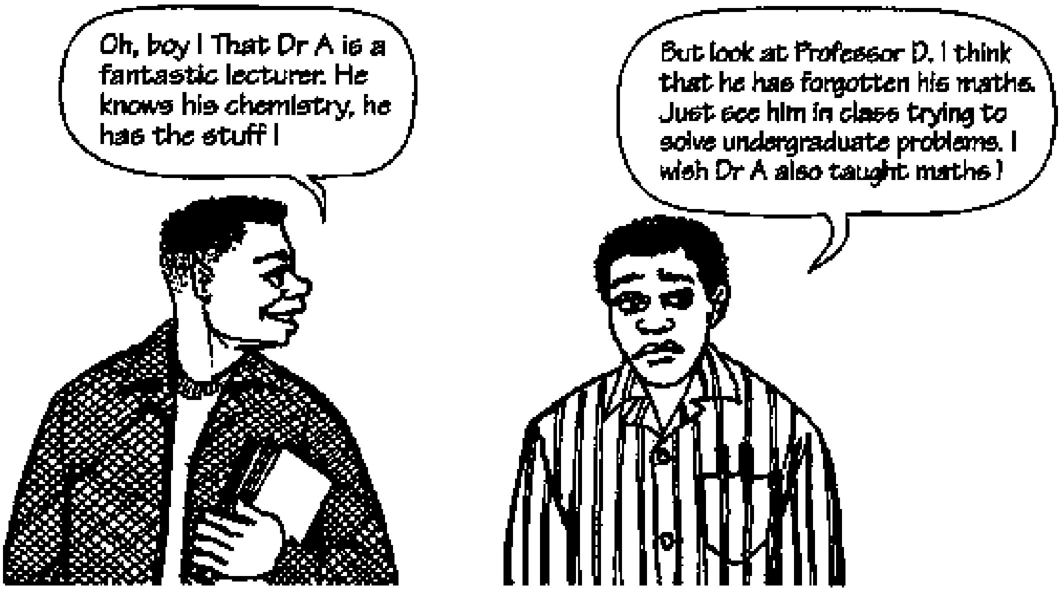


Figure 1.3 Students continually assess their lecturers

Whether university teachers like it or not, every time they step into a lecture room to teach students, they are putting themselves on the 'firing line', and students will either shoot them down or acclaim them. Students continually assess their lecturers informally, and the amount of confidence they have in them depends to a large extent on the perceived level of their competence in the subjects they teach. Broadly speaking, students rate very highly lecturers who 'know their stuff'. You should remember that first and foremost, teaching a subject, presupposes that the lecturer is proficient in the area. University lecturers are invariably specialists and so, like expert jugglers, must be well–versed in what they teach. When a particular course is assigned to you, there is no excuse whatsoever for you to give students anything but the best. Not only do the students expect that from you but in a way they also demand it.

Why should qualified university lecturers, recruited to teach a course for which they are supposed to be experts, give the impression of not knowing the subject?

Studies show that in some cases, lecturers fail to perform efficiently because of one or all of the following:

- ☐ lack of adequate preparation;
- ☐ poor delivery techniques;
- ☐ pitching the lecture above or below the academic level of the students;
- ☐ insensitivity to the expectations of the students.

Adequate Preparation

No university lecturer should walk into a lecture room to teach students without adequate preparation. While no one expects you to write a lesson plan, there is no doubt that a lecture plan or notes will be an invaluable aid in planning and presenting the lecture.

While it is standard practice to limit each undergraduate lecture to one hour, it may take you from one to two hours to prepare for it. This depends on the complexity of the subject matter and your own way of working. When you have prepared well for your lecture, you radiate confidence to your students.

Figure 1.4 Preparing for a lecture

There are a number of areas you should consider when preparing your lecture.

Areas to consider	Questions to ask yourself
1 Identification of topics and objectives	What do you want to teach?
2 Audience	For what group of students is the lecture meant?
3 Location and duration	Where will the lecture be given and for how long?
4 Subject matter	What is the scope of the lecture? How far, in terms of depth and breadth, do you think you can go with the subject matter in the prescribed time?
5 References	Is there any fact you think you have to look up in a book, journal or in your notebook? Are you confident with the facts you want to put across?
6 Trouble shooting	Are there any areas in the subject matter that you anticipate students might find difficult to grasp? If so, do you want to double check this areas to be prepared for the questions?
7 Instructional media	Do you want to use any aids during the lecture? Have you checked if they are available and in good working condition?

Figure 1.5 *Areas to consider when preparing your lecture*

If you have carefully considered all these seven areas, you will probably enjoy giving the lecture as much as your students will enjoy listening to you.

Delivery Techniques

Some people claim that teachers are born not made, and so, to some extent, they despise any attempt to provide them with prescriptions for good teaching, especially at the university level. Yet we all need to study and understand those expert teachers, for very often we hear complaints from students about their lecturers.

Figure 1.6 *To avoid such complaints, improve your delivery techniques*

The technique adopted in the delivery can make all the difference between a good and a bad lecture. Whatever the size of the lecture room, your voice must be clearly heard. You are the best judge of how to pitch your voice. If the room is too large for you to be heard, then you must use a microphone. You should adopt a conversational style of delivery and not keep your eyes glued to your lecture notes. Make eye contact with individual students, and scan the class as a whole. In a situation where students have few textbooks, lecture notes mean a lot to them. Therefore, when you have to write on the chalkboard, you must make sure that your writing is legible. Sometimes you may use an overhead transparency. In that case, you should make sure that the lettering on the transparencies is focussed sharply. Allow sufficient time for the students to take their notes before removing the transparency. – For more details on the use of instructional media you may refer to Chapter 6 of this book.

As a lecturer, you must strive to take your students forward by advancing their knowledge from a known starting point. In pedagogical terms, that starting point is referred to as the academic entry point. Therefore, before you start lecturing, you should establish the academic entry point of your students. There are easy ways of determining this:

- use of standardized tests in your area of specialization;
- giving your own prepared test;
- individual and general discussions with the students;
- providing a detailed course outline on the first day of meeting your class.

With such background knowledge, your students will not be lost. Moreover, you will successfully take them to the end of the course because you have pitched your lectures to their level. – You can find more details on classroom needs assessment in the next chapter.

Sensitivity to the Expectations of Students

In a university system where students are allowed to pick and choose the courses they register for, the choices they make are guided by certain expectations. In a typical university setting in most parts of Africa, the courses are classified as follows:

C	Compulsory	– courses that must be taken and passed;
R	Required	– courses that must be taken and may or may not be passed, but the student must reach an acceptable level of performance;
O	Optional	– courses that may or may not be taken.

Whatever the classification of the course you are teaching, you must be on the look out for the reaction of your students, especially if you have to teach the same course year after year. The way to obtain objective information about the reaction of your students is to give them a course assessment questionnaire. The information so derived will give you feedback about the success of your course which you may use to plan for the following year. –In Chapters 2 and 7, you will be guided on how to collect useful information on your teaching.

Lastly, we shall look at the characteristics of good lecturers.

A good lecturer should:

- ☐ have a clear voice and articulation;
- ☐ speak at a moderate rate;
- ☐ use a strong loud voice;
- ☐ vary the tone of voice;
- ☐ use a conversational delivery;
- ☐ use language and terminology which is easily understood;
- ☐ use facial expressions and gestures;
- ☐ not be afraid to smile;
- ☐ establish eye contact with individuals and the whole class;
- ☐ be neat and well groomed;
- ☐ be dynamic and enthusiastic.

Say why you would agree or disagree with the above statements. Which of these characteristics do you have yourself?

The Teacher as a Planner and Manager of Time

As a university teacher you must develop the skills to plan and manage your time. You have to plan your day, your week and the entire academic year so that you can accomplish all your work.

• prepare your lectures;
• give your lectures;
• supervise students carrying out research;
• carry out your own research;
• grade the assignments you have given to your students;
• set and mark your examination papers;
• attend departmental meetings and conferences;
• attend and serve on committees to which you are elected or appointed.

All of these tasks have to be undertaken along with your other commitments at home and in the community. In planning your time, you should take into consideration the relative importance of the tasks, the sequence in which they should be done and your own capacity to cope with them.

Taking a sound decision implies that you have weighed all the options and realize the implication of each one. If, for instance, you decide to prepare your morning lectures the night before, one assumes that you have considered the other options.

However, did you think about the fact that:

- ☐ you may need library references?
- ☐ there may not be enough time to prepare and duplicate handouts?
- ☐ you may not be able to get the necessary teaching aids because you have not booked them in advance?

You may also decide at the beginning of a course that you will set two tests, a mid−course one and an end−of−course one. This implies that you will manage your own time and also the time available for the course to accommodate these two tests. When you have to attend meetings of committees on which you serve, you must reschedule your lecture times. In such cases, be sure to give advance warning to your students.

It is, therefore, important when planning and managing your time to be flexible. In that way, you will be able to do much more work.

Figure 1.7 *Do not be a slave to time but rather manage and plan it*

The Teacher as an Academic Guide to Students

Many students will register to take the courses you offer because they need them as requirements for earning a degree and also because they think that they can cope with the work involved. As a university teacher, you also assume that your students can follow the courses you give.

However, you may find that when you give your pre−planned mid−course test, some students perform below your expectations. What do you do?

One easy way out is just to record the marks and conclude that the below average performers are not capable or did not pay attention to your lectures. In either case, you should hold a conference with the class as a whole and later, individually, with those students who have performed below expectations. This will take some time but if, as was suggested, you plan to accommodate such conferences, then there will be no problem. Let us now examine a real situation.

Professor X taught a course in chemistry to first year students. After the mid−course test the scores of the students were:

Scores	Number of students
70% and above	10%
50% – 69%	30%

40% – 49%	20%
Below 40%	40%

Professor X then held a class conference after which he asked all those who scored below 40%, which was the pass mark, to see him in his office at an appointed date and time.

During the conference:

- the class agreed that the mid–course test was a fair one;
- none of the students, however, claimed that the test was easy;
- those who scored below 40% did not know why they performed so poorly.

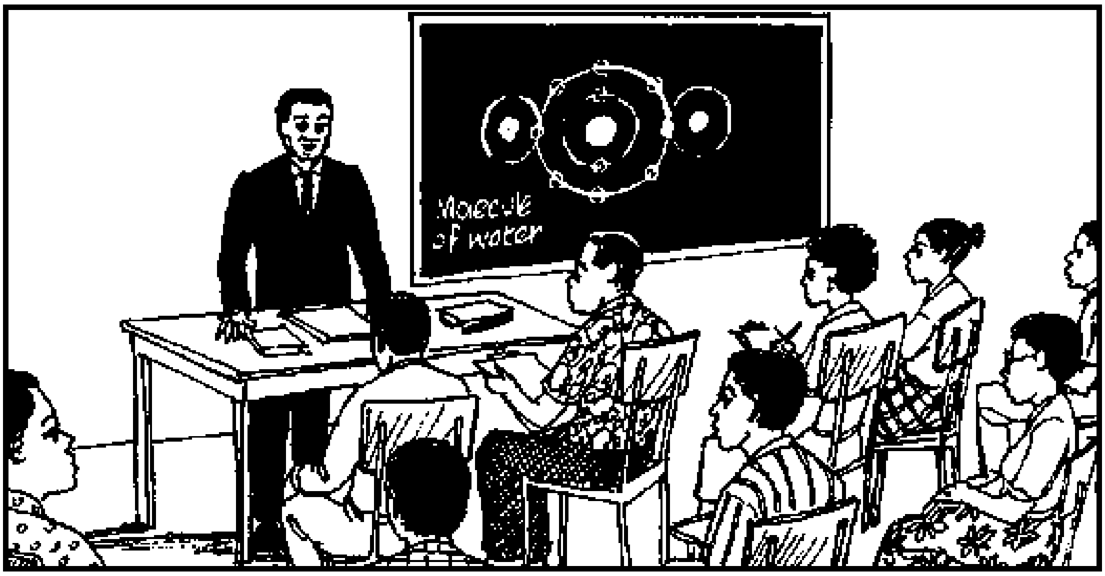


Figure 1.8 A class conference

Professor X was rather disturbed to find out that those who performed poorly did not realize what had gone wrong. Before the individual conferences, he studied the scripts of these students more closely and found that in almost all cases they had avoided the quantitative part of the questions.

Those who had attempted the quantitative part of the questions, performed poorly. Since chemistry is both descriptive and quantitative, good chemistry students must strike a balance between these two aspects. So, in his conference, he pointed out that observation to the students. To his surprise, they generally claimed that they disliked calculations because they considered themselves weak in mathematics. Any time they read a question which involved calculations, they skipped it. Having identified the main problem, Professor X went on to advise the students.

- First, he showed them how they had lost vital marks for not attempting quantitative questions.

- Second, he underscored the relationship between the theoretical concepts and the quantitative aspects of chemistry. Students cannot claim to know the theory without being able to apply it in calculations.

- Professor X illustrated how easy it is to apply the theory to some of the quantitative questions.

- Professor X then asked the students to go back and read a particular basic chemistry text which focusses on chemical calculations.

- Finally, Professor X asked the students to attempt those quantitative aspects of the mid–course test which they had avoided.

By taking on the added responsibility of advising students about certain aspects of the chemistry course, Professor X was fulfilling his role as an academic guide to the students. Some of the students Professor X advised discovered, to their own delight, that the quantitative questions were not impossible to solve after all. The problem was that, in the mid−course test, they had not even attempted them because of their previous notions about their incompetence in mathematics. They then came to accept the fact that to obtain good marks in the chemistry course, they had to attempt some, if not all quantitative questions. He also observed that the majority of these students were agriculture and medical students for whom chemistry was a compulsory course.

In his subsequent lectures, Professor X continually drew attention to the role of calculations in chemistry and worked out many more examples in class. At the end−of−course examinations Professor X, like the students, was pleasantly surprised with the final scores:

Scores	**Number of Students**
70% and above	20%
50% – 69%	50%
40% – 49%	20%
Below 40%	10%

All of us who teach students at university level can learn from the experience of Professor X. Make a list of .some of the practices you could adopt from Professor X.

The Teacher as an Adviser and Counsellor

In most institutions of higher learning, there is usually a Department of Clinical Psychology and/or a Department of Guidance and Counselling. The staff in such departments are usually professionals. They normally organize clinics for students who need some counselling. Despite this, many students will also come to you for advice on personal matters. What should a university teacher approached by a student for such advice do?

Since most instructors are older than the students, they are often expected to take on the role of parents. Students are also known to confide in some of their lecturers even if they do not teach them but only happen to interact with them on committees, in sports or in the choir. Because students come to you in confidence, you should respect that confidence and keep your conversations with them private. When you think that the matter placed before you is too specialized for you to handle, advise the student to go to a particular person who you consider can be of help.

Let us look at the following example of a student who might seek help from you.

Wanjiru has just got a letter from her father to say that the Local Government Council has awarded her a scholarship to read English at a university overseas. Only a week earlier Wanjiru had been given a place with a scholarship at the local university. Wanjiru has never travelled abroad, and is confused. She has to sign all the necessary papers for the overseas university within two weeks. She has now come to you to help her decide which university to choose.

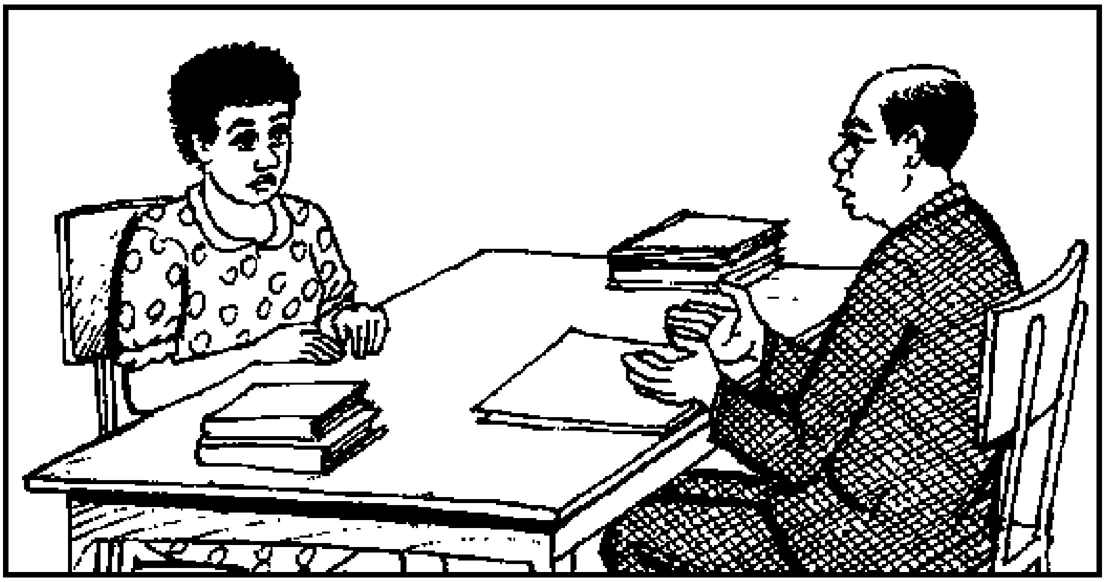


Figure 1.9 When students confide in you, you should keep their confidences private

Wanjiru's case may be similar to that of other students. Someone like you, whom the students trust, can provide suggestions and pose relevant questions to enable a decision to be taken. Experience has shown that when such students succeed in life, you will be remembered as a lasting model, adviser and counsellor.

The Teacher as a Researcher

As well as carrying out their teaching assignments, university lecturers are also expected to do research. In many instances, the ultimate goal of carrying out research is to publish in learned journals. Being published constitutes a vital criterion for promotion. Three indicators of the efficiency of a university teacher are linked: research, publication and promotion.

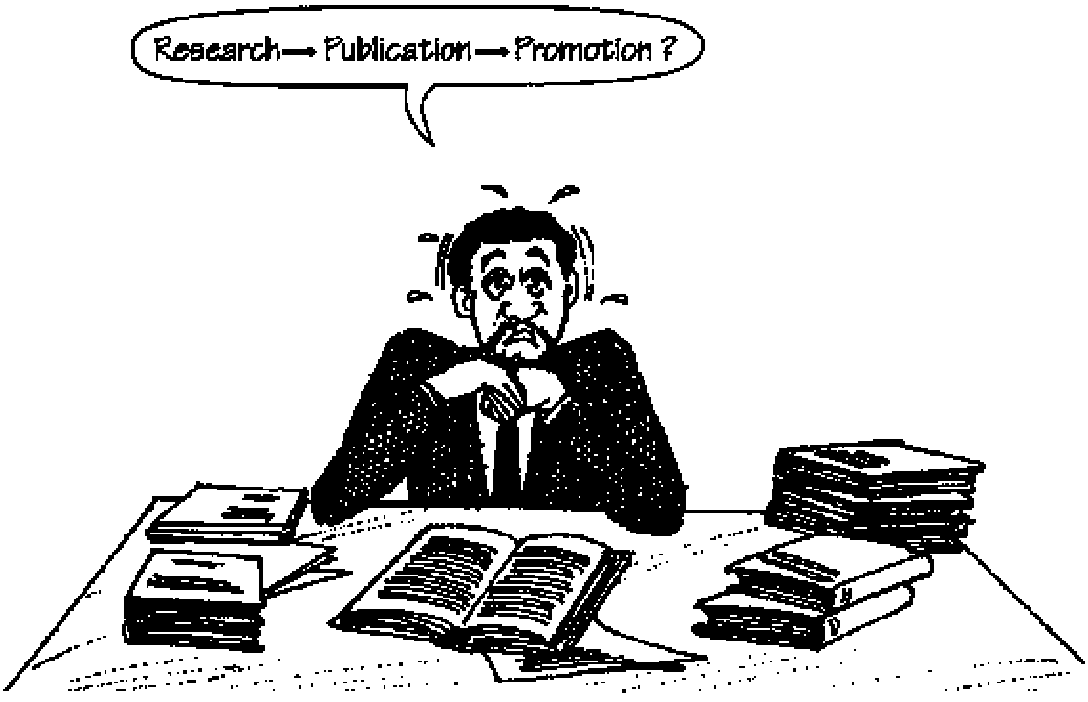


Figure 1.10 Are learned publications the best criterion for promotion?

There have been many arguments in African universities with respect to the relative emphasis that should be placed on teaching and research. While everybody expects an instructor to demonstrate proficiency in teaching, the decisive factor with regard to the efficiency of lecturers seems to be the number of research publications authored. –Chapter 8 of this book discusses research and publication at length.

It is assumed that university lecturers have been exposed to research methods, since these are a component of graduate studies in most universities. However, the fact remains that many university teachers do not engage in research and even if they do, many seem to avoid empirical and longitudinal studies. Why is this so?

There are many reasons for this, but two seem to be common:

- lack of adequate funds;
- anxiety to accumulate a number of publications over a short period.

Some universities make provision for staff research in their budget. Lecturers are also encouraged to submit proposals for research grants. Alternatively, you may look for external grants from agencies interested in your area of research. A good research proposal usually attracts external funds. So, from both internal and external sources, you may get funds for your research.

It is well−known that longitudinal and empirical studies take time to accomplish. However, you do not have to complete the research before you publish. Intermediate reports can highlight your findings up to the point you have reached. On the other hand, shoddy, snap research is frowned upon, no matter how many publications it leads to. So you should strike a balance between short−term research and longitudinal studies.

You are aware that in many African countries, governments look to the universities to provide new knowledge that can lead to development. While research can be done as a purely academic exercise, you should remember that practical research is preferred. As a result, we are all encouraged to be involved in Action Research. Major development projects in Africa are in dire need of empirical research information that could direct their planning and implementation. In bringing the academic world to the frontiers of knowledge in your discipline, you should also remember that your research should provide some solutions to nagging developmental problems facing Africa.

In carrying out your research, you should involve your students as much as is practicable.

How can you involve your students in ongoing research?

There are many ways of doing this, but the most commonly used strategy is to involve students in data collection. When doing that, they should know the focus of the study so that when you introduce aspects of research in your teaching, they will understand it. And just as we have argued that research carried out by university lecturers in Africa should be focussed on local problems so as to offer some solutions, you should also remember that the research results will greatly enrich your teaching.

The Teacher as a Consultant

The establishment of a university in a community is looked upon as a blessing in many respects. Not only does a local university provide immediate employment for middle−level manpower, but it also acts as a reservoir from which experts can be drawn for local and national activities. These experts are expected to render high−skill service to the community. Thus, university lecturers have been invited to:

- give public lectures on academic topics;
- chair functions organized in the community;
- carry out research on relevant issues in the community;
- participate in local politics;
- act as role models;
- assist with extension work.

In these days, when Africa, as a developing continent, has attracted much attention from the outside world, university lecturers are often called upon to work as consultants when research is being organized. As a university lecturer, you may be requested either to singly carry out a study commissioned from outside the country or to work jointly with another university lecturer from outside. In either position, your major role is that of a consultant. In many cases, you can give direction and provide the local input which in the past has sometimes been lacking.

CONCLUSION

This chapter has discussed at length six roles of a lecturer in any university in Africa. These are summarized in Figure 1.11.

Figure 1.11 Roles of a university lecturer

This outline may not be exhaustive but it describes to a large extent what is expected of you. We hope that you can identify with these roles. This chapter is not meant to be prescriptive but rather thought–provoking.

The roles we have described will vary in scope depending on the size and complexity of the university system in which you work. You should remember that you are fulfilling these roles when you teach your best.

CHAPTER 2 – TECHNIQUES OF NEEDS ASSESSMENT IN UNIVERSITY TEACHING

Barbara Matiru

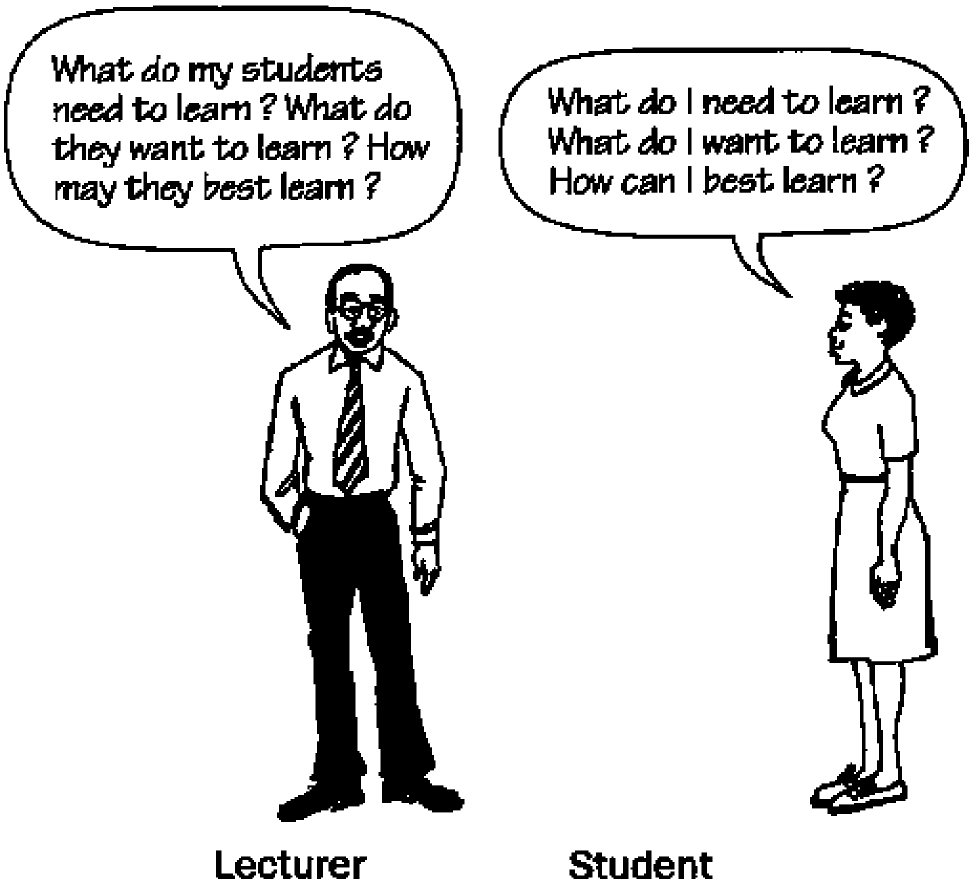
OVERVIEW

In this chapter we shall discuss:

- the purpose and meaning of needs assessment;
- what 'needs' are;
- the process and levels of needs assessment;
- how to plan a course on need assessment;
- the types of data and sources of information for needs assessment;
- data gathering techniques;
- processing the information gathered;
- making use of the needs assessment findings.

INTRODUCTION

A needs assessment is a necessary part of any planning for university teaching. It is just as important when preparing lectures or seminars as when designing an entire course or programme. If at the outset you do not understand the educational needs of students or those of the society from which they come, you may address them wrongly. Indeed, a mismatch between the learner and the content or approach to the teaching of a subject will not optimize learning. Moreover, as many universities move towards open and self–learning programmes, it becomes increasingly important for students to undertake needs assessment themselves. You and your students at the beginning of a course would, therefore, benefit by asking yourselves the following questions:



You should also note that in an atmosphere of cost containment in university education there is need to maximize the use of scarce educational resources. At the same time, the increasing concern for observable results must be satisfied. Needs assessment, therefore, can be used to identify relevant problems and to focus on areas of maximum benefit to individual students, lecturers and, in the long run, the university as a whole.

To be most effective, an educational needs assessment should be conducted as a rational, planned process so that findings are readily usable in course development (see Chapter 4). You should make needs assessment an integral part of not only designing your educational activities but also reviewing and evaluating their effectiveness, as far as possible in co−operation with your students, colleagues and the administration.

THE MEANING OF NEEDS ASSESSMENT

An overview of literature indicates that most writers feel it is important to identify educational needs. However, there is little agreement as to what these needs are, how they ought to be measured or what their usage in educational programming should be.

In order to distinguish between the various definitions of needs, Scissons (1982) has described the concept of educational need in terms of three need components: competence, relevance and motivation as well as two categories of higher order definition based on these components. The higher order categories are wants and complex needs. These components subsume many, if not all, of the varying definitions of need presently existing in literature.

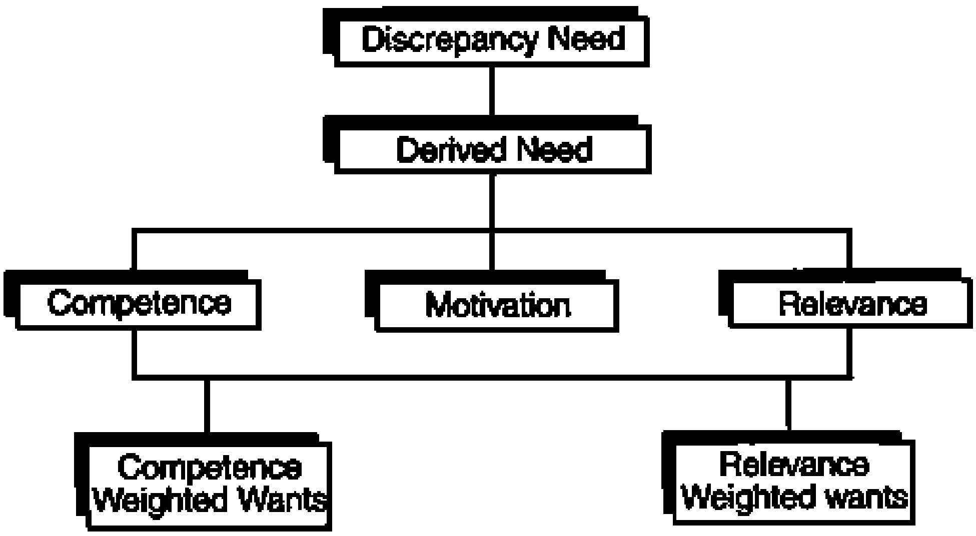


Figure 2.1 Need components

Source: Edward H. Scissons, 1982.

Let us study each component in turn. We shall start with the lower half of the diagram by looking at the meaning of 'competence', 'relevance', 'motivation' and 'wants' more closely.

Competence, Relevance and Motivation

Competence refers to an individual's ability to perform a range of skills. How useful these skills are to the person is an indication of their relevance. Your students' motivation then depends on how eager they are to improve their ability in those skills.

Wants

To plan a viable course, you will have to consider your students' wants. They may be incompetent in a skill or lack certain knowledge but if they are not disposed to remedy that situation then they are unlikely to learn. We say that they lack motivation. There are two kinds of wants, depending on whether the need component is considered in relation to either relevance or competence.

Relevance weighted wants: These are an expression of an individual's motivation to learn more about an activity he or she feels is important. They ignore skills and focus on motivation and relevance.

Competence weighted wants: These are an expression of an individual's motivation to learn an activity in which he or she lacks competence. They ignore relevance and focus on motivation and competence.

Complex Needs

Complex needs are the most refined category of needs. They are divided into two such sub−categories. Look once more at Figure 2.1. We shall next discuss the meaning of the first two boxes in the diagram.

Discrepancy need: This relates to those activities in which an individual is incompetent and which are important to him or her. It includes relevance and competence but excludes motivation.

Derived need: This relates to those areas where an individual is incompetent, which are important and which he or she is predisposed to actively remediate. It includes motivation, competence and relevance.

Keeping in mind the definitions we have discussed, in broad terms, we may say that an educational need is a discrepancy between an existing set of circumstances and some desired set of circumstances. These discrepancies can be described in terms of:

- knowledge;
- attitude;
- performance; or
- setting.

This is outlined in Figure 2.2.

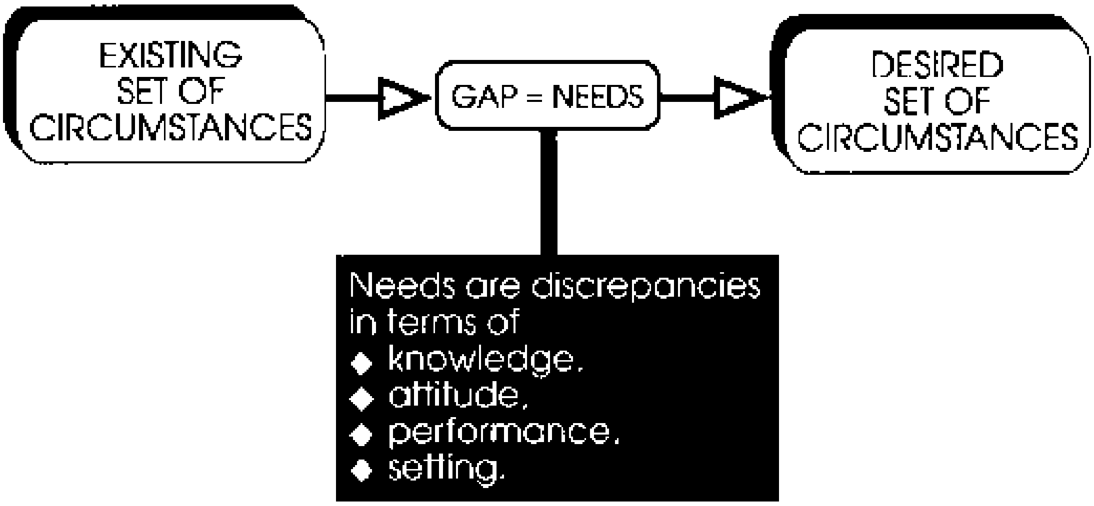


Figure 2.2 Diagrammatic description of needs

The advantage of this definition is that the lecturer can reduce or eliminate knowledge needs or the need for a change in attitude by using conventional methods of education that emphasize information transfer. Since a performance discrepancy is the gap between desired and actual performance, the definition encourages the development of criteria for effective performance. This in itself is a learning experience with potential for increasing the efficiency of those involved. The needs assessment also involves identifying areas where you or your students desire to expand existing competencies. This requires a comparison of the present status and the most recent pedagogic, scientific, technological or other relevant information. The focus should be on improvement and growth. Finally, the setting in which teaching and learning take place influences the quality of education as much as the teaching competence and the students' ability. Needs may also be identified, therefore, in the area of resources that have an effect on teaching and learning.

Needs assessment occurs whenever you are in some kind of interaction with your students, where you are obtaining and interpreting information about their knowledge, understanding, abilities and attitudes. This takes place every day as you listen to and observe them or hold a discussion with them after class. In this case the assessment is very casual. It may, however, also be formal as you ascertain your students' strengths and weaknesses in a test or examination.

1. What informal methods do you already use to assess your students' learning needs?

2. What formal methods of needs assessment have you built into your course?

Whatever approach you select, it is important to realize that you should be able to identify your students' emerging learning needs and interests. You should know what level they have reached, what sort of people they are becoming and what implications this has for their education. As a lecturer, you will have to make pedagogic judgements as to what new learning experiences are possible. Then perhaps, together with your students, you can reach a decision as to which ones are desirable. The result of such a process will generally be better teaching and learning.

THE NEEDS ASSESSMENT PROCESS

Because we live in an age characterized by change, we face the continual emergence of new educational needs. These needs may arise either from within or outside the university and have a profound impact on our courses. For example, many of us are overwhelmed by the task of teaching very large classes. We would like to learn new methods and techniques to cope with this situation. At the same time there is a lack of printed materials for our students. What can we do about this?

Figure 2.3 Even in large classes, the learning needs of individuals have to be met. How can you identify these needs?

Outside the university, industries are complaining that their manpower requirements are not being met. The government is also requesting a greater emphasis on university involvement in the community. All these are changing needs which have to be recognized and acted upon. This requires a conscious effort and raises such questions as:

- What are the needs of the society, community ?
- What are the needs of the university ?
- What are the needs of the university administration?
- What are the needs of the lecturers?
- What are the needs of the students?

It is a good idea to work out procedures to systematically identify these needs. They should include both existing as well as anticipated ones. You will most likely focus on the educational needs of the students first. However, the other needs mentioned have bearing on the teaching–learning processes at the university (see Chapters 3 and 5).

There are a number of stages in the needs assessment process. They do not have clearly defined boundaries and usually merge into each other. In the first step of the process, needs must be recognized. They must then be articulated. For example, in a course you are teaching, students may identify the need to make field visits. This is Step 1 in the needs assessment process. Then you must examine the need and determine how you will meet it. This is Step 2 where you have to plan the field visit. You will have to consider the following aspects, among others:

- transport cost;
- organization of the visit;
- assignments.

Next, it is useful to make a hierarchy that shows the full range of needs for a given subject or problem and their relationship to each other. For example, your students may have not only identified the need for field visits but also other needs such as special science equipment, certain new textbooks and more tutorials.

Are there any educational needs that have been identified for one of the courses you are teaching?

☐ Which of these needs should be given priority?
☐ How are they related?

Finally, based on these priorities, changes or innovations are implemented and later evaluated. This often leads to the identification of new needs and issues. The needs assessment process is summarized in Figure 2.4.

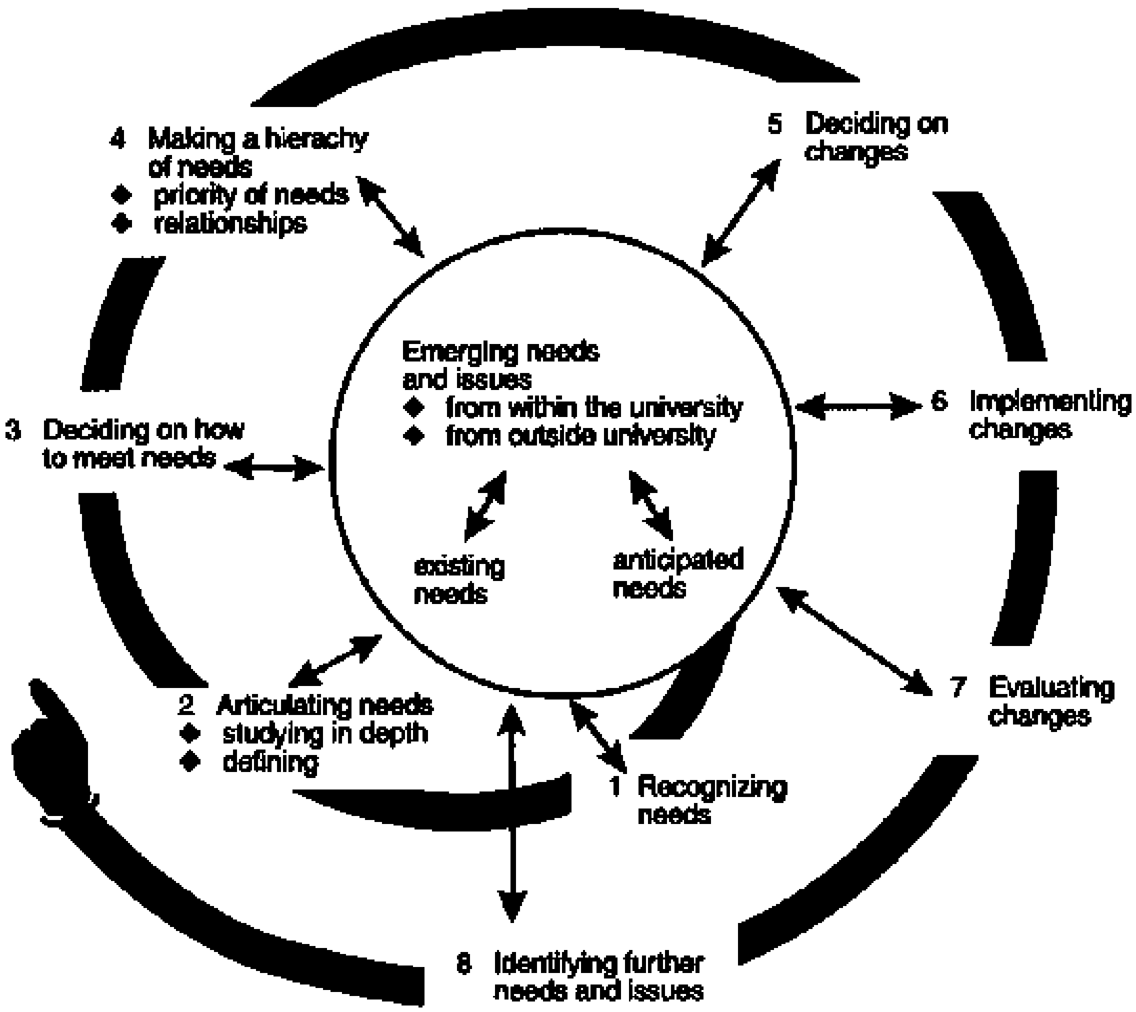


Figure 2.4 The needs assessment process

Source: Adapted from Duncan Harris and Chris Bell, 1986.

If we narrow these concepts down to the teaching–learning process, then before the lecturer begins teaching he or she should carry out a students' needs assessment. At the end of each semester, the lecturer should assess the students' learning and also evaluate the teaching effectiveness. The information obtained, together with other relevant data, will help in diagnosing the new needs of students and determining the purpose as well as the nature of the course for the next semester.

Study Figures 2.4 and 2.5. At which stages of the needs assessment process do you presently get involved yourself? At which stages do you involve your students or colleagues?

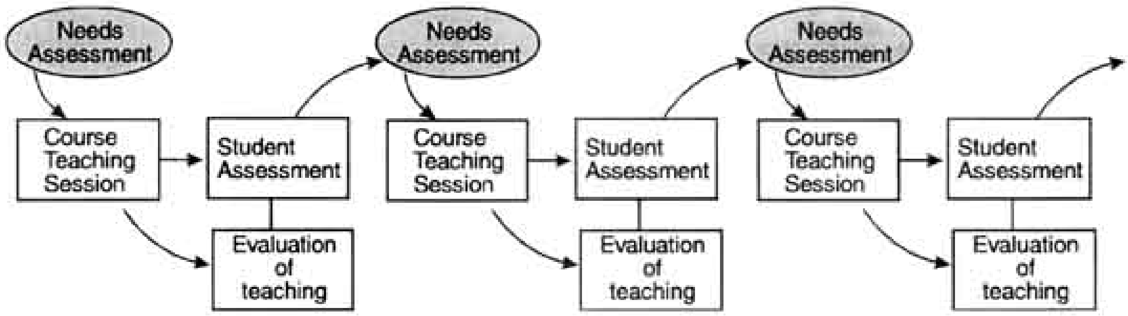


Figure 2.5 Needs assessment in the teaching–learning process

Source: Adapted from Derek Rowntree, 1987.

LEVELS OF NEEDS ASSESSMENT

The end product of a needs assessment should be a specification of needs in a form that you can readily use to develop your educational programmes. A systematic and complete needs assessment may be conducted at three different levels: the strategic, programme and individual course level.

Figure 2.6 Levels of needs assessment

Strategic Level

Needs assessment at this level provides information for long–term planning. Assessment results identify general content areas and the target groups that will be addressed during a specific period of time. The information gained usually indicates the direction of programming for three to five years. These long–term goals should, however, be reviewed yearly.

Data sought will include current university education issues; new knowledge and technology affecting teaching and learning at university level; political, social, economic, cultural and environmental issues. Such an assessment should examine national, community and institutional needs. The results will assist administrators and curriculum planners in making decisions concerning long–term goals and the future direction of programme development. These will later affect decisions about the courses you teach.

Programme Level

Here, needs assessment provides information about specific concerns within the general areas identified at the strategic level. The results will help deans, chairpersons and academic faculty members involved in programme design to make decisions about particular areas.

The outcome of a programme needs assessment is a list of programme topics that will be offered by a department. The topics should be within the general areas previously established, relate to the cause of the problems, and address needs of the university staff and students concerned (see Chapter 4).

Course Level

This level of assessment gives attention to classroom performance and the actual knowledge, skills and attitudes of the lecturer and students. If you have a clear understanding of the performance of your students you will be able to plan appropriate courses for them. You will have realized that today's students are anxious to be Included in decision making about their own courses. Discussions and negotiations between you and the learners are, therefore, an important part of the planning process. Such discussions will help identify not only the students' expectations but also some of the relevant problems and assumptions. Time spent on carrying out a needs assessment will result in much greater student motivation.

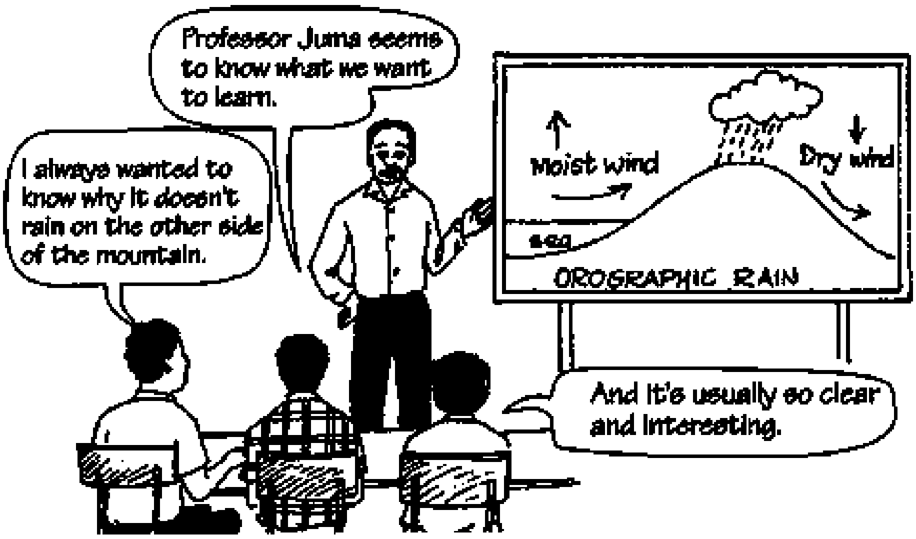


Figure 2.7 This lecturer has made a proper needs assessment

Unfortunately, this level of assessment is all too often not undertaken and assumptions are made about the students' knowledge, skills and attitudes. If they are incorrect, classroom activities often miss the mark. On the other hand, if proper needs assessment has been done, your courses will be more interesting and beneficial. They will be more likely to have a greater impact on performance. You can also use the assessment results to develop course objectives and to aid in planning content that will best meet the needs of the learners.

Needs assessment at the course level will be of the greatest use to you. The rest of this chapter will, therefore, focus on it .–You may wish to compare the following suggestions to the statements on course evaluation in Chapter 7.

PLANNING YOUR COURSE NEEDS ASSESSMENT

Since there are many ways to assess needs and many techniques that can be employed, it is advisable for you to draw up a plan that will assist you to make the necessary decisions. Questions to be borne in mind when planning a needs assessment for your course include some of the following:

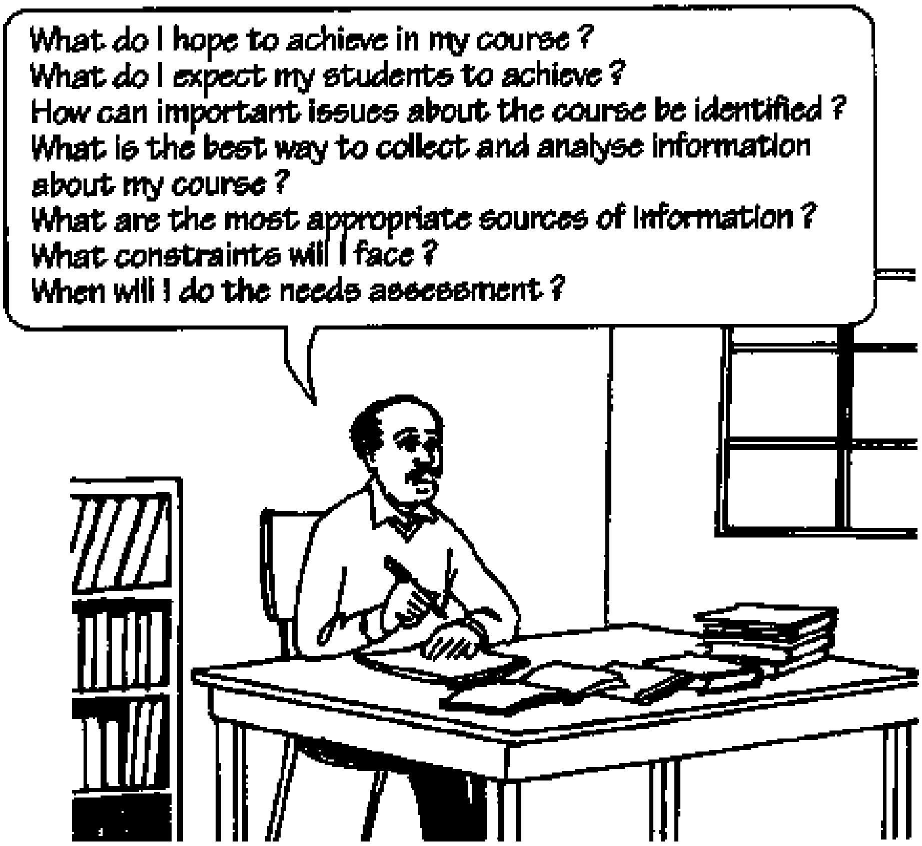


Figure 2.8 Raising planning questions about our needs assessment

Plans will differ from course to course but the basic elements are the same.

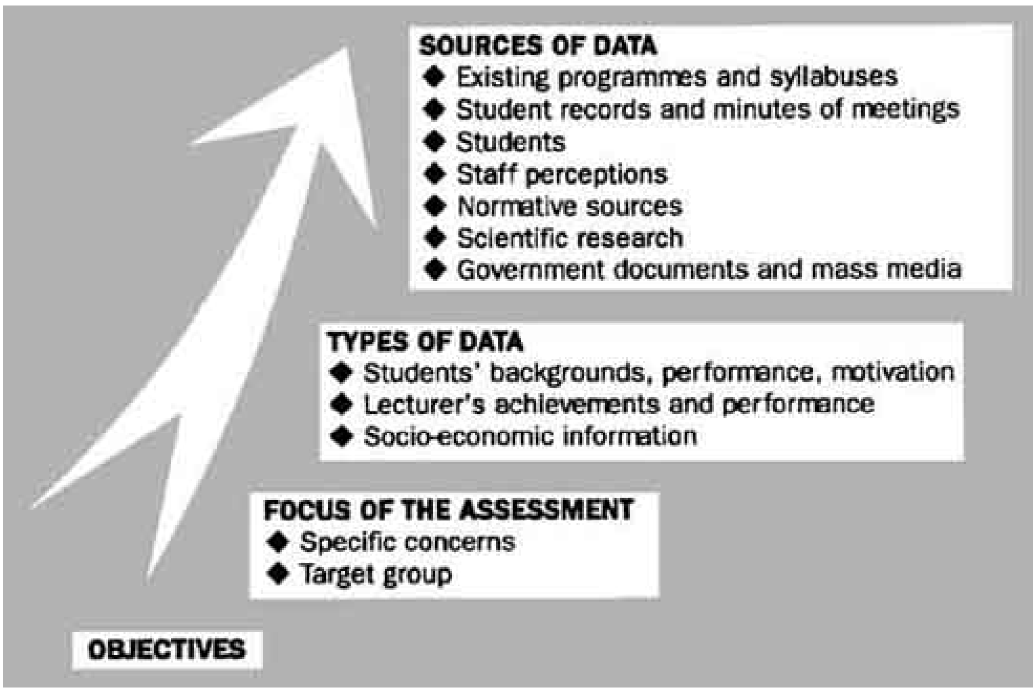


Figure 2.9 Elements of a needs assessment plan

Objectives

Most likely the purpose for carrying out your needs assessment is to improve teaching and learning. Perhaps you want to match the needs and learning styles of the students with your teaching approaches. Each time you carry out a needs assessment you must be clear about your objectives.

Focus of the Assessment

The needs assessment should focus on specific concerns to ensure that the results contribute to course planning. The issues may be general, focussing on the lack of facilities, new technology requiring information dissemination, or the needs of students to find employment after graduation. They may also relate to specific problems and needs such as the training of music teachers or engineers, thus defining course topics and the target group. You may identify such concerns by talking to the university students and staff, faculty experts in subject areas or by using your past experience. As far as course level needs assessment is concerned, your main focus will usually be on the students, the learning environment and your own teaching effectiveness.

In−built course assessment is usually done as part of your regular planning and teaching. It, therefore, does not require extra resources.

Types of Data

It is also important to select, at the planning stage, the data to be collected to address identified issues. Generally you can gather data on:

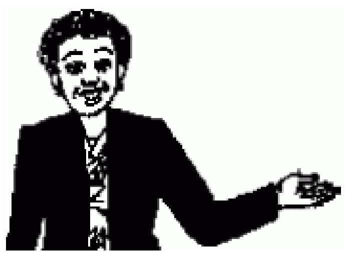
- individual student performance;
- individual student characteristics;
- the teaching and learning environment;
- educational achievement indicators.

Data About Students' Backgrounds, Performance and Motivation

Let us discuss some of the information you may wish to gather about your students.

Academic Background and Experience

Here, you should try to find answers to the following questions:



- What knowledge, skills and attitudes relevant to the course do the students have?
- What relevant experiences have they acquired already?

This information will enable you to pitch your course appropriately, or if you find that the students do not have the required prerequisites, to arrange for remedial work by referring them to suitable reading materials. On the other hand, if, for example, you are teaching engineering, and you find that many of your students do not have much experience with machines, as will be the case with most students who come from the rural areas, you could show them some relevant videos.

Think about any of the courses that you teach; 1. What pre−requisite knowledge, skills, attitudes and experiences would you want your students to have? 2. What action would you take to ensure that those who don't have the pre−requisites acquire them?

Motivation

Asking the following questions will enable you to gauge the level of motivation of your students:

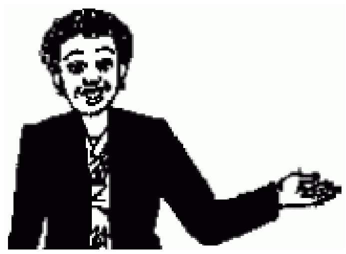
- ☐ What are the students' interests?
- ☐ What are their reasons for taking the course?
- ☐ How does the course relate to their future career aspirations?
- ☐ How appropriate is their learning environment?

Most African university students are highly motivated. However, it is not unusual to find some of them taking courses in which they have little interest. This is the case for many of those in the non−professional faculties who want to obtain a university degree but have failed to get admission to their preferred programmes. This point is also discussed in Chapter 3. It is a great challenge to you to design a course for such students and find ways and means of motivating them.

For any of the courses that you teach, how would you plan to enhance students’ motivation?

Learning Styles and Habits

You can gain useful information in this area by asking yourself:



- ☐ What are the students' learning styles?
- ☐ What are their study habits?

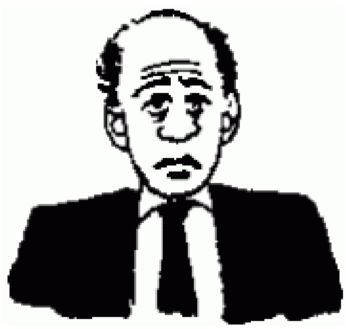
Information on the students' learning styles will help in selecting suitable teaching methods and media. − Chapter 3 discusses learning styles in detail.

Our education systems are very heavily oriented towards examinations. In the primary and secondary schools, our students learn by memorizing facts for reproduction in the examination and are very dependent on the teacher. Therefore, they will come to the university without relevant study ski l ls. This has led to the establishment of Communications Skills Programmes in all public universities in Kenya. These offer compulsory courses for all first year students to help them acquire skills such as using the library, note taking, reading, writing term papers and taking part in discussions.

What problems related to study skills do your students have? Think of several ways in which you could assist them to overcome these problems?

Demographic Information

Asking questions such as the following will assist you to get useful information:



- How many students will there be?
- What will their age range be?
- What other courses will they be taking?

This information will help you make decisions on:

- teaching methods and media;
- topics to select;
- examples to use;
- types of evaluation.

Individual Performance

Throughout your course you will want to assess how well your students are performing. What are their strengths and weaknesses? What course content has not been mastered and needs to be revisited? What topics, other than the ones you planned for, should be included in the timetable because your students need them? Are your teaching methods achieving the desired results or should you change to another approach? – An extensive discussion of student evaluation is presented in Chapter 7.

1. Keeping these questions in mind and referring back to Figure 2.3, make a list of how you assess the individual performance of your students. 2. From these assessments what learning needs have you identified recently?

You will also want to gather information about how effectively you are teaching.

Data About the Lecturer's Achievements and Performance

You can improve your teaching and learning through close observation, collection of feedback on student learning and acquisition of knowledge about how students learn. More specifically, you can find out how students respond to particular teaching approaches. You will, therefore, want to collect data on how they feel about your course and the methods you are using. It is a good idea to have a course assessment every semester.

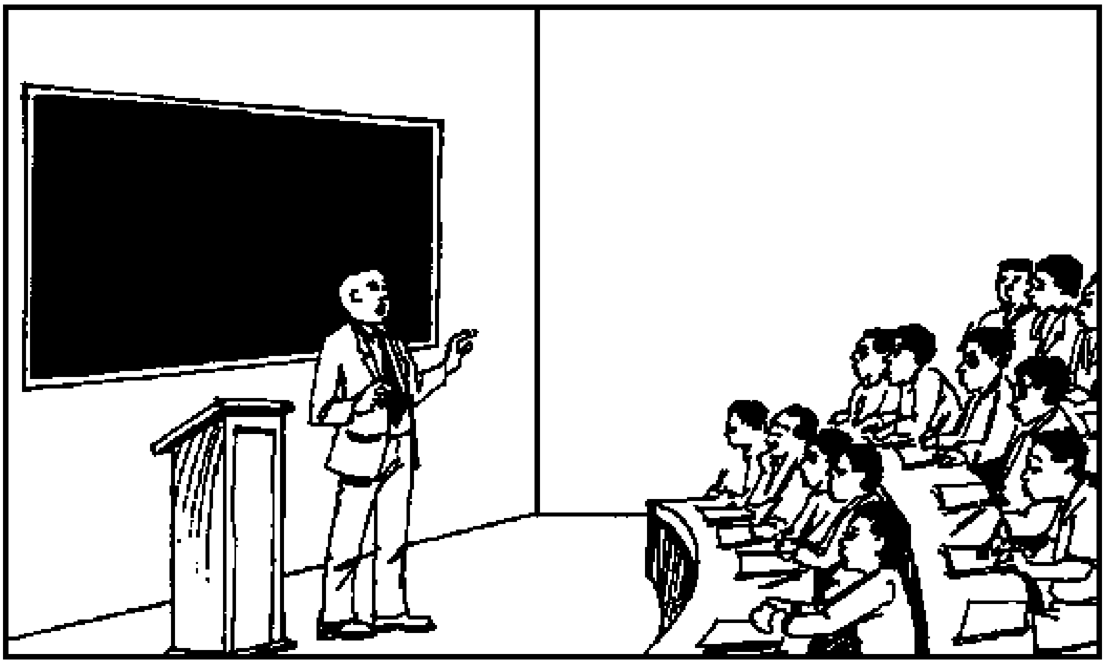


Figure 2.10 How effective are our teaching methods in promoting student learning?

You can also assess your course yourself. If you set out clear course objectives at the beginning, during your assessment you can see how many of these have been met. This will be an indication of educational achievement. A check list is also a useful tool to assess such areas as teaching methods, classroom environment, communication, questioning, and student participation. We shall discuss this further under 'Data Gathering Techniques'.

The information you obtain will identify teaching–learning needs that you can plan to meet in the next semester.

Have you ever assessed your teaching? What strengths and weaknesses were identified? Who provided feedback to you?

Data about Society

At the strategic level you should also be aware of what the current issues are in the community and wider society. These have a direct effect on your department and, eventually, the courses you teach. Relating the subject matter to real life situations also helps to make it relevant and interesting. – Grace Bunyi discusses this further in Chapter 4, but as far as needs assessment is concerned, she identified the following three areas.

The Needs and Aspirations of Society

African societies, in general, have national development needs. They are currently facing such problems as food insecurity, population explosion, lack of appropriate technology, lack of safe drinking water, and diseases. As we design our courses, we should be conscious of the need to train our students to analyse and find solutions to these.

The Socio–Political and Economic Philosophy of the Society

Since public universities in Africa are financed entirely by government funds, it is expected that the courses they offer are in line with the socio–political and economic philosophies of the respective nations in which they are situated. Although we are not saying here that our courses should propagate these philosophies regardless of their value, it is important to understand them in order to find ways and means of dealing with them. Knowing what cultural values the society emphasizes is useful. For example, whether society favours individual effort or group effort has implications for the methods we adopt.

The Needs of Social and Economic Spheres

The students we teach will, at a later date, work in social and economic spheres such as industry and agriculture. We should, therefore, continually carry out research in order to keep up with the changing knowledge, skills and attitudes of these different spheres. This will enable us to design courses that are relevant to the career needs of our students.

In many African countries, university students are no longer assured of getting employment on completion of their education. In the course that you teach, how would you prepare your students for such an eventuality?

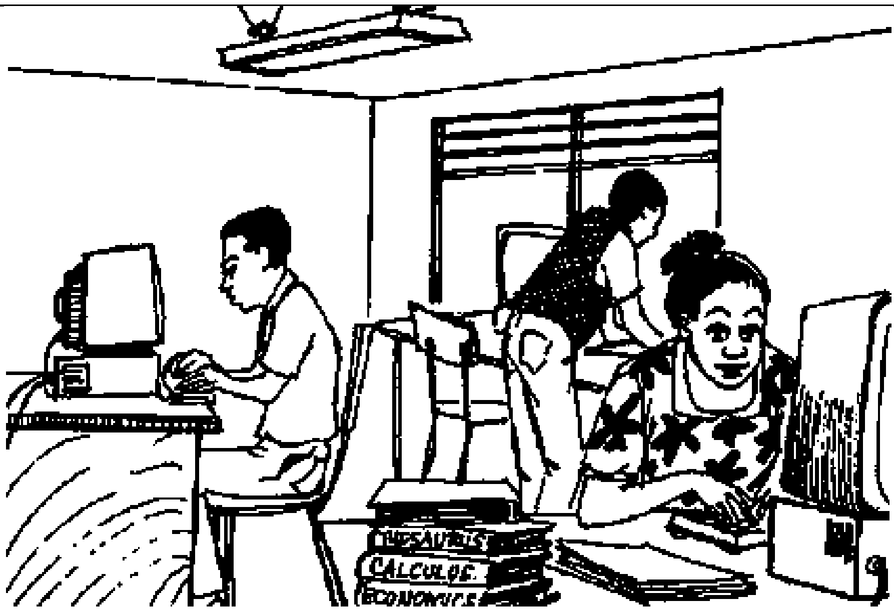


Fig 2.11 A group of self–employed university graduates

Sources of Information

There are a variety of sources from which you may obtain the data for your needs assessment. It is often helpful to have more than one point of view, so endeavour to collect information from as many sources as possible.

To assess the educational needs of your university students you may turn to:

Existing programmes and syllabuses: These indicate the content, structure and assessment procedures for your course.

Students' records and minutes of meetings: Useful information on the students' background, academic performance, awards, problems and other matters are recorded here. Departmental meetings also often raise issues related to students' needs.

Student opinions, attitudes and performance. Students, both past and present, can be an exceptionally useful source of information regarding teaching and learning. They may reveal which teaching methods best suit their learning needs, which topics they have not mastered or which projects interest them greatly. They may also point out that you, the lecturer, have a need for knowledge and skills in the areas of communication, teaching methods or counselling. How well you have taught and how well they have learned will be reflected in the students' tests, assignments and examination results.

Staff members' perceptions of needs. Your colleagues' perceptions of needs arising from their daily work provide a relevant source of information.

Normative sources: These are sources of data from which needs can be inferred by the study of comparative characteristics of similar individuals, groups or communities. You may look at other courses and the methods that were used. What were the achievement levels? Current literature in your field is also a useful reference at times.

Scientific research, new technology and developments: These can be used to identify needs. Research journals may be referred to for both course content and new approaches.

Data Gathering Techniques

We shall now consider some of the means of collecting information which may lead to the identification of needs. You may compare this passage to what is said on data gathering techniques in research (Chapter 8). – When analysing needs, you should remember, however, that different individuals and groups have different needs. The identification of these needs is an essential part of the teaching and learning process.

In deciding which techniques to use for gathering data remember to select:

- a technique that you are comfortable with;
- a method that is appropriate for your target group;
- one that gives you the required information;
- a technique for which you have sufficient time, personnel and appropriate facilities;
- a variety of techniques or approaches.

The data may be gathered:

- informally or formally;
- in a non–structured or highly structured manner;
- naturally or in a specifically organized way.

When choosing a data gathering technique, it is important to decide:

- what questions to pursue;
- who or what can provide answers to the questions;
- where the respondents or documents can be found;
- when and how the required information may best be collected.

The following are some of the techniques that could be used in a needs assessment.

Search of Documents

A search of relevant records, articles and texts can produce information or provide you with clues to problems. However, it does not always show causes of problems and may not reflect the current situation. The information collected can serve as a good beginning for focussing on particular needs that should be investigated more thoroughly. For your course needs assessment, such records as the minutes of curriculum planning meetings, student assessment records or the minutes of meetings from course team discussions are all possible sources of valuable information. Professional journals or reports of conferences may provide an insight to the newest thinking about teaching and learning methods. Don't forget to also refer regularly to the university calendar and syllabus.

Figure 2.12 Student records are a valuable source of information

Discussions and Interviews

Since learning is a co−operative venture between you, the lecturer, and the students, there is a need for you to have meaningful communication. This is often achieved through discussion.

Discussions and interviews will not only yield facts but can also be used to reveal feelings, perceptions of causes and possible solutions to problems. Since some goals of instruction include changing attitudes, interviews can be used to measure the gap between desired attitudes and actual attitudes, as a direct indication of needs. They also give the maximum opportunity for students to freely express their opinion. Respondents are more likely to elaborate on their comments and can be urged to answer. Interviews are, however, time consuming and difficult to quantify. Respondents may feel they are being pressed.

Discussions and interviews range from very informal, non−structured talks to formal, highly structured ones. It is important for you to adopt the technique and approach that best suits the needs, purposes and context of a particular situation.

Informal Discussion

Informal discussions often start spontaneously before or after a lecture. They may result from a chat in your office. Students may even meet during tea break to discuss their learning. It is good to encourage such meetings because often issues of real relevance are raised. They allow those taking part to air their feelings in a relaxed atmosphere. Although such discussions may have no preconceived focus they often centre on one or two points as the talk progresses.

Figure 2.13 An informal discussion in progress

Partially Structured Interviews

Here the lecture usually follows a schedule or a checklist of questions that are to be raised. Such interviews help to generate discussion but allow the respondents more freedom than structured ones.

In preparing this type of interview for a needs assessment you should:

- decide on the issues to be raised;
- decide how to record the information;
- write the guiding questions;
- write the probing follow−up questions;
- pre−test the questions on a few people similar to those you plan to Interview;
- revise the questions that are not clear, difficult to answer or do not provide the desired response.

Group Discussions

Group discussions may also be organized in a non−structured or structured way. Many times such discussions arise during class activities or during field work. They may produce very fruitful results.

These techniques are also elaborated in Chapter 5 where the authors focus on them as teaching methods rather than strategies for gathering information on educational needs. Chapter 3 provides valuable suggestions for optimizing small group work .

To initiate group discussion:

- ask questions;
- pose a problem;
- introduce the main issue and then let each group chairperson guide the ensuing discussion;
- present examples or case studies for discussion in a

  − verbal form,
  − visual manner like a video or film,
  − written paper.

When first identifying issues and needs, a non−structured approach may be best. At other times, especially when you want to focus on specific issues and keep a record of what is said, certain structuring techniques may be desirable.

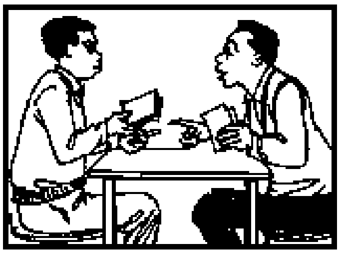
Let us examine a number of structured group discussion techniques.

The Pyramid Technique

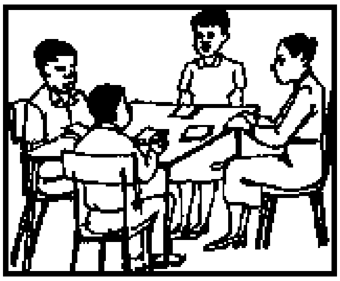
This method involves individuals focussing on specific problems or needs. They then share their thoughts in small groups and later with the whole group. The technique encourages everyone to participate. It allows open discussion and interaction.

When using this technique:

ask each student to write comments on a specific need or issue;

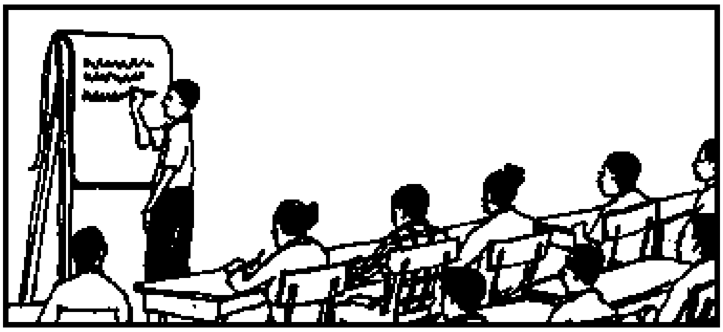


pair off students and let them discuss their comments, attempting to find mutually shared or different ones;



each pair joins another pair for further discussion;

each group of four joins another four and the discussion continues. A recorder lists the group's comments and one person is chosen to report;



the entire group reconvenes and responses are recorded on a flip chart.

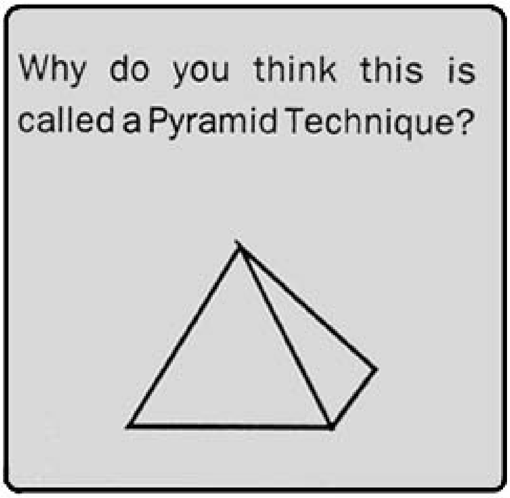


Figure 2.14 The Pyramid Technique

The Pinboard Technique

This technique has similar advantages to the pyramid technique. When using this procedure:

- ☐ give each student two cards;
- ☐ ask them to write a pressing need or problem on each card (or response to a question, or comment on an issue);
- ☐ request each student to pin one card on the pinboard for the group to read;
- ☐ when all the cards are pinned up, they are grouped by needs or problem areas;
- ☐ the areas are discussed and numbered by priority.

If there is time, the process is repeated for each student's second card.

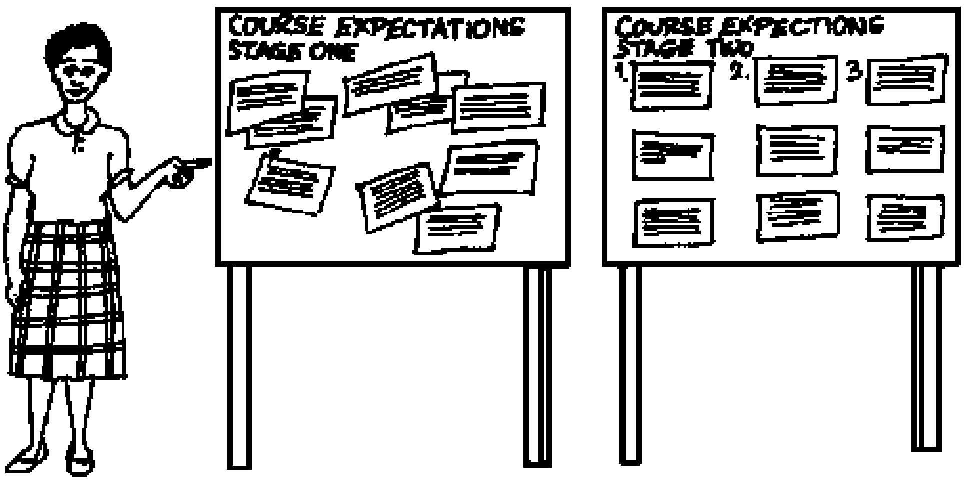


Figure 2.15 Using the pinboard technique

Brainstorming

Brainstorming is a useful way of gathering information about needs relatively quickly from groups of about 10 to 20 members. The steps you may follow include the following:

- ☐ in a lively and clear manner, present a specific need or problem or ask a question;
- ☐ encourage each member of the group to give a spontaneous response, no matter how far−fetched;

☐ responses are recorded in each group but no comment or judgement is made at this stage to ensure that novel and unusual responses are not discouraged;

☐ encourage group members to develop each other's responses;

☐ when there are no more responses, give the groups time to discuss, synthesize and evaluate the suggestions;

☐ the ideas are then shared as each group reports back. (If there is only one group this last step is not necessary).

Buzz Groups

A buzz group consists of 2 to 4 people who discuss a question, need or problem for a short period of time. It is a useful technique which allows each group member to focus on a specific topic prior to a more general discussion. Responses should be recorded as brief notes.

Observations

Observations provide first–hand information about activities and problems. They are often the only way of obtaining direct measures of performance. Most of us spend a lot of time observing our students. If you notice puzzled faces or other forms of body language during a lecture, this may indicate that further explanation is needed. By making our observation more systematic we can collect much useful information. Observation may also confirm information generated by other techniques.

Again, as with other methods of collecting data, there are various styles of observation. Open observation requires experience and skill as it is not always easy to decide which events should be focussed on and which ones are important enough to be recorded. It is, therefore, a good idea for you to assess certain aspects of particular interest by introducing some degree of structure. Records could be kept in the form of field notes. At times information may also be recorded on a tape or video recorder if such equipment is available.

A structured observation makes it possible to maintain focus on specific items. It also makes the task of observing and recording easier. You may prepare an observation schedule yourself. This could take the form of a list of items to look for and make comments on. When observing a junior lecturer you might use the following schedule. You can put grades in the boxes and write comments on the lines.

Observation Schedule

Lecturer’s name _______________ **Date** _______________

Course _______________________ **Time** _______________

Topic _________________________

☐ Lecture objectives

☐ Learning environment

☐ Use of student’s previous knowledge

☐ Organization of lecture

☐ Pacing of lecture

☐ Clarity of information

☐ Use of teaching and learning aids

☐ Attitude of students

☐ Students’ participation

- ☐ Student's feedback
- ☐ Variety and level of questions to students
- ☐ variety and level of questions from students

Figure 2.16 Lecture observation schedule

The headings allow you some flexibility while still maintaining focus. The notes you keep are a starting point for discussion with the lecturer and the students. This discussion will improve their understanding and increase their awareness of what is happening in a lecture. It will also provide you with various needs from both the teaching and learning point of view.

1. With prior arrangements, visit a colleague's class and apply the observation schedule in Figure 2.16 (or one you have developed yourself). 2. Discuss the results with your colleagues. 3. Invite your colleagues to come and observe you teaching. 4. Plan with your colleagues how you may improve your teaching.

Paper−and−Pencil Techniques

Information may be collected by a variety of paper−and−pencil techniques. These can reach many people, provide anonymity, are relatively inexpensive, permit time for reflection before answering and are cost−effective. They can be given to a large number of people simultaneously, are more easily standardized than interviews and are relatively easy to analyse. We are going to describe a few of these.

Assessment Results

Assessment results can provide valuable information about teaching, learning, resources and the educational setting. Any form of assessment you use in your course will provide data for a needs analysis: a quiz, a test, examinations, group surveys, project reports. As illustrated in Figure 2.5, assessment is not an end point in learning but a means of improving it.

Questionnaires

A questionnaire is a collection of written questions which are usually answered in the absence of the person collecting the information. − Please look also on Chapter 8. − You can collect information quickly from a large number of people using this technique. However, make sure that the:

- ☐ questions are not ambiguous;
- ☐ layout facilitates the flow of questions;
- ☐ instructions are clear;
- ☐ information is easy to analyse later;
- ☐ questionnaire is not too long (3−4 pages).

When you are developing a questionnaire for your needs assessment, you may use open−ended or closed questions. Closed questions allow the respondents very little latitude in answering and some respondents even become frustrated because the choice of answers does not fit their desired response. Such questions are, however, often considered easier to answer and analyse.

Example

Did you find the demonstration useful?

Yes ☐ No ☐

How useful did you find the demonstration?

Very useful ☐ Not useful ☐

Open–ended questions, on the other hand, allow the respondents more freedom in the way they answer and in the kind of information they give. They are easier and quicker to write but are more difficult to analyse. They also take much more time to summarize.

Example

What other field experiences would you find helpful?
....
What were your reactions to this term's tutorials?
....

It is often useful to combine closed and open–ended questions in a questionnaire. This provides specific information and, at the same time, allows the respondents to expand their answers.

Example

How useful did you find the demonstration?

Very useful ☐ Useful ☐ Not useful ☐

How could it have been made more useful for you?

Information from questionnaires may be summarized in various ways. A blank questionnaire may be used to tally closed questions.

Example

Did you find the tutorials helpful?

Yes ☐	No ☐
𝍸 𝍸 𝍸 || = 17	||| = 3

For open–ended questions you may use sheets of paper or cards. Each time a new idea or comment is noted, write it on a card. If the same or a similar idea is noted, add it as a tally on the same card.

Example

What other field experiences would you find helpful? (Students have visited a brewery).

Responses tallied on this card included:

We should see how local brews are made. (II)
I want to interview traditional beer makers. (III)
It would be helpful to see what the components of locally made brews are. (I)
There are a variety of traditional beers that we should analyse. (I)

Once all the responses were recorded on the card, the information was then summarized like this:

Visits to traditional beer makers (7)

Checklists

Checklists, as we have already mentioned, are a useful way to collect, record and summarize information. A task, process, activity or area of responsibility is broken down into detailed parts or steps and these are arranged in a logical sequence. A column allows the lecturers or students to assess areas of knowledge, skill or practice. All items are work–related and do not contain reference to non–learning problems.

Study the learning needs assessment scale that follows. Tick those items you do regularly each semester. Give yourself a rating on a scale from 0 – 5. What are you going to do about the areas you have not ticked or for which you have given yourself a low rating?			
Functions and Performance Statements		**Regular Activities**	**Rating 0–5**
1 Learning Needs Assessment			
	Use competency–based models, performance analysis, and other needs assessment techniques.		
	Design and use various instruments, surveys, questionnaires, and other data–collection methods.		
	Analyze data and translate into course needs.		
2 Develop Learning Strategies and Designs			
	Select best strategies to meet learning needs.		
	Use learning theories and principles.		
	Develop learning objectives and designs.		
	Use diverse learning methods.		
3 Provide Learning Materials			
	Research and collect information from print and non–print sources.		
	Develop multimedia materials.		
	Write and produce case studies, exercises, manuals, and other print materials.		
	Evaluate film, software, packed programmes, and other materials.		
4 Facilitate Group Learning Activities			
	Use effective presentation methods.		
	Use group interaction methods.		
	Use full range of learning methods.		
	Use audiovisual equipment and materials.		
	Use computer–based instruction.		
5 Evaluate Learning Results			
	Design and use methods and instruments to collect learning–related data.		
	Formulate recommendations for course redesign.		
6 Internal Consulting			
	Conduct data collection and problem analysis.		
	Formulate strategies and develop plans to solve learning–related problems.		

	Consult with colleagues regarding problem analysis as well as strategies and resources required to solve learning problems.		
	Prepare organizational climate for change.		
	Work with a wide variety of personalities and styles to implement plans.		
	Evaluate effectiveness of strategies and plans.		
7 Individual Counselling			
	Assist students to assess learning needs and develop learning plans.		
	Provide learning−related information and resources.		
8 Management			
	Develop and maintain a positive working relationship with colleagues and administration.		
	Communicate the importance of human resource development.		
	Develop yearly and multi−year training and development plans for programmes.		
	Develop positive work environment.		
	Effectively supervise and motivate other staff.		
	Contract, manage, and evaluate consultants for projects.		
	Schedule and co−ordinate staff, facilities, materials and equipment to meet course goals.		
	Develop and maintain an information system providing performance data to staff, administration and other departments.		
	Evaluate individual student, staff and programme performance.		

Figure 2.17 Learning needs assessment scale

Source: Adapted from: Ray Bard, Chip R. Bell, Leslie Stephen, and Linda Webster, 1987.

Delphi Technique

The Delphi technique is a useful method of systematically collecting and combining information on needs from a number of individuals. It involves gathering data which is analysed and then fed back to the group members to elicit further information which is also analysed and fed back. The technique, therefore, comprises a number of cycles of activity which could involve the following procedure:

- ask participants to list 5 (or 8, or 10) important skills or knowledge items that they need, or specific issues that concern them;
- collate the results;
- circulate the list to participants and ask them to rate the importance of each cluster of items (1−...) using each number only once;
- collate the results again;
- circulate the list to participants again and ask them to rate the− importance of each item considering their ideas in light of the overall group response;
- collate the results once more;
- discuss the results with all the participants;

☐ plan what to do.

Figure 2.18 Planning what to do as the final step in the Delphi Technique

Self-assessment and Student Review

This data collection method can give lecturers and students some perspective on their needs. Activities may be compared to normative standards. The three examples of appraisals in this section were adapted from ones prepared by the Centre for Enhancement of Teaching Effectiveness, Murray State University, Murray, Kentucky, U.S.A.

Study this student appraisal for teaching. It is brief and takes little time to complete. Try using it at the end of some of your teaching sessions.				
STUDENT APPRAISAL OF TEACHING				
This card enables you to rate your lecturer/instructor. For each of the aspects listed below, ring the numbers which best represent your view.				
ASPECT	**POOR**	**FAIR**	**GOOD**	**EXCELLENT**
Organization	1	2	3	4
Knowledge of subject	1	2	3	4
Communication	1	2	3	4
Responsiveness	1	2	3	4
Feedback	1	2	3	4
This lecturer/instructor compared to others	1	2	3	4

You could also appraise your teaching session yourself. Here is a checklist you might use at the end of a course to assess what needs there are for improvement. Mark the space in the box with the number indicating your response. Use the following ratings:

1 = Strongly disagree 2 = Disagree 3 = Agree 4 = Strongly agree

1. The objectives of my course were clear.	☐
2. I was well prepared for the course.	☐

3. I appeared to be knowledgeable in the subject field.	☐
4. My course was well organized.	☐
5. I communicated the subject matter well.	☐
6. My course requirements were clear to the students.	☐
7. I was fair and impartial.	☐
8. I was genuinely concerned about the progress of the students.	☐
9. I stimulated independent thinking.	☐
10. I stimulated students to do well in the course.	☐
11. I treated students with respect.	☐
12. I was responsive to students questions and ideas.	☐
13. I was enthusiastic about the subject.	☐
14. I stimulated interest in the subject(s).	☐
15. Activities were consistent with the course objectives.	☐
16. I determined final student grades fairly.	☐
17. My students appear to have gained a great deal of new knowledge from this course.	☐
18. The topics of discussion were relevant to the course content and objectives.	☐
19. I taught all of the class sessions scheduled.	☐
20. I provided opportunity for 'going over' tests.	☐
21. I was available to students during the posted office hours.	☐
22. Students appeared to respect me.	☐
23. I often related lectures to the students' personal experiences.	☐
24. What I talked about in class was almost always related to the course objectives and content.	☐
25. Exam questions were based on text, classnotes, and assignments.	☐

Add other questions that you feel are relevant to appraise your own teaching effectiveness. You could include some questions on the teaching–learning environment or the use of media.

Lastly, let us study a more detailed student analysis of teaching.

Teaching Analysis by Students (TABS)
The Centre for Enhancement of Teaching Effectiveness is working with instructors to improve the quality of teaching that they offer to their students. This questionnaire is designed to help instructors identify their

particular teaching strengths, isolate any specific instructional areas for improvement, and develop instructional strategies directed at maximizing strengths and improving instruction.
In order to identify these teaching strengths and areas for improvement, the Centre is collecting information about teaching in this course in at least one of the following ways: by discussing course design and teaching patterns with your instructor, by observing and video–taping some classes, and by asking for student opinions about performance on some specific skills and behaviours. The information will be used by your instructor only; this process is completely separate from end–of–the semester course evaluations. Thus, your responses will be of most value to your instructor as s/he works towards improvement if your answers are thoughtful and honest. Your co–operation will be very much appreciated
Section I Teaching Skills and Behaviour
This questionnaire includes statements describing a variety of specific teaching skills. Please read each statement carefully and decide the extent to which you feel your instructor does or does not need improvement, given your own style of learning. Respond to

each statement by selecting one of the following options:
1. No improvement is needed.
2. Little improvement is needed.
3. Improvement is needed.
4. Considerable improvement is needed.
5. Not a necessary skill or behaviour for this course.
Now write the number of your choice in the box.

1. The instructor's explanation of course objectives	☐
2. The instructor's explanation of the purpose of each class session and learning activity	☐
3. The instructor's ability to arouse my interest when introducing an instructional activity	☐

4. The instructor's explanation of the work expected from each student	☐	
5. The instructor's ability to maintain a clear relationship between the course content and the course objectives	☐	
6. The instructor's skill in clarifying the relationship among the various topics treated in the course	☐	
7. The instructor's skill in making clear the distinction between major and minor topics	☐	
8. The instructor's skill in	☐	

adjusting the rate at which new ideas are covered so that I can follow and understand them		
9. The instructor's ability to clarify material that needs explanation	☐	
10. The instructor's speaking skill	☐	
11. The instructor's ability to ask easily understood questions	☐	
12. The instructor's ability to ask thought–provoking questions	☐	
13. The instructor's ability to answer questions clearly and concisely	☐	

☐	
14. The instructor's ability to lead classroom discussions ☐	☐
15. The instructor's ability to get students to participate in class activities ☐	☐
16. The instructor's skill in facilitating discussions among students as opposed to discussions only between the instructor and students ☐	☐
17. The instructor's ability to wrap up before moving on to a new topic	☐
18. The instructor's ability	☐

to tie things together at the end of class	
19. The instructor's explanation of precisely how my work is to be evaluated	☐
20. The instructor's ability to design evaluation procedures that stress the accomplishment of major course objectives	☐
21. The instructor's performance in periodically providing opportunities for me to assess my progress in learning such as exams, conferences and papers	☐
22. The	☐

instructor's selection of materials and activities that are thought–provoking		
23. The instructor's ability to select materials and activities that are not too difficult	☐	
24. The instructor's provision of variety in materials and activities	☐	
25. The instructor's ability to use a variety of teaching techniques	☐	
26. The instructor's ability to structure course content and learning experiences in creative, vivid, and	☐	

unexpected ways	
27. The instructor's management of day–to–day administrative details such as correcting exams, providing necessary materials, scheduling course activities and announcing exams	☐
28. The instructor's flexibility in offering options for individual students	☐
29. The instructor's ability to take appropriate action when students appear to be bored	☐
30. The instructor's availability for personal consultation	☐
31. The instructor's ability to	☐

relate to people in ways that promote mutual respect		
32. The instructor's maintenance of a learning environment in which students feel free to share ideas and questions	☐	
33. The instructor's ability to inspire excitement or interest in the content of the course	☐	
34. The instructor's ability to relate the subject matter to other academic disciplines and real world situations	☐	
35. The	☐	

instructor's willingness to explore points of view other than his/her own	
36. The instructor's ability to get students to challenge points of view raised in the course	☐
37. The instructor's performance in helping me to explore relationship between my personal values and the course content	☐
38. The instructor's performance in making me aware of value issues within the subject matter.	☐

Section II Other Information	
Please tick the appropriate response for each of the following items beside the correct statement number.	
39. Class:	
	(1) freshman
	(2) second year
	(3) third year
	(4) fourth year
	(5) graduate student
40. Sex:	
	(1) male
	(2) female
41. Overall grade point average:	
	(1) less than 1.50 (lowest)
	(2) 1.50–2.49
	(3) 2.50–2.99
	(4) 3.00–3.49
	(5) 3.50–4.00 (highest)
42. In terms of the directions my life is taking, this course is:	
	(1) relevant
	(2) somewhat relevant
	(3) irrelevant
	(4) I am not sure
43. In this course I am learning	
	(1) a great deal
	(2) a fair amount
	(3) very little
	(4) I am not sure

44. As a result of this course, my attitude toward the instructor is:	
	(1) becoming more positive
	(2) becoming more negative
	(3) unchanged
45. As a consequence of participating in this course, my attitude toward the subject matter is:	
	(1) becoming more positive
	(2) becoming more negative
	(3) unchanged
46. I would prefer that this course:	
	(1) become more structured or organized
	(2) become less structured or organized
	(3) maintain about the present level of structure
47. Which of the following descriptions of student learning styles most nearly approximates your own? (Choose only one.)	
	(1) I like to think for myself, work alone, and focus on learning personally relevant content.
	(2) I prefer highly structured courses and will focus on learning what is required.
	(3) I try to get the 'most out of

	classes' and like sharing my ideas with others and getting involved in class.
	(4) I am competitive about getting good grades, and try to learn material so that I can perform better than others.
	(5) I am generally turned off as a student, uninterested in class activities and don't care to work with teachers or other students.
48. About how much time and effort have you put into this course compared to other courses of equal credit?	
	(1) much more
	(2) somewhat more
	(3) about the same amount
	(4) somewhat less
	(5) much less
49. Generally how valuable have you found the assigned readings in terms of their contributions to your learning in this course?	
	(1) very valuable
	(2) fairly valuable
	(3) not very valuable
	(4) there have been no assigned readings

50. Overall, I would rate this course as:	
	(1) excellent
	(2) good
	(3) fair
	(4) poor

Diaries

Diaries are written records of events. They can be brief notes kept on a log sheet or longer personal reports. They are useful in building up a regular record of events over a period of time. Diaries are most appropriate for monitoring learning during classroom events, projects or fieldwork. They may also be a useful record during the development of curriculum materials or specific student group activities. Such records may reveal needs and issues that you could focus on to improve later learning events. They are also useful aids to memory when it comes to writing your annual reports. Sometimes they may assist another lecturer who has to stand in for you when you are on leave. A similar method is the 'work−done−record' described in Chapter 7. Here is an example of a log sheet from a lecturer's diary.

Date	Notes on activity, problem, issue, plan	Location	Time spent	Material or equipment used

Unmet Needs Conference

Such a conference consists of a large meeting with numerous small group discussions held simultaneously. The discussion in each group is centred on a broad theme or issue such as 'large classes', 'lack of learning materials' or 'what we hope to achieve in this programme'. You may use this type of conference to find out the nature and extent of the needs of individuals, departments and faculties. It will also provide you with the opportunity to address university problems co−operatively.

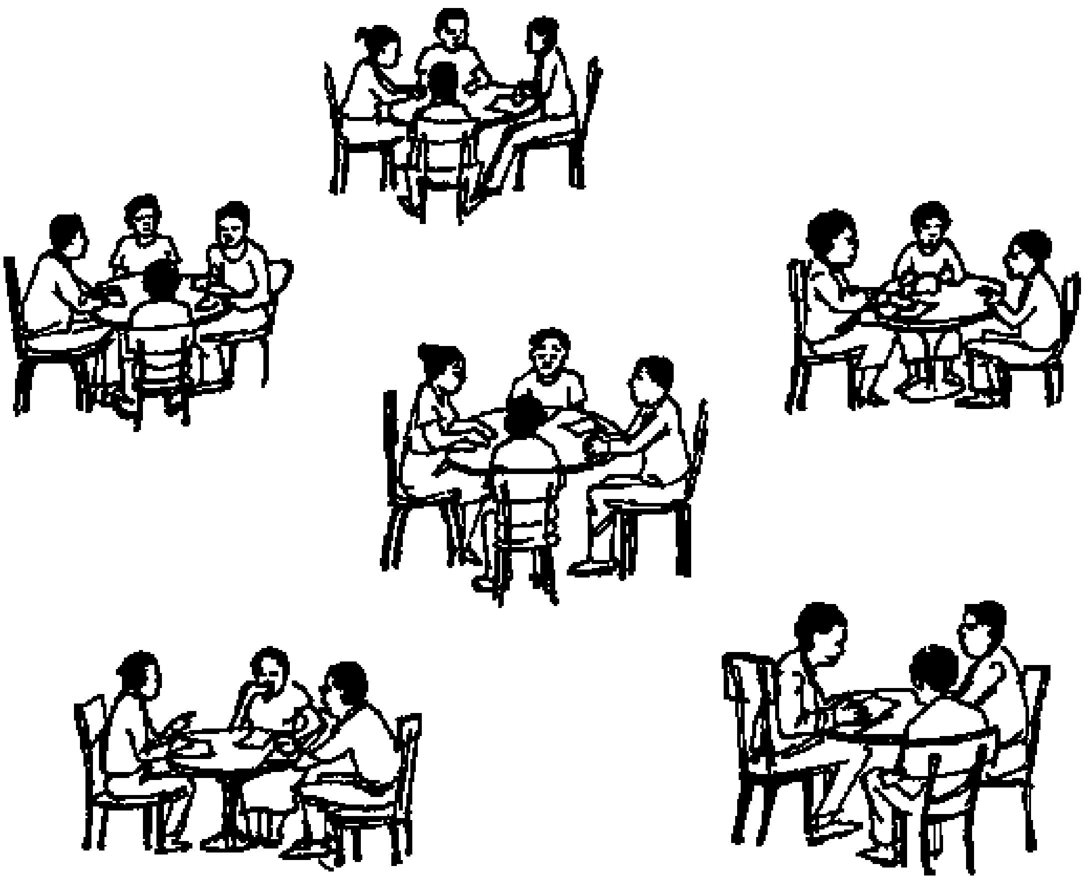


Figure 2.19 An Unmet. Needs Conference in progress

Triangulation

In order to obtain as complete and unbiased needs assessment information as possible with data from a variety of sources, you should try to use three or more techniques. Such an approach also tends to be more reliable. You might, for example, use a questionnaire, interviews and follow−up observations.

Another method is to follow up a group of students over a period of time. You can then check if their needs are consistent and which needs or problems seem to be most pressing.

Advantages and Disadvantages of Various Data Gathering Techniques

To assist you in your decision making, a summary of the advantages and disadvantages of the techniques we have discussed is provided.

Methods	Advantages	Disadvantages
1 Searches of documents	☐ Objectives analysis in syllabus, course outlines – cognitive, skills, attitudes	☐ Not always available
	☐ Content analysis in syllabus, course outlines – identify dimensions, verify	☐ Does not usually indicate priorities
	☐ Overview of issues	☐ Some objectives are impossible to achieve
	☐ Clues to problems	☐ May not show causes
		☐ Not always up−to−date

2 Discussions and interviews	☐ Provide clarification of views	☐ Time consuming
	☐ Able to compare views	☐ Reluctance to admit needs
	☐ Free expression	☐ Can be expensive
3 Pyramid assessment	☐ Learning groups formed	☐ Limited to about 40 people
	☐ Minimal time required	☐ Final needs tend to be general rather than specific
	☐ Students take maximum responsibility	☐ Minority needs lost
4 Pinboard method	☐ Individualized	☐ For small groups
	☐ Discussion	☐ Takes time
	☐ Highly motivating	
	☐ Time to reflect	
	☐ Needs grouped by themes	
5 Brainstorming and Buzz Groups	☐ Information gathered relatively quickly	☐ Some irrelevant responses recorded
	☐ Everyone encouraged to participate	☐ One person may dominate group
	☐ Spontaneous responses	☐ Focus may be lost
	☐ Group discusses, synthesizes and evaluates responses	☐ May inhibit some individuals
6 Observation	☐ First–hand information about activities and	☐ Time consuming
	problems	☐ May be stressful
	☐ Concurrent or follow–up observations	☐ May be biased
	☐ Clear indication of current needs	
	☐ Useful in confirming information generated by other techniques	
7 Assessment results	☐ Valuable information on	☐ May be biased
	– learning	☐ May omit reasons for results

	– resources	
	– teaching	
	☐ Clues to problems	
	☐ Readily available	
8 Questionnaires and surveys	☐ Individualized	☐ No guaranteed return
	☐ Can clarify points	☐ Not always completed
	☐ Cost effective	
	☐ Can reach many people	
9 Checklist	☐ Practical, work–related	☐ Related only to tasks
	☐ Minimal time required	☐ Not all needs included
	☐ Task, process, activity or area of responsibility dearly broken into steps	☐ No discussion
10 Delphi Technique	☐ Individualized	☐ Takes time
	☐ Skills and knowledge needs clarified	☐ Needs competent collator
	☐ Priorities identified	☐ Not self–pacing
	☐ Motivating	
11 Self–assessment and	☐ Individualized	☐ May not be honest
student review	☐ Learning activity needs	☐ May omit certain areas
	☐ Good perspective on own needs	
12 Diaries	☐ Regular records	☐ Personal perspective
	☐ Monitor events	☐ Take time if detailed
	☐ May provide deep insights	
13 Unmet Needs Conference	☐ Good for large groups	☐ Takes time
	☐ Co–operative discussion of problems	☐ Needs effective planning
	☐ Broad themes	
14 Triangulation	☐ Fuller information	☐ May require more time
	☐ Less biased	☐ May require more personnel

	☐ Various perspectives	
	☐ Clearer interpretations	
	☐ More critical analysis	

Figure 2.20 Advantages and disadvantages of data gathering techniques

Prepare two data gathering instruments such as an observation schedule, questionnaire, interview or checklist. If you are using discussion techniques describe the technique and write out the guiding questions.

Processing the Information

Once you have administered the questionnaires, conducted interviews and observations, and searched relevant documents, what you have collected is raw data. This, in itself, is not information on needs. Information has to be systematically produced from the available raw data to be used in making decisions about your course. You may have to tally the responses, work out percentages, close open−ended questions and write verbal descriptions of what you find out. − Data analysis and report writing are discussed in more detail in Chapter 8.

In analysing needs there are four main questions that should guide you:

- ☐ Do any needs exist?
- ☐ Are the needs identified educational needs?
- ☐ What are the causes of the identified needs?
- ☐ What are the priorities among the identified needs?

The analysis then consists of judging and comparing one set of data with another that represents some standard to determine if there is any variance. In a course needs assessment, the analysis would aim at comparing collected data describing current circumstances with some standard that describes a more desirable condition.

The next step is to determine which of the identified needs are educational needs and which would be more appropriately reduced by administrative or other non−educational means. Educational needs, as mentioned earlier, can be defined in terms of deficiencies of knowledge, skills and attitudes and can be addressed through educational means. Non−educational needs require administrative action, such as policy changes, purchase of new equipment or alterations in staffing patterns. Some needs, of course, contain elements of both. You should pay careful attention to their interactions.

You may identify a number of areas in your teaching sessions that may have to be changed. Some factors you should consider at this stage are:

- ☐ the seriousness of the problem;
- ☐ the number of staff or students affected;

☐ the potential of solving the problem through educational means;

☐ the available resources;

☐ the relationship between the course, programme and university goals;

☐ time investment required;

☐ capability and willingness of yourself as well as other staff to take part in professional training and make necessary changes.

You can then weigh these factors and make a priority list indicating those needs that should be addressed first. Others can be tackled if time and resources permit.

1. Make a list of some of the concerns and needs your students have expressed recently.
2. Which of these are educational needs and which are non−educational ones?
3. Prioritize the educational needs.
4. Plan how you can meet some of these needs and reduce some of the problems.
5. Discuss your plans with a colleague.

Making Use of the Assessment Results

You may ask yourself once more, 'What is the purpose of needs assessment, especially classroom assessment?'. Cross and Angelo (1988) offer a concept map to answer this question.

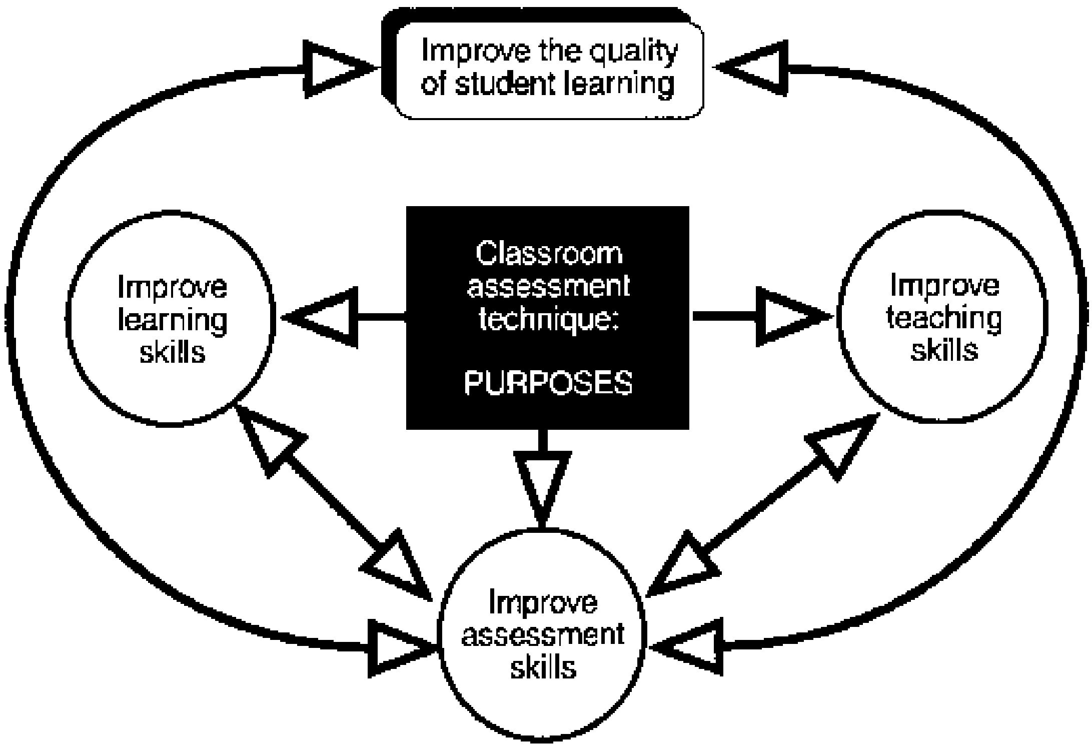


Figure 2.21 Purposes of classroom needs assessment

If the aim of your needs assessment is, therefore, to raise the overall quality of student learning by improving:

☐ learning skills;
☐ teaching skills; and
☐ assessment skills;

the information you gathered should be used towards those ends. This will probably call for a discussion with your students, other lecturers and personnel involved in the teaching−learning process. It will also require you to review your course and how your students interact with it.

The notes that you have made about your students' needs, the problems they experience and the issues that concern them will be the basis of your discussion. You could use some of the discussion techniques described earlier in this chapter to focus on these aspects. Together, you and your students may come up with suggestions on how to solve certain problems or change parts of the course.

Sometimes it will be helpful to make a brief report about your findings. First, this gives you an opportunity to organize the data, to systematize your thinking and to draw conclusions. Second, the report may be used as a basis for course planning decisions and later, in evaluation, to determine if the needs have been eliminated or reduced. Third, the report serves as a means of communication with your professional colleagues.

Besides giving copies of the report to deans, heads of departments and colleagues, it is a good idea to organize a meeting to discuss the findings and recommendations with those concerned about the issues of the needs assessment. This group could also indicate the actions that should be taken to make use of the findings. By involving other staff members in this way, there is a greater likelihood that they will support the actions that are initiated as a result of the study.

Figure 2.22 Share your findings with colleagues

You can do a lot individually by reflecting on the results from your needs assessment. How do the findings help you understand your course with a view to:

- ☐ sustaining it;
- ☐ developing it, and, where possible;
- ☐ improving it?

You will be able to make some changes, such as re−scheduling a practical, as the course is in progress. This will benefit students who are currently taking it. Other changes, such as replacing a required text will have to be done for the following course and so will benefit future learners only. A new teaching approach on the other hand, may have both immediate and long−term benefits.

Students are grumbling that Biology 304 is the most boring course they have had to take. They are also complaining that far too many of their peers are failing in the end−of−term examination for that subject. The best advice they can give their friends is to avoid Biology 304 if at all possible!

In carrying out a needs assessment about this problem:

a. Who could be your sources of information?
b. What data gathering techniques would you use and why?
c. How would you disseminate your findings?
d. What would be the best way to make use of your findings?

CONCLUSION

Without any form of needs assessment, education becomes teacher−oriented and directed. With the appropriate use of needs assessment you become a facilitator and your students will be more committed to their own and others' development. Needs assessment should, therefore, be an integral part of any university course. There are many reasons for conducting needs assessment at this level and many benefits. The overall purpose, though, is to obtain information so that you can better determine the nature, extent and priority of educational needs to develop courses that foster better teaching and learning.

There are three levels of needs assessment but we have focussed on the course level as being the most crucial for your everyday teaching, research and community service. The need to plan your assessment was emphasized. Outline the objectives, target group, focus of the assessment, type of data you intend to gather, the sources of data and the techniques you are going to use. Choose a technique you are comfortable with and that provides you with the required information. To obtain as complete and unbiased data as possible it was also suggested that triangulation should be an in−built component of your needs assessment.

Lastly, it is well worth spending some time to compile a brief report. This allows you to organize the data, draw conclusions and consider the implications of the findings. These should be shared as widely as possible with your colleagues, the administration if necessary, and your students.

To respond to the growing concern for quality university teaching and learning, to work out appropriate ways to meet the needs of the students and the community, needs assessment is one of the best tools you can use. It will increase the relevance of your courses and may be conducted, as we have seen, by relatively simple methods.

SUGGESTIONS FOR FURTHER READING

Bloom, B.S., G.F. Madaus and J.T. Hastings. *Evaluating to Improve Learning.* New York: McGraw−Hill, 1981.

> This book focusses on assessing students' learning. It is aimed at classroom teachers. There are sections covering issues such as: objectives; learning for mastery; summative, diagnostic and formative assessment; writing and selecting items for various levels of cognitive learning.

Cross, K. Patricia and Thomas A. Angelo. *Classroom Assessment Techniques: A Handbook for Faculty.* Ann Arbor, Michigan: University of Michigan, 1988.

> The purpose of this book is to help university lecturers and instructors improve teaching and learning in their classrooms. It provides the reader with tools for assessing the learning of their students. The handbook is divided into three sections. Section 1 on assessing academic skills and knowledge, Section 2 on assessing students' self−awareness and learning skills, Section 3 on assessing student reactions to teaching and courses. You will find the book easy to use and very practical.

Harris, Duncan and Chris Bell. *Evaluating and Assessing for Learning.* London: Kogan Page, 1986.

> This is a very useful text on assessment in general. Chapter 2 has a section on 'Needs Analysis'. It also gives an excellent description of the various data gathering techniques in detail. Chapter 3 then focusses on assessing mastery, motivation, prediction, learning and teaching. It also discusses how assessment should be carried out and who should do it.

Heron, John. 'Assessment Revisited' in *Developing Student Autonomy in Learning by* David Bond. London: Kogan Page, 1988.

> The author compares traditional authoritarian university assessment with assessment methods that focus on the students. What he states has direct bearing on needs assessment. How students learn and how they provide evidence of what they have learned is really more fundamental than what they have learned. This chapter will enable you to reflect on how feedback from your students as individuals, in pairs or in groups, may provide information about needs that should be recognized and acted on to improve your course.

Matiru, Barbara. *Towards Academic and Professional Excellence in Higher Education, Part II.* Bonn: DSE, 1991.

This book has a section on needs analysis in university teaching. The author gives a definition of 'needs' and 'needs assessment'. She also explains the various levels at which the process may be conducted. Finally a step−by−step explanation of how to carry out such a task is given including how to set objectives, identify sources of information, select data gathering techniques, analyse the information collected and disseminate it.

Rowntree, Derek. *Assessing Students: How Shall We Know Them?* London: Kogan Page, 1987.

Rowntree discusses assessment in a very intellectual manner. For an all−round understanding of the meaning and purpose of assessment as well as the thinking of a variety of experts on the topic, this text is a valuable reference.

Schirmer−Seiffert, Annette. *Training Need Analysis and the Development of Training Course Concepts.* Bonn: German Foundation for International Development (DSE), 1992.

Some of the topics discussed in this manual include how to identify training needs, situation and problem analysis, raising the right questions, sources of information and translating training needs into training courses. You will find the diagrams and illustrations that accompany the text most helpful.

CHAPTER 3 – THE LEARNING PROCESSES

Darge Wole

OVERVIEW

In this chapter you will find:

- a brief overview of teaching−learning problems in African universities;
- a description of learning;
- a discussion of the major learning processes in the cognitive processing model;
- suggestions to promote teaching and learning in the context of:
  - lectures,
  - small group work,
  - laboratory exercises,
  - problem solving in general,
  - independent study, and
  - evaluation.

INTRODUCTION

Learning is an enduring change in how we think, act and feel about things. We learn facts. We develop skills. We solve problems. We like some things and dislike others. We also learn how to learn! All these outcomes are the result of the interaction of many factors. In educational institutions, including universities, these factors include the characteristics and needs of the learner, the relevance of the curricula to the learner, the interest and skills of the instructors, the adequacy of instructional materials, the purpose and method of evaluation, and the learning environment in general.

This chapter first provides some information about these factors in the context of African universities. It then identifies relevant ideas about learning, including types of learning and specific learning processes together with what affects them. We then focus on the practical implications of theories of learning and the learning processes for instruction in our universities. This is the crux of the matter since we all wish to be more effective in our lectures, demonstrations, arranging group work and in encouraging our students to be creative in problem solving.

Figure 3.1 To be an effective university teacher, you need to know something about how students learn

'The Learning Processes' is a very wide topic which cannot be handled in a chapter such as this. Actually, the scientific study of the learning processes has a long history in psychology. For instance, there were researchers who argued that learning is essentially a matter of different forms of association. A signal is associated with what follows it, the name of an object is associated with the object itself, an action is associated with the consequence, and so on. Those who argued this way were not interested in what happens within the mind of the learner. There were also researchers who proposed that learning is considerably influenced by imitation or observation.

Lately, there has developed a strong viewpoint that the learning processes are understood best if we know how the individual handles (in his mind) the information he gets. You have probably heard terms like short–term memory and long–term memory. These are terms that some researchers use to describe the learning processes within a person. Other researchers, working along the same line, chose to deal with different levels of processing information. They essentially argued that the degree to which a person elaborates information (by relating a new idea to previous ones, by forming mental images of external events, by drawing inferences, and so on) is a critical aspect of the learning processes. Today, this last view is quite influential, although the other viewpoints have also gained some acceptance.

Given the variety of viewpoints about the learning processes, we have chosen to adopt the model which advocates that the learning processes are best understood if we consider how the individual handles incoming information or a new task. This chapter, therefore, emphasizes basic ideas for this model. In keeping with the purposes of the handbook, it then proceeds to suggest practical ways to enhance various learning processes at the university level. We hope that you will find the suggestions useful. Try them. Adapt them. Improve on them!

SOME CONDITIONS THAT AFFECT INSTRUCTION IN AFRICAN UNIVERSITIES

As centres of advanced learning, universities face numerous challenges. Nations look up to them for new and more effective ideas in many areas including education, health and agriculture. Organizations regularly seek consultancy services from universities in order to get expert advice on costly projects. Many people study very hard and spend considerable amounts of time and money to get a university education in preparation for careers.

African universities, like those elsewhere, face essentially the same challenges. However, the socio–economic status of African peoples and the conditions in which the universities function are different from industrialized countries. Unless we take African conditions into consideration when we plan our instruction, we will not be as effective instructors as we should. Needs assessment, as discussed in the previous chapter, will assist us in this regard.

But what kinds of conditions affect instruction in African universities?

Let us identify some.

Student Needs and Characteristics

Many students come to universities from schools that are located in rural areas. They need time to learn to function efficiently in such a new environment. This is because, compared to their homes, the city is relatively impersonal, more time−conscious, structurally more complicated and more technologically oriented. These students may find it difficult to use libraries, plan their daily schedule or work with others from different localities. They may also feel lonely and anxious.

Many university students also have problems with the language of instruction, as this is often not their native language. In some cases, their prior training in the medium of instruction was inadequate. As a result, they may find it difficult to follow lectures, to understand their study material and to take notes. In addition, it is not easy for such students to ask or answer questions clearly and to write reports and term papers.

Another problem concerns the attitudes students have towards education and learning. For example, many applied for admission to the university on the basis of the pecuniary benefits and social prestige of the field of study rather than their academic ability and special talents. Others rarely read books once school closed because they had no interest or lacked reading materials. In brief, when students do not relate learning to their interests and abilities or when they do not see it as a continuous process, instruction becomes difficult.

There are additional problems connected with the students' backgrounds. Some join the university with academic deficiencies that hamper instruction. Others have socio−economic problems which distract them from their studies. Such students worry about their poor families, and they sometimes want to quit their studies and find a job to support them. Due to lack of money to purchase such items as stationery, clothing, or even food, these students may become depressed and almost inactive in their studies.

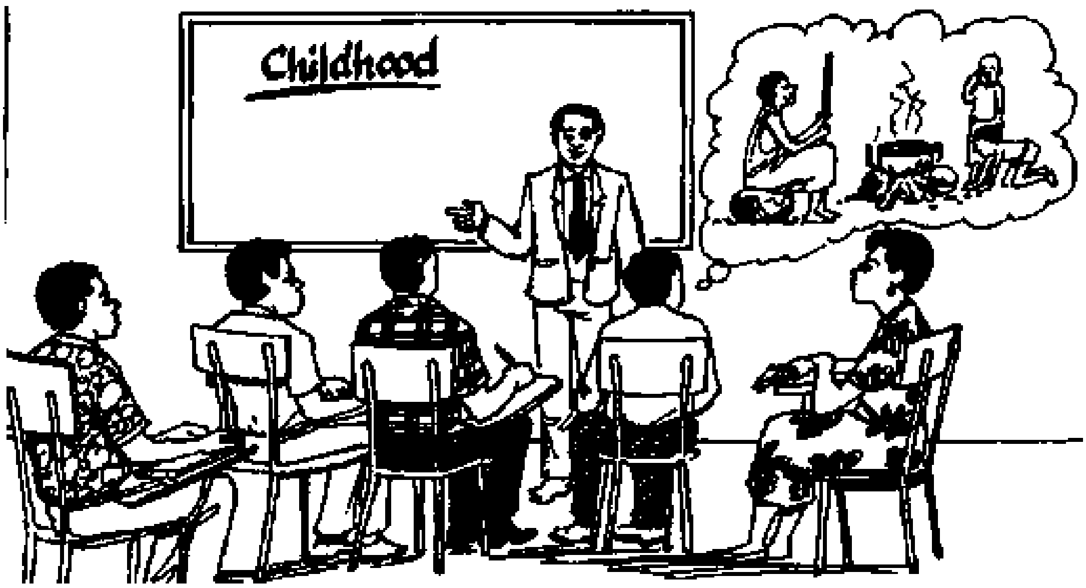


Figure 3.2 Family problems spilling over into academic pursuits

Certain habits and views also interfere with instruction. For example, students' respect for instructors is sometimes mixed with fear. Some of them hesitate to question their instructors' ideas, even when the ideas are clearly debatable. Other students do not ask or answer questions in class but raise them in the corridors. There are also individuals who find it difficult to distinguish between the academic and the personal. You probably have had students come to you to 'discuss' a low grade because they felt you had discriminated against them. There are also a considerable number of them who try to write down everything the instructor says in class because, judging from answer papers, they cannot differentiate between important and unimportant points. It is further evident that students do a lot of rote learning, without actually internalizing the information (see Chapter 2 for how to carry out an assessment of students' needs).

Instructors, Materials and Facilities

Many lecturers have not been trained in methods of teaching or in principles of learning. What is more, a considerable number of them have only their first degrees. Instructors also get disgruntled with unsatisfactory conditions for teaching, learning and research. For example, problems with making proper arrangements for fieldwork, shortages of reading materials and poor facilities discourage them from carrying out their duties effectively.

As lecturers, we also have a number of responsibilities which are not directly related to teaching and research but which, nevertheless, affect our professional activities. Being among the few who are highly educated in our communities, we are asked to serve on various social committees. We also have to take care of relatives who expect financial and other forms of assistance. Some of us even find it difficult to provide adequate housing for our own family! Given such preoccupations, it is hard to focus on teaching and research.

Regarding materials, many textbooks do not include relevant local issues, illustrations and exercises. In addition, the language of the textbooks may be too difficult for our students. What is worse, there is a shortage of such textbooks, as well as reference books and journals. We also have a problem of lack of lecture and seminar rooms. Why can't we solve these problems? Because of other problems−budget constraints, shortage of qualified staff to produce materials, insufficient incentives for staff, problems with foreign currency, lack of donors, and the like.

Evaluation Process

We do not conduct as much continuous student evaluation as we should.

It appears that final examinations are the decisive factor in our evaluation. Why does it happen?

Sometimes the class becomes very large and we are over−loaded with lecture hours, research and administrative duties. We also find it difficult to make arrangements to evaluate students in field or practical situations. Furthermore, in universities where supplementary and make−up examinations are given in addition to regular examinations, it is taxing to prepare a series of examinations appropriately, to correct the answer papers carefully and to provide adequate feedback to students.

There are other problems concerning student evaluation. In some situations, different lecturers teach different sections of the same course, but they do not use the same evaluation procedure. It also seems that many instructors are not sufficiently familiar with appropriate methods of setting examinations, reviewing examination questions and analysing scores. Furthermore, examinations are often viewed only as a basis for assigning grades. The usefulness of examination results in improving the teaching−learning process is not sufficiently appreciated. − University testing is carefully analyzed in Chapter 7.

Overall Learning Environment

Many universities are largely financed by their governments, and the budget allocation for such institutions depends on the economic conditions of the country. A declining national economy sometimes leads to a cut in government funding. At other times, the budget remains more or less the same while the cost of running the university has actually increased. In both cases, universities face serious financial problems in providing the required materials and facilities for teaching, learning and research. Figure 3.3 illustrates a typical situation where many students have to share one piece of equipment rather than each having his or her own with which to practice.

Figure 3.3 Inadequate supplies of equipment create poor learning conditions

Some governments also make the final decision concerning which fields of study new students should pursue. Therefore, many of them are allocated to fields of study outside their choice. They struggle through their programmes either because there are no alternative places of study in the country or because they do not have money to go and study elsewhere.

Occasionally, students and instructors get Involved in political activities. Sometimes this results in classes being interrupted. Lecturers are then required to conduct crash programmes later on. In addition, instructors who are persecuted because of their ideas or who are dissatisfied with the political situation of their country flee to other places. Many of these individuals are effective instructors, and this is a great loss.

SELECTED IDEAS ABOUT THE LEARNING PROCESSES

Identifying the meaning, types and levels of learning is essential for improving instruction. So we shall now take up this matter. We shall then turn our attention to specific aspects of the learning processes and the factors that affect them. The descriptions of learning and levels of learning outcomes provided here closely follow those of Robert Gagne and Benjamin Bloom.

Meaning, Types and Levels of Learning

Let us start with some examples of different student behaviour. When students trace the history of their country, citing only personalities, battles and treaties, they have learned verbal information. However, if they solve mathematical problems using a variety of symbols, we say they have developed intellectual skills. Some students are further capable of dismantling, adjusting and reassembling a carburetor. In this case, we say they have developed psychomotor skills. Consider also those who show a consistent tendency to be critical of opinions stated by the mass media. They have developed critical attitudes. We also know that students use different methods of studying, including memorizing, outlining and diagramming. This means they have established specific learning techniques.

The examples just cited illustrate various forms of learning. Before learning takes place, students show a particular type of behaviour in a given context. After learning, they show a different type of behaviour in essentially the same context. They exhibit changes in behaviour, and they learn:

- verbal information;
- intellectual skills;
- psychomotor skills;
- attitudes;
- learning techniques.

However, we know that one type of learning, such as verbal information, is related to another, such as attitude. Knowing the type of learning that will take place in the teaching session helps us to arrange instruction properly. In the case of verbal information, for example, instruction heavily depends on 'telling or stating'. In psychomotor learning, however, demonstration is as important as lecturing.

There are not only different types of learning but also different levels. Take the case of learning a theory, which you may categorize as verbal information. Some students simply reproduce statements about the theory that an instructor gives in class. This is newly acquired knowledge. Other students express the theory in their own words, adding some explanation. This is what we call comprehension. Others go further and apply the theory in real life. We call this application. There will also be a few students who relate the theory to other theories. They have reached the level of analysis. Others deduce specific propositions from the theory. This is the level of synthesis. Some are able to assess the strengths or weaknesses of the theory on the basis of empirical data. These have reached the level of evaluation. In brief, learning can assume different degrees of depth, understanding, elaboration, or application.

Processes in Learning

Being able to identify types and levels of learning is not enough for you to devise strategies that will enhance learning. You also need to examine the processes of learning in some detail. This is what we are going to do now. The different aspects or sub−processes of learning that we will look at are:

- attention;
- information processing, retention and recall;
- problem solving.

Attention

It is not the eye that 'sees':
It is the consciousness (the mind).
Amharic saying

A student in a classroom cannot direct his energies to everything simultaneously. The instructor's voice, the flickering light over his head, the rumbling in his stomach, the unlabelled diagram on the chalkboard, the chatter of other students at the back of the room ... all are potential matters for focus. However, the student concentrates on some, and the rest remain in the background. This is the process of selection and focussing attention which is affected by a variety of factors. We shall now discuss a few of these.

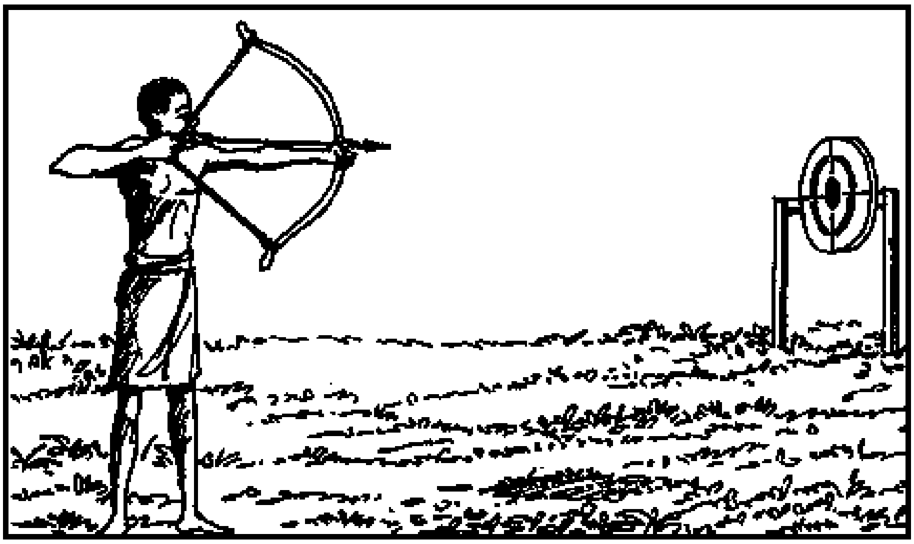


Figure 3.4 Focussing attention in a traditional way

Motivation

We expect students to have some predominant purpose in coming to the university. This could simply be to qualify for some job that would enable them to be economically self−sufficient and help their relatives. Or it could be to prepare specifically for prestigious or high−salaried employment. In some cases, they may even be interested in developing their individual talents. In so far as our students believe that university education helps them to achieve their goals, they are likely to pay a substantial amount of attention to instruction and independent study.

Self−Concept

Students, like all other individuals, have certain beliefs about their abilities. Some feel they can do very well in all courses. Others think they are no good in particular courses. A low academic self−concept can result from frustrating past results. In Chapter 2 mention was made of chemistry students who had the notion that they were incompetent in mathematics.

Inadequate understanding and appreciation of courses or misconceptions about one's potential can also contribute to a low self−concept. In any case, students who seriously underestimate or overestimate themselves are not likely to be as attentive as we expect them to be.

Anxiety

You have probably heard students talking about their concerns: their health, their families, their relationships with room−mates, textbooks, examinations, the political situation, and similar matters. If students do not see how they can avoid or solve their problems, their anxieties may overwhelm them. In such cases, the students become so preoccupied with their multiple concerns that they find it difficult to attend to their studies properly.

Organization of Instructional Materials

Systematically prepared instructional materials such as handouts containing specific objectives, coherent course outlines, and annotated reading lists help students to follow a course (for details see Chapter 4). For the students, such organization facilitates the task of identifying meaning and pattern in a presentation. It also prolongs their attention span. Organizing instructional materials is especially important when we have difficult concepts to present, or when the class session is relatively long.

Instructional Media and Communication Style

You can capture and hold the attention of students if you present the instructional materials in a vivid, novel, and unusual way or create instructional situations that involve manipulation and exploration of objects. This is because humans have a curiosity drive, enjoy solving puzzles, and gain satisfaction from their mastery over an activity.

An effective communication style not only adds meaning to the teaching session but also minimizes boredom. This can be achieved through variations in the style of communication such as a change in voice, selective use of stress, gestures, humour and movement.

☐ Think of a short anecdote related to your next lecture and begin the class with it. You will probably find out that your students are very attentive.

☐ When you observe that attention is high, introduce the essence of your lecture and reinforce it by relating it to your anecdote. Then pause for a while. Your students will probably be eager to know what you are going to say next. Are their faces still attentive?

Information Processing, Retention and Recall

He who skirts a town does
not know what is inside.
Hausa proverb

Learning is not limited to attention. In fact, attention starts off a whole series of other activities, some visible and some not so visible. Overtly, students write, draw, ask questions, manipulate objects, and so on. Covertly, they recognize, compare, generalize, predict, and recall. These are some of the various ways in which information is processed, retained and retrieved. Just like attention, these processes are influenced by a variety of factors. Let us consider some of them.

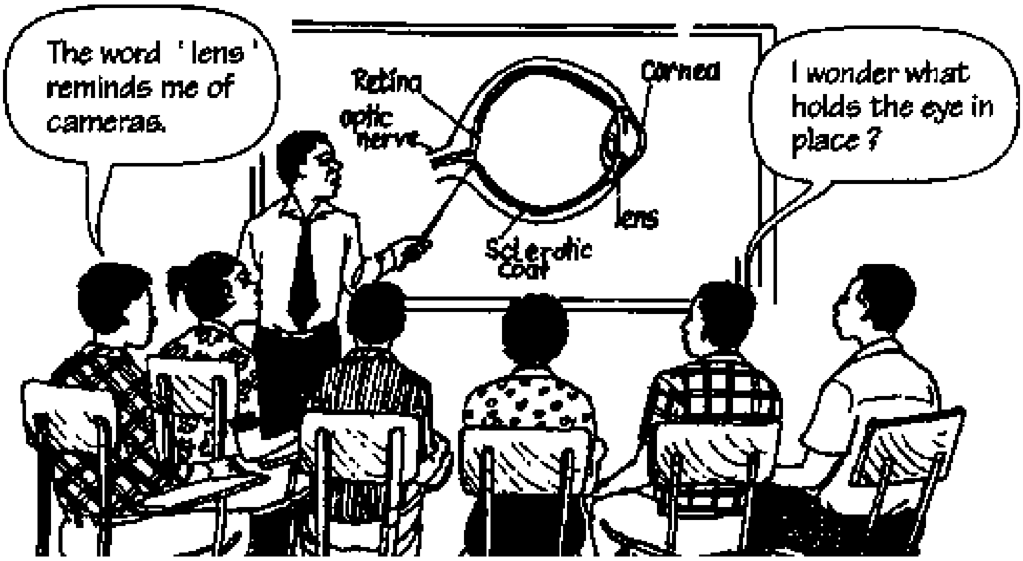


Figure 3.5 Reflecting on the human eye

Pre−requisite Knowledge, Skills and Attitudes

A student who does not have an adequate grasp of basic concepts or skills will have difficulty in assimilating or mastering new ideas based on these pre−requisites. There is often a great difference in prerequisite knowledge among students in the same class. Try to do the following in some of your classes.

- ☐ List some concepts or formulas that should have been mastered by your students in order to be able to understand a new topic you are introducing.
- ☐ Ask students to write on a piece of paper the concepts or formulas they recognize from your list.
- ☐ Find out how many students said they know a concept and how many said they do not.
- ☐ You will probably find out that you need to go through certain concepts before beginning to talk about your new topic.

If students regard university instruction simply as a process of amassing information from instructors and think that courses are totally independent of each other, they cannot be expected to be analytic in their studies or profound in their thoughts. The same holds true for those whose central aim is only to pass examinations.

Instructional Goals

What do we tell our students to expect from a given course? Is it that they should be able to state facts, apply formulas in solving problems and list steps in performing a specific skill? Or, is it to be able to identify the implications of a written text, select and use appropriate formulas in solving new types of problems, and perform a skill smoothly and rapidly? In short, the type and level of expectations we specify, along with students' understanding or appreciation of them, influence the way students will study the course. − The impact of formulating objectives is also discussed in Chapter 4.

Adjustment of Instructional Methods

Some subjects are best taught using specific instructional methods. History courses, for instance, involve considerable narration and interpretation. On the other hand, technical courses, such as technical drawing and typing, require demonstration and practice. Mastery of symbols does not receive as much emphasis in Political Science as it does in Physics and Mathematics. Drills are more suited to language instruction than to geography lessons. − Chapter 5 focusses on teaching methods.

Organization and Clarity of Presentation

Organizing a presentation helps students to activate relevant knowledge, see how one idea fits into another, and anticipate subsequent ones. Simple language, uncomplicated diagrams and clear steps also assist in understanding or decoding salient points without strain. Moreover, maintaining an appropriate rate of presentation is important because students can process only a limited amount of information at a given time. In addition, redundancy, or repeating an idea in different ways, ensures that a point is not missed or misunderstood.

Modelling

As instructors, we are likely to influence our students even in ways which are not explicitly stated in course objectives and outlines. Circumspection, diligence, originality and orderliness are all attributes which can be imprinted on our students through modelling. That is to say, students often adopt such exemplary behaviour, even when they are not lectured on it.

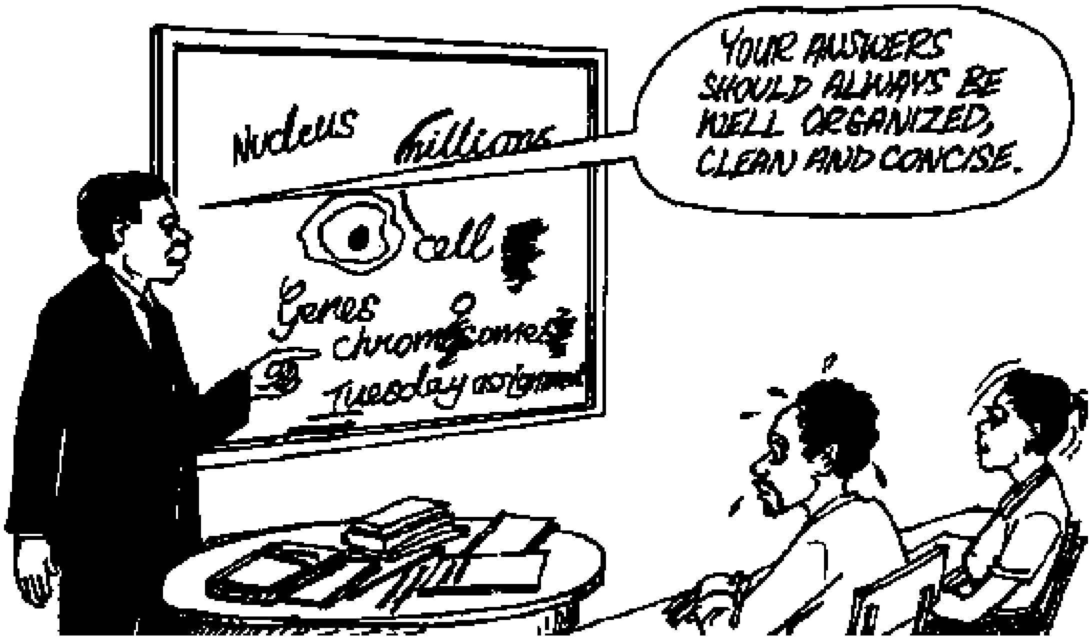


Figure 3.6 'Do what I say, not what I do'

Practice and Feedback

There are quite a few ideas concerning the use of practice and feedback (knowledge of results) in promoting learning. Let us consider some of them.

If you encourage your students to practice their knowledge and skills in a variety of conditions (different contexts, different methods), this will facilitate the application of the ideas and skills to new situations. In courses involving a lot of verbal information, your students will find out that extensive elaboration is much more effective for comprehension, retention and retrieval than simple repetition. For studying text, techniques such as 'survey, question, read, recite and review' (SQ3R), or, 'preview, question, read, relate, recite and review' (PQ4R) can be useful. Individual techniques such as tracing the origin of terms, paraphrasing, exemplifying, creating a mental image, chunking (breaking the exercise or material into manageable portions), categorizing information by sequence and type, depicting information in the form of diagrams, identifying implications and summarizing, are also helpful.

In courses that involve skills learning, distributing practice over a period of time instead of using continuous practice helps to avoid fatigue and to minimize error. Practising segments of a skill first and then practising it as a whole is also an efficient method if it can be broken down into relatively distinct parts.

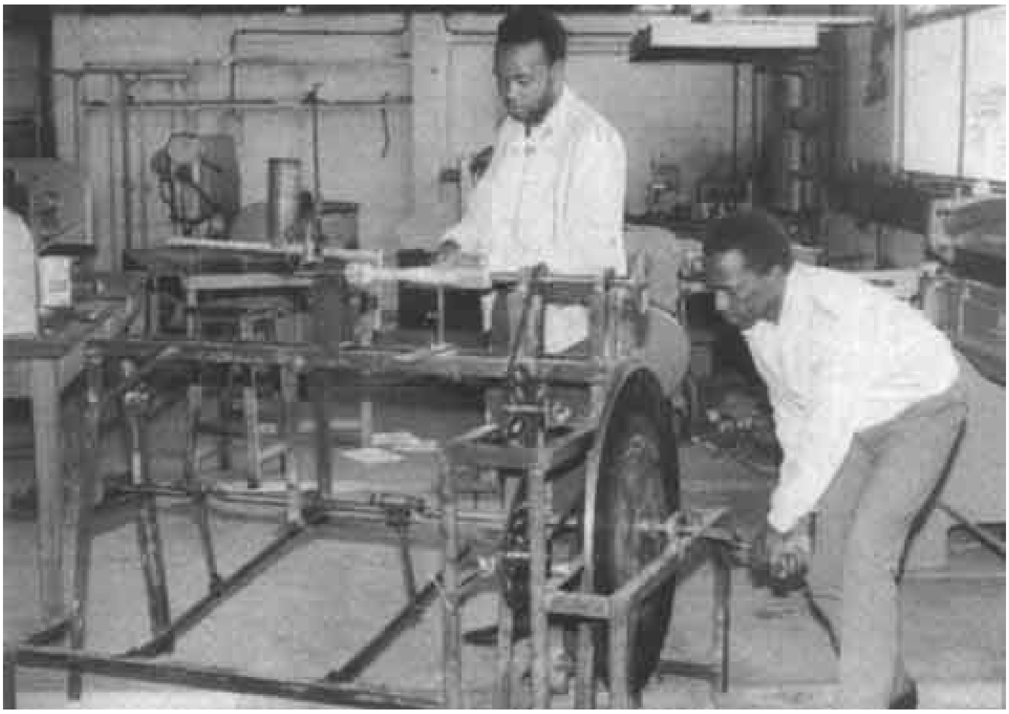


Figure 3.7 Students practising a skill in mechanical engineering

Students performing a task, for example, answering a question or practising a skill, are likely to correct or improve their competencies if you provide them with individual feedback about the adequacy of their performance. For a number of reasons, immediate feedback is usually more effective than that which is delayed. First, students remember clearly why they chose to perform a task in a given way initially. Second, their interest in getting a reaction about their performance is high. Third, they avoid practising wrong things indefinitely.

Another way of receiving feedback is self−monitoring. This is an efficient way of correcting a student's weaknesses. It also lessens the burden on you! Through self−checking, for instance, reviewing materials or steps to see if there are gaps or omissions, trying to explain unexpected results, and using alternative methods to solve a problem, the student can often determine right away what is wrong and what can be done about it. Self−monitoring also enhances self−confidence and satisfaction.

Feedback which includes some form of reward, such as praise, points or privileges, helps to foster performance and diligence. You have probably tried it. However, we expect learning to be more enduring and exciting if it corresponds with the student's personal desires and talents.

The feedback that students give you is no less important than the feedback you give them. Students provide a variety of signals such as frowning, squinting, doodling, chatting, tardiness, passiveness, contradictory or amorphous answers and wrong use of technical terms. Picking up these signals helps you adjust instruction and evaluation. But remember that not all students are equally expressive.

You may want to locate in some of your classes those students who readily show their feelings on their faces or in their activities. These are your “barometer” students. Try to identify them!

Problem Solving

One who investigates matters is better
than one who simply receives instruction.
Amharic saying

So far we have looked at two major categories of the learning processes. They are:

- attention;
- information processing, retention and recall.

However, the essential mission of a university is not so much to provide information kits to students but to help them prepare for unexpected challenges. Thus problem solving deserves special consideration as the third major aspect of the learning processes.

Figure 3.8 An unexpected challenge

Here are some observations about problem solving.

- Problem solving is finding an adequate method of achieving a goal under unfamiliar or difficult circumstances. Two such examples are finding a method of protecting a crop from an unidentified pest, or fixing complicated equipment that produces esoteric readings.

- Knowledge of facts and principles is useful but not sufficient for problem solving. What is needed is the ability to combine or relate different facts and principles creatively so as to produce an effective solution to a problem. In crime detection, for instance, one draws on one's knowledge about human anatomy, human motives, cultural values, geographical locations and types of ammunition when investigating a specific case of murder. Similarly, devising a strategy for protecting crops from an unfamiliar insect calls for creative thinking involving relevant information about such things as crops, insects, chemicals and climate.

- Problem solving is a process which moves through different stages. The first stage, which is recognizing the existence of a problem and pinpointing it, is the most important. You probably remember a time when you felt uneasy but could not pin down the exact problem. Frustrations, mental conflicts and tension often precede or accompany the recognition of a problem. For example, trees may be cut down in hundreds or female participation in school may be very low, but unless people feel some uneasiness about those situations, they are not perceived to be problems.

- The other stages in problem solving include information gathering, incubation and illumination. We recall or collect information and brood over the problem in search of an answer. Sometimes the solution clicks at an unexpected moment. You have probably experienced this type of insight at odd times, while trimming your fingernails, writing a letter, boarding a bus or even dancing! Once you feel you have a solution, you become very eager to see if it really works. Depending on the outcome, it may be necessary to revise the initial solution or to think of a new one.

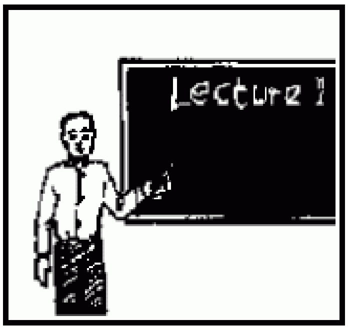
- Habits and emotional tendencies can be serious barriers to problem solving. Some people are rigid in their thinking; they stick to some solution that they used before despite its inadequacy in the new context. Others are afraid of making mistakes: failure plays havoc with their self–esteem. Still others are impulsive. They grab the first solution that comes to their mind. There are also people who have the habit of turning to external sources such as authorities, instructors and books, in search of 'the' answer to a problem.

PROMOTING LEARNING IN UNIVERSITIES

What we have said so far is that learning is a change in ability, attitude and performance which is affected by the instructional context, including the characteristics and needs of students, and the adequacy of resources. What is more, the change in learning is a process involving attention, information processing, retention, recall and problem solving. Now you might ask what the relevance of all this is to university instructors.

A simple answer is that knowledge about the learning processes provides ideas on how to facilitate learning in various instructional situations in our universities. Whilst focussing here on the effects of instruction on student learning, we refer to the comprehensive presentation of teaching methods in Chapter 5. Have a glance at the figure comparing teacher−centred methods to learner−centred approaches. Let us now discuss some ideas about learning in different situations.

Towards Effective Lectures



Here are some specific suggestions, together with examples and clarifications, on how you can make your lectures more effective. The suggestions given in this section are related to the basic points we have discussed about attention and information processing.

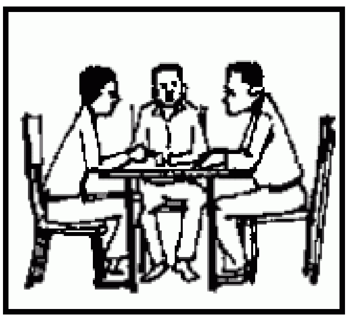
Suggestions	Examples/Clarification
1 Indicate the goal of instruction, that is, what students will be able to do at the end of each lecture. Also provide a carefully drawn and functional course outline indicating the major components of the lectures, the time allotted to each sub−topic, the requirements and methods of evaluation.	For example, after a geography lecture the student should be able to determine the share of sale of coffee by East African countries in their national economies, or after a psychology lecture the student should be able to list different types of neuroses together with their major characteristics.
2 Activate relevant previous knowledge as an introduction to a new topic.	Indicate relevant information from previous courses. Ask students probing questions to find out what they know about the new topic or what they think is important to know about the topic. For example, co−variance analysis may be introduced by asking students what they know about correlation or by citing major points about analysis of variance.
3 Explain basic concepts in different ways.	This can be done by defining, exemplifying, indicating attributes, specifying relationships with other concepts, and identifying local versions whenever possible.
4 Vary instructional resources, as appropriate.	Use plain paper to draw properly labelled sketches, charts, maps and tables; models; specimens; extracts from letters and biographies; tape−recorded speeches; annual reports, research findings; and resource persons.
5 Pose puzzling types of questions or present discrepant findings.	Issues where you might raise such questions or present such findings include: the origins of man, the relationship between language and thought, and the concept of development.
6 Use appropriate language, pace and organization.	Use simple words and short sentences. Pause to check if students are following you. Include signals such as "consequently', 'as a result', 'in contrast', and 'in summary'. Important terms should be written on the chalkboard with

	proper spacing and in an orderly way.
7 Encourage student participation in different ways.	Raise questions during lectures and avoid belittling students' questions. Ask students to inject their personal experiences into discussions, and involve them in demonstrations.
8 Use different methods to maintain attention and to clarify or emphasize points.	Use gestures, eye−contact, facial expressions, intonation, pertinent local proverbs, amusing anecdotes and jokes.
9 Use illustrations from the students' environment.	For example, in an introductory course in natural sciences, biological, chemical and physical laws may be expounded by referring to common vegetables in the backyard, the local drinks in the kitchen or the radio in the living room.
10 Avoid distracting mannerisms.	For example, constantly tapping the table, frequently adjusting the necktie, faltering in your speech with 'ah', or 'eh' or 'mm' and frequently clearing the throat.
11 Show some flexibility.	React appropriately to student
	concerns about such matters as textbooks, consultation hours, examinations, and to unexpected questions about something heard on the radio or something observed in the community.
12 Show interest in the lectures and discussions.	Be punctual, up−to−date in content and method, alert and responsive to questions as well as to physical reactions such as frowning and fretting. Also encourage expression of personal views.
13 Anticipate student problems or possible confusion between concepts and include clarifications beforehand.	For example, avoid confusion between the terms 'drought' and 'famine', 'revolution' and 'coup d'état', 'statistical significance' and 'practical significance', 'Na' and 'N'.
14 Ask students to be precise about their questions, and ascertain if the answer you give is sufficiently clear.	Do not accept vague or general questions such as: 'Can you go over what you said once again?' Since nodding or silence do not necessarily indicate understanding, ask questions to check.
15 Provide time for discovery and self−monitoring.	Give opportunities to students to answer questions and to check their answers by themselves. Facilitate this by giving clues and by indicating possible ways of checking answers.

Figure 3.9 Suggestions for making lectures more effective

These suggestions are only some of the approaches you can use to facilitate lectures. Let us now look at some suggestions regarding effective small group instruction.

Towards Effective Small Group Work



The suggestions listed here are based on ideas we have already mentioned, especially those concerning instructional goals, student needs, pre−requisite knowledge, self−monitoring and feedback. For more details on small group work, please read the pertaining passages of Chapters 2 and 5.

Suggestions	Example/Clarification

1 Determine the goals of the group work. Check also if members understand the concepts, skills or attitudes necessary to carry out the group activity effectively.	For example, if a discussion of the ways in which mass media can assist in controlling the spread of AIDS is to be fruitful, members should first have basic ideas about AIDS. Similarly, group work to improve a local farming tool calls for knowledge about the strength of different types of wood. Students' needs and views should also be accommodated as much as possible in planning group activities including the selection of strategies and choice of members.
2 Check to see that the group's composition is suited to the goals of the group activity.	For example, a group task centring on the identification of problems of youth will benefit from contributions by individuals who have different socio−economic backgrounds.
3 Use different types of group work as appropriate.	Some types of group work you might use include:
	❑ buzz sessions and brainstorming where different groups identify various solutions to the same problem, to different aspects of the problem, or to separate problems;
	❑ tutorial groups where capable students are willing to study a topic with others in their classes;
	❑ case study groups where single cases can be tackled in depth by collecting information or evidence from different sources;
	❑ seminar and research groups when a project is too large or too demanding for individual students and/or where group discussion is desirable;
	❑ role play where it is important to practise or simulate likely professional situations.
4 Monitor and facilitate group work.	Check if activities proceed according to time allotment and sequence, and, where necessary, clarify the task and provide materials. Avoid dictating to groups and getting too involved in their activities.
5 Arrange an appropriate situation for sharing and discussing results.	Minimize the requirement for special equipment; avoid time pressure; let group members sit together if they wish; discourage interruption of presentations. Also include discussion of the feelings of members towards the activity in relation to its academic value, the way it was arranged, and the personal satisfaction members derived from the activity.

Figure 3.10 Suggestions for making small group work more effective

In general, for small group activity to be effective, it is essential that there is proper planning and group members appreciate the usefulness of the task.

Now let us turn our attention to ways of enhancing laboratory instruction.

Enhancing Laboratory Instruction

Perhaps the most useful ideas for improving laboratory instruction come from research on skill learning which requires specification of goals and procedures as well as modelling, elaboration, practice and feedback. We have discussed this to some extent under the topics of 'Meaning, Types and Levels of Learning' and 'Processes in Learning'. Look back. You may also refer to Chapter. Here are specific suggestions:

Suggestions	Examples/Clarification
1 Analyze the laboratory exercise to determine the specific steps to be followed in carrying out the relevant laboratory work.	For example, the steps in preparing ordinary soap include: placing a specific amount of beef tallow, alcohol and other ingredients in a flask to form a mixture; fixing a condenser, refluxing the mixture, and so on.
	Such information may be adapted from manuals. However, it is a good idea to list the steps in a detailed manner as you do the exercise yourself.
2 Determine the materials and the time needed for the laboratory exercise.	For the soap experiment, you need a round bottomed flask, a beaker, tallow, alcohol, brine solution and so on. In terms of time, you require about one hour to reflux the initial mixture. Add to this the time you need for cooling, filtering and subsequent steps. Such specification helps you avoid interruption later on. It also reflects seriousness of purpose.
3 Decide on the size of the group that will attend the laboratory demonstration at one time.	Keeping the group size as small as possible helps to provide adequate visual and auditory experience.
4 Try the laboratory exercise your self first.	This helps you to identify and correct unanticipated problems.
5 In demonstrating the laboratory exercise:	
☐ ensure that students can easily observe the demonstration;	Ensure that students can see your face, your hands and the apparatus. Give special consideration to physically handicapped students.
☐ state the purpose of the exercise;	In the soap experiment, students will first see how ordinary soap is prepared. They will then demonstrate the skill themselves.
☐ identify to students the materials that are going to be used for the exercise in case they are not familiar with them;	This will help the students to follow and remember steps during the demonstration.
☐ go through the steps of the exercise orally, giving explanations;	Describe the steps and explain the rationale for the sequence used. Suggest to the students that they, too, should describe or rehearse the steps mentally. This enhances understanding by matching the verbal and motor activities of the instructor.
☐ indicate any special precautions that should be taken;	In the soap experiment, you may indicate the damaging consequences of overlooking the cooling steps. This encourages students to be careful.
☐ ask students to state the steps orally and indicate what would happen if a sequence is changed, or what	This provides an opportunity to check if the students understand the steps and to give corrections where necessary. It also assists retention and application in situations where resources

alternative materials they would use if they cannot find the usual materials for the exercise.	are limited.
6 Give the students opportunities to do the exercise by themselves. Ask them to record their steps and results. Encourage discussions of problems and unexpected results.	Did a student skip a step? Did he use wrong amounts? Did he observe something 'strange'? Proper practice fosters smooth and efficient performance.

Figure 3.11 Suggestions for enhancing laboratory instruction

Occasionally we may not have sufficient time to conduct laboratory instruction properly. We may try to tackle the problem by employing laboratory assistants. But are our laboratory assistants familiar with effective methods of laboratory instruction? What do you think? This is a point worth checking.

Let us now consider suggestions concerning problem solving. This is an activity which should be evident in all courses and which you will agree is central to university instruction.

Encouraging Effective Ways of Problem Solving

As you read the following suggestions, you will observe that they emanate from basic ideas mentioned earlier. These ideas include prerequisite knowledge, proper habits and attitudes, practice in different contexts, and self−monitoring.

1 Encourage mastery of basic concepts and principles in lectures and assignments.	For example, a solution to an inter−group conflict requires a grasp of such concepts as 'perception' and ‘reciprocity'. Also, a solution to a problem in structural design requires some mastery of trigonometry.
2 Ask students to indicate in their reports constraints or problems with laboratory or workshop activities and fieldwork.	Such problems may include determining the authenticity of a document in historical research; replicating a chemistry experiment in similar conditions; handling a case for which there is no apparent legal provision.
3 Raise issues in presentations and handouts.	Theses or dissertations also help to sensitize students to different types of problems or issues. Students enjoy discussing controversial issues.
4 Ask students to identify exceptions to rules or cases which require special solutions.	In learning, things that happened long ago are usually remembered less well than things that happened more recently, but this is not always true. Similarly, in many areas such as economics, principles hold true only under specific assumptions.
5 Shock nonchalant students by describing possible hazards in using wrong formulas or approaches.	Show the consequences of using wrong formulas in designing a bridge, following a wrong diagnostic procedure in treating a patient, or ignoring an important evidence in handling a case of murder.
6 Encourage students to adapt principles and skills to different contexts.	Students can practise newly acquired mechanical skills on different types of farm vehicles. To be able to do this, students should be given immediate feedback.
7 Insist on a clear statement of problems by students.	In solving a physics problem, for example, it is important to state what is given and what is required. In stating a problem in plant genetics, it is better to use a phrase such as 'to strengthen the stalk of barley' than to use a phrase like 'to make barley resistant to heavy rains'.

8 Allow divergent thinking in oral discussions.	Such thinking may become evident in discussions about such issues as border disputes or the devaluation of national currencies and foreign debt.
	Divergent thinking may arise in any group problem solving in which members deal with a specific problem.

Figure 3.12 Suggestions for more effective problem solving

Perhaps one of the most serious obstacles we face when we try to encourage problem solving among our students is that they come to the university with habits and attitudes that counteract our efforts. Obviously, there is a limit to what we can do by ourselves. But that shouldn't keep us from doing what we can.

Now we shall look at specific recommendations regarding strategies for independent study and self−expression.

Facilitating Independent Study and Self−expression

If we ourselves set an example to our students with regard to independent study and self−expression and share with them those methods that we have found to be successful, we can help them a lot in this area. Let us now highlight some of these examples and methods.

1 Be exemplary by being well prepared and systematic in presentations and discussions.	Clear, well organized outlines and lectures; precise use of terms; consideration of different sources or points of view; logical analysis of issues and giving one's own conclusion are all desirable.	
2 Suggest useful methods of study, particularly those suited to your courses.	For example, drawing and labelling diagrams in biology, deriving a formula in mathematics, and using distributed practice in learning how to type.	
3 Encourage elaboration in assignments and tests.	Give exercises or tests that require students to produce examples or illustrations or to indicate their personal views of conclusions regarding data. In tests and examinations, include questions on reading assignments.	
4 Recommend essential reference materials such as dictionaries and well−written subject−area references.	Dictionaries of specialized areas, such as a dictionary of psychological terms, are highly desirable. Books which contain a glossary of terms, relevant sketches and pictures are also very useful.	
5 Encourage initiative and creativity.	Give reasonable options in the choice of topics for written reports. Also assign credit for originality, organization and conciseness in writing the paper.	
6 Give tips about reading skills.	Useful reading skills include:	
		☐ skimming content such as sub−topics, pictures, tables, captions, underlined or boldfaced or italicized words, and summaries;
		☐ raising questions of interest about the reading;
		☐ reading carefully and actively by judging whether statements are accurate, reasonable or clear;

		☐ relating ideas on different pages, predicting subsequent ideas, referring to earlier pages when in doubt, using context to determine the meaning of terms, re−casting major points from the reading, and checking one's points against the contents of the actual reading;
		☐ writing notes on the reading that include one's reactions.
7 Give tips about writing skills.	Useful writing skills include:	
		☐ determining the purpose of writing and selecting a precise title. The purpose may be to describe, explain and/or to argue;
		☐ collecting appropriate information by recording sources and preparing an outline;
		☐ writing carefully by indicating main points together with supporting ideas or examples;
		☐ using simple and precise words, keeping sentences short, showing the flow of ideas clearly by including connective terms like 'first', 'second', 'therefore', and 'however;
		☐ reviewing the written text to check accuracy of facts, clarity and precision of statements, validity of conclusions, and proper acknowledgement of sources.

Figure 3.13 Suggestions for facilitating more independent study and expression

One other important aspect of instruction that we need to look into closely is student evaluation. The following section presents specific ideas on enhancing such evaluation. You should also refer to Chapters 2 and 7.

Utilizing Evaluation to Improve Instruction

We use evaluation not only to find out how well our students have learned, but also to check how well we have arranged the Instructional conditions for effective learning.

Adequate evaluation involves three major phases:

- ☐ context or preparatory evaluation (initial situational analysis);
- ☐ formative evaluation (evaluation during instruction);
- ☐ summative evaluation (evaluation at the end of instruction).

Here are some suggestions on how to carry out these different aspects of evaluation.

Suggestions	Examples/Clarifications
1 Context Evaluation	
Make preliminary assessment of student needs and attitudes as well as of available resources.	Check the students' academic background, pre−requisite courses they have taken and the students' feelings. Also consider the number of students you are going to have, the amount of time allocated for instruction and the type as well

	as the adequacy of materials and facilities available.	
2 Formative Evaluation		
Find out how the instructional plan works as the semester/term proceeds.	Use indicators such as the level of student participation and achievement. These are reflected in the quality and number of questions and answers, reactions to teaching materials and projects, as well as test results. Continuously check your performance in terms of the rate, sequence and clarity of lectures, adequacy of demonstrations and feedback, adherence to course objectives and course outline.	
3 Summative Evaluation		
Develop sufficient and appropriate items for examinations on the basis of initial objectives.	Test items or tasks that are discreetly distributed over different portions of the course and that assess different levels of	
	learning as well as model answers that indicate the number of points allocated to correct responses; help in carrying out a proper evaluation.	
Invite students to give feedback about the way you handled the course.	Questionnaires or scales for this purpose often include items concerning:	
		☐ instructor preparation (adequacy of course outlines, teaching materials, overall content and projects);
		☐ methods of presentation (clarity of language, rate of activity, organization, content and use of illustrations);
		☐ utilization of resources (effective use of audio−visual materials and equipment);
		☐ interests and enthusiasm (relating ideas to actual life situations, trying novel approaches to problem solving, and showing warmth in student consultation);
		☐ evaluation methods (clarity of questions, fairness in marking, and openness in discussing answers).

Figure 3.14 Suggestions for effective evaluation

Student evaluation should be taken seriously. Otherwise, we may certify mediocre students as competent professionals and create problems for society and for the individuals themselves. In addition, proper evaluation calls for some knowledge of measurement and statistical procedures for analysing data.

This section has made a number of specific suggestions for improving instruction in universities and colleges. The focus has been not only on lectures but also on laboratory instruction and problem solving approaches. It is up to the individual instructor to select the approaches that work best in particular situations and to devise new ones when appropriate.

CONCLUSION

As a learning centre, the university is not only a place for sharing existing knowledge, skills and interests but also a place for critical assessment of ideas and the development of more effective approaches to life. Conditions in African universities give rise to various problems which hinder learning. Student problems such as unrealistic aspirations, poor study habits and socio−economic worries; institutional problems such as shortages of appropriate instructional materials and equipment, unsatisfactory conditions for the professional development of university instructors, and weakening or disruption of academic programmes due to budgetary and political reasons, all limit our efforts to foster learning.

No single approach will solve all the problems our universities face. However, one very useful step is to identify the different problems we have, and keeping these in mind, to design instructional methods that facilitate learning. In this regard, it is important to recognize a few basic points. First, since there are different types of learning, our teaching approach is influenced to some degree by the kind of subject we teach. Second, we can teach at different levels from imparting simple facts to encouraging critical assessment of ideas and problem solving. Third, in learning, what eventually matters is what the student actually does in terms of attending to information, processing information and problem solving. Therefore, what we lecturers do in instructional situations is important because of its influence on student activity. Fourth, various ideas exist to help us design instruction.

You will agree that the practical importance of learning principles and methods is the centre of our interest. That is why we looked at a number of tips for promoting learning in different instructional situations such as lectures, laboratory sessions and independent study.

A few final points should be emphasized. The writer does not claim that he has identified or accommodated all the important instructional problems in African universities. This chapter has raised only some points in that regard. Furthermore, the conditions in African universities are not totally different from those in universities elsewhere. There are similarities and differences between African and non−African universities, just as there are similarities and differences among African universities themselves. So we were not looking for a distinct African psychology of learning and instruction.

We should also note that, by themselves, instructors will find it very hard to improve the teaching−learning processes because they also personally face a number of problems outside their control which hinder their professional contribution. Universities and colleges, therefore, need to encourage and support instructors in practical ways. Although this chapter makes various suggestions for improving the teaching−learning processes, the merit or effectiveness of these depends on the judicious use of the suggestions by those concerned, depending on their specific needs and conditions. There is no single answer to our instructional problems.

SUGGESTIONS FOR FURTHER READING

Brown, J.W. and J.W. Thornton. *College Teaching: Perspectives and Guidelines.* New York: McGraw−Hill, 1963.

> Evidently a little old but still contains good suggestions for promoting teaching and evaluation. The content includes topics on methods of improving lectures, group discussions, evaluation and student reading skills. A preliminary assessment of the relevance of the suggestions to the instructional situations in our universities is appropriate.

Cronbach, L.J. *Educational Psychology,* 3rd ed. New York: Harcourt Brace Jovanovich, 1977.

> A well known authority in educational psychology presents in a simple manner many useful ideas about skill learning, attitude development, problem solving and evaluation.

Darge Wole. 'Identifying Student Background and Needs for Effective Instruction in Higher Education: A Research Agenda from Ethiopia' (unpublished paper). Addis Ababa, 1991.

> Describes various problems related to instruction in the Addis Ababa University and proposes that African Universities make a joint effort in identifying prominent student problems and in finding solutions to the problems.

Darge Wole. 'Notes on Selected Principles of Learning' (unpublished material). Addis Ababa, 1990.

> Briefly presents selected theories of learning, major variables affecting the teaching−learning processes and different ways of facilitating learning with particular reference to higher institutions of learning.

Davis, G.A. *Educational Psychology: Theory and Practice.* Reading: Addisson Wesley, 1983.

Discusses the importance of motivation, language and information processing in learning. Some attention is also given to the implications of cognitive theory of learning for teaching. Contains good illustrations.

De Cecco, J.P. *The Psychology of Learning and Instruction.* New Jersey: Prentice–Hall, 1968.

Deals specifically with different types of learning such as verbal and skill learning. Includes a well written chapter on problem solving. Evidently not up–to–date but still very useful.

Klausmeier, H.J. *Learning and Human Abilities: Educational Psychology,* 4th ed. New York: Harper and Row, 1971.

Important reference for arranging instruction to promote different types of learning. Particularly useful are the sections on psychomotor skills and problem solving.

Evans, J.L. *Children in Africa: A Review of Psychological Research.* New York: Teachers College Press, 1970.

Includes some background information about the social and psychological development of African children and youth. A section on current research summarizes a few studies about the relationship between child rearing methods and intellectual interests.

Gagne, E.D. *The Psychology of School Learning.* Boston: Little, Brown & Co., 1985

Contains a chapter that deals with information processing, including the use of elaboration in learning. A bit technical but good for those who want to get a feel about the theoretical underpinnings of human information processing.

Gagne, R.M. *The Conditions of Learning,* 3rd ed. New York: Holt, Rinehart and Winston, 1977.

Discusses in some detail the different types of learning and instructional approaches suited to each type of learning. Easy reading.

Higher Education Main Department (HEMD). 'Guidance and Counseling in Institutions of Higher Learning with Reference to Student Problems and Needs' (unpublished material in Amharic). Addis Ababa, 1987.

Revealing survey report of student needs in different faculties (agriculture, education, social science, technology, etc) in the Addis Ababa University.

Matiru, Barbara. *Towards Academic and Professional Excellence in Higher Education, Part I.* Report on the Sub–regional Workshop in Harare. Bonn: DSE, 1990.

Includes useful ideas on the learning process (M. Wesseler), course design (J. Johnston, pages 118 to 135), methods of teaching and learning (M. H. Knott, pages 136 to 152).

Matiru, I. Barbara. *Staff Development in Higher Education: Improving Teaching and Learning at Moi University.* Report on a National Training Workshop. Bonn: DSE, 1991.

Includes specific ideas and techniques regarding course design, lecturing styles, use of audio–visual aids, instruction involving small groups, and evaluation. Well illustrated with diagrams and pictures.

Mazrui, A.A. *Political Values and the Educated Class in Africa.* Berkeley: University of California Press, 1987.

In a series of chapters, the author dwells on matters related to education in Africa. In one of his chapters the author vehemently argues that even though many of the universities in Africa depend on government funding, they should not blindly change directions or academic programs just to accommodate the whims of their governments. Instead they should show intelligent 'cooperation'. Largely provocative.

Rosser, R.A. and G.I. Nicholson. *Educational Psychology: Principles in Practice.* Boston: Little, Brown and Co., 1984.

A comprehensive work treating such concepts as reinforcement and modelling and their implications for the classroom. Includes an illuminating section on concept learning.

Wandira, A. *The African University in Development.* Johannesburg: Raven Press, 1977.

Raises many issues pertinent to instruction in African Universities. Some of the issues are relevant even today. Among the issues: defects in secondary education and their impact on university instruction, and the inadequacy of curricula to fulfil the needs of African peoples.

Wober, M. *Psychology in Africa.* London: Clarke, Doble and Brendon, 1975.

Reports of many studies in Africa. Particularly interesting are the studies about the attitudes of African university students towards western education and towards African traditions.

CHAPTER 4 – COURSE DESIGN

Grace W. Bunyi

OVERVIEW

In this chapter we present one approach to the design of university courses in Africa.

The chapter is divided into:

- an introduction, which provides
  - a background to course design in African universities,
  - a definition of course design,
  - the purposes of course design;
- a discussion of the processes of course design in terms of
  - situational analysis,
  - objectives formulation,
  - content derivation,
  - selection of methods and media,
  - evaluation procedures and schedules;
- a final section on writing course outlines.

INTRODUCTION

The assumption that good teachers are born not made has been disproved. Effective teaching at any level is not achieved through some magical formula that is the property of a select few. Rather, effective teaching, to a large extent, depends on the teacher's preparedness. Preparation for teaching takes place at two stages: before the course begins and before each teaching session. Pre–course planning, or course design, is what this chapter is all about.

Figure 4.1 Effective teaching depends, to a large extent, on good preparation

Effective planning is a basic requirement for success in most professions such as architecture, engineering, law, business and even politics. Just as it is unthinkable that an engineer would embark on building a bridge without a plan, no teacher should start teaching a course without careful and conscientious planning.

Let us also consider the fact that African nations are characterized by problems of under development. All manner of economic, social−cultural and political problems face these nations including famine, disease, poverty, ignorance, population explosion, inappropriate technology, poor administrative structures and civil strife.

African governments look to their universities to provide leadership in tackling these problems by fulfilling four basic tasks:

- providing a general education for individual students' intellectual and moral development;
- providing skills and professional training for employment;
- undertaking research that will provide solutions to urgent problems;
- providing consultancy services for local development activities.

The content of university education, in educational vocabulary termed the curriculum, is the vehicle through which the first two tasks are carried out. Consequently, the determination of the university curriculum is a very serious undertaking. In the universities, the curriculum is manifested in the courses that are offered.

LEVELS OF CURRICULUM DEVELOPMENT

During your university teaching career, you will most likely be involved in curriculum development at various levels.

Faculty Level

The university may want to introduce a new degree programme, and you may be called upon to participate as a member of the team that determines the courses to be offered under the new programme. For example, at Kenyatta University in Kenya a Bachelor of Education degree programme with a primary school option was recently introduced.

Department Level

Within the faculty, new courses will be developed at departmental level. For example, in many African universities oral literature has been introduced in the curriculum, and oral literature units have been created in the departments of literature.

Unit Level

With time, it may be found necessary to separate the various aspects of oral literature. You would then have to teach oral narrative and song and dance as different units of study.

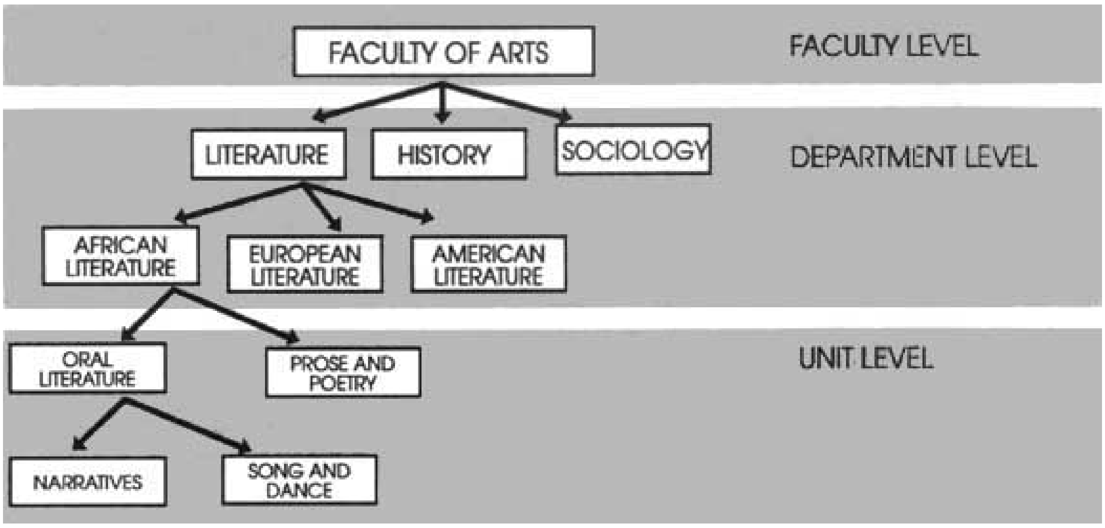


Figure 4.2 Levels of curriculum development at the University

- ☐ At which level of curriculum development have you been involvement?
- ☐ What courses were you deliberating on and what sort of decisions did you have to make?

MEANINGS OF TERMS

Before we continue, it is important that we establish the meanings that will be ascribed to the two terms that constitute the title of this chapter, 'course' and 'design'.

Course

In our universities, the term 'course' is used to refer to different things. In some universities, the term is used for a degree programme, such as Bachelor of Science in Agriculture course, for example. In other universities, the term is used to refer to a year's programme, such as the Bachelor of Science in Agriculture second−year course. In still other universities, the term is used to mean a programme of studies a student takes in one department.

In this chapter, we will use the term 'course' to refer to one unit of study, where a unit is the equivalent of 35 lecture hours ending with a written examination. This is in agreement with Rowntree (1986: 19), who gives the following definition:

> A course is a planned sequence of learning experiences, occupying several learning sessions and involving some form of assessment of the learner's work.

In our universities, such a unit is usually assigned to one lecturer who is a specialist in the relevant discipline.

Design

The *Collins English Language Dictionary* (1987) says that 'when you design something, you plan and create a picture of it in your mind and you make a detailed drawing of it from which it can be built or made.' From this definition we find that the design is the overall plan, picture, framework or structure with which to work in creating the final product.

Putting together the individual meanings of the terms 'course' and 'design', we define course design as the planning and writing of a framework to guide the teaching and learning of a unit.

PURPOSE OF COURSE DESIGN

Professionalism in teaching and learning involves more than just planning and teaching a series of lessons. It involves reflecting on and making decisions about one's teaching of the whole course well before it begins. This enables you to anticipate and avoid difficulties thus ensuring that effective and efficient learning is realized. −The importance of such anticipatory reflection is confirmed by other authors of this Handbook. Check Chapter 1, Chapter 2**,** also Chapters 3, 5, 7.

Course design will involve you in asking and answering some basic curriculum questions. Before you begin to teach your next course, ask yourself:

- ☐ What should the students gain from this course?
- ☐ What can I select from the knowledge, skills and attitudes embodied in my discipline in order to achieve my purpose most effectively?
- ☐ What teaching and learning methods and media will serve me the best in what I am trying to do?
- ☐ How will I know that my students have learned what I want them to learn?

Answering these questions will enable you to:

- ☐ determine the objectives of the course;
- ☐ analyse the content to be taught and learned as well as the appropriate methods and instructional media to be used;
- ☐ identify background knowledge and pre−requisites that students will need to succeed in the course;
- ☐ identify the central and unifying concepts of the course;
- ☐ determine the kind of evaluation to be used.

This reflection will improve the quality of your thinking about your teaching and enable you to communicate with other people about it. Consequently, you will be able to justify to yourself, your students and your colleagues what and how you are teaching.

Who designs the course varies from university to university and from discipline to discipline. In some institutions, this is left entirely to the person who is teaching the course, while in others it is the responsibility of the head of department. How many of the detailed course design activities discussed in this chapter each individual lecturer gets involved in also varies.

THE COURSE DESIGN PROCESS

In existing educational literature, opinion on what is the best approach to the design of curricula and courses is divided between those who believe that design should begin with a statement of the purpose (objectives) of the course, for example, Tyler (1949), and those who believe that it should begin with a statement of the content to be learned, for example, Stenhouse (1975). In general, there is overwhelming support for the objectives approach (Rowntree, 1974, 1986; Kemp, 1985; Miller, 1987).

The objectives approach to systematic course design, on which we shall base our discussion, involves decision making and action in five major steps:

Step 1 Situational analysis

Step 2 Objectives formulation

Step 3 Content derivation

Step 4 Selection of appropriate methods and media

Step 5 Determination of evaluation procedures and schedules.

At whatever level we are operating – faculty, department, unit, or lecture – all five steps are involved in one way or another. Let us now consider each step in turn.

Step 1: Situational Analysis

When we carry out a situational analysis, we are trying to understand the environment in which our course will operate. For the purpose of effective course design, it is important that we gain a clear understanding of both the student who is the target of our course and the society in which he or she lives.

Useful Information About the Students

The ultimate purpose of the course is to help our students to learn. In order to design a course that is suitable we need to know the following information about them:

- academic background and experience;
- motivation;
- demographic information;
- learning styles and habits.

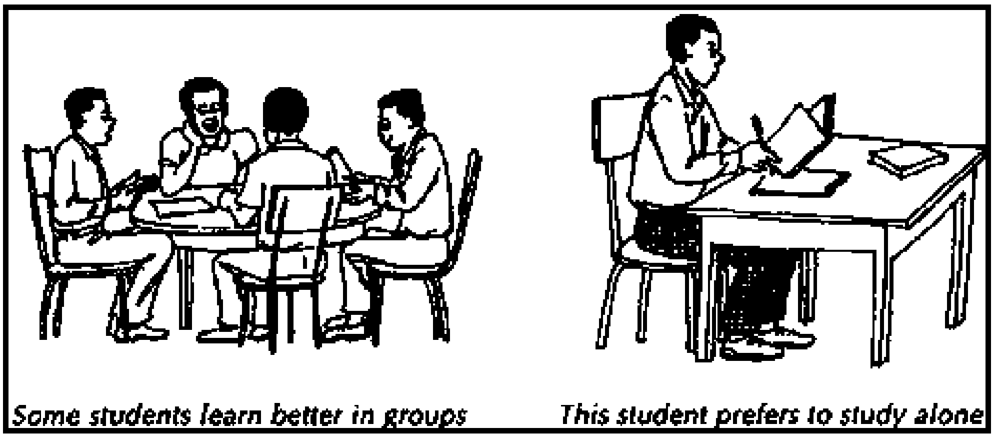


Figure 4.3 Different learning styles

Useful Information about Society

The students for whom we design our course live in African societies. It is important to understand the communities in which they live and in which they will most likely work. Such information is necessary in order to design courses that will be relevant to the society and should include:

- the needs and aspirations of society;

- the socio–political and economic philosophy of the society;
- social and economic needs.

For a detailed discussion about situational analysis and needs assessment refer to Chapter 2.

Step 2: Objectives Formulation

Having carried out a situational analysis, you are now ready to formulate your course objectives.

What are Objectives?

In formulating objectives, we are trying to address a fundamental question: What is the purpose of teaching this course? In other words, what should our students achieve as a result of taking it? Educational literature abounds with terms like aims, goals, specific objectives, criteria, standards and so on. All refer to expressions of purpose and intention. The general term 'objectives' is used to refer to these terms in a general way. However, for our purposes in this chapter, it is necessary to make a distinction between two terms: 'aims' and 'behavioural objectives'. Let us now attempt to explain the meanings of these terms.

Aims

We can make a distinction between aims and objectives on the basis of the degree of specification with which the statements are made and the point of view from which they are stated. Rowntree (1986: 44) defines aims as:

> ... a general statement of what you hope the course (or lesson) will achieve, perhaps expressed in terms of what you, the teacher, will be presenting to the learner.

Other writers such as Davies (1976) and Miller (1987) agree with this definition. From this, we can conclude that aims are general statements expressed from the point of view of the teacher. Thus, aims would include such goals as:

- giving students an understanding of the relationship between education and development;
- providing students with the theoretical understanding and practical skills to carry out scientific research;
- fostering an awareness of the potential dangers in a workshop or science laboratory;
- fostering an appreciation of oral literature;
- developing an appreciation of the role of dairy farming in national development;
- explaining basic mathematical concepts;
- analysing the problems of rural development.

As can be seen from these examples, aims are too vague to be of much use in the actual planning of a course. Different people interpret aims differently, and it is difficult to measure whether or not aims are being achieved. So you may ask what is to be gained by stating aims?

The following reasons for stating aims are given by Rowntree (1974) and summarize the arguments for identifying them.

- It is useful to conceive of the broad outcome of the course before moving on to the specifics.
- Aims provide the emphasis of the course.

- They provide us with a basis for justifying our objectives.
- Aims give us an indication of the teaching methods to select.

Think of any course that you teach and formulate its general aims.

Since aims do limit our area of concern, they guide our formulation of objectives. When you break down each broad aim into smaller aims, the achievement of which will lead to the achievement of the broad aim, you come up with behavioural objectives.

Behavioural Objectives

Behavioural objectives are highly specific statements of purpose. Davies (1976: 14–15) says:

> . . . specific objectives attempt to describe, in the clearest terms possible, exactly what a student will think, act or feel at the end of a learning experience.

Consequently, behavioural objectives describe the evidence that one can look for to determine the extent to which desired and intended behaviours have been learned by the students. Desired and intended behaviours are expressed from the student's point of view, that is, in terms of expected behaviour at the end of the course. Statements of such objectives usually begin with the phrase 'by the end of the course/lecture, the student should be able to . . .'.

The following is an example of how to derive behavioural objectives from an aim. One of the aims of a course in classics could be to familiarize students with the content and characteristics of literary masterpieces. To break down this aim and translate it into behavioural objectives, we ask ourselves this question. How will I know that the student is familiar with the content and characteristics of literary masterpieces? In other words, what student behaviours will I look for as evidence that he or she is familiar with the content and characteristics of literary masterpieces?

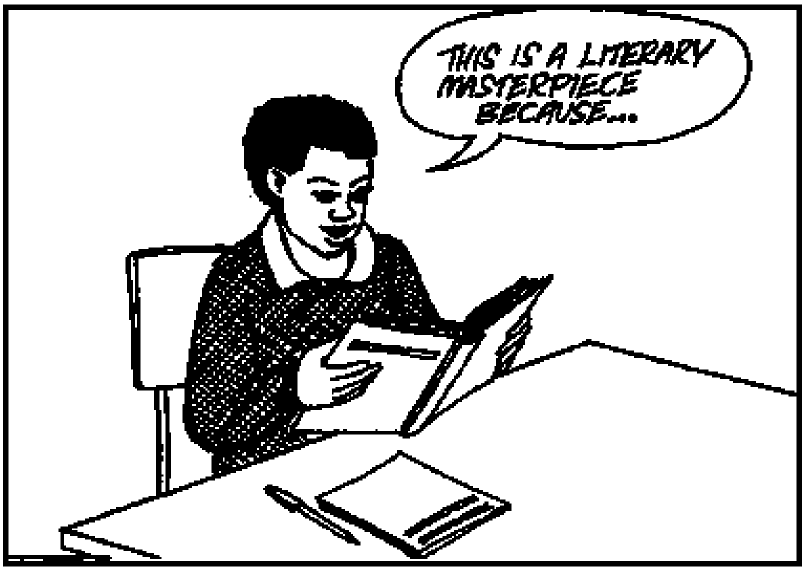


Figure 4.4 How will you know that the student is familiar with the content and characteristics of a literary masterpiece?

The answer to this question will be in the form of a list of things that the student should be able to do at the end of the course that s/he was not able to do before. Let us look at some examples of how these objectives should be stated.

By the end of this course, the student should be able to:

- define and explain the term 'literary' and 'masterpiece';
- identify the themes that literary masterpieces explore;
- appraise characterization in literary masterpieces;

- make distinctions between literary masterpieces and other kinds or writing.

In a course where the aim is to develop an awareness of the dangers present in a workshop, the following behavioural objectives could be derived.

By the end of the course, the student should be able to:

- identify the sources of danger in a workshop;
- describe how to deal with emergency situations in the workshop;
- take precautionary measures in potentially dangerous situations in the workshop.

What function do such highly explicit objectives perform? What is the purpose of stating such objectives?

Behavioural objectives are central to our work as lecturers, because they:

- serve as a very useful stimulus to think clearly about the whole course;
- act as guidelines in the course design process for the selection of
  - course content and structure,
  - appropriate teaching and learning methods,
  - appropriate means for assessment and evaluation;
- help us to communicate our intentions of the course to our students. Students are more motivated to learn and contribute when they know what is expected of them. We should also encourage students to formulate their own objectives. In this way we get to know about their needs and can cater for them in the course;
- help develop the student's capacity for self−evaluation;
- help us communicate with our colleagues which is important in forging links among courses which have a common overall purpose.

However, there are people who are opposed to the use of behavioural objectives for planning. Criticism of behavioural objectives is based on four major reasons. These are:

- Objectives emphasize trivial learner behaviours.
- Concentrating on pre−specified objectives may prevent one from taking advantage of important but incidental learning opportunities that occur during the course or lecture.
- It is undemocratic to pre−specify precisely how the learner should behave after the course.
- In some disciplines, such as the humanities, it is difficult to specify expected students' behaviours in observable and measurable terms since such behaviours are in the realm of attitudes and feelings.
- Objectives are difficult to formulate.

Despite these criticisms, many writers on course design (Rowntree, 1974, 1986; Davies, 1976; Kemp, 1985) generally agree that if one works diligently with objectives overtime, one will be able to develop ones that are free from these problems.

Types of Objectives

In educational literature, we are constantly reminded that education has to do with the development of the whole person: mind, feelings or emotions and body. This gives rise to the three domains of learning: the cognitive, the affective and the psychomotor.

- The cognitive domain has to do with the learning of knowledge and its application.
- The affective domain has to do with the learning of attitudes, feelings, values and appreciations.
- The psychomotor domain has to do with physical activity.

We should derive objectives for each of these domains. Obviously some domains lend themselves more to some courses than to others. For example, objectives in the psychomotor domain will be more prevalent in the practical oriented courses such as engineering and technology, home science, surgery, natural science and so on. On the other hand, there will be more affective domain objectives in social sciences and humanities courses such as literature, history, foreign languages, and sociology.

Levels of Objectives

Each type of learning is further categorized by level of complexity, and each domain is divided into five or six levels. Consequently, we talk of different levels of objectives within each domain.

DOMAINS/LEVELS	COGNITIVE	AFFECTIVE	PSYCHOMOTOR
recall/knowledge	list	choose	point to
comprehension	name	respond	demonstrate
application	classify	accept	construct
analysis	define	organize	assemble
synthesis	summarize	characterize	draw
evaluation	criticize	justify	measure

Source: Adapted from D. Gachuhi and B. Matiru (eds), 1989.

Figure 4.5 Classification of educational domains

The purpose of such a classification is to act as a tool for examining the balance of course objectives among and within domains.

Since university education in many disciplines emphasizes the cognitive domain, some details of the levels in this domain are presented here.

Stating Behavioural Objectives

It is generally agreed that behavioural objectives should be stated in terms of what the student will be expected to be able to do as a result of having studied the course. It is also generally accepted that expected behaviour should be identified in very clear and precise terms. But how do we achieve clarity and precision?

To achieve clarity and precision, we need to pay special attention to the verbs which we use. We should use simple, active verbs, such as 'write' 'construct' and 'analyse' that describe an activity and are not open to many interpretations. We should avoid static verbs such as 'know', 'understand', 'enjoy' and 'appreciate' that describe a state and are open to many interpretations. Static verbs are acceptable in stating course aims but not course objectives.

At a highly specific level such as planning for an individual lecture or planning evaluation requirements, it is necessary to indicate the criteria of acceptable performance in measurable terms. This means indicating how well the student must perform in order to be considered as having achieved the intended behaviour.

At this level of specificity, it is also often necessary to indicate the conditions under which the behaviour will be expected to occur. For example, will the student be timed, work under examination conditions or be able to use reference materials?

Here is an example of an objective in which all three conditions of very specific behavioural objectives are met:

> *Given a drawing of a skeleton of a cow, the student will label at least seventy per cent of the bones accurately. The task should be completed in fifteen minutes, without the aid of reference materials.*

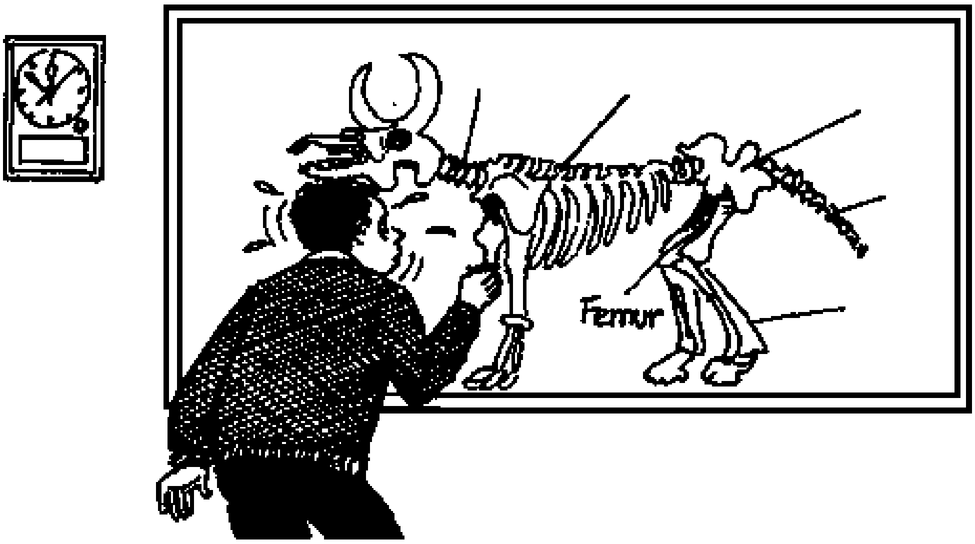


Figure 4.6 Will this student be able to meet all three conditions of the objective?

The expected student behaviour in this example is the labelling of the bones. The conditions are: the time allowed and working without the use of reference materials. The level of accepted performance is labelling 70% of the bones correctly.

Think of any one course you teach and formulate two highly specific behavioural objectives.

For the purposes of course design, it is not necessary to state objectives so specifically. The only condition to consider is the form of verb you use. The following is a list of verbs you can use in stating objectives for the various levels of the cognitive domain.

LEVEL	APPROPRIATE ACTION VERBS
If you want your students to	**Use one or more of these verbs**
know (knowledge)	state, define, list, name, write, recall, repeat, recognize, label, reproduce, recite, outline, arrange, match, memorize, order, relate
understand (comprehension)	identify, justify, select, indicate, recognize, report, restate, review, sort, translate, illustrate, represent, formulate, explain, contrast, classify, interpret, paraphrase, summarize, describe, discuss, express
apply (application)	predict, demonstrate, instruct, compute, calculate, perform, prepare, practise, apply, demonstrate, choose, schedule, sketch, employ, illustrate, interpret, use
analyse (analysis)	analyse, identify, differentiate, separate, compare, contrast, solve, appraise, calculate, categorize, criticize, discriminate, distinguish, deduce
synthesize (synthesis)	combine, summarize, restate, argue, discuss, organize, derive, relate, generalize, conclude, propose, arrange, assemble, compose, construct, formulate, plan, prepare, propose, set up, write, synthesize, design
evaluate (evaluation)	appraise, argue, attack, choose, compare, estimate, evaluate, predict, rate, score,

	value, judge, determine, support, defend, criticize, select

Source: Compiled from Kemp, 1985, and Gibbs, 1989.

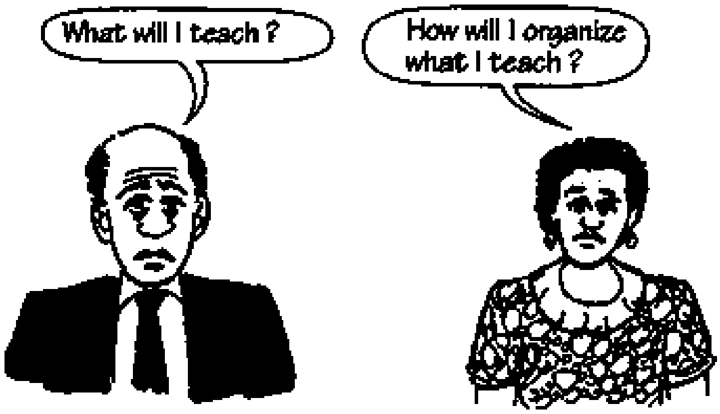
Figure 4.7 A list of verbs for use in stating cognitive objectives at different levels

Use the verbs given in this list to write behavioural objectives for two of the courses that you teach.

Step 3: Content Derivation

Having decided on the desired outcome of the course and stipulated this in the form of clear statements of objectives describing in precise terms expected student behaviour at the end of the course, we need to ask how these objectives will be fulfilled. In other words, what learning experiences must our students go through for our objectives to be achieved? This calls for content derivation.

Content derivation involves seeking answers to two questions:



What Will You Teach ?

Answering this question involves surveying your discipline in view of the course objectives. From your discipline, you select the knowledge, skills and attitudes needed by the students in order to achieve these objectives. What you should come up with are the main topics and sub−topics to be covered.

You should also identity the main tasks to be undertaken. No doubt, the issue of scope will arise. How much content you select will obviously be dictated by the time available and the depth you consider necessary to go into in order to attain the course objectives. At this stage, you may want to select more topics than you can teach. Later on, when the course is in progress, you can have the students themselves select which of these topics will be covered.

Choose a course you teach and then make a list of the topics to be covered. Now answer the following questions about each topic. This will assist you in making decisions about the content.

- ☐ Is the topic important in contributing to the attainment of cognitive, affective and psychomotor course objectives?
- ☐ Is the topic important in providing a grasp of the discipline?
- ☐ Is the topic relevant to prevailing conditions in society?
- ☐ Is the topic of special interest to the students?
- ☐ Is the topic so fundamental that others topics cannot be understood unless it is thoroughly mastered?

☐ Is the topic appropriate to the students' level of attainment? Is it within the students capabilities?

☐ Are you, the lecturer, capable of handling the topic effectively? Does it interest you?

☐ Are adequate resources (library, laboratory, equipment, audio−visual and even appropriate space) available for effective coverage?

How will You Organize What You Teach?

Available literature on organizing course content favours two approaches:

- ☐ logical organization;
- ☐ psychological organization.

Logical organization has to do with the way knowledge is organized within the discipline. Brunner (1960) talks of 'underlying principles that give structure to the subject'.

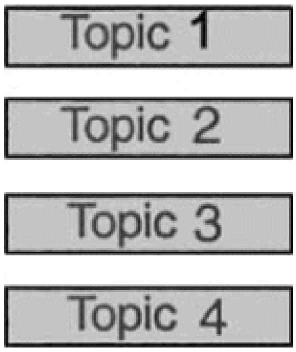
Psychological organization, on the other hand, has to do with how learning takes place in the mind of the students or, in other words, the student's preferred organization.

Logical and psychological organizations often conflict. The student may prefer to have the seemingly illogical ordering, for example, starting with practice before theory.

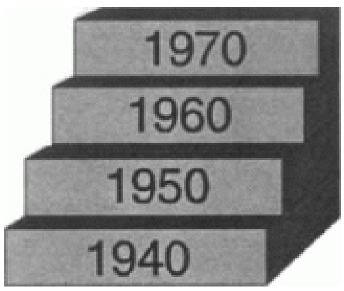
Various Ways of Organizing Content

In discussing content organization, which he calls 'sequencing', Rowntree (1986) has identified nine approaches.

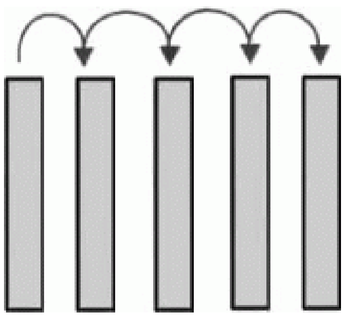
Topic by topic or parallel themes approach: In this approach the topics are treated independently of one another and can thus be studied in any order.



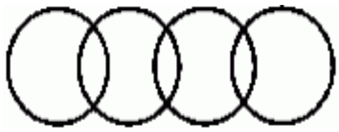
Chronological sequence or historical approach: Here events happening over a period of time are presented in the same order in which they happened.



Place−to−place or adjacent places approach: This is the spatial equivalent of the chronological approach. Presentation is from one place to an adjacent place. For example, in describing the structure of the human body, you start from the head, then move on to the neck and work your way down to the toes.

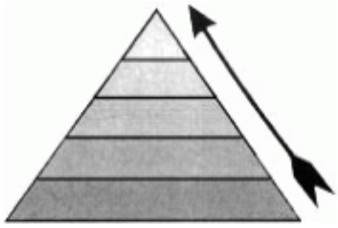


Concentric circle approach: This is a variant of the place−to−place approach. Here an idea or concept is included in the next and that one is also included in the following one and so on.

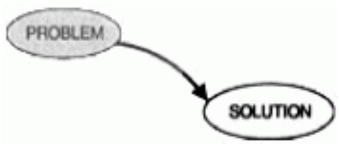


Causal or cause−effects chain approach: Here content is presented in cause−and−effect order. The student works through the chain of causes and effects for some event or phenomenon until he reaches and can explain the final effect, that is, the event or phenomenon itself. This approach is appropriate when your objective is that the students be able to work out and explain such relationships.

Structural logic or discipline 'sown logic approach: In this approach, the logical structure of the discipline dictates the organization of content. In a discipline one topic sometimes cannot be learned without prior understanding of some other topic. For example, in basic arithmetic, multiplication cannot be learnt before addition, and, in language teaching, sound discrimination (listening skills) must precede imitative articulation (speaking skills).

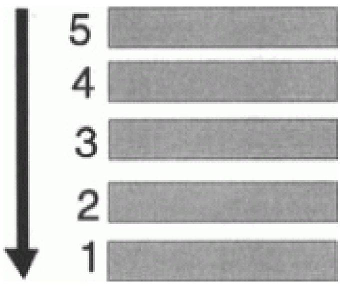


Problem−centred approach: In this approach content is organized in the form of concrete problems which are presented to the learner for exploration and solution. For example, in a course for doctors, one of the topics might focus on the problem of how best to deal with water−borne diseases in children of nomadic populations.



Spiral approach: Here the same topic is repeated over and over again as the course develops, each time at a more complex level.

Backward chaining approach: This approach is applicable where objectives require the learning of sequences. In this approach the last step in the sequence is learnt first, followed by the second last step and working backwards to the first step. For example, you would teach interpretation of research data before presentation of data and before collection of data and so on.



Other procedures for content organization include:

- ☐ moving from the simple to the complex;
- ☐ moving from wholes to parts or vice versa;
- ☐ moving from the known to the unknown.

These guidelines are useful to consider when deciding how to organize the content of your course. In general, the organization you choose should be the one that you believe will result in the most effective and efficient learning.

What content organization approaches do you find most effective for the courses you teach? Do you vary your approach?

Step 4: Selection of Teaching Methods and Media

The task of course design involves more than just stating objectives and selecting and ordering topics to be learned. It also involves selecting the teaching methods and instructional media to be used. In making decisions about how the course objectives will be achieved, we have to decide on what teaching−learning methods and educational media we will use. Let us first look at teaching−learning methods.

Teaching−Learning Methods

Educational literature is rich when it comes to teaching−learning methods, which are also sometimes referred to as learning experiences. These range from teacher−centred ones like lecturing and other expository methods to more student−centred approaches such as group discussions, tutorials and project work. In making decisions in this area, you should re−examine your course objectives and ask the questions:

Answering these questions will help achieve some balance between student and lecturer activities.

Although selection of teaching and learning methods depends on objectives, when making your choice, you should keep in mind the following general principles:

- the experiences selected should give opportunities to practise the kind of behaviour implied in the objective. For example, if one of the objectives is to develop certain manual skills, this cannot be attained unless the student has ample opportunity to practise these skills;

- for the students to carry on the new behaviours, the learning experience must give them satisfaction.

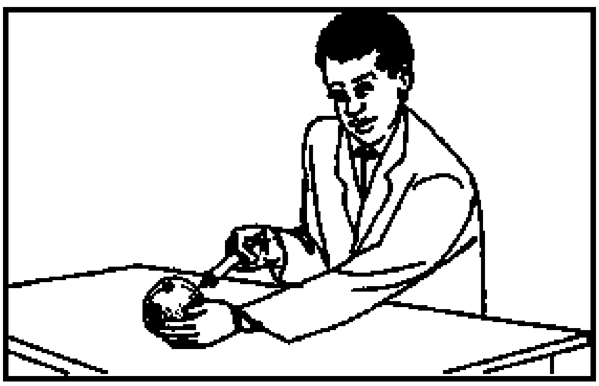


Figure 4.8 A student in the health sciences developing her manual skills

Other factors to consider in selecting methods are:

- the number of students taking the course;
- available resources such as time and space;
- available media;
- the lecturer's competency in using a given method.

A word of caution needs to be said about the last point. Much teaching in our universities is based on chalk and talk methods. Admittedly there are some good reasons for this: the very large classes and the lack of teaching resources, for example. However, it is also true that some lecturers choose those methods because they are familiar and also because, to a large extent, they are easier to apply.

However, if we are going to teach our best, we cannot go on merely doing what we are familiar with and what is easy for us. We must practise a variety of methods so that we can select those we use on the basis of their effectiveness in facilitating students' learning. It is only through practice that we can become efficient users of newer and more challenging teaching methods.

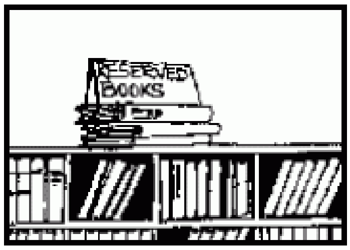
For a detailed discussion of the various methods see Chapter 5.

Think of the teaching−learning methods that you use in your courses and estimate where they are on the following continuum: Teacher−centred ☐–☐–☐–☐–☐–☐–☐ Student−centred

Instructional Media

Selection of instructional media should be done with course objectives in mind and in conjunction with the selection of teaching−learning methods. Despite the fact that there is a dearth of teaching−learning materials in our universities, the issue must still be addressed. We must not let this situation blind us to what is available and what we can get easily. What is called for here is creativity in improvising by collecting and cheaply producing or adapting your own materials.

The first thing you will want to do is to select a basic textbook or two for the course. You can do this by surveying the university bookshop and library, and you can also consult with your colleagues who might have taught the course before you. To prepare a reading list for the course, you should study the library holdings in the field and if necessary make arrangements to have key reading materials put in the reserve section of the library as early as possible. You can always solicit the librarian's assistance in this.



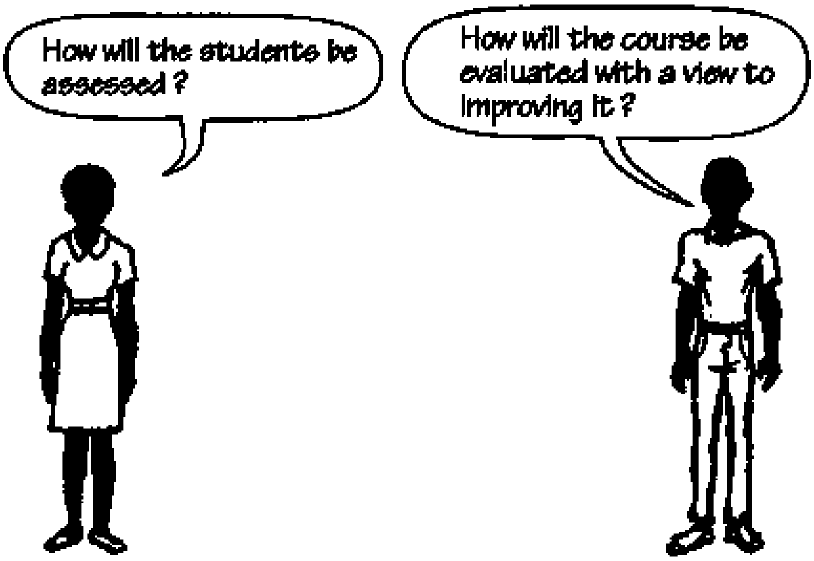
If your university has an Instructional Media Services Centre, you should investigate what is available and make a tentative list of potentially useful items. You can make firm bookings later when you are developing the course outline. Visit your university resource centre and familiarize yourself with what is available and the borrowing procedures. − See Chapter 6 for a detailed discussion of instructional media.

Step 5: Determination of Evaluation Procedures and Schedules

In course design, evaluation is important for two reasons:

- ☐ it enables us to determine the extent to which course objectives have been achieved by our students;
- ☐ it provides us with feedback information on the basis of which we can improve our course.

Consequently, in making decisions in this area the following two questions will guide us:



Let us deal with each question in turn.

Assessment

There are three things to consider here:

- what to assess;
- how to assess;
- when to assess.

What to Assess

If we consider situational analysis as a pre−course design activity, we find that we started the course design process by stipulating the purpose of the course through objectives formulation. Having laid down the objectives, it is only logical that we should want to ascertain whether or not they have been attained.

At this stage of the course design process, therefore, we go back to the course objectives and ask to what extent the students have achieved these. We attempt to measure the degree to which the students have acquired the knowledge, can perform the skills and exhibit the changes in attitudes required by the objectives.

How to Assess

At this stage we need to decide on the modes of assessment to use. Should we test orally, in writing, by practicals or use a combination of these modes?

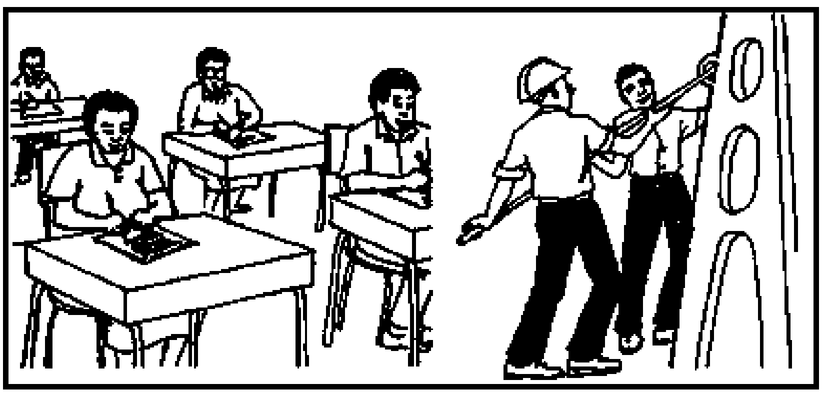


Figure 4.9 Modes of assessment depend on the skills being tested

We also need to decide on the types of questions to use. Available choices include multiple−choice questions, essay type questions and project work.

When to Test

Here we need to decide at what points in the course we will assess the students. All the decisions we make on students' assessment at this stage should be communicated to them at the beginning of the course and, where appropriate, be included in the course outline.

Other information the students need to have includes what the pass mark for the course is and what assessment marks will contribute to the final grade. In other words, will the final grade be based on continuous assessment, on the final examination or on a combination of both? − More information on university testing is included in Chapter 7.

Course Evaluation for Improvement

When designing a course, we should also plan for its evaluation. The purpose of the evaluation is to assess the effectiveness of the course so as to improve it for the benefit of future students. To do this, it is necessary that we review the:

- objectives;
- content and organization;
- methods and media;
- evaluation processes.

How do we get such information?

Sources of Information

Students' assessment results are an important source of information. If, for example, we give an assessment and find that most of our students have not attained the relevant objectives, we might ask ourselves the following questions to determine what went wrong:

Were the objectives unrealistic?

Was the content we selected and the organization we used the most appropriate and adequate?

Were our assessment procedures in line with the course objectives?

On the other hand, if most of our students perform too highly, we will want to know whether our objectives were too easily attainable considering the students' abilities and whether our assessment was at the right level of difficulty.

Once you have made decisions on evaluation, you have completed designing the teaching and learning programme for your entire course, and you are now ready to implement it, that is, put it into operation when your students arrive.

As you strive to achieve your course objectives, it is a good idea to keep a record of what went right and what didn't, what you found necessary to change and what you found worthwhile to stick to. This lecture−by−lecture evaluation of your design will help you to evaluate the entire course for the benefit of the next intake of students.

If you wish to know more about course evaluation, please turn to Chapter 7. There is also some helpful advice in Chapter 2.

At this stage you are ready to summarize your plans for the course in the form of an outline. This will give you and your students an overview of what lies ahead.

WRITING A COURSE OUTLINE

Recently, students at a Kenyan university rioted and went on the rampage burning to ashes one of their lecturer's cars. The university was closed indefinitely. The cause of the riots was ostensibly the serving of goat meat instead of chicken in the university cafeteria. However, when one of the students was interviewed by a local journalist, he was reported to have said that with examinations approaching, the students felt frustrated because lecturers had not given them handouts detailing course outlines, reference books and topics to be covered. This was the real cause of the riot!

Figure 4.10 Why did this

This incident underlines the importance of every lecturer writing and giving the students a course outline at the beginning of the semester. The students expect you to give them one but are too polite to demand it from you. They are too kind to ask why you have not prepared well for the course you are teaching.

In writing an outline, we are putting down on paper our plans for the whole course in terms of the objectives, content, teaching–learning methods and media, evaluation procedures and schedules, and all other information we consider necessary for the students to have. You should give them the outline during the first lecture and use it to explain everything about the course. You should also elicit reactions from the students so that you can get their feelings about the course with a view to accommodating their needs in your plans.

In writing the outline you are making a time plan and therefore scheduling course activities well in advance. This means you will be able to book equipment and invite guest speakers in good time.

For students, the outline is useful because it:

- sets out what the course demands are;
- allows students to plan their work accordingly.

The following Is an example of a course outline for an English course.

Course Outline	C 253: English Grammar and Usage
Target group	BEd 2nd Year English Language Group
Lecturer	Dr Wanjiru Kimani

Lecture times	Mondays 9 – 10 a.m. and	
	Wednesdays 2 – 3 p.m.	
Venue	Arts Zone, Lecture Theatre 2	
Lecturer's office	Administration Block, Room 20	
Office hours	Mondays 2 – 4 p.m.	
Thursdays 10 – 12 a.m.		
The overall aim of this course is to foster an appreciation of the complexity of English grammar through developing an understanding of the English verb phrase.		
Course Objectives		
By the end of the course, the students should be able to:		
	☐ appraise the definitions of the concept 'verb' to be found in various secondary school English Language course books;	
	☐ explain the relationship among time, tense and aspect;	
	☐ represent the various tenses and aspects of the English verb on a time line;	
	☐ describe and demonstrate the usage of the various tenses and aspects;	
	☐ analyse the special difficulties of the conditional;	
	☐ synthesize the various tense forms and aspects used to express present, past and future times;	
	☐ appraise English grammar rules in reference to the verb phrase.	
Course Topics		
The following topics will be discussed:		
	☐ Definitions – verbs, stative and dynamic verbs;	
	☐ Time, tense and aspect – meaning and relationships;	
	☐ The concept of the time line and related concepts	
		– event time (E)
		– reference time (R)
		– speech time (S);

	☐ The present tense – different usages of the present tense such as instantaneous present, habitual present and eternal truth;	
	☐ The past tense – various meanings conveyed by this tense as related to things such as time or duration of event;	
	☐ The future – ways of denoting the future in English, for example, 'will' and 'shall' 'be going to' + infinitive, the simple present;	
	☐ The perfect aspect	
		– the present perfect
		– the past perfect
		– the future perfect;
	☐ The progressive aspect – verbs taking or not taking the progressive, various meanings conveyed by the progressive such as repeated activity or transitional events;	
	☐ The conditional – usage of the conditional to express eternal truths, hypothetical activities, past impossibility, politeness and so on.	
Teaching and learning will be problem and discussion based, and the secondary school English language classroom will be used as the focus of students' future teaching.		
Assessment		
Continuous assessment will account for 30% of the final mark and will be based on one term paper and two short quizzes. An end–of–semester examination will account for 70% of the final mark.		
Basic texts		
Leech, G. *Meaning and the English Verb.* Longman, 19 71. Quirk, S. Greenbaum. *A University Grammar of English.* Longman, 1973. Leech, G. and J.A. Svartuik. *Communicative Grammar of English.* Longman, 1975. Palmer, F. *The English Verb.* Longman, 1974.		
Further reading		
Swan, M. *Practical English Usage.* Oxford University Press, 1980. Leech, Geoffrey. *English Grammar for Today: A New Introduction.* MacMillan, 1982. Huddleston, R. *Introduction to the Grammar of English.* Oxford University Press, 1984.		

Obviously the elements of the course outline will vary depending on the university one is working in. However, all the information that you consider will enhance effective and efficient students' learning should be included.

☐ The outline you have just studied has all the basic elements of a good course outline. However, it is not perfect. How would you improve it?

☐ Try to get hold of a number of outlines for various other courses. Compare them to your own course outline. Does your outline and the ones you studied have all the necessary information required in a complete course outline?

☐ Revise your outline if it needs to be improved

Having developed the course outline, and made enough copies for your students, you are ready for your first meeting with them. You will now be in a position to share your plans and subsequently begin teaching. No doubt, as you go through the course, you will find all the efforts that went into the course design worthwhile.

CONCLUSION

So far, it might appear as if the course design process is linear and that it flows smoothly from one stage to the next. That is, from objectives formulation to content derivation to selection of methods and media and ending with the determination of evaluation procedures. In practice, this is not the case, as feedback from the evaluation takes us back to the objectives thereby reactivating the whole process all over again. At the same time, decisions already taken often have to be revisited in view of decisions about to betaken. Thus, the process is interactive and involves working back and forth as can be seen from Figure 4.11.

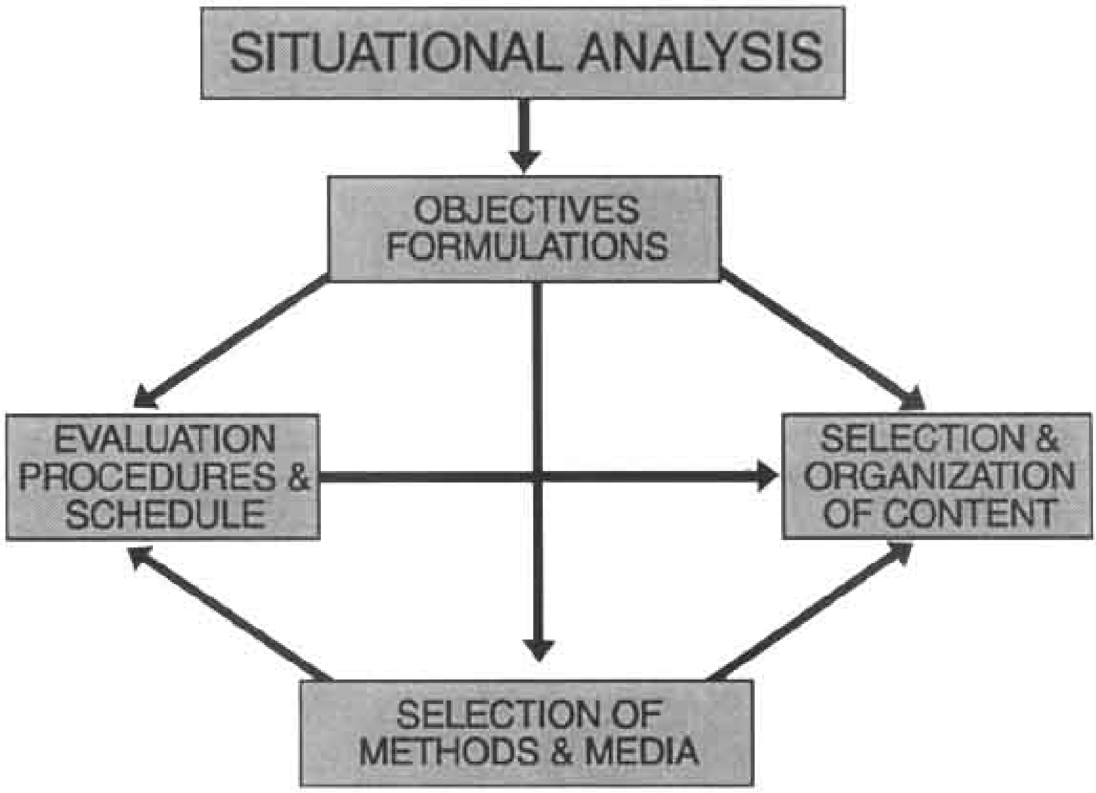


Figure 4.11 The interactive course design process

SUGGESTIONS FOR FURTHER READING

Brunner, Jerome S. *The Process of Education.* New York: Harvard University Press, 1960.

> This book is written by a very well known educational psychologist. In it he argues that each discipline has its own structure and that teaching of the fundamental ideas of the discipline should be based on the structure of the discipline.

Davies, Ivor Kevin. *Objectives in Curriculum Design. New York:* McGraw–Hill, 1976.

This book discusses the place of objectives in curriculum development in detail. It is divided into two sections. The first section discusses the theoretical and historical background to the use of objectives, the arguments for and against their use and reviews empirical findings. The second section deals with the writing of objectives and gives many examples. The section ends by presenting alternatives to objectives in planning for learning.

Gibbs, Graham and Trevor Habeshaw. *Preparing to Teach. An Introduction to Effective Teaching in Higher Education.* Bristol: Technical and Educational– Services Ltd., 1989.

This book presents ideas on all aspects of teaching in higher education. Although it has a technical orientation, readers from other disciplines will benefit because of the practical approach adopted and the very many examples given.

Kemp, Jerrold E. *The Instructional Design Process.* New York: Harper and Row, 1985.

Although the book is not primarily targeted for educational course designers, it is very useful, as it presents the process simply and with many examples from a variety of instructional settings.

Matiru, Barbara. *Towards Academic and Professional Excellence in Higher Education, Part I.* Report on the Sub–regional Workshop in Harare, Zimbabwe, 29th May to 9th June, 1989. Bonn: DSE, 1991.

This report presents country profiles on university staff development and discusses the role of the university in Africa. There is also a chapter on course design (J. Johnston, pages 118 to 135)

Matiru, I. Barbara. *Staff Development in Higher Education. Improving Teaching and Learning at Moi University.* Report on the National Training Workshop, Mombasa, 3 –15 April, 1989. Bonn: DSE, 1991.

This book discusses all aspects of teaching at the university level and also covers the systems approach to course design.

Miller, Alien H. *Course Design for University Lecturers.* London: Kogan Page, 1987.

This book presents all elements of the course design process in brief. It is useful for quick reference.

Rowntree, Derek. *Educational Technology in Curriculum Development.* London: Harper and Row, 1974.

This book treats all aspects of teaching very thoroughly, providing the theoretical background. Highly recommended reading.

Rowntree, Derek. *Teaching Through Self–Instruction.* London: Kogan Page, 1986.

This book discusses all aspects of teaching as in the earlier book but this time with a heavy orientation to student learning.

Stenhouse, Lawrence. *An Introduction to Curriculum Research and Development.* London: Heinemann Educational Books, 1975.

Stenhouse presents the objectives approach to curriculum design and development and criticizes it before offering two approaches to designing and developing curricula rationally: the process approach and the research approach.

Tyler, R.W. *Basic Principles to Curriculum and Instruction.* Chicago: University of Chicago Press, 1949.

Although this book is rather old, the author is a well known authority in the field of curriculum design, development and evaluation. This book is proclaimed to be the first attempt at systematizing the curriculum design process.

CHAPTER 5 – METHODS OF TEACHING AND LEARNING

Mike Knott and Peter Mutunga

OVERVIEW

In this chapter we shall examine some of the main methods of teaching and learning used in higher education. More specifically we shall:

- introduce the topic by examining the classroom environment, overviewing teaching methods, and discussing their selection;
- examine the lecture, or expository methods;
- discuss laboratory teaching, or practical learning methods;
- explore small group work, or discussion methods;
- review key teaching skills which have applicability with any method.

INTRODUCTION

In his teaching, the wise man guides his students but does not pull them along; he urges them to go forward and does not suppress them; he opens the way but does not take them to the place . . . If his students are encouraged to think for themselves, we may call the man a good teacher.

Confucius

In this chapter we shall study some of the main teaching and learning methods in higher education by examining the background to teaching, discussing particular methods, and overviewing teaching skills that facilitate learning. Because of limited time and space, we shall periodically make use of diagrams and tables in order to reduce explanations in prose. In addition, from time to time, we shall refer to further reading, should you wish to explore an aspect in greater detail. Pleasant reading and may it help you in your teaching!

BACKGROUND TO TEACHING

Perhaps, we should start by saying what we mean by teaching method. Very simply, method refers to the *modus operandi* of teaching, or the way information is transmitted to the learner. Methods describe conceptually the instructional process, that is, not only how information gets from teacher to learner but also how the learner:

- ☐ uses it;
- ☐ interacts with it;
- ☐ receives guidance;
- ☐ is given feedback.

Whether we are experienced teachers or not, there is probably agreement that using the right method is important, because teaching forms a significant part of our daily work, and the quality of student learning is dependent on the effectiveness of the approach used.

Not only is teaching important but it is becoming increasingly complex due to the many variables and constraints that affect choice. For example, the type and level of learning, the time available, the facilities and size of class are some of the factors that have to be considered. Quite clearly, no one method is suitable all the time or for every situation. Today, your task as a university lecturer is no longer limited to imparting information in the hope that it will be comprehended, for you have to see it in its totality of planning, organizing, delivering and controlling the whole teaching and learning process. Thus the teacher is not only a communicator but also a 'manager', with responsibility for ensuring learning occurs. In addition, this means facilitating learning, that is, helping the student in many ways and creating a non−threatening classroom climate. − The functions of university lecturers are described in Chapter 1.

From what has been said it should come as no surprise that one of the central questions asked by university lecturers all over the world is 'what methods shall I use ?' In attempting to answer this question we shall first examine the teaching environment before overviewing different methods and identifying their uses.

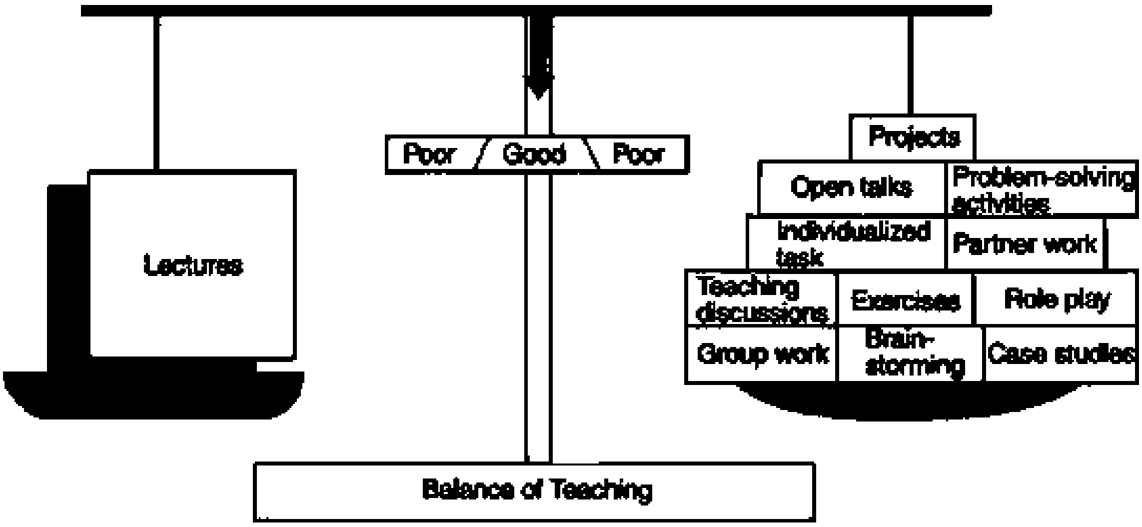


Figure 5.1 Using a variety of methods enhances the teaching−learning process

Source: Adapted from I. Barbara Matiru, 1991 (Moi University Workshop).

Teaching Environment

If we examine the present environment in which teaching operates, we note it is far more complex and turbulent today than in the past. −Constraints that affect instruction in most African Universities are described in Chapter 3. − Many of our traditional ways of teaching are no longer fully adequate unless utilized correctly and augmented with more student activity, feedback, dialogue and variety. Let us first briefly explore the past environment to better understand the present.

In so far as teaching is concerned, the lecture and tutorial have been the main methods used in universities, with the lecture being the most common, a feature that continues to this day. We may note that the popularity of the lecture is a carry−over from the early universities when learned scholars read their notes to students before the existence of printed books.

A second historical feature is that, traditionally, the goals of teaching at university have been the acquisition of knowledge, scholarship, and the development of enquiring minds. There was nothing so profane as the professional, technological and vocational considerations creeping in today.

A third significant aspect is that universities used to be left alone without undue external interference, which was an independence and isolation welcomed by both society and the university community. This may well have encouraged the external viewpoint that universities are elitist, aloof and conservative, and are populated by academics who are either geniuses or eccentrics. Today, gone are the ivory towers of the past, for universities tend to have the spotlight on them as students, society and the state, and increasingly question many aspects of university endeavour, including teaching methods.

So much for the distant past, but what have been the forces that have influenced the recent past and brought us to the present? One such element has been the explosion of knowledge and the emergence of new specialists, which have placed greater demands on students and lecturers and expanded the content of university courses. A second factor concerns external socio−economic and political pressures which have led to vastly increased student numbers, fewer resources, and new demands from society and the state. Another significant influence is the research into student learning (see Chapter 3) which has resulted in new developments in educational technology, including:

- more active and student−centered teaching methods requiring less teacher talk;
- more dialogue and positive action to help students exchange their passive listening role for more active, participative and independent learning.

1. Do you rely mainly on the lecture method or are your approaches more active and student−centered?
2. Do your students listen passively or participate actively and even engage in independent learning?
3. What changes have you made in your teaching in recent years? What further changes do you need to make?

Quite clearly the rate of change and the pressure influencing change are increasing in tempo. This means we, as teachers, have to be better than our predecessors and more adaptable if quality is to be maintained. An understanding of teaching methods and willingness to update ourselves will help.

Many teachers, faced with more students, more lectures but fewer resources, are unhappy about the future. We, though are less pessimistic. We believe positive developments in these areas are now taking place throughout the world for we may note the increasing introduction of teaching and learning improvement centres within universities, together with various staff development initiatives and international programmes directed at improving teaching and learning. At the same time, however, better recognition and rewards for good teaching, together with the provision of adequate resources are necessary.

Overview of Teaching Methods

Teaching at university has diverse goals, so you should make use of the many different methods available. Most of us are familiar with lectures, tutorials and practicals but relatively few of us fully exploit the many possibilities which lie within these broad categories. Teaching involves communication, that is, the exchange of information and *understanding.* Too often in the recent past, however, this has been one way with little dialogue or active participation by students.

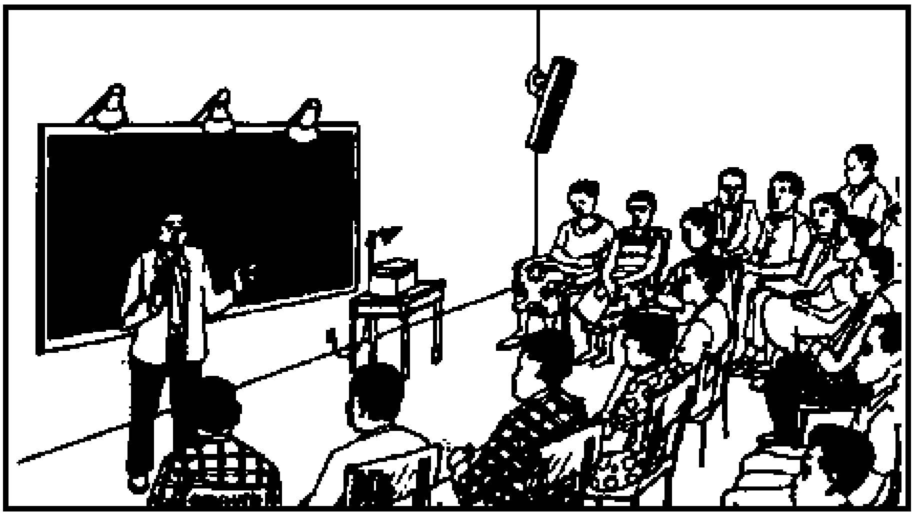


Figure 5.2. Are you using only one way communication with your students?

Unfortunately, no simple and universally acceptable model for classifying teaching methods is to be found and those available often pose problems with the terms used. Figure 5.3 offers a model to identify levels of generality or specificity of instructional methods: it should also clarify terminology. Let us discuss it briefly. At the Strategy Level, we refer to the overall way in which the process of instruction is organized and executed. This can be either 'expository' or 'discovery' and has several sub−divisions. At the Method Level we refer to the instructional process itself, which has a more or less defined set of procedures and tends to promote a particular strategy. You will note familiar examples of methods such as lecture, tutorial and seminar. At an even more specific level, the Technique Level, we refer to a detailed activity within an instructional process such as a buzz group or quiz, and which is usually of short duration.

	Strategy	Main	Sub−divisions	Main focus

		divisions		
Level 1	The overall way in which the process of instruction is organized and executed	Expository	Didactic	Telling
			Practical	Showing
		Discovery	Experiential	Discussing
			Heuristic	Problem−solving
	Method		**Examples**	
Level 2	The instructional process that has a more or less defined set of procedures and tends to promote a particular strategy	Lecture		Demonstration
		Tutorial		Seminar
		Case study		Discussion
	Technique		**Examples**	
Level 3	A detailed learning activity, usually of short duration, used during an instructional process for a specific purpose	Video playback		Buzz group
		Poster design		Quiz
		Pyramid method		Case study

Figure 5.3 Instructional methods: levels of generality or *specificity*

Source: Adapted from Romiszowski, 1988.

We have already noted there are two main strategies. The first of these is largely direct instruction, with the teacher mostly telling and the student passively listening or taking notes. This approach emphasizes the transfer of basic information for students to memorize and reproduce. It answers the questions 'what' and 'how' only. With the explosion of knowledge in most disciplines, this approach tends to lead to shallow learning and time problems. The second general strategy is indirect, with the teacher helping the learner to find out by posing questions, guiding, indicating sources of information and sharing ideas, problems and solutions. Here one searches for meaning and attempts to answer the question 'why'. A colleague of ours describes the former as 'instruction' and the latter as beyond instruction', which we believe sums it up well. Look at Figure 5.4 and study the differences between teacher−centred and learner− centred characteristics.

FOCUS	TEACHER−CENTRED	LEARNER−CENTRED
Approach	Expository: 'talk and chalk'	Discovery: 'dialogue and inquiry'
Purpose	Transfer of information	Development of individual potential
Rationale	Education as technology	Education as liberating process
Strategy	Surface learning	Deep learning
Teaching link	Direct	Indirect
Teacher role	Authoritative: "all knowing expert'	Facilitative: 'developer'
Teacher activity	Telling, checking, correcting	Guiding on route, resources interpretations

Student role	Rote learning	Self−direction for meaning
Student activity	Listening, note−taking	Exploring, reflecting, questioning
Methods	Lecture, seminars, demonstrations	Discussions, simulations, problem−solving

Figure 5.4 Teaching and learning characteristics

Source: Adapted from Ramsden, 1992.

Let us now come much closer to the real life situation of teaching at the university by giving you details of eight methods and their characteristics (see Figure 5.5). This figure can be used for reference purposes, and will help in selecting methods later. Most of these are used within universities to a lesser or greater degree but it is unlikely that such a range is found in any one faculty or department. The eight methods listed are perhaps modest in number, for one authority, Huczynski, describes over 300 methods.

Past teaching in universities was largely didactic, with the lecturer telling and the learner listening passively, and in many universities this still remains the general practice. It works very well when there is a limited amount of information to be acquired and it is well presented, but difficulties arise when course content becomes excessive, student numbers are large, or when time constraints exist, which is often the position today. This is not to suggest we should throw out lectures but we do need to be aware of their limitations so that we can avoid weaknesses.

Method	Strength	Weakness
Directed study of material in textbooks	☐ Effective way of teaching basic facts	☐ Requires careful planning and structuring
	☐ Allows learner to work at own pace	☐ Dependent on suitable text being available in sufficient numbers to cater for the size of the class
	☐ Needs no specialized facilities	☐ Not suitable for achieving many higher cognitive and non−cognitive objectives
Programmed text	☐ Same basic advantages as directed study of books	☐ Preparing suitable material is very time−consuming
	☐ Allows learners to interact with the material	☐ Not suitable for achieving many higher cognitive and non−cognitive objectives
Self−instruction using audio visual media and computer based learning	☐ Enables a wide range of educational objectives to be achieved (especially lower cognitive)	☐ Ideal ready−made course ware seldom available
	☐ Allows learner to work at own pace	☐ Preparation can be time consuming, expensive and requires specialist skills

	☐ Can save teachers from having to carry out repetitive, time consuming work	☐ Not suitable for achieving many higher cognitive and non–cognitive objectives
	☐ Allows interaction between learner and instructional programme and can be highly stimulating	☐ Cannot be used unless suitable hardware is available, which can be expensive
Lectures and similar expository techniques such as demonstration	☐ Cost effective in terms of staff/student ratio	☐ Strongly dependent on skill of lecturer
	☐ Strong in achieving lower cognitive objectives	☐ Weak in achieving most higher cognitive and affective objectives
	☐ Generally popular with students and staff	☐ Not suitable for achieving psychomotor objectives or developing communication or interpersonal skills
	☐ Ideal for introductory or overview purposes	☐ Student involvement low or non–existent
		☐ Pace controlled by teacher non–existent
		☐ Pace controlled by teacher
		☐ Most lectures are too long for the concentration span of students
Buzz sessions and similar short small group exercises	☐ Excellent method of introducing variety into a lecture, thus helping to maintain student attention	☐ Only useful in a supportive role as a part of a larger lesson
	☐ Can achieve a wide range of objectives, both cognitive and non–cognitive	☐ Requires skilled facilitator
	☐ Students are actively involved in lesson	
	☐ Allows feedback to take place	
Class discussions, seminars and tutorials	☐ Same basic advantages as buzz sessions	☐ Danger that not all the class takes an active part
	☐ In addition, the greater length allows a wider range of objectives to be achieved, often of a high level	☐ Can cause timetabling problem if a class has to be split

		up
	☐ Enables relevant topics to be examined in depth	☐ Danger of tutor dominating discussion
Participative exercise of game/simulation/case study type	☐ Can be used to achieve a wide range of objectives, both cognitive and non−cognitive, often of a high level	☐ Only useful in a supportive or illustrative role
		☐ Can be difficult to fit in, especially with long exercises
	☐ High student involvement	☐ Must be relevant to be of educational value
	☐ Stimulating and motivating if property designed	☐ Requires briefing and debriefing skills
	☐ Ideal for cross−disciplinary work	
Group projects	☐ Suitable for developing a	☐ Danger that not all members will pull their weight
	wide range of objectives, both cognitive and non−cognitive, often of a high level	☐ Assessment of contribution made by individual students may be problematic
	☐ Ideal for developing inter personal and group skills	
	☐ Ideal for cross−disciplinary work	

Figure 5.5 Characteristics of some main instructional methods

Source: Adapted from Percival and Ellington, 1988.

Study figures 5.3, 5.4 and 5.5 once more.

1. Which approaches do you use? Give examples of

- ☐ Teacher−centred approach
- ☐ Learner−centred approach

2. Give the level of generality or specificity for each example you have listed.

An important aspect to be noted in discussing teaching methods is the current educational research which shows that learning is enhanced if students are more active and independent, with the lecturer adopting less of an expository and more of a facilitative and guiding role. Not everyone accepts this, as yet, but teaching developments indicate a significant shift towards more student−centred learning today with an increase in active participation by students. The result is more variety, flexibility and integration of teaching methods.

Finally, it may help to increase our understanding if we try to place the various methods on a continuum which is lecturer−oriented at one end and student−oriented at the other (see Figure 5.6). It is not easy to position many of the methods because of several factors that may influence the way a method is used. For example, the natural teaching style of the teacher (authoritative or facilitative), the approach to learning of students (deep or shallow), and the influence of constraints (time, resources and size of class) may well alter the position of a method on the continuum. Effective teaching requires all these factors to be taken into account when using a particular method for it is very much a case of getting the 'right mix' in the situation applying at the time.

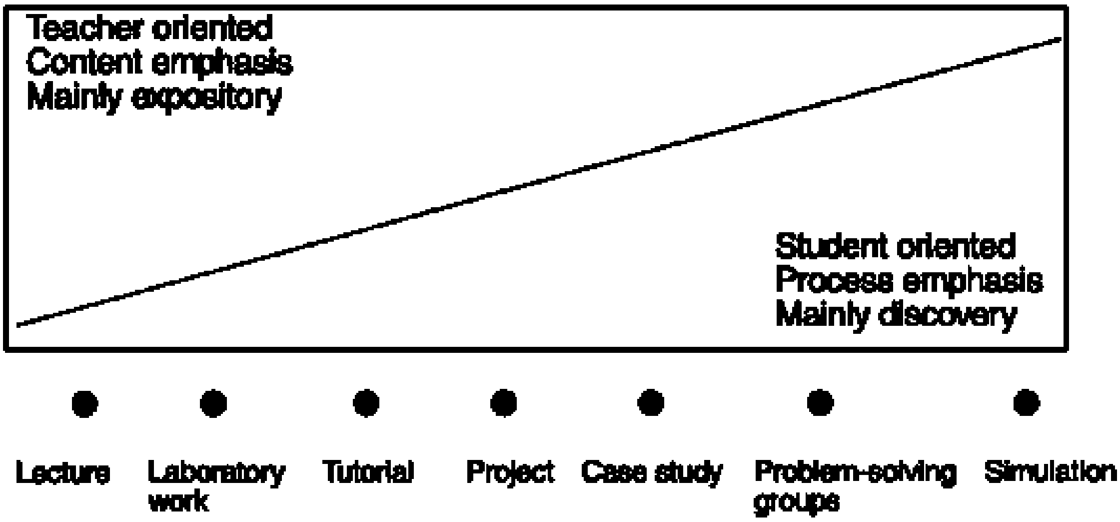


Figure 5.6 A continuum of teaching methods

Source: Adapted from Brown and Atkins, 1988.

Figure 5.6 is our attempt to position some methods along a continuum but perhaps you would like to try this for yourself.

1. Where would you place some other methods, for example buzz groups, field trips, or a simulated game?

2. Explain why you have selected a particular position.

3. Discuss this with a colleague to deepen your understanding.

Selection of Teaching Methods

Few will disagree with the importance of using the right method in teaching. Because there is no simple and instant way of selecting a teaching method, we must consider several factors. In this section we shall first discuss the purpose or objective of learning and the level required, followed by group size, local constraints such as time available and facilities, the degree of autonomy of the learners, and finally, any preferences or dislikes of the lecturer. In dealing with purpose, we need an appreciation of formulating objectives in order to determine the level of learning required.

Objectives of Learning

The specification of learning objectives is important in selecting an appropriate teaching method, for these serve as targets for our teaching. There is general agreement on the need for stating objectives but much less on the degree of specificity which is appropriate. –Formulation of objectives is also discussed in the previous chapter. Several models are available but the taxonomy developed by Bloom *et al.* (1956) is perhaps the best known. At universities we are mainly concerned with knowledge or the cognitive domain, but of more importance is the hierarchy of levels of knowledge in this domain. Figure 5.7 identifies the various levels and explains requirements according to Bloom's model as interpreted by a more recent authority. It needs to be noted that many of us often tend to select a higher level of objective than is really required.

Levels of knowledge	Description	Learning methods	
1. Memory(knowledge)	Learner can recall facts, definitions, procedures, actions, behaviours.	Lectures	Algorithms
	S/he can identify, define and describe.	Talks	Check lists
		Programmed learning	Information maps

		Demonstrations	Laboratory work
		Reading	Directed study
2. Understanding	Learner has grasp of concepts, ideas, procedures and techniques.	Explanations	Assignments
	S/he can explain, compare, justify and give examples.	Discussions	Projects
		Case studies	Business games
		Group feedback analysis	Tutorials
		Seminars	Quizzes
3. Application	Learner can use the concepts, ideas and techniques in standard situations.	Demonstration and practice	Syndicates
	S/he can use or apply things in the 'correct' prescribed way.	Role play	Coaching
		Simulations	Assignments
		Discussions	Projects
			Field trips
4. Transfer (analysis, synthesis and evaluation)	From all the concepts, ideas, procedures and techniques ever learned, the student can select the one most appropriate to a new non− standard situation.	Brainstorming	Counselling
	S/he can modify or create new hypotheses, ideas or tools to cope with unique situations where there are no 'right' or established answers.	Discussions	Secondment
		Dialogue	Assignments
		Group exercises	Diagnostic instruments and feedback
		Sensitivity training	Projects
		Problem solving	

Figure 5.7 Objectives of learning

Source: Adapted from Huczynski, 1983.

Group Size

Our courses or classes will vary in size and the numbers in a particular teaching session will change from very small to very large. Quite clearly class size plays an important part in selecting a method because some are unsuitable when the group is excessively large or small. For example, too large a group would not be suitable for a discussion. Figure 5.8 outlines various group sizes and indicates an appropriate method for each.

Group	Size	Methods
Individual/Pairs	1−2	Programmed instruction, coaching, computerized learning, directed study

Small group	3–14	Discussions, role–play, brainstorming, tutorials, seminars, projects, demonstrations, case studies, simulation/games, and small group activities
Medium group	15–29	As above with more difficulty and less effectiveness
Large group	30–60	Syndicates, lectures, seminars, panels, workshops, case studies, problem–solving groups
Aggregate	Over 60	Lectures augmented with buzz groups, syndicates and small group activities

Figure 5.8 Croup size and appropriate method

Local constraints

You should also consider any local constraints when selecting a method. The two most important factors are the time and facilities available, including resource materials and textbooks. Quite clearly if an essential requirement for a particular method is not available, for example, a piece of equipment for a demonstration, then that method cannot be used. Similarly, if there was insufficient time to undertake a field trip, then some other method such as a video recording would have to be used.

Autonomy of Students

The degree of student autonomy is increasingly featuring in the selection of methods but this tends to be the case in more developed countries, where students often are more independent and have a wider choice in how they study university courses. In Africa, perhaps, this should not concern us too much at present but it is something to bear in mind for the future, particularly if we wish to become more learner–oriented.

Lecturers' Preferences and Dislikes

This is mentioned because there is evidence that lecturers' likes and dislikes, together with their experience, have a bearing on the method they use. This is partly related to their philosophy, style and value system but also to their past experiences and their confidence in using new and often less controllable methods. Here we are not going to deal with this in depth but only wish to indicate that there is a need for the dissemination of new information to lecturers, together with periodic updating workshops on teaching methods.

Summary

The selection of an appropriate method is important but not as important as its execution. Before we turn to more detailed information on particular methods, let us summarize by providing a check–list of suitable methods for particular types of learning. This is shown in Figure 5.9.

Learning level	Lecture	Reflective lecture	Laboratory	Project	Tutorial	Simulation	Problem solving
Memorization	?	?	•	•	•		•
Understanding	•	?	?	?	?	?	•
Application		•	?	?	?	?	•
Transfer		•	•	?	•	•	?

Key: Fully suitable = ?

partially suitable = •

Figure 5.9 An overview of the suitability of a specific method

THE LECTURE METHOD

In this section we shall discuss the lecture method. We shall do this by examining its main characteristics, outlining some of its strengths and shortcomings and suggesting ways of improving it. – Remember the outline in Chapter 3, where the impact of lecturing on student learning is explained.

What is a Lecture?

Very simply, a lecture is an organized verbal presentation of subject matter often augmented by visual aids. According to Bligh (1972), a lecture is a period of more or less uninterrupted talk from a teacher. A more detailed definition is found in Percival and Ellington (1988) who state that a lecture is 'a didactic instructional method, involving one–way communication from the active presenter to the more or less passive audience'. Perhaps unkindly we should also include the student who described a lecture as 'an occasion to sleep whilst someone talks'.

History and Background

Historically the lecture can be traced back to the 5th century BC when it was popular with the Greeks. It was widely adopted in the early Christian and Muslim Universities in medieval times when books were scarce, and even today, it is the most common teaching method in higher education. The term lecture comes from the Latin *lectare,* to read aloud, which identifies it as an expository or 'telling' method.

Whilst the lecture largely consists of one–way communication from the teacher, this does not mean that there can be no discussion or dialogue between lecturer and students. Often such two–way communication is limited to the teacher asking questions to establish that the subject matter has been assimilated but many skilled lecturers are able to make their lectures more thought–provoking and interactive, so that deeper learning is possible. This is to be encouraged and we shall return to how this can be achieved later in this chapter.

Research on Lectures

Much has been written about lectures and lecturing and it may help our understanding if we examine briefly what research has established. Three main trends may be noted, the first comparing their effectiveness with other methods, the second detailing the views of students and lecturers and the third focussing on learning in lectures. So what does the literature tell us about the lecture?

In comparing the lecture with other methods we find that:

- ☐ the lecture is the most common method used in universities;
- ☐ it is as effective as other methods for imparting knowledge up to comprehension level but less effective for higher cognitive levels;
- ☐ it is less effective for teaching practical skills than demonstrations and laboratory work;
- ☐ discussions are more effective than lectures for changing attitudes.

In spite of these limitations, a consensus of authorities report the lecture has a place in higher education but should not be the only method used. Studies of views on the lecture reveal that both students and lecturers place high value on clarity of presentation, suitability of structure and generation of student interest. In addition, the lecture is popular with lecturers, students and administrators. They give the following reasons.

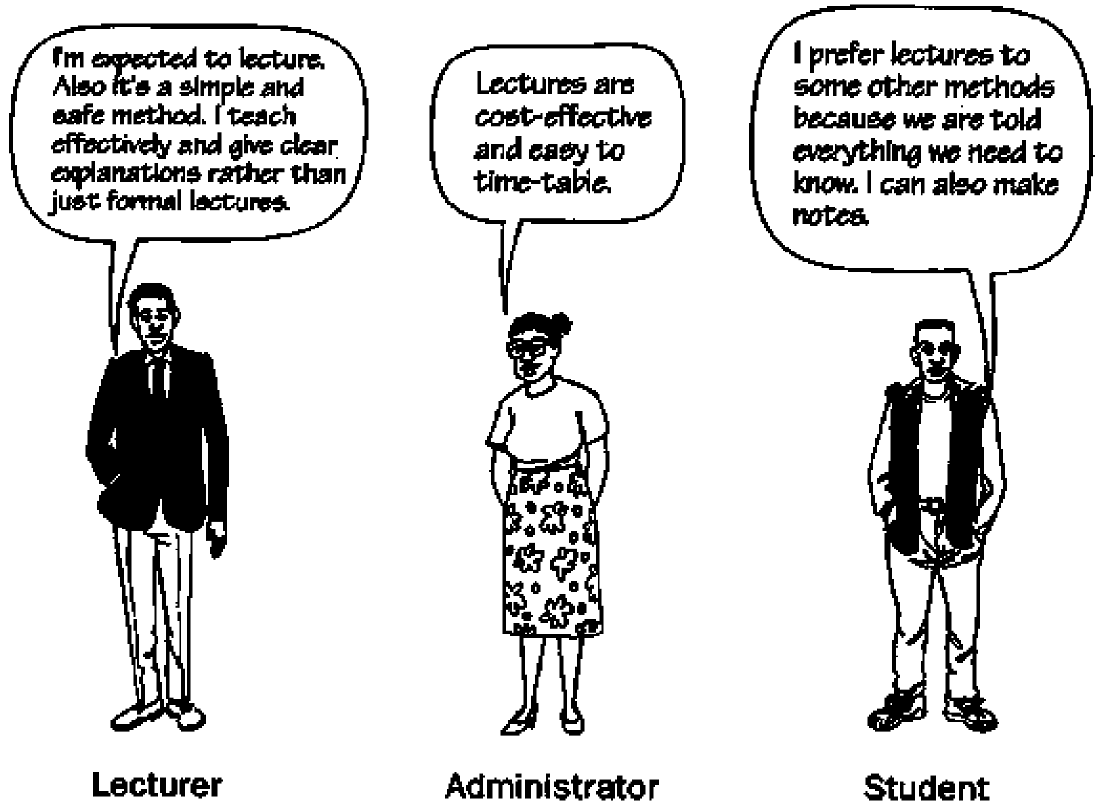


Figure 5.10 Why do you prefer lectures as a teaching–learning method?

From an educational or learning view point, several limitations of the lecture method are reported in research, many of which are frequently made worse by poor lecturing skills. For example:

- research indicates that lectures need to be augmented with more active and participatory learning approaches;
- lectures tend to encourage 'surface' learning only, which facilitates memorization but is unsuitable for 'deep' learning required for understanding and problem solving skills.

Learning from Lectures

One way of improving lectures is to examine the process of teaching and learning that takes place, for in doing this we find there are several techniques and skills for enhancing this method. So how do students learn in lectures?

Very simply, students learn in two ways: firstly, from the information presented by the lecturer, and secondly, by the way they process and restructure the information received to suit their own interpretation. Thus the degree of understanding will vary according to the way the information is transmitted, received and processed. A lecture can facilitate learning by being well structured, interesting and meaningful or it can inhibit learning by being confused, boring and meaningless. Let us examine this process a little deeper.

A lecturer sends information in many ways.

Verbal: through explanations, definitions, examples, descriptions or comments.

Extra–verbal: through the lecturer's vocal qualities such as clarity, audibility, fluency and speed.

Non–verbal: through gestures, facial expressions or body movements.

Visual: through the use of visual aids.

Students also learn by listening, observing, note–taking, discussing and restructuring information. The effectiveness of learning, however, is dependent on how well they receive and process the information, together with the quality of the message received.

Figure 5.11 In Africa, teaching and learning often take place under difficult conditions

Having read this information about how students learn from lectures, what would you do, despite the difficult conditions, to improve your lectures so that your students will understand them better and learn more from them?

You might have included the following points in your answer.

- Firstly, you must organize and structure your presentation so that it is meaningful to your students.
- Secondly, you must arouse students' interest and hold their attention.
- Thirdly, you must help your students to learn in various ways.

By reflecting on these main lecturing processes and strengthening some of the skills required, many of us can enhance the quality of our lectures. So what are the skills associated with lecturing?

Skills of Lecturing

We have some reservations about using the word lecture for it can conjure up a droning lecturer and sleepy, passive students. We tend to agree with George Brown, a well known authority in Britain on teaching, who prefers to use the word 'explaining' for lecturing. He describes explaining as 'giving understanding to others' for it consists of a series of short statements containing principles, Illustrations, definitions and qualifications, all of which are well organized and spoken clearly. It follows that the explaining must be appropriate for the particular learners and suitable for the time available.

The process of explaining has a number of important characteristics such as clarity, organization, emphasis, orientation, examples and feedback. Let us discuss these points in detail.

Clarity: this is promoted by using explicit smoothly flowing language and avoiding vagueness. It means defining new terms, clarifying key points, paraphrasing, and giving directions on learning tasks as well as speaking clearly, audibly and not too fast.

Organization: This calls for a sound structure and logical approach in which essential points are concisely covered, key links and relationships are indicated and good use is made of time. A well organized explanation will show evidence of sound preparation and will not attempt to cover everything.

Emphasis: This is concerned with the highlighting of important elements and details. Vocal emphasis, involving tone, pitch, volume and pauses, together with gestures, eye contact and pointing are ways of giving emphasis in explanations and these can be augmented by visual aids and handouts.

Orientation: This means helping to promote learning in several ways, for example, in outlining the structure of a topic when opening a lecture or introducing a new theme, giving directions and advice on what to expect, or using the key structuring moves that signal what is happening during the lecture. These are summarized in Figure 5.12.

Examples: These are essential in explanation but they need to be apt and interesting within the students' repertoire of knowledge, and with sufficient frequency and variety. A typical example, comparisons, and 'problem' examples should also be given to enhance comprehension.

Feedback: Continuous monitoring is an important feature of explanations for without it there can be no certainty that 'understanding' has resulted. Feedback is initiated by the lecturer asking questions, inviting queries, seeking interpretations and probing for clarification.

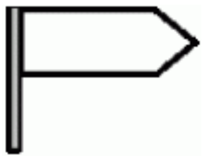
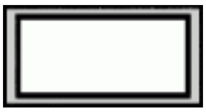
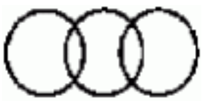
Four key "structuring moves" as identified by Brown	
Signposts:	
	Statements which signal the direction and structure, for example, Today I want to examine four approaches to the management of tumours: Firstly, the use of surgical techniques; secondly, the use of radiotherapy; thirdly, the . . .'
Frames:	
	Statements which delineate the beginning and ending of sections, for example, 'Let's now leave radiotherapy and turn to the use of chemotherapy . . .'
Foci:	
	Statements which highlight or emphasize key points, for example, The basic pharmacological principal underlying chemotherapy is (pause)..
Links:	
	.'Statements that link sections of the lecture together or to previously acquired knowledge or experience, for example, 'So you can see chemotherapy is often as aggressive and invasive as excision and . . .'

Figure 5.12 Signaling direction when lecturing

Source: Adapted from Brown and Atkins (1988)

In addition to the above features, one of the most important and challenging aspects of effective explaining is that of generating and maintaining student interest. This increases the desire to learn by gaining and holding attention, avoiding boredom, encouraging learning activity, and providing a non−threatening helpful climate. Much depends on the inherent enthusiasm and innovativeness of the lecturer. The direction and help given to students as well as appropriateness of examples are also important. These should be complemented by a variety of participatory and active learning techniques.

The identification of specific lecturing skills is no easy task. Unfortunately, we cannot deliver here a more detailed examination, but we have researched the literature and adapted a list of teacher activities which summarize effective basic skills (see Figure 5.13).

Lecturer Activity Effective Lecturing Behaviours		
Explains	☐ Uses logical, organized approach	☐ Covers essential factors
	☐ Is clear and concise	☐ States relationships

	☐ Defines key terms	☐ Emphasizes key points
Introduces topics	☐ Clearly states objectives	☐ Overviews topic
	☐ Describes structure	☐ Advises requirements
	☐ Illustrates relevance	☐ Links with past/future
Uses teaching aids	☐ Uses appropriate medium/equipment	☐ Provides variety of stimuli
	☐ Ensures audibility/clearly visible	☐ Structures content clearly
	☐ Checks equipment before lecture	☐ Presents interestingly
Maintains interest	☐ Displays enthusiasm, own interest	☐ Personalizes instruction
	☐ Gives interesting/apt examples	☐ Varies activities
Questions and responds effectively	☐ Asks questions clearly, concisely	☐ Uses questions to explore, clarify
	☐ Uses problem solving questions	☐ Re−phrases, reinforces answer
	☐ Distributes questions effectively	☐ Encourages answers, elaboration
Organizes participation	☐ Sets appropriate tasks	☐ Varies activities
	☐ Issues clear briefs	☐ Gives guidance
Responds to students' needs	☐ Checks students' understanding	☐ Adjusts content, if necessary
	☐ Repeats/clarifies/amplifies	☐ Shows awareness of needs
Communicates well with voice	☐ Is clear and concise	☐ Uses pauses, silences, varied tone
	☐ Uses appropriate language	☐ Makes eye contact and uses appropriate gestures
Uses time well	☐ Starts and finishes promptly	☐ Shows evidence of planning
	☐ Departs from plan where appropriate	☐ Advises on students' time−use
Closes lesson	☐ Reiterates and summarizes key points	☐ Issues reading lists
	☐ Advises on follow−up action	☐ Acknowledges students' efforts

Figure 5.13 Skills of lecturing

Source: Adapted from O'Neil and Pennington, 1992.

Preparation of Lectures

The effectiveness of a lecture is closely related to the quality of the preparation. In this section we shall examine preparation skills for, as George Brown states, 'presentation is important, but without a clear, coherent lecture structure which emphasizes key points and examples, a presentation may have a short−lived effect'.

In preparing a lecture we should consider three main factors: firstly the purpose of the lecture, secondly the content and the structure, and thirdly how to include some key features in our lecture plan.

Purpose

Lectures are given for several reasons, for example to:

- tell students what they need to know (note−taking lectures);
- promote understanding and learning in depth (problem−solving lectures);
- provide an introduction to a topic (overview lectures);
- stimulate student interest in a topic (motivational lectures).

This means we need different kinds of lectures for different purposes and it is important at the start of preparation to be clear on the type of lecture required. Very often it is possible to combine two purposes, for example, an overview and motivational lecture, but is unlikely that all purposes can be fully accommodated in any single lecture.

Content and Structure

The selection and structuring of content is very important for it ensures optimum coverage of a topic as well as understanding. In addition, it is closely related to purpose for this determines whether selection of content should require full coverage, an overview or only some elements of the topic. Most of us tend to select too much content, probably because we know a great deal about the subject. So, we need to be ruthless in selecting only relevant information which must be viewed in the light of the students' perspective and stage of development. One way of reducing content is to categorize it as 'must know', 'should know' and 'nice to know', and use only the 'must know'.

Having selected the content, you should then consider the way it is structured. This is important in planning a lecture for it determines whether coverage is adequate and student understanding likely. Three common methods of structuring lectures are the classical, the problem centred and the sequential. See Figure 5.14 for details of these structuring approaches.

Structure	Description	Advantages	Disadvantages
Classical	The topic is divided into main sections, then sub−sections and finally elements. It is the most common form of structure. Each sub−section will contain main points with examples, elaborations and other relevant information.	☐ Easy to plan and take notes from	☐ Can generate boredom
		☐ Useful for outlining subject matter	☐ Necessary to clearly indicate structure, delineate sections, emphasize key points and link to overall topic
Problem−centred	Contains a statement of the problem, then various solutions are postulated and evaluated.	☐ Intellectually stimulating	☐ Easy to confuse rather than clarify or wander aimlessly
		☐ Students' participation easier	☐ Note−taking difficult
Sequential	Consists of a series of linked information on a linear or step−by−step basis leading to a conclusion.	☐ Useful in historical accounts and maths based subjects	☐ Must be interesting for effectiveness and within students' capacity

Figure 5.14 Structures for preparing lectures

Source: Adapted from Brown and Atkins, 1988.

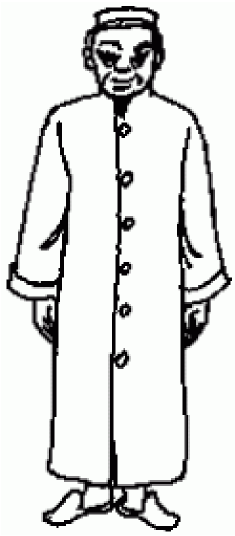
Key Features

Several key features should also be included in most lectures for full effectiveness and, in our view, it is better to attend to these when preparing lectures. The following are considered the more important.

- ☐ The introduction or opening stage of a lecture is crucial. Effective openings require that you should gain the students' attention, advise on content and structure and indicate the purpose or objective.

- ☐ The use of appropriate audio−visual aids is important for clarity and comprehension but it is essential that these are well prepared. Ensure that illustrations and diagrams are simple, brief and readable from the back of the class; handouts are concise and well structured; whilst slides, videos, films and recordings, must be relevant as well as clearly seen and heard. These should be viewed as 'aids' only and require augmentation through reflection and activity by students, so it is important that you plan for this and allow time to achieve full benefits.

- ☐ You should deliberately build−in consolidation of learning in your lectures and allow time for such purposes. Many of you are familiar with the old Chinese adage:



• First you tell them what you are going to tell them (the introduction)

• Then you tell them (the instruction)

• Then you tell them what you have told them (the consolidation).

It is important that such recapitulation is presented differently to the original instruction and not word for word. When time permits the task can be shared with students as the lecturer can pose suitable questions to extract the information, perhaps with some guidance and elaboration. Again, such aspects require attention in the preparation stage, such as framing suitable questions or selecting a different structure for reviewing the topic.

- ☐ Because you have a lecture scheduled for one hour it does not mean you have to talk for the whole hour. The inclusion of student activities is an important alternative for it enables you to renew attention, provide opportunities for student reflection or problem−solving, and helps you to obtain feedback on progress. Many lecturers will argue that they haven't time to waste on student activities but research evidence shows that active learning is essential for understanding.

• set questions or problems for buzz groups or collective answers;

• show video clips and discuss implications;

• set a brief multiple−choice questionnaire and discuss solutions;

• give students data and ask them to frame questions, make estimates or solve problems;

• ask students to discuss a research design or a set of findings;

• list advantages and disadvantages of a procedure or theory;

• have students suggest examples and compare with neighbour;

• let them make a problem solving poster outlining the problem, solution, issues and implications;

• demonstrate a task and discuss;

• instruct the students to draw a one page 'map' of a topic, detailing main elements, sub−elements and links.

Before leaving this section on preparations we should note that it is not advisable to write out every word for a lecture or to try and cover everything. A common error is to over−prepare by reading so much that you become overwhelmed but still unsure of what you are going to say. Try and summarize your main points on one sheet. You can use this as a handout, an introductory visual aid, or to talk to in your lecture.

Identify a lecture you will soon have to deliver. Prepare for it by giving its:	
☐ purpose	☐ structure
☐ content	☐ key features

Group Instruction

Group instruction forms part of the expository telling method of instruction, often classified as a lecture. It usually follows a prescribed format that is structured and systematic. This type of instruction is commonly used in further education and programmes of a vocational or business nature. A brief outline is given here as it is a simple method yet incorporates a number of important principles of learning.

Group instruction consists of five main steps.

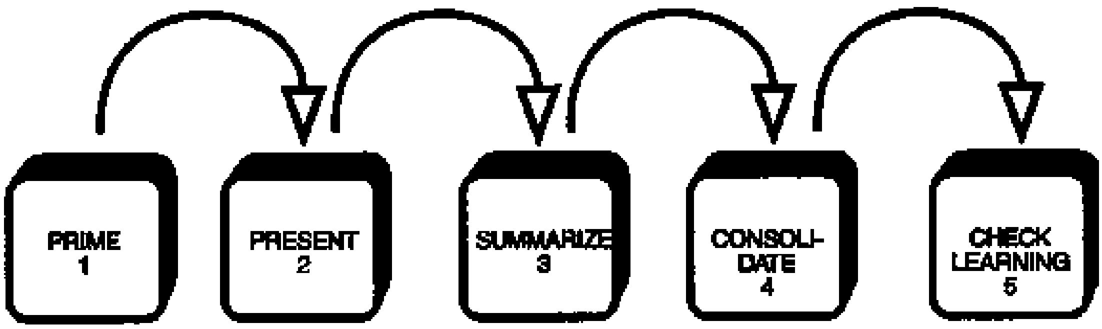


Figure 5.15 Five main steps in structuring group instruction

Step 1: Prime

The purpose of the prime stage is to get students into a state of readiness to learn. This is done by advising on procedures for the session, giving a brief outline of the topic and its structure, and generating student interest by indicating the importance of the topic as well as how it will be utilized. If desired, a review of relevant previous learning may take place. At the end of the prime phase students should be aware of what is expected of them, should want to learn and should know how the subject will be dealt with.

Step 2: Present

Step 2 forms the bulk of your input. In this stage the main body of information is delivered in a systematic and logical manner, or put another way, a well organized explanation is given, using visual aids.

Step 3: Summarize

At the end of the presentation phase, the topic should be summarized and the main elements reviewed. Visual aids such as an overhead projector (OHP) should be used where appropriate.

Step 4: Consolidate

Up to this stage, it may appear that the lecturer has given a good lecture for not everyone takes the trouble to get their students ready to learn, present their material in a structured and visual way, and provide a good summary at the end. But even when doing all this, there is no certainty that students will remember the instruction for there has been no mechanism to make the group think hard about the topic and, as a result, learn. This is the purpose of the consolidation stage for it forces students to recall the information and think it through with guidance from the lecturer.

Consolidation is achieved by the lecturer first asking some simple recall type questions on key elements of the topic and then posing open ended questions of a problem solving type. The way these are asked is important and the lecturer should advise beforehand that some questions will be raised to help the students understand the information given but no one should answer until requested.

The consolidation phase proper, some prefer to call it recapitulation, now commences, with the lecturer:

- ☐ posing an open ended question;
- ☐ pausing to give students a chance to think;
- ☐ nominating at random a student to supply the answer (if this is not done at random some students will 'switch off');
- ☐ echoing the response by using the student's own words or paraphrasing them.

When the nominated student gives an incorrect answer, the lecturer should refer it to another student or give clues to correct the original response. This procedure should be repeated until all the main elements and key aspects of the topic have emerged and the lecturer should ensure by the distribution of questions that as many students as possible make a contribution. Some variations to this format are possible, for example, you may record the answers and then compare these with the original structure or use them to probe for deeper knowledge or a justification.

A second phase in the consolidation stage, time permitting, is to give students the opportunity to ask questions requiring clarification or elaboration. A danger is that questions may call for information that is over and above that decided in the planning of the topic, or lead to sidetracking or argument that is excessively time−consuming.

Step 5: Check Learning

The final stage of group instruction is to check learning and its purpose is to assess the effectiveness of instruction. This is done by asking several questions requiring short, or one word answers on the main points covered. These may be asked orally or shown on an OHP, but should always require written answers. These should be marked there and then by each student, either personally or through exchanging answer sheets with a neighbor, whilst the lecturer calls out answers and asks for results. This can be done formally or informally, but both students and lecturer will have some idea of whether the instruction was assimilated because all students were tested.

It is difficult to be precise with regard to the allocation of time for each phase but as a guideline the following is suggested:

Step 1:	Prime =7.5%	(5 minutes)	
Step 2:	Present = 35%	(21 minutes)	based on a
Step 3:	Summarize = 10%	(6 minutes)	60 minute
Step 4:	Consolidate = 37.5%	(22 minutes)	session
Step 5:	Check learning = 10%	(6 minutes)	

Group instruction is a simple but structured method which, if planned and executed effectively, enables a lecturer to organize meaningful presentations, provide for student participation and retain control of the learning process in a facilitative way. More important, it ensures learning occurs. This is what students expect from lectures and what lecturers would like to provide.

After your next lecture ask yourself whether you have:

- ☐ primed your students?
- ☐ presented the information effectively?
- ☐ summarized the topic?
- ☐ consolidated the presentation?

☐ checked whether the students have learnt the main points covered?

If your answer to any of these questions is 'no' then you should improve your group instruction methods.

LABORATORY TEACHING AND PRACTICAL WORK

This section examines instructional methods based on practical, experimental and investigative work, mostly carried out in laboratories but also extending to projects and fieldwork. (This type of instruction is also dealt with in Chapter 3.) We shall focus on scientific and technological disciplines in the main which aim to understand the process of scientific enquiry. In doing this we shall deliberately exclude practical work in non−scientific areas such as business studies, law and the social sciences due to differences in the nature of such work, which is more concerned with social interaction and communication. This, we believe, is more related to the next section dealing with group work.

Historical Background

Practical work occupies an important place in the education of scientists and engineers. It is based on the assumption that learning by doing is best for acquiring technical skills. Today laboratory work is well entrenched and is here to stay probably with some modification to conventional methods if present trends continue.

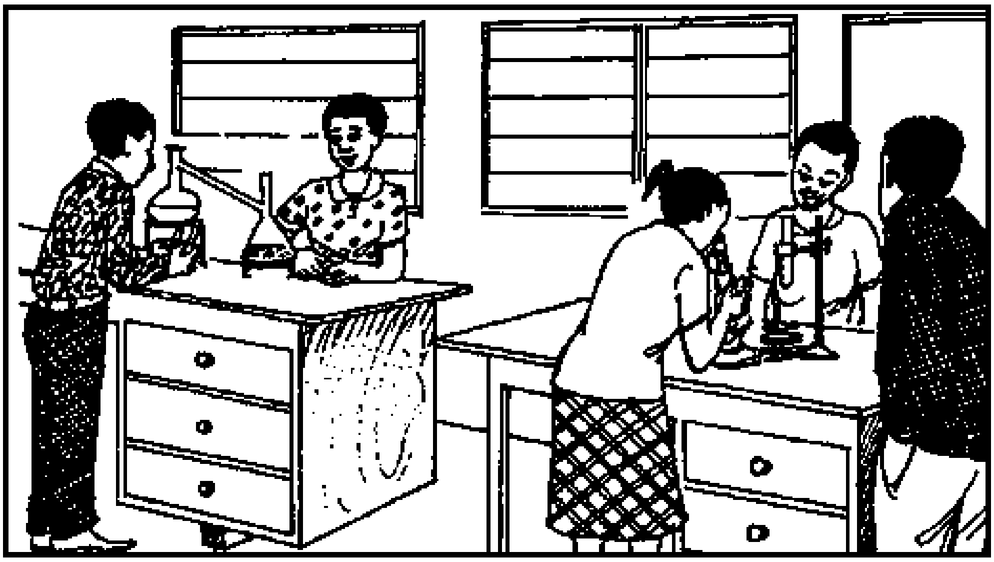


Figure 5.16 Laboratory work furthers the understanding of scientific principles and the process of scientific enquiry

Historically the use of laboratories for teaching in universities is relatively recent having been largely introduced in the mid−nineteenth century in order to cope with increasing student numbers in scientific and technological areas. Early practicals were essentially demonstrations aimed at the acquisition of observational and manipulative skills and for training in the use of equipment. With the rapid growth of scientific knowledge, a variety of exercises and structured experiments were introduced on an increasing scale and students were required to work through these, spending considerable time in laboratories and in writing reports on their work. Such was the position up to a quarter of a century ago and still is in many universities.

During the past twenty−five years a major re−appraisal of uses and methods in laboratory teaching has taken place. However, there is considerable controversy about these. In the debate several areas of serious concern have been expressed, for example:

☐ the high cost of laboratory work, making it difficult to continue providing facilities and resources to the standard felt necessary;

☐ severe time constraints and overloading of timetables leading to serious problems in meeting syllabus requirements in quality and quantity;

- dissatisfaction with the effectiveness of conventional laboratory work which does not foster the understanding of scientific concepts and the application of scientific principles to solving problems.

The result of this re−appraisal of laboratory work has been the augmentation of conventional methods with more experiential and discovery−based strategies leading to higher cognitive learning and to less repetitive and time−consuming activities. This new emphasis calls for changes in teaching methods and in teaching roles as well as in more independent learning by students. These trends are by no means universal as yet but are increasingly being introduced or planned for the near future. We may summarize the current goals of practical work today as:

- teaching technical skills relevant to the subject;
- understanding scientific principles and the processes of scientific enquiry;
- developing systematic problem−solving skills;
- nurturing the development of professional attitudes, practices and commitment.

Purposes of Laboratory Work

Laboratory work is used for many purposes. Figure 5.17 itemizes these and lists a wide variety of uses.

Laboratory classes may be used to:

- teach theoretical material not presented elsewhere
- illustrate and amplify lecture material
- develop manipulative skills
- develop ability to follow instructions
- familiarize students with instruments and apparatus
- familiarize students with the design and construction of experimental equipment
- develop observation skills
- develop skills in gathering and interpreting data
- develop a concern for accuracy and precision
- develop skill in communicating experimental results
- develop the ability to write coherent and well−argued reports
- develop the capacity for self−directed learning
- encourage independent thinking
- stimulate thought through experimental interpretation
- develop the students' skill in problem solving with a wide number of variables and many possible solutions
- encourage enterprise, initiative, resourcefulness
- develop personal responsibility and reliability for experimentation

Figure 5.17 Possible purposes of laboratory classes

1. Select the five most important and the five least important purposes of laboratory teaching from this list. This exercise is very useful when reviewing your laboratory programme to ensure sufficient coverage without excessive duplication.

2. Compare your choice with other colleagues.

3. Another method is to draw a grid, list the main purposes in the vertical margin and number the laboratory sessions on the top axis. You can then identify which objectives are covered in each laboratory session and establish the usefulness of each laboratory.

Focus on Laboratory Teaching

1. How far does laboratory teaching actually fulfill the expectations which lecturers have for it?

2. What is the nature of laboratory learning?

Let us briefly explore the literature to find answers.

From surveys undertaken in the mid 70s we learn that engineering and science students in Britain spent between 50% and 70% of their contact time in laboratories and, in addition, spend most of their free' time on finishing practicals and writing the work. One study details time spent in laboratories as 500 hours for chemists, 400 for biologists and 300 for physicists. In addition, it reported each major practical took up to seven hours to write up (Brown and Atkins, 1989). No figures are available for Africa but an initial enquiry at the University of Zimbabwe revealed that science students currently spend up to 50% of their time in laboratories.

Several comparative studies of conventional laboratory classes and other forms of teaching indicate shortcomings in the effectiveness of laboratory work for although more effective than other methods for acquiring observational and manual skills, it is generally less effective for teaching factual knowledge, concepts, scientific enquiry or problem solving skills. Other findings from the literature report largely negative attitudes to laboratory work by students, high costs, poor cost effectiveness as well as poor allocation of marks, considering its importance and the amount of time devoted to it. Moreover, several studies report the tendency for practical work to emphasize low grade skills and to foster only superficial or mechanistic knowledge with little understanding of the relationship between theory and practice.

It may help our understanding if we outline some causes of inferior laboratory work and the nature of such learning.

- Much laboratory work has become a ritual in which students follow routine instructions and are not required to think. In addition, a significant amount of laboratory work and assessment procedure only require 'right answers' or the reproduction of factual information.

- If is often assumed that learning occurs if information is given to students. This is not correct as student engagement or reflection, commitment and active exploration of experience is necessary for meaningful learning. Because laboratory work is largely a teacher dominated form of instruction, this leaves little opportunity for students to engage in the content in their own way (Ramsden, 1992).

- Full learning potential in laboratory work depends on mastery of key concepts, but the degree of understanding in practical work is often limited to superficial rote learning in which knowledge is stored in isolated units unconnected to other learning .

- Pre−requisite knowledge on entry is important in higher education and if inadequate, can result in students being left behind. In addition, some students enter university with incorrect beliefs about scientific phenomena and not all abandon their pre−existing framework. It has been found that the rigid following of highly structured procedures tends to promote the continuation of knowledge deficiencies whereas freedom to design experiments and 'discover' new knowledge reduces such shortcomings.

Although a number of educators favour the experiential approach, they emphasize that learners must be guided when it comes to practical work. Students should be helped to reflect on their experiences in a critical way. They must also be allowed to explore independently in order to find out things for themselves.

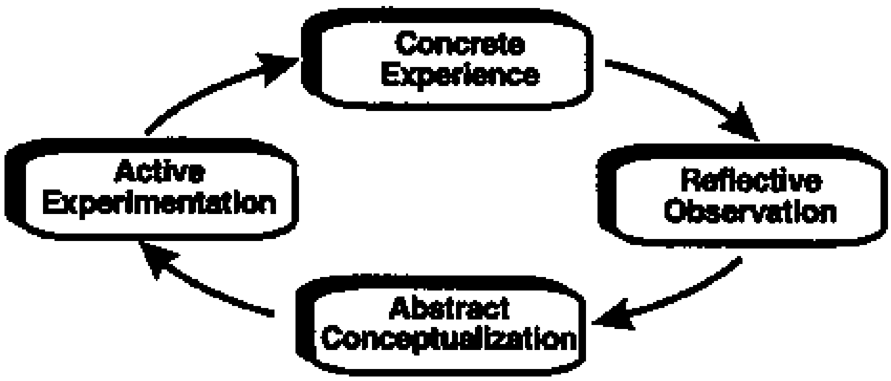


Figure 5.18 The nature of the experiential cycle

Student	Teacher
Actively explores tasks/experience	Plans 'experience', communicates tasks
Reflects/tests ideas and assumptions	Observes, gives feedback, guides and assists
Shares experiences, clarifies, selects action	Helps, if required, and relates to 'real world'
Uses to confirm applicability, gain confidence	Encourages, supports and confirms

☐ It is considered important for laboratory teachers to be aware of differences between rote and meaningful learning, and of different positions on the expository – discovery continuum. For example, chemical symbols and formulae may be learned parrot–fashion (rote–learning) or with understanding (meaningful learning) and can be taught either through reception, experimental or discovery learning.

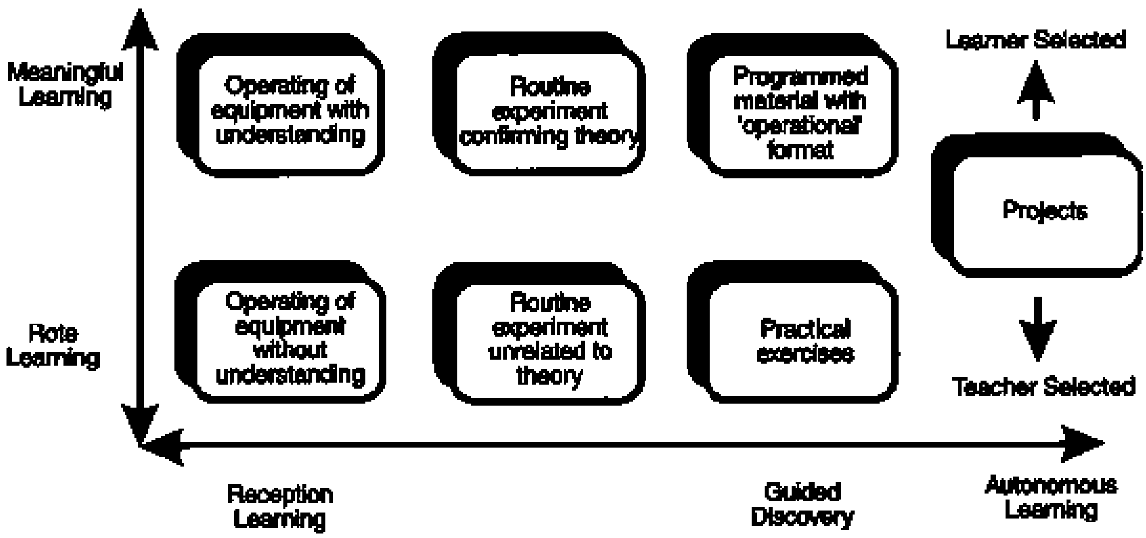


Figure 5.19 Practical activities related to learning theory

Source: Adapted from Yorke, 1981.

☐ Another hypothesis that may prove useful is that of the 'support–challenge' concept. This suggests that it is important to achieve the 'right mix' of both support and challenge for the circumstances concerned.

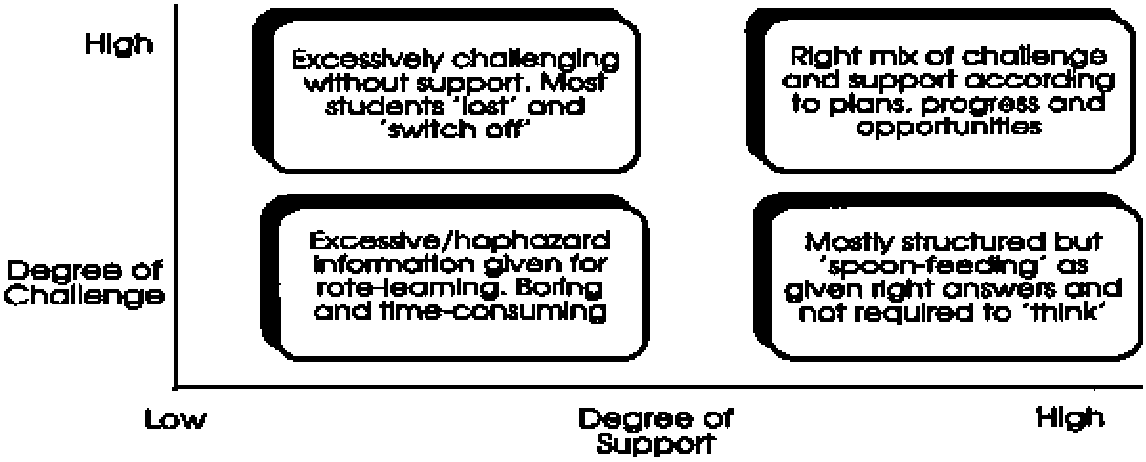


Figure 5.20 The support–challenge grid

Source: Adapted from Horabin and Williams, 1992.

Some of the causes for inferior laboratory work are also the reasons for poor work in other learning situations. Reflect on your own teaching–learning sessions.

1. Make a list of some of the reasons why your students are engaging only in the lower levels of learning (rote learning).

2. Suggest ways of making your students' learning more meaningful.

Methods of Laboratory Teaching

The fundamental principle on which laboratory teaching is based is that students teach themselves and each other. Although the students essentially learn through their own efforts, it is the lecturer who provides the experiments, tasks, instructions and guidelines. To be able to do that, you need to have the skills outlined in Figure 5.21.

Skills	Uses
Demonstrating and Explaining	Generating and maintaining interest
Questioning, listening and responding	Training technicians and demonstrators
Briefing, debriefing and giving feedback	Helping students to learn
Preparing a laboratory course and activities	Facilitating

Figure 5.21 Skills of laboratory teaching

Demonstrations

Demonstrations are mostly designed to illustrate and consolidate theoretical principles outlined in lectures. It is important that the demonstration is held shortly after the lecture, otherwise the relevant principles are forgotten. It is equally undesirable if the demonstration occurs before the lecture as the principle concerned would not be known.

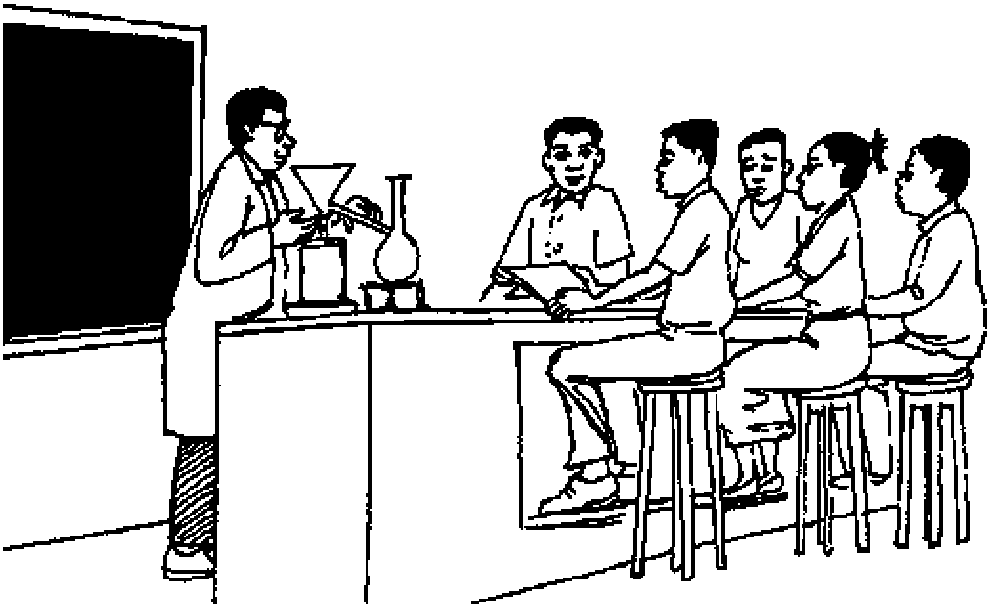


Figure 5.22 Demonstration designed to support theoretical principles should follow shortly after the lecture

Exercises

Exercises are tightly structured experiments in which students follow precise instructions and acquire observational and manipulative skills. They also confirm theory and, in a limited way, impart new scientific information. Many exercises are repeated annually and students 'pass on' findings, whilst sometimes careful reading of the instructions may reveal the conclusions expected.

Structured Enquiries

Structured enquiries are partially structured experiments which require students to develop their own procedures and interpretations of the results. They require problem−solving skills as well as interpretive, observational and manual skills.

Open Ended Enquiries

Open ended enquiries require students to identify a problem, formulate a solution, develop experimental procedures, interpret results and recognize implications. Various constraints on the student such as time, equipment and materials may be present. This type of experiment requires more advanced problem−solving skills and on a small scale, requires many of the abilities of the research scientist. At this level learning is moving beyond mere understanding and is likely to be at the application level, if not beyond.

Projects

Projects are based on long experiments, field studies or a series of experiments and are usually carried out in the final years of a first degree. They enable a student to:

- explore a field deeply;
- develop initiative and resourcefulness;
- increase intellectual curiosity;
- develop innovativeness to the full.

As such, a project offers an excellent learning experience but can be time consuming for both student and supervisor. Projects may be undertaken on an individual or team basis. However, the latter may pose problems with assessment although enhancing co−operation and working with others.

A hierarchy of skills exists in the different methods and it is extremely important to be clear on the objective required so that you can select an appropriate method. A useful scheme of analysis of laboratory teaching which determines the level of scientific inquiry based on the degree of student autonomy in arriving at a solution has been developed by Hegarty (1978) and is shown in Figure 5.23.

Type of Method	Level	Aim	Materials	Method	Answer
Demonstration	0	Given	Given	Given	Given
Exercise	1	4	4	4	Open
Structured inquiry	2	4	Given	Part Given/Open	4
Open inquiry	3	4	Open	Open	4
Project	4	Open	4	4	4

Figure 5.23 Levels of scientific inquiry in practical work

> Select several experiments from your laboratory course and use Figure 5.23 to classify each one of them. Check your classification with other colleagues. Most experiments are at levels 0 and 1. Levels 2 and 3 are more likely to stimulate a student to think and develop high cognitive skills. This exercise is particularly useful in reviewing laboratory work.

Improving Laboratory Teaching

The debate on laboratory teaching has largely resulted in two separate schools of thought, those advocating 'more of the same' and those wanting change of some kind. It may help if we outline for your consideration some of the suggestions made by Brown and Atkins (1988). For convenience we have divided them into five categories.

Clear Objectives

The many uses and expectations of laboratories make it unlikely that all objectives can be achieved satisfactorily. For example, setting several objectives for one laboratory session often means that several lesser ones are achieved but an important one is missed, or a particular laboratory may not always be the best type for reaching an objective. Clarity on the purpose of each session is, therefore, most important.

Precise Instructions

Instructions should be clear, unambiguous and in the correct order. They should be designed so that students can see clearly the important features of apparatus or other materials they are required to use. Flow charts, decision trees and written statements supported by clear diagrams may be necessary for complex directions.

Training Laboratory Assistants

The role of laboratory assistants is to help students to carry out their activities. These activities may consist of:

- ☐ following instructions;
- ☐ solving a design problem;
- ☐ setting up apparatus;
- ☐ checking the apparatus works;
- ☐ obtaining, observing and recording the results;
- ☐ noting any peculiarities in methods or results;
- ☐ linking the results to theoretical principles or other results.

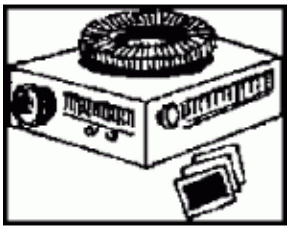
So, laboratory assistants must understand the experiments and be familiar with the equipment and procedures if they are to help the students. As a lecturer in charge of a laboratory course you can help them as well as the learners by providing a laboratory manual. This should outline the experiments and also provide guidelines for the demonstrators on what to do during laboratory sessions. Indeed, you could also spend some time training them to develop their skills as assistants. Lecturers at a number of universities identified the following as useful skills that all laboratory assistants should acquire:

- ☐ Observe students at work.
- ☐ Anticipate major difficulties of understanding.
- ☐ Recognize major difficulties of understanding.
- ☐ Give brief, clear explanations of processes and procedures.
- ☐ Give directions.
- ☐ Ask questions which clarify difficulties of understanding.
- ☐ Ask questions which guide students through the activity.
- ☐ Answer students' questions in a simple, direct and non–critical way.
- ☐ Offer supportive and encouraging remarks.
- ☐ Know when to help or not help a student.

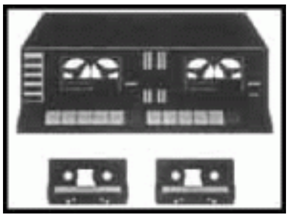
Facilitating Methods

As we have already mentioned, laboratory teaching methods should as far as possible allow students to teach themselves and each other.

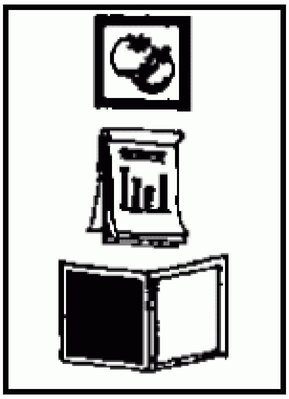
Some facilitating methods may help you towards that goal. They also allow students to work at their own pace. These methods should contain the explicit goal of the experiment, clear instructions and well–labelled diagrams. They may also generate questions on the activity and its implications. Such methods include:



Slide booklets to show a process, a complex procedure or complicated apparatus.



Tape booklets to provide instructions, descriptions and methods of calculations.



Wall charts for displaying instructions, demonstrations and descriptions of apparatus.

Video recordings to provide instructions, the working of equipment and demonstrations of techniques or procedures.

Computer programmes to describe the experiment, provide instructions, to plot or calculate results and to ask questions.

Interactive video as a laboratory simulation (video + computer).

Questions and Self−evaluations

Students should be encouraged to read and think about all aspects of a laboratory activity. You may facilitate this by asking them questions before elaborating on an experiment or task and again afterwards. Such questions provide clues for important points. They also motivate students to check whether they have carried out procedures correctly.

A self−evaluation check list is a useful tool in this respect. It can be used to direct students to assess how well they have carried out a task, what its implications are and how they might improve. If they are working in groups they may wish to evaluate each other using such a list.

Which of the suggestions for improving laboratory teaching could you apply in your own classes?

SMALL GROUP TEACHING

We now turn to a range of teaching methods in which co−operative activity and joint participation feature strongly. These methods differ from the traditional passive and expository methods which rely on the sole efforts of the lecturer, for small group teaching achieves skills from the collective contribution of the teacher and class members. You may compare the following ideas to the proposals for group activities in Chapter 3. – We have deliberately used the generic title *small group teaching* for this section because it emphasizes that students learn in an integrated small group. Sometimes this method is referred to as 'discovery learning', Indirect instruction' or 'student–centred methods'. Let us together explore the process of small group teaching.

What is Small Group Teaching?

Most of us are familiar with some form of small group teaching, for example the tutorial, which has a long history in universities. Tutorials can be traced back to Socrates who led his students in critical inquiry to insight through discussion. This is a method we would all like to use with our own students. If we had to explain small group teaching and its implications but were only allowed to make three points we would select the following:

- Discussion in some form or other underpins all small group teaching for these methods seek to examine a topic or problem through the free flow of argument in which participants learn form each other by pooling ideas. As such it is an attempt to better understand knowledge and solve problems rather than acquire new factual information; thus it is 'discussion with a purpose'.

Figure 5.24 Students participating in a lively small group discussion

- Teaching small groups is more complex and challenging than generally realized because it calls for more flexibility and adaptability, higher facilitative and interactive skills, as well as superior planning and organizational competencies. This means the effectiveness of the teacher is more critical for successful learning than in other methods and, at the same time, perhaps more risky and less controllable.

- Trends in recent years show that the use of small group teaching is increasing in universities. This is because, since early days, it has always been well–suited to the development of deep and meaningful learning at higher cognitive levels, but now it has been found equally beneficial for the development of a range of professional competencies, personal skills and desirable attitudinal traits. More specifically, learning in interactive groups enhances critical thinking, problem–solving, communication skills, innovativeness, and both inter–personal and team skills. All of these are much in demand today with current external pressures and market forces affecting university practices.

Definitions

Some definitions might help our understanding. George Brown (1988) describes small group teaching as 'Getting students to talk and think,' which we feel is a useful and succinct description. An American author, G.D. Borich (1988), emphasizes the key characteristics of *inquiry, discovery and problem–solving.* These initiate 'a process of generalization and discrimination which requires students to rearrange and elaborate their understanding of a topic'. This is echoed by Curzon (1990) who talks of 'collective exploration and public evaluation of ideas'.

Perhaps, you might care to formulate your own interpretation from those just given.

Small−Group Teaching Methods

The common labels for small group teaching are tutorials, seminars and problem−solving classes, but this is, perhaps, too general for classification purposes. Five separate types have been identified to describe the full range of techniques, namely:

Buzz Sessions, which refer to short discussions by very small groups within a lesson (also referred to as buzz groups or brainstorming).

Group Discussions, which consist of various forms of in−depth discussions, such as tutorials or seminars.

Problem Solving Activities, which cover a range of games, simulations and participative exercises such as case studies, role plays, business games.

Mediated Feedback Sessions, in which specific skills are practised, analysed and discussed, such as micro−teaching and interactive skills training.

Group Projects, whereby a small group undertakes a cooperative task of a practical nature, such as a laboratory or field project.

Here is a classification of the techniques we have just described.

Mode	Type	Method
Discussion	Buzz Sessions	Buzz Group Brainstorming
	Group Discussions	Tutorial Seminar
Mediated Activity	Problem Solving Activities	Case Study Role Play Business Game
	Feedback Session	Micro Teaching Interactive Skills
Independent Activity	Internal Projects	Laboratory Projects
	External Projects	Field Projects

Figure 5.25 Classification of small group teaching approaches

You will probably have noted that small group teaching can be grouped broadly into two main modes, namely Discussion and Activity. We have still not listed the whole range of methods, but many are merely refinements of a basic method and it is unlikely that any lecturer will use the whole range on a regular basis. How to conduct some of these small group sessions has been explained in Chapter 2. A more sophisticated description of group teaching methods and their application is presented.

Figure 5.26 is an overview of the most commonly used small group methods.

Method	Description
Brainstorming	A technique for generating many ideas uncritically with comment and evaluation only considered later.
Buzz Groups	A short period during a lesson in which several small groups intensively discuss a given issue, often followed by plenary feedback.
Case Study	An in−depth analysis of real or simulated problems for students to identify principles or suggest solutions.

Controlled Discussions	A discussion in which students may raise questions or comment but the tutor controls the general direction.
Fishbowl	A discussion group in an inner circle surrounded by a silent 'observation' group. Often followed by plenary session or role reversal.
Free Group Discussions	A group discussion in which topics and direction are largely controlled by members not tutor.
Problem−centred Group	A group with a specific open ended task which is discussed, with findings reported at plenary session or summarised on a poster.
Projects	A practical group exercise or scholarly activity involving investigation of a problem.
Pyramid (Also called Snowball)	An 'idea' generating technique whereby groups of two briefly discuss a problem, then form groups of four for further discussion prior to reporting back.
Questions	Tutor displays questions (on BB or OHP), gives time to think and then elicits answers for discussion and elaboration by group. Can be used as quiz with teams.
Role Play	A technique in which participants act out different roles in particular situations and later discuss their feelings and aspects of the problem.
Seminar	Group discussion of a paper presented by a student.
Simulation and Games	An exercise involving essential characteristics of a specific real situation where participants re−enact specific roles.
Step−by−step Discussions	A discussion organized around a carefully prepared sequence of issues and questions to draw out the required information from students.
Syndicate	Several sub−groups forming part of a larger group each working on a problem for a set time and reporting later to the whole group.
Tutorial	A meeting with a small group, often based on a pre−set topic or previous lecture.
Workshop	A 'hands−on' participating experience involving several methods and directed at developing skills or attitudes.

Figure 5.26 Small group methods: overview

Constraints on Small Group Teaching

We need to note that several constraints and prerequisites impose limitations on small group teaching. We shall mention size, group knowledge, and environmental factors.

Limitations of Size

Size limitations are clearly necessary due to the interactive nature of small group teaching. Group size is dictated by the type of interaction desired and by practical and economic considerations. Most authorities cite 'not more than ten students if full benefits are to be obtained', but recognizing economic reality in Africa, we would suggest this figure can be increased to not more than twenty−five in many cases. Obviously, the larger the group, the more difficult it is to undertake small group teaching. Very large groups over 50 persons are not suitable for small group work, although some aspects may be incorporated on a limited basis.

Figure 5.27 shows the type of interaction you may achieve with various group sizes.

Size	Type of interaction
Very small groups of five persons	Personal instruction (individual tutorial, buzz group)

Small groups of 6 to 17 persons	Group instruction (tutorial, brainstorming, case study)
Medium groups of 18 to 29 persons	Class instruction (seminar, problem solving activities)
Large groups of 30 to 49 persons	Workshop instruction (syndicates, small group/plenary sessions)
Very large groups of 50 or more	Mass instruction (only limited group work)

Figure 5.27 Size limitations for small group teaching

1. In which of your classes could you use a small group teaching?
2. For what purpose would you use it?
3. What would be the size of the groups into which you will divide your class?
4. What limitations are there on the size of groups you have selected?

Pre−requisite Knowledge

A second consideration in using small group teaching methods is that in order to have a meaningful discussion, some previous knowledge or relevant experience should be available within the group. This is normally provided through earlier lectures, reading assignments, or practical tasks and is often supplemented with a lecturette or brief talk immediately prior to group work. In the latter case, care needs to be taken that this does not develop into a lengthy monologue or another lecture.

Organization

Finally, we would briefly mention several organizational or environmental factors that cause problems. Small group teaching may require more staff which may not be possible if the student/staff ratio is rigidly fixed by tradition, politics or financial constraints. Similarly, more time may be required and this may pose time−tabling problems. Another factor is that space and seating need to be intimate and flexible to be suitable. Seating arrangements are very important. Some suitable seating configurations are shown in Figure 5.28 where the lecturer is identified as L or • and the students as □ or ○.

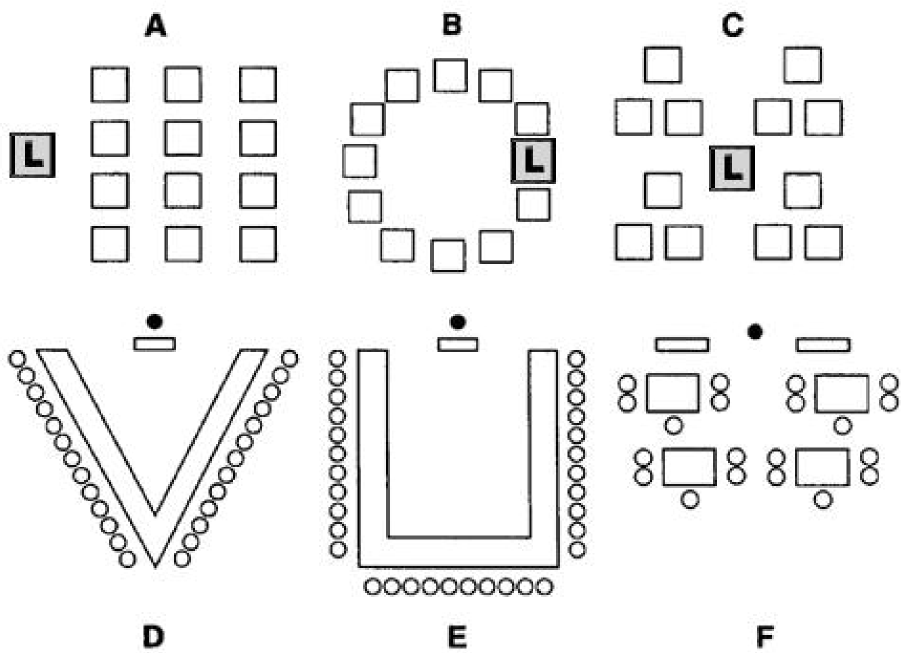


Figure 5.28 Some possible seating arrangements for small group teaching.

1. Which of these arrangements is most likely to be lecturer−dominated?
2. Which ones are most likely to encourage sub−group interaction?
3. Which arrangements will probably encourage the students to talk to each other as well as to the lecturer?

4. What are the advantages and disadvantages of arrangements D and E?

Lastly, it is desirable that a student−centred approach with an open, non−threatening climate is acceptable to both staff and students, and the department is committed to this form of learning.

Nature of Small Group Teaching

Small group teaching is complex, for it combines the strengths of individual instruction and the benefits of group interaction. This is also due to the fact that it can be highly structured and controlled by the tutor, or can be essentially free or open and largely controlled by students. In spite of its complexity, it can be very effective when well executed so it may help our understanding if we briefly examine the nature of five key characteristics: learning, interaction, development, leadership and student engagement.

Learning

The deeper learning that results from small group teaching occurs in two ways. Firstly, through *revision,* that is, the reinforcement of existing knowledge, and secondly, through *re−structuring,* or the modification of previous knowledge into a new conceptual framework. Revision takes place through discussion modes, mostly in tutorials, while re−structuring is developed through deeper exploration, reflection and pilot testing, mostly in problem−solving activities with discussion. What happens in both cases is that with the help of the tutor, each participant's knowledge is supplemented with information possessed by other members and then interpreted.

Interaction

The interaction of communication patterns that occurs between group members is of two types, and may be either two−way, that is limited to dialogue between a tutor and individual students, or it may involve multi−way communication in which students interact freely with one another. This is illustrated in Figure 5.29, and will determine whether the instruction is teacher− or learner−centred.

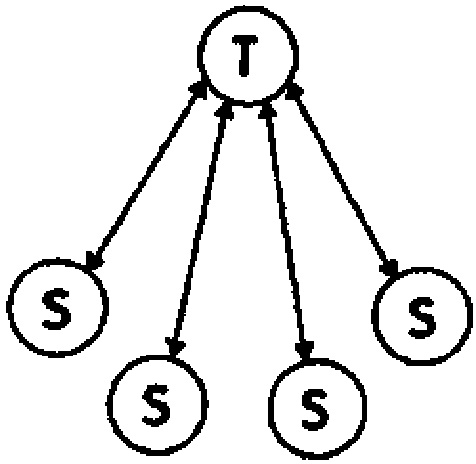


Figure 5.29 Communication patterns − Teacher Controlled: Two−way communication

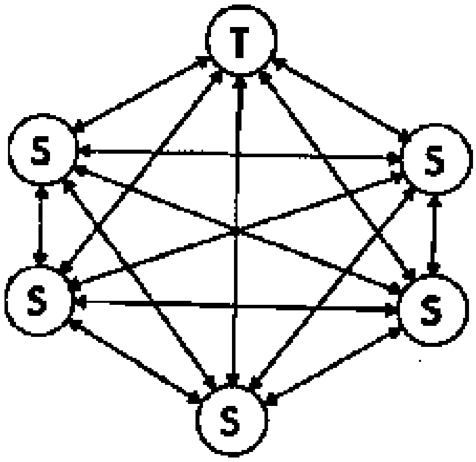


Figure 5.29 Communication patterns – Group Controlled: Multi–way communication

Development

Another important finding from group dynamics, that is the interaction within a group, is that each group passes through several developmental phases before getting into a cohesive and productive learning group. A skilled lecturer can accelerate this process, but without attention, it may be unnecessarily prolonged as group members compete and clash over roles or in reaching a consensus on group norms. Regrettably, some groups never become more than a collection of individuals, and therefore, do not operate as a group or entity for learning purposes. In such cases the benefits are lost.

Leadership

The tutor largely determines the type of group activity and interaction, so his or her 'leadership' role is of great importance and calls for high skills and adaptability, as well as a knowledge of group dynamics. The leadership role will vary according to several factors such as purpose, structure, tutor style, degree of control desired and group characteristics, but the quality of tutorship is vital and will enhance or hinder group learning. Several group leadership roles have been identified, for example:

Group Leader – giving strong direction to the discussion or activity.
Group Facilitator – generating self–expression and interaction within the group.
Neutral Chairperson – controlling and summarizing, but not contributing.
Consultant – giving assistance, information and guidance.
Observer – noting events for reference later.

We may note that several roles may be adopted by an effective lecturer in any one lesson.

Another important aspect of leadership is that it can be shared or delegated to individual group members or sub–groups.

Think about the nature of the small group teaching that you do. 1. Do you ensure deeper learning mainly through revision activities or those requiring re–structuring? Make a list of the activities you have recently had your students do in your tutorials or practicals. 2. For the group activities you have listed, what leadership (role) did you assume?

Student Engagement

Finally, let us suppose you had only one student to teach. You would not expect to ramble on, as in lecturing to large groups, but rather would work jointly with the learner in exploring the subject in various ways. You would probably present some information, provide sources for further reading, ask questions and discuss ideas. In doing this, you would encourage the learner to:

- ☐ give personal viewpoints and interpretations;
- ☐ provide examples;
- ☐ justify assumptions;

- explore relationships;
- apply ideas to new situations;
- test for confirmation.

Thus as tutor, mentor and coach you would ensure your student was engaged in active and purposeful learning. Modern small group teaching does just that and helps students grasp difficult concepts and wrestle with misconceptions. In doing this, it enjoys the best of the more traditional didactic approach and the contemporary discovery strategies. This is when the skills of the tutor are crucial.

Skills for Small Group Teaching

We discussed the skills of lecturing earlier in this chapter and listed the main skills. In addition to those basic skills, effective small group teaching requires special skills in preparation, questioning and responding, and facilitating, as well as using sub−groups and varying methods. We shall examine these in a little more detail. −Knowledge of group dynamics and learning provides a useful background however, and this was dealt with in Chapter 3.

Preparation

Preparing for small group teaching is challenging, yet it is often neglected. Clarity of purpose and objectives is essential and consideration of strategy, setting, content and method is advisable. What is required is a light, flexible framework and avoidance of too tightly structured a format, which invariably provokes a lecture. How is this best achieved?

Purpose

In determining purpose, the overall goal needs to be selected, for example, revision or the deepening and re−structuring of knowledge. General goals need sub−dividing into specific problems or elements making up a complex topic, and the special features or questions to be answered require identifying. Having a topic alone is not enough, it must be focussed on a particular goal such as to:

- evaluate progress;
- provide for a skill;
- solve problems;
- appraise or compare differing approaches.

Clarifying goals is closely related to strategy.

Strategy

A useful way of determining a strategy or framework for a discussion is to produce a 'map' of the topic. The procedure involves firstly, the development of ideas, concepts, related areas and then, secondly, the formation of questions, order of attention, and activities required. This is best done by writing the topic or problem in the middle of a blank piece of paper and developing your conceptual framework. Such a 'map' is sometimes called a brain pattern' or a 'spider−diagram', for it is essentially a pictorial representation of a network of information. Such a 'map' can be used at the start of a discussion (or lecture) to overview the topic and show how it is to be tackled, to keep on track or to summarize. Additions developed by students can be made, omissions noted and topics for future sessions determined. This approach may also be used as a joint exercise with students and is useful for revision purposes or sharing interpretations.

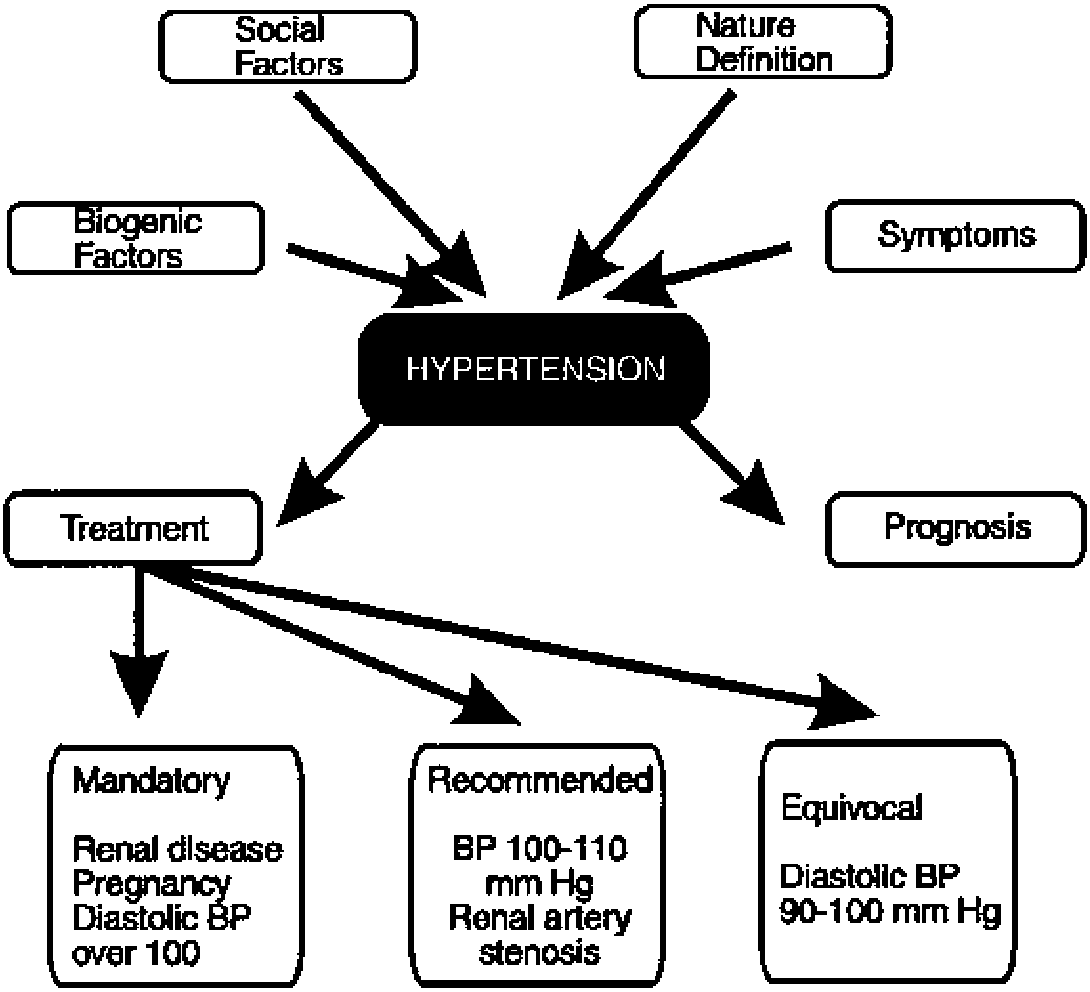


Figure 5.30 A strategy 'map' from medical instruction

Source: from Brown in Cox and Ewen, 1982.

Content

Content is closely related to the syllabus and course design. In small group work the knowledge already within the group is an important factor if discussions and activities are to be meaningful. For this reason, it is often necessary to prescribe readings or other tasks prior to small group work and to use these in the activities selected.

Setting

The setting also needs to be considered and constraints of size, room layout and facilities taken into account in planning. In effect, this is a mini feasibility study as methods, goals, or settings may require modification. The type of group, or their stage of development, innovativeness, autonomy are other factors that may affect the environment for group work.

Method

The use of method is covered later and a wide variety of options are open. These need selecting during preparation and should be closely related to goals, strategies, content and setting. Variety, particularly in tactics, is important but unsuitable methods should not be used just for the sake of change. Try out new and different ones but remember in such cases you are learning as well as teaching and should not be surprised if it feels strange at first.

Questioning and Responding Skills

Very simply, questions are requests for information that enable the questioner to draw out responses or build on them to develop new insights. Questions are used for many purposes, for example, to:

- Promote learning by

  – drawing on the knowledge and experience of group members
  – provoking thought and opinions
  – ensuring analysis, comparisons, examples, summaries
  – deepening learning through reinforcement and restructuring.

- Motivate learners by

  – arousing interest
  – orientation and direction
  – establishing rapport.

- Provide feedback by

  – assessing progress
  – checking pace and level of learning
  – diagnosing difficulties.

- Control students by

  – bringing them back to the topic
  – waking up sleepy ones
  – breaking up private discussion.

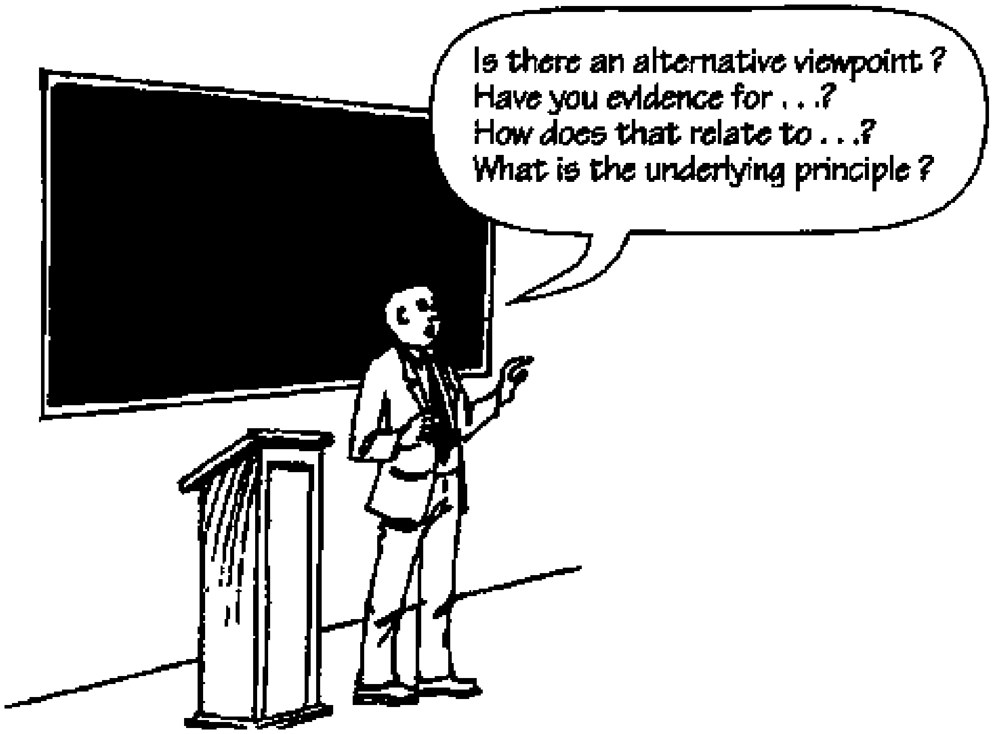
Using the wrong type of questions can waste time and make students lose interest, so in general, it is advisable to use broad, thought–provoking and open questions rather than narrow, recall–type ones. It is a good idea to formulate a series of several open questions for your course covering conceptual, empirical and value aspects that have to be answered to achieve objectives, and to discuss these with students at the beginning of the year and each term. These act as points of reference for direction, targets and progress.

Sequence is crucial for each discussion and it is sensible to have a few key questions ready that will clarify the topic progressively. It is usually advisable to use simpler, even recall type questions at the beginning of a discussion to start the thinking process, but it is important to move on to higher order questions as quickly as possible.

Alternatively, a simple divergent question may be used and narrowed to specific aspects as the discussion warms up. Pauses are often advisable to give time for reflection, even to the extent of allowing time to note the main elements or list three examples before opening the discussion.

Other questioning tactics include ensuring suitable direction and distribution of questions. For example, it may be necessary to nominate a student to answer a question, but care must be taken that the discussion does not become a dialogue between one student and the tutor. Prompts and probes are vital to eliciting learning responses. The former should contain clues or hints in a rephrased question, whilst the latter should probe deeper by narrowing the focus.

Examples of probing questions are shown in the following illustration:



In responding to questions, effective tutors invariably comment on answers and often use the reply by paraphrasing it, referring it back to the group, building onto it with further questions and generally getting 'more mileage' out of it in a variety of ways, such as by recognizing the contribution made or elaborating on the answers. Encouragement is also given in many ways, for example, in praising a student, or allocating a sought−after task, or providing a way for deeper investigation such as lending a book.

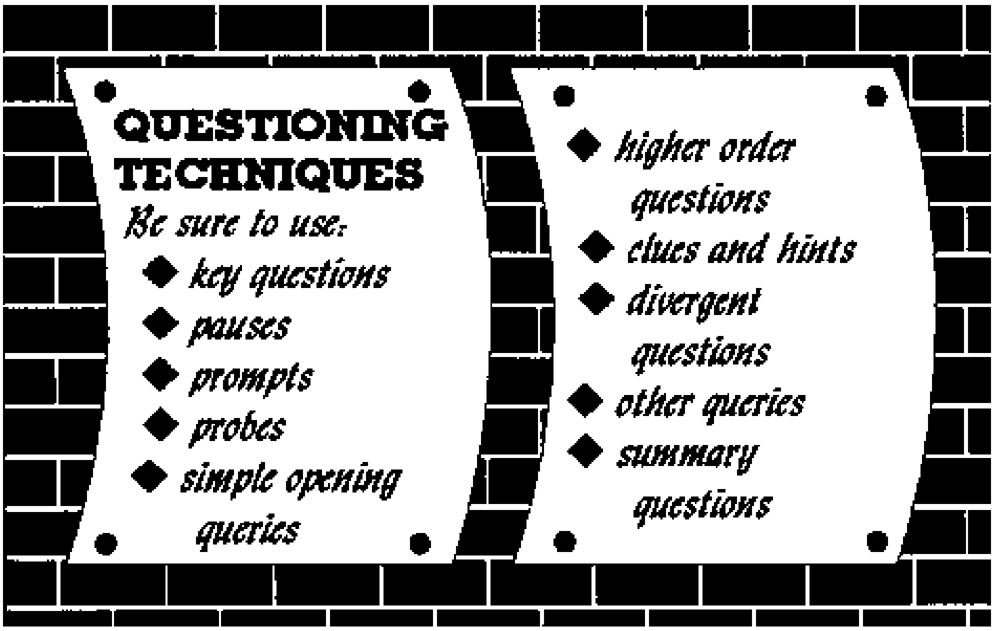


Figure 5.31 Do you use these questioning techniques?

In preparing for your next small group teaching session, write out: ☐ 2 simple recall−type opening questions ☐ 2 higher level questions ☐ 1 probing question ☐ 1 prompting question ☐ 3 summarizing questions

Before closing, we should note that listening skills are also of significance. More importantly, many of the attributes described here apply equally to the students and lecturers because small group teaching is about participatory activities.

On Being a Facilitator

In small group work you have to start the discussion or activity, keep it going, and constantly monitor and control the learning. In doing this you will *facilitate* learning in several ways, for example, by generating interest, encouraging participation, adjusting the focus and pace as necessary, and generally allocating tasks and setting the tone to ensure meaningful contributions from all members. This rarely happens on its own but has to be managed or facilitated. It requires the understanding of group dynamics and the use of small group methods. Let us briefly examine some of the requirements.

Climate Setting

The need for a safe friendly climate is important if students are to talk and share thoughts without risk or fear of 'being put down'. A good idea is to attend to this at the beginning of the academic year by discussing group work with your new students, clarifying their (and your) expectations, and agreeing on simple ground rules such as, 'Must contribute . . .', 'No interrupting others . . . '. We suggest that you should do this in two separate stages. First of all, explain, discuss and formulate preliminary rules. Second, modify and ratify these after a short trial period. Doing this helps 'clear the air', trains members in group work and accelerates group formation and autonomy.

Figure 5.32 Setting the tone to ensure meaningful contributions is important

Generating Interest

This can be done in a general way by:

- using students' names;
- demonstrating your own enthusiasm;
- varying activities;
- relating learning to the 'real world';
- showing an appreciation of students' contributions.

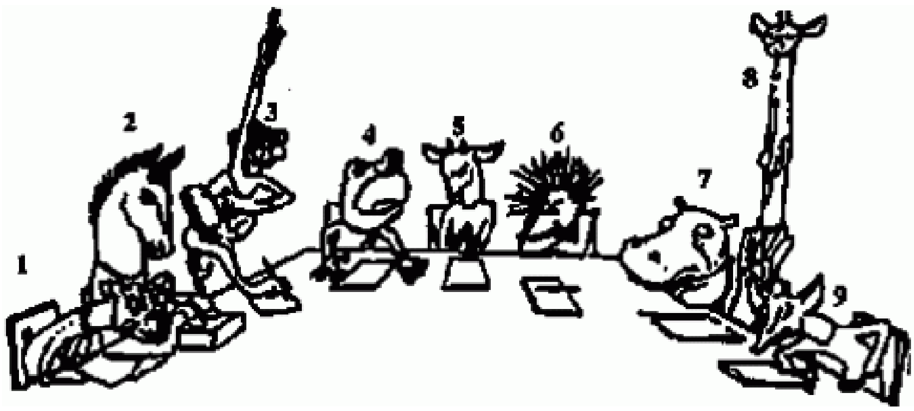
More importantly, motivate students at the start of each small group teaching session when it is vital to outline the purpose, state the objectives and brief the group on the task and how it is to be tackled. The use of advance organizers such as buzz groups or brainstorming tactics to generate ideas, stimulate thought, or determine an agenda are other ways to energize a learning group.

Encouraging Participation

Active participation by group members is central to small group teaching and your ability to make this happen will largely determine the effectiveness of the learning. You may ensure participation in several ways, for example by:

- skillful questioning;
- using sub−groups;
- using methods that facilitate active participation;
- handling members in a way that promotes interaction.

We have already discussed questioning and will shortly examine using sub−groups and varying methods. Handling group members requires patience, politeness, the avoidance of argument, and an ability to deal with different persons 'nicely', that is, without excessive authority or belittling them publicly. For example, quiet or unresponsive students need to be brought into the discussion, perhaps by asking them easier questions so that they gain in confidence. Conversely, any student dominating the discussion excessively should be restrained, possibly by recognizing his or her contribution but requesting information from someone who has yet to be heard. Sometimes it may be necessary to be more assertive, though rarely authoritative, by reminding a member of the objectives and the limited time available, or discussing the matter with the group for a democratic decision. Figure 5.33 is a light−hearted summary of ways to handle different members.



WHAT TO DO WHEN A GROUP MEMBER ...	
1.	WANTS A FIGHT: Don't get involved. Explore his/her ideas but let the group decide their value.
2.	WOULD LIKE TO HELP: Encourage him/her frequently to give ideas, and use them to build on.
3.	BEGINS TO SPLIT HAIRS: Acknowledge his/her point but remind him/her of the objective and the time limit.
4.	JUST KEEPS TALKING: Interrupt tactfully. Ask a question to bring him/her back to the point being discussed and thank him/her.
5.	SEEMS AFRAID TO SPEAK: Ask easy questions. Give him/her credit to raise his/her confidence.
6.	GRINDS HIS/HER OWN AXE: Recognize the self−interest. Ask for an answer to his/her own objections or refer back to group.
7.	IS JUST NOT INTERESTED: Ask about his/her work and how the discussion could help.
8.	ACTS SUPERIOR: Recognize his/her ability and ask challenging questions.
9.	WANTS TO SHOW HOW CLEVER S/HE IS: Watch out for trick questions. Pass them back to the group to answer.

Figure 5.33 Handling different participants

1. Draw−up your own DO's and DONT's list about how to handle individual group members.

2. Compare it with a colleague also reading this book.

Using Sub−groups Within Larger Groups

We have discussed a number of skills for small group teaching which enable you to create a group, generate interest, and organize activities which focus on deeper learning through discussion, reflection and problem−solving inquiry. In undertaking this you need a 'super' skill, that is the skill of knowing when to use smaller groups within a larger group and how best to use a particular technique. This comes with practice and experience, but to help accelerate this we have outlined some variations of small group tactics in Figure 5.34, which should be utilized in conjunction with the overview of small group methods given in Figure 5.2.

In addition, we have summarized some of the cogent reasons for utilizing small groups, viz:

- to ensure participation and contributions from each student, e.g. pyramiding, buzz groups, pinwall;
- for re−structuring information to a higher level of cognition, e.g. debate, case study, mind−maps;
- to obtain consensus, e.g. Nominal Group Technique;
- to generate divergent ideas, e.g. fish bowl, students' questions;
- for developing personal skills, like assertiveness, working with others, various communication skills, e.g. simulation, project work, syndicates;
- for solving problems, e.g. brainstorming, Force Field Analysis, case study;
- to reduce task or question when group gets 'stuck', e.g. buzz groups, syndicates.

TACTIC	DESCRIPTION	USES
Rounds	Each group member gives an idea, comment or suggestion on a given topic. The rules require members only speak in turn; all must raise new items, comment on previous contributions, or pass each time round.	Ensures all members participate. Useful to set agenda for discussion or task.
Pinwall	Formats may differ but basically to generate ideas or information anonymously, as participants write items on cards for posting on a board for subsequent attention as agenda, problem−solving ideas or evaluation items.	Ensures all members contribute. A kind of written anonymous brainstorm.
Force Field Analysis	A technique to identify the forces, favourable and unfavourable, bearing on a problem.	Generates ideas on problems and solutions.
Students' Questions	Students' questions are identified using 'rounds' or 'pinwall' exercises. Selected questions are then answered by group discussion, small group/plenary work or by students chairing their own discussion.	Identifies and attends to concerns of students. Students learn from each other.
Nominal Group Technique (NGT)	A technique starting with 'rounds' to identify topics, then allocation and individual working on topics for small groups, then buzz group discussions and production of a poster displaying findings for plenary reporting back.	A formalized problem−solving technique in which consensus is obtained through discussion.
Mind Map	Involves a group in the joint production of a pictorial representation of a topic (a 'map'), which divides the topic into main elements and sub−elements and shows relationships.	Used as a framework for discussion or problem−solving.
Debate	Division of group into small group! to prepare case 'for' or 'against' an issue. Sub−groups meet later to finalize 'for' and 'against' case and debate ensues.	Involves all in planning, develops skills in argument, increases understanding.

Figure 5.34 Varying tactics for small group activities

We end with a word of caution. All these small group methods or tactical variations may be used with both large group and small group teaching but will be self−defeating if over−used or used incorrectly.

IMPROVING TEACHING METHODS

There is much advice from many sources on how to improve teaching and learning in higher education but many of us are confused by its variety and complexity. A further problem is that the environment in which teaching operates has changed. We believe that there is need to identify these changes and influencing factors that operate so that we can come to terms with such forces. Accordingly, in this final section we shall briefly discuss ways of improving teaching.

Augmentation

Most attempts to improve teaching methods have concentrated on presentation skills, style or aspects of planning. These help the new lecturer, particularly to acquire the basic skills of teaching. Another more recent approach, that of augmentation, attempts to update staff in aspects of teaching that promote more active and participative learning, make use of dialogue, feedback and reflection and utilize a greater variety of methods and media. This calls for more facilitative skills and many of the tactics used in small group teaching and experiential learning. This approach emphasizes the need for student engagement, helping the student find structure and meaning by 'wrestling with concepts', and sharing learning tasks with others. Aspects of such measures are particularly useful with very large classes which commonly feature today but require careful planning and high facilitative skills. Figure 5.35 shows ways of augmenting teaching with several approaches.

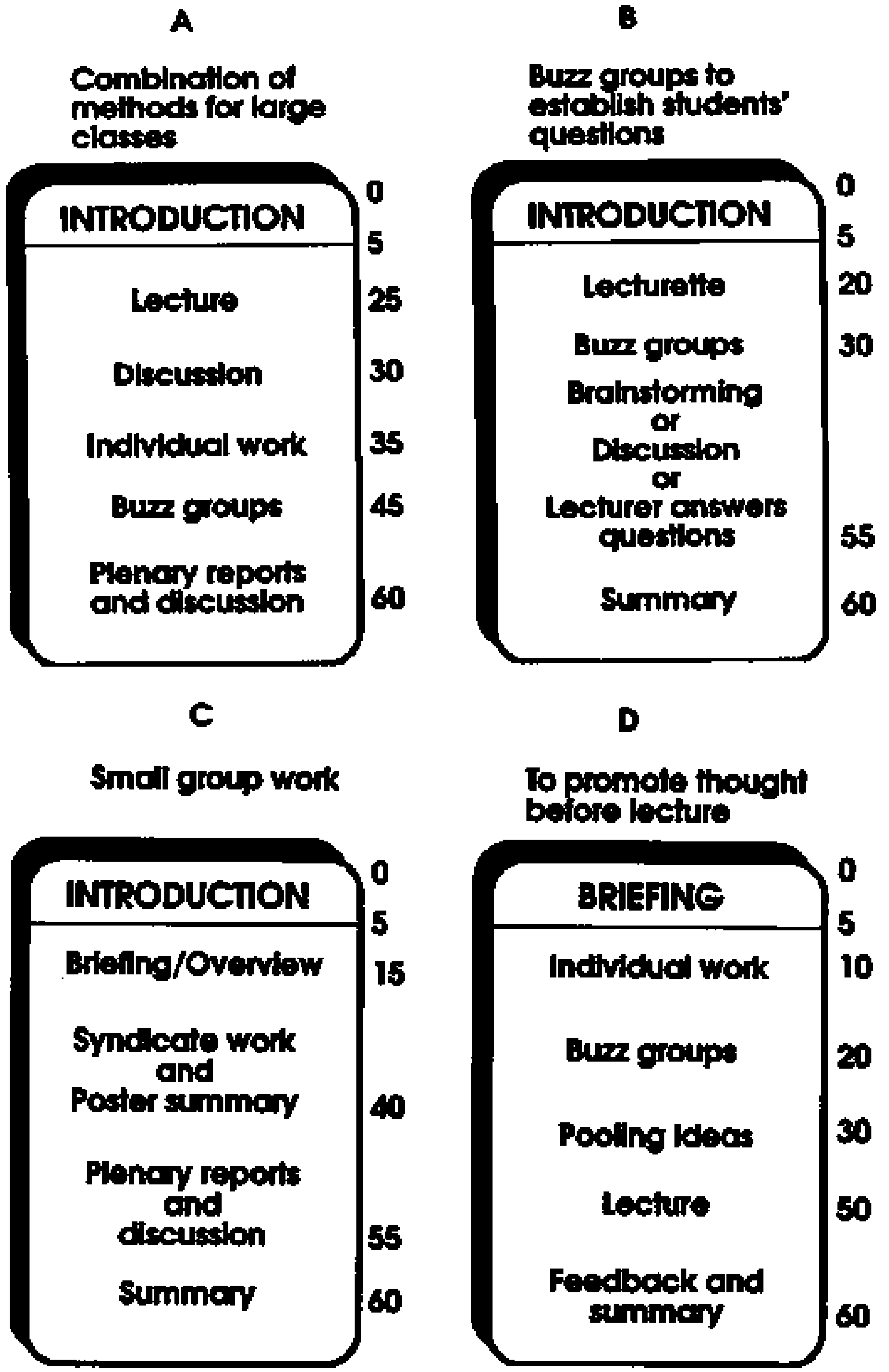


Figure 5.35 Augmentation of teaching methods

Self–development of Teaching Skills

Questions are often asked about the development of teaching skills. This is a sensitive area and much of the advice concerns self–development activities. We would suggest the following:

- Attending short courses or workshops: These are given by teaching and learning centres in some universities and occasionally by donor aid agencies. Alternatively, a local group of interested lecturers could organize a training series and share the presentation (see Gibbs, 1981).

☐ Check lists: Several check list type documents are available. Details will be found in Gibbs and Habeshaw (1989) and O'Neil and Pennington (1992). A useful one is also found in Chapter 2.

☐ Practical readings: Strongly recommended are the Habeshaw and Gibbs series.

☐ Establishing criteria: The establishment of local criteria on what makes an effective teacher is a useful way of discussing and developing an understanding of requirements.

CONCLUSION

In this chapter we have reviewed various teaching methods. The better understanding of this will help you to teach your best and cope with the demanding situation in African Universities today. We have emphasized that you should make use of the many different methods available and not just stick to what is familiar. Teaching involves two way communication, so you should encourage dialogue and active participation by your students.

We outlined a number of approaches and how they are related to the different levels of learning. In particular, we discussed the didactic, practical, experiential and heuristic ways of teaching. We also placed the various teaching methods on a continuum, which was lecturer−oriented at one end and student−oriented at the other. You were asked to note that current educational research shows that learning is enhanced if students are more active and independent, with the lecturer adopting less of an expository role and more of a facilitating and guiding one.

It is important to choose the right method for the right situation. In this selection you should consider the objectives of learning, group size, local constraints, the students' abilities and your own preferences. The chapter focussed on three main areas. Firstly, it discussed the lecture method, its strengths and weaknesses and how you can improve your lecturing skills. Secondly, it emphasized laboratory teaching and practical work, highlighting the most recent developments. We pointed out that practical work should be designed to support theoretical principles and should follow shortly after information inputs. Methods of laboratory teaching such as demonstrations, exercises, structured as well as open ended inquiries and projects have been outlined.

The last pages of the chapter elaborated group teaching in which co−operative activity and joint participation featured strongly. Five different ways of conducting small group teaching have been given prominence while numerous other methods have been summarized. Suggestions were provided on climate setting, group formation, seating, group facilitation as well as questioning and responding skills.

We hope you will try out some of the suggestions given here in your next course and will find them helpful. If at first you are not quite comfortable with the method, remember that practice and experience will help you to improve your skills. You will see this reflected in the greater motivation and deeper learning of your students.

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CHAPTER 6 – INSTRUCTIONAL MEDIA

Johnson Nkuuhe

OVERVIEW

Topics covered in this chapter include:

- defining instructional media;
- using an instructional media;
- selecting media;
- choosing media – boards, overhead projections, printed material, slides, video;
- obtaining appropriate media;
- evaluating media.

INTRODUCTION

What I am told, I forget;
What I see, I remember;
What I do, builds a castle in my head.
Igbo Proverb

In this chapter we begin with a definition of instructional media and justify their use. We then discuss the criteria you may consider when selecting equipment and materials to accompany your lectures and seminars. An explanation of the range of media you are likely to encounter in universities in Eastern and Southern Africa follows. We spend more time on chalkboards, overhead projectors and transparencies, handouts and manuals which are more common and only briefly discuss media such as films and videos which are often not available. We also give some suggestions on how you can produce your own materials.

We all know that due to financial and other constraints there is a shortage of appropriate media in our universities. Therefore, we give some ideas on how to obtain, manage and evaluate instructional media.

We trust that you will not only use the ideas presented in this chapter, but that you will also come up with other ideas and share them with colleagues in your university. In this way, all of us can produce attractive and lively instructional media for our students.

What Are Instructional Media?

The term instructional media has been defined in a variety of ways. In some cases, it refers to all aids that are used by the lecturer and students. In other cases, it refers only to printed media. In this chapter, we shall use the term to mean all devices and materials used in the teaching and learning processes. This definition is close to a broader definition such as that of Romiszowski (1981: 339) which includes not only electronic communications media, but also such devices as slides, photographs, teacher–made diagrams, charts, real objects and handouts that we use in the process of planned instruction. Figure 6.1 gives examples of some instructional media.

Type	Examples
Print	Pamphlets, handouts, study guides, manuals
Visual	Charts, real objects, photographs, transparencies
Audiovisual	Slides, tapes, films, filmstrips, television, video, multimedia
Static/display	Chalkboard, feltboard, display easels, flip charts, cloth board, magnetic board
Electronic	Radio computers, electronic mail, CD–ROM, multimedia

Figure 6.1 Different types of instructional media

Why Use Instructional Media?

We know from educational psychologists that every person learns by receiving information through the sense organs such as the ears, eyes, nose, mouth and tongue, hands and skin. From your own experience, you will realize that there is a relationship between the quantity of information we remember and the sense organs being used. You also know that students learn skills, concepts and ideas better when they try them out in practice. The old adage that 'practice makes perfect' has a sound scientific basis.

Whenever we talk, the words we use are arbitrary symbols that represent whatever we are saying. With visual aids, words acquire a more concrete meaning. Study Figure 6.2 which graphically represents this point. What are your views?

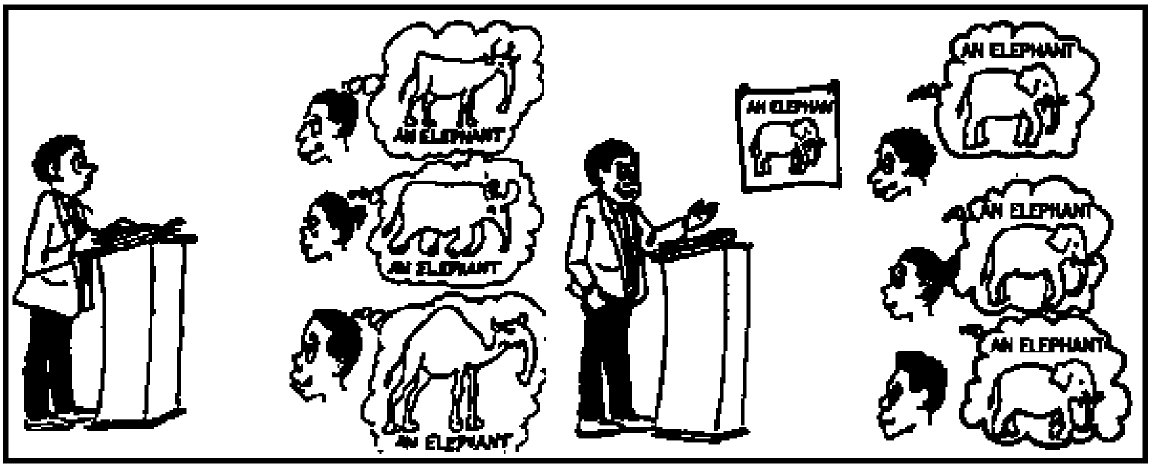


Figure 6.2 Visual aids give concrete meaning to words

Instructional media have important advantages because they:

- allow easy and repeated reproduction of an event or procedure;
- provide visual access to a process or technique;
- provide a common framework of experience to a large number of learners;
- promote an Illusion of reality;
- gain and hold the attention of the learner;
- focus attention or highlight key points;
- save time by avoiding wordy explanations;
- create impact;
- facilitate the understanding of abstract concepts.

Figure 6.3 lists media that you can use to demonstrate certain phenomena.

Reasons for media use	**General examples**
To form a clear idea of something	Real object, model
To stress the essential and leave the non−essential in the background	Model, scheme
To give visual access to something which may be inaccessible	Model, picture, photo, poster, film
To clarify abstract information which may be difficult to communicate verbally	Diagrams, columns of figures
To condense large quantities of information	Diagrams, handouts
To promote mental activities of students	Handouts, textbooks, films, pictures
To give feedback to the teacher about student progress/achievement	Tests, study guides with assignments, handouts with questions
To encourage emotional response	Films, photos, poems
To support the work of the teacher	Sound recordings, any medium
To give tests	Any medium

Figure 6.3 Reasons for media use with examples of appropriate media

Source: Adapted from Romiszowski, 1988

Study Figure 6.3.

1. Which of the media listed do you use?

2. Give reasons why you use these media and not others.

SELECTING INSTRUCTIONAL MEDIA

One of the challenges that will face you as a university lecturer or professor is the selection of the best and most appropriate teaching method –for which the preceding chapter furnishes some assistance – and the instructional media to complement this method. Just as the educational process is influenced by many factors, so is the selection of instructional media. Among these factors are:

- the task to be learnt and the teaching method selected (course objectives and content);
- characteristics of the learners such as their experiences, interests, motivations;
- characteristics of the lecturer such as that persons' skills, attitudes and preferences;
- material factors including economic and political constraints as well as cost, time availability, ease of use and maintenance of the medium chosen.

These factors are all inter–related as is shown in Figure 6.4. However, for purposes of this chapter, we shall discuss them in turn.

Figure 6.4 Factors affecting the selection of instruction media

Sources: Adapted from Romiszowski, 1981, and Laver, 1990.

Material factors are a major consideration in any African university because resources are always diminishing. What factors have affected media use in your university?

Course Objectives and Content Factors

Be sure to make course content and objectives the starting point for your media selection. These two topics are discussed in more detail in Chapters 3 and 4. Wherever possible, use real objects instead of specially prepared instructional media. Because these objects are known to you, you will find them easy to present to your students. Let us look at some examples.

- In a geography, geology, or metallurgy lecture, you should show your students the real rock type rather than a slide or photo of it.

- In a biology or physiology lecture on respiration, animal lungs and hearts from the local abattoir will serve better than slides or worse still, trying to describe these structures and processes verbally.

- You can describe a double−storeyed house with three−dimensional diagrams or slides in an architecture lecture, but your students will understand better if you use a model of a house. Students will have more fun and learn still better if they make the models themselves.

- Anthropology students will appreciate the evolution of the human skull if they have a real skull in front of them rather than only slides or photographs of it.

There are many more examples. It may not always be possible or convenient to get real objects or models, but try.

Learner and Lecturer Factors

Student factors include their preferences, perceptual difficulties, experiences and background (rural, urban), interests, level of motivation, individual differences, physical disabilities and others (Laver, 1990: 156). Students from rural backgrounds may initially have difficulty interpreting moods and emotions from photographs, films and video clips, whereas this is easy for town dwellers who have grown up watching TV and video. More factors that influence learning are discussed in Chapter 3. As the lecturer, you will influence media through your own skills, knowledge, attitude, and preferences. For instance, if you have problems operating a film projector, you may be tempted to avoid using it.

Material Factors

We all know of the economic and political constraints facing our universities. These often affect the budget. Consequently, shortages of equipment such as projectors, television sets, videos, computers and teaching materials such as handouts, study guides, textbooks, transparencies, slides and films will greatly affect your media selection. However, if you are convinced of the necessity for media, you should try and get them or find substitutes, which may not be as good as originals, but are better than nothing.

INSTRUCTIONAL MEDIA GENERALLY AVAILABLE IN UNIVERSITIES

Media range from the simple and available, such as chalkboards, to the complex and costly, such as television or video, film or filmstrips. You are not likely to use all the instructional media that we discuss in this book. In fact, you should not attempt to. However, after considering the factors in media selection, compare what you already have with the media described here. Select a few that are feasible. You can change them after carrying out an evaluation such as the one discussed at the end of this chapter. You can also incorporate some of the ideas suggested here to modify media currently in use. From our experience, the novice lecturer tends to use too many instructional media, leading to confusion among the students. On the other hand, the old professor tends to resist trying out new technologies, and sticks to old, tried methods, which may prove unexciting. A middle course is the best. Now let's move on to discuss some specific media.

The Chalkboard

The chalkboard will probably be your most widely used display or static medium. Chalkboards are usually painted concrete, plaster, plastic or wood surfaces. Most boards are painted black, although you might encounter green, brown or white ones. The same principles apply regardless of the surface of the chalkboard.

The chalkboard may be used to supplement a talk or slide show; emphasize important points, words and definitions; draw attention to important issues; summarize a discussion or leave a reminder (Laver, 1990).

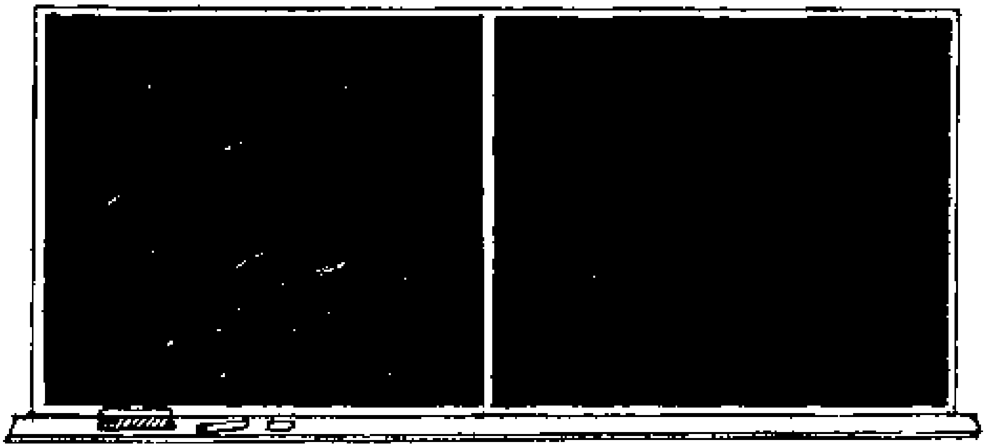


Figure 6.5 Always clean the chalkboard after your lecture

Practical Hints for Using the Chalkboard

You will improve your teaching sessions if you:

- ☐ plan your teaching session in advance;
- ☐ are neat and tidy, and ensure that your writing can be seen by all students. Keep a straight line when you write, and avoid sentences that trail off the board;
- ☐ erase irrelevant words and phrases properly. Half rubbed out words are irritating to any audience. Avoid erasing information with your fingers as you write;
- ☐ print or encircle important words as you build up the theme;
- ☐ use colours to highlight points, but not too many at once;
- ☐ always clean the board after your lecture.

Advantages and Disadvantages of the Chalkboard

The major advantages include ready availability, low cost, and ease of maintenance. Maintenance usually ranges from cleaning to smoothening and re−surfacing the chalkboard, especially if the surface is rough wood or concrete. If felt pens are used on white or green boards, they should be protected against drying by replacing the caps when not in use.

The major drawback of the chalkboard is that the information written on the board is temporary. This is particularly a problem if your discipline involves complex illustrations such as maps, chemical reactions, mathematical formulas and complex diagrams. In such cases you will probably want to use more permanent media, such as flip charts and posters, for these illustrations.

In addition, you spend more time during lectures writing than when you use handouts, slides or the overhead projector (OHP). This slows you down, although some students might benefit from this slow pace. Some people have a tendency to talk to the board as they write, and this can be annoying to many students, especially those at the back of the room who cannot hear what you are saying. With large classes, too, it may be hard for students at the back to read what is on the chalkboard.

Printed Media

Printed media are materials used to inform, motivate or instruct learners. Kemp and Dayton (1985: 159) classify printed media into three types:

Learning aids. Guide sheets, job aids, picture series.
Training materials. Handouts, study guides, instructors' manuals.
Information materials. Brochures, newsletters and reports.

If you are new to university teaching, or if you have never produced instruction media, you may follow the recommendations in this section to produce your own printed media.

Advantages and Disadvantages of Printed Media

As discussed by Lewis and Paine (1986), the advantages include that these media are:

- easy to carry and use;
- easy to generate, produce, modify and update;
- cheap, especially if the media are black and white. Colour, as a rule, is more expensive;
- familiar to your students.

The disadvantages of printed media are that:

- they may be too familiar and be ignored because they look like high school materials;
- it may be difficult to teach skills or convey emotions and feelings through print;
- they will be difficult to update if the printed material is bound as a book.

Planning Stages in the Production of Printed Media

Before you produce any instructional material, including printed media, you should plan carefully. Take into consideration the objectives you intend to achieve, your target audience, whether print is the most appropriate medium for your lecture and whether the printed media will be used alone or in combination with other media. Your planning here needs to be more elaborate than that for display media such as the chalkboard, posters and transparencies. There are three stages in this planning: pre–design, design and post–design. Kemp and Dayton (1985) propose that you make a check list for this preliminary planning before instructional material is written.

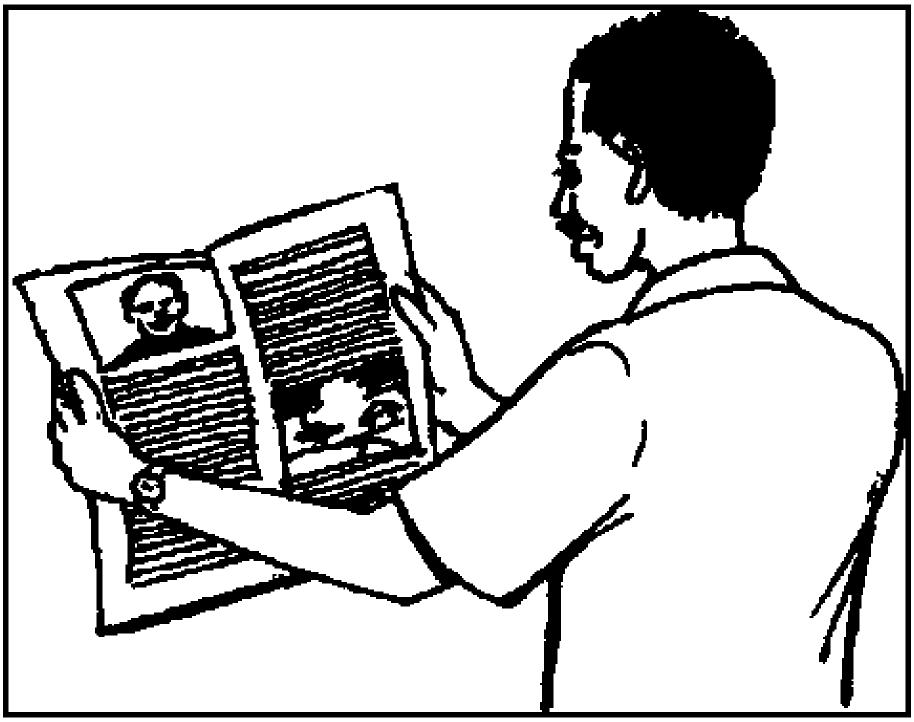


Figure 6.6 Printed Media

During the pre–design stage, try to be creative and take decisions that are based on perception and learning theory. Kemp and Dayton suggest that you:

- start with an idea or a purpose. This could be either to motivate, inform or instruct the students;

- develop the specific objectives and write them down;

- consider the learner. Plan for one major audience group, but also think about secondary ones who might use the material;
- use a team approach. Have a production team to handle content, communications, instructional design, as well as technical and financial aspects of producing instruction material;
- constantly review what you have done;
- prepare the content outline.

During the design stage, you write and organize text, and present it with appropriate illustrations (see Nkuuhe, 1992: 177). You should also:

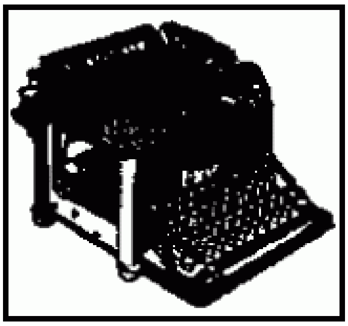
- Review your planning check−list that includes ideas, objectives, target student groups, suitability of the material, when needed, number of copies, how they will be used, subject content, production team and funds.
- Organize and produce the draft version, ensuring smooth, logical flow of content. Concentrate on main points and leave out unnecessary details.
- Strike a balance between giving too little and too much. If there are textbooks, remember that handouts should not replace these books.
- Keep the reader in mind regarding vocabulary and examples.
- Use simple words, short sentences and paragraphs; minimize use of jargon, technical terms, abbreviations and acronyms (DTP, WP, FAO, IMF and so on). Define them if you have to use them
- Use elements that facilitate comprehension and the learning process especially in long documents. These include headings and sub−headings to separate and identify sections of text, bullets and numbered lists, summaries, accurate references, a glossary of important terms, as well as an index.

During the post−design stage, you will be editing, testing the material on users and rewriting. If you have access to a computer, it will assist you to edit, rewrite and produce the material fairly quickly and cheaply.

Tools and Techniques in the Writing Process

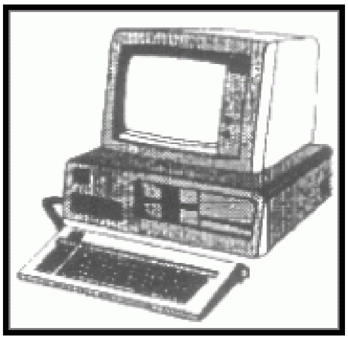
Most of us in higher education produce instructional materials. Details may differ between disciplines, but the principles are basically the same. The tools used include typewriters, word processors and typesetters.

Typewriter



The typewriter (manual or electronic) is probably the commonest piece of equipment in the production of handouts in our universities. Typewriters organize letters and numbers on a page. In short, they typeset a page, albeit at a basic level.

Word processor



The word processor can be a person, a machine (computer) or even a computer programme. Word processing involves text manipulation on computer, using one of the common word processing programmes such as WordPerfect, WordStar, MS Word, Multimate, Write and many others.

There are many advantages to word processing over using a pen or typewriter. A word processor:

- ☐ allows you easy text entry and rapid manipulation at the touch of a button;
- ☐ stores your documents permanently for quick editing and saves you time−consuming re−typing;
- ☐ allows text attributes such as underline, bold, italic, justification;
- ☐ handles columns and rudimentary graphics (illustrations);
- ☐ allows automatic page formatting in terms of page size, page length, line and page number;
- ☐ has built−in writing aids such as spell check, word count and thesaurus (synonyms and antonyms). It can generate a table of contents, an index, and even check your grammar. All this makes the writing process with computers fast and pleasurable.

In the production of handouts and manuals, word processing is a valuable software package. Other packages, depending on the nature of your handout, might include graphics for producing line drawings and charts, spreadsheets for tables and charts, or specialized software for mathematical and chemical symbols.

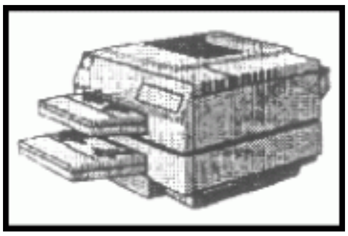
Typesetter

The typesetter is a person or machine. Here, however, we mean the machine that produces high quality documents as in textbooks, newspapers and magazines. The low cost typesetting that we are advocating does not even use a typesetter, rather a personal computer and a desktop laser printer. The typeset document can then be printed either in the institution or outside. The text of this handbook was produced by such a process.

Producing Multiple Copies of Documents

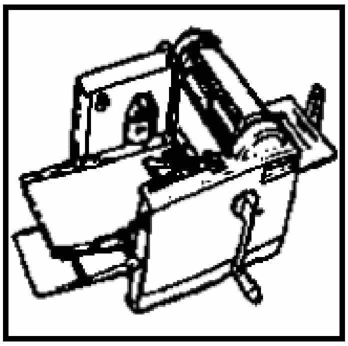
Typed, word processed, or typeset documents are usually one copy of a document which we may refer to as the master copy, the original or camera−ready copy. You can then print it in a variety of ways, depending on the equipment available in the institution.

Photocopier



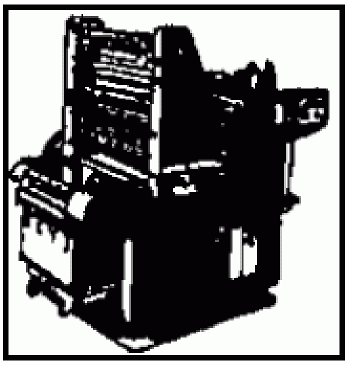
A photocopier is the simplest 'printing machine'. It is neat and convenient but quite expensive if you plan to have more than 10 copies of each page.

Duplicator



A stencil duplicator (mimeograph) is a cheaper alternative if you need 10 to 100 copies per page, and it costs about 20 % of photocopying. You can cut stencils using a typewriter, but if you have a computer and a dot matrix printer, you can transfer your word processed material directly to the stencil simply by removing the printer ribbon. There are electronic stencil cutters which will transfer material from a normal printed page with text and diagrams on to a stencil which can then be duplicated.

Printing Press



A printing press is used if more than 100 copies of each document are needed. Printing costs about half compared to stencil duplication, depending on the volume printed. You can print within or outside the institution (see Matiru, 1992: 159 for details of textbook production).

Your institution will most likely have a printing unit. Visit it and request to be taken around so you can follow the printing process. Observe the steps involved in the printing of the typeset manuscript. Which of these steps can you identify?

Improving Printed Media by Typesetting

Thanks to low–cost powerful computers, laser printers and page design (typesetting) software, you can improve instructional material that is typed or word processed to give it a professional textbook look or even improve it further into a booklet or book by using desktop publishing (DTP).

A modest DTP system could consist of 1 – 3 computers, 1 laser printer, 1 dot matrix printer and 1 scanner (for graphics and text). For software, you would need programmes for word processing, typesetting, graphics (for charts, graphs and drawings); specialized software for statistics, accounts, database, engineering, chemistry and others. This hardware and software system can be expanded as new needs arise. Figure 6.7 illustrates the constituents of a modest desktop publishing unit. The word processing machine (WP) could be eliminated and one personal computer (PC) used. The large screen is optional.

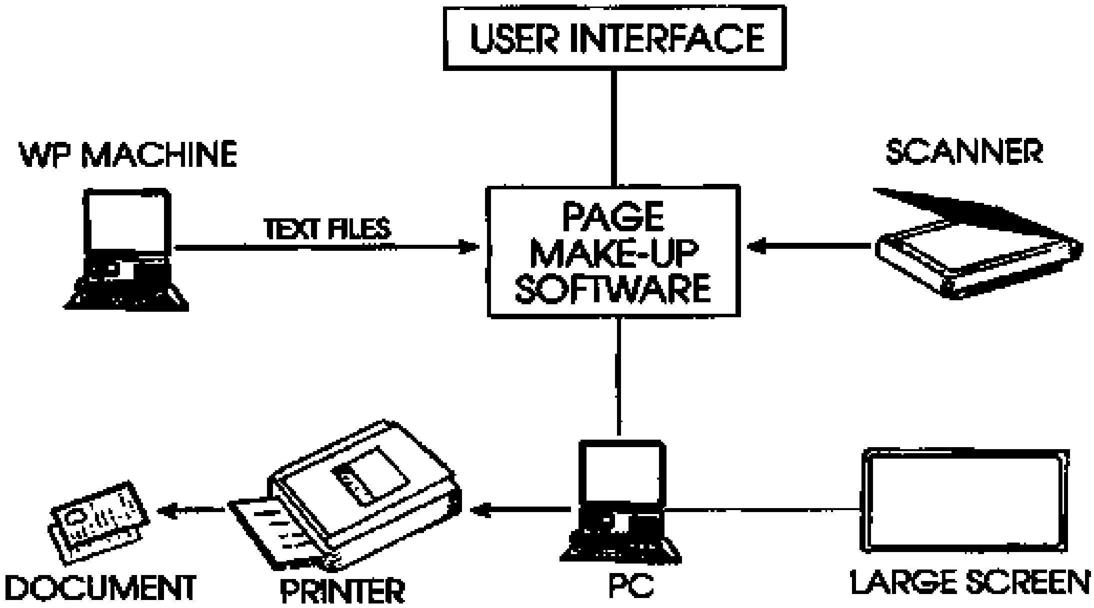


Figure 6.7 Constituent parts of a single−user desktop publishing system

With DTP it is possible for your university, or even your faculty or department to design and produce newsletters, booklets, manuals, books, logos, letterheads, diagrams, certificates, reports, and other material at low cost.

If you are interested in a more detailed discussion of DTP, see Nkuuhe (1992).

Advantages of DTP over Traditional Publishing

There are four main advantages of DTP over traditional publishing where computer use is minimal or non−existent. These are discussed by Bate and Wilson−Davies (1987). They include:

- ☐ cost benefits as it costs less than half of traditional publishing;
- ☐ time saving since it takes only 20% of traditional publishing time;
- ☐ control over errors, content and confidentiality;
- ☐ building up a good image or profile of your university and giving a professional appearance to its products.

You probably have instructional materials such as handouts, manuals and study guides that you have developed recently or over the years. Check around your university for DTP facilities. Discuss with someone who is familiar with DTP how your materials could be improved. If you are convinced that your material could be developed into a booklet or book, ask the publishing unit what sort of changes you need to make. Do not be discouraged if the suggested changes are extensive. In fact, you may need to rewrite the material. If you have been using a computer, this will not be difficult.

Transparencies and the Overhead Projector

Transparencies are acetate or plastic sheets, normally about letter size (A4), on which you can write your information. The transparency is then used with an overhead projector to show the written material on a screen or wall (Figure 6.8). This instructional medium is probably next to the chalkboard and handouts in frequency of use. Unlike chalkboards, which are restricted to small classes, the OHP can be used with medium or large classes. Use it to demonstrate visually important points, show diagrams, highlight issues, build up information as you teach, and to support other methods of communication visually.

Before you make transparencies, you should plan them carefully just as you planned your printed media.

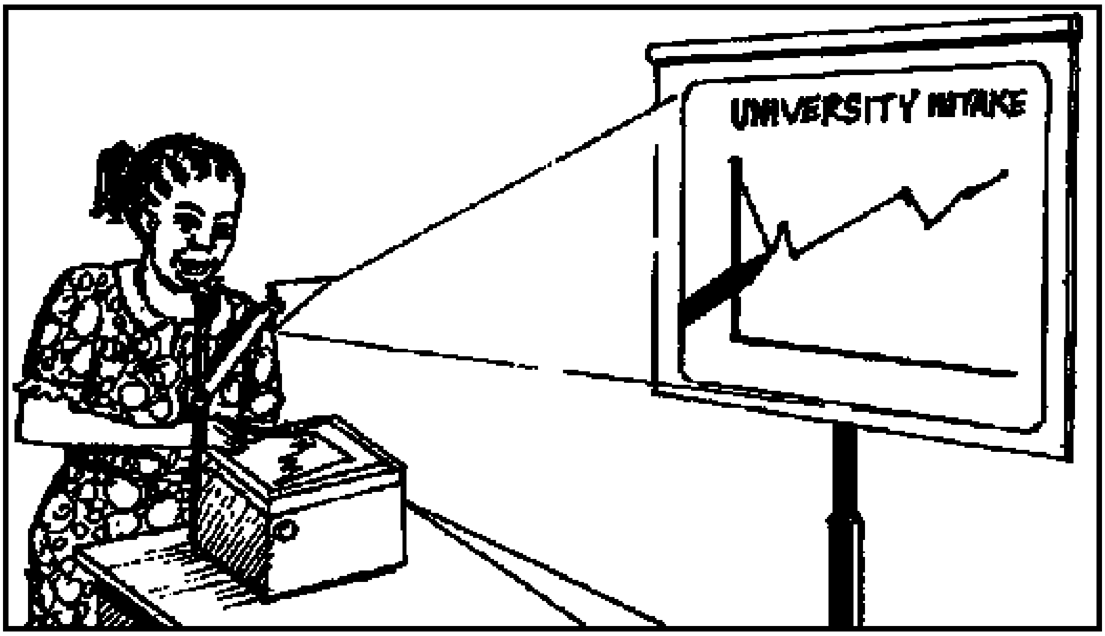


Figure 6.8 A lecturer using an overhead projector

Study Figure 6.8. Notice the position of the presenter and the pointer (marker/pen) being used. Do you always face your students when you use an overhead projector or do you face the screen?

Preparing an Overhead Transparency

Here are some useful steps in preparing overhead transparencies.

- Select the material that you will use for your transparencies. If there is no acetate paper, then clear plastic sheets, or old but well cleaned x−ray plates will do.
- Measure your page according to the size of the OHP screen. Leave a margin at the sides, top and bottom. This will ensure that all your information can be displayed at once if necessary.
- Plan your text and diagrams carefully. Try to summarize the main points. You should not attempt to convey your entire talk on the OHP,
- Remember that you can also add information to your original transparency as you talk. This can be done by using special pens.
- Choose your colour pens. There are basically two kinds of pens which you can use for writing or drawing on transparencies: (a) spirit−based pens whose images are permanent, meaning that the writing or drawing can only be erased using special solvents such as methylated spirits, and (b) water based pens whose images can be erased with plain water.
- Use large bold lettering and clear simple drawings with as few lines and labels as possible (Laver, 1990).

1. Suggest alternative materials from which to make transparencies if acetate sheets are too expensive or are not available. Make transparencies from some of those materials.

2. You have used transparencies and you need to re−use them. Some contain material written in permanent ink, others in temporary water−soluble ink. Try to rub these used transparencies clean with water, methylated spirit, alcohol (laboratory ethanol or even gin), typewriter thinner, after−shave liquid, or any other solvent that will do the job. You might need to consult a friend in the chemistry department. Compare the instructional material that you write on these transparencies to that written on new and expensive transparencies. Try to estimate the saving involved and the good feeling you get after a satisfactory result.

Non−conventional Ways of Producing Transparencies

Apart from felt pens, you can use photocopiers, thermocopiers, laser printers, dot matrix printers and plotters to make transparencies. These may be black and white or in colour. The principle involved here is that text or diagrams can be transferred from paper to paper by a variety of means. Instead of paper, the information is transferred to transparencies to be used for presentation in a lecture, seminar, conference or workshop.

There are more sophisticated ways of making transparencies: photocopiers, thermocopiers, colour photocopiers, dot matrix, inkjet or laser printers, and plotters in one or more colours. If your institution owns these gadgets, try them and produce some of your transparencies. If you are not familiar with any of them, get someone to help you. Look for a machine elsewhere if your university does not have one or if it is broken down.

Step–by–step Presentation Skills

There are a number of presentation skills you can easily learn to improve your teaching sessions. Before your students arrive:

- ☐ set up the projector and test its position in relation to the power outlets in the room;
- ☐ ensure that you have all your transparencies at hand and in the right order;
- ☐ place one of the transparencies for your lecture on top of the projector screen, switch on the projector and practise before your lecture;
- ☐ adjust the height of the image so that everyone will be able to see;
- ☐ test the focus by adjusting the projection head;
- ☐ turn off the machine and place your transparencies in order;
- ☐ place a sheet of paper between the transparencies so that they do not stick together.

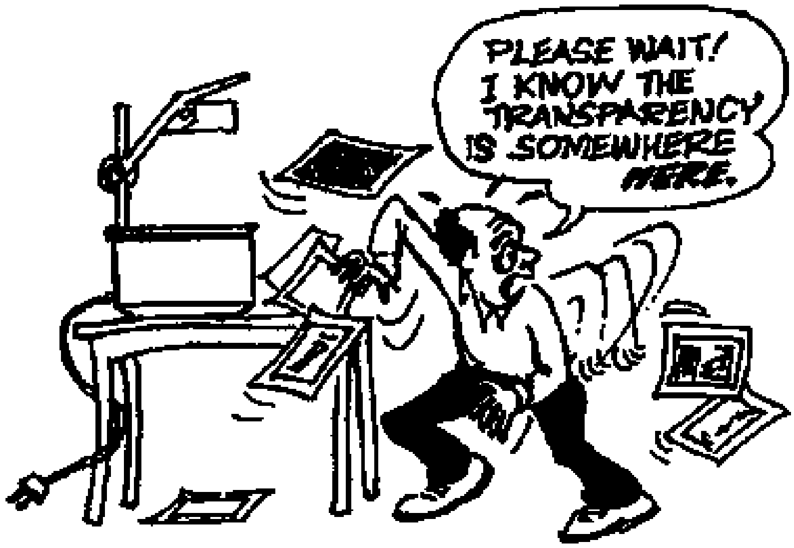


Figure 6.9 Adequate preparation will avoid panic

Follow these steps when using the OHP:

- ☐ Always face the audience and never turn your back on the group.
- ☐ Read the information from the transparency in front of you. There is no need to turn your back and point to the screen behind you.
- ☐ Use a pen or a small pointer or even the shadow of your hand to highlight certain points.
- ☐ Either read the text or keep quiet and allow the students to read it before you comment. Watch the students for reaction all the time and pause, ask questions and consolidate main

points as you teach.

☐ Cover the written material on the transparency with a sheet of paper or card, and reveal one point at a time. This technique ensures good note taking. Secondly, students will not be overwhelmed by too much material appearing on one transparency all at once.

☐ Have a sheet of paper under your hand if you are adding points to your transparency. This will avoid sweat marks and smudging.

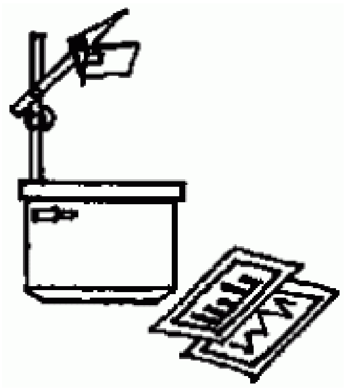
☐ Switch off the OHP when your are not referring to the transparency.

☐ Check that the fan is working or the OHP will overheat.

☐ Clean the glass screen with a clean cloth and methylated spirit or other cleaning fluid after use, or at least after 3 – 5 days of moderate to heavy use (Laver, 1990).

Advantages of Transparencies and the Overhead Projector

There are important advantages to using transparencies. They enable you to:



- face the class at all times;
- prepare beforehand to make your lecture more presentable and effective;
- make effective use of colour; show both transparent and opaque objects which will be greatly enlarged;
- make things appear to increase or grow by the use of overlays;
- demonstrate movement (animation).

Disadvantages on Limitations of Transparencies and the Overhead Projector

The disadvantages of the medium, according to Laver (1990), result from the limitations of the OHP which:

☐ needs a constant supply of electricity as well as spare bulbs and fuses;

☐ needs good maintenance and service;

☐ must be switched off when not in use for otherwise it distracts attention from the lecturer;

☐ should not be moved immediately after use because the filament will be hot and can easily break;

☐ requires you to have a constant supply of OHP pens. They should never be left open, because they dry quickly.

Depending on your discipline, prepare transparencies with overlays and animations using your own or any of these examples:

Geography – the water cycle
Agriculture – the nitrogen cycle
History – African in 1945, 1960, 1991, 1994
Chemistry – movement of the molecules
Engineering – the four–stroke engine

Biological Sciences – blood circulation

Photography: Photos, Slides and Slide–tapes, Filmstrips

The commonest photographic products that we use as instructional media are photographs (black and white or coloured), slides or film strips.

Advantages of Photography

A picture tells more than a thousand words.

Photographs, slides and filmstrips are easier to produce than drawings or paintings. They can 'tell a story'. They make 'invisible' things become visible and they are easy to use in self–instruction. They are useful to compare different events. In fact, photography is a graphic method to capture and record reality. Whenever you are limited in space or time and cannot show real objects or events to your students, photography can help you with realistic visual representations of the objects or events.

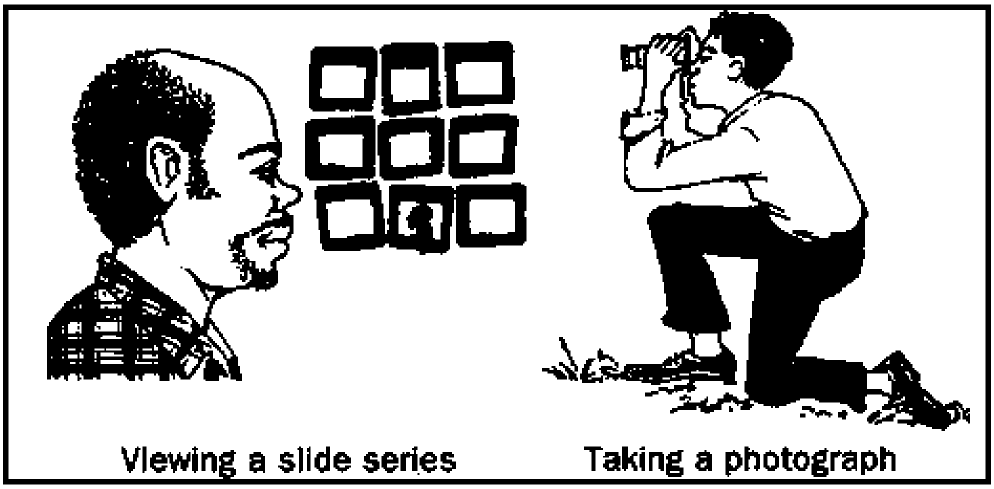


Figure 6.10 Photography

A logical sequence of photographs can be combined into a story which will be either self–explanatory or require only a little text. In ready made filmstrips, the photo story is usually accompanied by a text for the instructor, or a cassette tape which presents the story to the audience. Self–instruction is also facilitated by photographs. This advantage is often used in textbooks.

Imagine you would like to demonstrate the shape of bacteria to 500 students in the lecture hall. Only five microscopes are available, and two of them are out of order. Since bacteria cannot be observed with the naked eye, micro–photography can solve this problem.

The capacity of photography goes beyond micro– and macro–exposures. Infra–red or X–ray exposures are particularly interesting in scientific lectures. They can make things, such as the bones in our bodies or the digestive system in living organisms, visible.

When comparing time sequences or different locations, photography is unbeatable. The change of the clinical picture during a disease or the effect of a drug to cure a disease, can easily be shown by a photograph. So can changes in the weather.

Look at these photographs of the birth of a tornado.

Figure 6.11 Time sequence can be illustrated clearly by photography

Source: Jerome Spar, 1954.

The advantages of photography are not limited to teaching. As a university lecturer, you are also involved in research publishing and fund raising. All of these benefit from good illustrations.

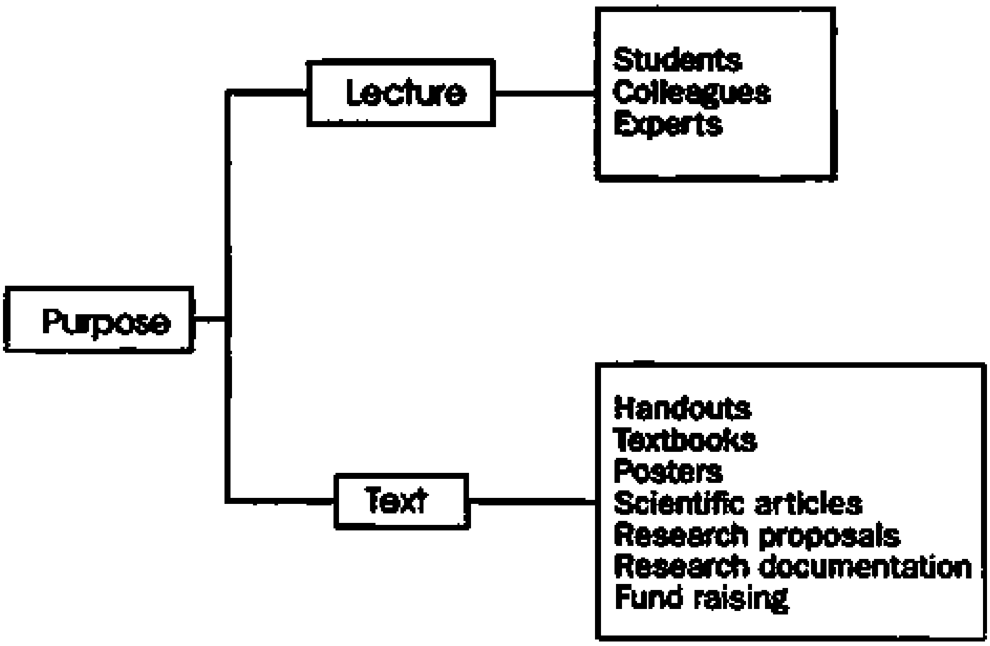


Figure 6.12 The many uses of photography

Disadvantages of Photography

Pictures cannot always replace reality. They do not capture movement.

You need motion films, working models or live demonstrations for this, and the production of these requires special skills and high investment. It is often difficult to get appropriate photographs, slide and film strips for your lectures. A photograph is only a two−dimensional representation of reality. Whenever you need to explain something which requires a three−dimensional representation, a model or a real object is even better.

Technical and Didactic Use of Photographs

You can use printed photographs to supplement any kind of text or poster in research publications, handouts, manuals and textbooks. They explain the content effectively and make reading more interesting. During your presentation, make sure that the photographs are large enough to be seen by everyone in the class.

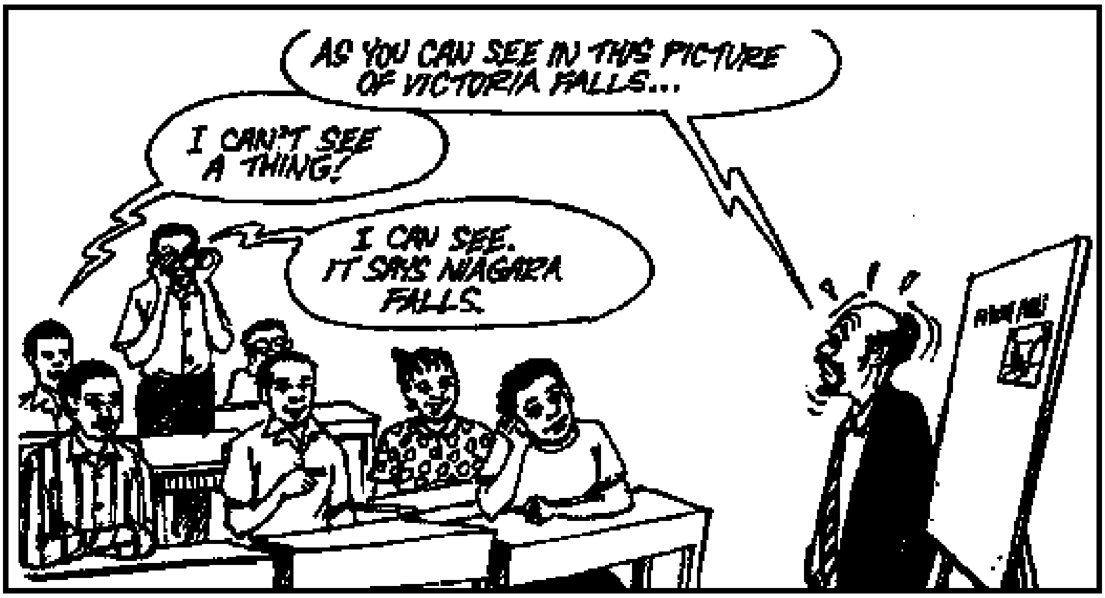
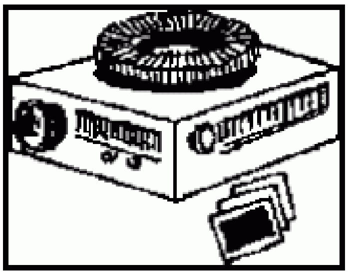


Figure 6.13 Students should be able to see your visuals clearly

When you present a picture to your students, do not tell them immediately what you expect them to see. After a short introduction, display the picture and allow students time to study it. Let them describe what they see or ask them which details they have observed. This method gives good information on your students' perceptions and on the quality of your photograph. It can tell you whether the picture is really suitable for your lecture or if modifications are needed.

Technical and Didactic Use of Slides



Lecturers use slides and slide series in the process of teaching. The technical requirements for production and presentation of these are comparatively inexpensive. Moreover, because you project them on a screen, you can present the slides even to large groups. How well you use your slides depends on proper preparation and evaluation.

Let us discuss a few suggestions for the effective use of this medium. You should begin by selecting your slides according to the subject, method (lecture or seminar) and audience. Select slides that will help your audience to understand your topic. Avoid bad quality slides. Arrange them in a logical sequence or combine them into a story.

On each frame write the title of the slide and its number. In addition, take notes about each single slide and write down the story. This will be the guideline for your presentation and will help you to find single slides in future.

Next, put the slides in a tray the right way up in the desired sequence. Avoid touching the slides. Touch only the frames. A single fingerprint may spoil a valuable picture. Avoid fingering the lens and bulb of the projector. Apart from the resulting poor picture quality, fingerprints shorten the lifespan of the bulb.

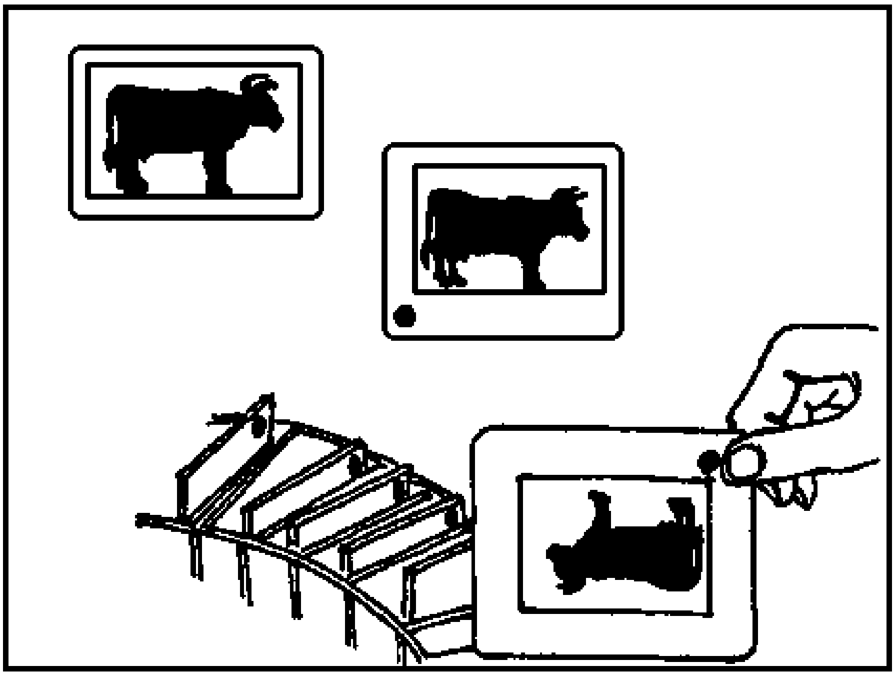


Figure 6.14 Loading slides the right way up.

Before showing your slides to an audience, check how the projector is operated. Become familiar with the technique, arrange all equipment In the lecture room, and take a quick look at your slides. Adjust the distance between the projector and the screen to ensure that all the audience can see the slides.

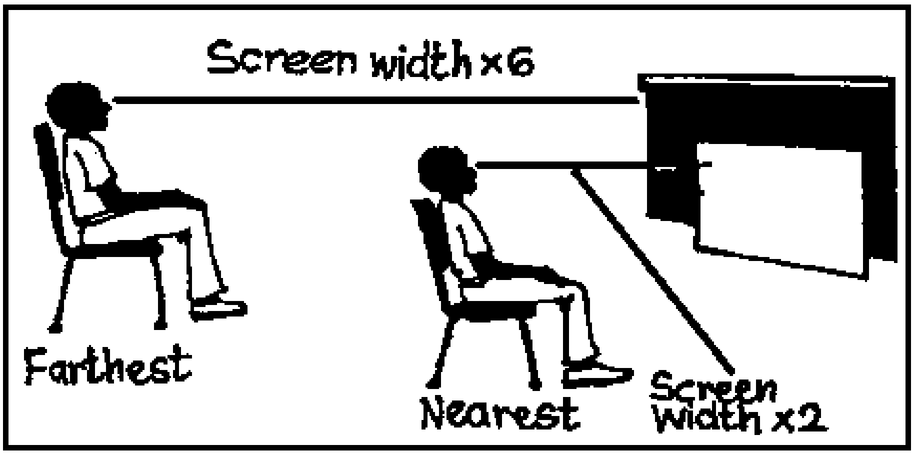


Figure 6.15 The optimal distance to view slides

Follow your guideline or your story as you show your slides. Keep in mind that your audience is neither familiar with your topic nor with your pictures. Therefore, do not change the slides quickly. Observe the reaction of the viewers to find out the right pace. Let individuals describe what they see or ask them questions related to the pictures. This way you can compare your intention with the audience's perception.

In case you do not achieve your objectives with some slides you should revise your slide series. At the end of your presentation switch off the light of the projector but let the fan run for a few minutes to cool down the bulb before you move the machine. This is because the filament breaks easily when hot, just like the OHP element. Store your slides in a cool, dry and dust–free place.

Technical and Didactic Use of Filmstrips

Slides arranged in sequence and copied on a film are called a filmstrip. This technical transformation makes the slide series very compact, easy to handle, carry and keep in the proper sequence. Unfortunately this sequence cannot be rearranged or modified. Filmstrips can also be made from photographs, posters, diagrams, cartoons or even text and are usually accompanied by tapes or a written text.

The technical requirements and preparations for the presentation of film strips are very similar to those for a slide series.

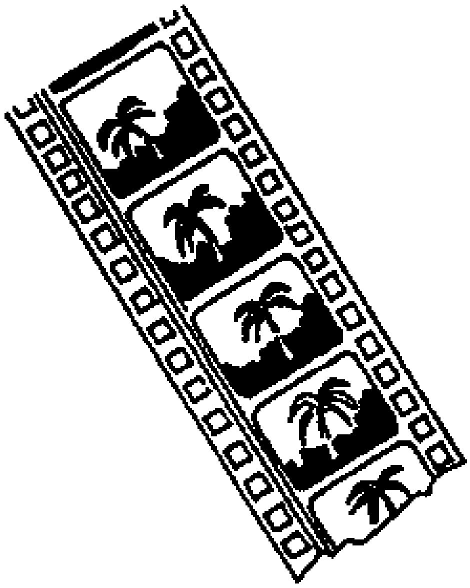


Figure 6.16 A film strip is a useful teaching aid

Production of Photographs, Slides and Filmstrips

To produce photographs, slides or filmstrips you require technical skills or a technician, and equipment such as a camera, films, darkroom, chemicals, and so on. Photography is costly, so plan carefully to minimize waste. The different steps in the production process may be described as follows:

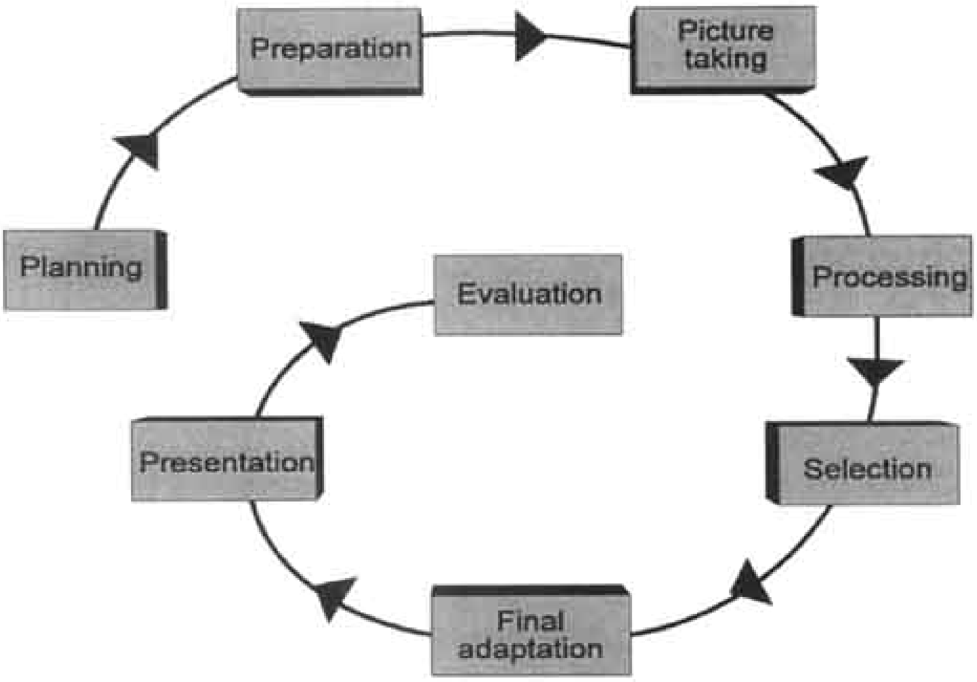


Figure 6.17 Steps in the production process of photographs, slides and filmstrips

Visit the audiovisual unit, if there is one in your institution, and request the person in charge to demonstrate to you some of the techniques used to produce instruction materials. Do they produce photographs and slides? We do not expect you to become an expert. However, observing their production techniques will make you a better user of instructional media. You will do even better if you produce some yourself.

Flip Charts and Display Easels

A flip chart consists of a number of large sheets of paper fixed at the top edge and set on a stand called an easel. You may prepare the chart before your lecture or put information on it during your teaching session. Write or draw on the sheets of paper using a felt pen, and flip them over as they are filled. Alternatively, you can detach the sheets from the easel and fix them on a wall or board with gum, blue tack or tape.

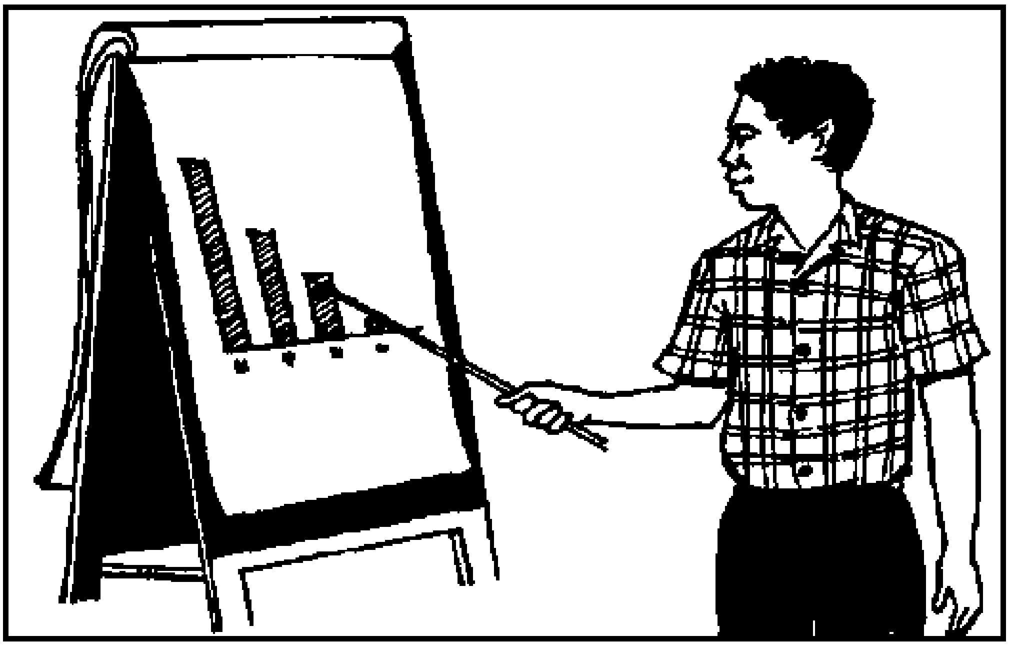


Figure 6.18 Lecturer using a flip chart

In practice you will probably use flip charts in seminars, tutorials, conferences and workshops. You can also use them with small postgraduate or undergraduate classes. Students can and should be encouraged to use flip charts when presenting their project or group reports.

Advantages of Flip Charts

Some advantages of flip charts:

- ☐ They are low cost and easy to make since you yourself, a carpenter, technician or handyman can make them locally from wood, bamboo or metal.
- ☐ You can purchase them, or improvise with discarded sugar or cement paper bags, or newsprint cut−offs from your local printer.
- ☐ They are easy to use, provided you have felt pens. You can use colour for emphasis and to make them more attractive. The pens are refillable.
- ☐ You can display sheets anywhere in the lecture room, seminar room, laboratory, or corridor after the lecture.
- ☐ You can prepare material ahead of time. This is not always possible with the chalkboard.

Disadvantages or Limitations of Flip Charts

Some disadvantages of flip charts:

- ☐ They can be used with small classes only (maximum 30).
- ☐ Good lettering is needed because otherwise they are hard to read.
- ☐ They are not permanent since cheap flip chart paper made out of newsprint tears easily.
- ☐ The cost of paper and pens may be prohibitive, depending on your institution’s financial resources.

1. For one of your seminars, tutorials or conferences this term, prepare a flip chart presentation. Remember, you may write key points on the papers as you teach or you may prepare the sheets ahead of time in some detail including notes, diagrams and flow charts.

2. If you are already using this medium, check if you can improve on it. Are you using colour for emphasis? Is your lettering large and clear? How is the arrangement of the page? Are you making use of boxes ☐, bullets •, arrows ?, diagrams and flow charts to illustrate or highlight your points?

Wall Charts and Wall Posters

You have no doubt seen these two−dimensional displays printed on paper and mounted on a wall, a notice/bulletin board or similar surfaces used in advertising. Have you ever tried to use them in your teaching? Like the chalkboard and the OHP, they are a display medium. You can use them to introduce a new concept, a process, a course, a programme, a product or a service. They are useful on open days, if your institution invites members of the public to show them what the university is all about. They are fairly cheap so you can use them instead of projectors and screens.

There are three types of posters:

Single glance posters. You put these up and then take them down right away.

Stop *and study posters.* These are more detailed. You put them up and each point is studied at a time. They often have more than one message.

Coloured posters. You use different colours to attract attention and differentiate items.

Advantages of Charts and Posters

Some advantages of these media are that:

☐ they require little material and are easy to produce;
☐ you can fix them permanently in one place, remove them, and put them up again as the need arises;
☐ they are accessible to a large number of people;
☐ you can use them at any time without need for supervision.

Disadvantages of Charts and Posters

Some disadvantages of these media are that:

☐ they are not useful for a large audience during a lecture;
☐ they can be easily stolen or destroyed;
☐ they are hard to store in good condition over long periods;
☐ you need artistic skills or an artist to produce good quality ones.

Production of Wall Posters and Charts

Because the materials you require cost little, it is a good idea to produce some of the posters you need yourself. The materials required include:

Figure 6.19 Planning a poster

- strong paper (50 × 70 cm or larger);
- felt pens and pencils of different colours;
- a ruler and an eraser;
- paper cutting equipment. A guillotine is the best if you have one, but a razor blade, a pair of scissors, a scalpel or even a sharp knife will do;
- pins, gum/glue or blue tack or masking tape to stick the posters on the wall or notice board.

The planning before production is similar to that outlined earlier, except that here you are trying to catch people's attention. So posters should be attractive and not overloaded. Ask a colleague or a student, your wife/husband or your offspring to look at your draft before you transfer it to the poster paper.

To make posters attractive, follow some of these suggestions (Kemp and Dayton, 1985: 171):

- mount the display where many students are passing by;
- make the display attractive to the reader by the use of
  - unusual design,
  - colour
  - bold headings,
  - good bold illustrations,
  - adequate lighting,
  - battery−operated motion if possible;
- involve the reader of the poster in questions, contexts of skill or guessing games;
- leave the display mounted long enough to attract attention and remove it or change it as the interest wanes.

Film and Video

These two instructional media have many similarities and we shall discuss them together. Unlike other media, film and video can demonstrate motion and sound simultaneously. They are powerful tools for simplifying complex concepts, processes, and procedures. Perhaps no medium can beat these two at showing changes over time, giving impact to topics, and promoting commercial or political propaganda.

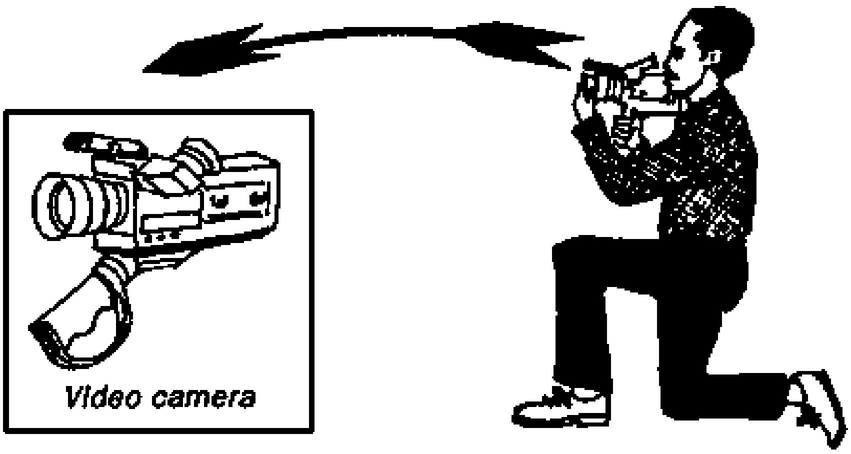


Figure 6.20 Film and video can capture motion, mood, attitude, impact

Showing films involves the use of film projectors (16 mm are the commonest) and rolls/reams of film. It costs a lotto produce 16 mm films, because you need complex equipment and trained personnel. To show a video, all you require is a regular television monitor, video recorder and a video camera. If your institution has not invested in either medium, then you are advised to opt for video because it is more available and easier to run as well as to maintain. It is also less difficult to get video tapes than 16 mm films. Moreover, there are companies that will copy your information from 16 mm films to video tapes.

Broadcast Formats and Video Tape Recorder Classifications

You might need to order video films or recorders, or you may receive them as donations. You should, therefore, know something about the standards and formats used.

There are different formats for television sets and video recorders:

- PAL/B for most of Anglophone Europe and Africa, the one you are likely to encounter routinely;
- SECAM for most of Francophone Europe and Africa;
- NTSC for North American countries.

Some television sets and video recorders have a multi−system. They can play tapes made anywhere in the world, but they cost about 50 % more than regular one−system ones.

Video tapes and video recorders that you are likely to encounter in higher education are classified, according to tape width, into:

- VHS −the commonest one. Most household video recorders are VHS. You should opt for this type.
- Betamax −a wider tape of good quality, but there are very few Betamax video recorders. Avoid this type.
- U−matic − a wide tape of very good quality, used in professional broadcasting. You need a special video recorder to play back U−matic tapes.
- Video 8 − small 8 mm tapes that resemble music cassettes. Not common at this stage, but they could be in future.

There are companies that will copy information from Betamax to VHS tapes. In fact, you can do it yourself. Think of a way to do it if you have two video recorders. Converting different broadcast formats is more complex. You need special companies to do this at about 10 times the cost of a normal blank video tape.

Therefore, what type of video recorder and tapes would you recommend to your institution? Why? What type of video recorders and tapes does your institution already have?

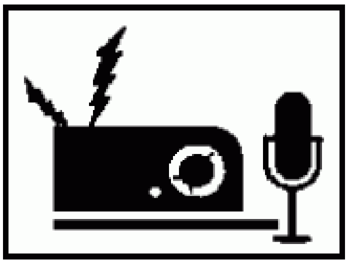
Production of Films and Videos within the Institution

You can produce video films yourself, if you liaise with the audiovisual unit in your university. If your institution has a Department of Mass Communications and Journalism, you should visit them to get ideas during your planning stages, because producing films and video tapes is a complicated, expensive process.

Other Instructional Media

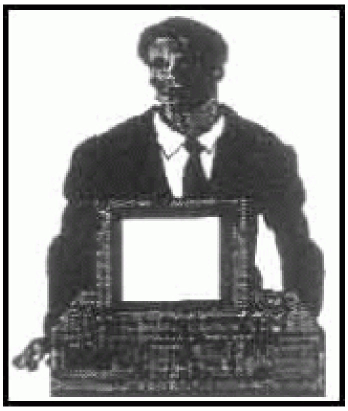
There are other media which we have not discussed in this section, because they are new, expensive, complex to use, and not widespread. They include: radio, computer–aided learning, multimedia, and information via satellite.

Radio



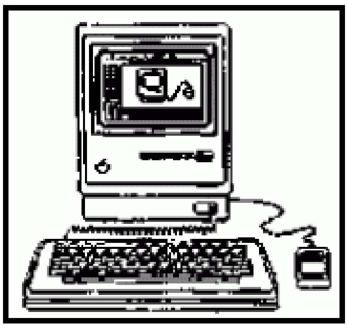
Radio programmes can be broadcasted on a national or institutional scale. The medium reaches many people, but involves extensive planning to produce valuable material.

Computer–assisted Learning



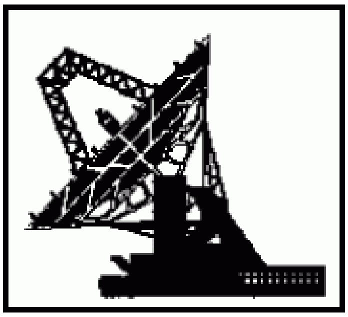
This is where students interact with the computer. Many computers are needed for this purpose.

Multimedia learning



Multimedia learning is computer–assisted where powerful computers capable of showing text, diagrams (graphics), sound and motion are needed. A computer with multimedia capability costs about 50 % more than an equivalent regular computer. Multimedia is the new exciting development with personal computers. The technique enables a computer to do things that in the past have needed three pieces of equipment: a computer, a television and video, and a stereo with compact disc.

Information via satellite



This method uses computers to send and receive information via phone lines or satellite (electronic mail). For example, you can get a journal article from any country within minutes. In fact you can get a whole journal down−loaded to your computer this way. All you need is a regular computer, a compact disc, ROM drive (CD−ROM) and a phone line. In short, if you can send a fax from your institution, then you can happily take advantage of this technology to enrich your library fairly cheaply. There are organizations that donate some programmes by this method to educational institutions in Africa (Levey, 1991).

A modem is another piece of equipment you may want to acquire. It permits computer information to be transmitted or received over telephone lines to another computer. The modem is connected to the computer and to the telephone.

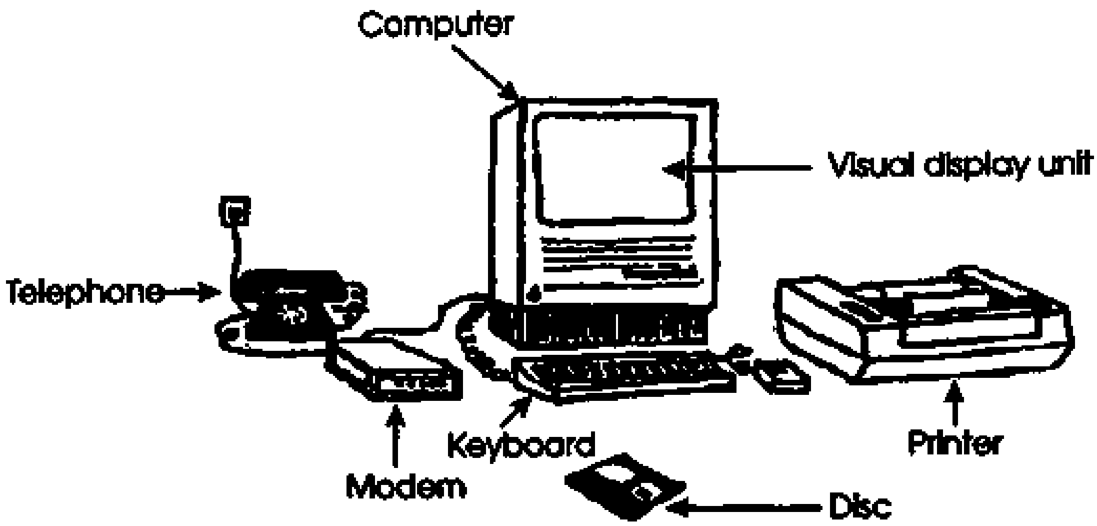


Figure 6.21 A computer set−up for linking with other information networks

Source: The Tribune: A Women and Development Quarterly, March 1990.

Some of these other media sound rather exotic and impractical. But, in fact, prices of the latest technology dependent on computers are falling all the time, and Africa need not be information−hungry any more. In our opinion, the major bottleneck with these media is not money as such but trained people with the necessary skills and ability to develop programmes to use in broadcast, multimedia and information by satellite.

OBTAINING APPROPRIATE MEDIA

The process of getting appropriate media is very tiresome and work−intensive, particularly in the beginning, and success cannot always be guaranteed. First of all, make sure that your institution, faculty or department is interested in media and supports you. Then develop a strategy to get what you need. Ensure that it is based on information exchange, co−operation, and a combination of interests.

Your success in getting appropriate media will depend largely on your own efforts and initiative. In your search for appropriate media, you will need to make a number of decisions. Figures 6.22 and 6.23 will assist you to make these decisions.

Start *at the star (*) and follow the arrows*

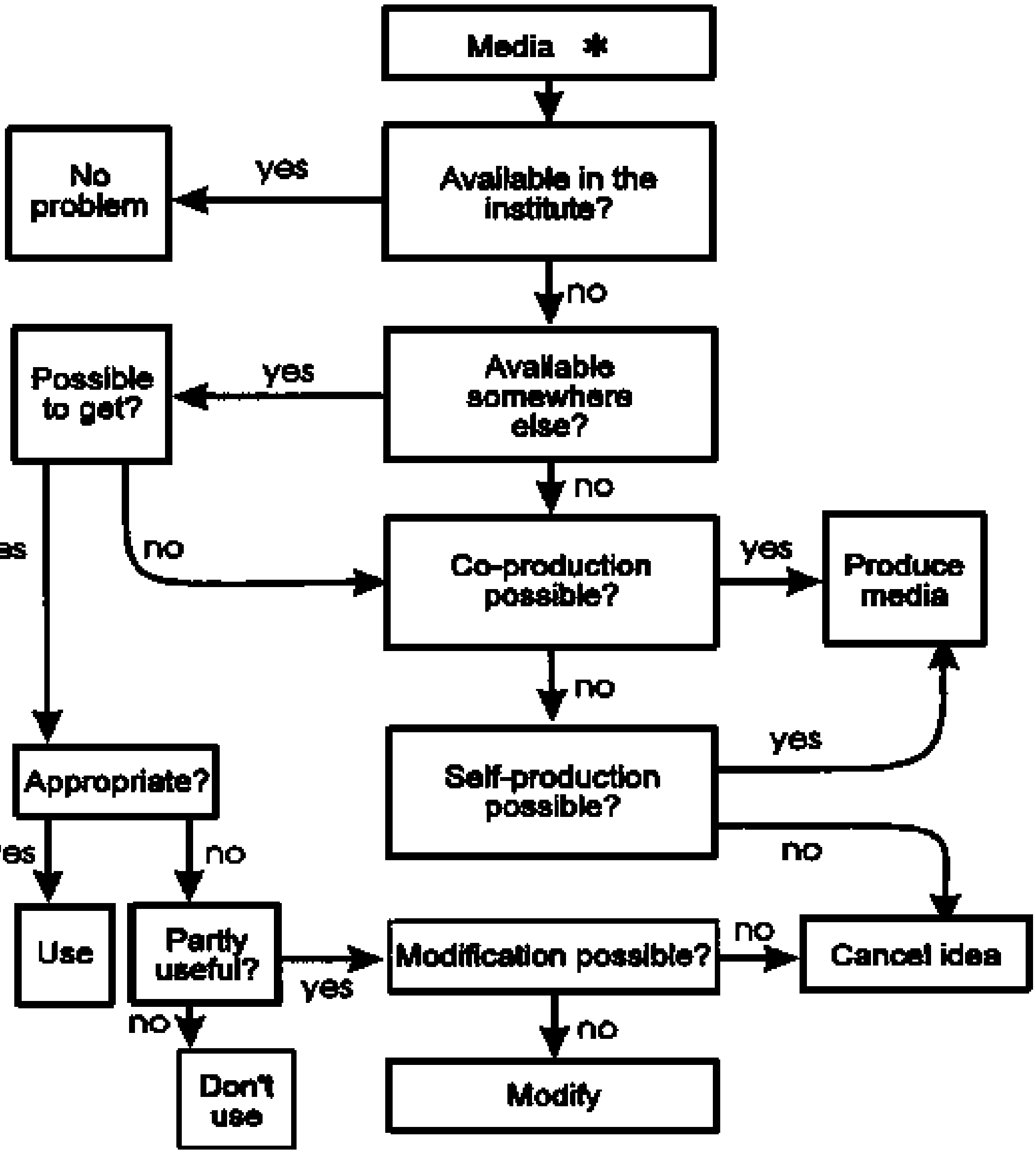


Figure 6.22 Decision tree (algorithm on how to get appropriate media)

Are the Instructional Media Available in Your Institution?

Contact colleagues, the library, or, If established, the audiovisual unit. Find out whether they can provide you with the necessary media. If you get what you need, check whether it is appropriate. Take it as it is or modify it if possible.

Are the Instructional Materials Available Somewhere Else?

If you cannot get media in your institution, then search somewhere else. Colleagues, former students, research publications or magazines are good sources of information on whom to contact. Be persistent and do not give up easily. Possible contacts include:

- other teaching institutions;
- national and international media centres;
- government ministries, national projects, research centres;
- international organizations (FAO, WHO, UNESCO);
- non−governmental organizations (NGOs);
- international companies.

Is Co−production with other Institutions or Organizations Possible?

Other institutions or organizations may be interested in acquiring instructional media, just as you are. If this is so, try to combine your efforts in the production of media. Co−production is always preferable to self−production because of the savings involved.

Can You or Your Institution Produce the Particular Media?

If your efforts in co−production are unsuccessful, check the possibility of self−production of the media. Self−production requires technical skill and materials, depending largely on the media chosen. Wall charts require much less skill and materials than a slide series, for example, which in turn, require less skill than making a video.

Find out whether the conditions in your institution allow use of the audiovisual unit to produce media. In−house production often produces more effective media and saves on cost.

Start at the star (*) and follow the arrows.

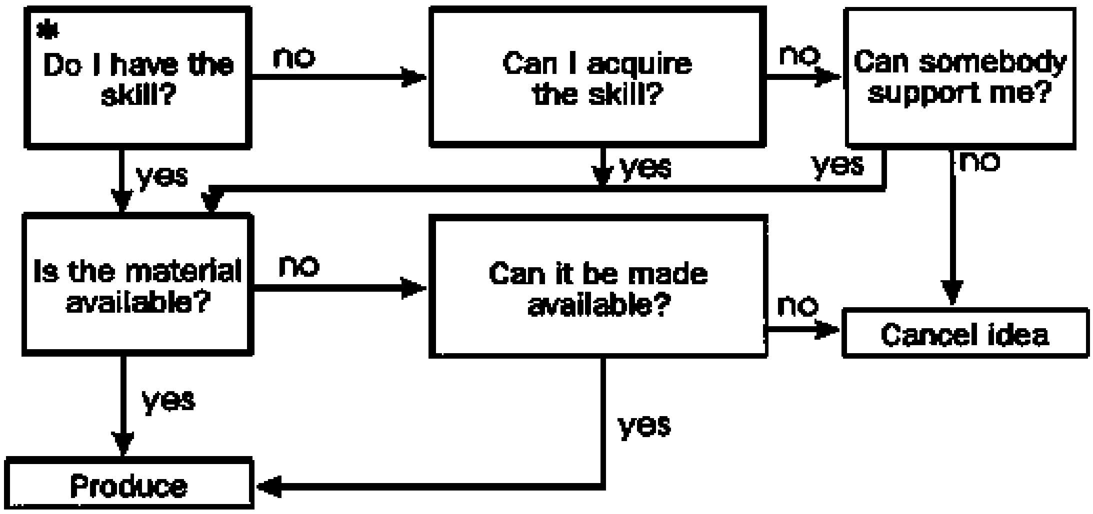


Figure 6.23 Decision tree (algorithm) on when and how to produce instructional media

Appropriate Utilization of Limited Resources

Acquiring or producing media is a tedious and expensive process. It is important, therefore, that this effort and money are not wasted by bad management of the media you have. Figure 6.24 summarizes the human and material resources available in African universities, as well as problems and possible solutions pertaining to instructional media. Study it and see what applies to your institution. Note that most suggestions revolve around good management, training, and adaptation of local resources.

Resources	Examples of problems	Possible solutions
Human	☐ lack of training/knowledge	☐ professional development
	☐ no access to resources	☐ technical training
	☐ large classes	☐ increase reward
		☐ modify attitudes
MATERIAL technological (hardware)	☐ lack of equipment and supplies	☐ skills training
	☐ expenses	☐ locate, utilize, adapt

	☐ abuse, misuse, underuse	a utilize local resources
	☐ data loss	☐ establish system of maintenance
MATERIAL informational (software)	☐ underfunding	☐ conduct writers' workshops
	☐ overcrowding	☐ write materials in–house
	☐ outdated, inappropriate information	☐ conduct software training workshops
	☐ information gaps	☐ adopt local resources
		☐ adopt newer and cheaper, donated technologies such as electronic (satellite) libraries, CD–ROM, database

Figure 6.24 Resource management: problems and possible solutions

Source: Adapted from Laver, 1991, and Nkuuhe, 1991

1. You need to obtain instructional media. Which organizations in your locality could you approach? If your university has links with outside institutions and organizations, can you use your influence to ensure that instructional media are part of the link programme? If the committee responsible for links asked you to write a paper and make recommendations, would you do it? What would you

2. Go around your department, faculty or institution, visiting centres where instructional media, however rudimentary, are kept. Can you see evidence of inappropriate utilization (underuse, abuse, misuse or poor maintenance)? Make recommendations to improve the situation.

EVALUATION OF MEDIA

Media evaluation is an indispensable part of your teaching. The general topic of evaluation of teaching and learning is discussed in Chapter 7 and you should refer to it for more details. According to Percival and Ellington (1988), you should evaluate your instructional media at the completion of production and during its use. At the production stage, you should determine whether:

- ☐ the materials meet your original objectives;
- ☐ content and technical aspects meet the expected standards;
- ☐ the material is of suitable length, and information flow is smooth;
- ☐ there are any gaps, errors, inaccuracies;
- ☐ the particular medium will integrate with other media.

When evaluating media, you should seek information from students, former students, colleagues, administrators and technicians. For your evaluation instruments, you can use formal and informal interviews or questionnaires. Chapter 2 presents an overview on assessment methods; see particularly. – Kemp and Dayton (1985:67) suggest that you should design questions that will give you helpful answers.

For instance:

- ☐ How well do students accomplish the objectives upon which the media are based?

- ☐ Do reactions indicate the medium appeals to the class or to individual students?

- ☐ If the media do not meet the objectives or if they lack appeal, what revision can be made?

- ☐ Are the arrangements for use of the media convenient for you and the students?

☐ Was any difficulty encountered in using the hardware?

☐ What were the development costs of the media (professional and staff time, materials, services)?

☐ What are the operational costs (staff time, materials, facilities)?

On the basis of your answers to these questions, you should revise the instructional media and/or the way you use them. It is advisable to repeat the evaluation periodically to maintain a standard of effectiveness.

CONCLUSION

In this chapter we have discussed instructional media that make your lectures interesting and assist your students to learn. After justifying the use of media and discussing their selection we described a range of media generally available in universities. These included the chalkboard, overhead projector, printed media, video, slides, photographs and others. We described how you can produce and use media to complement not only your teaching but also your research and publication. We concluded the chapter by describing how you can obtain appropriate media and how you should evaluate them.

We trust that you will have enjoyed reading this chapter and will find the information useful in your teaching.

SUGGESTIONS FOR FURTHER READING

Bate, Joseph St John and Kirty, Wilson−Davies. *Desktop Publishing.* London: BSP Professional Books, 1987.

A very authoritative and well written book if you want information on desktop publishing. Up−to−date with very good line drawings.

Hartley, James. *Designing Instructional Text,* 2nd ed. London: Kogan Page, 1985.

Strong on printed media, paper sizes, assessment of reading ability. Good on page design, too.

Kemp, J.E. and D.K. Dayton. *Planning and Producing Instructional Media.* New York: Harper Row, 1985.

perhaps the best text on instructional media. Well illustrated and easy to read.

Laver, S.? see Matiru 1990 and 1991.

Levey, L. *Computer and CD−ROM Capability in Sub−Saharan African University and Research Libraries. Report of the AAAS Africa Programme.* Washington, D.C. 1991.

The report of Lisbeth Levey, Manager, Sub−Saharan Africa Journal Distribution Program, American Association for the Advancement of Science, 1333 H Street, N.W., Washington, D.C., discusses use of CD−ROM technology to equip libraries in selected countries in Africa.

Lewis, R. and N. Paine. *How to Find and Adapt Materials and Select Media.* London: Council for Educational Technology, 1986.

The book discusses many media and gives the advantages and disadvantages of each. A small book but well written and easy to follow.

Lowe, N.K. (ed). *Low Cost Equipment for Science and Technology Education.* Paris: UNESCO, Volume I, 1985, Volume II, 1986.

A valuable book if you are interested in producing low cost books in the science field.

Matiru, Barbara. *Towards Academic and Professional Excellence in Higher Education, Part I.* Bonn: DSE, 1990.

Instructional media are presented by S. Laver, J. Rwambiwa and J. Nkuuhe (pages 153 to 173).

Matiru, Barbara. *Towards Academic and Professional Excellence in Higher Education, Part II.* Bonn: DSE, 1991.

S. Laver deals with 'Appropriate Utilization of Resources' (pages 117 to 125). J. Nkuuhe reflects on 'Computers and Modern Technology in Teaching and Learning' (pages 133 to 155).

Matiru, Barbara. *Towards Academic and Professional Excellence in Higher Education. Part III.* Bonn: DSE, 1992.

The inputs by Nkuuhe on desktop publishing (pages 174 to 205) and Matiru on textbook production (pages 153 to 173) discuss many aspects of producing printed media.

Nkuuhe, J.? see Matiru 1990, 1991, 1992.

Percival, F. and H. Ellington. *Handbook of Educational Technology.* 2nd ed. New York: Kogan Page, 1988.

The book discusses many media and gives advantages and disadvantages of each. It uses numerous tables and flow diagrams, well written and easy to follow.

Romiszowski, A.J. *Designing Instructional Systems.* London: Kogan Page, 1981.

This authoritative book discusses many media and gives advantages and disadvantages of each. It uses algorithms, tables and flow diagrams. It is well written and easy to follow.

UNESCO. *New Trends in School Science Equipment: The Teaching of Basic Science.* Paris, 1983.

UNESCO. *New UNESCO Source Book for Science Teaching.* Paris, 1973.

The two UNESCO books and the book edited by Lowe are good resource books if you are in the science disciplines.

Wilkinson, Judith (ed.). *A Guide to Basic Print Production, Books 1–4.* London: The British Council in Association with Intermediate Technology Publications, 1985.

The four books in the series are well written and illustrated. Book 2 is particularly useful on printed media.

CHAPTER 7 – EVALUATING UNIVERSITY EDUCATION

T. Mulusa

OVERVIEW

This chapter is divided into two parts.

Part 1 focusses on course evaluation and discusses:

- the scope of course evaluation;
- course design;
- course outlines;
- teaching materials;
- teaching and learning methods;
- course monitoring and quality control.

Part 2 focusses on student evaluation and examines:

• the purpose of testing;
• assessing student performance;
• construction of test items.

INTRODUCTION

The university lecturer's role in education evaluation is all−embracing. In this report, it differs fundamentally from that of teachers in secondary schools and non−university colleges, whose evaluation function is mainly confined to the limited areas of testing students' performance and achievement during course work, with very little room for making major changes to the curriculum or determining the students' terminal performance in examinations. At that level, the important functions of evaluating curriculum design, curriculum planning and development, curriculum implementation, quality control, and summative evaluation of students are, as a rule, assigned to educational planning and management agencies such as ministries or departments of education, curriculum development centres, school inspectorates, and examination boards and councils.

Figure 7.1 Educational evaluation is not just testing and examinations

The contributions made by school teachers and non−university college lecturers to evaluation of curricula and certification of students is indirectly channelled through these planning and management agencies. School teachers and college lecturers are usually invited to serve on the professional committees which advise the agencies, or they are used as sources of information and sounding boards by educational field workers and researchers from those agencies.

In contrast, university education the world over is controlled by special legislative acts and chapters which confer unlimited powers on the universities to carry out the following functions with minimal direct influence from outside:

- design and develop curricula;
- determine when and how to implement the curricula;
- control the quality of the curricula;
- determine student performance.

Universities themselves establish their own internal mechanisms, in line with their objectives and statutes, to control the quality of educational provision, qualifications and awards in their respective institutions.

You are probably aware of the tendency of many educators to equate educational evaluation with testing and examinations. Indeed, the evaluation courses taught by most university departments of psychology to secondary school teacher trainees in African universities mainly cover testing and examination, while hardly saying anything about programme evaluation.

Classroom teachers in secondary schools and non−university colleges only need basic training in using tests for assessing knowledge and understanding as well as determining progression from one educational stage to another. But we wish to suggest that university teachers need more evaluation skills for broader purposes. This will enable them to use evaluation tools for the planning, administration and quality control of their educational programmes.

Literature has a rich variety of definitions of what evaluation is supposed to be or achieve. You should be familiar with many of these. In this chapter, evaluation of university education means review and quality control of university courses, on the one hand, and determination of student performance and achievement on the other. We are not going to confine ourselves to the narrow scope of tests and examinations for students, as most educators are tempted to do.

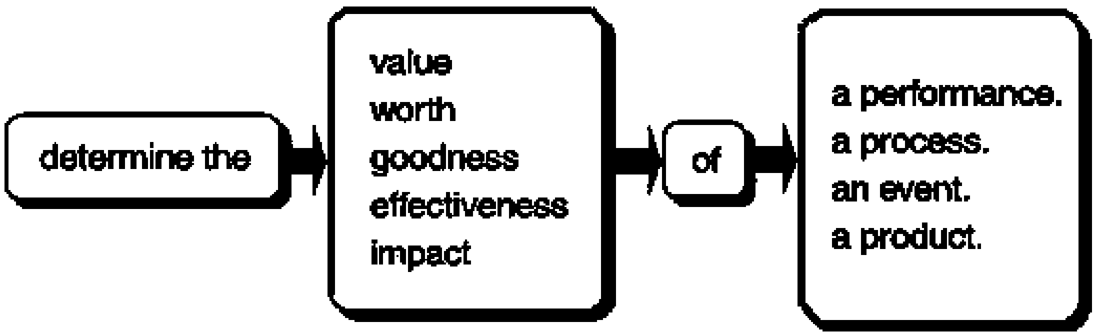
PART 1: COURSE EVALUATION

First, let us discuss course evaluation.

The Scope of Course Evaluation

Programme and course evaluation is a field which branched off from research recently but still shares many features with it in terms of aims and methodology. The main distinction is that the purpose of research is to increase knowledge and understanding of the world around us, while evaluation seeks to generate information for judging a programme, a process, an event or a product with a view to making decisions on how to improve them. You should, therefore, study this chapter with close reference to Chapter 8 on research and publications.

The purpose of evaluation, among others, is to:



The main concern in evaluation is to generate information for the purpose of making judgements leading to decisions on the programme or course, process, event or product under investigation.

Forms of Evaluation

Educators tend to classify forms of evaluation in terms of who conducts evaluation and when it is done. Let us look at these two classifications.

Who Conducts Evaluation?

An evaluation study conducted by the university's own administrators or academics is internal. Internal evaluators are suited to evaluate their programme because they have intimate knowledge of the course context and students' characteristics. On the other hand, they are likely to have blind spots and may be biased judges of their programmes.

If evaluators are appointed from outside the university, the process is known as external evaluation.

The main strengths of external evaluators are that they:

- are professionally well trained for the job;
- have wide experience gained by evaluating other projects;
- have no interests or weaknesses to protect.

External evaluators are supposed to be more objective than internal ones. On the other hand, they lack knowledge of the university environment and internal processes.

For best results, it is suggested that evaluators should work closely with all staff and students in a process known as participatory evaluation. In this case course participants are involved in deciding what should be evaluated and how the evaluation should be done.

> Classification of evaluation into internal, external and participatory modes has very interesting implications for the management of university education, which we invite you to reflect upon.
>
> 1. Which are the reasons for assuming that internal evaluators are biased, that they have blind spots and lack broad experience outside their own programme or institution?
>
> 2. On what basis would the position of internal examiner, within university settings, be justified?
>
> 3. What purposes would an external moderator play in university examinations and programme evaluation?
>
> 4. Should students be given a role in the evaluation of both their courses and their abilities and performance?

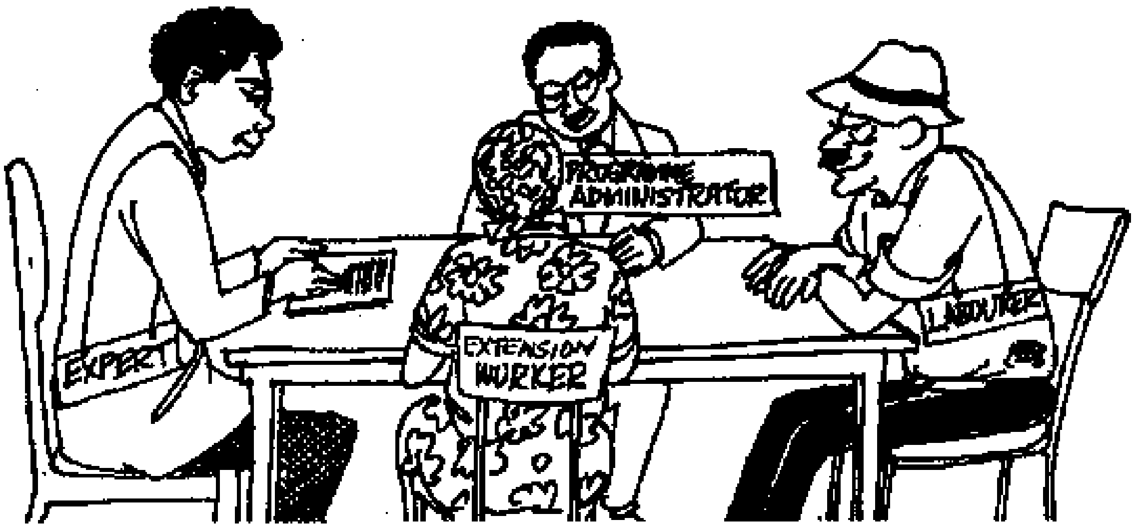


Figure 7.2 Participatory evaluation is an effective method for accessing the university's community programmes

When Should Evaluation Take Place?

Literature suggests that the critical points when evaluation should be conducted are at the beginning and during the life of a programme. The results of such formative evaluation, are used to improve the programme or course and to attend to students' problems before its conclusion.

An evaluation conducted at the end of a course is known as summative evaluation. While this often comes too late to provide information for improvement, the findings are useful in planning similar courses. It also gives lecturers and department heads feedback on how well they performed.

Formative evaluation refers to course review and mid–course testing of students. Summative evaluation refers to end–term research and terminal assessment. Evaluators now agree that educational programmes require ongoing evaluation. We shall discuss continuous evaluation later on under the title 'Monitoring and Quality Control'.

Evaluation Agenda

Agenda for course evaluation emerge in different ways.

> Like a research study, an evaluation study sometimes emerges from reading around a subject, discussion with fellow professionals, knowledge of ongoing investigation an area of study, and intuition. An evaluation problem may be formulated because a course seems to be doing badly (students appear to avoid a whole course or parts of it, students may be finding a course difficult) or, in contrast, the course may be very popular and attracting unexplained participation. At this point, you should begin to wonder whether the content is too difficult or too easy, too much or too little. Think about your own course.
>
> 1. Is the course content a source of problems?
> 2. Are there sufficient teaching materials?
> 3. Is the teaching properly conducted?
>
> From this thinking an evaluation problem is formulated and developed very much on the lines of a research study as explained in Chapter 8.

From this thinking ,an evaluation problem is formulated and developed very much on the lines of a research study as explained in Chapter 8.

As a university lecturer your evaluation tasks are more likely to emerge from your teaching, student assessment, and research.

Designing a Course Evaluation

After you have decided what aspect or problem of your course needs evaluation, the next step is to interpret, that is, break down the problem into researchable issues which can be investigated systematically. You will find that the specific issues are best stated in the form of questions to guide your investigation.

The specific questions are then further broken down into even more specific issues for investigation. In turn, these should suggest what information you require in order to make judgements that will lead to decisions about the future of the course.

Evaluation Methods and Instruments

Chapters 2 and 8 give a description of most of the evaluation instruments used in course planning and research and, therefore, we do not need to describe them here in detail. Note that we do not make any difference between instruments and methods. In evaluation, questionnaires, observation schedules, and other approaches are both instruments and methods of collecting evaluation data and information.

The common instruments used in course evaluation are:

- ☐ expert judgement;
- ☐ library search;
- ☐ questionnaires;
- ☐ interviews;
- ☐ observation schedules;
- ☐ tests.

The strengths and weaknesses of these methods are presented in greater detail in Chapters 2 and 8. However, it is necessary here to make brief comments on how these instruments and methods are used in evaluation.

Expert Judgement

Many aspects of course evaluation such as course design, course objectives, learning methods, instructional materials and student assessment are best reviewed by subject specialists, teaching technology specialists, psychologists and test experts. Remember that to get accurate feedback from experts, you need to spell out clearly the points on which they should give you feedback.

Library Search

Library search is important in the preparation for all forms of investigation, including evaluation. In addition to a review of background literature, which is done in preparation for an evaluation study, a great deal of the actual evaluation investigation in course design, course outlines and content review is normally based on documentary sources which form part of a library search.

Questionnaires

Questionnaires are useful in evaluation studies which involve collecting information from many respondents scattered over a large area, such as former students and their employers. In constructing questionnaires, always remember that the respondents do not have the time and patience to answer long difficult questions. The questions should, therefore, be short, clear and written in simple language.

Interviews

Interviews are either based on structured interview schedules or on free discussion around a few issues. A discussion–like interview guided by a few questions is very difficult to conduct unless the evaluator is experienced in interviewing and is well grounded in the subject matter under investigation. There is more information on this topic in Chapter 2.

Observation Schedules

It is usually difficult to observe university courses during teaching, unless a lecturer allows the evaluator to sit in his or her classes. However, you can take note of your own classes, especially practical work, group discussion, individual work and reactions to tests and examinations. The activities noted must be written out in detail in the observation schedule and standard ways of measuring observed behaviour indicated. Refer to Chapter 2, for more information on this topic.

Tests

Tests and examinations provide information which can be used to evaluate the course design, teaching process, and student performance.

When preparing your courses you should design tests for different aspects of educational evaluation, which include evaluation of:

- the course;
- teaching and learning processes;
- student performance;
- processes and procedures of evaluation;
- methods of testing.

Processing Evaluation Data and Information

If you have planned your evaluation systematically to generate objective data, you should also employ appropriate methods in editing and processing the data to generate useful information for making valid judgements on the course. Evaluation is not casual review based on impressionistic assumptions, but a disciplined study.

When processing data, computers are very useful. However, if you have no access to one, you can process the data manually, although this will take you much longer. Chapter 2 provides some basic information on how to do this.

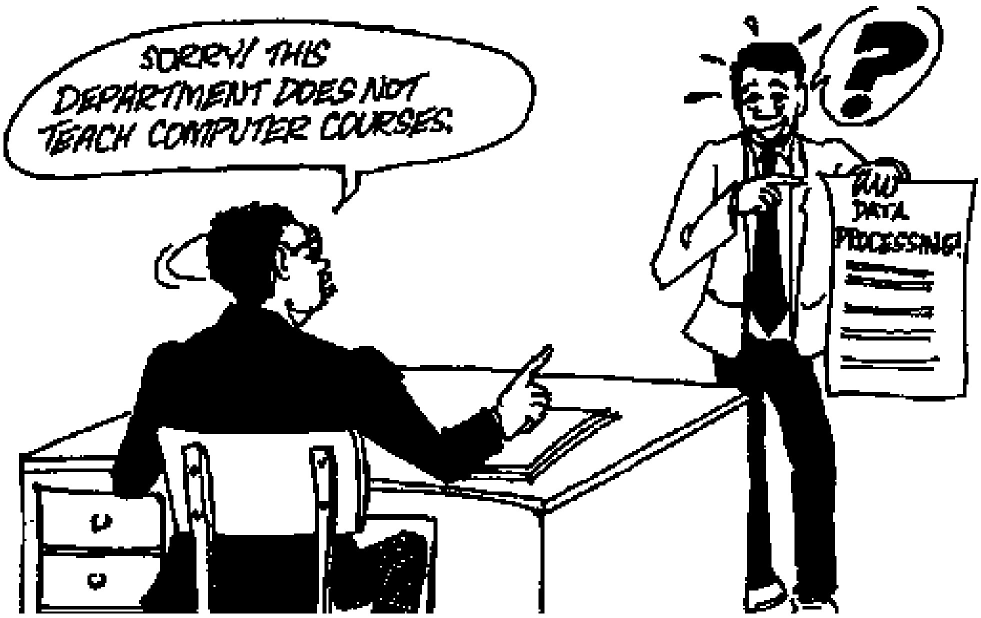


Figure 7.3 Lack of new technologies should not be an excuse for avoiding evaluation

Report Writing

Writing an evaluation report is governed by the style of writing research and other scientific papers. Your report must be brief, written in formal language, and supported where appropriate by statistical data and graphic presentation of data such as charts and diagrams. The final conclusions of the study must emerge from the information you have generated. Chapters provides further details on this topic.

The steps of evaluation design and implementation we have discussed can be summarized in the diagram presented in Figure 7.4.

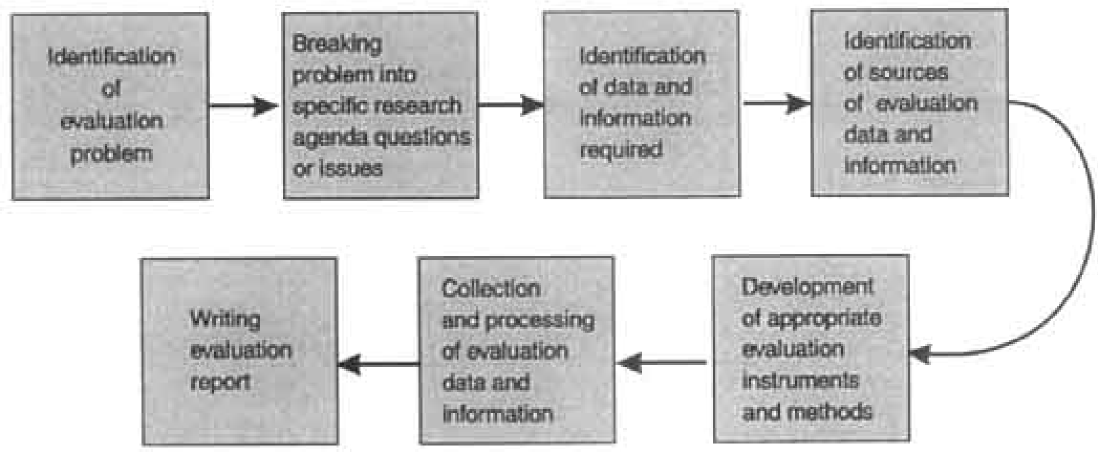


Fig 7.4 Steps in evaluation design and implementation

Evaluation of Course Design

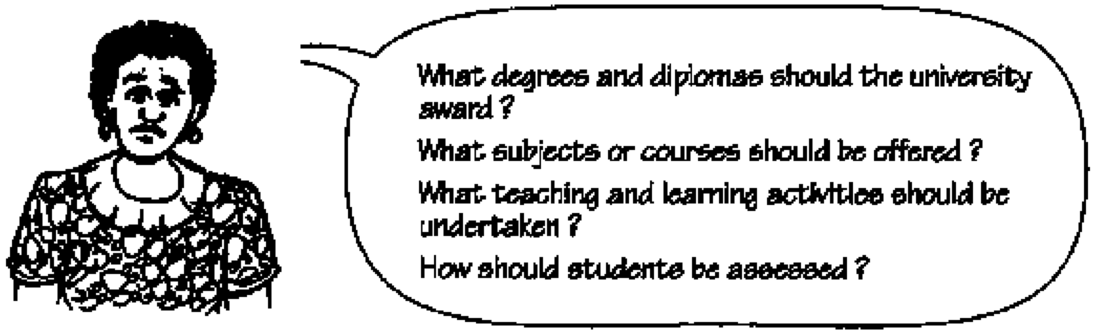
University courses are in many ways very conservative and unresponsive to changes taking place in the world outside the institution. For example, in Kenya in the early 1970s, secondary schools and the Ministry of Education complained that the Bachelor of Education (BEd) degree graduates were not competent to handle Form V and Form VI secondary school classes. The University of Nairobi and the then Kenyatta College, which were responsible for the training of secondary school teachers, debated this issue for many years but made no significant changes to the BEd courses. Examples of courses which have continued to be taught in spite of prolonged demands for change from outside the university could also be cited in many other countries.

A curriculum can easily get out of step with the needs of the consumer community if course evaluation is not regularly conducted or if it is not sufficiently accurate. Another explanation is that some forms of course deterioration may be well known to university lecturers, but they may be unable to take appropriate action either because of loyalty to certain established programmes, or from fear of exposing weaknesses which might endanger their careers.

However, the need to make a fresh start, or to make drastic curriculum changes, arises from time to time in both old, well established universities as well as newer ones because:

- the government may request universities to increase their student intake in response to population increase and other developments in the country;
- there may be need to create new areas of learning, leading to new career openings;
- available resources may be shrinking, making it imperative to cut back existing courses.

At times of crisis, university lecturers need to ask very basic conceptual questions about their programmes such as:



Sources of Information for Course Design Evaluation

The main sources of information on conceptual and design issues in your courses are:

- course outlines from other universities;
- course materials (textbooks, research papers, journal articles);
- experienced teachers in the field and in related fields;
- colleagues in your department and other departments;
- external examiners;
- educational and economic planners;
- employers of your graduates and the general public.

What is the justification for the involvement of the following groups in the design of a university course?

- current students
- former students
- teaching media specialists
- professional organizations

Establish your own priorities. Would you also involve some or all of these groups in the evaluation of that course design? If so, explain your methodological preferences.

Methods and Instruments for Course Design Evaluation

The main methods and instruments for collecting information are:

- expert judgements to elicit information from specialists such as subject specialists, university administrators, educational and economic planners;
- library search to elicit information from course materials, national development records, literature from other universities, research papers and professional journals;

- questionnaires for current and former students, professionals in the field, employers and members of the public;

- interviews with subject and curriculum specialists.

Evaluation of Course Outlines

University calendars normally show the regulations for different degrees and diplomas and list the main topics in a course description. They do not give instructional objectives or list the specific lectures to be delivered. These are prepared by the lecturer in a course outline. One of the first things you may have to do before you start working, is to make such an outline. Detailed discussion of course outlines is presented in Chapter 4.

Let us look here at sources of information, as well as evaluation methods and instruments, which can help you to evaluate your course outlines.

Sources of Information for Course Outline Evaluation

The main sources of information on the accuracy and appropriate−ness of the course outline are:

- subject specialists;
- psychologists;
- administrators;
- curriculum developers;
- educational planners.

Methods and Instruments for Course Outline Evaluation

These include:

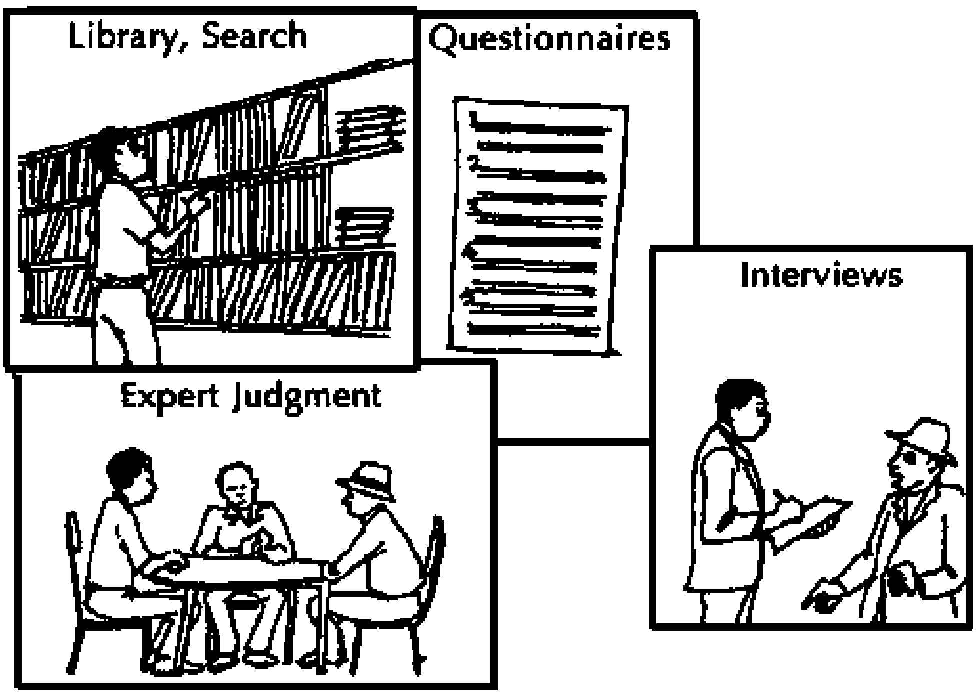


Figure 7.5 Four common methods and instruments for evaluating course outlines

Evaluation of Course Content

Another area you might like to evaluate is your course content. At university level, research is all the time churning out new masses of information. You are also handling students who have the ability to explore their area of study on their own, often coming across many points which were not covered in your lectures, or which may not be in full agreement with what you said previously.

Your responsibility as a lecturer is, therefore, to decide:

- what content is relevant to your course;
- what should be done with fresh information added to the area of study by research;
- what the needs of the students are;
- how the content should be arranged.

Sources of Information for Content Evaluation

To evaluate the content of your course, you need to elicit information from:

- professional colleagues;
- professionals from related fields;
- reference books and course materials;
- research papers and publications on the area of study;
- course outlines from other universities;
- members of the public, including present and former students of the course;
- employers of your graduates.

You need to guard against relying exclusively on ideas from your own teaching department or the institution in which you were trained. Universities, both in and out of your country, as well as other institutions may have information that can greatly enrich your courses.

Methods and Tools for Content Evaluation

You can employ a wide range of social research methods and tools to gather information on the relevance, adequacy, suitability and organization of your course content.

Some of the recommended methods and tools are:

- expert judgement;
- review of documents;
- library search;
- questionnaires and interviews.

What arguments would you use to raise funds for an evaluation study to generate information for course content improvement?

Evaluation of Teaching Materials

To increase interest and to reinforce learning, university lecturers should make use of a wide range of teaching materials such as textbooks, filmstrips, slides, pre−recorded tapes, charts, maps, diagrams, self−instructional books, journal articles, high quality papers, pictures and real objects. For a detailed discussion of instructional media, see Chapter 6.

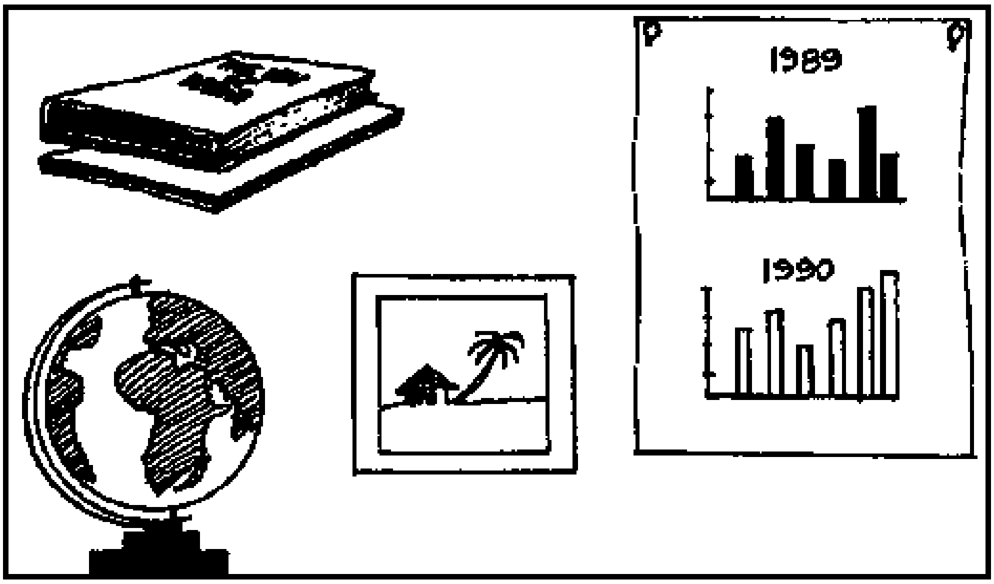


Figure 7.6 Which of these materials would enhance your teaching?

Since universities are more specialized than secondary schools and non−university colleges, they are expected to buy, develop and use a wider range of teaching materials. Our students' tendency to depend on lecture notes and avoid using the libraries, lack of interest in buying books or building personal libraries may be partly due to the lecturers' style of teaching. Dictation encourages students to copy lecturers' notes word for word, and to regurgitate them in term papers, mid−course tests and final examinations. Heads of departments should shoulder the blame for not encouraging the use of innovative teaching approaches which involve a wide variety of teaching materials. You, therefore, need to evaluate the materials themselves as well as their use.

Sources of Information for Evaluating Teaching Materials

Evaluation of teaching materials should generate the following information from lecturers, students and specialists in the use of teaching media:

- the variety of teaching materials used;
- suitability of the materials;
- frequency of use of different teaching materials;
- cost of materials;
- effectiveness (how much they are liked and used to improve teaching).

Methods and Instruments for Evaluating Teaching Materials

You can use the following methods and tools to elicit information on the quality of teaching materials and on how effectively they are utilized:

- reviews by media specialists and subject specialists;
- reviews of catalogues of materials in the department or university teaching resources bank';
- interviewing colleagues on availability and suitability of existing materials;
- obtaining feedback from students.

Evaluation of Teaching Methods

University teaching tends to be inferior to the kind of teaching that goes on in secondary schools not because lecturers are not trained teachers, as is often claimed, but because their training is informal and poorly organized. One becomes a university lecturer by observing peers and senior colleagues teaching, reconstructing experiences observed in class as a student, intuition and sheer trial and error.

You must have noted that teaching at university level tends to be plain and monotonous when compared to what goes on in schools. The lecture method is used even in situations where student−centred methods would be more appropriate. Universities with teacher training programmes and management training programmes have lecturers who have specialized in teaching methods, but they are usually not used at all outside their own departments.

With the growing size of classes in African universities, teaching methods need to be modified to make the learning process richer and more interesting. As stated, diversification of methods goes hand−in−hand with the diversification of materials.

Think about your own teaching methods. Do you use mainly lectures? How could you introduce more variety into your teaching? Perhaps you need to evaluate your teaching methods to achieve better results. Read more about this in Chapter 5.

Sources of Evaluation Information for Teaching Methods

The main sources of information on teaching methods are subject, teaching methods and management training specialists and, of course, your students. The objective in varying teaching methods is to satisfy the learning needs of your students. You should, therefore, also take into account their feelings on the use of different teaching methods.

Methods and Instruments for Evaluating Teaching

The following evaluation methods and instruments are likely to elicit the most important information you require to evaluate teaching methods.

- ☐ Expert judgement: subject specialists, teacher trainers and management trainers can give suggestions on teaching methods either as position papers or as commentaries on existing methods.
- ☐ Observation: where appropriate, you can observe your colleagues teaching (with their permission).
- ☐ Questionnaires: to elicit more detailed information from colleagues and students without them having to identify themselves.
- ☐ Interviews: to find out if your teaching methods are appropriate.

Course Monitoring and Quality Control

After a course has passed through all the university decision−making committees and boards successfully and has been implemented, it has to be inspected and updated regularly to maintain the required academic standards.

Here is one example to illustrate the importance of developing respectable academic standards. The author visited Sokoine University of Agriculture in 1990 and was intrigued to find that lecturers there were disappointed that Egerton College in Kenya had been elevated to a degree−awarding institution. They were worried that the diploma courses for which Egerton College was respected throughout Sub−Saharan Africa would now be neglected. Apparently, the agriculturalists educated at Egerton College had distinguished themselves as extension workers in many African countries.

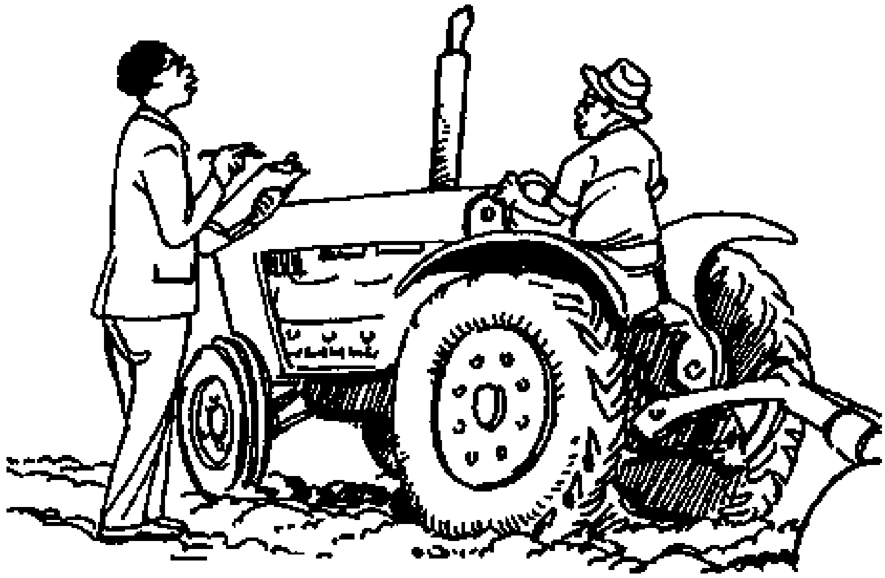
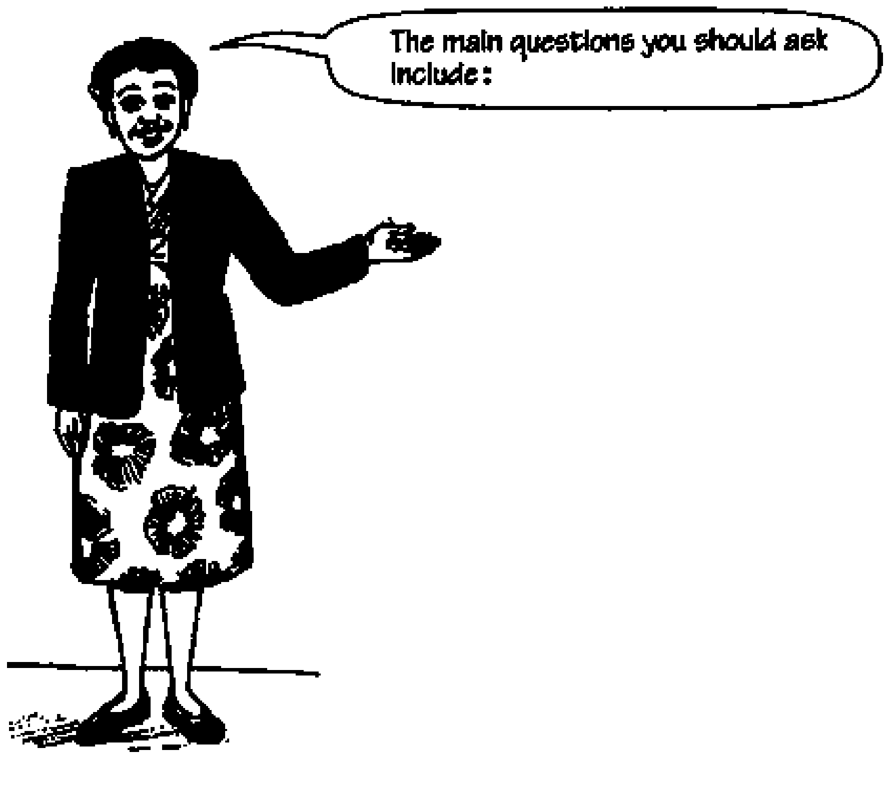


Figure 7.7 Are we preparing university graduates with appropriate professional diplomas or degrees of a high standard ?

With the increasing number of university graduates in Africa and the simultaneous decline in employment opportunities, employers will begin to look more closely at the abilities of graduates of different universities. Agriculturalists, engineers, medical doctors, school teachers and other professionals from institutions which are known to have high standards will have advantage over their colleagues from universities with mediocre programmes. Graduates with non−professional degrees will face even more difficulties.

We are suggesting that in the absence of external inspectors or assessments to influence university educational standards, the lecturers themselves should shoulder this responsibility. A university or a teaching department which does not institute measures for monitoring and maintaining high standards is bound to lose credibility in the long run.

What does course monitoring involve?



- ☐ Are subject objectives being met?
- ☐ Is the course relevant to the needs of students and employers?

- ☐ Are there gaps in the topics covered?
- ☐ Is course content up–to–date?
- ☐ Is the material covered suitable and adequate for this level?
- ☐ Is there any evidence of course deterioration, or does student performance show unexpected variations?

Sources of Information for Monitoring and Quality Control

Course monitoring has two main sources of information: the lecturers who teach the course and their students. Relatively less important sources which you could tap are former students, employers of the graduates, external examiners, subject specialists and researchers in the area of study.

Methods and Instruments for Monitoring and Quality Control

A number of course monitoring instruments exist in most university teaching departments although they may not be effectively used to monitor the teaching functions. Most university courses start off with a teaching–learning guide, the course outline. This gives details of the order of the different topics, the time allotted to each, and what learning activities will take place.

All you need to do in order to turn the course outline into an effective monitoring instrument is to add a blank column to it in which running comments on how the course is conducted can be entered. Then fill in this column after every lecture, tutorial or practical answering such questions as:

- ☐ Did the material planned for a lecture or any other learning activity fit into the time slot provided?
- ☐ Did all planned activities fit into the course schedule?
- ☐ Were all teaching resources available?
- ☐ Have all out–of–class activities been done on schedule?
- ☐ What are the students' responses to the teaching?

Another instrument you could try is what the extra–mural fraternity refer to as the 'work–done–record'. This describes briefly what has happened at every teaching session, as well as any additional activities between formal classes such as set readings and individual assignments. Moments of crisis can be remembered even one year after the event, but one cannot recall all the details of what happened at each teaching session. We, therefore, strongly recommend that you develop your own work–done–record and fill it in immediately after each teaching activity. Here is an example of a work–done–record.

DATE	TOPICS	REMARKS
REFERENCE BOOKS	1	
	2	
	3	

Figure 7.8 Modified Work–done–record

Other methods of course monitoring include:

- questionnaires and interviews regularly administered to students;
- inspection of student performance in tests;
- taking stock of the teaching materials available;
- noting students' reactions to different content areas.

Which approach would you choose if you were to propagate a machinery for regular review and renewal of courses in your university? Write an outline to prepare for discussions within your department or faculty.

This part of the chapter has attempted to define course evaluation and to examine five aspects:

- course design;
- course outlines;
- teaching and learning methods;
- course monitoring and quality control.

For each of these critical evaluation points, we have indicated the kind of information you should look for, the main sources of such information and the methods and instruments you are likely to use to elicit information.

PART 2: STUDENT EVALUATION

In order to find out whether you have achieved your course objectives, you will have to evaluate the performance of your students. This can be done through testing.

Purpose of Testing

Testing is used in this chapter to cover all assessments used to determine knowledge, ability, competence and experience in and outside the formal learning settings. Within university circles, testing refers to a broad variety of assessments. These range from informal questioning of students during lectures and tutorials to formal assessment such as quizzes, term papers, mid−term papers, practical work, continuous assessment tests, project work, terminal examinations and social research items used to assess skills, knowledge, attitudes and experiences. Formal, end−term examinations also fall within the scope of this broad definition of testing.

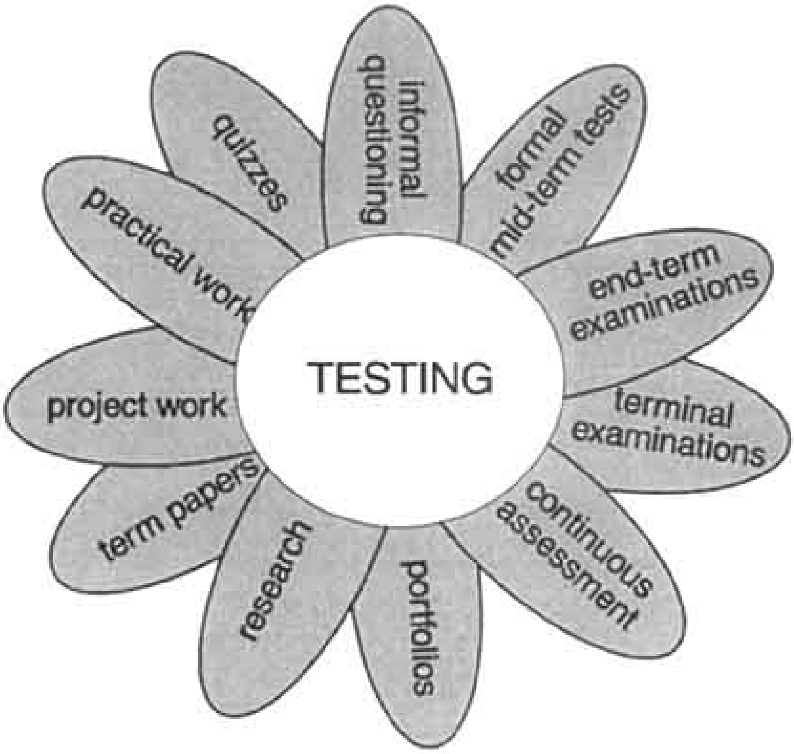


Figure 7.9 Testing includes a broad range of assessments

We have combined student testing and curriculum or course review in one chapter because they are both intended to measure the worth of education. We have already shown in Part 1 that students are an important source of course evaluation information. Student scores tell us as much about student achievement and ability as they do about the quality of the course outline and the process of teaching. In addition to the normal achievement and ability tests intended to select and grade students, you can design your own tests to assess the quality of your courses and teaching.

University Testing

University examinations go back in history to the Middle Ages in Europe. With time, the form of tests employed, both at university and school level, has become more sophisticated. In the recent past, we have seen a gradual move away from exclusive reliance on terminal examinations to greater use of continuous assessment, special projects, research papers, portfolios of materials collected or work done during the course, along with terminal examinations.

In schools and universities, testing is the main 'accounting' procedure. Lecturers who lack knowledge about measurement are, therefore, at a decided disadvantage when tackling today's educational problems. Since most university lecturers in African countries, and indeed in the whole world, are not test experts, their tests often miss the mark. In other words, they often convince themselves that their tests or examinations are valid and reliable in assessing students while, in fact, the tests may assess the course, the teachers and other things more than the students. Or they may not be assessing anything accurately.

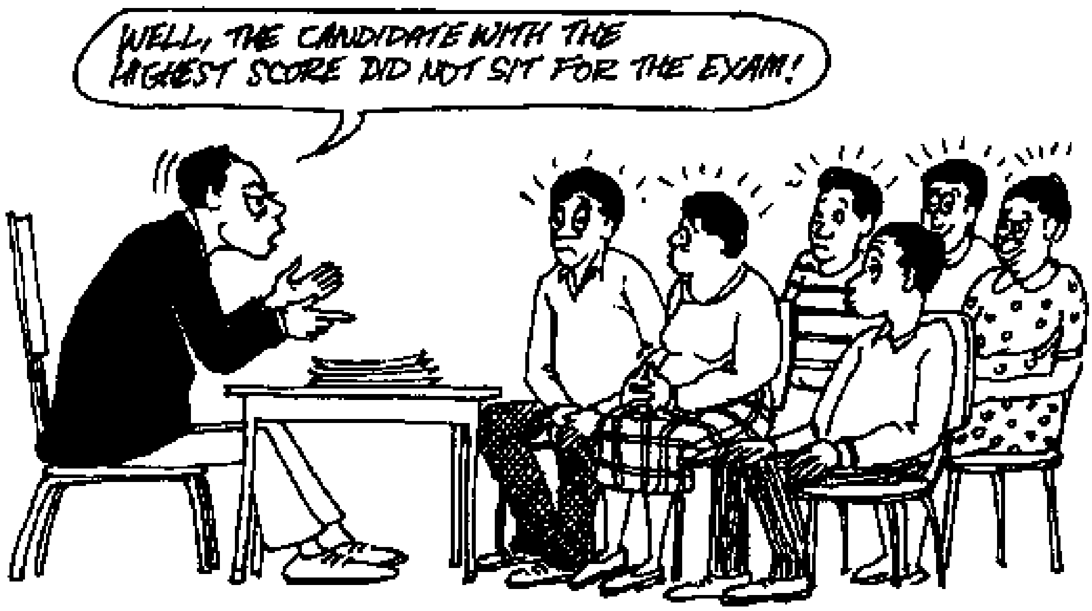


Figure 7.10 How valid and reliable are the scores of this exam?

Different areas of learning, human development and work require special educational measurement procedures, and different groups of people require educational accounting modes which are appropriate to their needs, abilities and experiences. Ideally, all educators should be specialists in educational measurement, but in practice the number of educators that are proficient in testing is negligible. Even school teachers, who spend two or more years learning the art of teaching, do not get sufficiently grounded in testing, partly because the field is too vast to cover in a few lectures, partly because it is not fully developed.

Like most university lecturers and professors, you are probably not a test expert. However, you can greatly improve your testing competence through individual reading, staff seminars and practice. University teaching and learning units also offer invaluable opportunities to refine one's testing techniques through well conducted examination moderating meetings. These, however, can only develop one's skills if they are held in a friendly atmosphere, focussing on assisting colleagues to clarify the wording and general presentation of their test items so as to get as close as possible to measuring students' ability and achievements. Examination moderating which degenerates into confrontation or focusses on pointing out rather than correcting weaknesses does not help one to grow professionally.

1. What are the examination moderation procedures in your university? How helpful do you think they a re? What kind of improvement would you suggest?

2. Do you agree that educational testing is under−developed? What can be done about it?

What Do Tests Show?

Tests enable institutions to make better decisions when judging, classifying and selecting people. We should, however, note that some of the standardized tests which have been designed by the most knowledgeable test experts are by no means perfect. Some internationally used tests are said to be culturally biased and to give advantage to candidates with a strong background in English and Mathematics. If tests designed by the best men and women in the trade, and reviewed and revised by equally qualified test specialists, are far from perfect, our own test items, constructed by non−specialists, probably have even more weaknesses.

Some of the things which a test can measure are:

- students' ability to learn;
- recall of the subject matter (superficial understanding);
- depth of understanding of a subject;
- ability to apply what has been learnt;
- long−term use of the subject matter.

While it is justifiable at the end of a course to use test items intended to grade candidates in terms of ability and achievement, we should keep in mind the wider use of tests to promote learning. Test items for promoting learning will vary from casual oral questioning in a lecture or seminar to formal written tests and research papers.

Handling Test Scores at University Level

There is some magic attached to tests scores worldwide. Developing countries often treat such scores as if they were God−given. University examination boards, for instance, spend long hours debating what to do about candidates who have scored one or several points below the magic pass mark of, say, 40%. The solutions finally arrived at are often meaningless.

Suppose that an examination board or senate decides that candidates who have failed an examination with a score of 36% or above should be rescued, provided they have performed well in other subjects. On what grounds would their decision be justified? You should ask yourself:

1. What is the rationale for setting the new bottom line of 36% and not a little lower or higher?

2. Does performance in one subject justify a pass in a completely different subject?

3. Are grades of say, 36% and 50% by candidate A better than the 34% and 75% in corresponding subjects by candidate B?

4. Are there better ways of determining the final score of a candidate who has scored a low mark in one or more subjects?

5. Can the phenomenon of sudden unexpected failure be avoided?

One of the main weaknesses of current procedures for grading university graduates is that test scores are not processed beyond percentages. In Kenya, the exception is Egerton University, which has adopted the Grade Point Average (G.P.A.) widely used in the United States of America. The G.P.A. is a cumulative score which takes account of varied activities and tests spread through the course. The strength of G.P.A. lies in the ability of lecturers to assign accurate weighting to the different assessments fed into the system, and basing the assessment of an individual on a large number of varied tests covering different areas of the content and different stages of development.

Accounting for educational inputs, processes and outputs is far from perfect. The juggling with scores by university examination boards, and the political pressure put on teaching departments or examination boards to raise or lower examination scores support our assertion that there is as yet no foolproof procedure for assessing human ability and achievement. Our tests and examinations are crude estimations of what we Intend to assess, and therefore, any effort made to improve on our testing procedures benefits the lecturer, the student being tested, and the institution.

Assessing Student Performance

You must have noted that university testing is built around essay type questions, with little variation In the content and wording. Most test questions are built around a limited number of key words such as 'describe', 'explain', 'discuss' and 'analyse'. Over a period of time, the student becomes familiar with all possible questions on a topic, and, therefore, develops model answers for the few test options available in the area of study. In the long run, mastery of answering the test options in a given area becomes the focus of learning. As a result of focussing sharply on the examinable area, vital details of the subject matter, which do not feature in the limited examinable areas, tend to be eroded or are not treated with the seriousness they deserve.

Figure 7.11 We need to have a clear idea on how best to assess our students

Equally important in the existing testing system is the weakness of giving undue advantage to students who can handle essay topics, while failing to test their understanding of details. A student with sophisticated language skills performs with distinction, while those who have internalized details of the subject but do not have the language to explain them are permanently disadvantaged. As an alternative to the essay type test, we wish to suggest that short answer test items:

- ☐ allow a wider range of test techniques and possibilities;
- ☐ provide more thorough coverage of the syllabus;
- ☐ encourage testing of varied abilities in students;
- ☐ give opportunities for detailed, accurate and precise feedback to students;
- ☐ discourage students from concentrating their efforts on selected areas which are thought to be 'examinable'.

To what extent are the short item tests suited to your courses?

We believe the essay test has its place in terminal examinations as does the term paper but that they should not be seen as the only testing tools available to the university lecturer. Due to lack of space, it is not possible for us to give detailed descriptions of the wealth of test options available to educators. We recommend Cross and Angelo (1988) and other assessment manuals if you wish to go deeper into quality assessment. – There are valuable hints in the papers submitted by S. Bali and Ayele Meshesha to the DSE Workshop in Witzenhausen and Berlin. See Matiru (1991), pages 156 to 192.

A study of the conditions under which students learn best both inside and outside the classroom (Light, 1990) revealed that students appreciated and respected courses in which they received immediate and detailed feedback on both oral and written work, along with opportunities to revise and improve. You are likely to give immediate, frequent and detailed feedback if you rely more on short answer test items than essay type items.

Figure 7.12 How soon are students likely to get feedback on these essays?

Short answer tests are easier to adapt for scoring by computer, opening up the possibility of your giving feedback to a large class of 500 students or more within a week or less. During the current period of rapid university expansion in Africa, the use of computers in testing and teaching should be explored more exhaustively. The university computer departments or institutes should aggressively expose their resources, possibilities and potentials to the teaching departments, while the latter should open up their teaching to the use of computer technology. We believe that even lecturers in fields like literature and other arts may find computer use very enriching. Like any innovation, computers in teaching are likely to be embraced by progressive departments while the laggards will take years resisting them.

Higher education institutions in developing countries have tended to associate a short answer test item with a simple test, suitable for the elementary levels of the formal education system. Many university lecturers do not approve of the use of short answer test items in certain subjects at secondary school and often blame any learning disabilities in their students on the use of short answer items. Such teachers would prefer exclusive use of narrative answers, especially in the humanities and artistic subjects at all levels. These feelings are based on the experiences which most lecturers have had through their high school and university careers.

Levels of Testing

The prevailing negative attitude to short answer tests in Africa is based on a distorted view or a lack of familiarity with the literature of the cognitive domain (levels of learning and understanding), first proposed by Bloom in 1956. Six levels of understanding and learning were identified in the cognitive domain which should be of interest to all educators, particularly to test specialists. You probably remember from Chapter 4 that they are knowledge, comprehension, application, analysis, synthesis and evaluation.

Of what use is Bloom’s taxonomy of educational objectives to a university lecturer?

We have mentioned the cognitive domain because of its relevance to assessing academic skills and intellectual development. If you wish to pursue Bloom's ideas, you will find that we have left out two other domains that feature in his taxonomy: the effective domain of attitudes, values, interests and feelings, and the psychomotor domain of physical skills. These were also discussed in Chapter 4. Chapter 3 deals with some of these aspects with reference to student learning.

According to Bloom, an educator should carefully think about what levels of testing will suit the educational content at hand. Some of your subject matter can be tested by simple recall or recognition of facts using questions such as:

What is the name of X?

When did Y happen?

Whose name is associated with Z?

At the level of application, the educator requires the student to relate two things: an idea, theory or method, and a concrete situation. In mathematics, for example, this may involve the use of a formula to solve a specific calculation. In other fields, it will involve explanations of phenomena in terms of theories or principles already learnt like the principles involved in reflection of objects from a shiny surface (Physics), a plant taking in water from the soil (Biology), or prices falling with increased production of goods and services (Economics).

The examples presented should indicate how you can design both short answer test items and essay type test items to assess different levels of understanding. Bloom's taxonomy is not only an essential tool for internal examiners but also an invaluable method of evaluating the structure of examination papers for external examiners. It will assist you as an external examiner to identify what levels of understanding an examination paper addresses.

A more recent categorization of intellectual abilities designed for post−secondary education and proposed in 1989 by the New Jersey Student Learning Sub−Committee, identified three proficiencies which a test should attempt to address.

> *Getting information:* which means understanding and internalizing other people's works − books, lectures, theories, arguments, works of art or musical compositions.
>
> *Manipulating information:* which means evaluating information, for example, synthesizing, ordering or recording information presented by others.
>
> *Presenting information:* which means expressing one's own ideas orally, in writing or in graphic form.

A third classification, developed by a conference organized jointly by the U.S. National Institute of Education and the Learning Research and Development Centre of the University of Pittsburgh in 1985, presented three high−level cognitive skills.

> *Knowledge acquisition.* This means knowing when you know, knowing what you need to know and knowing the utility of taking steps to change your state of knowledge.
>
> *Problem solving.* This means analysing the problem, searching for related knowledge, planning possible attempts at solutions, keeping track of progress and checking results against both overall and immediate goals.
>
> *Intelligence and reasoning.* This involves approaching tasks in an organized, non−impulsive fashion and drawing simple logical conclusions.

In 1986, The National Centre of Research to Improve Post−secondary Teaching and Learning, University of Michigan, proposed a cognitive structure with three elements.

> *Knowledge structure.* This is the study of both the structure of the subject and the student's internal representation of this structure. The student's cognitive structure is assessed indirectly byword association, card sorting, ordered−tree techniques and interviews or directly by concept mapping, concept structuring and similar techniques.

Learning strategies. These outline how students acquire and modify their knowledge base under three categories:

- cognitive, which refers to student learning or 'decoding' of material as well as strategies to facilitate retrieval of information;
- metacognitive, which relates to planning, regulating, monitoring and modifying cognitive processes;
- resource management, which refers to strategies concerned with the student's control of resources such as time, effort and outside support.

Thinking and problem solving. This involves critical thinking, problem solving and reasoning.

You probably do not need all the detail into which test experts are prepared to go. However, it is important to be aware of the depth of thinking and research that is going on in the field of testing. Knowledge of recent contributions to thinking about testing will equip you to guide and assess the intellectual growth of your students better. Using the ideas presented here, you have a chance to evolve your own testing strategies which might ultimately help you and your colleagues in and outside your discipline.

Item Construction

When designing and constructing test items, we suggest that you:

- define the content area to be tested;
- state the objectives of the test;
- define the knowledge and skills to be tested;
- clarify the levels of understanding to be tested;
- select the test tools to be employed;
- use enough items to maximize the reliability of the test;
- decide on the length of the test;
- keep each item, or cluster of items, complete, independent and unified;
- arrange the items in logical sequence;
- provide appropriate weighting for the items;
- use formal language and correct grammar;
- give specific and complete directions.

In addition, you should:

- avoid using difficult language;
- avoid testing unimportant and trivial details;
- avoid using vague qualitative terms such as 'few', 'much', 'seldom' and 'most';
- avoid using absolute terms such as 'always', 'never', and 'all';
- avoid construction of questions that do not have a clear answer, such as double barreled questions which elicit two answers;

- [ ] avoid testing subject matter that was not taught.

Theses lists of DOs and DONT's are by no means exhaustive. Every time you set tests, you will come across many more new experiences of what to do and what not to do. Look at one of your recent test or exam papers and see how closely it follows the suggestion made in theses lists.

Construction Procedures

First, you should assemble all instructional materials, complete with trial exercises and teaching aids such as diagrams, charts, maps, handouts and other illustrations. Do not assume that you know the course content inside out, and that you do not require reference materials when setting tests. You are likely to work faster and more accurately if you systematically inspect the subject matter to be tested and the instructional materials to be used.

Universities normally require lecturers to set end−of−course examinations at the beginning of the semester, or even before the course starts, to allow time for moderation of the test, or evaluation by external examiners well before the terminal examination period. If examinations are set before the teaching takes place, the latter does not influence the setting, although it can equally be argued strongly that if the setting is done in advance, the lecturers may be tempted to teach around the examination questions in order to impress the external examiners and the university.

We support the setting of examinations before the teaching starts as part of the overall preparation of the lecturer's input into the learning system. To avoid leakage, all such examination papers should be set in private and then stored safely.

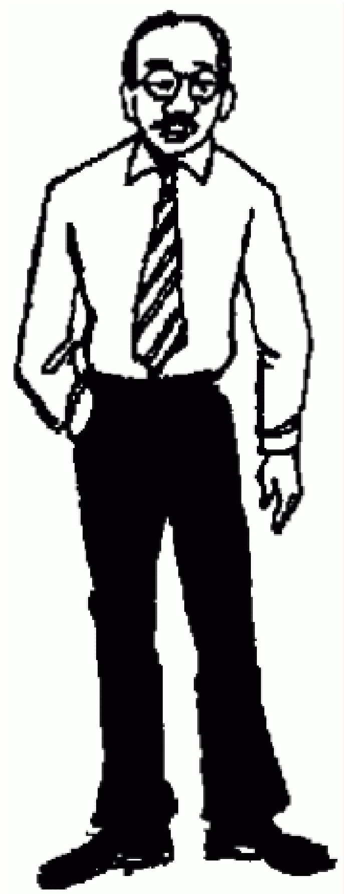
Figure 7.13 Set your examination papers away from the prying eyes of students

We further suggest that other tests such as term papers, continuous assessments, projects, fieldwork and library research should all be set alongside the terminal examinations to ensure even coverage of the whole content area.

Second, you should write down the objectives of the test precisely and in as much detail as possible. Objectives of the test will not appear on the examination paper, but they are intended to assist you to formulate test items that address the purposes of the test accurately. You will find that the objectives of a terminal test will differ from those of continuous assessment tests, term papers, projects, research and fieldwork. For example, objectives of a terminal test are likely to focus on the understanding and application of what has been taught, while objectives of fieldwork, project work, and research will tend to focus on assisting students to explore new ground on their own.

Sound course objectives will assist you to generate test objectives which address the correct outcomes of the inputs and processes of learning. But course objectives are much broader than test objectives and you should keep a clear distinction between the two.

Third, you should make a draft of the test paper or examination, noting the following questions:



- ☐ What test items will best measure the characteristics you are looking for?
- ☐ How much time will students require to complete the test?
- ☐ What choices should students have?
- ☐ Will all materials required for the test, such as specimens, work sheets and calculators, be available?
- ☐ Will students be exposed to all the subject matter to be covered by the test?
- ☐ How should the scoring be done?

Finally, the draft test should undergo a period of review and reflection to ascertain that it conforms to the test guidelines stated above and can shed light on the student characteristics which we wish to measure. As part of this reflection, the examiner should write out an answer to each test so as (a) to ascertain that the test questions are answerable and (b) to decide on the weighting of the responses and to take decisions on scoring, that is, making a marking scheme.

Types of Tests

In our discussion of test types, we shall cover oral tests, written tests and practical assessment. We are not going to include opinion scales and other tests which are frequently used in research questionnaires and interviews but are not normally used in assessing cognitive skills.

Oral Tests

There are two types of oral tests. One is casual questioning used to jog students' minds to recall previous learning and other experiences so as to relate them to current learning activities. The other one is formal interviews used to assess individuals for awards of qualification such as a diploma, award of benefits in a job, qualification for a scholarship or a loan, and placement. Casual questioning requires little preparation. Experienced lecturers can spontaneously ask questions as easily as they can crack jokes. New lecturers should not, however, take the risk of going into class without prior preparation of the questions to pose to reinforce learning and to make the lecture lively. You should write down the questions to make sure that you do not forget them.

For formal oral examinations or interviews, you must prepare, write down and rehearse the main questions to be put to the students to ensure systematic questioning and coverage of the whole content area. A test on anatomy, for example, might be planned as shown in Figure 7.14.

DOMAINS	LEVELS OF TESTING			
	Recall Recognition	**Comprehension**	**Analysis & Synthesis**	**Application**
Parts of the body				
Body tissues				
Internal organs				
Bones				
Digestive system				
Blood system				
Nervous system				

Figure 7.14 Example of planning a formal interview for anatomy students

We shall now describe the levels of testing shown in the diagram. They correspond to the cognitive levels proposed by Bloom.

Written Tests

Written tests include true or false items, matching items, lists, labels, arranging items, multiple−choice questions, analogies, short answer questions and essays.

True or False and Matching Items

The lowest level of knowledge is tested by presenting students with information which they should identify. One way to identify the information is to state whether it is true or false. Students may also identify items in lists matching them as instructed.

An experienced lecturer should have no difficulty in designing true−false tests. For a new lecturer, true−false tests should be derived from course textbooks and other reference materials. Such tests can show how well a student has read and understood the course material. The item can be a phrase or a sentence, either constructed by the examiner to summarize an area of the content or quoted directly from course materials.

Matching exercises take many forms depending on the content being tested. The student must be given clear instructions on the relationships to look for in matching items. Some of the common positive relationships tested are:

- similarity in meaning;
- items that exist within the same system;
- objects that have identical functions;
- complementary objects or processes.

Some content areas offer opportunities for negative relationships emphasizing differences.

Items which have to be matched are presented in two lists which can be varied to avoid repetition. For example, one can use two lists of words or phrases, incomplete sentences which should be completed with a word or phrase selected from a list, or a cluster of similar concepts. The test should normally be made more difficult by having an extra item in one list which is left over after the matching is completed.

Completing Sentences, Making Lists, Labelling, Arranging Items

A slightly higher level of knowledge than recognition is the ability to remember factual information. Simple ways of testing recall are:

- completing sentences by filling in missing words and phrases;
- making lists of characteristics or processes associated with given phenomena;
- labelling diagrams, pictures, graphs and other illustrations;
- arranging items such as technical words in a required order.

A recall test should be based on standard textbooks and other course materials rather than on the lecturer's notes. The latter encourages rote learning and regurgitating the notes. You should reduce the possibilities of students scoring well or badly because they happen to have read, or fail to have read, certain texts. This can be done by giving detailed guidelines to students at the beginning of the course on the texts which may form the basis for tests, in other words the compulsory reading texts.

Multiple−choice Questions and Analysis

Comprehension is a level of knowledge that goes beyond simple recognition and recall. The learner is able to break down knowledge into smaller units, interrelate its component parts, relate the whole to previous learning experiences and apply it to learning as well as problem solving. One item used to test comprehension is multiple−choice questions, where the student is able to select a correct response from several similar alternatives. You may also use analogy, where the student is required to reason and show a relationship between parallel cases. Under comprehension we include Bloom's analysis, synthesis and application.

Short Answer Questions

A short answer item requires a brief narrative response varying from a few sentences to a page or two. The student is given precise instructions on how long the short answer should be. The length of the expected answer is expressed either in terms of the:

- number of words;
- number of sentences;
- fraction of the page;
- number of pages;
- time to be spent on it.

The student must know that there is no advantage in turning a short answer into a long essay. If part of the test is to assess the student's ability to write briefly and precisely, then a long answer should be penalized for failure to follow instructions, and for using too many words to convey a message that could be expressed in fewer words. A short answer question enables the examiner to assess many parts of a course and to use different types of questions while at the same time giving the student greater flexibility and choice. And like an essay, the short answer question assesses the student's ability to express his or her ideas coherently.

Essay Questions

The essay, in its various forms, is the most common item for assessing university students. It provides an opportunity to demonstrate ability to organize ideas and to express them freely. But it has many limitations. The examiner is confined to very few testing items and, it is difficult to make objective and reliable judgements of essays which often present different points expressed in different ways. In addition, either a very small area of the content tends to be covered or the items are so general that they do not address essential details. Essays also take excessively long to grade.

However, the purpose of this section is not to discredit any method of assessment but to encourage the use of a variety of test items. While the essay item is the easiest to set, we are suggesting that it is imprecise in enabling the examiner to sample the student's knowledge, achievement and ability accurately, and to make precise and objective judgements on performance. Some of these weaknesses may be overcome by preparing a detailed marking scheme.

Practical Assessment

In professional training, as well as in such courses as science, music and art, practical assessment is an essential component in evaluating the students' achievements. It may be carried out in a working environment or under examination conditions. A practical examination is a test procedure in which the student performs the skills to be evaluated in a natural or carefully planned simulated setting. Measurements may be obtained by observing the performance itself and/or products of the performance.

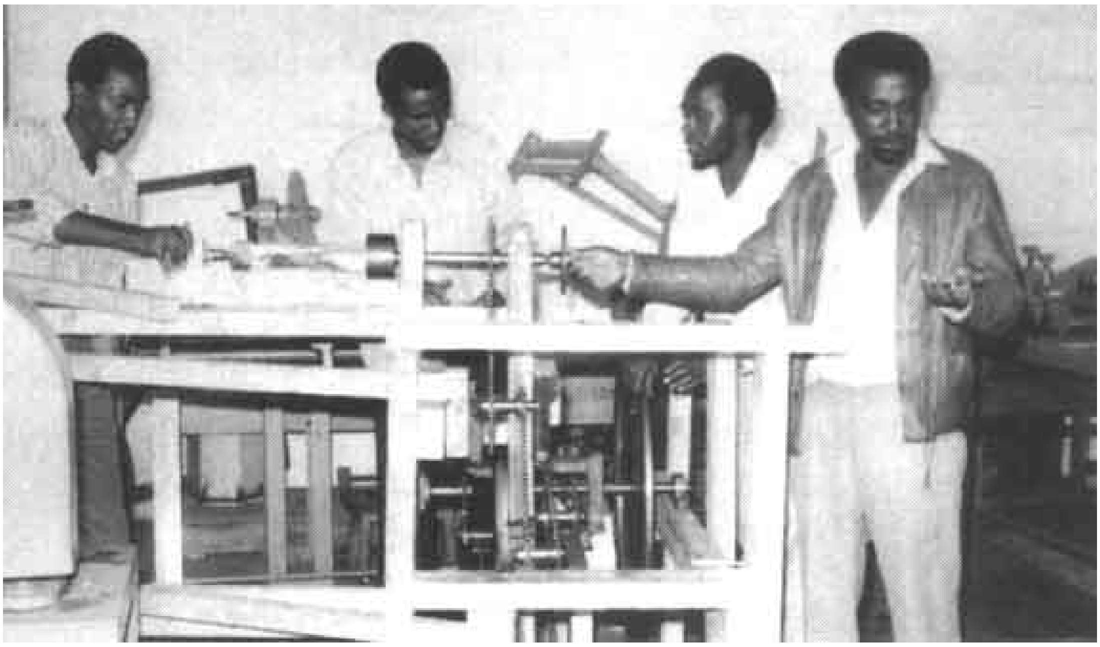


Figure 7.15 Assessing students' practical work is an important aspect of any professional training

Practical assessment provides opportunities to test, in a realistic setting, skills involving all the senses while the examiner observes and checks performance. Students may have to deal with unexpected problems they have not met before, either in the laboratory or in the field. Practical activities may also test attitudes and responsiveness to total situations as well as the ability to communicate under pressure. The student is required to relate ideas, theories and methods to concrete tasks.

What should you consider when preparing a practical examination? Take into account:	
☐ the task;	☐ investigative or creative ability
☐ the steps to be followed	☐ standards
☐ Level of skills.	

The most common methods and instruments in this type of evaluation are observation schedules and check lists or a combination of the two. These may be used to assess such students who are to enter professions as teachers, doctors or social workers by analysing the task they perform and assessing their attitudes or skills. Examiners will also check whether science, art or architecture students have followed correct procedures and produced an item of the required standard.

Here is an example of a practical assessment instrument. You may use it as it is or adapt it for your own purposes.

MAJOR CATEGORIES OF ASSESSMENT	SUB–SECTIONS OF EACH CATEGORY
1 Approach to task	☐ Consideration of local conditions
	☐ Initiative
	☐ Ability to give and receive instructions
2 Handling equipment	☐ Overcoming difficulties

	☐ Thoroughness
	☐ Accuracy
3 Recording of observations	☐ Legibility of recordings
	☐ Checking on processes
4 Translation of data	Calculations
5 Overall assessment	Outstanding ability 10 + ☐
	Above average 8–10 ☐
	Average ability 5–7 ☐
	Below average 1 – 4 ☐
	No ability 0 ☐

Remember that some students become so nervous during their practical tests that they may even break equipment. As a result, they fail to get the expected results.

What would you do if this happens while you are assessing a student?

In some situations you may prepare an interview schedule with guiding questions to help you interview other specialists working closely with the students at their stations. This will give you another perspective on their performance.

CONCLUSION

This chapter has attempted to highlight course evaluation, an area which is often taken for granted or completely neglected. It has been suggested that university courses are in danger of decaying and falling out of step with the needs of society because of the lack of evaluation.

The chapter has described the process of systematic course evaluation and indicated important stages when evaluation should be undertaken. During the entire period of a course, evaluation should be an on–going process and it is your responsibility to ensure it takes place, using information from as many sources as possible. Our opinion is that university lecturers rarely consult their former students, non–university practitioners, psychologists, professional trainers, educational planners and other educationists in designing their courses. There is too much reliance on the small closed circle of colleagues in the same discipline. We hope that this assertion is wrong. However, we wish to encourage more frequent programme inspection with input from the wider community which employs and uses university graduates.

We feel that tests are sometimes narrowly conceived and occasionally abused. We have advocated the use of testing to promote learning by giving frequent and accurate feedback to students.

Most African universities are growing faster than available re– sources. Lecturers, overwhelmed by large numbers of students, must develop strategies to teach effectively in spite of this. We have suggested that the short answer test item, if possible scored by computer, is part of the answer to maintaining high standards in the face of ever increasing student numbers.

However, the short item test is not seen as an emergency measure but a step forward in giving quality education. It enables the educator to use different methods and items of assessment to delve deeply into many content areas and to assess students more objectively.

Finally, we have said that both course evaluation and student evaluation are underdeveloped. We need to have a clearer idea of what good education is, and how best to assess our students. Therefore, in addition to research in your field, you should also be taking a greater interest in analysing the educational needs of your students.

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CHAPTER 8 – RESEARCH AND PUBLICATIONS

Godfrey Muriuki

OVERVIEW

In this chapter, we shall discuss:

- the meaning of research;
- research design;
- research methodology and techniques;
- data analysis;
- ethics and protocol in

research;
• application of research findings;
• research supervision;
• dissemination of research findings.

INTRODUCTION

In many countries, universities are considered to be a valuable asset. Besides training high–level manpower, they are expected to organize and manage knowledge. This is clearly spelt out in the various university acts. Here, we can do no better than quote the University of Nairobi Act of 1985 which defines the functions and objectives of that university as being, among other things, to participate in discovery, transmission and preservation of knowledge and to stimulate the intellectual and cultural development of Kenya'. From this perspective, universities are seen as instruments of development in that, through research, they provide a body of fundamental knowledge which assists in the attempt to seek answers to the myriad pressing national problems. Undoubtedly, fundamental knowledge is the key to technological development. Conversely, an inadequate stock of knowledge stymies attempts to find solutions to such problems.

Figure 8.1 Besides training high level manpower, universities are expected to organize and manage knowledge

In the African context, universities are probably the only viable institutions which can provide inventive development ideas and knowledge. As think–tanks, they can offer practical answers to assist African countries to achieve their economic, educational, cultural and social objectives. That is the theory: the practice is rather different.

In recent years, the public has been disenchanted by the quality of research being undertaken in universities and other institutions. You have probably heard or read about cases of research misconduct reported by the mass media in North America, Europe, Australia and, of course, Africa itself. Indeed, cases of plagiarism have even been reported from institutions that have hitherto been considered as citadels of academic excellence.

Turning to Africa, donor agency circles are replete with all manner of unflattering stories about the behaviour of African researchers. They are quite often accused, for example, of pocketing research cheques and promptly disappearing into thin air only to turn up with shoddy research results towards the end of their contract. On other occasions, they are accused of 'cooking' data or not even bothering to carry out any research work at all.

More often than not, policy makers seem to pay scant attention to research results from universities. They argue that these institutions provide irrelevant information and that even then it mostly arrives too late. Moreover, the information is also considered to be on many occasions biased, inaccurate and non–confirmable. Worse still, academics are accused of being too theoretical, insensitive to practical and political realities, and dismissive of the financial implications of their half-baked proposals. Is it a wonder, then, that policy makers are so skeptical of the contribution that can be made by academics?

Even at your own university, it is probable that all has not been plain sailing. For example, postgraduate students often feel that their supervisors are not effectively discharging their duties. They claim that these academics are cold, aloof and regard those they are supposed to guide as an unmitigated nuisance. In other words, they have no interest at all in their students, let alone their research topics. Consequently, supervisors provide little or no advice or practical assistance. Above all, it is said that they are hardly ever in their offices. Many take forever to read drafts submitted to them, and this is done in such a perfunctory manner as to make their comments of little value. Some supervisors lack research experience and, therefore, have no relevant skills or knowledge to impart to their students who, in turn, complete mediocre theses through no fault of their own. Worse still, some deliberately delay or prevent the timely completion of theses through such unbecoming tactics.

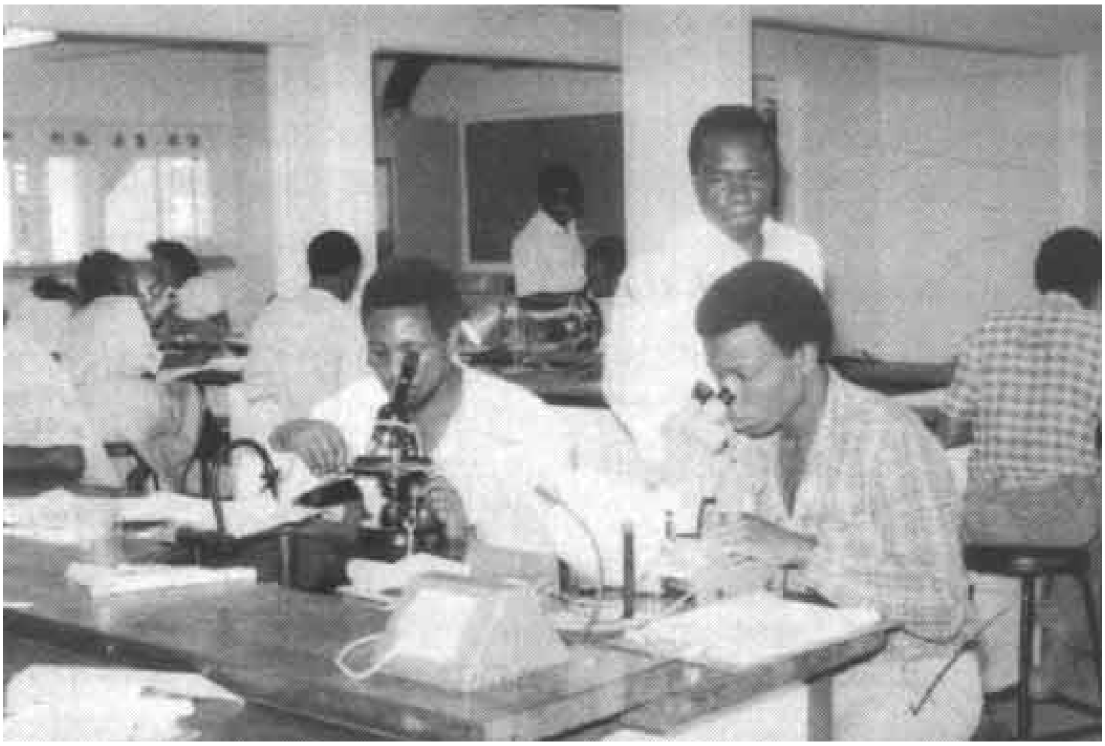


Figure 8.2 Do you provide adequate supervision to your research students?

However, you should not assume that this problem is confined to Africa alone. In Britain, for example, funding bodies have become considerably irritated by the apparent inability of postgraduate students to complete their studies in the stipulated time schedule. Their dissatisfaction has led them to make fresh scholarship awards to individual universities contingent upon a satisfactory rate of completion.

On the other side of the Atlantic Ocean, a related but different problem exists. In the United States, postgraduate students, particularly those In the Teaching Assistant category, complain of outright exploitation by their professors. They argue that they are deliberately overburdened with work so that their professors can have more free time for Individual research. Even worse, they contend that American professors are so preoccupied with their own research and preparation of publications that they have little interest in or time for teaching.

Yet, when all is said and done, research plays a pivotal role in universities. At the personal level, promotion is to a large extent dependent upon academic output. Hence the often quoted publish-or-perish rule. Nevertheless, research is by no means everybody's cup of tea. Some lecturers undergo the agony of conducting research only because it is required of them. Others are excruciatingly irritated by the formalities that accompany such projects.

But take heart. Albert Einstein did not impress his professors sufficiently enough to be appointed to an academic post. The poor man had to seek the solace of the drudgery of a civil service job in a Swiss patent office. You, of course, know who had the last laugh. Einstein was determined enough to pursue his scientific research interests to the eventual amazement of the scientific community that had cold-shouldered him. This chapter does not promise to turn you into an Einstein. It merely hopes to offer guidelines on how you can go about conducting your own research as well as effectively assisting your students in that endeavour. To do so, it will cover the salient features that you need to know in order to successfully perform your dual role of a researcher and supervisor. Of necessity, our coverage will be fairly brief, but we hope that this will act as an appetizer to entice you to embark on further reading.

MEANING OF RESEARCH

As a lecturer, you are expected to carry out your own research and assist students to do the same. Many of them will come to you without the foggiest idea about what they want to do. Indeed, they will expect you to suggest an area of study and even a suitable topic. It is important, therefore, that you should be equipped to deal with such a situation by fully understanding what research is all about.

What is research? A number of people define research with reference to a bespectacled, grey−haired, old man wearing a white coat and bending over a bench mixing foul−smelling chemicals in a dingy laboratory.

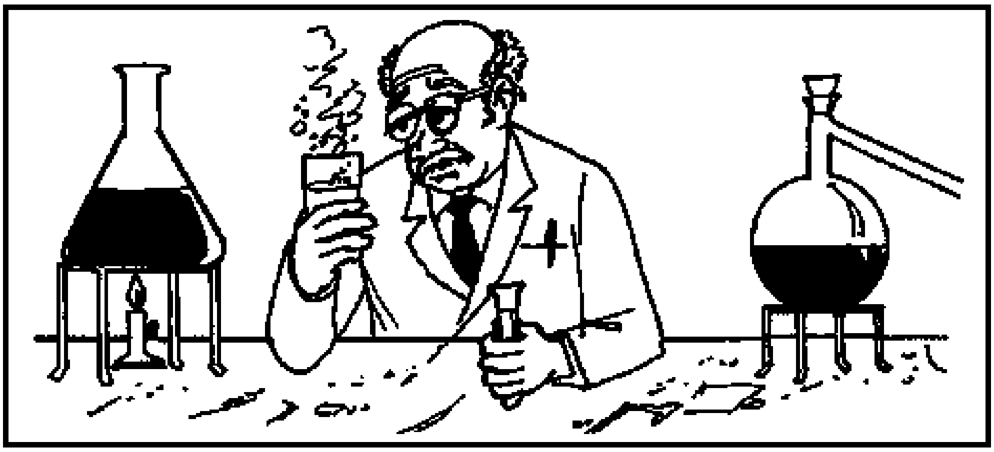


Figure 8.3 Is this your idea of research?

That perception has some elements of what constitutes research but it is not, thankfully, the total picture. Let us take a true−to−life situation. When the disease AIDS broke out in the United States, doctors had no clue at all what disease it was, what caused it or how to cure it. They were certain of only one thing: it seemed to attack the immune system of the victim. Given that situation, medical researchers set out to investigate the causes of the disease and to seek a cure. To date, a lot is known about this scourge because researchers have spent considerable resources in gathering information through observing patients and conducting experiments. Using this example, we can then take the word research to mean to investigate, repeatedly search or quest in an endeavour to discover answers to problems through reliance on empirical evidence. Note that empirical evidence is obtained through observation and experiments, both of which constitute the scientific method.

The term scientific method is here used in a special sense. It refers to the philosophy that is common to all research methods and techniques, irrespective of the branch of study. That is, its primary goal is the pursuit of truth as determined by logical considerations. In summary, research:

- relies on empirical evidence;
- utilizes relevant concepts;
- is committed to objectivity;
- adheres to ethical neutrality;
- describes the methodology used;
- aims at formulating theories.

You should note that, before you can gather empirical evidence, it is necessary to specify the purpose of the research. Some pertinent questions you should ask yourself are:

What exactly is to be studied?

What are the objectives of the study?

Is it worth studying?

Does it contribute to our general understanding of things?

In short, why am I doing this research?

Answers to these questions will provide a rationale for the study. It will indicate the value and purpose of the proposed research.

Research can be carried out with several objectives in mind. For example, as you walk down the streets of Nairobi, Harare or Kampala you may notice the presence of juvenile beggars, locally called 'parking boys', 'street kids' or 'bayaye'. This phenomenon may arouse your curiosity and make you want to find out more about them. Alternatively, you may wish to carry out a preliminary investigation to test the feasibility of undertaking a more detailed study at a later date. This type of investigation is called an *exploratory study.*

In Africa today, a major debate is going on about the desirability of multi−party politics. Imagine that one of your students is studying political science and is fascinated by the emotional outbursts exhibited by the protagonists. He is keen to understand how widespread the support for the introduction of multi−parties in the country is. To answer that question, it is necessary for him to carry out a survey either through interviewing people or asking them to complete a questionnaire. Such an exercise is called a *descriptive study.*

The case of AIDS, referred to earlier, provides us with the third purpose for research. We noted that medical researchers were baffled by the new disease which, for lack of a better term, they called AIDS. They carried out experiments with a view to determining or explaining its causes. This is what is called an *explanatory study.*

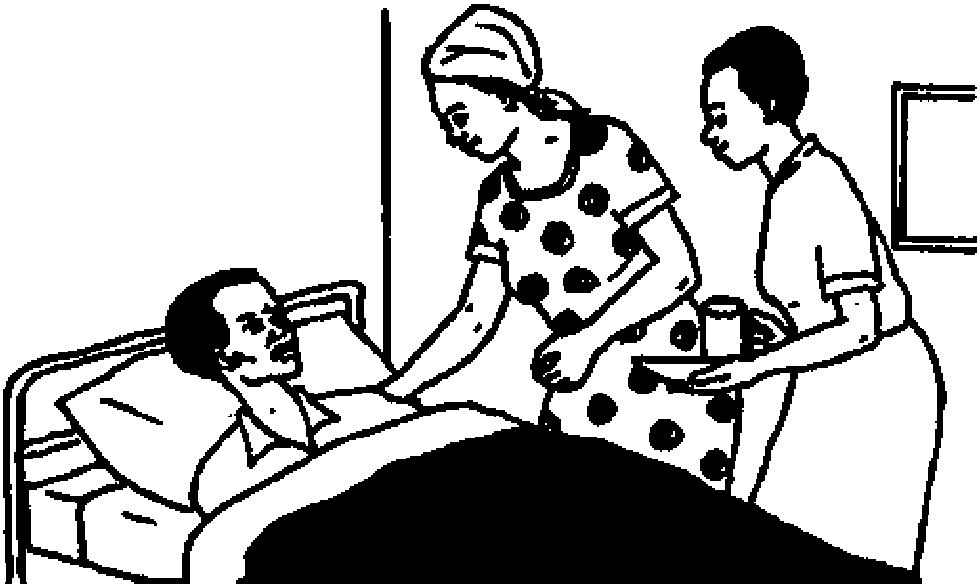


Figure 8.4 Medical experts are baffled by the disease they have called AIDS. Long−term research may find a cure.

Source: Kazungu and Njeru, 1990.

You should also be familiar with two other terms that are commonly used. Indeed, your attention might have been caught by the debate over whether African universities should emphasize basic or applied research. Basic research is fundamental or curiosity−oriented, and is carried out without any concern for immediate utility. It is undertaken for the sole purpose of adding to our general knowledge rather than being prompted by a desire to provide answers to a specific and practical problem. In contrast, applied research is conducted for the express purpose of its practical application. Usually, it is in response to a specific problem which requires a solution. The attempt to get a cure for AIDS is a case in point.

Nevertheless, the two types of research are by no means mutually exclusive. For example, advances in bacteriology took place only after lens grinders managed to manufacture better microscopes. More recently, transistors were invented by applied scientists. As you no doubt know, they have now become part and parcel of many laboratory components and devices. The spin−off is that advances in scientific instruments have facilitated further discoveries in both applied and pure scientific research. You should, therefore, take note that basic and applied research are closely intertwined and interdependent.

- ☐ Should your University engage in basic or applied research. Why?
- ☐ Make a case for both types of research by listing the strengths of each as well as the contributions they have made to our knowledge.

RESEARCH DESIGN

In this section, we shall discuss research design which is the strategy for conducting research. It describes the general plan for collecting, analysing and evaluating data after identifying:

- ☐ what the researcher wants to know;
- ☐ what has to be dealt with in order to obtain the required information.

A good research design considers:

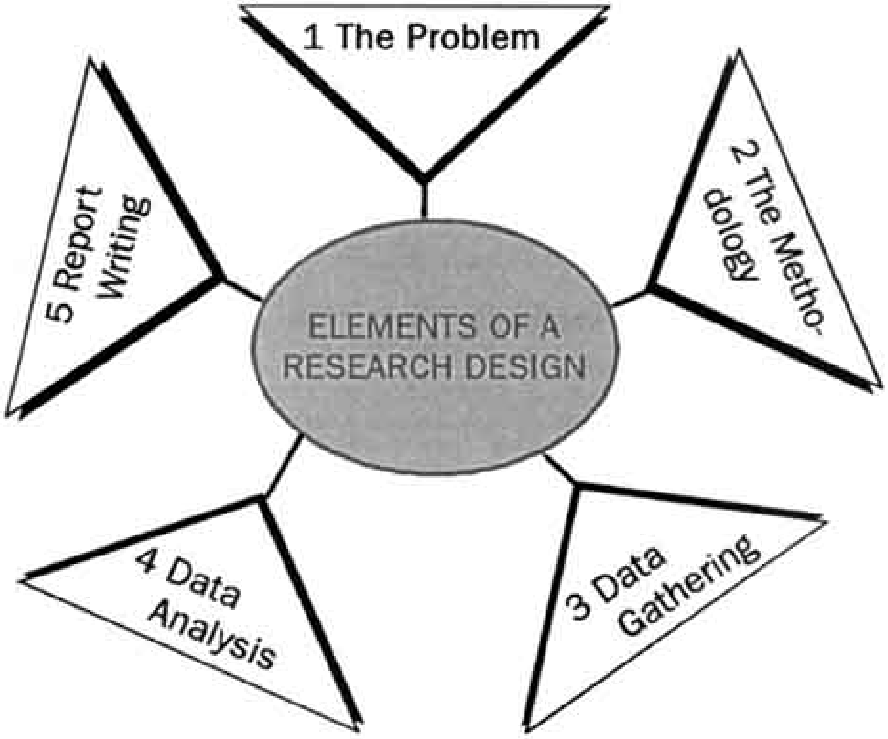


Figure 8.5 Elements of a research design

Let us now discuss in detail the various stages of designing and executing a research project.

Problem or Objective

The first step in a research project is to choose a topic. There are no hard and fast rules regarding the choice. In general terms, this is primarily determined by the researcher's academic interests or environment. Moreover, a researcher seeking a viable topic can be assisted by colleagues or other individuals who have undertaken research in a similar or related field. Indeed, it may emerge as a result of a careful reading of the extant literature in the area of interest, that is, simply by shopping around.

Choose a research topic that might interest you and justify why it deserves to be studied.

Having chosen your topic it is necessary to intensify your knowledge about the subject at hand. This is done by undertaking a careful study of the existing literature, which is called literature review. The purpose of such a review is to enable you to know:

- what research has been done in the subject;
- what others have written about the topic;
- what theories have been advanced;
- the approach taken by other researchers;
- areas of agreement or disagreement;
- whether there are gaps that you can fill through the proposed research.

In the process, you should be able to clarify the theoretical concepts or framework to be used as well as the appropriate data gathering techniques. At the end of this exercise you will have clarified the purpose of the research.

Methodology

The cardinal rule in scientific research is commitment to objectivity. That is, you as a researcher must avoid value judgements. Equally, personal motives, social and political pressures, or even promises of economic rewards must be ignored. Furthermore, the collection of data invariably depends on observation and experiment. It is vital, therefore, that you identify an appropriate method of investigation. But whatever method you adopt, it must yield adequate data that will enable you to attain the objectives of the study.

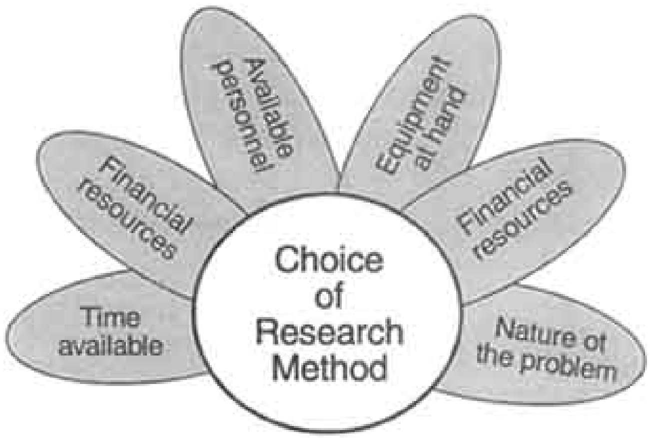


Figure 8.6 What should you consider when choosing a research method?

A number of considerations influence the choice of a research method. To begin with, the nature of the problem will indicate the type of data that should be obtained. Secondly, a prudent researcher will take into account the available resources. Obviously, there is no point in choosing a method of inquiry that requires sophisticated equipment that is out of reach. Nor would it be profitable to employ one that demands enormous financial resources that are not guaranteed. Thirdly, a researcher must take into account the amount of time at his or her disposal as well as personal competence.

At this stage, let us repeat the obvious. There are many types of enquiry. Each has its own strengths and weaknesses. Some concepts are more appropriately studied by particular methods than others. Put simply, you as a researcher should consider the best methods available, taking into account the peculiarities of the problem under study.

There are four major research methods :

- experiments;
- surveys;
- field research;
- analysis of existing data or content analysis.

We shall now look at each one of these in turn.

Experiments

In the biological and physical sciences, this is the method that is commonly used and is normally associated with laboratory work. Experiments involve relatively limited and well defined concepts and propositions.

You should note that the purpose of experiments is to test a hypothesis and provide an explanation. It should be pointed out that experimentation can be an appropriate method in the social sciences. Indeed, it is also widely used in those disciplines. The essential components of experiments include:

- independent and dependent variables;
- experimental and control groups;
- pre−testing and post−testing.

An experiment is designed to examine the effects of an independent variable on a dependent variable. The independent variable is the phenomenon which is hypothesized to be the input or antecedent variable. That is, it is the factor that is presumed to cause the dependent variable and is manipulated, measured or selected prior to measuring the outcome or the dependent variable. In contrast to this, the dependent variable is the characteristic hypothesized to be the outcome of some input variable.

Use of control groups is considered to be mandatory in such experiments in order to minimize the potential effects of other variables which might affect the research results. In testing new drugs, medical researchers frequently administer the drug to an experimental group and a placebo to a control group. The control group patients believe that they are receiving the same drug as the experimental group. Some, in fact, do improve. But if the new drug is effective, those receiving it will show better improvement than those in the control group.

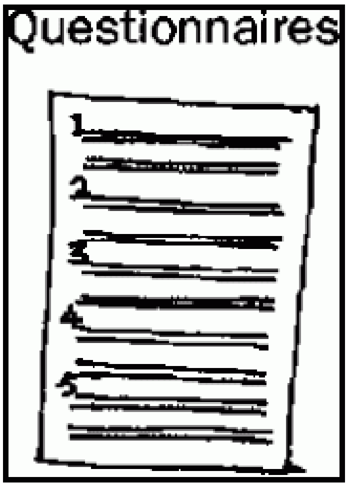
In the simplest experimental design group, subjects are initially measured in terms of a dependent variable (pre−tested). They are then subjected to a stimulus, which represents the independent variable. Differences between the two are then considered to be the consequence of the influence of the independent variable. The crucial thing is to ensure that the results are brought forth by the experimental conditions rather than intervening factors.

Surveys

This is probably the oldest research technique known to man. In biblical times, Moses is reported to have conducted a census of the population of Israel. We are also told that ancient Egyptian rulers conducted routine censuses as part of their normal administration procedures. Today, survey research is perhaps the most widely used mode of investigation in the social sciences.

Surveys are normally used in studies which have individuals as units of analysis. They are particularly useful in measuring people's attitudes and orientations in a large population. This is evidenced by the popularity of public opinion polls, particularly in the western world. Survey research is carried out through questionnaires and interviews.

Questionnaires



The main tool that is used in survey research is the questionnaire. As you noted in Chapter 2, care should be taken in designing this tool to ensure that it is short, well laid out, easy to read and with clear and simple questions. It is also necessary to decide whether to use a structured or an unstructured questionnaire. The structured one includes fixed items, fixed response categories and fixed sequencing of items. Its design restricts the respondent to specific questions, answers and sequences. This has the advantage of enabling researchers to obtain answers to their chosen questions in the required form. Its disadvantage is that it tends to be too restrictive and does not allow room for creative responses. The desired responses can be characterized as scaled, ranked, categorical or multiple choices.

In contrast, an unstructured questionnaire does not have such characteristics. As a researcher, it is your responsibility to formulate your own open questions and record the responses. Usually, you are expected to record them as fully as possible. In some cases, this is done verbatim through the use of a tape recorder.

A questionnaire can be administered in two ways. Trained interviewers may be sent to seek answers from respondents, or where conditions permit, it can be self−administered. In the latter case, the researcher sends the questionnaire to potential respondents. Under such circumstances, the questionnaire should be accompanied by the following:

- ☐ a stamped self−addressed envelope;
- ☐ a covering letter describing the purpose of the research;
- ☐ brief instructions on how to complete the questionnaire;
- ☐ guidance on when and where to return the questionnaire.

You should note that, if properly administered, a mail questionnaire is cheaper and quicker than the interview method. It is also quite useful when dealing with sensitive matters where anonymity is of essence. On the other hand, that can be a problem, because respondents can easily lie about essential details, particularly those pertaining to personal matters. They may also provide insufficient information. Equally, responses can be quite unpredictable and hence frustrating to a researcher. In many cases, respondents have to be followed up, which can be an arduous and time–consuming exercise. However, a response rate of between 25 and 50% is generally considered to be reasonably adequate.

Interviews

This data gathering technique is widely used in the humanities and social sciences. Moreover, in Africa, this has become a very popular tool for conducting research in fields that do not demand experimental work.

Reliability and validity of data based on interviews is very much dependent on consistency. Variation among interviewee and Interviewer leads to random error and systematic bias. Care has, therefore, to be taken in the choice of informants and the training of research assistants, where this is applicable. The latter is essential because experience has shown that success In interviewing depends on the disposition of the informants. Therefore, there is need to create confidence between the respondent and the researcher.

An interviewer needs to create a rapport with the Informant. It is useful to begin with general questions before moving on to personal or sensitive matters. As a rule, the Interviewer should record the responses as completely as possible. The use of a tape recorder has proved to be a boon, assuming that Informants are not suspicious or Intimidated by it.

Interviews have the advantage of allowing you to directly elicit Information from people and to clarify it on the spot. In this way, you will obtain more comprehensive and detailed data than would otherwise be the case. Moreover, face–to–face encounters enable you to evaluate the respondent as an informant. This is because it is possible to observe his reactions to particular questions which can provide clues to the veracity of the responses. This cannot be done when using a questionnaire.

The disadvantages of the technique should not be minimized. It is extremely expensive because of the amount of time that is invested in each interview. Employing assistants also adds to the cost, and creates logistical headaches. Furthermore, the success of an interview depends on many variables, such as the deportment of the Interviewer and the disposition of the informants, all of which the researcher is not always In a position to control.

Figure 8.7 Interviewing is a useful data–gathering technique

Field Research

Strictly speaking, field research is not a research method. It refers to the context in which the study is carried out. For our purposes, this context is the setting where people live and perform the daily activities which are the subject of field investigation. Among the types of data that can be usefully collected are :

- opinions and attitudes about selected topics;
- cultural norms and practices;
- social roles and organization;
- social relationships.

Primarily, such information is obtained through participant or direct observation and may later be used in case studies. A variant of this is participatory or action research, whereby the subjects of the study take part in the planning and execution of the research project with a view to generating action−oriented results. A case in point is the celebrated process of conscientization as carried out in Latin America. To date, field research is generally associated with anthropologists and sociologists, although this technique is used all the time in everyday life.

At this stage, you should remember that experiments and surveys are good research methods for providing quantitative or statistical data. In contrast, field studies largely provide qualitative data. The nature of your study will determine the kind of information you require.

Take the case of Mr Know−all. Mr Know−all, a lawyer, has been hired to defend Mr Brave−heart, a murder suspect. In cross−examining the investigating officer, Mr Know−all, notices that Police Constable Worldly−wise becomes very nervous when asked to give details about the circumstances which led him to connect Mr Brave−heart with the murder. The demeanour of the witness leads Mr Know−all to suspect that PC Worldly−wise is trying to hide something. He, therefore, aggressively intensifies his cross−examination. It finally transpires that his client was connected with the murder only because of a long standing vendetta. Worldly−wise and Brave−heart had quarreled over a girl, Black−beauty, ten years before. Undoubtedly, the demeanour of Worldly−wise cannot be quantified, and yet it was crucial in proving that Brave−heart was innocent.

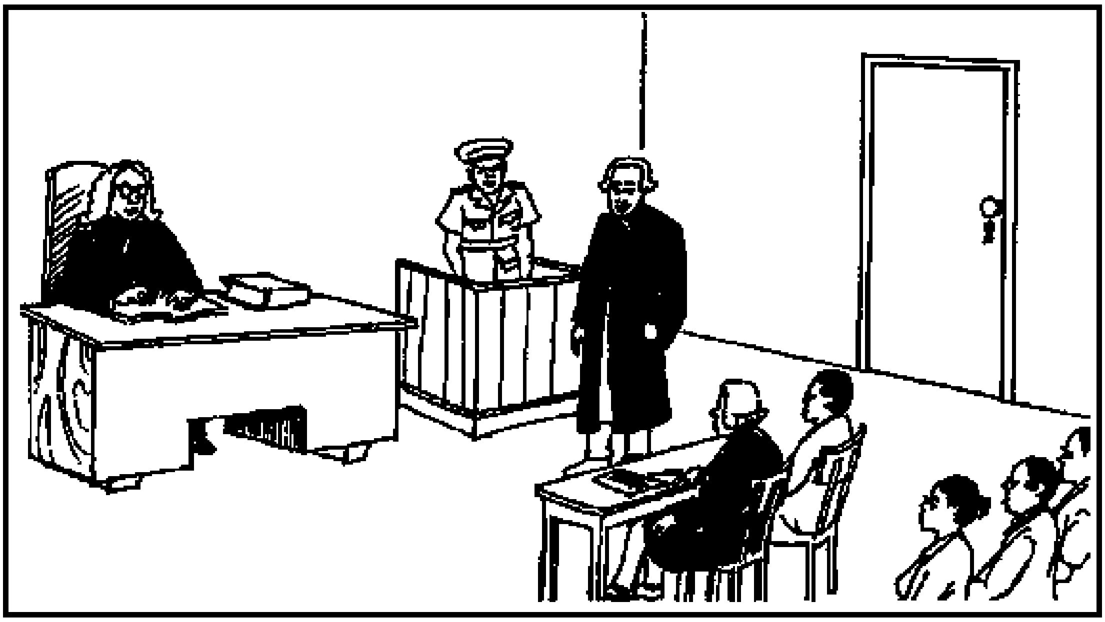


Figure 8.8 Some data cannot be quantified but may provide useful qualitative information

In short, participant or direct observation has distinct advantages. It allows a researcher to directly interact with the social phenomenon under study. Through this, it provides an opportunity for developing a deeper and fuller understanding of the problem being investigated. Qualitative data by their nature may be imprecise rather than definitive. Yet, when all is said and done, the technique is relatively inexpensive, flexible and yields valuable data which can then be analysed to generate theory.

To end this section, let us introduce some terms that are widely used in reference to research which involves experiments, surveys or fieldwork. First, a study that gathers data at one point in time is called a *cross−sectional study.* Secondly, if such a study were extended over a stretch of time it would be referred to as a *longitudinal study,* which can be sub−divided into three categories:

Trend Study

This kind of study compares the same type of data at different time periods. A good example would be a study of child mortality in Africa since 1960.

Cohort Study

A cohort is a specific group such as those born in the same period. A sample of the sub–group is then studied at different points in time. Suppose we wish to know the fate of the Mau Mau freedom fighters after independence in Kenya. We could study them at five–year intervals as follows:

1968	Study	A
1973	Study	B
1978	Study	C
1983	Study	D
1988	Study	E
1993	Study	F

Panel Study

This is most useful when studying change. In this case, you take the same people and study their attitude towards a particular phenomenon overtime. For instance, if you are interested in finding out the general attitude towards single parenthood, you would take a group of people and interview them at periodic intervals on the same subject and over a number of years.

Analysis of Existing Data

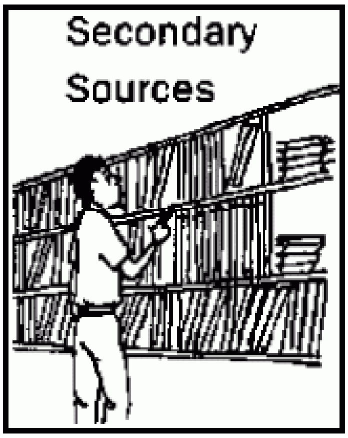
Sometimes a researcher may not be interested in carrying out an experiment, undertaking a survey research or fieldwork. He may simply be interested in analysing or studying existing data. This is what some scholars call content analysis. This type of research is particularly appropriate in the field of communication. Suppose a researcher wanted to assess the impact of the recent and unexpected collapse of communism in Eastern Europe on Africa. Assuming that he did not have the inclination to carry out survey research, he could quite easily confine himself to examining and analysing the contents of newspapers and magazines that contain the necessary material on the subject.

Content analysis can be used in virtually all disciplines. However, the method is probably most popular with and most widely used by scholars in the humanities and social sciences, particularly in those studies which have a historical dimension. But the research process remains the same as for the other methods mentioned. In other words, it also requires the preparation of a proper research design. In particular, it must have a hypothesis that is to be tested against the extant data. The most distinctive feature of this method is that it is confined to studying material that has already been collected and housed in libraries, archives, museums or held in private hands.

The available material for analysis may be grouped into two categories. There are *primary sources* which comprise first–hand or eye–witness accounts of events. These are contemporaneous with the event, experience or time. In contrast to this, *secondary sources* are records of information that were not made at the time when the events referred to in the document occurred. Usually, secondary sources have been obtained from elsewhere.

Primary sources include such records as minutes of meetings, newspaper reports, autobiographies and so on. Their chief characteristics are that the recorder was present during the occurrence of the event and, consequently, has firsthand information about the data. In short, he or she has personal experience. This, however, is not meant to give the impression that primary sources are always trustworthy. Indeed, data from human sources are subject to many types of distortion due to subjectivity, selectivity, loss of memory or deliberate and calculated deception. You should always remember that the researcher had no control over data collection methods, instruments used or even the accuracy of the recordings. Note, for example, the recent selective destruction in the United States of the White House

tapes by the Nixon administration.



As far as secondary sources are concerned, the recorder was not present when the event that is described occurred. It is a secondhand report which means that the event is being reported through the courtesy of an intermediary. Consequently, the intermediary could presumably have caused more distortion for the reasons just cited. Nevertheless, this does not necessarily mean that they are entirely inaccurate. They could, at times, be even more useful than the primary sources.

Complete the following table by giving examples of:	
Primary Sources	Secondary Sources
a.	a.
b.	b.
c.	c.
d.	d.

Analysis of archival and library sources has several distinct advantages as a method of study. It is cheaper In both financial and time input compared to the other methods. An individual, for instance, can single–handedly carry out a whole research project without the necessity of engaging research assistants or purchasing expensive equipment. In such an instance, the researcher has full control of the project.

Furthermore, the method has another important advantage. If a researcher botched up a survey or experiment, the chances are that he would have to start all over again, literally from scratch. This may not be necessary in this case, as parts of the work can be repeated independently. There is, therefore, an inbuilt safety valve.

Earlier on, it was noted that a researcher can influence the kind of information he obtained from informants, depending on the interaction between the two parties. In data analysis, there is no possibility of such a risk. The researcher cannot have any effect on the subject being studied. The raw data already exists, and there will be no effect on it when it is being analysed.

You should also note that content analysis has been called a number of different terms. In some literature, it is known as secondary analysis. This refers to the fact that a researcher is using the already collected data to study a problem that is essentially different from the one considered by the original collector of the data in question. That is, the new researcher subjects the data to additional analysis.

On the other hand, consider an individual who is fascinated by the importance that coffee has assumed in the world economy. He or she will presumably start asking questions such as when and where coffee was first cultivated or how it is grown, processed and marketed. To answer these questions, the researcher will invariably have to examine and analyse whatever records exist from the past. To do so is to use the historical method.

By now, you will have noticed that, in both these cases, the researcher has been saved the problem of gathering data. He or she has not interacted with the original source of the material in anyway. It is this feature which has led this type of inquiry to be called *unobtrusive measures of* conducting research.

For the research topic you chose earlier on, select a suitable research method and indicate its advantages and disadvantages.

Sampling

In most of the methods discussed it may be difficult to gather the required data from all the possible sources. This is particularly the case in survey and field research, where the population is too large to be covered in total. For this reason, investigators use sampling in order to obtain a manageable segment of the total population. Such a segment must, however, be representative of the whole population as far as possible. This is the most important goal in sampling.

Sampling means the process of selecting a sub−group from a population of elements, such as people, objects or events. The researcher starts off with a *sampling frame* which consists of the element or object that is the subject of study. For example, university riots have become a common feature on the African continent. And if a researcher wanted to know why, in 1991, students from Kenyatta University rioted and burned their lecturer's car, for instance, the student nominal roll would constitute the sampling frame.

Figure 8.9 Research into the causes of student unrest may help to prevent incidents such as this

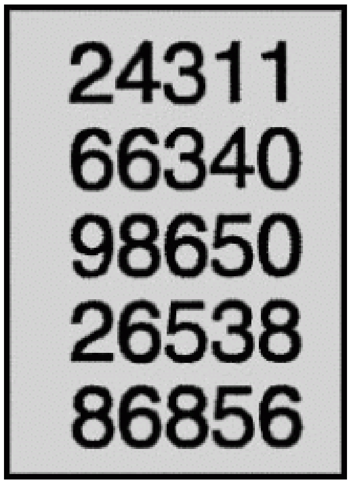
In order to ensure that there is no bias in the choice of the sample, researchers resort to random sampling. This is carried out in such a way that there is no observable or obvious regularity in the choice of elements. Thus, there is unpredictability. Nevertheless, each element has an equal chance of selection. This procedure ensures that there is no conscious or unconscious bias. Consequently, the probability of the sample being unbiased is very high. But remember that even the most carefully selected sample will almost never provide a perfect representation of the population from which it was selected.

It should be noted, however, that there are several sampling methods that can be used. As a researcher, you should familiarize yourself with each one of them, particularly noting their advantages and disadvantages. The commonly used ones are random sampling which consists of the simple, systematic and stratified method, and non−random sampling which encompasses systematic, convenience, purposive and quota samples. Generally speaking, random methods have the potential for selecting a sample that has a high probability of being representative of the total population.

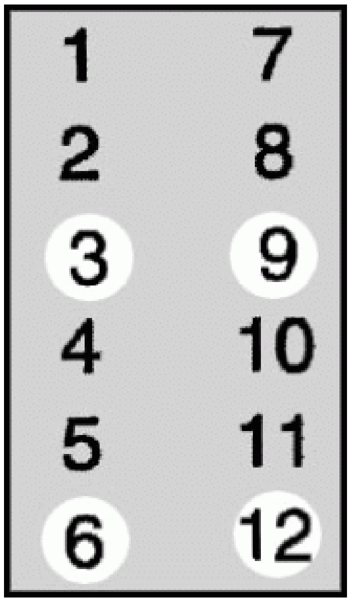
Random Sampling Techniques

Let us first discuss random sampling techniques.

Simple Random Sampling: These days there are numerous computer programmes that generate random numbers, just as there are books of random numbers. Once you have chosen your sampling frame, you assign a number to each item in the list and then select elements using a table of random numbers. Alternatively, you could use a computer. This method is not commonly used because it is cumbersome and complicated as well.

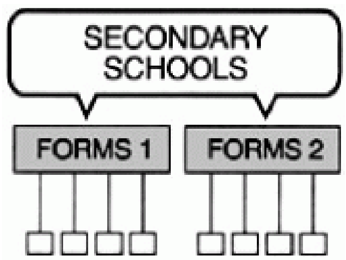


Systematic Sampling: In our example of Kenyatta University students, you would pick every *nth* student in the nominal roll for interview. As you notice, this is a simpler method and, therefore, more widely used. In this case the *nth* number in every third one.



Stratified Sampling: The purpose of this is to organize the population into homogeneous subsets before selection. For example, our Kenyatta University students, can now be arranged according to sex or year of study before using either of the techniques for selecting the required elements.

Multistage Cluster Sampling: Suppose you want to study the problem of secondary school indiscipline in Kenya. The first step would be to obtain a list of all the secondary schools. This will constitute your primary sampling frame. But the number of pupils involved is too large. You might then restrict yourself to Forms 1 and 2 which constitute the secondary sampling frame. And finally, you would select individual pupils from each of the schools. Hence your tertiary sampling frame.



Note that the samples described thus far conform to the probability theory. This means that each element has an equal chance of selection, independent of any other event in the selection process. In some cases, it is impossible to select such probability samples. Suppose, for example, you wanted to carry out a study of an allegation that lecturers award good marks in exchange for sexual favours. You will probably be unable to obtain a list since the culprits are unlikely to come forward. In all such sensitive cases, you will have to content yourself with non−random or non−probability samples which we shall describe next.

Non−Random Sampling Techniques

Although non−random sampling techniques have the potential for bias, in some cases they are the only ones that can be used.

Purposive or Judgmental Sampling: In this method you can use only a limited sample because that is all that is available. Corruption has become a social cancer in Africa. Any attempt to study the phenomenon, say in the civil service, cannot be a popular subject at the moment. If you are faced with a situation where people are uncooperative, seek information from those who are willing to give it. Obviously, your sample will not be representative, but volunteers are likely to provide you with invaluable data.

Convenience Sampling: In this method you use a sample because it is easily available. University lecturers have found out that it is easy and cheap to conduct surveys among students. In this case, students constitute a convenience sample, which is based on ease of access.

Quota Sample: In this exercise the first step is to set up a matrix of the characteristics required, such as sex, age or race. For example, a study of students' attitudes towards a new curriculum would be best handled by seeking their views, faculty by faculty. And assuming you want to interview only a hundred students, then the necessary quota sample can be obtained as follows:

Table 8.1 A quota sample of university students

Faculty	Enrollment	Percentage	Respondents
Arts	1,000	33.33	33
Commerce	500	1667	16
Engineering	200	6.67	7
Law	200	667	7
Medicine	200	6.67	7
Science	800	26.66	27
Veterinary Medicine	100	3.33	3
TOTAL	**3,000**	**100,00**	**100**

The highest number of respondents will be from Arts (33) and the lowest from Veterinary Medicine (3). You then simply go out and fill the relevant quota.

Snowballing Sampling: A student of history wants to study the *Mau Mau* or *Chimurenga* wars in Kenya and Zimbabwe. To do this, he identifies a few knowledgeable *Mau Mau,* or *Chimurenga* veterans who, in turn, introduce him to others. Through this process, more and more informants are drawn into the sample as the research proceeds. That is why this method is called snowballing.

What common sampling methods would you use in your research? List them and write the advantages and disadvantages of each.		
Common sampling methods	Advantages of method	Disadvantages of method
1.		
2.		
3.		
4.		

Data Analysis and Report Writing

Having collected your data, you will probably heave a sigh of relief, thinking that your tribulations are at an end. You are wrong. You are now left with the most important research tasks: assembling and analysing the data as well as compiling your report.

From your experience thus far, you are aware that in both social and scientific research, masses of data are collected which have to be analysed. This has led to the increasing use of statistics, which help to reduce unmanageable data into concise summaries. It may also assist in the drawing of conclusions much more easily. Although statistics scare some people, remember that there are many manuals on the subject which can be consulted. You should, therefore, familiarize yourself with the commonly used statistical methods, such as means, variance, Chi square, histograms and so on.

The recent explosion of information has created a problem of its storage and manageability. Consequently, information needs to be quantified for ease of manipulation and analysis. It also needs to be stored where it can be easily retrieved. For these reasons, the computer has increasingly become the handmaiden of researchers worldwide.

The technological revolution has created exciting research tools in the form of desktop and laptop computers which have proved to be extremely useful in a variety of ways. Besides enabling researchers to store and manipulate data, they have revolutionized the world of publishing. For our purposes, the computer enables the researcher to prepare reports much more easily than was possible only a few years ago. Its importance cannot, therefore, be over–emphasized.

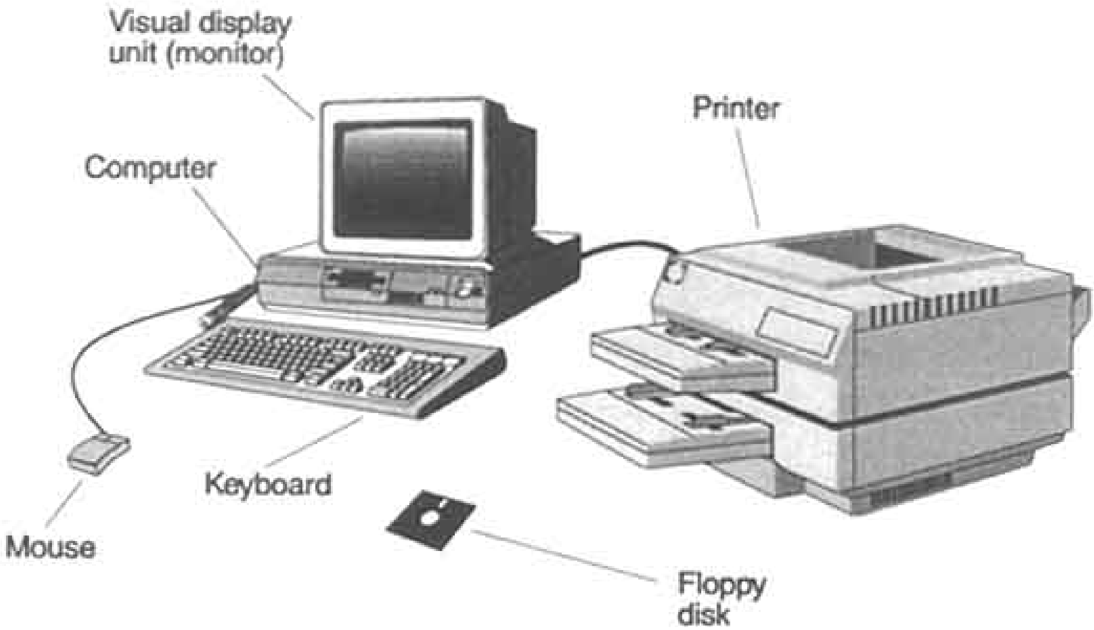


Figure 8.10 The desktop computer is an extremely useful research tool

With the analysis of data done you are now in a position to write your report. Before doing so, however, you need to bear in mind the original purpose of the research. Was the intention to write a thesis, a book, a research paper or an article for a journal? In some cases, you will be provided with guidelines by the University or the publisher. In others you may have to use library references to help you decide on the format. Nevertheless, there are common features which are applicable to all reports as outlined here.

Statement of the Research Problem: This will serve as an introduction to the report. It should clearly state the nature of the problem and why it is being studied.

Background to the Problem: Normally, a research problem is prompted by earlier studies, theories or observations. It is important, therefore, to refer to such studies. This forms the background literature or literature review. The review should only refer to those materials that are most relevant to your study. Certainly, it should not include everything that you have read on the problem.

Research Model and Design: In this section, you should state the specific research question or hypothesis.

Data Collection: The reader is interested in two questions. What did you do to get the data? Where and from whom did you get them? Consequently, your duty is to explain how you carried out the study.

Data Analysis: This forms the main part of your report. It should describe how the data were analysed and conclude with an interpretation of the results or findings.

Discussion: Having presented your findings, it is essential to relate them to the objectives of the study. Do your findings prove your hypothesis? If not, why? Indeed, you should relate your conclusions to those of the works referred to in the literature review. In any event, you want to highlight the unique features of your study, compared to those of the others.

Conclusions and Summary: The concluding section should summarise the whole project. It should, as far as possible, emphasize its special characteristics, particularly its contribution to the advancement of knowledge in the discipline concerned. Policy implications and suggestions for future research should also be included, where this is applicable.

ETHICS AND PROTOCOL OF RESEARCH

When all is said and done, the quality of research and the attendant publication will depend on academic integrity, among other things. In many academic circles, it has been observed that the publish−or−perish syndrome has had a deleterious effect on the quality of research results. It has contributed to immature publication of data, honorary authorship, hasty publication of data without adequate tests, recycling of the same data, plagiarism, and outright fakery.

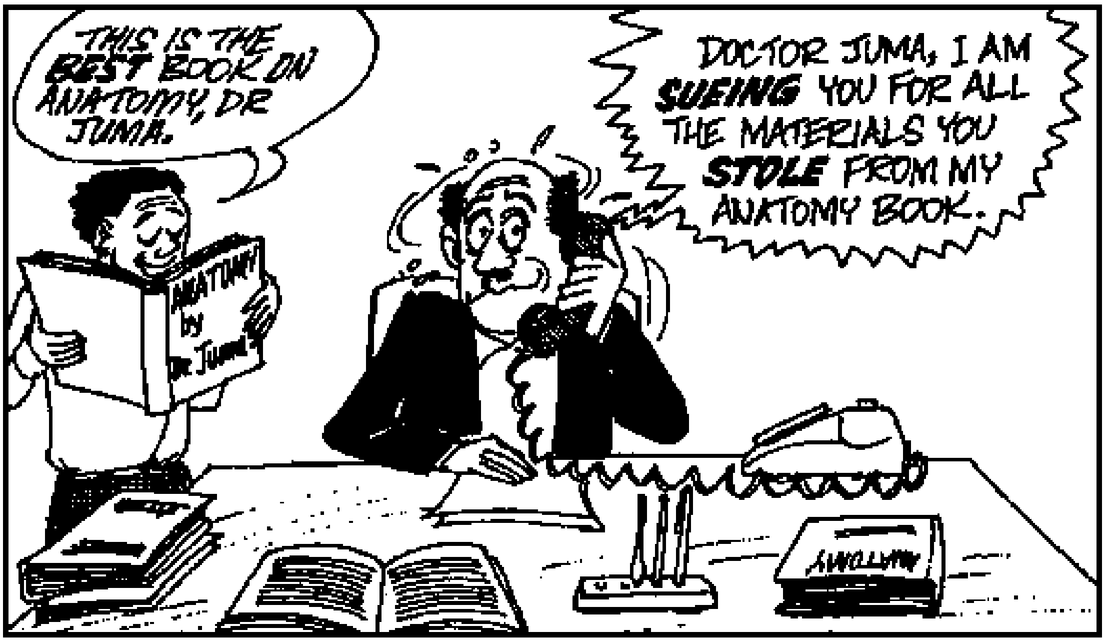


Figure 8.11 Pride comes before a fall

At the same time, African researchers face other formidable difficulties. Apart from the drying up of financial resources, research of any type is nearly always suspect by autocratic African regimes. Research clearances have been instituted by nearly all African governments in an attempt to referee research in the so−called 'sensitive areas'. Failure to abide by the dictates of government officials could lead to unpleasant sanctions, ranging from a stern warning to spending a spell as a guest in a government hostel, otherwise known as a police cell.

You should also be familiar with the current debates in the biological and physical sciences. For example, animal lovers have protested against the use of animals in research, arguing that this causes them unnecessary suffering. Others have raised misgivings regarding chemical and biological weapons, test−tube babies and surrogate motherhood. The question is − should scientists take part in such experiments?

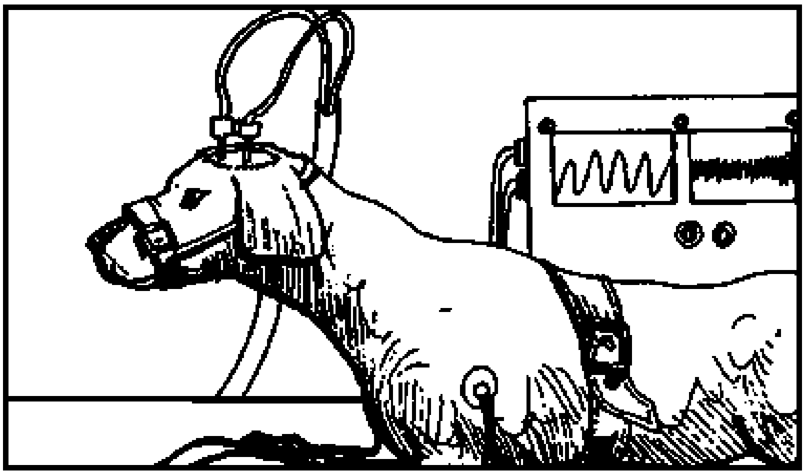


Figure 8.12 Experimenting with animals is a controversial subject

Be that as it may, researchers cannot eschew ethics and politics. People will always question the experimental methods used or point to the misuse of research findings. The crucial factor, however, is to maintain objectivity and strictly adhere to the scientific method. Saying that, however, does not absolve us from keeping our house in order. For example, there is no excuse at all for committing plagiarism when all that is necessary is to acknowledge our debt to other authors whose ideas we might have borrowed. Neither is tampering with results a sign of intellectual maturity.

Equally, we should remember that, in most areas of research, trust is an essential commodity. There is a great need, therefore, to protect our sources of information by maintaining anonymity and confidentiality wherever these are necessary or called for. Even more, a researcher should not deceive his informants about the nature of his study. In particular, covert research, coercion and invasion of privacy should be avoided. Remember that it is our duty to be sensitive to the political and social environment in which we operate. Finally, complete and accurate reports are mandatory at the end of the research work.

RESEARCH MANAGEMENT

Under the topic of Research Design, we discussed the main elements of a research project. This section is intended to complement that information as well as to tie together a few loose ends.

Once you have identified a research problem and formulated how to carry out the investigation, you still need to seek financial resources. At this stage, you will be required to submit a research proposal. This is an overall plan describing what you intend to accomplish, why and how.

Besides the elements noted under the Research Design, you will this time need to include a time schedule and a budget. A time schedule describes in detail the amount of time allocated for the various stages of the research. At first this may seem unnecessary, but experience has shown that many researchers are often unable to complete their research in time. Often postgraduate students, for example, abandon their studies because their grants run out long before their projects are completed. And the main trouble is that they spend too much time looking for a researchable topic or gathering data in the field. Strict adherence to a time schedule would obviate this problem.

Now assume that you have 15 months from October 1994, within which to complete a research project. A suitable time schedule could then be as follows:

A budget is, of course, an obvious item. The key to this is to remember that you have to convince a donor to part with his money. So you need to have a well–formulated research project and a realistic budget. The budget should be itemized as follows:

Personnel/research assistants; equipment; supplies; stationery; postage.

Transportation and accommodation; data analysis/computer time; typing; photocopying/printing; binding.

Date	Task

1 October to 31 December, 1994	☐ Preparation of a research proposal
	☐ Application for research clearance
1 January to 30 June, 1995	☐ Preparation for fieldwork
	☐ Fieldwork
	☐ Analysis of data
1 July to 31 October, 1995	☐ Analysis of data
	☐ Writing up report
1 November to 31 December, 1995	☐ Typing of report
	☐ Submission of report

Figure 8.13 Time schedule for a research project

Prepare a time schedule and a budget for a research project you are planning.

APPLICATION OF RESEARCH FINDINGS

Close−fisted bureaucrats often wonder whether it is worth spending such great amounts of money on research. They seek quick returns on this investment and shake their heads in utter disbelief and bewilderment when this does not happen.

Of itself, research is a direct and an indirect instrument of development. As fifteen presidents of leading American universities have stated, 'One of the decisive elements in the quality of any society is the level it is able to reach and sustain in the quality of its research and scholarship.' It seems to be clear that research generates fundamental knowledge which, in turn, brings power and prestige to individuals and nations. This correlation can be demonstrated by a look at the Nobel Prize winners in selected countries between 1901 and 1989. In this regard, take into account the relative power of these countries in the world today.

Table 8.2 Nobel Prize winners between 1901 and 1989

Country	1901−30	1931−60	1961−89	Total
Austria	3	4	3	10
Denmark	4	–	3	7
England	15	18	32	65
Germany	27	14	9	50
Holland	6	–	3	9
Italy	2	2	4	8
Sweden	3	5	13	21
United States	6	33	123	162
U.S.S.R.	2	2	8	12

Sources: Saad Z. Nagi and Ronald G. Corwin, 1972.
Philip W. Goetz (ed), 1990.
Otto Johnson (ed), 1991.

Several comments can be made about the statistics in Table 8.2. First, Britain and Germany were the leading countries in the world at the turn of the century. Second, both declined in relative terms after the Second World War and the U.S.A. emerged to take their role. These statistics vindicate that view.

Figure 8.14 Developing countries seldom have the resources needed to support intensive research

The position of the U.S.S.R. is different from what one would expect. However, this can be explained by the fact that Russian academics faced a trying time after the Revolution of 1917. Thus, although it is a superpower, its record of fundamental research is not as impressive as that of its rivals. Or presumably not enough is known about their work.

Finally, the U.S. laureates were reinforced by the immigration of leading academics fleeing from turbulent Europe. But in fairness, it should also be noted that the U.S. government provides enormous financial resources in support of research.

Research and Theory

In our discussion of the research design, we noted that a theoretical framework was necessary. It was further argued that this provides the basis for establishing the hypotheses to be tested. Logically, hypotheses suggest the observations or experiments that need to be undertaken. In other words, theories lead to hypotheses and hypotheses, in turn, lead to observations or experiments. Observations and experiments automatically provide the basis for empirical generalizations.

The exercise of developing hypotheses from theory is called deductive logic. And, conversely, constructing theory or general principles from specific observations is termed inductive logic. The suggestion here, then, is that theory and research are closely interlinked through these two logical methods. This is a never−ending interaction which can be represented as a cycle.

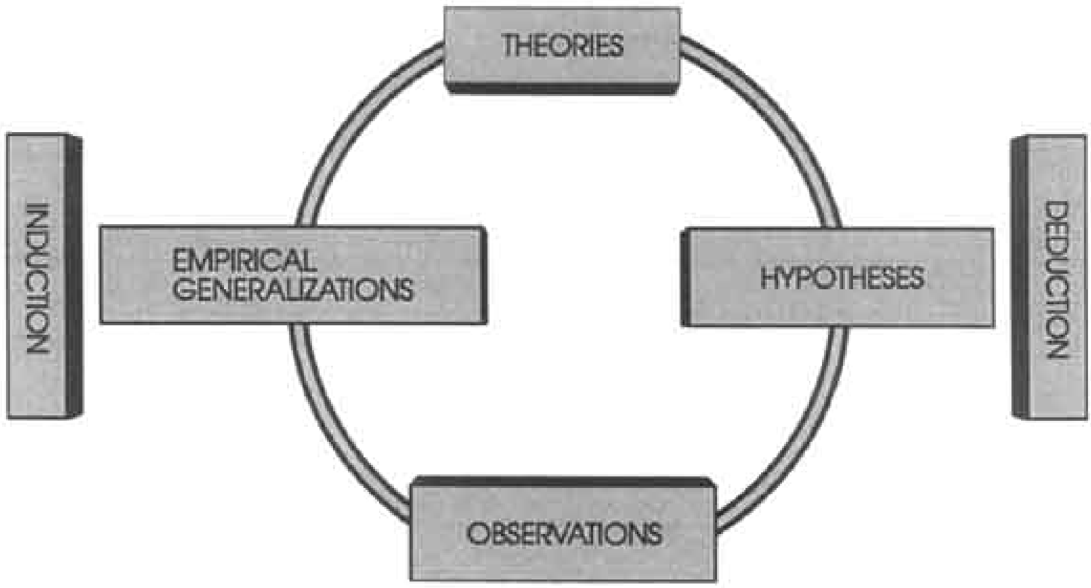


Figure 8.15 Research and theory are closely interlinked

Source: Earl Babbie, 1989.

Research and Teaching

Historically, teaching has not always been a full−time job. Consequently, there was always plenty of time for research. Moreover, until the great expansion in higher education, universities were few in number, and they tended to attract the best authorities available in any given field. As a result, there was no conflict between research and teaching. Today, however, the situation is different.

Let us explode a few myths. The notion that teaching is neglected at the expense of research does not seem to be borne out by the existing evidence. For example, a recent study carried out by the Committee of Vice Chancellors and Principals of British Universities (CVCP) indicated that only 30% to 40% of an academic's university time was actually spent on research. British academics, on their own admission, apportioned use of their time as follows:

Table 8.3 Time allocation by British academics

Duties	Percentage of Total
Undergraduate time	37
Graduate course time	5
Graduate research time	6
Personal research time	24
External professional time	10
Unallocatable internal time	18

Source: Graeme Norris, 1979.

Asked to define their interests and inclinations vis−a−vis research and teaching, British academics responded as shown in Table 8.4.

Table 8.4 Inclination for teaching and research by British academics

Inclination	Percentage
Very heavily towards research	10

In both, leaning towards teaching	36
In both, leaning towards research	54
Very heavily towards teaching	0

Source: Graeme Morris, 1979.

These statistics clearly indicate that most British academics maintain a healthy balance between research and teaching. However, there is a clear indication that overall research is regarded as being more important than teaching *per se.* But only a small percentage (10%) is heavily inclined towards research over and above everything else.

Research, Publications and Promotion

There is a general belief in academic circles that teaching abilities are ignored by promotion committees. Conversely, it is assumed that there is a direct relationship between publication and promotion. Even more, the reputation of the journal where one's article is published is also regarded as an important indicator of the quality of the work. For example, it has been noted that the American Economic Review rejects about 91% of all the articles submitted for publication. It is believed that this high rate of rejection is necessitated by the desire to maintain a high standard of scholarship on the part of the journal. So if a researcher manages to have an article published in the journal, then he or she is considered to have made it.

But in this equation, the vagaries of the publishing world should be taken into account. It has generally been observed that the quality of an article may not always be the determining factor when it comes to its rejection or acceptance for publication. For instance, an article that challenges an existing theory or view gets a rough ride and has a high chance of being rejected altogether. In contrast, an article by an author of well−established reputation stands a good chance even though its quality may not be very high. For this reason, the current system of assessing manuscripts militates against younger, but deserving, scholars. To complicate the matter further, in Africa, academic publishing is a dying or at best an ailing industry, thereby making it even more difficult for African scholars to find easy avenues for having their work published.

Figure 8.16 How many publications in your university library are authored by African scholars ?

On the whole, however, promotion is certainly not dependent on a single factor although, admittedly, publications play a dominant role. In 1976, for example, Lewis studied promotions in a number of top American universities. He found startling results. Of those promoted in twelve of the universities, only 12% had contributed articles to major learned journals. In another ten universities, the figure dropped to 5.5% and fewer than 3% was quite common. Indeed in some cases, Lewis found out that tenure had been granted with the beneficiaries having published no single book. He also found out that many academics had written nothing of consequence after obtaining their PhD. His general conclusion was that promotions owed much less to merit in either teaching or research. It would appear, therefore, that social factors play a more important role in promotion than we are prepared to admit.

Most African universities have faced this dilemma. In the University of Nairobi, for example, academics argue that they experience difficulties doing research or attempting to publish books or articles. In particular, they point out that financial resources for supporting research are not, by any measure, adequate. And even if they were, the overwhelming student numbers leave them with little free time for research. In this regard, the available statistics are quite revealing. Enrollment in public universities from 1986 to 1991 was as follows:

Table 8.5 Student admission in Kenya, 1986−1991

Academic Year	Number admitted
1986−1987	10,143
1987−1988	17,538
1988−1989	7,801
1989−1990	7,502
1990−1991	17,000
1991−1992	10,000

Source: Joint Admissions Board records.

The number of students admitted into the four Kenyan public universities dramatically increased in the 1987/88 and 1990/91 academic years. Two lots of students were admitted in 1987 in order to clear a backlog that had built up when the University of Nairobi was closed in the aftermath of the 1982 failed coup d'état. The year 1990 saw the implementation of the new education system (dubbed 8−4−4) and the admission of the last group from the previous system ('A' level), resulting in the phenomenon of the so−called 'double intake'.

The growth in student numbers has not been commensurate with the expansion of physical facilities. The problem has been particularly acute with regard to hostel accommodation, lecture rooms and libraries. This mismatch has forced Nairobi University to stagger the teaching in order to cope with these difficulties. The upshot of this arrangement is that the academic staff have to teach throughout the calendar year with only short breaks. Quite obviously, little research can be carried out under such adverse conditions.

An added headache is lack of publishing avenues. Until 1977 East Africa was very fortunate to have the East African Literature Bureau, which was committed to publishing academic textbooks and journals. With the collapse of the East African Community, the Literature Bureau folded up. Its demise has meant that there is no comparable firm which is interested in what is considered to be an uneconomic venture − publishing academic books and journals.

In view of these difficulties, academics rightly complain that it would be manifestly unfair to require them to have as impressive a record of publications as their counterparts in North America and Europe. They have suggested that teaching, administrative and committee work, both in the university and at the national level, should be recognized as an important area of contribution that deserves consideration for promotion purposes. A points system model has been suggested which takes into account all the major factors. For example, in the case of publications, it awards points for a thesis, a conference or a seminar paper, an article and a book. Similarly, it recognizes university administrative chores and service to the community at large.

What would you consider to be suitable criteria for the promotion of academic staff in your university?

Research and Curriculum

At this juncture, it is important to ask yourself whether there is any relationship between research and the quality of teaching in universities. As with most academic matters, opinions vary. However, by its nature research forces a scholar to study thoroughly the available material in a given field. This measure alone means that a researcher engages in creative organization of facts and concepts through criticism, interpretation and re−interpretation of data. Strictly speaking, this is what is referred to as the essence of scholarship. Commitment to scholarship you will probably agree, leads to a greater understanding of the subject matter. That should also make a scholar a better teacher, though this is not always the case.

There is another factor to be taken into account. Where vigorous and exciting research is a premium commodity, there develops an enabling learning climate. Such a hospitable learning environment creates a dynamic atmosphere in which old ideas and theories are constantly challenged afresh. Long held views are dissected and modified, obsolete or irrelevant material is discarded, and the curriculum is revisited in order to determine its utility and relevance. In that process, the latest research results are likely to be taken into account in the attempt to create a more suitable curriculum.

A conducive academic environment acts as a forceful magnet to good staff and students. This is because it enhances the prestige of an institution in the eyes of the public. In other words, the quality of research is an important element in determining the well−being of an academic institution. It makes the difference between a real university and a glorified high school. Such an institution will, in all probability, be a hub of research activity and advanced study and training. Certainly all universities crave for prestige and recognition as centres of academic excellence.

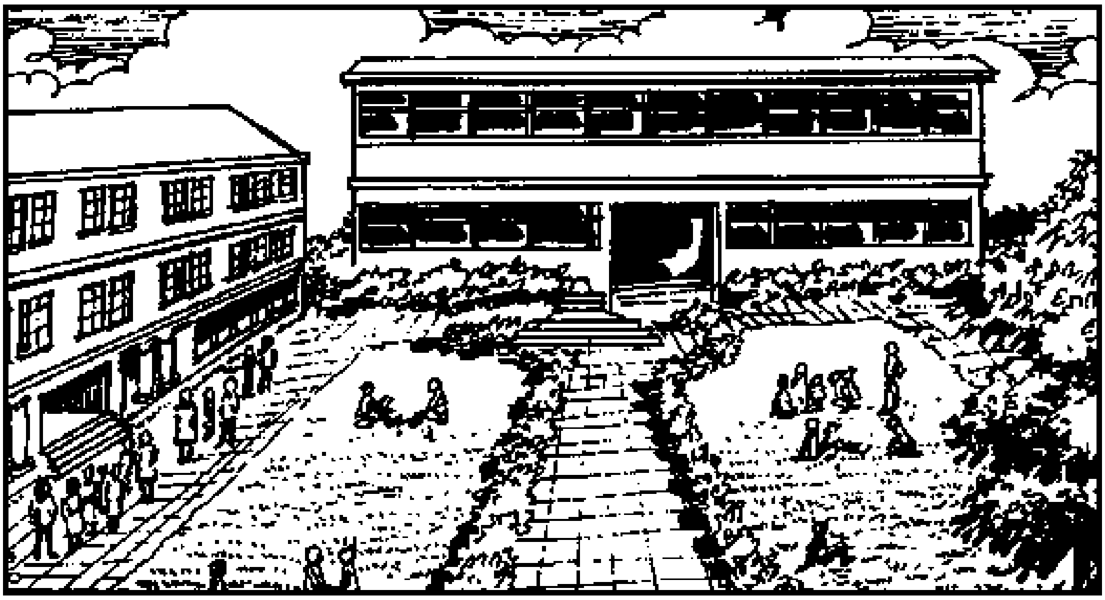


Figure 8.17 A conducive academic environment acts as a forceful magnet to good staff and students

RESEARCH SUPERVISION

As mentioned previously, research and advanced study go hand−in−hand. Moreover, having noted the adverse criticisms that have been levelled against supervisors, it is essential that the question of research supervision be discussed.

Needless to say, only an effective researcher can be a good supervisor since his or her primary duty is to enable students to acquire the necessary research techniques and expertise. But, as indicated by the periodic outcries against supervisors, all has not been well on this front.

A research supervisor has a specific role to play. His or her duty is to assist a student to devise an acceptable research proposal and oversee its successful execution. He or she should:

- assist the student to identify a researchable topic;
- direct the student to the existing literature;
- assist in refining the methodology;
- supervise the research process;
- act as a critic at all times and particularly at the writing stage.

This presumes that the supervisor is an expert in the area of study chosen. Above all, experience shows that a good supervisor is one who has a real interest in the student. Such a lecturer creates a close working relationship, promptly assesses the work submitted and is always available when needed.

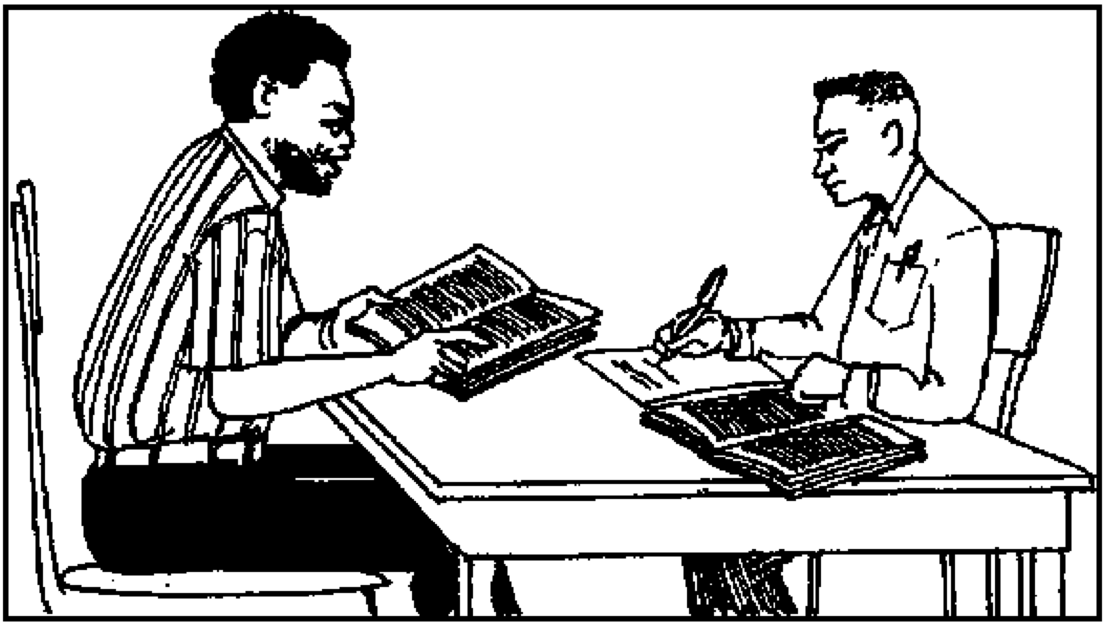


Figure 8.18 A good supervisor is a trusted academic companion

Besides providing guidance, supervisors should act as managers. Through regular progress reports, they should always keep abreast of what the student is doing . They should plan a work schedule and a system of feedback. Together they should also be familiar with the tactics adopted by students when they have problems or face difficulties. The most common of these are: avoiding the supervisor, late submission of assignments, resenting criticisms and making untenable excuses. The supervisor should be on the look out for these danger signals. In many cases, the problems arise because the student may have personal difficulties. These may range from sickness and pecuniary embarrassment to social maladjustments. Others may lack the necessary writing skills, in which case they would need extra attention and assistance. In such situations the student needs the supervisor's special support and guidance.


Figure 8.19 Students need your support and guidance in carrying out their research projects

In the final analysis, you should realize that a shoddy piece of research work is not a reflection only of the student's abilities. In a sense, it is also a reflection of your abilities as a supervisor. A research project is, therefore, a co−operative endeavour between the student and you. It is amazing how often supervisors forget this, to the detriment of their own academic standing. The important factor to note is that research is part and parcel of training in advanced studies. You should, therefore, treat supervision as seriously as you do teaching.

- [ ] make a list of the main characteristics of a good research supervisor.
- [ ] Which of these characteristics are your strong points?

DISSEMINATION OF RESEARCH FINDINGS

Throughout the African continent, universities face a critical shortage of suitable teaching material for two reasons. To begin with, much of what exists has been proved to be irrelevant to modern Africa. In the humanities and social sciences, in particular, the material is Eurocentric and pays little attention to the African situation. Most of it was produced in the heyday of the colonial empires, when the chief educational goal was to spread western culture. Secondly, the cost of books and journals produced overseas has become exorbitant. Indeed, these days few librarians can claim to be up to date with the purchase of library materials. Most of them have not done so for the last ten years.

Faced with this situation, it is necessary for African universities to build their capability for self−reliance based on local scholarship. All this is contingent upon an active and sustainable research enterprise as well as a serious commitment to the production of textbooks.

But this is only one way of disseminating research findings. Needless to say, a lot of research reports are gathering dust in libraries because dissemination of the findings remains a major problem on the continent. You are undoubtedly familiar with the usual complaints that regional and national journals have ceased publication or appear erratically; that publishers are only interested in producing school textbooks, which are regarded as money spinners; and that funds to organize workshops, seminars, and conferences are hard to come by. This all too familiar scenario can be overcome by establishing effective academic presses to serve the university community. There is also a need to encourage lecturers not only to carry out research but to publish their findings at the same time. In this regard, the possibility of winning a handsome prize for such an endeavour has proved to be a forceful incentive.

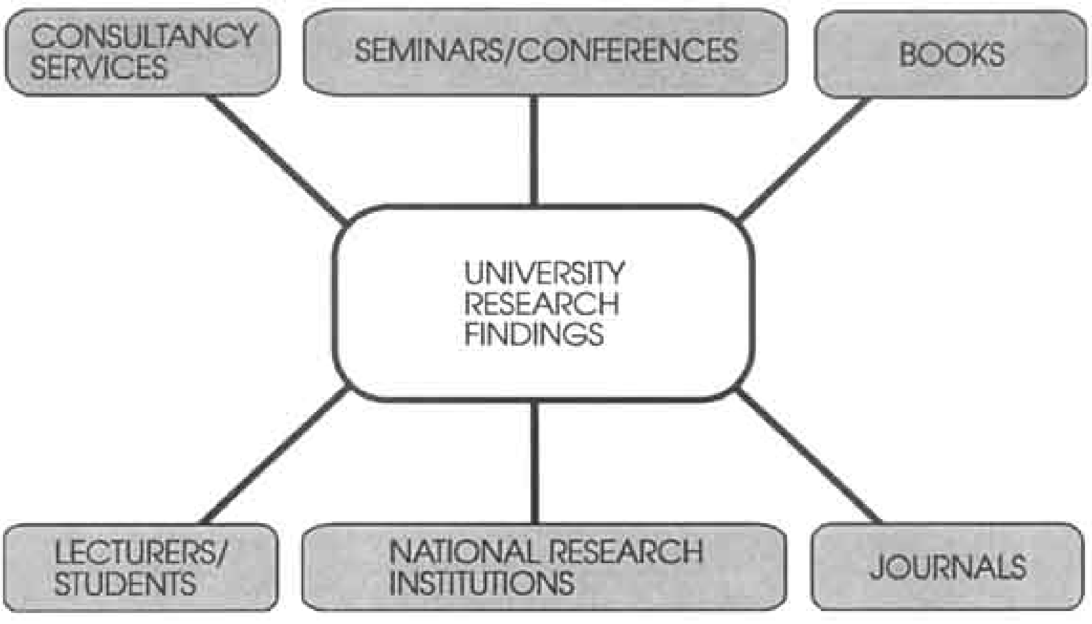


Figure 8.20 Dissemination of university research findings

Yet the overall goal must be to create a research culture. To tell you the truth, no one has a ready−made answer how to do that. Nevertheless, a few suggestions can be offered. First, experience indicates that allowing lecturers to offer consultancy services outside the corridors of universities has, to some extent, contributed to the creation of a research climate. The only danger, of course, is that preoccupation with such services can lead lecturers to neglect their primary charge, the students. Dependence on donor agencies to support research can also develop a dependency syndrome.

This brings us to the second point. In order to avoid being victims of the dependency syndrome, universities should draw up their own research agenda. To do so will require deciding what the most critical priorities are. This can be done by taking into account several factors. At the national level, research priorities should be based on national development policies and needs. Here, government departments can be called upon to indicate their areas of immediate concern. In short, universities have not been aggressive enough in shopping around for research projects. And judging by the number of consultancies offered to foreign researchers, there is a definite need for university experts to sell themselves to public institutions, particularly in the field of developmental research. Frankly, this is the area where universities can have a great impact on national policies.

Outside the public sector, universities should also consider their own special research needs. Indeed, research activities have often been enhanced by the existence of departmental research projects. These projects have the advantage of creating collaborative research which, in turn, pools the available expertise. This enhances the capability of departments to undertake major research work. An added advantage is that younger academics can easily be initiated into research through collaborative projects. In such a situation, possibilities exist for the development of inter–disciplinary research which is a neglected area in many African universities.

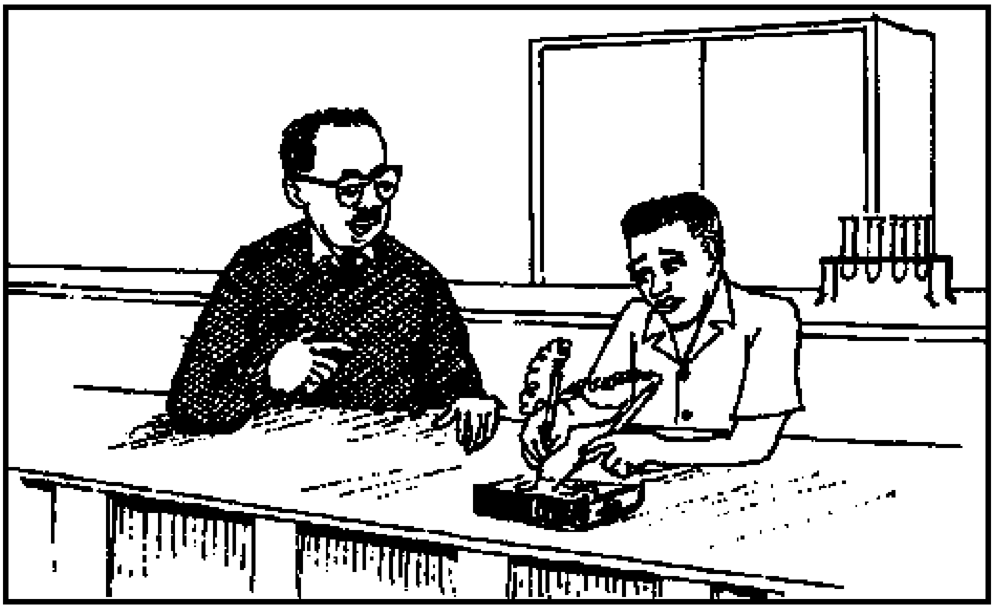


Figure 8.21 Younger academics should be initiated into research through collaborative projects

Finally, the relationship between universities and national research institutions should be strengthened. Very often, the two operate as though they were incorrigible enemies, while at the same time purporting to be working towards the same goal. The two ought to complement each other in both research and training. For example, in East Africa there are fine research institutions outside the universities which have earned international recognition and reputation. Yet, local researchers and students hardly make use of them. It is a pity that they are more accessible and better known to foreign researchers than to local scholars. A case in point is the National Museum of Kenya which is renowned for its work on human evolution. Regrettably, it has remained the preserve of expatriates in both staffing and research activities, thirty years after Kenya's independence.

Publications

When we talk about publications, we are generally referring to three features:

- the process of publishing printed matter;
- communication of information to the public;
- printed matter offered for sale or distribution.

Figure 8.22 The University of Zimbabwe has an active publishing department for the work of its own staff as well as of those outside the institution

Research findings can be made available to the public in three forms: conference papers, journal articles or books and monographs. The decision to publish in any of these forms will be largely determined by the available avenues for publishing the type of material in our possession as well as the intended purpose of this publication.

A conference paper is a useful tool when we want to test our ideas amongst professional colleagues. Its purpose is to gain academic exposure which, in many cases, can become the starting point for future professional publications. You should remember, however, that the paper must adhere to the theme of the conference and guidelines for presentation which are normally spelt out by the organizers.

Exposure in a conference enables you to gain valuable criticism, although this is not always the case. You may then proceed to polish both the paper and the research findings for publication. The revised copy can be sent to a journal that has an interest in your area of study, while the manuscript of the research findings should be despatched to a potential publisher. Before doing the latter, you need to verify whether the potential publisher has an interest in your subject of study. To do this, you should send a letter of enquiry accompanied by a detailed outline of the proposed document and a sample chapter.

At all times remember that a book is a specialized publication. It gives a summary of research carried out in an area of study. Similarly, a monograph concentrates on a narrow topic of purely academic interest with little regard to its marketability. For this reason, publishers are usually wary of producing monographs. It is important, therefore, that you bear in mind the need to have an attractive manuscript for the publisher by making it as marketable as you can. You should ask yourself some pertinent questions such as: Who needs it? Is it different from all other books? What are its unique features?

Furthermore, you should strictly follow the publisher's recommended layout, format and style. Normally, the company's Editor will provide guidelines on these. In any event, the manuscript should be neat and well–prepared. It should also be double–spaced with ample margins on all sides. If you use tables and illustrations, they should be as close as possible to the relevant text. Finally, do remember to retain a copy of the manuscript when you send it in. It can be lost on the way!

☐ What research and publication constraints do you face in your university?

☐ Suggest ways of overcoming them

CONCLUSION

In this chapter, you have been exposed to the idea that research is a serious academic enterprise. You have probably noticed that undertaking a research project is comparable to an industrial project, such as the construction of a road, where a civil engineer is commissioned to design and oversee the work. To do this, he requires a blueprint which spells out such details as the design of the road, the materials needed, the cost of the project and the time schedule.

Similarly, as a researcher you depend on a well thought−out research proposal. This must include a research design which will assist you to make the best use of your time and resources. The importance of this instrument cannot, therefore, be over−emphasized. It is a vital component in your effort to achieve successful completion of your project.

At the same time, we have argued that research is an important and vital component of our academic duties. We have a duty to assist our societies to solve national problems. Indeed, in the African context, universities are well placed to carry out this task through research. But in order to enhance such activities, there is a need to minimize the bottlenecks that now face us. To begin with, it is important to establish reliable inventories of the ongoing research in each country. The establishment of documentation centres and reference libraries is also long overdue.

At the same time, younger researchers find it difficult to attract funding. For this reason, the more established academics should regard it as their duty to train them in both research techniques and the art of applying for grants. Of even more importance is their incorporation into the research projects of senior staff. In this way, they gain invaluable practical experience and exposure to the intricacies of the research enterprise. This hands−on experience would make introduction to research a less painful undertaking. In the final analysis, it would contribute towards creating a conducive and enabling climate for research and advanced training.

As we have seen, the quality of research and scholarship is a useful barometer for measuring the academic health of an institution and indeed the standing of a nation. In our case, it contributes to academic and professional excellence in higher education. It is our duty, therefore, to maintain an active and sustainable research enterprise.

SUGGESTIONS FOR FURTHER READING

Babbie, Earl. *The Practice of Social Research,* 5th Ed. Belmont, California: Wadsworth Publishing, 1989.

> The author discusses the theoretical principles on which scientific research techniques are based as well as the relationship between theory and research. He then examines the research methods and techniques.

Kothari, C.R. *Research Methodology: Methods and Techniques,* 2nd Ed. New Delhi: Wiley Eastern Limited, 1992.

> This book covers a wide range of topics related to research methodology. It explains the technique of defining a research problem and covers the various designs. It is particularly useful in its coverage of research techniques that are widely used in the social sciences.

Smith, R. V. *Graduate Research: A Guide for Students in the Sciences,* 2nd Ed. New York: Plenum Press, 1990.

> This book discusses the problems of developing and improving research skills and preparing for professional careers. It also offers valuable advice on a wide range of topics such as time management, ethics and library and literature work.

Sproull, Natalie L. *Handbook of Research Methods: A Guide to Practitioners and Students in the Social Sciences.* Metuchen, New Jersey: Scarecrow Press, 1988.

> The handbook provides basic information on research in an attractive and concise format. It is particularly useful in providing research students with instructive summary charts and exhibits. Major concepts are also defined and their advantages and disadvantages highlighted.

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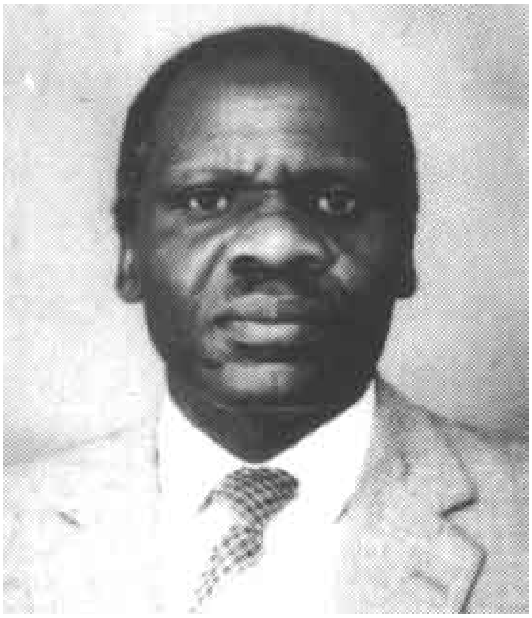
Tom Mulusa



Tom Mulusa holds a BA degree from the university of London, MA from the University of Nairobi and MA in Education and PhD in Education from the University of Massachusetts. His main area of work has been as lecturer in the Institute of Adult Studies, Director of Extra−Mural Studies, and Senior Lecturer, Faculty of Education, University of Nairobi. Dr Mulusa retired in 1991 and continues with his interests in research programmes, evaluation, leadership training, education and development as an educational consultant, based in his home town Gambogi, Kenya.

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Godfrey Muriuki was born in Nyeri, Kenya, and educated in Makerere University College, Uganda, where he obtained a BA (Hons.) in History. He then proceeded to the School of Oriental and African studies where he obtained a PhD in African History. Professor Muriuki has served as Chairman of the Department of History and Dean, Faculty of Arts of the University of Nairobi. Currently, he is Director of the Board of the Common Undergraduate Studies and Special Advisor to students.

He takes keen interest in community affairs. He has been honoured with the Order of the Elder of the Burning Spear (EBS) of Kenya; honorary life membership of the Historical Association of Great Britain; and editorial boardship of *African Affairs, Journal of African History* and *The International Journal of African Historical Studies.*

Peter Kiilu Mutunga

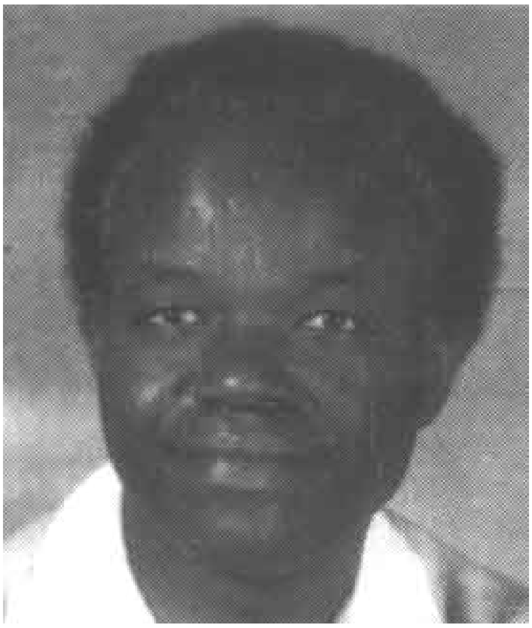
Peter Kiilu Mutunga was educated at San Francisco State University where he received his BA and MEd degrees. Later he proceeded to Claremont Graduate School, California, where he obtained a PhD in Education. He is a senior lecturer and current Chairman of the Department of Educational Communication and Technology at Kenyatta University, Kenya. His areas of specialization are Mathematics Education and Pedagogics. He has recently co–authored *Mathematics Education* and *Mathematics into Health* among other publications.

Anna P. Mwangi

Anna P. Mwangi obtained her MA degree in Literature and Linguistics and Diploma in Education from Sofia State University. She has been Chairman of the Department of Literature at Kikuyu Campus of Nairobi University and is the Vice Chairman of the Editorial Board of the Kenya Adult Education Association's newsletter, KAEA News as well as its Journal. Her areas of specialization are Literature and Linguistics. She is interested in promoting distance as well as adult education and has written or edited various educational materials in this area. She is serving as a consultant to a number of NGO's, institutes and ministries in the Eastern and Southern African Region in the development of their public education and information materials as well as proposal–writing.

At present Anna Mwangi lectures at the Department of Literature and Linguistics, Faculty of Social Sciences, College of Education and External Studies, University of Nairobi, where she is also a Warden of students. She has been elected as the representative of her Faculty to the Nairobi University Senate.

Johnson Nkuuhe



Johnson Nkuuhe graduated as a veterinary surgeon from the University of Nairobi, Kenya in 1974, and practised his profession in Uganda, his home country, for three years. He then proceeded to the University of Saskatchewan, Canada, where he obtained an MSc and a PhD in Physiology, Endocrinology and Reproductive Physiology. Since 1983, Dr Nkuuhe has lectured at the University of Zimbabwe in Physiology, primarily to veterinary students, but also to medical, agriculture, and pharmacy students at undergraduate and postgraduate levels.

Dr Nkuuhe has special interests in development issues (draft animal power and small−scale dairying), and information technologies, especially the use of computers as tools to improve the efficiency of the individual person in higher education. At the time of writing this Handbook he was using his own computer hardware to produce newsletters for two networks: the University Staff Development in Eastern and Southern Africa (USDESA) Newsletter and the African Feeds Resources Network (AFRNET) Newsletter.

Ruth Schlette

Ruth Schlette holds a PhD in History from the University of Munich, Germany. She has lectured at the University of Munster and at Teacher Colleges ('Pädagogische Hochschule') in Bonn and Koblenz. From 1984 to 1993 she was the Head of the Higher Education Section of the DSE's Centre for Education, Science and Documentation.

IKO − Verlag für Interkulturelle Kommunikation
ISBN 3−88939−076−5