CONTENTS

Preface 9

1. A Technology of Instruction 13

Technology and Learning 13; Principles of Learning and Instruction 14; Varieties of Instructional Technology 16; Individualised Instruction 18; Distance Education 30; Simulations 36; The Organisation and Delivery of Instructional Technology 38; Individuals 38; Media Centres 38; Instructional Development Units 39; Specialised Services and Projects 40; The Whole Institution 41; The Role of Governments and Foundations 43; Summary 44

2. The Evaluation of Teaching and Learning 46

Some Definitions and a Little Recent History 46; Basic Terms Defined 46; The Need for Evaluation in Education 47; Applying Learning in the Real World 49; Aims and Objectives 51; Behavioural Objectives 51; Evaluation for Whom? 52; Constructing Objectives 53; Formative and Summative Evaluation 54; Summative Assessment 55; Formative Assessment 55; Norm-based and Criterion-based Evaluation 57; Summary 59

3. Criteria for Evaluation 61

Some Methodological Considerations 61; Descriptive Methods 61; The Experimental Method 62; Quasi-experimental Methods 66; Correlational Approaches 67; The Role of the Investigator 69; The Measurement of Learning and Skill Performance 70; Bloom's Taxonomy 70; Direct and Indirect Tests of Learning 71; The Validity and Reliability of Tests 74; Attitudes and Attitude Change 76; Measuring Attitudes 77; Other Criteria 78; Costs 78; Time 79; Efficiency 81; Functional Effectiveness 82; The Results of Evaluation 82; Summary 83

4. Programme Evaluation 85

Setting Goals 85; Summative or Formative Evaluation? 85; Timing 86; Inappropriate Evaluation 87; Selecting the Method 89; Informal Observation and Testimony 89; The Case Study 90; The Experiment 91; Collecting Data 92; Interviews 92; Surveys

92; Existing Evidence 94; Direct and Indirect Methods 94; Measuring Individual Differences 95; Standardised Instruments 96; Costs 96; Special Problems 97; The Problem of Selection 97; The Role of the Evaluators 97; Effective Communication 98; Summary 100

5. Four Case Studies 101

Self-paced Instruction in Mechanics: A Descriptive Study 101; Focus of the Study 101; Method 102; Results 102; Critique 103; The Lecture versus CAI: A Comparative Evaluation 105; Focus of the Study 105; Method 106; Results 107; Critique 107; Factors Affecting an Instructional System: A Study of Teacher Expectations and Programmed Learning 109; Focus of the Study 109; Method 109; Results 110; Critique 110; Project LONGSTEP: A Programme Evaluation 111; Focus of the Study 111; Method 112; Results 113; Critique 114

6. Instructional Technology Evaluated — An Overview and Critique 116

Principal Approaches to Evaluation 116; Simple Descriptive Studies 116; Comparative Studies 117; Research on Different Methods of Implementation 117; General Programme Assessments 118; The Results of Evaluation 118; Methodological Problems 119; Expectancy and Social Desirability Effects 120; Evaluation Criteria 121; Study Design and Control of Variables 124; Interpretation of Results 126; A Concluding Comment 128; Summary 129

7. Lessons for the Future 130

Matching Instructional Medium to Instructional Content 130; A Learning Matrix 131; Quality, Permanence and Pacing in Media 133; Relating the Medium to the Individual Student 135; The Role of the Teacher 137; The Question of Efficiency 138; Unresolved Questions for Evaluation Research 139; Long-term Effects 139; Individual Versus Group Learning 140; Evaluation and Creativity 141; Instructional Technology: Means or End? 141; Summary 143

Annotated Bibliography 145

Index 160