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RESEARCH INTO THE SIMULTANEOUS CONDUCT OF MAN-MAN AND MAN-COMPUTER INTERACTION

by
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A Master's Thesis submitted in partial fulfilment of the
requirements for the award of Master of Science of
the Loughborough University of Technology
November 1975

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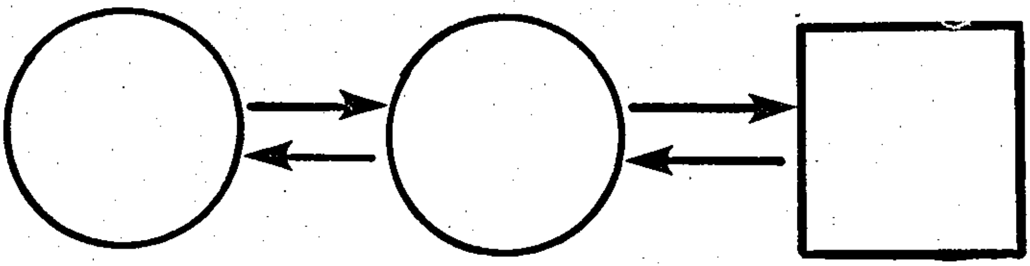
SUMMARY

This Thesis traces the development of Double-interaction Research conducted over a period of one year. The research focussed primarily on the human issues surrounding face-to-face Double-interaction. Double-interaction refers to the simultaneous conduct of Man-Man and Man-Computer Interaction. A real-life example is the Customer-Airline Official-Computer interaction in the Travelling context:



Double-interaction is a new area of research, and very limited literature, directly relevant, is available. Supported by appropriate Field Studies, several important human issues affecting Double-interaction were identified. The factors that emerged were put to test by an experimental study.

The findings suggest that a useful framework for studying Double-interaction may be provided by a joint consideration of: The Customer
The Operator
The Computer (or System)
The Enquiry

Each factor can be considered for its 'person' or 'efficiency' content. Further, the findings report how the 'person' or 'efficiency' nature of the 4 factors may interact to produce differing degrees of Double-interaction transaction harmony. The thesis ends with considerations regarding future Double-interaction Systems.

Finally, the thesis provides the groundwork for a research approach that will hopefully lead ultimately to a better quality of life for Customers and Operators alike, in the Double-interaction context.

ACKNOWLEDGEMENTS

The policy currently practised of not revealing the identity of the Organisations visited makes it difficult to pay to them a fitting tribute.

Grateful thanks are extended to:-

1) all the Officials, on the Field Sites, and all the 'Customers' in the Experiments, who kindly participated in the Study.

2) the Organizations concerned for allowing the Study to take place.

3) to various members of the HUSAT Staff, in particular Mr. R.F. Penn, Mr. T. Oliver, and Miss C. Dawson, who helped with the various stages in the development of the Research.

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CONTENTS

Page

1. INTRODUCTION 1

1.1 MCI and Double-Interaction 1

1.2 Real-life Occurrence of Double-Interaction 2

1.3 The Subject Matter and Scope of Double-Interaction Research 3

1.4 Hypotheses 4

1.5 Definitions and Explanations of Terms 6

2. FIELD STUDY 8

2.1 Field Study 1: Computer-aided Information Retrieval at a University Library 8

2.1.1 Observations 9

2.1.1.1 The Task 9
2.1.1.2 Layout of Participants 9
2.1.1.3 Type of Interaction Flow 10
2.1.1.4 Multiple Interactions of the Operator 10

2.1.1.4.1 The Operator/Customer Interaction 11
2.1.1.4.2 The Operator/Computer Interaction 11
2.1.1.4.3 The Operator/Other People Interaction 11

2.1.2 Problems and Explanations 12

2.1.2.1 Discrepant Role Expectations 12
2.1.2.2 Not knowing enough about the Computer 12
2.2.2.3 O's reaction to system failure 13
2.1.2.4 System dependence 13
2.1.2.5 Multiple-interaction and the Pressures on O 14

2.1.3 Discussion 14

2.2 Field Study 2: Computer-aided Airline Bookings 15

2.2.1 Objectives 15
2.2.2 Methodology 15
2.2.3 Findings 17

2.2.3.1 Description of the Situations 17
2.2.3.2 Observation-Findings 20

2.2.3.2.1 Interaction Procedure 20
2.2.3.2.2 Layout of Participants 21
2.2.3.2.3 Information Regarding the Flow of Interaction 22
2.2.3.2.4 Dialogue Control 24
2.2.3.2.5 Interactional Errors 25
2.2.3.2.6 Operator/Customer Relationship 26

2.2.3.3 Interview-Findings 29

2.2.3.3.1 Operator Experience and Training 29
2.2.3.3.2 Ease of Translation 30
2.2.3.3.3 Reaction to System Failure 31
2.2.3.3.4 The Operator's Views on the Customer 32
2.2.3.3.5 Job Satisfaction and the Effect of Technology 34

CONTENTS (contd)

Page

3. DISCUSSION 39

3.1 A Comparison between Computer-aided Airline Booking and Information Retrieval Systems 39

- 3.1.1 Comparisons of Transactions 39
- 3.1.2 Discrepant Expectations of Operator and Customer 39
- 3.1.3 System Dependence 40
- 3.1.4 Multiple-interaction Environment and the pressures on the Operator 40

3.2 Strains for the Customer 41

3.3 System-oriented and Customer-oriented Operators 44

3.4 A Long-Term Trend towards functionality or System-orientation for Operators and Customers 47

3.5 Summary and Conclusions 49

4. AN EXPERIMENT IN DOUBLE-INTERACTION 51

4.1 Introduction, Aim and Hypotheses 51

- 4.1.1 Introduction 51
- 4.1.2 Aim and Hypotheses 51

4.2 Experimental Design and Methodology 54

- 4.2.1 Task, Technology and System 55
- 4.2.2 Enquiries 64
- 4.2.3 Operator-orientation 66
- 4.2.4 Customer-orientation and Satisfaction Measurement 68
  - 4.2.4.1 Pre-test Questionnaire and Customer-orientation 68
  - 4.2.4.2 Post-test Questionnaire and Customer Satisfaction 70
  - 4.2.4.3 Testing the Model 71
- 4.2.5 Experimental Procedure 74

4.3 Findings 79

- 4.3.1 Customer Types 79
- 4.3.2 General Factors Governing Customer Satisfaction in Double-interaction 83
- 4.3.3 Testing the Model 87
  - 4.3.3.1 Efficiency-centred Customer 90
    - 4.3.3.1.1 Efficiency-centred Customer/ Simple Enquiry 90
    - 4.3.3.1.2 Efficiency-centred Customer/ Complex Enquiry 91
    - 4.3.3.1.3 Commonalities between the Effects of Simple and Complex Enquiries and Changes in the Model 94

CONTENTS (contd)

Page

    - 4.3.3.2 Person-centred Customer 97
        - 4.3.3.2.1 Person-centred Customer/ Simple Enquiry 97
        - 4.3.3.2.2 Person-centred Customer/ Complex Enquiry 99
        - 4.3.3.2.3 Commonalities between the Effects of Simple and Complex Enquiries and Changes in the Model 100
    - 4.3.3.3 Differences and Commonalities between the Behaviours of Efficiency-centred and Person-centred Customers 102
- 4.3.4 A Review of Some Associated Issues 104
    - 4.3.4.1 The Operator 104
        - 4.3.4.1.1 How the Operator appeared to the Customer 104
        - 4.3.4.1.2 The Operator's 'natural' Orientation 113
        - 4.3.4.1.3 The Operator's 'induced' orientations and her reactions to the 4 situations 114
    - 4.3.4.2 The Person-centred Customer and his Special Behaviour 120
        - 4.3.4.2.1 Customer's Initial Expectations and their Relationship to the Evaluations of the 4 Situations 120
        - 4.3.4.2.2 A Summary of the Person-centred Customer's 'Special Behaviour' 123
        - 4.3.4.2.3 A Discussion on the Person-centred Customer's 'Special Behaviour' 123
    - 4.3.4.3 Defects, Deficiencies, and Defences 125
        - 4.3.4.3.1 The Reality of the Situation 125
        - 4.3.4.3.2 The Enquiries 126
        - 4.3.4.3.3 The Operator 127
        - 4.3.4.3.4 Small Sample Studies 129

5. DISCUSSION 131

5.1 Double-interaction Appraisal 131

5.2 Relevant Literature 132
- 5.2.1 The System-approach, the Task-approach, or the Social Psychological Approach? 132
- 5.2.2 Relevant Literature from the System- and Task-Viewpoints 134
- 5.2.3 Person-related and Efficiency-related Orientations: Relating Literature 134
- 5.2.4 Relevant Literature from the Social Psychology Viewpoint 135

CONTENTS (contd)

Page

5.2.4.1 'People' centred and 'Things' centred Persons 135
5.2.4.2 'People' as a Central Focus 136
5.2.4.3 Competitive and Co-operative Orientations 136
5.2.4.4 The Exchange Theory 137
5.2.4.5 A Comment on Literature Relating to Interactive Styles of Behaviour 138

5.3 The Customer 138

5.4 The Operator 141

5.5 The System 143

5.6 The Enquiry 147

5.7 The Model 149

6. SUMMARY AND CONCLUSIONS 154

7. REFERENCES 159

APPENDICES 161

TABLES

Page

1. A List of Double-Interaction Applications 3
2. Hypotheses 5
3. Activities of the Kiosk 18
4. Activities at the Shop 19
5. Information regarding Flow of Interaction 22
6. Interactional Errors 25
7. Factor Chart used for Determining Operator/Customer Relationships 26
8. Analysis of Operator/Customer Relationship 27
9. Operator Experience 29
10. Operator's "Ideal" and "Worst" Customers 32
11. Job Satisfaction Relating to Technology 35
12. Combining Job Satisfaction and Technology Type with Operator Type 36
13. An Explanation for Preferences Attached to Jobs with Differing Technologies 37
14. Double-Interaction Strains produced by the System 43
15. Simple and Complex Enquiries 65
16. Experimental Design 75
17. Customer Types 80
18. Distribution of E:P Scores 81
19. Customer Types and Sex Factor 83
20. General Factors Governing Customer Satisfaction in Double-interaction 84
21. Findings of the Experimental Attempt of Testing the Customer Satisfaction Double-interaction Model 89
22. How the Operator appeared to the Customers 105
23. How the Operator appeared to Different Customer Types 106
24. Operator's Reactions to the Conduct Require 116

DIAGRAMS

Page

1. MCI Dyad 1
2. MCI Triad 2
3. Layout for Participants 9
4. Iterative Flow of Interaction 10
5. Multiple Interaction Structure of the Information Search Activity 10
6. Plan of the Airport Kiosk 17
7. Plan of the Shop 19
8. Layout of Participants 21
9. Types of Interaction Flow 23
10. Graphical Representation of Findings on Operator/Customer Relationship 28
11. System-oriented and Customer-oriented Operators 45
12. A Switch-over Between Descriptions of Ideal and Worst Customers 46
13. "Human strains" of Face-to-Face Double-Interaction 50
14. A Model to represent the State of Customer Satisfaction in the Double-interaction Context 52
15. An Extract from the Manual Version 58
16. An Extract from the Fare Table 59
17. An Illustration of the Stages in the Computer System, as displayed on the V.D.U. 61
18. Operating the Computer System 63
19. The Structure for obtaining Customer Satisfaction by the Indirect Method 73
20. The 4 Double-interaction Situations 74
21. Layout of the Travel Kiosk 76
22. Primary Factors Governing Customer-Satisfaction in Double-interaction 85
23. Secondary Factors Governing Customer-Satisfaction in Double-interaction 86
24. Operator as perceived by Different Customer Types 107
25. A Comparison between Initial Expectations and Actuality of the 4 Situations, for Different Customer Types 122
26. Qualities of the Human Participants in a Double-interaction 150
27. States of Harmony in Double-interaction 152

PLATES

Plate 1 Manually operated Travel Kiosk 77

Plate 2 Computer aided Travel Kiosk 77

General Plan

➤ 1. Introduction
2. Field Study
3. Discussion
4. Experiment
5. Discussion
6. Summary and Conclusions

Plan for Chapter 1

1. Introduction
1.1 MCI and Double-interaction
1.2 Real-life Occurrence of Double-interaction
1.3 The subject Matter and Scope of Double-interaction Research
1.4 Hypotheses
1.5 Definitions and Explanations of Terms

1. INTRODUCTION

There are instances to cite from everyday examples where a member of public addresses an enquiry to an official who furnishes a response with the aid of a computer. With the Customer (member of public) interacting with the Operator (official - a representative of a commercial or public organization), and the Operator simultaneously interacting with a computer, a double interaction phenomenon arises which poses special human problems. With the Customer - and to an extent even the Operator - facing a novel technology, the result often is a strained transaction. Examples of the double-interaction event of the type on which the research focusses are computer-aided Airline Travel Booking and Information Retrieval Systems. The present trends suggest a widespread use of double-interaction in the years to come.

1.1 MCI and Double-Interaction

There has been an upsurge of research interest in the field of Man-Computer Interaction (MCI) in recent times. Various teams and individuals are actively engaged in research of areas such as Programmed Instruction, Computer-aided Design, commercial and industrial applications of MCI, Terminal and Keyboard Design, and Human Communications generally.

Whatever the area of research, however, the studies focus directly or indirectly on an MCI dyad, or a two-way man-computer relationship.

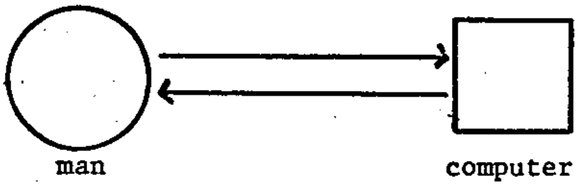


Diagram 1: MCI Dyad

To keep in line with technological advancements and related trends for the future, it seems necessary to extend the main focus of MCI studies to include the double-interaction event. This gives rise to a triad relationship.

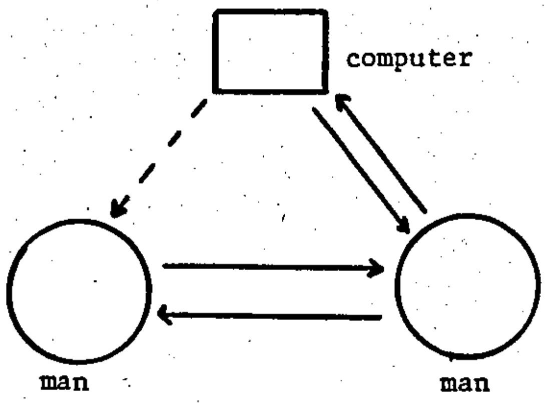


Diagram 2: MCI Triad

1.2 Real-Life Occurrence of Double-Interaction

There are three basically different ways the double-interaction activity can take place:-

1) intra-organizational transaction, where an operator is consulted by a member of the same organization.
2) cross-organizational transaction, where the operator is consulted by a member of another organization.
3) extra-organizational transaction where the operator is consulted by a member of the public.

Although the entire sub-field of the double-interaction phenomenon seems grossly neglected, the last aspect involves a member of the public - and the most naive at that - and deserves special attention. The present research aims to focus primarily on this latter aspect of double-interaction, which brings into contact the operator with a member of the general public.

Table 1 lists examples of double-interaction applications as they currently exist as well as the ones that are likely to occur in the near future.

present	1. Airline Bookings 2. Banking (Public Enquiries and Customer Accounts) 3. Gas and Electricity (Public Enquiries and Customer Accounts) 4. Information Retrieval 5. Police Emergency Systems 6. Telephone Sales (Sweden) 7. Theatre Bookings
future	1. Architecture (Customer participation in Design) 2. Building Societies (Public Enquiries and Customer Accounts) 3. Citizens Advisory Bureaus 4. Employment Exchange 5. Insurance (Public Enquiries and Customer Policies) 6. Telephone Directory Enquiries 7. Travel: Coach and Rail Travel, Package Tours

Table 1: A List of Double-Interaction Applications

1.3 The Subject Matter and Scope of Double-Interaction Research

Many characteristics of the double interaction phenomenon fall within the realm of social psychology. Mechanisms of interaction, possible coaction effects, differences in individual and group behaviour, organizational structure relating to individual behaviour, are a few of the many social psychological issues that may contribute towards an understanding of the phenomenon. The consonance-dissonance theory may play a particularly useful role here. A novel technology, demanding an unnatural conduct from the operator may create a special dissonance which will lead him to behave in a particular way towards the customer. The Customer himself may also seek consonant outlets to reduce dissonance arising from both an incomprehensible technology as well as an Operator who herself seems to be affected by it and is behaving in a "strange way".

At another level, the research is of an applied nature. Additionally the line of research aims at a "study of man in his working environment" or "how a particular technology affects its users". In this context the issue falls very much within the definition of "an ergonomic problem".

The scope of this research is confined to the Psychology or Ergonomics of Double-Interaction. The ultimate objective of all such research must be to plan for systems which follow closely the "technology-in-the-service-of-man".ideal. So it is with this research.

1.4 Hypotheses

A set of hypotheses relating to the Double-Interaction problem was necessary to serve AS A STARTING POINT.

Literature directly relating to the subject was not available.[1] However, it was possible to generate a set of hypotheses by combining part-relating findings and first hand experience of other MCI researchers with the researchers' own reflections.

The Table below lists the set of hypotheses thus generated. The hypotheses were intended to be assessed for relevance by carrying out appropriate field studies, and amended later if necessary. A small selection could then be taken up for the purpose of experimental verification. Alternatively, new hypotheses could be developed in view of the field-findings.

---

1. As the research developed, and new dimensions emerged, this opened up the prospect of finding some literature relevant to the study of Double-interaction. This will be reviewed at a later stage (Chapter 5), as thought appropriate.

Table 2: Hypotheses

<table>
<tr><th>Cause</th><th colspan="2">Consequence</th></tr>
<tr><td></td><td>Client Dissatisfaction</td><td>Operator Dissatisfaction</td></tr>
<tr><td rowspan="6">1. A Mismatch between Natural language and Terminal Dialogues</td><td colspan="2">1. function difficult to carry out</td></tr>
<tr><td colspan="2">2. function takes time</td></tr>
<tr><td>3. anxiety, uncertainty, and awkwardness of having to use other than normal conversational terms.</td><td>3. problem of conducting 2 different interactions at the same time.</td></tr>
<tr><td colspan="2">4. type of interaction between client and operator may become more formal or functional and less social.</td></tr>
<tr><td colspan="2">5. inflexible format strenuous for both client and operator.</td></tr>
<tr><td></td><td>6. double interaction may lead to greater number of errors.</td></tr>
<tr><td>2. Interacting with a novel technology</td><td>1. anxiety, awkwardness, and uncertainty of having to use a strange tool especially if fail to appreciate why it replaced the old tool.</td><td>1. job dissatisfaction if fail to appreciate why the new replaced the old tool, and how this new form of job relates to the rest of the system.
2. dilemma of making the client happy as well as do the job.
3. if system down, operator may side with the client against the system as this may offer the most consonant reaction</td></tr>
</table>

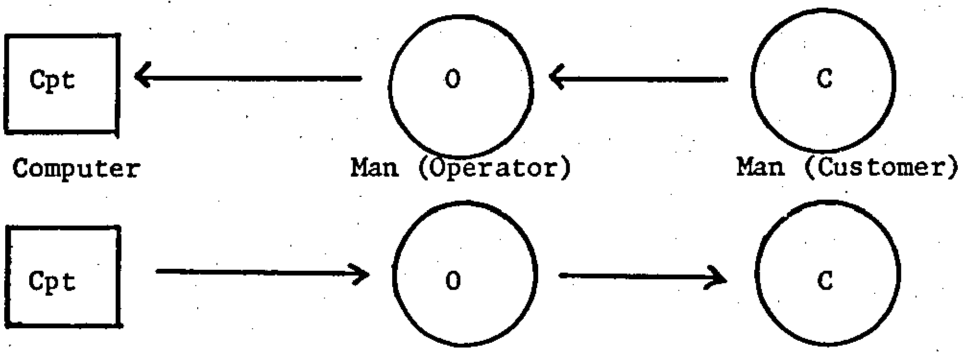
1.5 Definitions and Explanations of Terms

Interaction: A flow of information from one participant to another via verbal or non-verbal, spoken or non-spoken means. The Report refers to it mainly as a two-way exchange of such information between two participants. Hence Man-Man interaction or Man-Computer interaction.

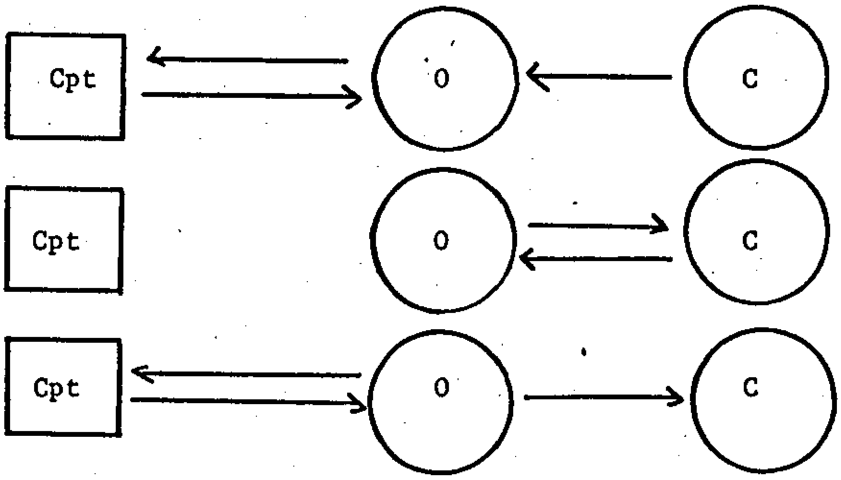
Double-interaction: An abbreviation to stand for the simultaneous conduct of Man-Man and Man-Computer interaction. Double interaction discussed in the Report is mostly for face-to-face situations although the computer may not be "visible" to either of the human participants. The Terminal may be visible and accessible to only one of the 2 participants.

Double-interaction may be of two types:-

Single Interaction: A Double-interaction progressing via a single input/output relationship.



Iterative Interaction: The alternative type of Double-interaction which extends beyond a Single interaction, to include pre-consultations between participants as an outcome of a previous interaction.



Interacting Participants: "Interacting Participants", unless otherwise specified, refer collectively to the three "participants" that make up the minimum requirement of a Double-interaction:
1) Customer or enquiring participant.
2) Operator or the intermediary participant.
3) Computer or System, or the participant being "consulted".

Operator: A term referring to the intermediary participant in Double-interaction who interacts directly with the Computer via a Terminal. It refers in real-life to Airline Officials, Librarians or other representatives engaged as intermediaries in Double-interaction.

Customer: A term referring to the enquiring participant or alternatively, one "receiving a service" collectively from the system and the Operator, in Double-interaction. It refers in real-life to Intending Travellers, Information Retrievers, or other members of the general public placed at the receiving end of Double-interaction.

Dialogue Control: A term referring to the control exercised, over the Dialogue, by one or more of the interacting participants. "Dialogue" refers to "conversation" or "discussion". "Who or what controls the Dialogue", for example, means "who or what leads the conversation, keeps it flowing, imposes restraints or constraints, etc."

Consonance-Dissonance: The terms derive their origin from Leon Festinger's Theory of Cognitive Dissonance (1957).

When two or more sets of beliefs and values match with each other, or when the opportunities created by one match with the needs of another, the parties may be said to be in consonance. When there is a mismatch, or a "non-fitting relation between 'cognitions', this leads to dissonance".

According to Festinger, ".. Dissonance is a motivating state of affairs" i.e. when Dissonance exists, man strives to reduce it.

General Plan

1. Introduction
➤ 2. Field Study
3. Discussion
4. Experiment
5. Discussion
6. Summary and Conclusions

Plan for Chapter 2

2. Field Study
2.1 Field Study 1: Computer-aided Information Retrieval at a University Library.
2.2 Field Study 2: Computer-aided Airline Bookings

2. FIELD STUDY

The aims of the field study were:

1) to acquaint the researcher with the real-life application of Double-interaction.
2) to assess the relevance of the set of hypotheses (Section 1.4, Table 2), and to develop new ones if necessary.
3) as an exploratory attempt to distil the more important issues at stake in the Double-interaction situation, and as an attempt to develop a common approach to future Double-interaction studies.

Two field studies have been carried out. The first one, at a University Library, examined the Computer-aided Information Retrieval System. It took the form of a part observation/part interview study in an attempt to meet objectives 1 and 3 as outlined above. The second field study, at a Provincial Airport, examined a Computer-aided Airline Booking System and took the form of a more detailed enquiry designed to meet all three objectives.

2.1 Field Study 1: Computer-aided Information Retrieval at a University Library

A University Library was participating in a Project on the feasibility of Automated Information Retrieval. (Details appear in the Appendix.) This gave rise to a Double-interaction with the Library Official (Operator, O) gaining access to various data bases via a computer link in order to carry out a search according to the specifications of the Retriever (Customer, C).

The objectives of the field study were primarily to view the real-life occurrence of double-interaction and secondly to extract human issues surrounding the Double-interaction Triad. The form of enquiry was mostly observational and was followed by a brief interview with the Operator.

2.1.I Observations

2.1.1.1 The Task

The task involved a literature search which the computer carried out based on "key words". A key word was the subject on which the Customer required a search. On input of the key word(s), the Computer would search through all the journal titles in the data base and output the total number of hits scored.

The Operator participated also in the decision-making that followed a Computer Output. There were three basically different types of decisions involved.

1) when the key word being tried out was too general, the Computer might output a number of hits that was too large to handle. In such a case the search field had to be narrowed down and a more specific key word selected.
2) when the key word was too specific, and the Computer output no hits at all, the search field had to be widened. A more general key word had to be selected.
3) when several key words collectively defined the search field, strategies of combining these had to be worked out.

2.1.1.2 Lay-out of Participants

O sat at the terminal with C sitting next to her. This lay-out enabled both O and C to observe information being output by the Computer (Cpt).

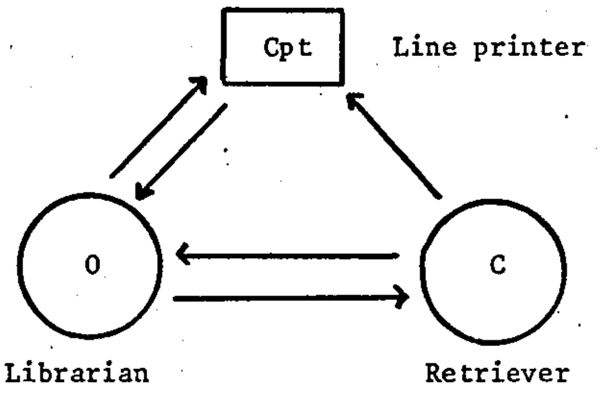


Diagram 3: Lay-out of Participants

2.1.1.3 Type of Interaction Flow

The type of interaction flow was mostly iterative (as compared to single). C would be re-consulted following an output from the computer and the computer in turn would be consulted again if necessary. O may even consult C, or vice-versa, in the middle of an Operator-Computer dialogue. Interaction would progress in this manner until the transaction came to a satisfactory end.

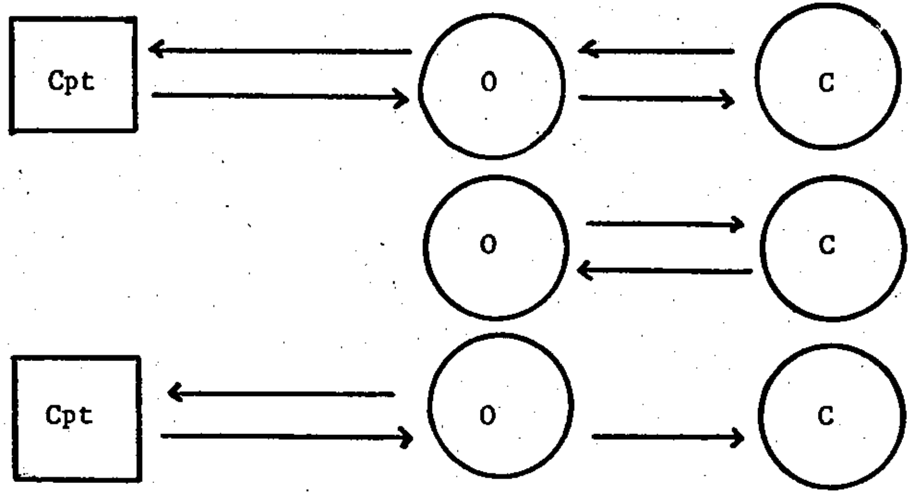

Cpt
O
C
O
C
Cpt
O
C

Diagram 4: Iterative Flow of Interaction

2.1.1.4 Multiple Interactions of the Operator

It was noted that the operator was involved with 3 types of interactions: Operator/Customer, Operator/Computer, and Operator/Other-People, at times with all three taking place at the same time.

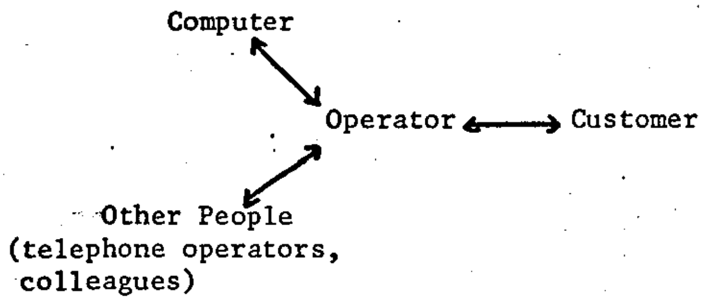

Computer
Operator
Customer
Other People
(telephone operators,
colleagues)

Diagram 5: Multiple Interaction Structure of the Information Search Activity

2.1.1.4.1 The Operator/Customer interaction took place with the C (Customer) in O's (Operator's) office sitting at the right of O and close enough to the terminal to watch and take part in the operator/computer interaction. O regarded C's task to be simple and asked him merely to arrive at an appointed time with a list of relevant search titles, besides briefing him on the object of the Project. Clearly both C and O needed to appreciate each other's needs in order for a successful interaction to take place. O had to match C's needs against the constraints imposed by the computer system. She therefore had to monitor C's needs to make them computer- and cost-compatible (the greater the time spent on-line, the greater the cost; more so if data-base overseas). She encouraged "slow clients" to react more quickly to the printout information, modified the search titles to either narrow down or expand the search field, and also modified the number of separate searches desired by C.

2.1.1.4.2.The Operator/Computer interaction involved input being made via a keyboard linked to the computer by telephone and the output via a line-printer and/or a V.D.U. Here O needed to appreciate generally the Computer aspect of the System and its overall behaviour. She also needed to know the interaction procedure, mainly the input procedure, what was or was not acceptable to the Computer, and how to correct for errors.

2.1.1.4.3 The Operator/Other People interaction arose most times out of necessity. O needed to consult - or had to be consulted by - her colleagues and telephone operators at various stages. Any search directed at the American Data-base had to go through the telephone operator. This resort to the telephone operator was frequent especially if the computer repeatedly denied access or if there were technical difficulties surrounding the telephone links. At another level, O had to consult a colleague based elsewhere in the building by telephone to enquire whether a call had come through or if she knew why the line had gone dead. At other times, other colleagues would come to consult her on Library matters, or to retrieve some item from the office, or simply to chat to her.

2.1.2 Problems and Explanations

2.1.2.1 Discrepant Role Expectations

O often spent a lot of time remodelling C's needs while actually on-line. A part of the problem seemed to arise from the discrepant role-expectations O and C have of each other and of the computer. The brief instruction that C received at the beginning may assume certain pre-requisite qualities that C might not possess. He might not appreciate what exactly he was expected to do till the very end. Hence he was at a loss to react suitably when both the computer and operator awaited his go-ahead. ("Is a 1000 references too many to output?" as one C asked O when on-line.) This may also explain why he did not at first pay particular attention to the search combinations being tried out, but realized later that he should have.

2.1.2.2 Not knowing enough about the Computer

When the computer is down or takes time in responding, C must have more or less constant feedback as to why the computer is behaving the way it is, if he is to participate successfully in the interaction. It is felt that if C was not actually present, but on telephone, then O may be relieved of having to provide this continuous commentary by simply iterating "Sorry to keep you waiting" at regular intervals. On the other hand, for C to appreciate better the nature of the delay, it is better to have first-hand contact.

Often, however, O lacked sufficient knowledge regarding the computer system to be able to explain to C the nature of the delay. This, she reported to the researcher, was "very worrying". Often, especially for one particular data-base the computer would go "dead in its tracks" without any explanations. This put O in an awkward situation: she remained helpless and expectant unable to tell whether she was still on-line or whether the computer would "come on" at all again. It might be difficult for C in such circumstances to appreciate why even O could not understand the situation and why she could not "do something about it".

The gravity of such a situation is much less for Information Retrieval than for say, Airline Travel Bookings where C needs to have faith in the Airlines and confidence in their Agents before deciding to book a seat with them. Such delays may even lead to panic if travelling requirements express a degree of urgency.

2.1.2.3 O's reaction to system failure

Whenever an hour or so, or even an afternoon, was wasted because of a repeated rebuff from the computer (e.g. "all ports busy, please try later"), O confessed she felt rather guilty about it and tended to apologize to C "as if it was my fault". However, at the end of a day's search, although she felt over-apologetic, she seemed to react strictly as a representative of the organisation and the role displayed was very much the functional role probably expected of her.

It is difficult to interpret O's reactions since her present role was a short-term one and her priorities might lie first with the Library, and second with the Project Authorities as well as with C. As such it may be difficult to separate her two roles. Unable to appreciate herself why the system was "down" it is possible that siding with the customer against the system may offer a consonant solution to the operator's dilemma. It was not readily apparent though, that this was the case.

2.1.2.4 System dependence

Repeated rebuffs such as "all ports busy, please try later" put C and O entirely at the mercy of the computer as it provided little indication whether they would be successful the next time round. Additionally, although the format used was quite flexible in some ways, it still demanded that O and C proceed in a systematic sequence that not all customers may be used to. Also, certain customers might feel unhappy about why the 1000 relevant references cited by the computer had to be narrowed down to, say, 200. Or even why they could not make an extensive use of the Retrieval

System. All these problems point towards the issue of whether the computer ought to be allowed to be the major controlling agent of transactions involving a man-computer dialogue.

2.1.2.5 Multiple-interaction and the Pressures on O

It was found that O would show signs of working under pressure, especially when there were technical delays in the use of the system. When this occurred, she had to interact rather frequently with the telephone operator as well as with a colleague (over another telephone) to ask her why the line had gone dead or whether her call had come through. She often had to relate the same problem to different operators, at times even explain to them why they must not cut the line just because they heard a whistle on it, as this, in fact, is a characteristic of Datel calls. On top of that, she was constantly under an indirect pressure from C's physical presence and was aware of her obligation to him to explain to him the nature of the delay. Colleagues, not realizing her predicament, would come to the office on various matters when O simply could not afford to be disturbed. Clearly, O had to work under great pressure at times, and had to succeed in reacting suitably according to the naivety of the customer, her colleagues and even the telephone operators. This demands in O a considerable degree of all-round appreciation.

2.1.3 Discussion

The solution to most of the problems lies in a technology that is designed to be client- or user-compatible. While it continues to be other than this, the operator will remain heavily burdened to try and reach a compromise between the customer-needs and the service offered by the computer. She may even have to be extensively trained in order to appreciate the working of the computer system as well as the varying degrees of human naivety. Even this will not remove the problem, but only equip the operator to tackle it better. The real solution lies in a design of an operator-computer unit that is compatible with the customer's needs as they occur and in their raw form.

2.2 Field Study 2: Computer-aided Airline Bookings

For a number of years now, Airlines have been operating a Computer-aided System of Travel Bookings. This gives rise to a double-interaction situation involving Customer/Airline Official and Official/Computer interactions.

Field Studies were carried out at (1) an Airlines' Tickets Kiosk at a Provincial Airport, (2) at the Airlines' City Office. At each situation the Customers were served at the counter with the aid of the Computer.

2.2.1 Objectives

Outlined earlier in Section 2, the objectives for the field study were:

1) to acquaint the researcher with the real-life application of double-interaction.
2) to assess the overall relevance of the set of hypotheses generated (Section 1.4, Table 2).
3) as an exploratory attempt to distil the more important issues at stake in the double-interaction situation.

2.2.2 Methodology

With the experience gained from the first field study, the researcher was in a position to plan a more detailed enquiry for the second. A three-way enquiry was thought to be a satisfactory approach for exploring human issues relating to double-interaction.

1) Observing the situation at Work.
2) Interviewing the Operator.
3) Interviewing the Customer.

There were practical constraints imposed by the situation:

1) the Customer could not be interviewed as this would interfere with the commercial aspect of the situation.

2) for the same reason, the Operator could be interviewed only in-between transactions and without any Customers present.

The enquiry was tailored to be compatible with the practical constraints, and two compromises in particular are worth noting:

1) Operator/Customer Relationships could not be determined by asking either participant during or at the end of the transaction. It had to be determined by an alternative means. One way was to employ an impartial judge. No such personnel were available to the researcher, nor would the presence of an additional person in a working space that was already restricted be convenient for the Operators and the Airlines. The researcher therefore decided to rate the task himself as part of the Observation Study.
2) Interviewing the Customer was not practical for reasons outlined earlier, and this aspect of the enquiry had to be abandoned.

The enquiry in its final form, was related overall to the set of hypotheses generated (Table 2, Section 1.4) and also to the objectives outlined earlier (Section 2.2.1). A summary is provided below; the details appear in the Appendix.

1) Interview Study 1: Situation Appraisal.
   Based on Structured/Unstructured Questionnaire. Name and Type of Organization, Operator's Task, Interaction Structure, Examples of Customer-Needs, Additional Notes (Appendix IV).

2) Observation Study: Type of Interactions Involved, Time taken, Dialogue Control, Errors, and a factor chart to rate the Operator/Customer Relationship (Appendix V).

3) Interview Study 2: Operator Viewpoint.
Based on Structured/Unstructured Questionnaire. Experience and Training. Degree of Interaction Difficulty, Examples of Ideal and Worst Customers, Reaction to System Failure, Job Satisfaction Relation to the Technology employed in the Task (Appendix VI).

The study was based on the activities of a total of 11 Operators: 5 at the Kiosk and 6 at the Shop.

2.2.3 Findings

2.2.3.1 Description of the Situations

The Kiosk

The Airport Kiosk was a cubicle roughly 10 ft. by 12 ft. manned by 2 Operators.

There were 6 Operators in all. They worked shifts: the early shift ran from 6 a.m. to 2 p.m. and the late shift from 2 p.m. to 10 p.m. The Passenger Supervisor filled in for one of the Operators occasionally.

For some of the activities carried out at the Kiosk the Operators used a computer terminal situated at right angles to the Counter and at some distance from it.

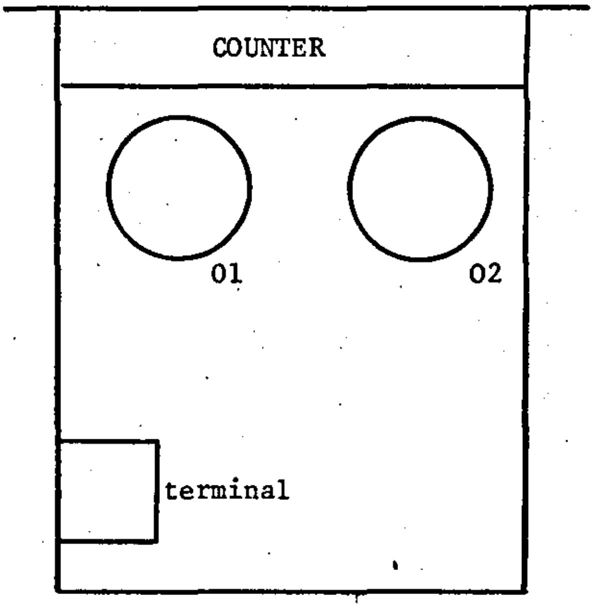


Diagram 6: Plan of the Airport Kiosk

The Kiosk dealt mostly with the ticketing of Internal and European flights. A list of the main activities appears below.

1. General enquiries (which should normally be asked at the Information Desk).
2. Flight information.
3. Ticket issuing (where booking had been made elsewhere).
4. Ticket booking.
5. Ticket Changes.
6. Excess baggage payment

Table 3: Activities of the Kiosk

Activities 3, 4 and 5, and even 2 on occasions, involve the use of the Computer and often led to double-interaction.

"The Shop" (City Office of the Airline)

The Shop was a spacious office, longer than it was wide. It was manned by 12 Operators at peak periods, and these worked office hours. The Operators were distributed in the following manner:

3 on International Section, sharing 2 terminals
5 on European Section, sharing 4 terminals
2 on Package Tours who also helped out the European Section when necessary
2 on Special Accounts dealing with Customers with whom they had special accounts (e.g. Business Firms).

The Supervisor would occasionally fill in for an Operator.

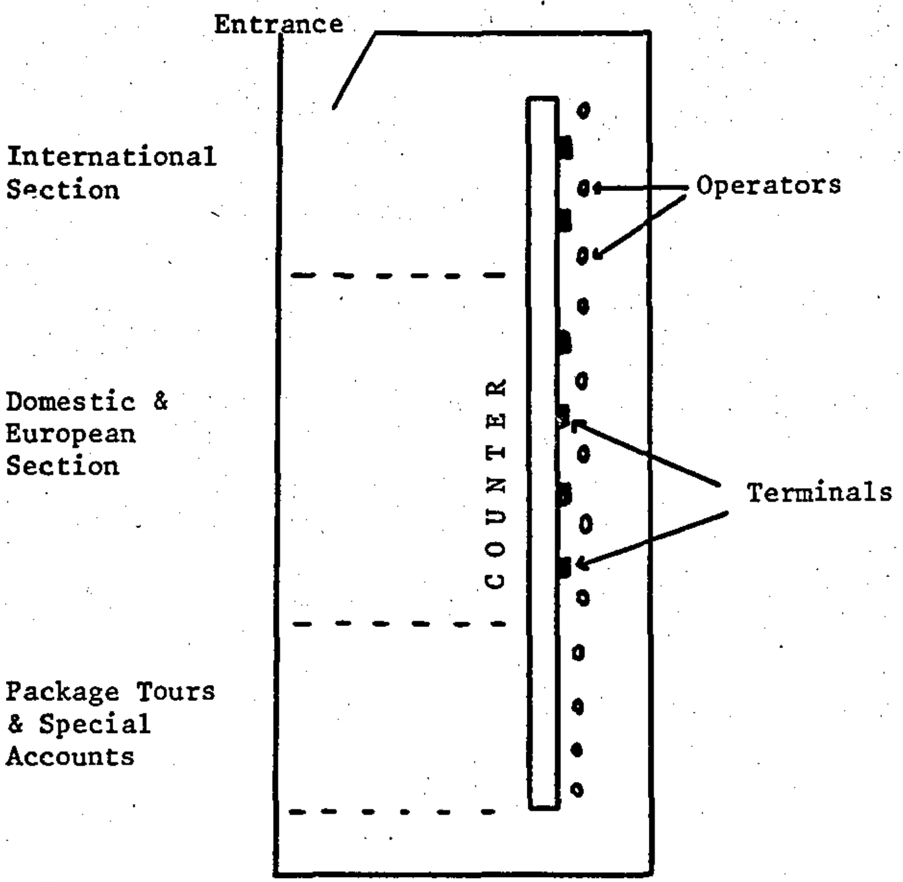

Entrance
International Section
Domestic & European Section
Package Tours & Special Accounts
COUNTER
Operators
Terminals

Diagram 7: Plan of the Shop

The Shop dealt with Domestic, European, and International Travel and Ticketing was the primary task undertaken. The on-line resort to the Computer and the resulting double-interaction was therefore more frequent than at the Kiosk. A list of the main activities appears below.

1. Travel Information
2. Ticket Bookings
3. Ticket Changes
4. Hotel Reservations
5. Car Hire
6. Package Tours

Table 4: Activities at the Shop

2.2.3.2 Observation-Findings

A total of 43 double-interaction transactions were observed; 27 at the Kiosk, 16 at the Shop.

2.2.3.2.1 Interaction Procedure. A typical transaction taking place at the Kiosk is outlined below:-

C enquired
↓
O wrote down the information
↓
proceeded to the terminal
(walks 2 or 3 steps)
↓
consulted a handwritten condensed
version of a flight manual
↓
input information via
special purpose keyboard
↓
computer output on the V.D.U.
(output also possible on the line printer)
↓
O walked back to inform C
and/or to issue ticket

The transactions were mostly carried out on a face-to-face basis although there were occasional enquiries that came in via telephone (from Travel Agents) and intercom (from colleagues elsewhere in the building).

At the Shop, a typical transaction progressed in the following manner:

C enquired

↓

O made input to the computer — via special purpose keyboard for Domestic and European System.

OR

via teletype for International System.

↓

Computer Output — via VDU for Domestic and European System (output also possible on line printer).

OR

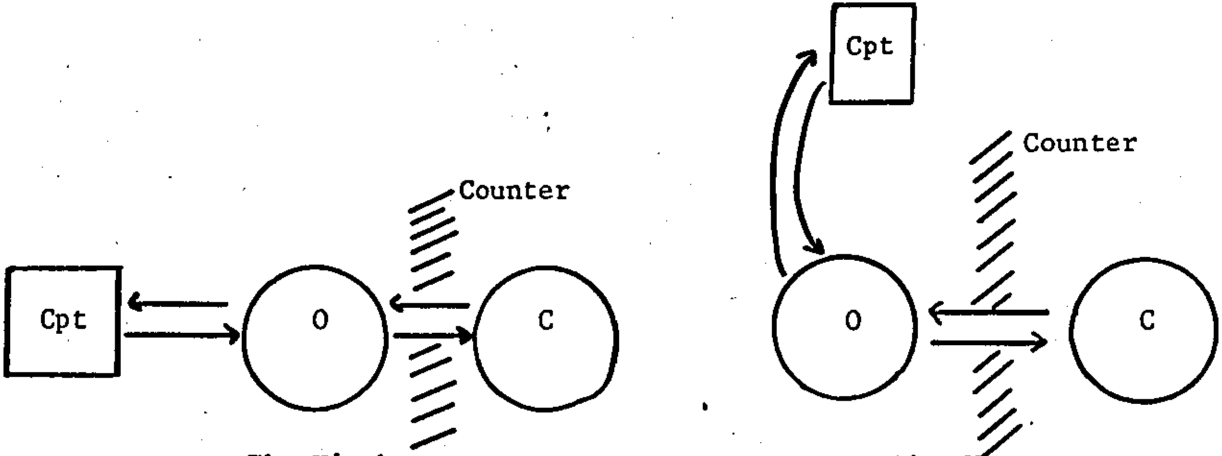
via teletype for International System.

↓

O informed C; consulted the Computer again if necessary

The transactions were mostly carried out on a face-to-face basis but 2 Operators were reserved specially to deal with telephone enquiries from some organizations with whom the Airlines had a Special Account. In addition, when the Computer showed a conditional full booking on a flight, the Operator needed to consult the Organizers by telephone on the matter. This did not seem to occur often.

2.2.3.2.2 Layout of Participants. At the Kiosk, the Operator had to walk a few steps to the terminal. At the Shop, the terminal was situated alongside the Operator so that both the Customer and the terminal were within easy access at the same time.



The Kiosk

The Shop

Diagram 8: Layout of Participants

Situation	no. of transactions studied	% of Total
Kiosk	27	63
Shop	16	37
Total	43	100

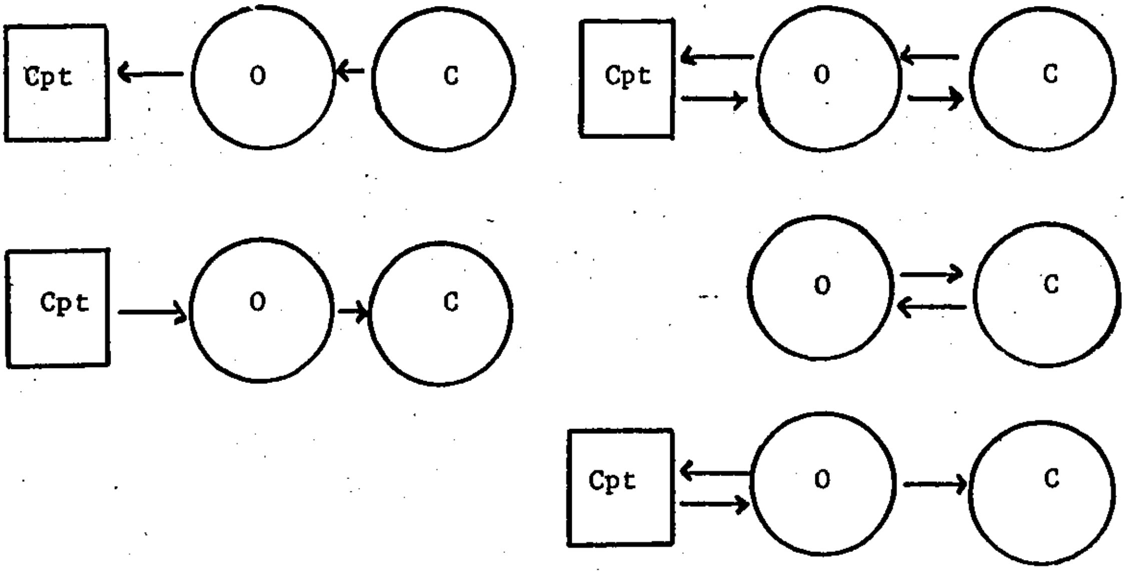
Type of Interaction Flow	no.	%	short transaction (t mean < 10 min)			long transaction (t mean > 10 min)		
			no.	%	$\bar{t}$ in min	no.	%	$\bar{t}$ in min
Iterative	15	56	13	87	8.8	2	13	15
Single	12	44	12	100	3.2	0	0	-
Iterative	10	63	8	80	4.2	2	20	35.5
Single	6	37	5	83	2.3	1	17	11
Iterative	25	58	21	84	4.0	4	16	25
Single	18	42	17	94	2.8	1	6	11

Table 5: Information Regarding Flow of Interaction

Although both situations had a mixture of the two types of interaction, the Shop had many more iterative than single types. On reflection, even some of the iterative interactions at the Kiosk seemed to progress serially so that each iterative interaction consisted of a number of single interactions put together. As one would expect, the single interaction was the shorter of the two, (2.8 min. and 11 min. compared to 4.0 min. and 25 min. respectively). The long transaction was an occasional awkward enquiry that the Operator received. Usually it resulted from a Customer requiring a change on a chain-booking, or from a group of Customers involved in decision-making based on a joint booking.

Kiosk: 44%
Shop: 37%

Kiosk: 56%
Shop: 63%



single

Iterative

Diagram 9: Types of Interaction Flow

Explanations

The Shop had many more iterative than single types of interactions. The layout at the Kiosk, with the terminal a few feet away from the Counter, seemed to encourage a single interaction. At the Shop, both the terminal and the Customer were easily and jointly accessible to the Operator and she did not have to write down the Customer-enquiry before proceeding with the Computer input. If she needed to consult the Customer while on-line with the Computer, he was easily accessible. This seemed to encourage a more iterative interaction.

A better explanation lies in the different decision making environments that surrounded the Kiosk and the Shop. The Kiosk dealt with a number of activities concerning same-day flights. Customers could not afford to take too long deciding on an issue. Some would simply be interested in making sure they were "on the next flight" while others had probably decided more or less on a course of action prior to arriving at the Airport. The Shop, on the other hand, had a more relaxed environment where Customers mostly arrived with advance booking needs. Meeting the alternatives for the first time, they were more likely to spend some time deciding on, and even trying out, one or two alternatives. This might lead to a greater number of iterative transactions.

2.2.3.2.4 Dialogue Control

Dialogue Control was incorporated within the general framework of Study as a contributor of possible significance to Operator/Customer Relationship. If Dialogue Control lay mainly with one participant, how did this affect the others?

It was difficult to determine, however, who or what controlled the Dialogue. This may be because the Control did not lie with any one participant but was more a shared activity. It is possible that as the Control shifted from one participant to another during a single interaction, detection became difficult especially in the short time the phenomenon had to be observed.

It seemed however that the Operator often had the upper hand over the Customer. At the Kiosk, one Operator reported an interesting observation; when the Customer was not providing enough information, and supporting information had to be extracted from him most Operators seemed to ask him for this in Computer-compatible order "quite automatically". This may imply that in the final instance, Dialogue Control may lie with the Computer.

The Operators reported how a new system that was scheduled to replace the present one, "questioned and answered back". If so,it could be that the new System may exercise a more direct Dialogue Control and this will probably change significantly the effect over the Operator/Customer relationship.

2.2.3.2.5 Interactional Errors

As part of the Observation Study, any visible errors committed by the Customer, Operator, or even the Computer, were noted. Errors looked for were of a behavioural nature, and ones which were possible to "pick up" by observing the reactions of Operator or Customer. The passive role that the researcher had to bear so as not to influence the interaction, did not permit a thorough error analysis.

However, such an analysis was outside the scope of the study in any case, since the focus was on broad behavioural issues.

Errors noted in 43 transactions are listed below. A Customer changing his mind over a booking is classified also as "an error" in this context.

Error Committed By	Error Description	Number of Errors Committed		
		Kiosk	Shop	Total
Operator	interpretational error (O interpreting C incorrectly)	2	1	3
	operational error (including O not knowing how to proceed with C's enquiry)	2	1	3
	Computer Input Error (i.e. input of non-compatible information)	0	0	0
Customer	indecisions, incompatible needs, and/or inconcise expression of needs	5	1	6
Computer or System	pre-arrival ticket errors	2	1	3
	Total	11	4	15

Table 6: Interactional Errors

Comments and Explanations

The more outstanding findings were that:

1) there were no computer input errors observed.
2) of the 15 errors in total, 9 were made up of Operator interpreting the Customer incorrectly and the Customer being indecisive, inconcise, and/or having incompatible needs. Of these 9 errors, 7 were noted to take place at the Kiosk.

The task of operating the terminal seemed to present few problems to the Operators and no Computer input errors were noted.

There seemed to be a mismatch of objectives between Customer and Operator, of the type found in the Library situation. Also, the Airport seemed to present a strenuous decision-making environment for the Customer who was likely also to be travel-anxious.

2.2.3.2.6 Operator/Customer Relationship

As explained earlier (section 2.2.2) the researcher had to arrive at a compromise in the way he would have desired to determine the Operator/Customer Relationship. In the light of practical constraints, it was decided to rate this relationship himself as the only possible alternative. It can be argued that this was acceptable since the study was mainly of an exploratory nature and the form of analysis would still provide useful indications.

The Operator/Customer Relationship was rated, on a subjective basis, on a list of factors of the type often employed in social psychology studies. Each factor was scaled from 1 to 5, with a '0' (zero) reserved for the case where it was not possible to rate the factor at all. Table 7 shows the final form of the Factor Chart on which the researcher rated each interacting participant. (The Factor Chart was a part of the overall Observation Chart which appears in Appendix V.)

anxious	0	1	2	3	4	5	cheerful
unsure	0	1	2	3	4	5	sure
submissive	0	1	2	3	4	5	dominating
functional	0	1	2	3	4	5	chatty
impatient	0	1	2	3	4	5	patient
cold	0	1	2	3	4	5	warm
angry	0	1	2	3	4	5	calm
dissatisfied	0	1	2	3	4	5	satisfied

Table 7: Factor Chart used for Determining Operator/Customer Relationships

Table 8 denotes mean values of the factor scores based on a 2 x 2 analysis, Operator and Customer on one hand, Kiosk and Shop, on another. Diagram 9 illustrates the same information graphically.

	Mean Values			
	Operator		Customer	
Factors	Kiosk	Shop	Kiosk	Shop
anxious - cheerful	3.2	3.3	2.8	2.5
unsure - sure	3.9	3.9	3.1	3.1
submissive - dominating	3.5	3.6	2.8	3.1
functional - chatty	2.5	2.7	2.9	3.1
impatient - patient	4.0	4.0	3.9	3.9
cold - warm	3.4	3.2	3.4	3.6
angry - calm	4.0	3.9	4.0	4.0
dissatisfied - satisfied	indeterminate		4.1	3.9

1 = left extreme of factor
5 = right extreme of factor

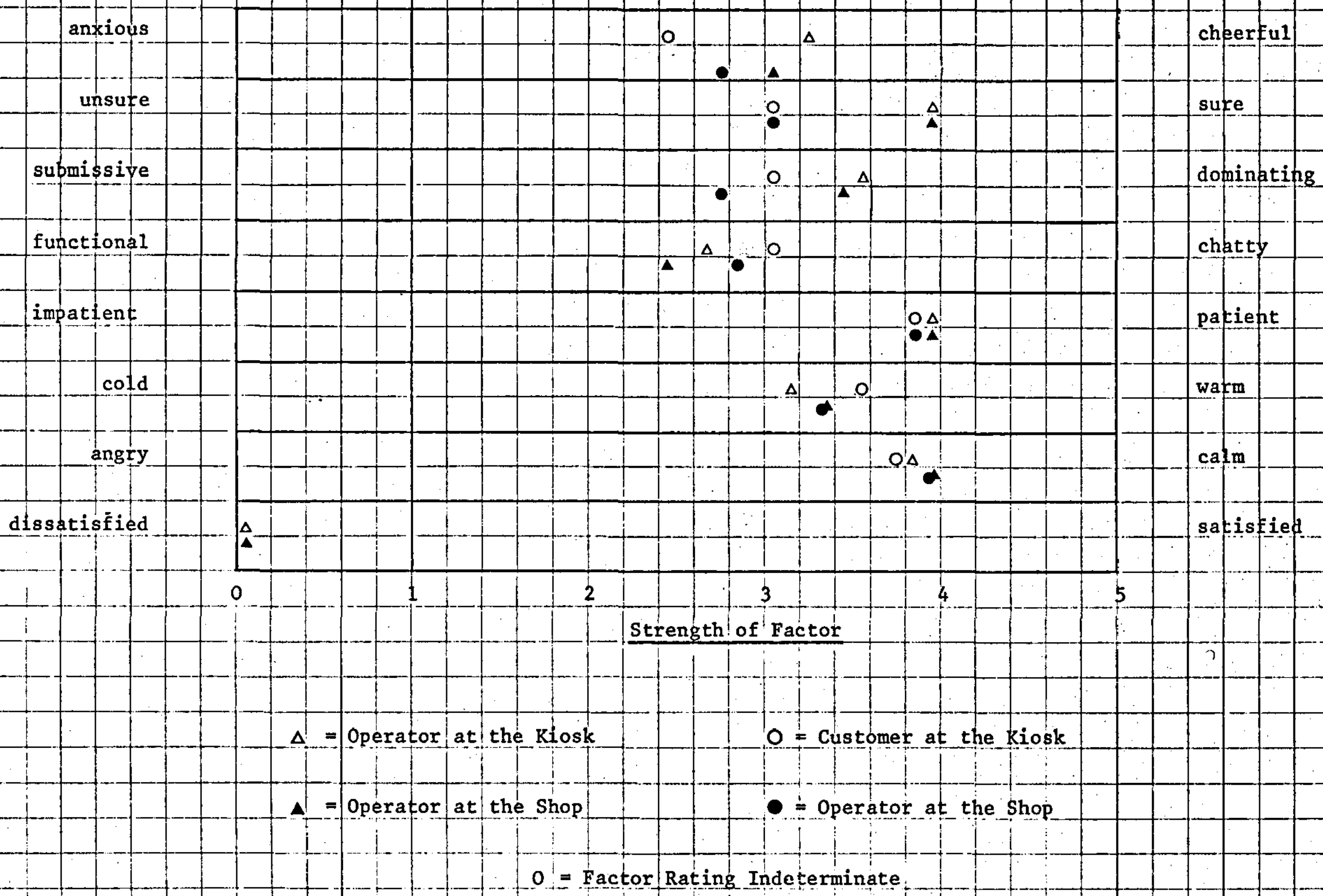
Table 8: Analysis of Operator/Customer Relationship

The Operator could not be rated on the Satisfaction-Dissatisfaction Factor. She did not express satisfaction with each transaction by any noticeable means, perhaps because this was not necessary.

Comments and Explanations

Important features to note are that:

1) the first 4 factors (anxiety-cheerfulness, unsure-sure, submissive-dominating, functional-chatty) depict differences between the Operator and the Customer.
2) the Customer was the more anxious, unsure, and submissive, but chatty of the two participants.
3) the Customer at the Kiosk is much more anxious than the Operator and is also more so than the Customer at the Shop.



Graph 10: Graphical Representation of Findings on Operator/Customer Relationship

The Airport seemed to present an anxiety-prone environment to the Customer. This anxiety was little recognised or served by the Operator's neutrality. In addition, the Operator tended to be rather functional compared to the Customer who seemed to lean on chattiness. The Operator may be expected to be surer and more dominating, however a mismatch between the Operator and Customer did exist in the anxiety-cheerfulness and functional-chatty dimensions.

The findings suggest that strains do exist in the double-interaction situations. The task seemed to lead the Operator to be more task aligned than Customer aligned. This may support earlier suspicions (section 1.4: Hypotheses) that technology may determine the way in which an Operator will behave towards a Customer. The constraints of the task, may also make it difficult for the Operator to be able to please the Customer at the same time. Seeking consonance with the system may create, for the Operator, a dissonance with the Customer.

2.2.3.3 Interview-Findings

5 out of 6 Operators at the Kiosk were interviewed (1 was on leave). The appropriate 6 of the 8 available Operators were interviewed at the Shop. As was mentioned in a discussion of Methodology in an earlier section (section 2.2.2) the interview was based on a part-structured questionnaire (Appendix VI).

2.2.3.3.1 Operator Experience and Training. Table 9 summarizes the Operator experience.

Situation	Mean Duration of Employment with the Airline (in years)	
	present job	overall
Kiosk	2.9	11.3
Shop	2.8	9.8
Mean	2.9	10.5

Table 9: Operator Experience

Past experience included "telephone-selling" (tackling booking enquiries on the telephone) and/or Ticket Bookings at the Counter aided by the manual operation.

At the Kiosk, most Operators had "picked up" the Computer operations from other personnel. The Supervisor and one of the Operators were receiving training on a future booking system at the time of the study.

At the Shop, most Operators had received a fortnight's training on an older version of the European System. The Operators working with the International System also attended updating Courses at intervals.

Training was received at the London Offices of the Airlines and roughly lasted a fortnight per Operator. The period was difficult to define because the training was on a self-paced basis and the Operators may return to their work for a while before returning for the next session.

2.2.3.3.2 Ease of Translation. Subjects were asked about the translation process that occurred at 2 stages of the transaction:
1) Re-expressing Customer needs into a Computer-compatible form, and
2) Re-expressing Computer Output in a Customer-Compatible form.

The finding was that both these processes were "quite easy" to the Kiosk Staff, and "very easy" for the Shop Staff. The System seemed to present few problems to the Operator in this context.

The Kiosk staff may have found the mediation less easy because they had to jot down the information relating to the Customer before inputting.

There were other interesting features about the Operator's mediation activities. It was pointed out in the discussion of the Observation-Findings how the Operators on the Domestic and European Booking System (this means all the Operators at the Kiosk and some at the Shop) had to input information to the Computer in conjunction with a Flight Manual. This was a bulky manual and apparently contained far more information than was necessary for the operator at the Regional Airport. The Staff at the Airport Kiosk therefore extracted only information that was relevant to them, and reduced the Text to a few handwritten A4 sheets of paper. This aid, they reported, was "very convenient". For the International Booking System on the other hand, the Operator did not have to consult any manual and the Customer Enquiry was followed directly by an input to the Computer without any supporting aids. One Operator on the International System said she preferred this aspect because it was "much more efficient".

Whenever the Customer needed to take away any information the Operators had special forms on which the information output by the Computer could be written and the form handed to the Customer. It is thought that the System should be able to handle this task itself and be able to output, on request, information that is already "Customer-compatible".

2.2.3.3.3 Reaction to System Failure. The objectives of this study were to determine:

1) how "System-dependent" the task of the Operator was.
2) how she reacted to a System-failure.
3) how System-failure affected the Customer.

The Operator was asked to cite instances of System-failure and describe how she reacted and secondly, how the Customer reacted.

The finding was that both the Operator and the Customer were resigned to a System failing and seemed to accept it. There was a procedure that the Operator pursued to tackle the situation. She telephoned the local and/or the Central Office to determine the source of failure. Quite often it was only the local system that had failed. In this event, bookings could still be made by telephoning the Central Office. Whenever there was a delay in dealing with the Central Office, including the possibility that the Central System itself had failed, Customers were asked to call later for a reply or told that they would be contacted in due course if they could be reached by telephone.

In the event of a System failure, there were traces of a slight leaning by the Operator towards the System and away from the Customer. One Operator reported that it was not necessary for the Customer to be told that the System had failed and why an immediate response was not possible. She argued that had the Customer gone to a Travel Agent he would have had to wait for a response anyway since the Travel Agents used the manual operation of Ticket Bookings. A few Operators explained that they were "quite happy not knowing what was wrong with the System. This did not have to be explained to the Customer anyway".

2.2.3.3.4 The Operator's Views on the Customer. The Operator was asked to describe her ideal and worst type of Customer and to suggest where a "typical Customer" might be placed between the two extremes. The objective was to determine whether there was a match between the ideal expectation and what a "typical Customer" turned out to be.

Interestingly enough, each Operator thought that the typical Customer fell slightly towards her own ideal although the ideal did vary from Operator to Operator. However, there were incidental findings worth noting. Table 10 lists the findings on the "Ideal" and "Worst" types.

Customer Type	Description	Frequency of Mention
"ideal"	1. knows what he wants and/or "appreciates our side of things".	7
	2. pleasant, polite, well-mannered, and/or patient.	7
	3. a variable interesting type.	2
"worst"	4. unreasonable in demands.	5
	5. arrogant, dominating, a "talk-down", "know all" type.	7
	6. "stereotype", cold, dull	2
	7. unsure of his needs	2
	8. impatient and/or delayed	3

Table 10: Operator's "Ideal" and "Worst" Customers

There is an interesting difference in the descriptions attached to ideal and worst types of Customers. One type of Customer seemed to be described in the way he would directly influence the operational efficiency aspect of the job (descriptions 1, 4 and 7). The other type of Customer was described in the way he would add another dimension to the job by his personal qualities (descriptions 2, 3, 5 and 6). While 2 Operators even based their ideal or worst type on split-qualities. e.g. Description of an ideal Customer:

> "Well.. efficiency-wise, one who knows exactly what he wants. At another level, someone who is interesting to talk to".

Another finding was that the ideal and worst type did not necessarily represent two ends of the same dimension. There was a kind of a switch-over between the two dimensions as some descriptions moved from "ideal" to "worst". Not including the 2 Operators who had split views, 5 of the 9 remaining Operators showed this switch-over effect.

if the "ideal" is motivated by operational efficiency → then the "worst" type is motivated by personal qualities

if the "ideal" is motivated by personal qualities → then the "worst" type is based on operational efficiency

The "Switch-over" Finding

Explanations

In the way the Operators described their ideal Customer, there seem to be basically two kinds of Operators. One Operator is motivated by the operational efficiency and her ideal is a Customer who knows his needs. The other Operator is motivated by personal qualities and her ideal is one who is well-mannered and/or interesting. For some Operators the degree of alignment was so strong that even the worst type reflected this alignment. Hence, if the ideal was well-mannered, then the worst was ill-mannered.

For others, there was a switch-over such that if the ideal was based on operational efficiency then the worst was based on personal qualities, or vice versa.

There can be an explanation of the switch-over effect. If the Operator is efficiency oriented, then the System and the Operator are in consonance. If a Customer is also efficiency oriented then he increases the Operator/System consonance. He therefore becomes the ideal type. If on the other hand, the Customer is rude, arrogant, etc., then he is the type "who will not go along with the game" and tends therefore to aggravate the Operator-Customer dissonance. He becomes the worst type.

Similarly for the Customer oriented Operator. If the Customer is interesting and variable, he adds to the Operator/Customer consonance. He therefore becomes the ideal. The System is fixed and uninteresting and the Operator and System are in dissonance. A Customer who is unsure of his needs aggravates this dissonance, and he becomes the worst type. Hence, the ideal is one who increases consonance with one party and the worst type one who increases dissonance with the other. The theme is developed more fully in the Discussion.

2.2.3.3.5 Job Satisfaction and the Effect of Technology. The Operators had had several years experience. Most of them had some experience of the previous operations when Airline Bookings were carried out manually at the Counter (similar to the present operations carried out at most Travel Agents) or by telephone.

The Operators were asked to discuss their Job Satisfaction relating to the process of dealing with the Customer and to the working environment in general for 2 situations:
1) the present technology
2) previous technology.

The object of the exercise was to examine whether technology had any effect over the Operator's Job Satisfaction. They were asked to discuss the issue, and to conclude each discussion by rating on a 5-point happy-unhappy scale (Appendix VI, Q.15). Hence each Operator offered two ratings; one on the "previous job", and one of the "present job".

Table 11 summarizes the findings.

It can be noted that:

1) the Operators disliked the telephone-selling aspect of their previous job.
2) most Operators were happy with the manually operated Counter.
3) there was no clear dichotomy between preferring one type of Counter to another.

Previous Job		Present Job
Manually operated Counter	Telephone-selling	Computer-aided Counter
✓		✓
	X	✓
	X	✓
X		✓✓
✓		✓✓
	X	✓
✓✓	X	✓/X
✓		X
✓		X
✓		X
	X	✓

KEY	
✓✓	Very happy
✓	Quite happy
✓/X	"depends"
X	Not happy

Table 11: Job Satisfaction Relating to Technology

Explanations

The findings were difficult to explain as they stood. However, explanations were possible when one combined these with the supporting information the Operators provided, together with earlier findings.

Table 12 relates the information of Table 11 with the orientation of the Operators as delineated from their "ideal Customer" descriptions.

Operator Type		Previous Job		Present Job
Customer-Oriented	System-Oriented	manually operated counter	telephone-selling	Computer-aided Counter
-		✓		✓
-			X	✓
	-		X	✓
	-	X		✓✓
	-	✓		✓✓
-		✓✓	X	✓/X
-		✓		X
-		✓		X
-		✓		X
	-		X	✓
* -	* -		X	✓

✓✓ = Very Happy ✓ = Quite Happy ✓/X = "depends"
X = Not Happy * = split-ideal

Table 12: Combining Job Satisfaction and Technology Type with Operator Type

Telephone-selling was "a conveyor belt type of activity" as some Operators described it and disliked by all the Operators. There was little personal contact for the Customer-oriented Operator while the System-oriented Operator found this activity a non-significant way of contributing to the rest of the system.

The preference for either a manually operated or a Computer-aided Counter seemed to depend also on a further variable - Customer Frequency. Table 13 summarizes this explanation.

Type of Technology	Type of Operator			
	Customer-oriented		System-oriented	
	Customer Frequency		Customer Frequency	
	High	Low	High	Low
manually operated counter	-	+	-	-
computer-aided counter	-	+/-	++	-

+ = Happy	- = Unhappy

Table 13: An Explanation for Preferences Attached to Jobs with Differing Technologies

1) Customer-oriented Operator

   a) When Customer Frequency was high she disliked operating at either Counter. Conversation and dealings had to be strictly restricted to the business at hand. If at all there had to be a forced choice, she would probably prefer the manual Counter because it allowed her to spend greater time per Customer, than the Computer-aided Counter even if the latter "processed" a greater number of Customers in the same time.

b) When Customer Frequency was low, she was happy working at either Counter but happier with the manually operated one. She had better control over the pace of her task which she could vary according to the Customer and herself. In addition, the manual Operation enabled her better to extend a personal service to her Customers. The Computer seemed to have taken over that control and when it rejected a booking nothing could be done about it. However, in the event of a low Customer Frequency, both technologies enabled her - although at differing degrees - to spend greater time with the Customer and even gave the Operator a chance to interact with her colleagues. It also served as a "useful breather" from time to time.

2) System-oriented Operator

a) When Customer-frequency was high, the System-oriented Operator was "very much at home" with quick and efficient Computer-aided operations, as different from the time consuming, inefficient, and even clumsy operations of the Manual System. The greater number of Customers "processed" in a given time, the happier the Operator.

b) When Customer-frequency was low, the Operator was unhappy with either technology. The Manual Operation was "inefficient and slow" in any circumstances while a low Customer frequency meant she had long periods when she remained idle. To her dislike, the idle periods were even more pronounced for the Computer-aided Operation.

General Plan

1. Introduction
2. Field Study

➤ 3. Discussion

4. Experiment
5. Discussion
6. Summary and Conclusions

Plan for Chapter 3

3. Discussion
3.1 A Comparison between Computer-aided Airline Bookings and Information Retrieval Systems
3.2 Strains for the Customer
3.3 System-oriented and Customer-oriented Operators
3.4 A long-term Trend towards Functionality or System-orientation for Operators and Customers?
3.5 Summary and Conclusions

3. DISCUSSION

3.1 A Comparison between Computer-aided Airline Booking and Information Retrieval Systems

There were differences between the two situations that need to be noted before comparing them. The Double-Interaction at the Library arose from a Project which was a feasibility study. A single Operator performed the service. She also retained some of her former duties as a Librarian. She did not have the same length of experience with the task. In any case, the project was a short-term activity.

Comparisons can be attempted however bearing this in mind.

3.1.1 Comparisons of Transactions

1) The Customer had little access to the terminal in the Airlines situation, and participated in the Operator/Computer Interaction only at an indirect level. Participation was more direct in the Library Situation and the Customer was expected to follow the information being output by the Computer and relate to the Operator whether the citations were relevant or not. As in the case of the Kiosk, the Library Operator had to have a written record of the Customer's needs before proceeding with the input. The former was so because the terminal was distant from the Counter and it was easier for the Operator to carry the information in a written form rather than in her head. For the Library situation, the "keyword" was often highly technical. The Operator often had to refer to it or to what it was supposed to be combined with, while inputting so as not to make any errors.

   The flow of interaction at the Library situation took much longer and a joint participation between Operator and Customer led to an iterative interaction.

3.1.2 Discrepant Expectations of Operator and Customer

As was mentioned in the findings on the Library situation, strains arose from a mismatch between the role expectations of Operator and Customer. Hence a Customer's insistence on wanting to see what all the 1000 citations were, aggravated the Operator who expected him to make up his mind based on only a small sample. This was also the case with the Airlines situation. Some

Operators found it difficult to accept why the Customer was taking so long to decide. An example of such an occurrence is the following. A Customer found that the flight he would have liked to be booked on was full:

> "What alternative day would you like Sir?"
> "Well if I can't have that day, then any other day is just as bad"
> "What day Sir?"
> "Any day"
> "Yes Sir, but any day in particular?"

The transaction soon led to strains and it seemed that the Operator failed to appreciate why the Customer could not easily have suggested a particular date as an alternative. She later reported that the gentleman was an example of an awkward Customer.

3.1.3 System Dependence

The Library Operator found a System failure very aggravating. Unlike the Airport System, there was an absence of any standby system. Additionally, the Airlines terminal was probably linked to a single Data Base. The Information Retrieval terminal, on the other hand, could be linked to various data bases - including overseas ones (see Appendix II and III) - according to the Customer's requirements. The chances of a System failing or a delay caused by an "all lines busy" rebuff were much greater than in the case of the Airlines System. The Library Operator was highly dependent on the System. Her predicament was even more pronounced at times when the Computer "went dead" without any explanations and it was difficult to tell when it would "come back to life".

3.1.4 Multiple-interaction Environment and the pressures on the Operator

In common with the Library Operator, the Kiosk Operator was often involved in simultaneously occurring multiple interactions. The pressures were not shared to a similarly pronounced degree by the Shop Staff who numbered 12 in all and who had more or less a fixed number of duties each. The Kiosk was manned by 2 Operators only and the pressures at peak travel periods were even greater than those of the Library Operator. An example is this extreme case the researcher came across:

O waiting for colleague to finish with the terminal
Enquiry came in over the Intercom
A message came over the Airport loudspeaker
A Colleague came in with an enquiry
The Customer wanted to query something

Comments:

It is evident that in certain situations Operators are under great working pressures. Combining this with a faltering System (Library situation) and with a deep operational involvement in the task, leads to predicament that many Operators may face. It may be impossible for them to "do the job" as well as please their Customers, in the existing circumstances.

3.2 Strains for the Customer

It was a great disadvantage that it was not possible to interview the Customer. However, deductions are still possible from the Observation Study as well as the interview with the Operators.

The Customer was generally quite anxious (especially at the Airport) but seemed also to lean on chattiness almost as an outlet to his unsure/anxious/submissive combination. He seemed ill-received, however, by an Operator who was slightly functional and dominating. It is possible that the computerized system by enhancing the operational efficiency has succeeded in being able to "process" many more Customers in the same time. The Operator, however, seems to have lost her former "power" to deal with each Customer on an individual basis. She may be finding it difficult to both attend to the job as well as to please the Customer and react suitably to his anxious/unsure/submissive, or to any other special disposition.

There was also a case of mismatched Role Expectations between Operator and Customer. Double-interaction became strenuous in the Library situation when the Customer did not exactly behave in a way he was expected to. This expectation seemed to be System-determined. For example, the Customer was expected to realize the Computer-running-time costs. There seemed to be a parallel situation at the Airport. The Customers meeting the system for the first time (or even making a booking for the first time) were not aware of how exact and ordered they had to be in stating their needs. This displeased the Operators, (and aggravated one type of Operator more than another as discussed in the next section). The researcher can cite one instance which soon led to "strains" between Operator and Customer. The Operator asked the Customer if the old lady at the Germany end would need any assistance:

> "What kind of assistance?"
> "Is she ill or has she any difficulty with walking?"
> "Um... Why do you want to know? I mean, can you do anything about it from this end?"

The Customer was trying not to appear rude to the Operator but could not appreciate her question. The particular Operator attending found that Customer "rather daft".

It is also worth noting how changing a booking especially if a booking was of a complicated nature, often led to "awkward" transactions. Unless the System is highly receptive to such changes and to Customer indecisions, there will always be an indirect pressure on the Customer to "change his ways". As one Operator reported, the Domestic and European Booking System was "particularly bad" when it came to carrying out corrections. (The International System was reported to be better suited.)

At another level, "human strains" in Double-interaction seem to be related to the demands of the task itself. For example, when a task is a joint exercise between Operator and Customer in the resort to the Computer (e.g. Library situation) the situation often gives rise to various degrees of decision making. When a Customer need is too specific, the need has to be widened in scope. When it is too wide, it has to be narrowed down. When there are a number of objectives at play, there is often a complicated double-interaction drawing on a combination of different degrees of decision making. In this situation, the System has to be particularly adaptive. The Airline Booking tasks were on average, less complicated in this direction and human strains seemed to occur in a different context. This will be taken up more fully in the coming sections.

1. The System imposes "too many" constraints and/or demands a pronounced degree of dependence from the users (e.g. the Computer "stopping dead in its tracks" unexpectedly in the Libary situation).
2. Fixed order Man-Computer Interaction has a carry-over effect on Man-Man Interaction.
3. The System may impose implicit constraints on running time (including cost considerations) so that the Operator may expect the Customer to be quicker than he can be.
4. The System seems to affect the Operator's expectation of the way the Customer conducts himself in a decision-making situation. This expectation may be more aligned to Computer-compatible decision-making and far-removed from "natural decision-making" (e.g. The former may be quick and organized, the latter may be neither).
5. When a Task involves varying but fairly predictable levels of decision-making, the System is often not adaptive enough to aid directly particular types of decision-making.
6. Even when extra facilities are provided by the System, the Customer is often not aware of these. The Operator may expect the Customer to "readily appreciate" the reason behind or even the nature of such facilities, which the Customer may not.
7. The System leads to "unnatural explanations" (e.g. Operator to Customer: "The booking is not possible because the Computer says 'No'").
8. The System seems to have taken over the control from the Operator affecting the latter's ability to serve Customers "on an individual personal basis", which she no longer can.
9. The System seems to be suited to one type of Operator and hence probably to a particular type of Customers only.

Table 14: Double-Interaction Strains produced by the System

3.3 System-oriented and Customer-oriented Operators

It was found that there were basically 2 types of Operators. There was a "basic function" common to all Operators, of "doing the job" or "attending to Customers". The Operators however diverted beyond the "basic function" to become either "system-oriented" or "Customer-oriented", (see Diagram 11). This seemed to define not only their "ideal" and "worst" type of Customers, but also the style of interaction with the Customers, as well as the preference attached to the manual or the Computer-aided technologies.

In addition the way that some Operators offered split-descriptions for their "ideal" or "worst" Customers, suggests that the two qualities, although different, were not exclusive of each other. However, one was more pronounced and dominating.

The Customer-oriented Operator defined her ideal based on how he would add a special dimension to her job by his personal qualities. The System-oriented Operator on the other hand, defined her ideal based on how he would enhance the operational efficiency aspect of her job by being exact, brief, etc. in expressing his needs. The orientation was very strong for one or two Operators. In this case, their worst Customers were simply the opposite of their ideal. In most case however, there was a switch-over between "efficiency" and "personal qualities" as the description of the Customer moved from "ideal" to the "worst" type.

It seemed that to be in consonance in one direction, e.g. with the System, meant being dissonant in another, e.g. towards the Customer. If the Customer turned out to be efficient, concise, etc., then he added to the Operator-System consonance and was the ideal Customer to have. If on the other hand, he turned out to be ill-mannered, dominating, etc. then he added to the Operator-Customer dissonance. The System-oriented "worst" Customer was therefore based on his personal qualities. To explain it in another way, it is as if to suggest that the Customer was acceptable even if he was clumsy, inefficient etc. as long as he was the

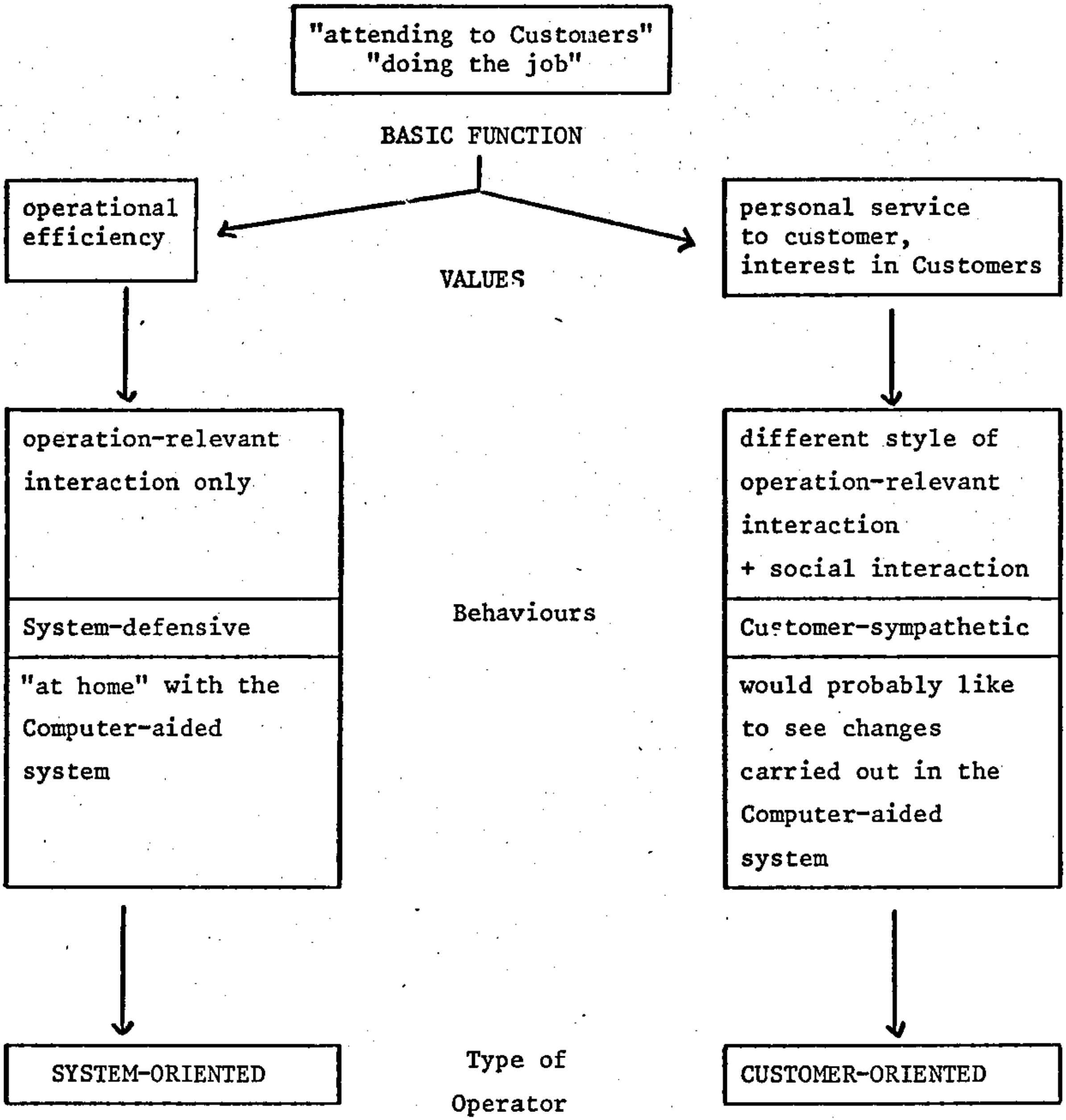

"attending to Customers"
"doing the job"
BASIC FUNCTION
operational efficiency
VALUES
personal service to customer, interest in Customers
operation-relevant interaction only
System-defensive
"at home" with the Computer-aided system
Behaviours
different style of operation-relevant interaction + social interaction
Customer-sympathetic
would probably like to see changes carried out in the Computer-aided system
SYSTEM-ORIENTED
Type of Operator
CUSTOMER-ORIENTED

Diagram 11: System-oriented and Customer-oriented Operators type who would then leave it completely to the Operator to handle him in her own way.

There was a similar effect for the Customer-oriented Operator. Being consonant in one direction - towards the Customer - somehow meant being dissonant in another. If the Customer did have interesting personal qualities then he added to the consonance. If he had uninteresting personal qualities (i.e. he was cold, dull, etc.) that was still acceptable as long as he was not clumsy, inefficient, etc. at the same time. This aggravated the Operator-System dissonance, and the Customer-oriented Operator based her "worst" Customer on how badly he would hinder the operational aspect of the job.

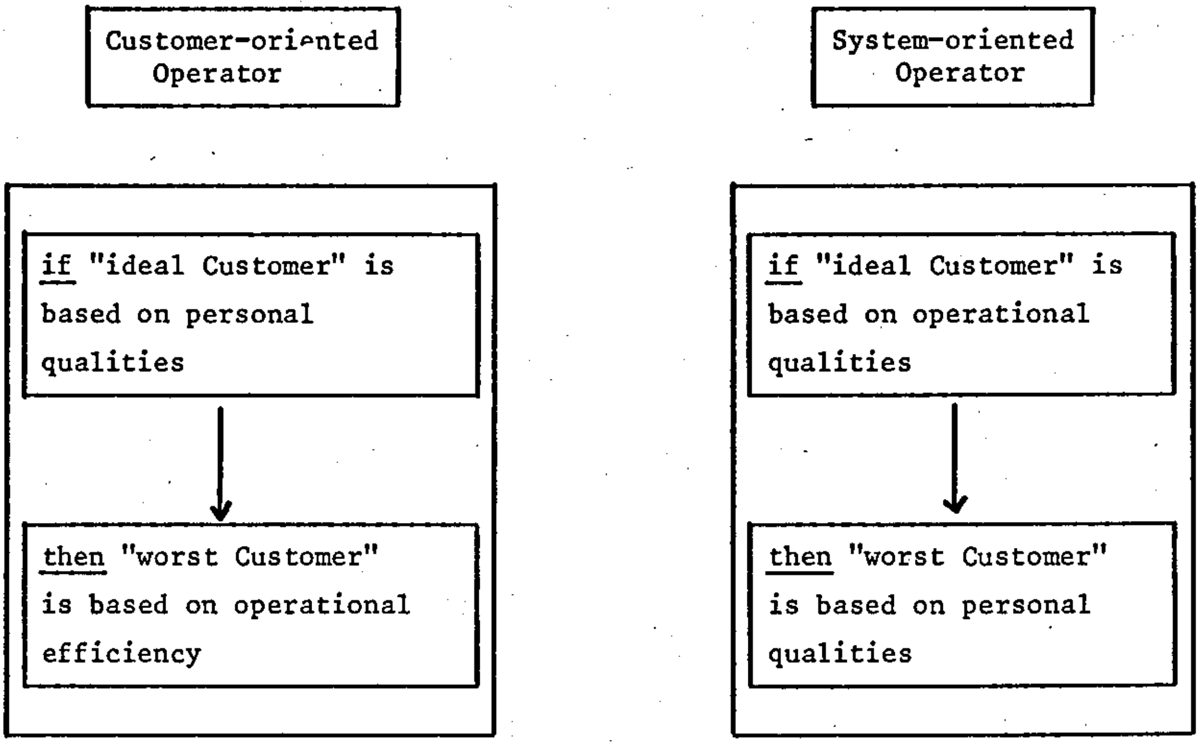

Customer-oriented Operator
if "ideal Customer" is based on personal qualities
then "worst Customer" is based on operational efficiency
System-oriented Operator
if "ideal Customer" is based on operational qualities
then "worst Customer" is based on personal qualities

Diagram 12: A Switch-over Between Descriptions of Ideal and Worst Customers

The Operators' job satisfaction also reflected their basic orientations or "types". The System-oriented Operator was very much "at home" with the computer-aided technology which was a great boon to operational efficiency. The Manual Operation was "clumsy" and time-consuming. The issue was different for the Customer-oriented Operator who had several grievances to report against the present system. She could no longer extend a personal service to the Customer and treat the Customers on an individual basis like she was able to. When the Computer rejected a booking attempt, "that was that", and the next available flight was "much too far away in the future". Previously, she could manipulate other bookings with greater power depending on the needs of the Customer. It seemed so "unnatural" as one Operator reported, to have to tell the Customer that a course of action was not possible simply because "the Computer won't have it". There was a necessity, it seemed, for a more "natural" reasoning that the Computer could attach to its rebuffs. The present system, on the other hand, had advantages over the manual system that improved the quality of the "personal service" that the Operator could provide to her Customers. For example, it was possible to request that assistance be given to a traveller flying in from a foreign country because of a particular handicap. Hence, it is not suggested that the Computer-aided system completely rejects the Customer oriented Operator. Rather, it seems that the present system may be in need of a lot of improvements before it can succeed in accommodating the Operator and her particular disposition.

A similar finding about two Operator types has been suggested by other researchers. The MICA Survey (A Survey of Man-Computer Interaction Applications in Commercial Situations; Eason, Damodaran & Stewart, 1974) reports of a similar finding in the Banking situation. Blake's Management Styles (Blake & Mouton, 1963) also refers to the two types although in reference to Managers. The underlying theme is that there are two kinds of Managers; those who have a concern for people and those who have a concern for production.[1]

3.4 A Long-Term Trend towards Functionality or System-Orientation for Operators and Customers?

It was seen earlier (section 3.2 and Table 14) that strains existed in the conduct of Double-interaction. Many of these were argued to be System-determined. It was seen, in the last section, how the present system was more suited to the characteristics of one type of Operator than the other. Indeed, for the Customer-oriented Operator, many aspects of the existing system were creating a dissonance. However, the System had to be accepted since the job demanded a dependence on the System. It is

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1. A more comprehensive survey appears at a later stage (Chapter 5) after a closer examination of the Customer has been conducted.

possible that the Operator may gradually be shifting her orientation towards the System and away from the Customer, to try and reduce the dissonance. There were other aspects of the System which also seemed to change this behaviour over the long run. For example, Operators reported how they automatically extracted the information from the Customer, when this was not forthcoming, in an order that was Computer-compatible, "without even being conscious of it at the time". Two Operators reported how they "hated" the coming of the Computer in the beginning, but "now missed the pace" when the system went down and when the operations had to be carried out manually.

This may also have indirect but significant effect on the Customer. As the Operator tends towards achieving consonance with the existing System, she creates dissonance with the Customer. The Customer also has to accept the situation which he has to meet time and again, and may also try and reduce this dissonance by gradually "changing his ways". This translation may be as unconscious as in the case of Customer-Oriented Operators. Examples were reported of how some Customers "now came in" expressing needs in an exactly Computer-compatible manner and asking for the line printer output itself which they took away with them - the whole transaction lasting a matter of seconds. If the Customers took too long to decide over a booking matter or were inconcise in the expression of their needs, it was often easy to tell that they were not being very acceptable to the Operators. They might then consider being more "Operator-compatible" the next time.

Thus existing systems, which are part-incompatible with a certain type of Operator, may be in danger of promoting a long-term translation towards functionality or system-orientation for both direct users (Operators) and indirect users (Customers).

3.5 SUMMARY AND CONCLUSIONS

Human strains in double-interaction seem to arise from an interplay between:

1) qualities of the Task
2) qualities of the Human Participants
3) qualities of the System

More specifically, the findings from the Field Studies suggest that:

1. There are two types of Operators. A Customer-oriented Operator sees the Customer as a special dimension of the job. The System-oriented Operator derives her satisfaction mostly from the operational efficiency aspect of the job.

2. Operators in double-interaction situations are often placed in multiple interaction environments and are under great working pressure. It may be difficult to "do the job" as well as "please the Customer" under these circumstances, for one type of Operator.

3. The job often defines an absolute System-dependence. It is vital in such a case to make sure that the System functions at all times. A "faltering" System was found to aggravate the Operator.

4. Existing systems and associated Working Environments accommodate one type of Operator much more satisfactorily than the other.

5. Existing Systems and the functional aura surrounding these seem to create a dissonance for the Customer-oriented Operator who may find it particularly difficult to succeed in both "doing the job" as well as "pleasing the Customer".

6. When faced with a System which is more or less fixed and not very controllable, the outlet for the Operator's dissonance may be a gradual shift in orientation towards the System and away from the Customer who is variable and adaptive, and easier to control.

7. The Customer, in turn, may require to meet the situation time and again. His own style, dissonant with that of the Operator, may gradually change as it strives towards compatibility with the Operator.

8. There may be a long-term effect therefore, of a gradual human translation towards functionality or system-orientation, as a result of the existing systems on which double-interaction situations are based.

9. It has not been possible to examine the Customer-end of Double-interaction as closely as the Operator aspect. Part two reports a laboratory study which attempts to meet this deficiency as well as to test a possible approach to the study of Double-interaction. We shall re-appraise the problem in the light of the findings that emerge.

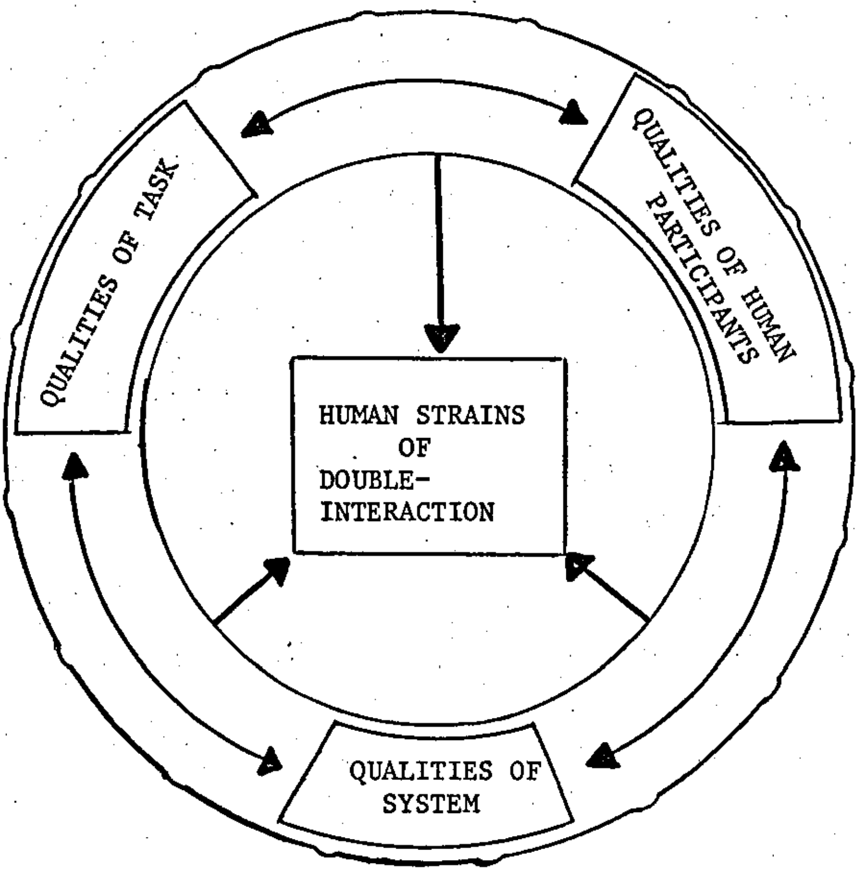

QUALITIES OF TASK
QUALITIES OF HUMAN PARTICIPANTS
HUMAN STRAINS OF DOUBLE-INTERACTION
QUALITIES OF SYSTEM

Diagram 13: "Human Strains" of Face-to-Face Double-Interaction

General Plan

1. Introduction
2. Field Study
3. Discussion
➤ 4. Experiment
5. Discussion
6. Summary and Conclusions

Plan for Chapter 4

4. An Experiment in Double-Interaction.
4.1 Introduction, Aim, Hypotheses, Model
4.2 Experimental Design and Methodology
    4.2.1 Task, Technology and System
    4.2.2 Enquiries
    4.2.3 Operator
    4.2.4 Customer and Customer Satisfaction
    4.2.5 Experimental Procedure

4.3 Findings
    4.3.1 Customer Types
    4.3.2 General Factors Governing Customer Satisfaction
    4.3.3 Testing the Model
    4.3.4 Other Issues

4. AN EXPERIMENT IN DOUBLE-INTERACTION

4.1 Introduction, Aim and Hypotheses

4.1.1 Introduction

A number of conclusions were arrived at in the previous Section. As was seen, the Field Study did not facilitate the study of the Customer to any reasonable degree. The Customer, arguably, could be a primary focus for Double-interaction Studies. The Experiment was designed to recognize and implement this focus, and at the same time to incorporate, for testing purposes, some of the findings or trends suggested by the field experience.

Certain hypotheses could be formulated at this stage, to represent collectively, a skeletal structure of Double-interaction (Diagram 13, Page 50). Further, an attempt could be made to test these hypotheses, as well as the overall working of a model that linked all the hypotheses in a single framework. The hypotheses and the model are outlined in the Sections below.

4.1.2 Aim and Hypotheses

Aim: To study the nature of 'Customer Satisfaction' in a Double-interaction situation.

Hypotheses: The degree of satisfaction that a Customer attaches with a Double-interaction situation is a function of:-

1. The Person-orientation or Efficiency-orientation of the Customer.
2. The Customer-orientation or System-orientation of the Operator.
3. The type of technology that the Operator employs in the execution of the task (e.g. Manual and Computer Technologies).
4. The type of enquiry with which the Customer negotiates the situation (i.e. 'Simple' or 'Complex').

4.1.3 The Model

CUSTOMER TYPE	ENQUIRY TYPE	SITUATION 1 Customer-centred Operator/ Manual Technology	SITUATION 2 Customer-centred Operator/ Computer Technology	SITUATION 3 System-centred Operator/ Manual Technology	SITUATION System-centred Operator/ Computer Technology
Efficiency centred	Simple	X	X/✓	$\checkmark^-$	$\checkmark^+$
	Complex	XX	✓/X	X/	✓✓
Person-centred	Simple	✓✓	X/✓	✓/X	XX
	Complex	$\checkmark^-$	$\checkmark^+$	X/✓	X

XX = Highly Unsatisfactory
✓✓ = Highly Satisfactory
$\checkmark^+$ = More Satisfactory than $\checkmark^-$

Diagram 14: A Model to represent the State of Customer Satisfaction in the Double-interaction Context

Explanations

1. Terms

i) Customer-centred and System-centred Operators have been discussed in detail in the Discussion (Section 3), and the reader may find it useful to glance at Diagram 11, Page 45, to refresh his memory.

ii) Computer and Manual Technologies are self-explanatory and have also been discussed briefly in relation to Operator Job-satisfaction in Section 3.

iii) A Person-centred Customer is the Customer-equivalent of a Customer-centred Operator. He derives satisfaction from Person-relevant aspects of the transaction, e.g. personal service, 'interesting' Operator, etc. An Efficiency-centred Customer is the Customer-equivalent of a System-centred Operator. He derives satisfaction out of efficiency-relevant aspects of the transaction, e.g. speed of response etc. The reader will be introduced to the concept in greater detail in the Sections to follow.

iv) 'Simple' and 'Complex' types of enquiry is also self-explanatory. It will be discussed in more detail in the Section to follow. Briefly, a Simple Enquiry enjoys one or more of qualities such as 'quickly executed', 'compatible', 'brief', etc. A Complex Enquiry, on the other hand, may be 'not readily executed', 'incompatible', 'time-consuming', etc.

2. Model Behaviour

The model is based on suggestions from the Field Study as well as the resercher's own reflections. Some of these suggestions appear below in a very simplified form.

i) Manual technology provides a 'natural and meaningful environment' and is suitable to the Person-centred Customer (and to the Customer-centred Operator). Computer technology provides an 'ideal efficiency-environment' and is suitable to the Efficiency-centred Customer (and to the System-centred Operator).

ii) Manual technology may be more suited to handle simple enquiries, the more sophisticated computer technology may be more suited to handle complex enquiries.

iii) The degree of satisfaction attached to a Double-interaction will therefore be reflected by the 'fit' or 'non-fit' of its various components, i.e. by how far the 3 'participants' (the Customer, the Operator, and the System) and the Nature of the Task (the Enquiry) are consonant or dissonant on Person-related and Efficiency-related lines.

iv) The 'fit' of 'non-fit' with the Operator will be more influential than that with technology or system, since the Operator lies between the Customer and the System.

Hence, each Double-interaction situation could be 'over-simplified' into 'an n-part consonant, m-part dissonant' description, to describe the extent of harmony and 'Customer Satisfaction'. For example, a Complex Enquiry/System-centred Operator/Computer Technology and an Efficiency-centred Customer would be '4-part consonant' situation, and one expressing maximum consonance. The model would predict this as an 'ideal' situation for an Efficiency-centred Customer.

4.2 Experimental Design and Methodology

Briefly, the experiment was designed to simulate a real-life application of Double-interaction: the Double-interaction, as well as the environment and issues surrounding it, would appear as 'real' to the Customer as possible.

Various issues surround the experimental study of Double-interaction and these will be discussed, in some detail, in the Sections to follow.

Experimental Variables (Technology, Enquiry, Operator and Customer orientations, and Customer Satisfaction) will be discussed in Sections 4.2.1 to 4.2.4 under appropriate headings.

Measurement and Treatment of Data will be discussed, as seems most appropriate, in Section 4.2.4 under the heading of 'Customer-orientation and Satisfaction Measurement'.

Finally, Section 4.2.5 will outline the Experimental Procedure.

4.2.1 Task, Technology and System

The Task, around which the Double-interaction would arise, was chosen to be Customer Enquiring on Train Travel.

This is a situation where an opportunity is offered to Customers seeking information relating to Train Travel and the Operator serves the Customer or the Enquiry, by drawing from a particular System via a particular Technology.

The choice of such a Task was supported by the following reasons:

i) it typifies everyday Double-interaction transactions.

ii) it represents a 'real' problem and a 'real' Customer resort.

iii) the Manual version of operating the System was already available in form of a reference document, and was the standard source of information for real-life Operators, while the Computer version could be simulated, with relative ease, with respect to the available resources.

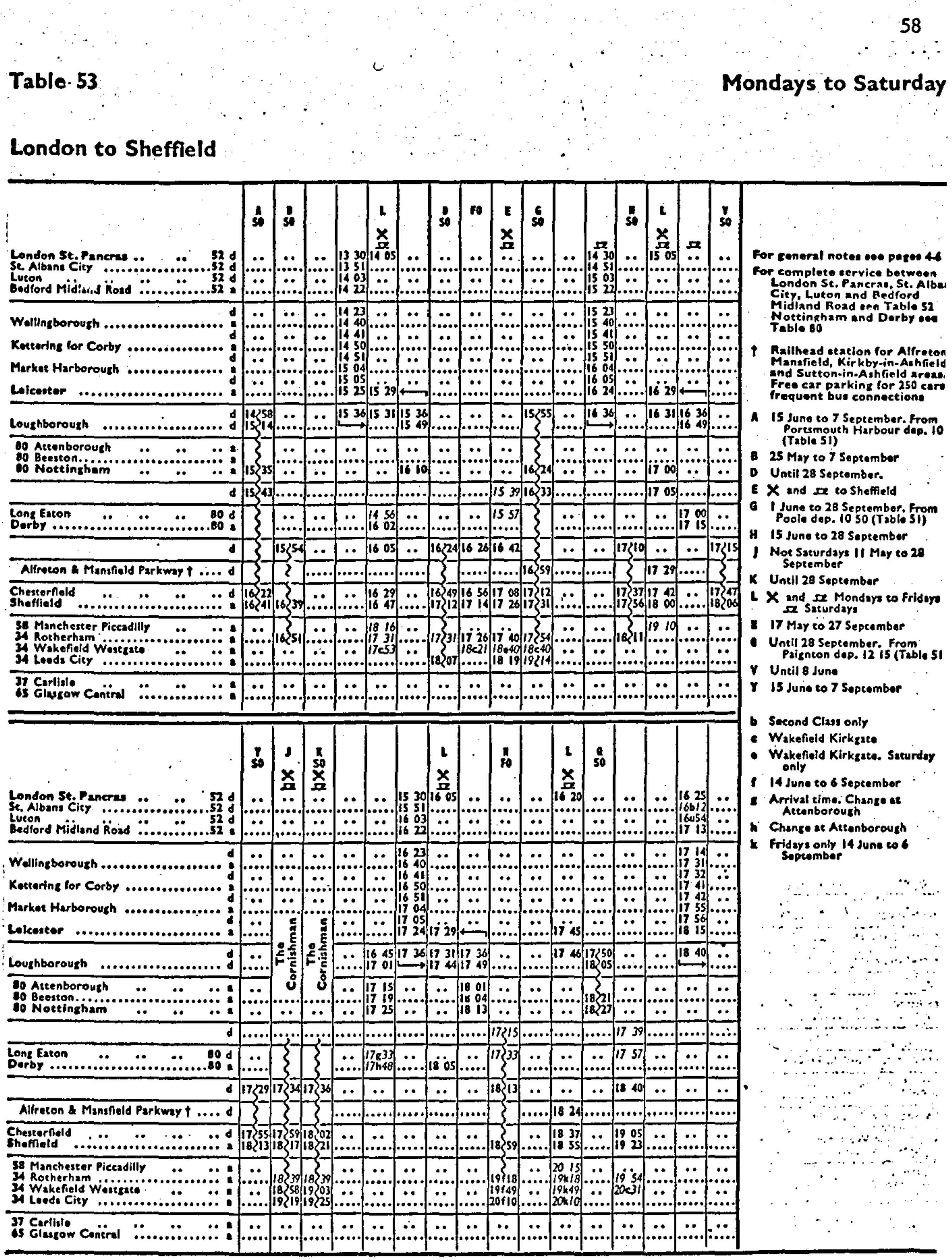
iv) Computer-operation of such a System would be 'quite straightforward' and would involve little Operator Training.

As was outlined, the Experiment sought to test, as one factor, the Effect of Technology. Hence, the System had to be operated via 2 Technologies: i) Manual
and ii) Computer

The inherent person-suitability of a Manual System and Efficiency-suitability of a Computer System are summarized below. The Manual and Computer versions used in the Experiment represented most of this quality. However, the Computer System had certain special features, one or two of which were especially person-suited. These will be outlined later in the discussion on the Computer Version.

Manual	Computer
Natural Interaction.	Unnatural Interaction.
Offers choice and discretion to Operator.	Fixed-order Man-Computer Interaction. Also, MCI otherwise in marked contrast to Man-man Interaction.
A meaningful environment for the Customer.	Does not allow Operator discretion.
Customer can appreciate the Operator's task and functions.	Operator lacks feeling of personal power over Customer affairs.
Slow	Fast
No quick or easy means of updating information.	Information can easily be up-dated.
'Manual = Inefficiency' Attitudes.	'Computer = Super-efficiency' Attitudes.

The Manual Version needs little explanation. This is available in book form to the public. For the benefit of the reader, this is the same manual he might have encountered when seeking information such as Train Times, either at a Local Library, or, more probably, at a Travel Agency. Briefly, it contains Train Travel Information (not including Fares) representing the whole of the national network. Each route appears in a tabulated form (see Diagram 15). For the purpose of the experiment, only one route (Sheffield-London, London-Sheffield) was used for technical reasons. (This, however, aided in matching the two technologies: a common starting point was now easily possible to achieve.) A separate 'Manual', containing Fare Information, was compiled. This outlined the Fare Information regarding each route alphabetically represented, and was a printed replica of the Fare Information stored in the Computer. (The Manual was, in fact, 'generated' on the Computer). Diagram 16 illustrates an example from the Fare Table.



58

Table 53

Mondays to Saturday

London to Sheffield

		A SO	B SO			L ✕☕		D SO	FO	E ✕☕	G SO		☕	H SO	L ✕☕	☕	V SO
London St. Pancras 52	d	..	..	..	13 30	14 05	..	..	..	..	..	..	14 30	..	15 05	..	..
St. Albans City 52	d	..	..	..	13 51	..	..	..	..	..	..	..	14 51	..	..	..	..
Luton 52	d	..	..	..	14 03	..	..	..	..	..	..	..	15 03	..	..	..	..
Bedford Midland Road 52	a	..	..	..	14 22	..	..	..	..	..	..	..	15 22	..	..	..	..
Wellingborough	d	..	..	..	14 23	..	..	..	..	..	..	..	15 23	..	..	..	..
	a	..	..	..	14 40	..	..	..	..	..	..	..	15 40	..	..	..	..
Kettering for Corby	d	..	..	..	14 41	..	..	..	..	..	..	..	15 41	..	..	..	..
	a	..	..	..	14 50	..	..	..	..	..	..	..	15 50	..	..	..	..
Market Harborough	d	..	..	..	14 51	..	..	..	..	..	..	..	15 51	..	..	..	..
	a	..	..	..	15 04	..	..	..	..	..	..	..	16 04	..	..	..	..
Leicester	d	..	..	..	15 05	..	..	..	..	..	..	..	16 05	..	..	..	..
	a	..	..	..	15 25	15 29	←	..	..	..	..	..	16 24	..	16 29	←	..
Loughborough	d	14 58	..	..	15 36	15 31	15 36	..	..	..	15 55	..	16 36	..	16 31	16 36	..
	d	15 14	..	..	→	..	15 49	..	..	..		..	→	..	..	16 49	..
80 Attenborough	a		..	..	..	..	..	..	..	..		..	..	..	..	..	..
80 Beeston	a		..	..	..	..	..	..	..	..		..	..	..	..	..	..
80 Nottingham	a	15 35	..	..	..	..	16 10	..	..	..	16 24	..	..	..	17 00	..	..
	d	15 43	..	..	..	..	..	..	..	*15 39*	16 33	..	..	..	17 05	..	..
Long Eaton 80	d		..	..	..	*14 56*	..	..	..	*15 57*		..	..	..	..	17 00	..
Derby 80	a		..	..	..	16 02	..	..	..	..		..	..	..	..	17 15	..
	d		15 54	..	..	16 05	..	16 24	16 26	16 42		..	..	17 10	..	..	17 15
Alfreton & Mansfield Parkway †	d			..	..	..	..		..	..	16 59	..	..		17 29	..	
Chesterfield	d	16 22		..	..	16 29	..	16 49	16 56	17 08	17 12	..	..	17 37	17 42	..	17 47
Sheffield	a	16 41	16 39	..	..	16 47	..	17 12	17 14	17 26	17 31	..	..	17 56	18 00	..	18 06
58 Manchester Piccadilly	a	..		..	..	*18 16*	..		..	..		..	..		*19 10*	..	..
34 Rotherham	a	..	16 51	..	..	*17 31*	..	*17 31*	17 26	17 40	*17 54*	..	..	18 11	..	..	..
34 Wakefield Westgate	a	..	..	..	..	*17c53*	..		*18c21*	*18e40*	*18c40*	..	..	..	..	..	..
34 Leeds City	a	..	..	..	..	..	..	18 07	..	18 19	*19 14*	..	..	..	..	..	..
37 Carlisle	a	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
65 Glasgow Central	a	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

		Y SO	J ✕☕	K SO ✕☕				L ✕☕		N FO		L ✕☕	Q SO				
London St. Pancras 52	d	..	..	..	..	..	15 30	16 05	..	..	..	16 20	..	..	..	16 25	..
St. Albans City 52	d	..	..	..	..	..	15 51	..	..	..	..	..	..	..	..	*16b12*	..
Luton 52	d	..	..	..	..	..	16 03	..	..	..	..	..	..	..	..	16u54	..
Bedford Midland Road 52	a	..	..	..	..	..	16 22	..	..	..	..	..	..	..	..	17 13	..
Wellingborough	d	..	..	..	..	..	16 23	..	..	..	..	..	..	..	..	17 14	..
	a	..	..	..	..	..	16 40	..	..	..	..	..	..	..	..	17 31	..
Kettering for Corby	d	..	..	..	..	..	16 41	..	..	..	..	..	..	..	..	17 32	..
	a	..	..	..	..	..	16 50	..	..	..	..	..	..	..	..	17 41	..
Market Harborough	d	..	..	..	..	..	16 51	..	..	..	..	..	..	..	..	17 42	..
	a	..	..	..	..	..	17 04	..	..	..	..	..	..	..	..	17 55	..
Leicester	d	..	The Cornishman	The Cornishman	..	..	17 05	..	..	..	..	..	..	..	..	17 56	..
	a	..			..	..	17 24	17 29	←	..	..	17 45	..	..	..	18 15	..
Loughborough	d	..			..	16 45	17 36	17 31	17 36	..	..	17 46	17 50	..	..	18 40	..
	d	..			..	17 01	→	17 44	17 49	..	..	..	18 05	..	..	→	..
80 Attenborough	a	..			..	17 15	..	..	18 01	..	..	..		..	..	..	..
80 Beeston	a	..	..	..	..	17 19	..	..	18 04	..	..	..	18 21	..	..	..	..
80 Nottingham	a	..	..	..	..	17 25	..	..	18 13	..	..	..	18 27	..	..	..	..
	d	..	..	..	..	..	..	..	..	*17 15*	..	..	..	*17 39*	..	..	..
Long Eaton 80	d	..			..	*17g33*	..	..	..	*17 33*	..	..	..	*17 57*	..	..	..
Derby 80	a	..			..	*17h48*	..	18 05	..		..	..	..	..	..	..	..
	d	17 29	17 34	17 36	..	..	..	..	..	18 13	..	..	..	18 40	..	..	..
Alfreton & Mansfield Parkway †	d				..	..	..	..	..		..	18 24	..	..	..	..	..
Chesterfield	d	17 55	17 59	18 02	..	..	..	..	..		..	18 37	..	19 05	..	..	..
Sheffield	a	18 13	18 17	18 21	..	..	..	..	..	18 59	..	18 55	..	19 23	..	..	..
58 Manchester Piccadilly	a	..			..	..	..	..	..		..	*20 15*	..	..	..	..	..
34 Rotherham	a	..	*18 39*	*18 39*	..	..	..	..	..	19f18	..	*19k18*	..	*19 54*	..	..	..
34 Wakefield Westgate	a	..	18 58	19 03	..	..	..	..	..	19f49	..	*19k49*	..	*20c31*	..	..	..
34 Leeds City	a	..	19 19	19 25	..	..	..	..	..	20f10	..	*20k10*	..	..	..	..	..
37 Carlisle	a	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
65 Glasgow Central	a	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

For general notes see pages 4-6

For complete service between London St. Pancras, St. Alba City, Luton and Bedford Midland Road see Table 52 Nottingham and Derby see Table 80

† Railhead station for Alfreton Mansfield, Kirkby-in-Ashfield and Sutton-in-Ashfield areas. Free car parking for 250 cars frequent bus connections

A 15 June to 7 September. From Portsmouth Harbour dep. 10 (Table 51)

B 25 May to 7 September

D Until 28 September.

E ✕ and ☕ to Sheffield

G 1 June to 28 September. From Poole dep. 10 50 (Table 51)

H 15 June to 28 September

J Not Saturdays 11 May to 28 September

K Until 28 September

L ✕ and ☕ Mondays to Fridays ☕ Saturdays

N 17 May to 27 September

Q Until 28 September. From Paignton dep. 12 15 (Table 51

V Until 8 June

Y 15 June to 7 September

b Second Class only

c Wakefield Kirkgate

e Wakefield Kirkgate. Saturday only

f 14 June to 6 September

g Arrival time. Change at Attenborough

h Change at Attenborough

k Fridays only 14 June to 6 September

Diagram 15: An Extract from the Manual Version

LOUGHBOROUGH- LONDON

LONDON - LOUGHBOROUGH

DAY RETURN	$ 3.61
WEEKEND 1ST	$ 7.24
WEEKEND 2ND	$ 4.69
PERIOD RTN	$ 5.42
1ST SINGLE	$ 5.07
2ND SINGLE	$ 3.79
1ST RETURN	$10.14
2ND RETURN	$ 6.22

LEICESTER- MARKET HARBORO

MARKET HARBORO- LEICESTER

DAY RETURN	$ 0.77
WEEKEND 1ST	
WEEKEND 2ND	
PERIOD RTN	
1ST SINGLE	$ 0.96
2ND SINGLE	$ 0.61
1ST RETURN	$ 1.92
2ND RETURN	$ 1.22

LEICESTER- KETTERING

KETTERING- LEICESTER

DAY RETURN	$ 1.06
WEEKEND 1ST	
WEEKEND 2ND	
PERIOD RTN	
1ST SINGLE	$ 1.53
2ND SINGLE	$ 0.84
1ST RETURN	$ 3.06
2ND RETURN	$ 1.68

LEICESTER- BEDFORD

BEDFORD - LEICESTER

DAY RETURN	$ 1.73
WEEKEND 1ST	$ 3.50
WEEKEND 2ND	$ 2.67
PERIOD RTN	
1ST SINGLE	$ 2.74
2ND SINGLE	$ 1.73
1ST RETURN	$ 4.95
2ND RETURN	$ 3.00

Diagram 16: An Extract from the Fare Table

The Computer version needs a more detailed treatment as its design, although representative of real-life systems, was undertaken at the Research Laboratories specially for use in the Experiment.

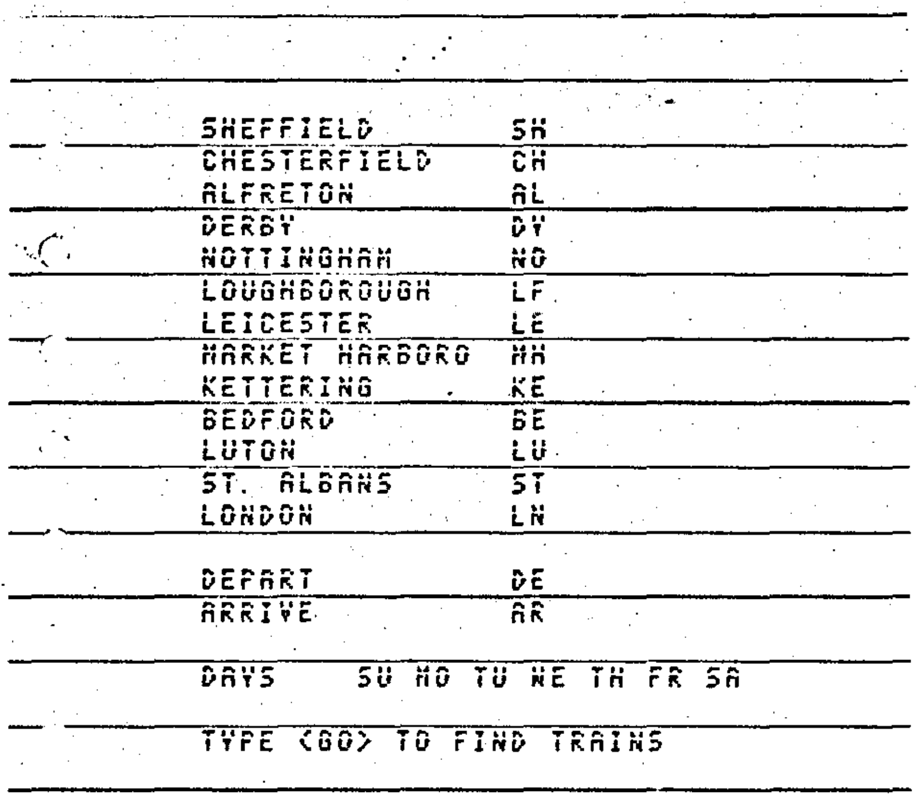
The idea was to have roughly a one-to-one transformation from the manual to the computer version, at the same time making sure that its working appeared credible, and in its final form, it did not deviate from a potentially real-life counterpart.

1. Components

   The System was set up on a DEC PDP 12 Computer at the Research Laboratories. The System, in its final form, consisted of 2 main units and a supporting unit. The main units were the Teletype (an input mechanism), and a Visual Display Unit (an output mechanism). The supporting unit was a fast Teleprinter (an output mechanism) which could output in printed form the information displayed on the V.D.U., if required. Plate 1 on Page 77 shows some of the features of the computer system.

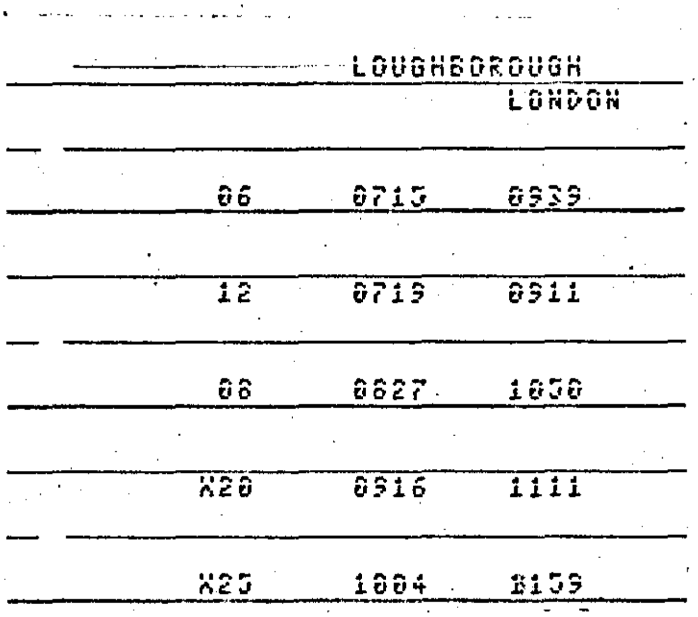
2. Operating the Computer System

   The operation mainly centred around progressing from Frame 1, the starting point, as displayed by the V.D.U., via Frame 2, to Frame 3 (see Diagram 17).



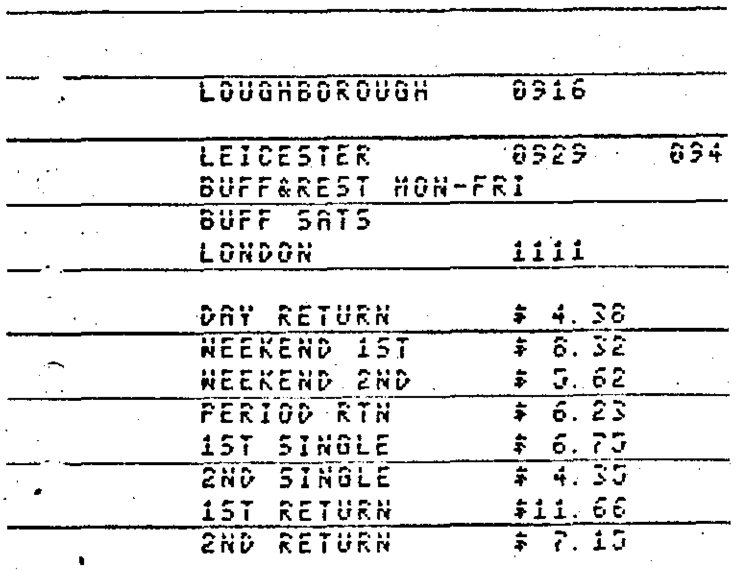
```
SHEFFIELD          SH
CHESTERFIELD       CH
ALFRETON           AL
DERBY              DY
NOTTINGHAM         NO
LOUGHBOROUGH       LF
LEICESTER          LE
MARKET HARBORO     MH
KETTERING          KE
BEDFORD            BE
LUTON              LU
ST. ALBANS         ST
LONDON             LN

DEPART             DE
ARRIVE             AR

DAYS     SU MO TU WE TH FR SA

TYPE <GO> TO FIND TRAINS
```

Stage 1: Frame 1



```
            LOUGHBOROUGH
                  LONDON

       06     0715    0939

       12     0719    0911

       08     0627    1050

      X20     0916    1111

      X25     1004    1159
```

Stage 2: Frame 2



```
LOUGHBOROUGH      0916

LEICESTER         0929     094
BUFF&REST MON-FRI
BUFF SATS
LONDON            1111

DAY RETURN        £ 4.38
WEEKEND 1ST       £ 6.32
WEEKEND 2ND       £ 5.62
PERIOD RTN        £ 6.23
1ST SINGLE        £ 6.73
2ND SINGLE        £ 4.35
1ST RETURN        £11.66
2ND RETURN        £ 7.15
```

Stage 3: Frame 3

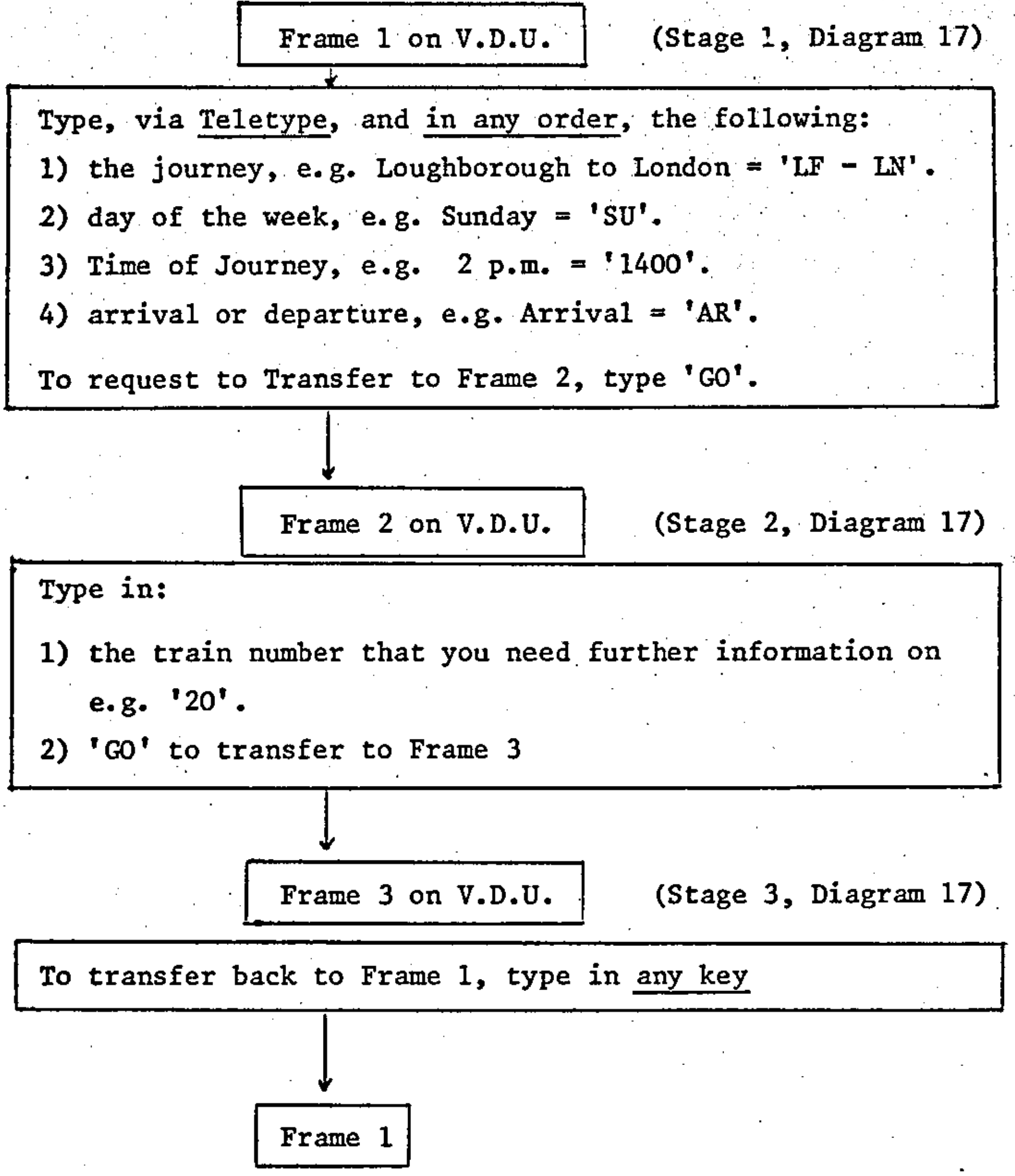
Diagram 17: An illustration of the Stages in the Computer System, as displayed on the V.D.U.

Frame 1, the starting point of a transaction, was equivalent in the case of the Manual operation, to having the Manual book-marked at a Table representing the particular route. It displayed the stations, in a geographic order of the Route, and also provided the various codes needed for the Operator to interact with the System.

Frame 2 displayed a selection of trains within a '+ or - 2 hour period' of an input arrival or departure time, e.g. if the Customer wanted to travel around 2 p.m., Frame 2 would display all the trains departing from a particular station of the route, within the period 12 noon to 4.00 p.m. (see Stage 2, Diagram 17). In addition, an 'X' against a Train number denoted a change involved for the particular journey.

Frame 3 displayed a 'break-down' on a particular train selected providing information such as facilities and fare (Stage 3, Diagram 17).

Diagram 18 illustrates the operations involved in progressing from Frame 1 to Frame 3.



Frame 1 on V.D.U. (Stage 1, Diagram 17)

Type, via Teletype, and in any order, the following:

1) the journey, e.g. Loughborough to London = 'LF - LN'.
2) day of the week, e.g. Sunday = 'SU'.
3) Time of Journey, e.g. 2 p.m. = '1400'.
4) arrival or departure, e.g. Arrival = 'AR'.

To request to Transfer to Frame 2, type 'GO'.

Frame 2 on V.D.U. (Stage 2, Diagram 17)

Type in:

1) the train number that you need further information on e.g. '20'.
2) 'GO' to transfer to Frame 3

Frame 3 on V.D.U. (Stage 3, Diagram 17)

To transfer back to Frame 1, type in any key

In addition, the information on the V.D.U. could be output on the Teleprinter by typing in 'P' with the control key pressed down. 'CNTL/P'.

Diagram 18: Operating the Computer System

3. Additional Features of the Computer System

The computer system had certain 'supporting features', that are worth noting. Such features would not be uncommon with real-life systems.

1) Frame 2 narrowed down the range of trains, as different from the manual, to a period of about 4 hours, representing a 'comfortable' range of trains for the Customer to select from.
2) Frame 2 was especially suited to answering a common question of the type 'I would like to reach London by noon. What would be the best train for me?' Typing in 'AR' (arrive) at Stage 1, rather than 'DE' (depart), would automatically display, on Frame 2, a selection of trains arriving at London at the required time. In the manual version, the same could be achieved only by first looking down the column of arrival times to London and then retracing back to the departure point.
3) Frame 3 provided a detailed break-down of a particular train, which in the manual version, would have to be collated from various parts of the Table, and even from more than one manual.
4) The supporting Teleprinter could provide the Customer with a rapid access, in printed form, to the information displayed on the V.D.U., if he so required. In the case of the manual version, the same could be achieved only in a laborious way, e.g. the Operator jotting the information down for the Customer, or by Operator-Customer teamwork.

4.2.2 Enquiries

A visit was planned to a city train travel Information Centre to obtain, amongst other information, a sample of real-life enquiries. The information obtained (Appendix VII) was classified according to the nature of the enquiry and classified further as 'Simple' or 'Complex'. Roughly, the Simple- or Complex- classification was based on the qualities of the enquiry as summarized in Table 15.

Simple Enquiry	Complex Enquiry
'typical'	'untypical'
'straightforward'	'awkward'
'reasonable'	'unreasonable'
'single-interaction'*	'iterative-interaction'*
'quickly' executable	'time-consuming'
compatible	wholly or partly incompatible

* see page 6 for Definitions

Table 15: Simple and Complex Enquiries

The Sample obtained from real-life needed to be replicated in the experiment as far as possible. At the same time, control had to be exercised over the type of enquiry asked, to facilitate a study of its effects. A compromise had to be struck, therefore, between assuring a conduct of enquiring that was as natural as possible at the same time making sure that roughly half the subjects negotiated the situation with one type of enquiry, and half with the other type.

One solution lay in form of guidelines representing the basic need of each type of enquiry in a skeletal form. Thus, as long as the customer roughly appreciated 'the bare essentials' of the enquiry, he would be left to his own 'natural devices' as to how he formulated it or how he dressed it up. (Appendix VIII shows a selection of these guidelines; the codes 'EA' and 'EB' refer respectively to 'Simple' and 'Complex').

4.2.3 Operator-orientation

The Operator was a young lady with prior experience in Double-interaction, although this was associated with Manual technology. More important, she seemed to have met, in the course of her Double-interaction experience, colleagues who were 'System-centred' or 'Customer-centred' that the researcher was attempting to simulate in the experiment. On the two accounts, and on the account of her sex (there are probably more female, than male, Operators in real-life Double-interaction situations), she seemed the right choice for the job.

She was introduced to what the researcher was attempting to simulate under 'Operator Type'. This was reinforced by written instructions that she was requested to read just before the onset of each session that required her to perform her duties in a particular way. Instruction A attempted to 'induce' Customer-centred orientation, and Instruction B, System-centred orientation. These are illustrated below.

Instruction to Operator for Orientation A

A

The Manager has emphasised:-

"Customers are the most important part of our job. The figures of the recent past show that we have been losing Customers consistently, which is a bad show. Our immediate mission is not only to win back the lost Customers but gain many more new ones. The only solution is to extend a service to them that will reflect the importance we attach to them, at the same time taking a special interest in the needs of every one of them.

So remember: Keep them coming. More important, let them tell their friends about us and recommend us to them, so that THEY WILL KEEP COMING IN GREATER NUMBERS! GOOD LUCK."

Instruction to Operator for Orientation B

B

The Manager has emphasised:-

"In recent months, we have been shown to neglect our main duty. This is PAPERWORK and not SERVING CUSTOMERS. Customers shouldn't be a part of our job but we have been requested to look after them while the redundancies last. Hence, although they have become part of our job temporarily, it must be understood that they are only a peripheral part of our job. We must make sure that our main duty which is administration, does not suffer on their account. We must be able to process them more quickly. Our immediate mission then, if we are to clear our backlog at all, is to make sure that the Customers take up the least of our time. So remember: OUR MAIN DUTIES CANNOT BE LEFT TO SUFFER BECAUSE OF THEM. GOOD LUCK."

4.2.4 Customer-orientation and Satisfaction Measurement

The Customer was in many ways, the primary focus of the experiment. A self administered questionnaire study sought to delineate:

1) the nature of the Customer's 'natural' or 'initial' state

and 2) the nature of his reactions to each situation.

4.2.4.1 Pre-test Questionnaire and Customer-orientation

There were two features of interest about a Customer's 'natural' state on which the Pre-test questionnaire (Appendix IX) attempted to seek information.

1) The first one was his ideal relating to what he 'looked for' in a Double-interaction, represented by priorities attached to 'person' or 'efficiency' aspects of the situation. Questions 1B and 2B sought to derive a measure of this Person-orientation or Efficiency-orientation of the Customer. This was attempted by asking him to rank, in order of importance, 6 qualities describing the Customer's ideal service and 6 qualities describing the Operator. Each set of 6 qualities was made up of 2 sub-sets of 3 qualities each, one sub-set representing affinity with 'Person' (e.g. 'personal', 'warm'), and the other with 'Efficiency' (e.g. 'quick', 'functional').

The ranks obtained could be reversed in order and aggregated to provide an Efficiency:Person Score representing each Customer's 'ideal'. The bias in the E:P Score would then suggest whether the Customer was 'Efficiency-oriented' or 'Person-oriented'.

Discussion of each feature in this Section ends with a brief consideration of the relating 'treatment of data'.

2) The second feature of interest was the Customer's Prior Expectations regarding the Double-interaction situation he was to meet. This was designed to be a supporting feature of the experiment and resulted from suggestions of the first of the 2 Field Studies, that the initial expectations of the Customer could be a significant contributant to Double-interaction harmony.

Questions 1A and 2A of the pre-test questionnaire (Appendix IX) sought to obtain a description of the Customer's expectations, regarding both the Operation to be served by as well as the service to be offered, borne out of personal experience with real-life Double-interactions or out of reports received from friends, etc. The Customer was asked to summarize these expectations by rating, along a 5-point scale, 6 dimensions describing the Operator, and 6 describing the Service. The polarities of the dimensions appeared in a 'fifty-fifty' randomly ordered 'mix' at any one end of the scales. The 6 dimensions were an extension of the 6 qualities that the Customer would use to describe his ideal (or, the 6 qualities for the ideal were one end of the 6 dimensions for the expectations).

In other words, the expectations would offer a link with the ideal and the two combined would offer a better insight into the nature of the Customer's 'initial state'.

4.2.4.2 Post-test Questionnaire and Customer Satisfaction

The post-test questionnaire (Appendix X) sought to evaluate the Customer's reactions to the situations encountered. This was attempted in 2 ways:-

1) Indirect Satisfaction Measure. This was a structured approach to the problem, and asked the Customer to rate each situation on the same dimensions that he would have used to describe his ideal, and via the same schemata as the one used for recording expectations (Questions 4 and 5, Appendix X). There was the inherent advantage of a ready facility, therefore, of comparing the Customer's reactions to each situation with both his ideal and his expectations.

   A measure of Satisfaction could then be set up, based on this indirect but exploring method of evaluation:
   1) the polarities of the dimensions on which the Customer rated each situation, could be matched with the equivalent qualities he used to describe his ideal.
   2) these ratings could then be aggregated to provide a 'single total' representing the degree of satisfaction derived from each situation. The 4 situations would hence lead to 4 satisfaction scores which could be compared and would suggest the Customer's order of preference.

2) Direct Satisfaction Measure. This was derived by a battery of 'direct' questions that asked the Customer to report his satisfaction without the aid of suggested guidelines or criteria (e.g. 'How satisfactory did you find the Operator?')

Questions 1, 2, 3, 6 and 7 of the post-test questionnaire represented the Direct-Measurement Approach. The 'ticks' according to the point they are placed along each scale could be converted into 'digits' (i.e. 1 = least satisfactory; 5 = most satisfactory). The scores on the questions, thus obtained, could be aggregated to form 'single totals', as in the case of the Indirect-Measurement Approach, representing the degree of satisfaction derived from each situation. (The relation between the 2 approaches is discussed in the next section.)

4.2.4.3 Testing the Model

The 4 satisfaction scores, could be ranked, and the effect of various factors could be provided by the values of the Correlation Coefficients derived from these ranks. For example, to test the effect of 'Enquiry Type', the Customers could be cast into 2 groups: those who negotiated the situations with a simple enquiry, and those who did so with a complex enquiry. Kendall's coefficient of concordance could then be calculated for the 2 groups. If the coefficient was significant, the column-rank-aggregates would provide a set of 4 'scores' denoting the degree of satisfaction or dissatisfaction with the 4 situations, for the group as a whole (Kendall, 1948).

Secondly, the 2 sets of ranks for each Customer (one set each for the Direct- and the Indirect-Measurement Approaches) could be studied (Spearman's Rank Correlation Coefficient) to provide information regarding the Customer himself, and used as a 'rough' basis to provide indications of Internal Consistency.

1) Ideally, the 2 sets of ranks should bear a high positive correlation, since each represented 'the same satisfaction'.
2) More probably, however, there would be no correlation between the two. This would be so if the Indirect Approach assisted the Customer with the process of Satisfaction-Reporting while the Direct Approach offered no help relatively. (This is to say, that with the latter, the Customer was 'at a loss' to generate criteria or qualities on which to base his 'satisfaction' or to provide a 'single tick' answer to a complex stage of affairs affecting his 'satisfaction'.
3) In the critical case, the 2 sets of ranks would bear a high negative correlation. This would be in the case where:
    i) the questionnaire, especially the Rating Method, proved difficult to comprehend and the Customer was 'misdirected' in the way he related the issues, and/or
    there was some other kind of 'internal' inconsistency in the Customer's subjective responding
    OR
    ii) the qualities used in the assessment structure on which the Indirect Satisfaction Method was based misrepresented the Customer's own criteria for satisfaction.

Of the 2 sets of possibilities the latter was unlikely, or more precisely, less likely. For one reason, there was a variety of qualities that were used and these were carefully thought out. Secondly, this was a structured, and therefore more thorough, approach of measuring satisfaction.

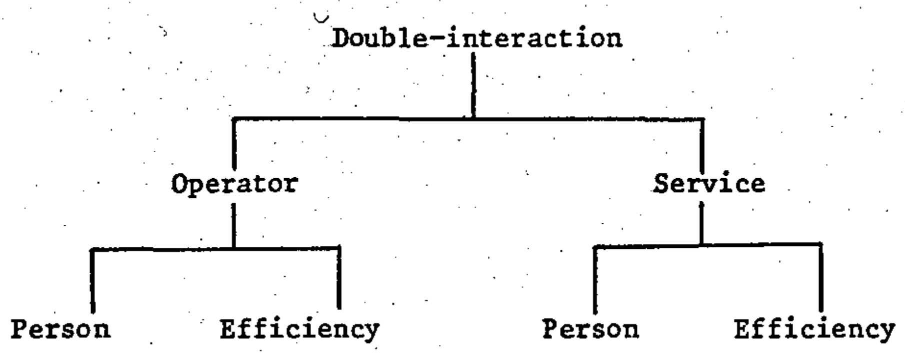


Diagram 19: The Structure for obtaining Customer Satisfaction by the Indirect Method.

A discrepancy between the Direct and the Indirect scores (denoted by a high negative coefficient) is more likely to be attributable to the first set of possibilities and could serve as indication of Internal Inconsistency within each of the subjects. Indeed, it was possible that Researcher's general observations during experiment could provide qualitative support for the influence of this issue. For example, there would be visible signs if the subject was struggling with a particular part of the questionnaire.

Finally, it would seem appropriate to base the customer-satisfaction, in the final instance, on the set of ranks derived by the Indirect Approach because:

1) it offered a more thorough evaluation method,
2) it provided a ready and direct comparison with the Customer's orientation, and
3) it assisted the Customer with the process of satisfaction reporting.

4.2.5 Experimental Procedure

An 8-day period was set up to allow for the running of the experiment. Prior to this, the Operator carried out quick rehearsals of the task she was supposed to perform with the Researcher 'standing in for the customer'.[1] On a 5-customers per day basis, it was expected that at the end of the period, 40 Customers would have been 'put to test'. Table 16 shows the Experimental Design[2] for this period. Diagram 20 illustrates the 4 Double-interaction situations that the Customer would meet.

	Customer-centred Operator	System-centred Operator
Manual Technology	Situation 1	Situation 3
Computer Technology	Situation 2	Situation 4

Diagram 20: The 4 Double-interaction Situations

---

[1] It was thought initially that due to other working pressures, the Operator had not been allowed an adequate period of training. However, the findings offered no such indication.

[2] The arrangements for the 7th and 8th days had to be interchanged due to system failure on the 7th day, so as not to waste customer time while the system was being repaired.

DOUBLE-INTERACTION EXPERIMENT

SCHEDULE

MAY 1975

Week	Date/			Order of Conditions			
1	13/5	Tues	1	A1	A2	B2	B1
	14/5	Wed	2	B2	B1	A1	A2
	15/5	Thurs	3	A2	B1	B1	B2
	16/5	Fri	4	B1	B2	A2	A1
2	20/5	Tues	5	B1	B2	A2	A1
	21/5	Wed	6	A2	A1	B1	B2
	22/5	Thurs	7	B2	B1	A1	A2
	23/5	Fri	8	A1	A2	B2	B1

Role A = Customer-Centred

Role B = System-Centred

Technology 1 = Manual

Technology 2 = Computer

Table 16: Experimental Design

The Customers represented a mixed sample drawn from the Loughborough population. The various occupations of the Customers were biased roughly in a 1:2 Students:Non-Students ratio. (This would permit a supporting study such as 'do Students behave differently from non-Students?')

When each day's Customers had arrived at the Research Laboratories, they were ushered into the waiting room, which conveniently had access to both the manual office and the computer office. See Diagram 21 and Plates 1 and 2.

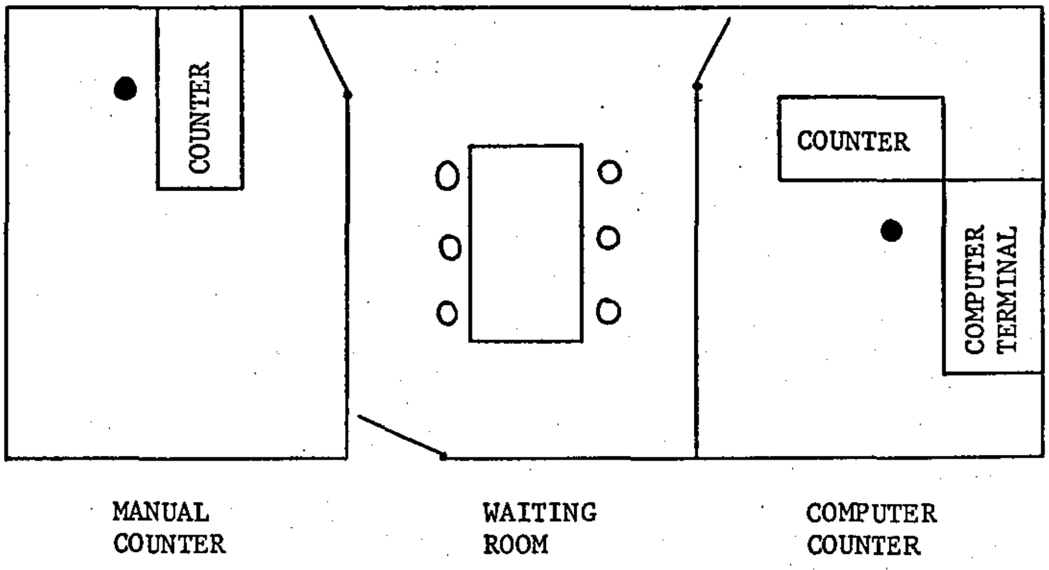

COUNTER
COUNTER
COMPUTER TERMINAL
MANUAL COUNTER
WAITING ROOM
COMPUTER COUNTER

Diagram 21: Lay-out of the Travel Kiosk

Plate 1: Manually operated Travel Kiosk

Plate 2: Computer aided Travel Kiosk

The centre table in the waiting room had a selection of up-to-date Travel Brochures which the Customers could browse through while waiting, as an attempt to simulate a real-life environment of a Travel Kiosk.

As they sat around this table, the Customers were given a short briefing on the purpose of their visit and what they were required to do. They were told that they had arrived at a Train Travel Information Kiosk and that 'here was a chance' for them to enquire about Train Travel. They were introduced to the Enquiry guidelines and each Customer was given an example containing 6 guidelines, taking care that there was no overlap in the contents of the 6 envelopes. They would meet the opportunity of enquiring 4 times in the course of the run through. To assist them form or formulate each enquiry, they were asked to select one of the guidelines provided. The guidelines were there only as a rough guide and remembering the details were not as important as having just a rough idea of the needs of the enquiry. Having digested the contents of the guideline, they were asked to discard it in a box provided, before they proceeded with the enquiry. If any Customer did not 'like' the selection of guidelines provided, for any reason, he was offered another envelope containing a new selection.

The envelopes were marked A, B, C, D and E, which formed the order in which the 5 Customers negotiated the first situation. For the rest of the situations, this order was shuffled so that roughly, each Customer would have been first and last in the order at least once in the course of the run through.

The Customers were asked if there were any problems so far with what was to be done. (For the vast majority, this was straightforward.)

They were also handed and asked to fill in the pre-test questionnaire and were told that following each encounter, they would be asked to fill in another (Post-Test Questionnaire). (For a small number of Customers, certain parts of the questionniare were difficult to administer, but help was provided whenever necessary.) Each set of questionnaires was collected following each session so as to prevent any cross reference.

The Customer was not told whether or not, or even how, the 4 situations differed.

Finally, assurances were obtained once again about whether there were 'any problems at all'. Assistance was offered wherever and whenever required but such occasions were infrequent. (For one or two Customers there were visible signs that the task was not 'motivating enough' and that even if it was, they were not taking it 'seriously enough'.)

The Customer was now ready to address his first enquiry. The next session would not commence until all the Customers had finished filling in the Post-Test Questionnaire.

4.3 Findings

4.3.1 Customer Types

First, a brief study of the occupations represented by the Customer sample. As has been discussed, the intention was to have a mixed sample. The sample obtained consisted of 15 students and 24 non-students (with one Customer having to stay absent due to uncontrollable circumstances, the total sample size was one less than the desired figure of 40). The non-students consisted of:-

Housewives, Working Housewives, Library Staff, Designer, Chef, Chauffeur, Businessman, Manageress, Handicapped unemployed person, and unemployed person. (Appendix XI summarizes other factors associated with the Customers such as sex, etc.)

Secondly, and more important, the person- or efficiency-orientations of the Customers. Questions 1B and 2B of the Pre-Test Questionnaire attempted to extract information regarding the Customer's ideal towards Double-interaction transactions, and whether there was a leaning towards Efficiency- or Person-related values. After reversing the polarities of the ranks of the 'Efficiency-describing' and 'Person-describing' qualities, and summing over like qualities, each Customer now had an Efficiency: Person Score such as '30:12' or '15:27'. If the Efficiency Score exceeded the Person Score by a value more than '3', the Customer was classified as 'Efficiency-centred'. If the bias pointed the other way, the Customer was classified as 'Person-centred'. All the boundary cases were classified as 'Mixed-Values' Types (Appendix XII).

Customer-Type	Group Size	% of Total
Efficiency-centred	24	61.5
Person-centred	8	20.5
Mixed-Values	7	18.0
Total	39	100

Table 17: Customer-Types

CUSTOMER TYPE	DISTRIBUTION OF E:P SCORES								
EFFICIENCY CENTRED	E:P Scores	30:12	29:13	28:14	27:15	26:16	25:17	24:18	23:19
	Frequency	6	2	2	3	1	6	1	3
	%	25	8.5	8.5	12.5	4	25	4	12.5
MIXED VALUES	E:P Scores	22:20	21:21	20:22					
	Frequency	2	5	0					
	%	29	71	0					
PERSON CENTRED	E:P Scores	12:30	13:29	14:28	15:27	16:26	17:25	18:24	19:23
	Frequency	0	0	0	3	2	0	0	3
	%	0	0	0	37.5	25	0	0	37.5

Table 18: Distribution of E:P Scores

Table 17 summarizes the results of this analysis while Table 18 illustrates the distribution of E:P scores. The features to note are that:

1) Table 18. Very broadly, there seems to be a greater density of distribution towards the ends of both Efficiency and Person scales.

2) Table 18. The span of distribution for the Person-centred Customer is shorter than that of the Efficiency-centred Customer (i.e. the extreme E:P score of the Person-centred Customer is 15:27 rather than 12:30). Partly, this may be due to a small sample size, but more important, this thinning out towards the Person-extreme would be expected. All the finding says is that there are few if any Customers who look for Person-related values in a Double-interaction to such an extent that they do not mind if their Enquiry was not answered at all. This brings us to the third point.

3) Table 17 and 18. There seems to be an overall bias towards Efficiency for most Customers. There are two points to note here. There may be an inherent bias in the measure employed to map Customer orientations. This is to say that there is a basic function associated with enquiring that may describe more an Efficiency need than a Person need. This is to say that the very act of wanting an enquiry answered could be interpreted, in itself, as a pure Efficiency need. On the other hand, the bias in the sample that there is a greater number of Efficiency-centred than Person-centred Customers, may indeed reflect, to some extent, one of the researcher's comments in the preceeding Discussion (Section 3). This was that due to the characteristics of present day systems which may be making heavy Efficiency demands on Operators and on Customers indirectly, an unconscious adjustment may be taking place whereby more and more Operators, and Customers, were turning System-centred.

4) Table 19. In the way people may be Efficiency- or Person-centred, the findings suggest no apparent bias of the sexes. Past research has suggested a sex bias in the way people occupy different orientations or display different styles of interactive behaviour, e.g. one researcher has suggested that women are likelier to be 'people-centred', and men likelier to

be 'things-centred' in the constructs they employ in describing people or situations (Little, 1960. Little's work will be reviewed in more detail in the Discussion, Section 5.)

CUSTOMER TYPE	SEX					
	Male		Female		Total	
	n	%	n	%	n	%
Efficiency centred	12	50	12	50	24	100
Person centred	4	50	4	50	8	100

Table 19: Customer Types and the Sex Factor

The theme of classifying Customers according to their Person-affinity or Efficiency-affinity is central to this stage of the present research. It will be referred to repeatedly in the coming sections, and developed progressively.

4.3.2 General Factors Governing Customer Satisfaction in Double-interaction

The data obtained from the questionnaires was cast into a set of rank-aggregates for each Customer, as explained in Section 4.2.4, denoting the degree of satisfaction attached to each of the 4 situations met in the study (Appendices XIII and XIV).

Table 20 shows a study of a selection of factors that may govern Double-interaction. As was discussed in Section 4.2.4, the 'strength' of each factor would be reflected by the size and significance of the Kendall's Coefficient of Concordance derived from the sets of Ranks of Customers bearing the factor in common. The coefficients have been corrected for different sample sizes in order to facilitate between-coefficient comparisons. Diagrams 22 and 23 illustrate these findings graphically.

Customer Grouping		Coefficient of Concordance	Significance
Overall		0.30	NS
Customer Orientation	Efficiency-centred	0.68	$p < 0.05$
	Person-centred [2]	0.15 (0.46)	NS ($p < 0.05$)
	Mixed-Values [3]	0.51	$p < 0.05$
Enquiry	Simple	0.12	NS
	Complex	0.76	$p < 0.01$
Sex	Male	0.49	$p < 0.05$
	Female	0.26	NS
Occupation	Student	0.53	$p < 0.05$
	Non-Student	0.16	NS

Table 20:[1] General Factors Governing Customer Satisfaction in Double-Interaction

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1. The Table does not include all the factors reviewed. A complete list appears in the Appendix (XV). Order or Period (i.e. week 1 or 2) effects were found to be non-significant. The Coefficients in the Table are based on the Indirect Satisfaction Scores in keeping with the discussion in Section 4.2.4.3.
2. Contrary to general findings for other Customers, the Person-centred Customer showed signs of a stronger factor with Direct, rather than Indirect, satisfaction scores. The Person-centred Customer behaved in a different and special manner on other accounts as well, as will be reviewed in a later section. It is possible that the Derived Measure has not captured the finer aspects of this Customer's cognitions to which he may be attaching greater importance. If so, the Direct Measure, although 'cruder' would represent better the overall satisfaction state of this Customer. We will look for further evidence for this special treatment to this Customer in the sections to follow. Meanwhile, the Direct Measure, for this Customer, is accepted as a more valid measure depicting his satisfaction.
3. N = 5. When Customers with Derived scores correlating highly negatively with Direct scores were rejected on grounds of internal inconsistency (Appendix XIV), the Mixed Values factor rose sharply in significance. The Table refers to this revised co-efficient and the sample size of the mixed values Customers is now reduced from 7 to 5. For other factors, the larger sample size seems to accommodate the few rejects reasonably well, and the coefficients remain unchanged.

The features to note are that:-

1) The most significant factors seem to be the Complex Enquiry and the Efficiency-centred Customers. The least significant is the Simple Enquiry.

2) Customer type is a strong influence on Double-interaction and falls from high to moderate significance levels as one moves from the Efficiency-centred Customers, through the Mixed-values types, to the Person-centred Customers.

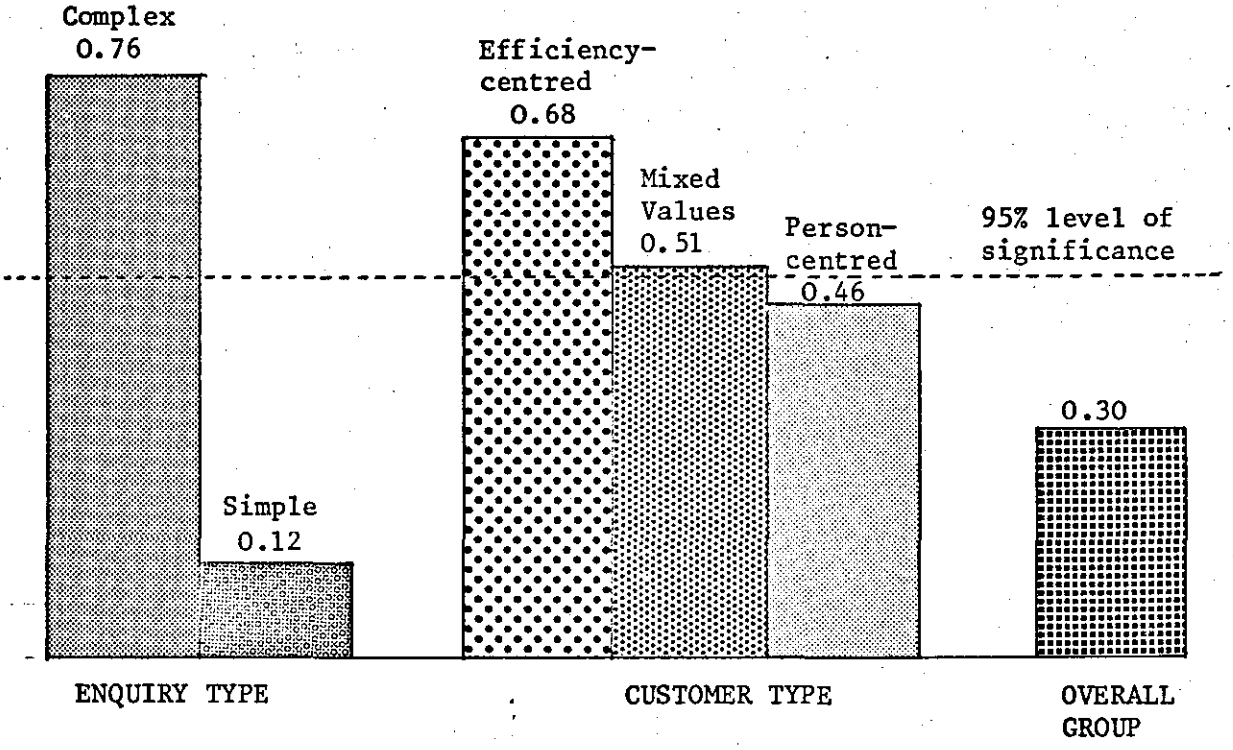

Diagram 22: Primary* Factors Governing Customer-Satisfaction in Double-interaction

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* Primary Factors = Factors relating to Experimental Hypotheses.

Secondary Factors = Other Factors that might also influence Customer Satisfaction.

3) Enquiry type bears 2 marked features. Whereas a Complex Enquiry offers a very strong contributing factor for Customer satisfaction, a Simple Enquiry represents a very weak force. The 'obvious' explanation would be the different time periods associated with each enquiry type, so that one provides a longer and more thorough appreciation of the situation encountered, while the other one does not. Secondly, the Simple Enquiry may trivialize the special features surrounding each situation. For many situations, the customers might find the sophistication of the situation far in excess to the simple nature of the enquiry.

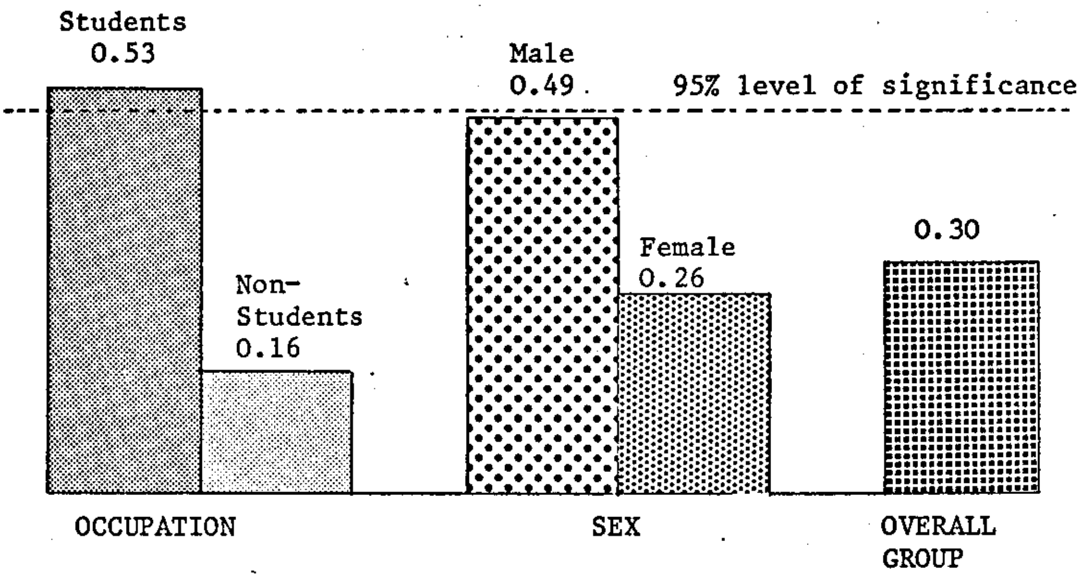


Diagram 23: Secondary Factors Governing Customer Satisfaction in Double-interaction.

4) The Occupation factor (more precisely, students v/s non-students) and the Sex factor both show interesting features. The significance is reflected by students, and males, but not by their respective counterparts. However, the result is less clear cut than it seems to suggest. This is because of the considerable overlap between the 2 groups. 93% of students were males. Also, 67% of students belonged to the Efficiency-centred group of Customers which has already been established as a strong factor. It seems to the Researcher, however, that students are a far stronger factor than males. This, in turn, bears a strong link with occupations in general. There may even be an experimental effect emerging here, i.e. University students are much more familiar with questionnaire answering than the general public.

In conclusion, the evidence examined in this section offers considerable support for the hypotheses that Customers satisfaction in Double-interaction is governed by the type of Enquiry as well as the orientation of the Customer. We are already beginning to note deviations within these broad factors and also the influence of secondary factors. We have still to examine the influence of the other 2 factors, namely the orientation of Operator and the type of System or Technology This will be taken up in the next Section which offers a detailed examination of how different factors combine, to affect the satisfaction that a Customer attaches to a Double-interaction situation.

4.3.3 Testing the Model

In Section 4.1 a model was introduced that suggested how the following factors might govern Customer satisfaction in the Double-interaction context:

1) Type of Customer (i.e. whether Efficiency- or Person-centred).
2) Type of Operator (i.e. whether System- or Customer-centred).
3) Type of System or Technology (i.e. whether Manual or Computer).
4) Type of Enquiry (i.e. whether Simple or Complex).

Table 21 attempts to summarize the experimental findings on the preferences that the Customers attach to the 4 situations. These preferences are derived from Rank-Aggregates of various groupings under study, such that the highest Rank-Aggregate would mean 'least satisfactory' and the lowest, 'most satisfactory'. (The Rank-Aggregates appear in Appendix XVII). The Table also compares the findings with the model. The original version of the model, as it appeared in Section 4.1, is amended slightly and without affecting its contents, to facilitate a direct comparison. As such, the state of the model is now depicted by Ranks, so that 1 = most satisfactory and 4 = least satisfactory.

Table 21: Findings of the
Experimental Attempt of Testing the Customer-Satisfaction Double-Interaction Model

CUSTOMER TYPE	ENQUIRY TYPE	Situation 1		Situation 2		Situation 3		Situation 4		SIGNIFICANCE LEVEL*
		CUSTOMER-centred Operator with MANUAL Technology		CUSTOMER-centred Operator with COMPUTER Technology		SYSTEM-centred Operator with MANUAL Technology		SYSTEM-centred Operator with COMPUTER Technology		
		MODEL	EXPER-IMENT	MODEL	EXPER-IMENT	MODEL	EXPER-IMENT	MODEL	EXPER-IMENT	
		row rank	row rank	row rank	row rank	row rank	row rank	row rank	row rank	
EFFICIENCY-CENTRED CUSTOMER	SIMPLE ENQUIRY	4	4	3	2½	2	2½	1	1	$p<0.05$
	COMPLEX ENQUIRY	4	3	2	1	3	4	1	2	$p<0.05$
PERSON-CENTRED CUSTOMER	SIMPLE ENQUIRY	1	1½	3	3	2	1½	4	4	NS
	COMPLEX ENQUIRY	2	3	1	1	3	2	4	4	$p<0.05$

1 = highly satisfactory
4 = least satisfactory

* Kendall's Coefficient of Concordance

4.3.3.1 Efficiency-centred Customer

A Customer displaying an ideal that was biased towards Efficiency-related rather than Person-related qualities in his views towards Double-interaction situations was classified as an Efficiency-centred Customer.

The Efficiency-Customer is discussed in this section under each type of enquiry he encountered in the 4 situations. The overall effect, if any, will be discussed following this preliminary discussion on the separate effects.

4.3.3.1.1 Efficiency-centred Customer/Simple Enquiry

It can be seen that the results here follow closely the model predictions. Satisfaction is maximum for the System-centred Operator/Computer Technology situation and minimum for Customer-centred Operator/ Manual technology. Customers find the two intermediary situations to be equally satisfactory. Although these situations lie between the extremes, the predicted preference order suggested by the model is absent in the findings.

The explanation probably lies in the nature of a Simple Enquiry: the simplicity does not facilitate an appreciation of the differences between the 2 situations. However, the findings associated with a Simple Enquiry serve to simplify the rationale of the model (normally, a model is an over simplification of a real life state of affairs). The general pattern here seems to be as follows:-

1) Where a Double-interaction holds all 3 participants in mutual consonance (Efficiency-centred Customer/ System-centred Operator/Computer Technology), the situation will be of maximum satisfaction to the Customer.

2) Where a Double-interaction holds the Customer in dissonance to the other 2 participants which are consonant with each other (Efficiency-centred Customer/Customer-centred Operator/Manual Technology), the situation will be of minimum satisfaction to the Customer.

3) Where a Double-interaction holds the Customer in consonance with only one of the 2 participants, and in dissonance with the other one (Efficiency-centred Customer in either a Customer-centred/Computer Technology OR a System-centred/Manual Technology environment), either situation will be of an equal intermediary satisfaction to the Customer.

4.3.3.1.2 Efficiency-centred Customer/Complex Enquiry

One of the more fascinating findings of the experiment is that the situation providing maximum satisfaction is not the System-centred Operator/Computer Technology one as predicted, but the Customer-centred Operator/ Computer Technology situation. The latter situation is a '2 part consonant/1 part dissonant' combination, and thereotically inferior to the former '3 part consonant' situation. However, the finding suggests a reversed outcome, with the latter preferred to the former.

There is an interesting riddle in the above findings; although the Efficiency-centred Customer still regards the computer environment as far more satisfactory than a manual environment, he prefers the Customer-centred Operator to the System-centred Operator. There are two possible explanations.

One lies in the nature of one sub-selection of guidelines to represent the Complex Enquiry selection. This selection was the Incompatible Enquiry sample which neither technology was equipped to handled, and the bulk of the enquiry rested on the Operator, and therefore on her 'mood' or orientation. (An example is a Customer wanting to take a weekend break and seeking recommendations of places to go.) This type of enquiry drew heavily on the qualities of the Operator, and with the System providing little or no direct assistance to the needs of the Customer, the System-centred Operator was seen to be inferior to the Customer-centred Operator. The latter was exceptionally suited to the needs of the enquiry that sought inherently, a more personal approach from the Customer and included, amongst other qualities, ones such as 'assurance', 'sympathy', and 'general polite considerations'.

However, the majority of the Complex Enquiries were of the type that generally placed heavier demands on the system. The second explanation lies in a more detailed study of an Efficiency-centred Customer. Although all the Efficiency-centred Customers shared a bias towards Efficiency- rather than Person-related values, there was a vast variation in the distribution of the scores, as has been seen.

This is to say, that a number of Efficiency-Customers also had a sizeable leaning towards Person-related values, although this was smaller than the one towards Efficiency. A complex enquiry, which made high Efficiency demands, seemed to require 'super-consonance' between the participants in Double-interaction. The nett outcome was an extreme situation: 'super efficient' but lacking in the 'human component'. As if to compensate for this lack, the Customers therefore turned to the Customer-centred Operator, and away from the System-centred Operator, although still 'clinging on' to the Computer Technology as a technology that was far superior to the manual alternative. If this explanation is a reasonable one, then one could expect the Efficiency-Customer who was pro-Efficiency but anti-Person to deviate from this general pattern and to derive maximum satisfaction rather out of the situation as predicted by the model (System-centred Operator/ Computer Technology). This is to say that Efficiency-Customers with an extreme E:P score of 30:12 in favour of 'Efficiency' and against 'Person', would derive maximum satisfaction from the situation that seemed to be 'over-efficient' to the group as a whole.

The researcher studied the preferences of all the 6 Customers with an E:P score of 30:12. The results could be interpreted as highly convincing. Not only did the rank-aggregate suggest a 'Number 1' overall preference for the 'super-efficient' situation, but all the remaining 3 situations were found to be equally inferior to this. This suggests that at least some efficiency-centred Customers will 'settle for' nothing short of a super-efficient environment. All other alternatives will be inferior to this, and more important, they will be equally inferior.

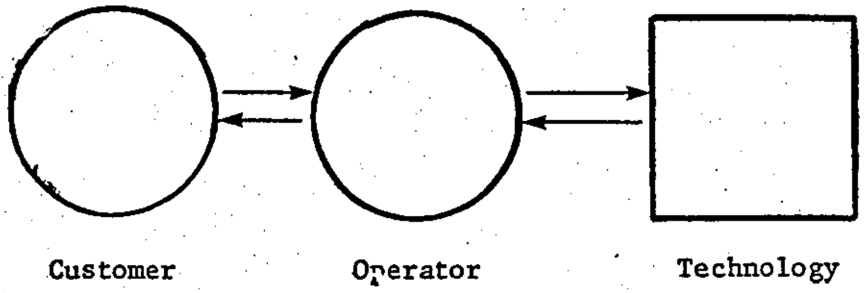
4.3.3.1.3 Commonalities between the Effects of Simple and Complex Enquiries and Changes in the Model

The common feature about both the enquiries is that the Efficiency-centred Customer is reacting in each case by attaching the foremost priority to the type of technology. It is only within this general 'pro computer anti manual' framework, that the Customer chooses between a system-centred and a customer-centred Operator to suit the Efficiency-content of the environment as affected by each type of enquiry.

The column-rank-aggregate of Rows 1 and 2 of the findings in Table 21 appearing earlier, provide a simple illustration of this 'pro-computer anti-manual' approach of the Efficiency-centred Customers. These aggregates appear below.

	Situation			
	1	2	3	4
	Customer-centred Operator/ Manual Technology	Customer-centred Operator/ Computer Technology	System-centred Operator/ Manual Technology	System-centred Operator/ Computer Technology
Column Totals depicting overall preferences	7	3½	6½	3

This is slightly contrary to the somewhat naive expectations of the model which intuitively assumed that in the conventional arrangement of a Double-interaction (illustrated), the effect of technology would be indirect and less readily 'felt' than the direct effect of operator.



However, the findings suggest that technology provides a far stronger nurturent for the Efficiency needs of the Efficiency-centred Customer than does the type of Operator.

Changes in the Model

1. Simple Enquiry

As has been seen, the model predicted the response of the Efficiency-centred Customer quite well when dealing with a Simple Enquiry. The agreement was absolute for the extreme positions, but the middle positions were tied and therefore did not bear out the predicted order of preferences of the model. This suggests that Simple Enquiries do not highlight the subtle differences of the intermediary situations. As long as either the Operator or the System is in consonance with the Customer, while the other is in dissonance, the 2 situations bear equal significance.

This would suggest that the middle positions of the model should be shifted from ordered to tied ranks, as shown.

	Situation*			
i.e.	1	2	3	4
	Preferences			
from	4	3	2	1
to	4	2½	2½	1

2. Complex Enquiry

The Efficiency-centred Customer, when faced with a Complex Enquiry, was following the general trend of the model, but there was a shift in priorities by 1 unit, across all 4 situations.

In general, the Customer was more satisfied by a Customer-centred Operator than by a System-centred Operator although his foremost preferences still lay with computer rather than manual technology. It seems that the high Efficiency demands made by the Complex Enquiry over saturates the Efficiency-content of the situation combining a System-centred Customer with a computer technology. Additionally, one aspect of Complex Enquiry may reflect much more a Person-need than an Efficiency-need. The nett outcome is that this situation fails to provide the ideal and an excellent compromise is found by turning to a Customer-centred Operator and away from a System-centred one.

The Model needs slight amendment to accommodate this finding, as shown.

---

* See Page 94 for Key to Situations.

		Situation*		
i.e.	1	2	3	4
		Preferences		
from	4	2	3	1
to	3	1	4	2

4.3.3.2 Person-centred Customer

A Customer displaying an ideal that was biased towards Efficiency-related rather than Person-related qualities in his views towards Double-interaction situations, was classified as a Person-centred Customer.

As before, the Customer is discussed in this section under the separate effects of the 2 types of enquiries before attempting to outline any general features about his behaviour.

4.3.3.2.1 Person-centred Customer/Simple Enquiry

The results show that, as in the case of the equivalent category for Efficiency-centred Customers, the outcome closely follows the predictions of the model. The most preferred situations are those using manual technology, and the least those that use computer technology. There is no distinction however, between the Customer-centred Operator/Manual Technology and the System-centred Operator/Manual Technology situations. This is contrary to the model expectations which predicted the first to be superior to the second.

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* See Page 94 for Key to Situations.

It will be seen in a later section that the Operator's own predicament in the system-centred orientation/ manual technology may have projected her as rather a Customer-centred than a System-centred Operator. This is thought to be the explanation for this deviation from the model.

However, interpretation needs care, since the coefficient of concordance was found to be non-significant. A closer examination of the column-rank aggregates (illustrated below and extracted from Appendix XVII), however, does reveal a strong feature regarding this type of Customer.

	Situation *			
	1	2	3	4
Column-rank aggregates	13	14½	12½	20

There is a near unanimous agreement that the System-centred Operator/Computer Technology situation is regarded as the least preferred. Compared to this, the other computer-aided situation (situation No. 2) is much closer in value to the most liked situations (1 & 3). This suggests that there is a strong interaction effect between Technology type and Operator type that affects the satisfaction of the Customer.

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* See Page 94 for Key to Situations.

4.3.3.2.2 Person-centred Customer/Complex Enquiry

The findings, here, are in close agreement with the extremes that the model suggested. The middle region, however, shows a shift by 1 unit.

The most preferred situation is one combining a Customer-centred Operator with the computer technology rather than with the manual technology. It may be that the manual technology is unsuited to the heavier demands of a Complex Enquiry.

However, the second best situation is not that of the Customer-centred Operator/Manual Technology but the System-centred Operator/Manual Technology. As mentioned earlier, there is a possibility of an experimental effect (to be discussed in a later section) in which the System-centred Operator is projected as a Customer-centred Operator. There is also some merit in what may be interpreted as the 'obvious' explanation. This is to say that the heavy Efficiency demands of a Complex Enquiry may be better answered by a situation offering some compatibility to it (i.e. a System-centred Operator) rather than no compatability at all (i.e. a Customer-centred Operator).

Once again, situation 4 (System-centred Operator/Computer Technology) is regarded as being least satisfactory. Compare this with the most preferred situation (Customer-centred Operator/Computer Technology), and the sharp contrast between the interaction effects provides us with further evidence that this Customer is sensitive to, and reacts more to, interaction rather than to separate effects.

Lastly, although there was 95% significance in the findings, and agreement was absolute, care must be exercised in the degree of confidence attached to these. The 'group' consisted of 2 members and few models can be tested using only 2 subjects. However, the level of the significance suggests that the findings provide a strong indication.

4.3.3.2.3 Commonalities between the Effects of Simple and Complex Enquiries and Changes in the Model

The common feature seems to be that Customer satisfaction is more a product of the sensitive interaction between Operator type and technology type rather than a product of separate effects. The Customers are unanimous in thier dissatisfaction with the System-centred Operator/Computer technology situation, when dealing with either type of enquiry. The same is not necessarily true, however, for the sister situations which have the same Operator type with a different technology, or vice versa. With these, significance seems to shift according to a combined effect of the various factors.

Another common feature is the affinity that a System-centred Operator, operating the System manually, offers to this Customer. This situation shared a joint first choice with the Customer-centred operator/manual technology one, when the Customer was dealing with a simple enquiry. For the complex enquiry, the situation was found to be even better in relation to the Customer-centred Operator/manual technology situation, which the model predicted, in both cases, to be superior. The explanation, however, lies in an experimental effect to be reviewed in more detail in a coming section, which argues that the System-centred Operator in situation 3 'looked' more like a Customer-centred Operator. When

Operators, who are 'naturally' Customer-centred, are asked to take on an Efficiency-centred approach, then a struggle may ensue when the nature of technology (e.g. manual technology) seems to be a positive hindrance to the execution of a 'super efficient' conduct. This 'struggle' seemed to leak out to the sensitive Person-centred Operator, and the situation showed signs of the Operator 'being human after all'. The Person-centred Customer was, as such, finding the Operator in this situation to be 'not quite Efficiency centred' and even leaning a little towards his own Person-centred orientation.

Changes in the Model

Simple Enquiry

In view of this experimental effect, it is suggested that the features of the model dealing with the System-centred Operator/manual technology situation be retained in their entirety. This is to say that the finding is a characteristic of simulated, rather than naturally occurring System-orientations, and therefore the model ought to remain unchanged.

Complex Enquiry

The findings agree with the model for most and least preferred situations. However, for the middle positions, the order of preferences attached is in reverse to that predicted by the model. This is to say that for the intermediary situations, the findings suggested that the Customers preferred the manual technology situation having a System-centred Operator rather than the same situation having a Customer-centred Operator. The experimental effect that made the System-centred Operator appear to be more Customer-oriented, has been noted. But the feature to note also is that the heavy Efficiency-demands of a Complex Enquiry may be better handled by a situation offering some leaning towards Efficiency (i.e. a System-centred Operator) rather than the one offering little or none at all (i.e. a Customer-centred Operator). In view of the 2 arguments above, it seems that the model should be changed by a compromise solution. The significance for the middle regions ought to be depicted by *tied* rather than *ordered* ranks.[1]

i.e.

	Situation[2]			
	1	2	3	4
	Preferences			
from	2	1	3	4
to	2½	1	2½	4

4.3.3.3 Differences and Commonalities between the Behaviours of Efficiency-centred and Person-centred Customers

1) The Efficiency-centred Customer was reacting more within a general framework of a 'pro-computer, anti-manual' philosophy. For this Customer, type of technology provided the overriding force governing satisfaction while the Operator occupied a less significant, even a purely instrumental, role.

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[1] The updated version of the model appears in Section 5.6 of the Discussion and again in the Conclusion.

[2] See Page 94 for Key to Situations.

2) The simple enquiry seemed to have differing impacts for the 2 types of Customers. For the Efficiency-centred Customer, this enquiry enabled him to discriminate between the 4 situations. For the Person-centred Customer, the same type of enquiry seemed to reduce the differences between the 4 situations, (this is depicted by the significance values associated with the findings: the former was found to be far more significant than the latter, Table 21).

   Many of the differences between the two sets of responses seem to suggest an underlying difference in the cognitive processes of the two types of Customers. This will be developed more fully in the sections to follow.

3) It is worthwhile introducing a commonality here that may bear especial significance if the findings are to be applied to the design of real life systems.

   Looking down the column-ranks of the findings under each situation (Table 21), it can be seen that situation 2 (Customer-centred Operator/Computer Technology) offers the best compromise to accommodate the needs of both types of Customers. An ultimate goal to aim for, then, would be to combine a Customer-centred Operator with a Computer Technology so as to produce situations which answer directly the needs of Operators and Customers alike.

4.3.4 A Review of Some Associated Issues

4.3.4.1 The Operator

As will be remembered, Operator styles were simulated in the experiment in accordance with how they were thought to occur in real life. The 'Customer-orientation' and 'System-orientation' of the Operator were induced by first describing and explaining to the Operator the nature of the two approaches reinforced by written instructions of the kind that employees might receive from management regarding desired job conduct (see section 4.2.3).

The Operator merits special considerations in the Double-interaction context and it seems appropriate to offer here a brief review of the following issues:-

i) how the Operator appeared to the Customer,
ii) the Operator's 'natural' orientation,
iii) the Operator's reactions to the 'induced' orientations and to the 4 Double-interaction situations.

4.3.4.1.1 How the Operator appeared to the Customer

Question 5 of the Post-Test Questionnaire was devoted to the Customer's perception of the Operator and Table 22 shows the frequencies with which the Customers saw the Operator as either being Efficiency-centred (or System-centred), or having Mixed-Values, or being Person-centred (or Customer-centred).

Operator 'seen' as:	SITUATION			
	1	2	3	4
	Customer-centred Operator		System-centred Operato	
	Manual	Computer	Manual	Computer
Efficiency-centred	21	27	17	26
Mixed Values	9	7	16	10
Person-centred	7	3	4	1

1) S: $0.01 < p < 0.05$
2) With frequencies combined to comply with 'number of subjec to be less than 5' Rule, S: $p < 0.05$.

Table 22: How the Operator appeared to the Customers

The singular feature about the results is the substantial bias in the Customer's perception towards the Operator being Efficiency-centred. Before continuing further, it seems useful to elaborate on the findings by breaking down the frequencies according to the associated Customer type. Table 23 offers this break down and the information is graphically illustrated in Diagram 24.

Customer Type	Operator 'seen' as	SITUATION			
		1	2	3	4
Efficiency centred	Efficiency-centred	14	20	12	17
	Mixed Values	5	3	9	6
	Person-centred	5	1	3	1
Mixed Values	Efficiency-centred	4	5	3	4
	Mixed Values	1	0	2	1
	Person-centred	0	0	0	0
Person centred	Efficiency-centred	3	2	2	5
	Mixed Values	3	4	5	3
	Person-centred	2	2	1	0

Table 23: How the Operator appeared to Different Customer Types

See Diagram 21.

The features to note are:

1. The break down indicates that the Efficiency bias in the Customers' assessments, is strong in the assessments of the Efficiency-centred and Mixed Values Customers.

2. The Efficiency- and Person-centred Customers are reacting to the situations very differently. Interestingly, it seems that they react to situations somewhat according to their own ideals. This is to say, their perceptions of the Operator seem to be 'pulled' in the direction of their own ideals. (The mixed-values customer is an exception to this, but see notes).

The mixed values customer, however, is of less significance at this stage of research than his other 2 counterparts, for several reasons.

1. he is a very small sub-sample (N=5) facilitating only weak predictions.
2. he may not be a 'natural' mixed value type but may only represent a measurement noise zone between Efficiency- and Person-orientations.
3. at least within the present simplistic framework of a dichotomic Efficiency-or-Person consideration, having a further third customer type seems excessive. Until the measure can be developed further, if necessary, the mixed values Customer is treated for the present as a by-product of the nature of the measurement employed.

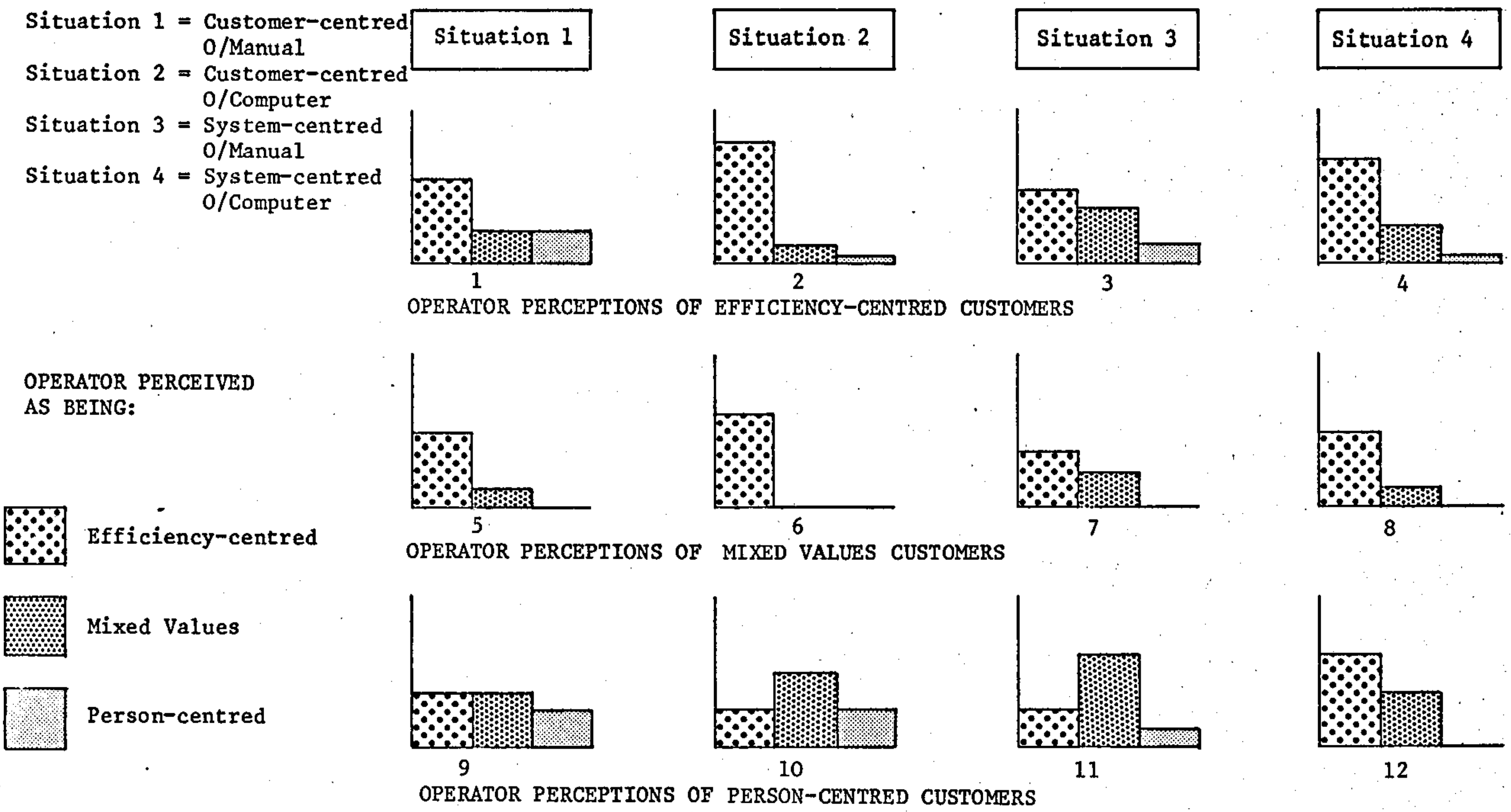

Diagram 24: Operator as perceived by different Customer Types.

3. There is further evidence of a finding cited earlier: the Efficiency-centred Customers seem to react mostly to the effect of technology; the Person-centred Customers tend to be more critical and seem to react to the interaction between the effects of Operator type and technology.

   i) Histograms 1-4. For the Efficiency-centred Customers, the manual technology situations (situations 1 & 3) increase the mixed values and Person-centred perceptions, and reduce the Efficiency perceptions, of the Operator. The computer technology situations (situations 2 & 4) seem to enhance the Efficiency aspects of the Operator while permitting very few perceptions of any other kind.

   ii) Histograms 9-12. For the Person-centred customers there is no apparent commonality in the reaction to the 4 situations except a general tendency for the Operator to appear more mixed values or Person-centred, than Efficiency-centred. Beyond this, reaction to each situation is sensitive, and different from that to any other situation. Looking down the 4 Histograms, it can be seen that the Person-centred customer is not reacting just to the Operator type or just to technology but to the interaction between the two factors. For example, situation 4 (Histogram 12, System-centred Operator/computer technology). The perception of the Operator, here, bears a heavy bias towards efficiency, and one that is in marked contrast, for example, to the relating features of situation 2 (Histogram 10, Customer-centred Operator/computer technology).

4. Although it can be seen that the Person-centred Operator reacts differently to different situations, it is possible to suggest further that Operator type is of greater significance to this type of Customer while technology only enjoys a secondary importance. This can be illustrated, for example, by looking at the Person-centred evaluations of this type of Customer (Histograms 9-12, 3rd bar). There are some Person-centred evaluations when the Operator is Customer-centred; there are few, if any, when the Operator is System-centred.

Explanations

1) The results show that Customers responses to the Operator are affected, in the first instance, by their own ideals.

Literature suggests that judges seem to differ according to their 'general evaluative sets', in the way they respond favourably or unfavourably to others (Gage and Cronbach, 1955). It is possible that the 'general evaluative sets' themselves reflect the judges' or the perceivers' own ideals.

Attribution literature suggests in this context, the phenomenon of 'Hedonic relevance' or the extent that a person's action proves rewarding or costly to the perceiver. Jones and Davis (1965) suggest that 'correspondence' or the certainty with which one makes inferences about others' intentions and dispositions, increases with "Hedonic relevance". This is closely related to how there may be an ideal related pull in the way Customers 'see' the Operator.

However, 'Hedonic relevance' itself is more an observation than an explanation. It is possible that ideal related Person- or Situation-perceptions is simply a form of dissonce-reduction. For Dissonance Theorists (e.g. Festinger, 1957), man is always striving towards fitting cognitions and meaningfulness of the world around him and his own relation to it. A basic ideal-related bias serves to support the existing meaningfulness that the perceiver has of his environment. For Attribution Theorists, a basic ideal-related bias in the observations of individuals or situations may facilitate the existing notions of predictability with which the perceiver can anticipate the behaviour of future events.

2) Beyond this broad ideal-related feature, there is a noticeable bias for the Operator to be observed as 'Efficiency-centred', whatever her orientation. There are three points to note:

   i) The Efficiency-centred Customers made up the largest of the 3 groups and numbered more than the remaining 2 groups put together. To an extent, therefore, the overall picture was 'blown up' by the possible ideal-related bias of the large group of Efficiency-centred Customers.

   ii) The second explanation may lie, at least to a small extent, in the particular predicament that the Operator may have found herself in. She was under pressure from other directions to continue to perform her duties as a Technical Assistant, between experimental sessions. Also, she had suffered from a spell of illness just before the commencement of the experiment. It is possible that she found it easier 'coping with things generally' by aligning herself with the task, rather than with the Customer. She therefore appeared more System- or Efficiency-centred generally.

iii) The nature of an enquiry offers a strong explanation. Insofar as an enquiry may be reduced to its raw form, i.e. that it demands certain information, this need may be interpreted as purely an Efficiency need. This is to say, there is a 'basic function' associated with any enquiry that is inherently an Efficiency-demand. It is possible, therefore, that there is a basic attribution-bias towards Efficiency. To explain:-
the Enquiry was answered.
Therefore, the Operator was Efficient.

3) This brings us to explanations regarding the third noticeable feature of Operator perception. This is that Efficiency-centred Customers are reacting to technology type rather than Operator type, while Person-centred Customers react to interaction between factors and rather more to Operator type than technology type.

To an Efficiency-centred Customer, the Operator plays a purely academic role in a Double-interaction. The Operator is instrumental to his needs being met, while the more significant force behind this, or the chief needs provider, is the technology or the system. His perception of the Operator as being Efficiency-centred seems strongly affected by 'transfer-attribution'. To illustrate:- Did you get your enquiry answered?

'Yes'.

Why do you think you got your enquiry answered?

'Technology must be pretty efficient'.

What about the Operator?

'I suppose, she too must be efficient'.

The Person-centred Customer, on the other hand, shifts his perception of the Operator according to different situations, and in the light of accompanying factors*. This sensitivity to interaction between factors seems to be explained by growing evidence, that this type of Customer is rich and complex in his cognitive make up. (The Person-centred Customer will be considered further in a separate section to follow.) Additionally, there is also evidence that, while an Efficiency-centred Customer aligns himself with technology type rather than with Operator type, the opposite is true for the Person-centred Customer, the Operator provides the special dimension of the situation while technology serves purely as instrumental role.

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* Note

The enquiry serves an interesting function for this Customer. He reacts to the different enquiry type in more than one way. It was seen earlier how the Person-centred Group overall, was in closer agreement with Direct, rather than Indirect, satisfaction scores. Examination of interaction data shows that this is only true for the complex enquiry; for the simple enquiry there is stronger agreement with the Indirect Method. Hence, there is growing evidence that simple and complex enquiries have markedly different impacts on this Customer, even to the extent that mechanisms of deriving satisfaction from situations differ according to the enquiry type.

4.3.4.1.2 The Operator's 'natural' Orientation

This study is devoted to a review of the nature of the Operator's 'natural' orientation, as an introduction to a further review examining the possible relationship between the 'natural' and the 'induced' states.

The Operator was a member of the technical staff who had previous experience with Double-interaction tasks at a Counter, although not with the aid of a Computer. Two alternative methods of deriving her natural orientations were employed. These, respectively, were 'ideal-linked' and 'job-linked' and associated with the Operator's past experience with Double-interaction, to add credibility, and as an aid to her questionnaire response.

The first was the same method used to obtain Customer ideals, with the questions suitably rephrased. (Appendices IX and XVIII.) This method leads to an E:P score (Efficiency:Person Score) and the bias in the ratio serves as a basis to classify the person as being Efficiency-centred or Person-centred. The finding was an E:P score of 18:24, depicting a Person- or Customer-centred Operator.

The second method (the job-linked method) was a battery of statements describing her view on her previous Double-interaction experience, with which she was asked to agree or disagree. There were 20 statements in all, 10 of which described a leaning towards Efficiency, the other 10 towards Person-related qualities. The statements appeared in a random order on a self-report type format. (Appendix XIX.) Method 2 led to an E:P score of 11:9, depicting a Mixed Values Person with a slight bias towards Efficiency.

In summary the Operator's ideal-linked approach was Customer-centred, while her job-linked approach suggested a mixed values kind of orientation. In relation to her role in the experiment, one argument that could be put forward would be the following. Having had previous Double-interaction experience of a mixed values order, the Operator had roughly the right kind of intermediary qualification to take on the two orientations required of her by the experiment. However, the feature to note, and that cannot be dismissed, is that the Operator's ideal is very much towards a Customer-centred approach, and the way she reacted to the job demands towards Efficiency- and Customer-centred approaches may have a strong bearing on this fact. This will be examined in the next section.

4.3.4.1.3 The Operator's 'induced' orientations and her reactions to the 4 situations

1) To recap, the 4 situations in the experiment were:-

Situation	Technology	Operator-orientation
1	Manual	Customer-centred
2	Computer	Customer-centred
3	Manual	System-centred
4	Computer	System-centred

As was explained in section 4.2.3, the 2 Operator-orientations were 'induced' by explaining to the Operator the nature of the two styles of approach, and strengthened by 2 written instructions, one for each orientation, describing what was required of the Operator and why.

2) It was thought useful to obtain feedback from the Operator to provide insight into the following issues:-

   i) the way the Operator reacted to the 4 situations
   ii) how much the 'induced' orientation violated the 'natural' orientation. This would be depicted by the 'degree of struggle' that the Operator associated with each type of orientation or 'job demand'.

   The feedback device had to be simple and quickly completed in order that it did not interfere with the experiment. With this in mind, the Operator was asked simply to rate on a 5-point scale, the degree of ease or difficulty with which she associated the execution of the conduct required. The 'basic unit' of the Operator Feedback Sheet (Appendix XX) is illustrated below.

   How difficult or easy did you find following the instruction for this session?
   Please tick the appropriate box.

	1	2	3	4	5	
Very difficult	☐	☐	☐	☐	☐	Very easy

3) Findings

   Table 24 illustrates the findings.

	SITUATION			
	1	2	3	4
	Customer-centred Operator		System-centred Operator	
	Manual	Computer	Manual	Computer
Ease/Difficulty* Score	39	38	26	29
Range **	1	1	2	1
Ranks (1 = 'easiest')	1½	1½	4	3

* '40' = maximum possible 'Ease'
'8' = maximum possible 'Difficulty'
** '4' = maximum possible 'Range'

Table 24: Operator's Reactions to the Conduct Required.

The 2 main features to note are:-

i) The Operator reports a very high Ease Score for the Customer-centred Orientation. At the same time she feels 'rather awkward' with the System-centred Orientation.

ii) Reactions to all 4 situations generally remains in the Easy region of the Easy-Difficult continuum. However, it is noticeable that situation 3 is, for some reason, most awkward to handle.

4) Explanations

i) As will be recalled from section 4.3.4.1.2, the Operator's ideal in dealing with Customers depicted a Customer-centred approach. As if to emphasise this feature, the findings here suggest that she found it easy to execute the Customer-centred conduct, and relatively difficult to be System-centred.

Additionally her overall reaction is towards a particular orientation or job demand, rather than towards technology. This is somewhat in support of a quality postulated about 'Customer-centred Operators', in section 3 at the conclusion of the field study. It was remarked that a Customer-centred Operator aligned herself with the Customer and not with technology or system. This is also in common with a sub-feature describing a Person-centred Customer discussed in the preceding section. It was seen then how the Person-centred Customer seemed to react rather more to the Operator than to the technology relating to the situation.

ii) Why did situation 3 (System-centred Operator/ Manual technology) present a special problem to the Operator?

It is worthwhile considering a number of issues here. Firstly, the 3rd and 4th situations demanded the Operator to be 'System-centred' or 'Efficiency-centred', which was contrary to her 'natural' Customer-centred ideal. In addition, in situation 3, she was asked to operate a manual technology. It was suggested in section 3 that technology may interfere with an Operator's conduct. In the experiment, in the Operator's own words, "Being super-Efficient comes easy with a Computer and is made worse by Manuals". There is some support here for the suggestion that the nature of technology may serve to hinder or support the particular orientation of the Operator.

By the same argument, we should therefore be able to explain why the Computer Technology seemed to support, rather than hinder, the Customer-centred approach in Situation 2. There are two points to consider. Firstly, as has already been observed, there is a possibility that technology is only of secondary importance to this Opera-or; that as long as the job demands comply with her own Customer-centred ideals, she is neutral to whether she has to serve with manuals or with a computer (e.g. the ease associated with situations 1 and 2). However, certain features about the computer system used in the experiment seemed to support directly a Customer-centred orientation (e.g. a fast teletype output of information that the Customer could take away with him, or a detailed breakdown on a particular train). The manual system did not enjoy the same Customer-centred features present in the Computer system. To reiterate, one technology demanded no special qualities of her, and the recourse to it was of a firm that was 'natural' to her. The other technology imposed special demands on her (keypunching, knowledge of operating a terminal, etc.) and placed her in a far from 'natural' environment. However, it had certain Customer-supportive qualities that were absent in the manual system. The joint outcome was that in both situations 1 and 2, technology was supporting the Customer-centred approach required of the Operator.

Comments in Conclusion

1) It was seen earlier that the Person-centred Customer found the System-centred Operator in situation 3 leaning rather towards mixed values and even being Person-centred. In the light of the discussion so far, this was the same situation that the Operator had to struggle to comply with. It seems that this 'struggle' got across to the Person-centred Customer giving rise to a reaction such as, 'She is quite human underneath all that'. It was as if the Operator was giving away her real self through the struggles.

   This has been discussed when considering the model fit. It was then seen that while the findings suggested a rather similar Customer-reaction, of the Person-centred Customers, for both the Customer-centred Operator/Manual technology situations, the model expected a far more favourable reaction to the first situation. It was argued, however, that the model was correct in its prediction and that the findings were under the influence of an experimental effect. The foregoing section goes some way towards explaining this effect and upholding that conclusion.

2) The side issues discussed in this section offer some illustrations relevant to real-life behaviour. There are suggestions, for instance, of a 'struggle' that ensue when Operators are asked to act in ways contrary to their natural orientations, and that different technologies may serve to ease or aggravate this 'struggle'.

4.3.4.2 The Person-centred Customer and his Special Behaviour

The Person-centred Customer displayed some unique characteristics not entirely apparent from his ideal. Before summarizing and attempting to explain the features that made up this behaviour, it seems appropriate first to discuss one feature of this Customer which it has not been regarded as relevant to introduce earlier.

4.3.4.2.1 Customer's Initial Expectations and their Relationship to the Evaluations of the 4 Situations

The Pre-Test Questionnaire sought to obtain the prior expectations of the Customers regarding situations met in real life, such as the one replicated in the Experiment (Questions 1A and 2A, Appendix IX).

The results were added together to provide a single 'Initial Expectations Score' for each customer. The same questionnaire content and design was used to obtain also the 4 satisfaction scores of the Customer, one for each situation. Hence the Pre-Test Score was directly comparable with the 4 Post-Test Scores.

The 4 Post-Scores were each deducted from the Pre-Score, and the sign of the difference noted, to assess whether each of the 4 situations was:-

i) better than expected (+),
ii) just as expected (=),
iii) worse than expected (-).

The findings, thus derived, projected an approximate illustration of how each situation might deviate from the Initial Expectations. It would now be possible to examine these findings in the light of different Customer types. Adding the like signs of the differences for each situation would then suggest an overall direction (if any) towards which the group as a whole was being pulled. This analysis is graphically illustrated in Diagram 25.

The range of the pre-scores (the initial expectations score) was also calculated for each group to illustrate the degree of inter-group differences:

Person-centred Customers	N = 8	Range = 14
Efficiency-centred Customers	N = 24	Range = 15
Mixed Values Customers	N = 5	Range = 9
	Maximum Possible	Range = 48

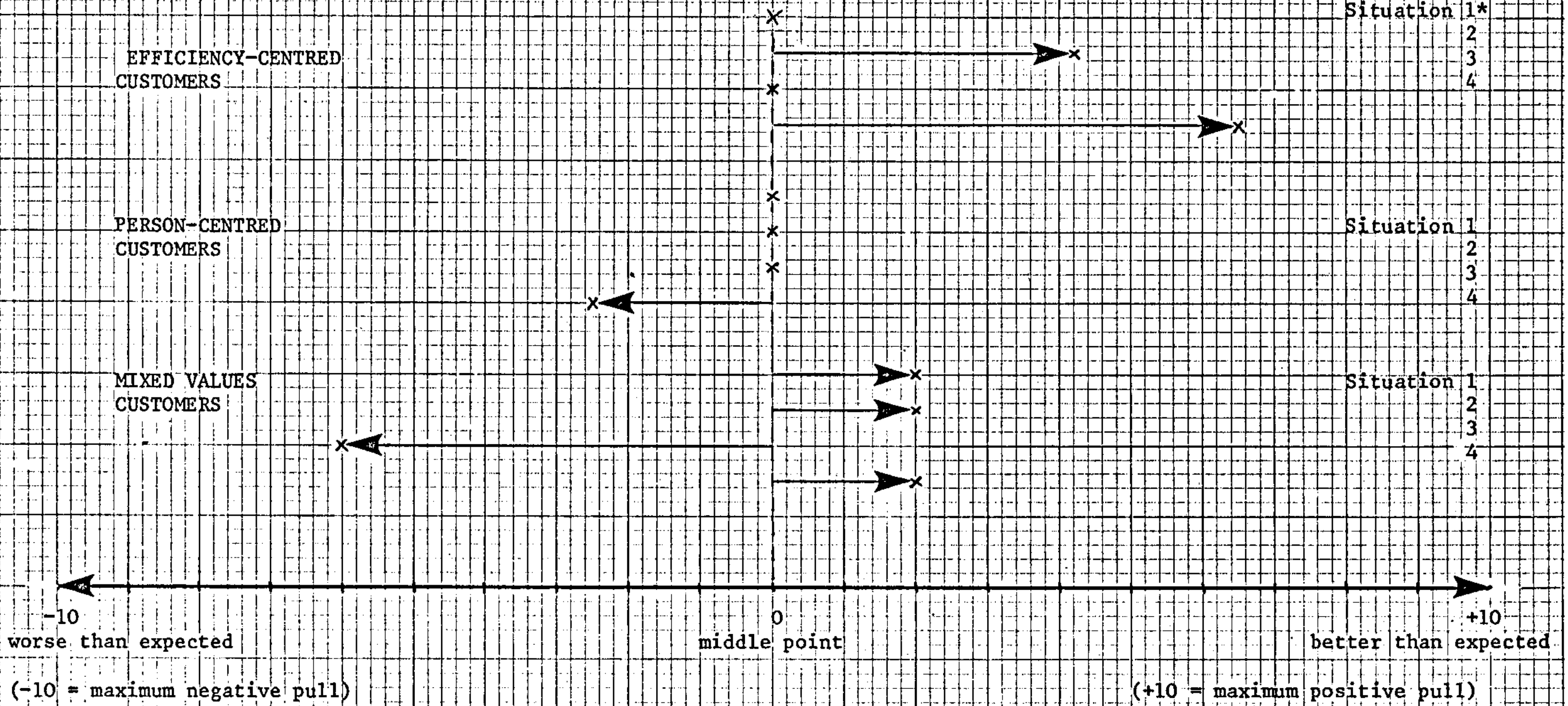
The features to note are:-

1) Taking into account the group size differences, the inter-group agreement is least for the Person-centred Group and highest for the Efficiency-centred Group. (See the figures above.)

2) While some of the 4 situations provided an improvement over the Initial Expectations of the Efficiency-centred and the Mixed Values Groups, none were an improvement for the Person-centred Group. (See Diagram 25).

3) It is noticeable that one situation provided a negative 'pull' for the Person-centred Group. This was the System-centred Operator/Computer Technology situation which the Group were near unanimous in condemning. (See Diagram 25).

It is interesting to relate the overall nature of these findings with that of the satisfaction provided by the 4 Situations. It was seen, especially under the influence of the Simple Enquiry, that the group as a whole was unable to discriminate between the impact of the first 3 situations. It can be seen from the diagram, that the same 3 situations were providing a 'neutral' impact on the group as a whole, i.e. the



* See Page 114 for Key to Situations

Diagram 25: A Comparison between Initial Expectations and Actuality of the 4 Situations, for Different Customer Types.

situations were neither worse nor better than expected, and differentiating between these became difficult. The findings suggested however that the Group found the 4th situation (System-centred Operator/Computer Technology) especially unsatisfactory. From the diagram, it can be seen that it is the same situation which the group were near unanimous in rating as 'wrose than expected'.

Lastly, it is also worth commenting that at least for the Person-centred Customers, the standards they attach to interaction situations are so high, that none of the 4 situations in the experiment could match them, a situation not found for other Customer types.

4.3.4.2.2 A Summary of the Person-centred Customer's 'Special Behaviour'

1. He is more individualistic, within his group, in his reactions to situations.
2. He is sensitive to interactions between various factors in his evaluation of situations.
3. He appears to have 'high standards' which few present-day situations seem to meet.

4.3.4.2.3 A Discussion on the Person-centred Customer's 'Special Behaviour'

The Person-centred Customer is sensitive to situational variations, and adding or subtracting a factor changes his evaluation of an otherwise identical situation. Even in his daily transactions, he looks for much more than simply getting his enquiry answered. He finds few daily situations which fulfil his ideal.

The enquiry type has a widely varying impact on his evaluations of situations. A Simple Enquiry trivializes his encounters, while a Complex Enquiry raises the quality of his encounters towards levels that begin to satisfy his requirements.

It seems that he has a large bank of fine underlying 'qualities' that he can draw from to evaluate different situations. When a Simple Enquiry trivilaizes the nature of the situation, the information regarding his evaluations has to be 'dug out of him' (Indirect Satisfaction Scoring). When the enquiry is complex, although effective evaluations are now possible, it seems more reliable to record the feedback via direct reporting. A small selection of Efficiency- or Person-related qualities do not provide an adequate mapping of the finer underlying cognitions, but the Customer could be relied upon to present a 'truer' picture by the direct reporting method which leaves him to his own devices in providing an overall satisfaction score.

It is not suggested that the classification of Person-centred Customers is unjustified. It is rather suggested that there is a possibility that the simplistic nature of basing evaluations on a 6-question battery may not adequately 'map' this Customer. While justifying adequately the membership of the Person-centred classification, he may be drawing on the subtler regions within this classification, when reacting to task-related, Double-interaction situations.

4.3.4.3 Defects, Deficiencies, and Defences

Like other studies, this experiment had its inadequacies, and this section is devoted to a review of these.

4.3.4.3.1 The Reality of the Situation

The first point to consider is how far the situation provided a 'real' environment to facilitate a reliable study.

This is a general issue relating to most laboratory simulation studies, and while the 'unreality' cannot be absolutely removed if control has also to be exercised on the factors under study, it is certainly necessary to minimize the 'unreal' content.

Various steps were taken to ensure this:

i) the task selected was a duplication of a real everyday task familiar to the Customers, and at least supported by a manual system, in existence for many years.

ii) the enquiries were selected from a sample of real life enquiries, so that the Customer would be already familiar with the information needs depicted by the guidelines.

iii) the Operator played a 'real' role in the Double-interaction context.*

iv) the sample was selected so that none of the Customers knew the Operator in person.*

v) the 'waiting room' had a large selection of Travel Brochures for the benefit of the Customer.

Note

* To quote one Customer:
"I know of the staff shortage at Loughborough so it must be Leicester British Rail people who have put their Operator at your disposal".

4.3.4.3.2 The Enquiries

The Customers were provided with Enquiry-Guidelines (Appendix VIII). Would not these guidelines interfere with the 'normal conduct' of enquirying?

The guidelines were there to control broadly the nature of the enquiries. The control was a necessary aspect of the study. The technical and other constraints that surround experimentation in general, offered no alternative means of exercising a control which would achieve the same results.

However, the following steps were taken to minimize the disadvantages and reduce the burden for the Customer so that his normal enquirying was impaired as little as possible.

i) The Customer was 'left to his own devices' to formulate the exact enquiry. He was requested only to have a rough idea of the nature of information needs represented in the guidelines.

ii) The Customer had a selection of 6 guidelines from which to choose 4 (one for each situation). He was further given the option of asking for another set of 6, if he had any reasons against using the ones provided.

iii) The Customers were verbally oriented towards the use of the guidelines for each day's session in the following way:-

> "The Guidelines are only there to assist you. Please formulate your own enquiries, as you would do at any Travel Counter, around the needs expressed in the Guidelines.."

In its final form, the Control over the enquiries was only of a broad flexible nature.

4.3.4.3.3 The Operator

1) The same Operator was employed to 'take on' 2 seemingly contradicting orientations. Would this not violate the intentions of the research - which postulates that there are two kinds of Operators - and would not the Customers, seeing the same face as they saw in the previous situation, react similarly to the Operator in all 4 situations?

   It is not uncommon for researchers - especially student researchers - to have to maximize the use of scarce resources. A resort to 2 or even 4 Operators would not only be an 'unnecessary luxury', but additionally would have run the danger of introducing 'personality' and/or 'appearance' effects into Operator evaluation.

   By ensuring that the same Operator displayed 2 different conducts of operation, all other factors could now be held constant. This way it was possible to relate the findings directly with the issues under study, uncontaminated by personal factors such as appearance, clothing, personality, etc.

   Finally, if the predicted impact of Operator type and Technology type was sufficiently strong, this would override the concept of 'first impressions' or 'familiarity'. Results suggest this to be the case.

2) Is it not artificial to demand of one 'type' of Operator, behaviour that characterized another 'type'?

   In real life jobs often demand people to be 'other than themselves', often leading to Role Strain and Role Conflict. In fact, an example could be derived from the Operator's own previous employment. It was seen in section 4.3.4.1.2 that the Operator's ideal reflected a Customer-centred approach while the job was 'pulling' her towards Efficiency-orientation.

It is one of the aims of this Research to explore how environmental factors (e.g. nature of technology or system) may be manipulated to lessen such an effect.

3) 'All this experiment did was to study one kind of Operator (i.e. Customer-centred) operating different technologies, and how this Operator and the technology jointly produced an effect on the Customer. What about the other kind of Operator (i.e. System-centred)'?

Although the Operator's ideals projected her as a Customer-centred Operator, this study did succeed, it is argued, in putting to test the 2 kinds of Operator-orientations. As was seen, these were simulated by descriptions and explanations of the orientations to be achieved, and reinforced by 2 strongly worded job instructions that the Operator read selectively at the beginning of each orientation.

Additionally, the Operator had had previous real life Double-interaction experience and more significant, she seemed to have 'seen and met' the two kinds of Operators in her previous employment.

Findings support the overall claim of 'successful simulation'. Operator-perception, as was seen, did relate to the particular orientation adopted in the experiment, although the perceptions were also influenced by different Customer types.

However, the deficiency has to be acknowledged. The 'natural' orientation was thought to interfere markedly with the 'induced' orientation in situation 3 (System-centred Operator/Manual technology), although the perceptions of the Efficiency-centred Customers were still not visibly affected. This feature, on the other hand, did provide useful 'side insight' in the applied research context. It illustrated, and confirmed previously cited suggestions, that different technologies may serve to aggravate or ease the 'dilemma' situation of the Double-interacting Operator. The 'side insight' would have been more complete it is accepted, had there been also a way of putting to test an Operator who was 'naturally' System-centred.

4.3.4.3.4 Small Sample Studies

As will be recalled, the 39 Customers consisted of
24 Efficiency-centred Type
8 Person-centred Type
7 Mixed-Values Type
(testing was limited to 5 of the latter group).

It can be seen that for the 2 latter groups, the relative sizes were beginning to fall towards 'weak predictability' levels. However, the data was treated with appropriate statistical methods which took into account 'small frequencies'. Whenever interpretations were risked on low frequencies, this was duly pointed out for the benefit of the reader.

In order to obtain a reasonably sized sample that had matched numbers of Efficiency- and Person-centred Customers, a prior screening of a large number of subjects would have been necessary. It proved exceedingly difficult to get the 39 subjects for the study; one reason was lack of financial remuneration that could be offered to the subjects.

However, a lot of social psychological research is based on small sample studies, and substantial insight into this context is often provided by a detailed qualitative inspection not necessarily relating to sample size. Accepting the case rather for 'scientific rigidity' in research, the following points can be summarized regarding the overall testing of the Model.

1) Efficiency-centred Customers provide confident grounds for interpretation because of their reasonable Sample Size (N = 24).

2) Person-centred Customers (N = 8), although they do not permit the same degree of confidence, do provide strong indications of the trends relating to the Model.

3) Mixed-Values Customers (N = 5), are excluded from most discussions (the reasons for this were reviewed in an earlier section). Where they are discussed, they serve only to provide supportive evidence to other issues.

General Plan

1. Introduction
2. Field Study
3. Discussion
4. Experiment

➤ 5. Discussion

6. Summary and Conclusions

5. Discussion

Plan:

5.1 Double-Interaction Appraisal
5.2 Relevant Literature
5.3 The Customer
5.4 The Operator
5.5 The System
5.6 The Enquiry
5.7 The Model

5. DISCUSSION

5.1 Double-Interaction Appraisal

We have come a long way from the initial stages of the project when the researcher was seeking ways and means of analysing and approaching the Double-interaction issue. Although we have not quite arrived at the Grand Solution, we have built ourselves a relatively strong base from which to explore the issue further.*

Essentially, Double-interaction has been examined in the Social Psychological context, treating the Customer, Operator, and System as a 3-participant unit, while also drawing from Ergonomics especially in the System- and Task-considerations. The focus has been on Face-to-Face occurrence of Double-interaction and the exploration has been on the nature and extent of 'transaction harmony' as affected by the Customer, the Operator, the System or Technology, and the Task. Further, it is thought useful to look at the Operator as being Customer- or System-oriented, and at the Customer, as being Person- or Efficiency-centred to provide a meaningful basis on which to examine the dynamics of Double-interaction.

A model was set up, and tested, that illustrated the various 'states' of Double-interaction. It depicted various degrees of 'transaction harmony', or from the Customer's viewpoint 'Customer Satisfaction', according to the consonant or dissonant relationship between the various components of Double-interaction. Basically, it suggested maximum 'transaction harmony' when all 3 participants lay in absolute consonance along either Person- or Efficiency-related lines, and minimum 'harmony' when 2 participants (i.e. Customer and Operator, or Operator and System) lay in dissonance to the third. The impact of the Task or the Enquiry on this state was also suggested according to its degree of 'simplicity' or 'complexity'. Further, it argued the position that a manual system was inherently in consonance with Person-related values, and that a computer system was inherently in consonance with Efficiency-related values, while other System-Person combinations were in dissonance.

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* For the reader with special interests in this Research, it is recommended that he reads through the previous Discussion (Chapter 3) before coming to the present one.

Detailed considerations will be offered on the foregoing issues in due course. First, however, a brief look at the Literature of Research relevant to Double-interaction.

5.2 Relevant Literature

5.2.1 The System-approach, the Task-Approach, or the Social Psychological Approach?

As has been pointed out, literature directly relating to Double-interaction has been lacking. It is not that the concept is new. Human Scientists, especially, have been aware of the importance of Double-interaction for some time now. For example, in a discussion on the role of Human Sciences in Man-Computer Interaction Studies (Shackel, 1969), the author talks about providing a "suitable trained 'buffer' between the public and the Computer".

It is rather a lack of adequate joint Man- and System-considerations that seems to characterise present day research and System-design.

There is still a visible belief that if you design a 'good' system and it will automatically take care of the user. Man has remarkable qualities. He is adaptive. He can be trained almost to perform miracles. Behaviour can change his attitudes. As a result, there is often a danger of calling 'positive evaluation' claims such as 'the system worked beautifully' or that 'progress was better after the implementation of the new system'. If the system was only a little 'better' than its original version, it is deemed to have been 'successful'. Hence, the focus on Man only attains an assumed importance.

There is also an 'easier way out' effect whereby a lot of research claiming to be human-conscious, relies almost entirely on easily measurable time-and-error analysis on which to base user-evaluations. A lot of highly relevant aspects of Man bypass this evaluation because they are complex to study. The extreme difficulty with which the focus-on-man can be executed is thus allowed, discrepantly, to trivialize the relevance of man as a primary aspect of study.

The foregoing discussion is to a large extent true for a lot of current Man-Computer Interaction research. Man-Man Interaction, on the other hand, has been almost exclusively awarded attention by Social Psychologists. But the researchers here have tended to look upon Man-Man Interaction in a general, social, and even theoretical framework, that is lacking in System- or Task-specific considerations.

Hence the problem that the researcher faced was how to create a research framework that combined the Man-Computer Interaction approach with the Man-Man Interaction Approach. It is not claimed that the approach adopted succeeded in being a balance between the two kinds of emphasis - this is for the reader to judge - but simply, that this was the desired objective.

One important feature of the framework adopted was the consideration of Person- or Efficiency-orientations of the human participants in Double-interaction. There was some evidence to suggest the real-life existence of the two kinds of persons. What is more, this line offered a suitable compromise between the two approaches outlined above. Insofar as two human participants were interacting with each other, one dimension with which to review Double-interaction would be the Person-concept. Insofar as, a certain Task had to be performed in a reasonable time period, another relevant dimension would be the Efficiency-concept.

5.2.2 Relevant Literature from the System- and Task-Viewpoints

There are few researchers to cite that are of any direct relevance to Double-interaction, as has been pointed out earlier.

There have been suggestions that User Acceptability of Systems is positively influenced by previous attitudes towards the Systems. For example, an Operator with pro-Computer attitudes (e.g. a System-centred Operator?) will find it easy working in a computer environment (Lucas, 1974).

There have also been research recommendations for a System to be specifically suited to the job types it is supposed to serve. This was concluded from a Survey the researchers carried out on the use of Computer Systems by Clerks, Specialists and Managers (Damodaran et al., 1973). In the context of Double-interaction, the Operator may represent a special 'job type', different from other job types within the same organisations.

Two current research programmes to cite of indirect relevance are the ones conducted by the Research Group headed by Professor Chapanis at John Hopkins University (e.g. Chapanis et al., 1972) and the Communications Studies Group at University College, London (e.g. Christie & Holloway, 1975). The central focus for both these is the influence of different communicating media on Man-machine Interaction, but the approach offers little of significance to the focus adopted for Double-interaction study.

5.2.3 Person-related and Efficiency-related Orientations: Relating Literature

Miller & Rice (1967) discuss the following aspect of the Customers they interviewed in a Laundry Service Study. Customers praised a local laundry offering a valeting service. They knew that the cleaning was carried out by a larger parent company but this they chose to label as 'cheap and garish' or that 'they never get things properly clean'. Even when evidence was offered to the contrary, or the logical discrepancy was pointed out in labelling one as 'clean' and the other one as 'dirty', they would persist with their original evaluations with comments such as "but the clothes have such a beautiful appearance when you collect them".

"The idea of individual personal service went so far with some Customers that they displayed manifest guilt if they used more than one shop, or if they changed cleaners. Quite clearly, the feelings being expressed were about something other than a convenient utilitarian service", (i.e. a 'Person-centred' Customer).

A version of Person/Efficiency approach has also been used in another research context, which has become a basis for a Management Training Programme. Blake & Mouton (1964) have suggested that the basis for 'good management' lies in the considerations of the extents of Production-orientation and People-orientation of Managers.

5.2.4 Relevant Literature from the Social Psychology Viewpoint

5.2.4.1 'People' centred and 'Things' centred Persons

B. Little (1971) has suggested that people may be seen to take up an orientation along 2 dimensions: towards 'people' and towards 'things'. People-specialists construe people and objects in terms of psychological qualities. Things specialists construe people and objects in terms of physical properties.

It is possible that there are links between People-specialists and 'Person-orientation', and Things-specialists and 'Efficiency-orientation'. It was possible to examine the relationship on one account; on this however, the findings suggested absence of any possible commonalities. Little suggests, with evidence, that women are likelier to be People-specialists and men likelier to be Things-specialists. For the Person- and Efficiency-centred Customers, however, no such sex bias was apparent (Section 4.3.1).

5.2.4.2 'People' as a Central Focus

Karen Horney (1945) has suggested the phenomenon of 'tripartite typology' in the interactive behaviour of people. To explain, people may be classified as

either i) moving towards people,
(e.g. 'Will he like me?')
or ii) moving against people,
(e.g. 'How strong an adversary is he?')
or iii) moving away from people
(e.g. 'Will he want to interfere with me?')

The theory has its roots in clinical psychology. What may be a 'good idea' for abnormal psychology, may not be applicable in the context of task related interaction, an area of 'normal' psychology. However, it is an interesting theory, which at a later date if further research is possible, may help us to understand better the behaviour of Person-centred Customers, who have so far projected themselves as a specially complex group of people.

5.2.4.3 Competitive and Co-operative Orientations

It is H.H. Kelley's suggestion (1971) that some people persistently compete, while some persistently co-operate. Kelley demonstrated this by laboratory experimentation, of the Games-study type. The interesting feature is the suggestion of how Competitors 'drive' the Co-operators into competing as well, without realizing it.

The derivation of Competitor/Co-operator Theory seemed very theoretical in nature, although Kelley's team have gone on to claim support from field studies focussing on real-life interactive behaviour.

5.2.4.4 The Exchange Theory

The Exchange Theory (e.g. Homans, 1961)seems of interest because:-

i) it offers a rational explanation to an issue - social interaction - that is often believed to be impossible to rationalize.
ii) it has parallels with the Double-interaction Model.

Briefly, the Exchange Theory treats Social Interaction as a 'Social Market' where people gather together to maximize their profits and minimize their costs. The 'profits' and the 'costs' are a reflection of the values of the interacting participants.

For example, the 'sympathy seeker' will approach a 'sympathy provider' to converse with, but will avoid a 'sympathy basher'.

The Double-interaction model discusses the harmony of a Double-interaction situation provided by matched values of interacting participants.

An example of a number of flaws associated with the Exchange Theory, is that it assumes availability of choice. While in Double-interaction, the Customer may have to resort to a particular situation where a certain kind of Operator and System are 'forced' upon him.

In its basic framework, however, the Exchange Theory may provide a useful counterpart with which to compare and discuss the Double-interaction model, if and when research can be developed further.

5.2.4.5 A Comment on Literature Relating to Interactive Styles of Behaviour

It seems that while there exists a myriad of constructs, different researchers believe differently in the super importance of one or two factors at the expense of others. Howeve whereas Person-Efficiency Approach is offered especially to serve evaluations of Double-interaction, most of the approaches discussed in this section seem to serve as highly generalized approaches. The researcher is of the belief that different situations 'bring to surface' different sets of constructs, with which man chooses to construe his world. At least for Double-interaction in particular, and Task-related Interaction in general, 'mapping' each person on Person-related and Efficiency-related dimensions may serve a useful purpose, in the context outlined above. This, in turn, will provide a meaningful basis on which to relate the different participants in a Double-interaction situation.

5.3 The Customer

The Customer is at the receiving end of a Double-interaction. Often, however, his relevance at the Design and Planning stage, is at best assumed. The focus is often first on the System, secondly on the Operator, and lastly if at all, on the Customer.

The Customer, as has been discussed, is a very special part of Double-interaction, and a very sensitive one at that. Before considering the 2 kinds of Customers, let us first discuss the general effect of Expectations-mismatch. At least a part of the problem of human strains in Double-interaction is due to the mismatch in role-expectations between the Customer's and the Operator's versions. This is especially true for situations that demand a reasonable degree of

Customer-participation in Double-interaction, and truer still for those that demand a joint Operator-Customer interaction with the Computer (e.g. Library Information Retrieval). No doubt, the Customer would be 'better educated' on the next encounter, but given a choice, the Customer may not want to meet the same situation again. Often when a continued resort is necessary, adjustments are towards compatibility with the System and a natural Man-Man Interaction becomes restrictive, and even specialistic. For at least the Person-centred Customer, it is doubtful if his ideal will be approximated by such a situation, as he is a complex individual with special requirements which are not often met by present, every-day life situations. To the researcher's thinking, given a choice, this type of Customer would be the first to opt from meeting such a situation.

The Person-centred Customer is indeed a complex person. He seems to look for much more than just getting his enquiry answered, even in Task-related Interactions. He is attracted to the Customer-centred Operator, and dislikes the Computer. However, he is sensitive to interactions between factors influencing the situation. In one case (i.e. for Complex Enquiries), he is quite likely to choose as his ideal situation one combining the Customer-centred Operator with the Computer Technology, while at the same time choose as his 'worst' situation, one combining a System-centred Operator with the Computer Technology. Not only is the nature of the Operator important to him but also the nature of the System and the Enquiry.

He seems to have a rich complex of underlying cognitions and draws on the finer aspects of Person/Efficiency dimensions on which to base his evaluations. It is possible that a simplistic small-scale battery of questions does not adequately represent the complexity of his evaluations.

He probably resents society heading towards super-efficiency, and the advent of the Computer. He finds this a force wrecking the Personal-Interaction Philosophy and present day task-related interactions that meet his ideal are hard to come by. (In the experiment, for example, he was the hardest to please by any of the 4 Double-interaction situations.)

The Efficiency-centred Customer, on the other hand, is in many ways, the counterpart of the Person-centred Customer, The Operator is 'purely instrumental' to his needs and he finds greater importance in the nature of the System. If the latter is Computer-aided, 'so much the better' for this Customer. The manually operated system, on the other hand, is slow and inefficient, and works contrary to his own standards. He is happy in an advanced technology environment. A Computer provides his ideal Efficiency promoting environment, and if the Operator is also System-centred, then his ideal is matched even better. However, he is far less fussy about what kind of Operator he is served by as long as this is in a Computer or Advanced Technology environment.

As part of a group, he is very representative and a small selection of Efficiency- and Person-related questions seem to provide a more or less adequate representation of his orientation. His behaviour does seem to shift, however, with increasing Efficiency-content of his orientation. This is to say that the Customer with an Efficiency: Person Score very highly in favour of 'Efficiency' will look for situations that are even more marked in efficiency-content. For example, in the experiment, such Efficiency-centred Customers found the System-centred Operator/Computer Technology situation the most satisfactory, while the rest were found to be equally inferior.

He is also a member of a group that the researcher considers, is going to grow even larger in the present state of affairs. If present day planning focusses first on the system and only then on its users, and if the systems place high demands on the Operator, one reaction will be for the Person-centred Customer to feel dissatisfied with current situations far removed from their ideal. What is more probable, however, is that the human participants will have to adjust themselves to the System over which they have little ready control; for the Operator to do so directly and necessarily, and for the Customer to do so indirectly by first adjusting himself to the Operator or by opting from meeting such situations at all. It is useful to pause to think about the human issues now when the use of Double-interaction Systems is not widespread.

5.4 The Operator

The Operator is also an important part of Double-interaction, and often faces a dilemma in trying to cope with the Customer in one way and the System in a different way, both at the same time.

First, as before, a note on the mismatch of expectations. A large part of this problem seems to lie in the contrast between man-man interaction and man-computer interaction within a Double-interaction. The Customer-Operator mismatch of the roles expected of each other is encouraged, it seems, by a highly technical Man-Computer Dialogue that is in marked contrast to a non-technical Man-Man Dialogue. The position argued is that when faced with the demand to conduct two interactions that are markedly different in style and content, the Operators fail to appreciate the naive, non-technical Customers, and even reject these as 'clumsy', 'difficult', 'do not appreciate our side of things', etc. However, this is true for one kind of Operator, more than the other, as will be seen.

The Customer-centred Operator is the Operator equivalent of a Person-centred Customer. She finds the customer a special dimension to her job. She is interested in her Customers, wants to extend a personal service, and she is attracted towards Customers who themselves share this Person-centred approach, and away from the Efficiency-centred, 'super efficiency' demanding types (e.g. Businessman in the Airline Passenger Service situation). Computer technology, for this Customer, has taken away certain ways by which she could formerly extend a personal service to her Customers (e.g. a central Computer Store and Bulk bookings does not allow the Airlines Operator to enjoy the same 'power' she had over the welfare of individual customers). Very often, this approach is no longer possible. 'Actions' or 'Decisions' can no longer be exercised at her discretion but are subject to ruling of the Computer. When the operation makes special demands and calls her to interact in specialist and 'unnatural' ways, this is in marked contrast to, and interferes with, her natural man-man conduct with the Customer.

As was remarked earlier, if the System is in opposition to her orientation, and she does not have a ready control over it, the outlet to the dilemma may be to adjust herself to the System. The Customer would then have to adjust, in turn, to the Operator, because the Customer is the more adaptive of the two (i.e. the Customer and the System).

The System-centred Operator is an Operator equivalent of the Efficiency-centred Customer. She cannot 'afford' to have the Customer dwell on matters outside her perception of the business at hand. She looks upon her job as being able to answer the enquiry in the most efficient manner, and she finds the Computer a blessing in this respect. "If the Computer cann provide Efficiency, I don't know what can". She finds the operation of the System the most important part of her job and her ideal is away from Customers who "cannot or will not appreciate her side of the job" and who are "difficult" or "clumsy enquirers".

She is better able to cope with the high demands that a System might place on her and this she readily accepts as 'part of the job'. As outlined earlier, she is also a member of a group which is likely to grow in size if Systems heavily encourage Operators to be System-centred. (Diagram 26 summarizes the relationship between the 2 kinds of human participants in Double-interaction in the light of other factors. It appears, appropriately, after these have been discussed).

5.5 The System

The System provides a strong force in the make-up of a Double-interaction. As has been suggested, changing the System from manual to computer not only affects the 'transaction harmony' but also the directions in which future Double-interaction might move. We have already considered some implications that a present day System may bear on the working of Double-interaction. Table 14 is repeated here, with a slight amendment, to summarize this point.

As has been pointed out, the manual technology is inherently suited to provide a personal service to the Customer and offers consonance both to the Person-centred Customer, as well as the Customer-centred Operator. The environment created by the Manual Technology is 'meaningful', 'natural' and conducive to social interaction.

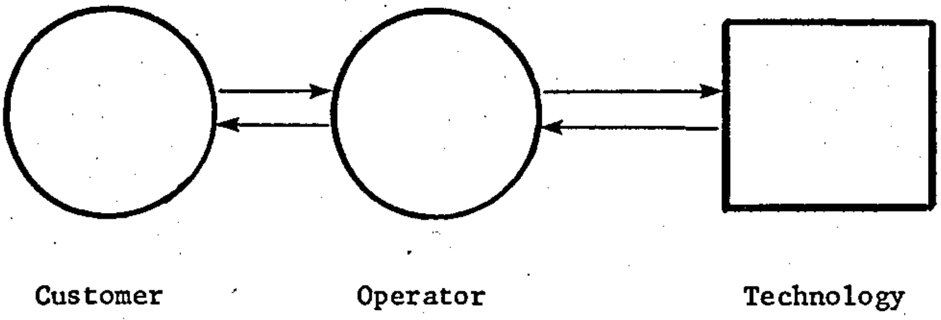
Computer technology, on the other hand, is the 'anti-man' for the participants with Person-related orientations. Even if systems were designed in the first instance to be Customer-centred, it is possible that the 'anti-man' reaction would not disappear completely. While there remain everyday instances, such as the Computer having 'messed about so-and-so', this stigma can only be reinforced. It is not totally without reason that a Person-centred Customer might want to 'steer clear of the Computer'. The Computer demands an above normal

1. The System imposes "too many" constraints and/or demands a pronounced degree of dependence from the users (e.g. the Computer "stopping dead in its tracks" unexpectedly in the Library situation).
2. Fixed order Man-Computer Interaction has a carry-over effect on Man-Man Interaction.
3. The System may impose implicit constraints on running time (including cost considerations) so that the Operator may expect the Customer to be quicker than he can be.
4. The System seems to affect the Operator's expectation of the way the Customer conducts himself in a decision-making situation. This expectation may be more aligned to Computer-compatible decision-making and far-removed from "natural decision-making" (e.g. The former may be quick and organized, the latter may be neither).
5. When a Task involves varying but fairly predictable levels of decision-making, the System is often not adaptive enough to aid directly particular types of decision-making.
6. Even when extra facilities are provided by the System, the Customer is often not aware of these. The Operator may expect the Customer to "readily appreciate" the reason behind or even the nature of such facilities, which the Customer may not.
7. The System leads to "unnatural explanations" (e.g. Operator to Customer: "The booking is not possible because the Computer says 'No'").
8. The System seems to have taken over the control from the Operator affecting the latter's ability to serve Customers "on an individual personal basis", which she no longer can.
9. The System seems to be suited to one type of Operator (System-oriented Operator) and hence to a particular type of Customer (Efficiency-oriented Customer) only.

Table 14: Double-Interaction Strains produced by the System

understanding. It creates an interaction practice that is unnatural. It is designed and implemented very often, purely on Efficiency criteria, taking into account the needs of the masses, at the expense of individual needs of any single person. The total effect is one that discourages the Person-centred approach of interaction.

At another level, it is worth considering the differing impacts technology has upon different types of Customers.



The Customer is at the end of a Double-interaction relay (see illustration), which suggests that the effect of technology, if at all, can only be an indirect, weak one, the stronger effect being on the Operator. However, Customers are quite sensitive to the effect of technology, and the sensitivity seems to reflect the nature of their orientation. Experimental findings suggest, for example, that generally, it is the nature of technology that provides the primary focus to the Efficiency-centred Customer. As long as he is served by a Computer, he is not 'bothered' very much about the nature of the Operator. For the Person-centred Customer, it is the Operator, and probably a combination of factors but certainly not the single effect of technology, that is of primary importance.

The final aspect of System considerations is in some ways a global one. Organisations can adequately contain complex specialist systems for use by a specialized group of people. It seems that as the use of Systems progress more and more towards the boundaries of the organisation and/or attract a wider range of users, the complexity of their interface must accordingly lessen to accommodate this shift. In the Double-interaction context, the organisation interacts with the outside world at its boundary. The outside world is no longer a specialized group but consists of the public at large: housewives, senior citizens, students, etc. This is a marked transformation which the Systems, used at the boundary, may not adequately be able to handle. System interface at the boundary may still retain and therefore suffer from, the complexities of the interfaces that lie well inside the organisation. The Operators, as well, are not the same as the ones inside the organisation, nor are their jobs the same. The public at large, that the System purports to serve, must be able to identify with the Operator. Here again, the Operator and the Customer are not synonymous. The Operator has to maintain a delicate balance between appearing to share membership with the general public, as well as retain membership of the organisation. A System which demands or leads to a specialized unnatural interaction with the Customer, greatly aggravates the situation.

This is to say that the System interface at the boundary has to match in complexity the education and perceptions of the public at large. System specialists must realize this necessary shift in focus as the use of Systems moves outwards from the inside of the organisation. This may even suggest that the design of Double-interaction Systems may be carried out better by a special group of System-specialists rather than by the same ones used to design Systems for use inside the organisation.

To summarize, we have discussed the implications of the System for the participants of Double-interaction as well as for the related future trends. We have also noted the bias attached to the Computer, a positive one in the case of a System-centred Operator and Efficiency-centred Customer, and a negative one in the case of the Customer-centred Operator and the Person-centred Customer. We have further seen how the Computer may be seen to discourage the 'personal approach' philosophy. While the anti-computer stigma cannot be attacked directly, there are good prospects of indirect attack. If Systems can be designed with the Customer - and more important, both the Customer and the Operator in mind - and if the System can be seen to work for the Customer, this will go a long way towards mellowing the stigma. Finally, it seems desirable that the apparent sophistication of the System bear a close match with the 'sophistications' of the general public at large, and, rather than Systems giving rise to new Interaction Practices, that they abide by existing natural practices of Man-Man Interaction.

5.6 The Enquiry

The final component of Double-interaction, and no less important than any of the ones discussed so far, is the Enquiry. It is the Enquiry that promotes a Double-interaction in the first place.

The point to note about the Enquiry is that it adds another strong Consonance-Dissonance factor to the three already discussed. For instance although the Person-centred Customer's ideal situation would be to be served by a Customer-oriented Operator operating a manual technology, the Complex Enquiry shifts his ideal towards a situation having the same Operator but supported by a computer technology (the Model and the Experiment). It is as if the Customer seeks a compromise between his ideal and the possibility that a Complex Enquiry may best be served by a sophisticated system (i.e. Computer).

Secondly, the nature of Enquiry seems to offer effects that vary for the 2 kinds of Customers. For example, in the Experiment, the Person-centred Customers were 'at a loss' to evaluate the situation when they had to negotiate this with a Simple Enquiry. It seems that the nature of Enquiry takes on special characteristics for this Customer, and unless the Enquiries meet certain pre-set standards, this Customer finds the Situation too excessive for the simple needs of the Enquiry. (On the negative side, however, the Person-centred Customers were near unanimous in voting against one situation: System-oriented Operator/Computer Technology, even when using the same enquiry.) For the Efficiency-centred Customers, the situations were generally found to be not over-compatible with the Simple Enquiry.

Thirdly, there is a point we have not considered hitherto. As will be remembered the enquiries were pre-classified for the experiment as 'simple' or 'complex'. Certain criteria were employed in making this classification. For example, the 'simple' enquiry was 'typical', 'quickly executable', 'System'compatible', etc. The findings suggest a re-appraisal in this Simple/Complex consideration. Disregarding the measurement problems, it seems more useful to consider the enquiry in the context of enquiry needs and in turn to classify these as 'Efficiency' or 'Person' needs. For example, a part of the Complex enquiries in the experiment were the 'incompatible', advice-seeking kind of enquiries, e.g. "Could you recommend to me a Resort in the North where I would like to spend a quiet weekend?" The Operator can respond to this Enquiry either by explaining how it could not be entertained or by offering advice or recommendations, which means she has to respond to Person-needs rather than Efficiency-needs. Appropriately, it would be best served by a Customer-centred Operator. This would explain why, for the Complex Enquiry, the Efficiency-centred Customer found the Customer-centred Operator/Computer situation more satisfactory than the System-centred Operator/Computer one. Another illustration which would support this theme can be drawn from a frequent feature of Double-interaction. This is where the Operator is called upon to help the Customer with decision-making, (e.g. choice of flight dates in the travel situation, or of a retrieval strategy in the Library Information Retrieval). At least a basic nature of such an Enquiry may reflect a Person-need predominantly, and demand a matching Person-centred approach from the Operator. The situation is often aggravated by Systems which are not directly compatible with this kind of human issue in Double-interaction and which rely on the Operator to channel the Customer through to a particular decision all by herself. It is possible that the System-centred Operator may not be able to provide the sympathetic and understanding approach that may be required, and the Customer-centred Operator may be better equipped to handle this issue.

Finally, if one were able to establish the Enquiry needs according to Person-or-Efficiency content, then two useful purposes would be achieved:-

i) one could start considering the compatibility of the System directly with the Enquiry needs,

and ii) this could provide a common framework for considering enquiries in different situations.

It would then be possible to attempt a general consideration bringing together different Double-interaction situations, as well as more detailed situation specific considerations of particular Double-interaction.

5.7 The Model

So far, we have discussed the components of Double-interaction under separate headings, although in relation to each other.

Let us summarize first of all the inter-relationship between the Human Participants of Double-interaction in the light of other factors. Diagram 26 serves this point, and offers a combined summary of the Operator considerations of Chapters 2 and 3, and the Customer-considerations of Chapter 4 of the report.

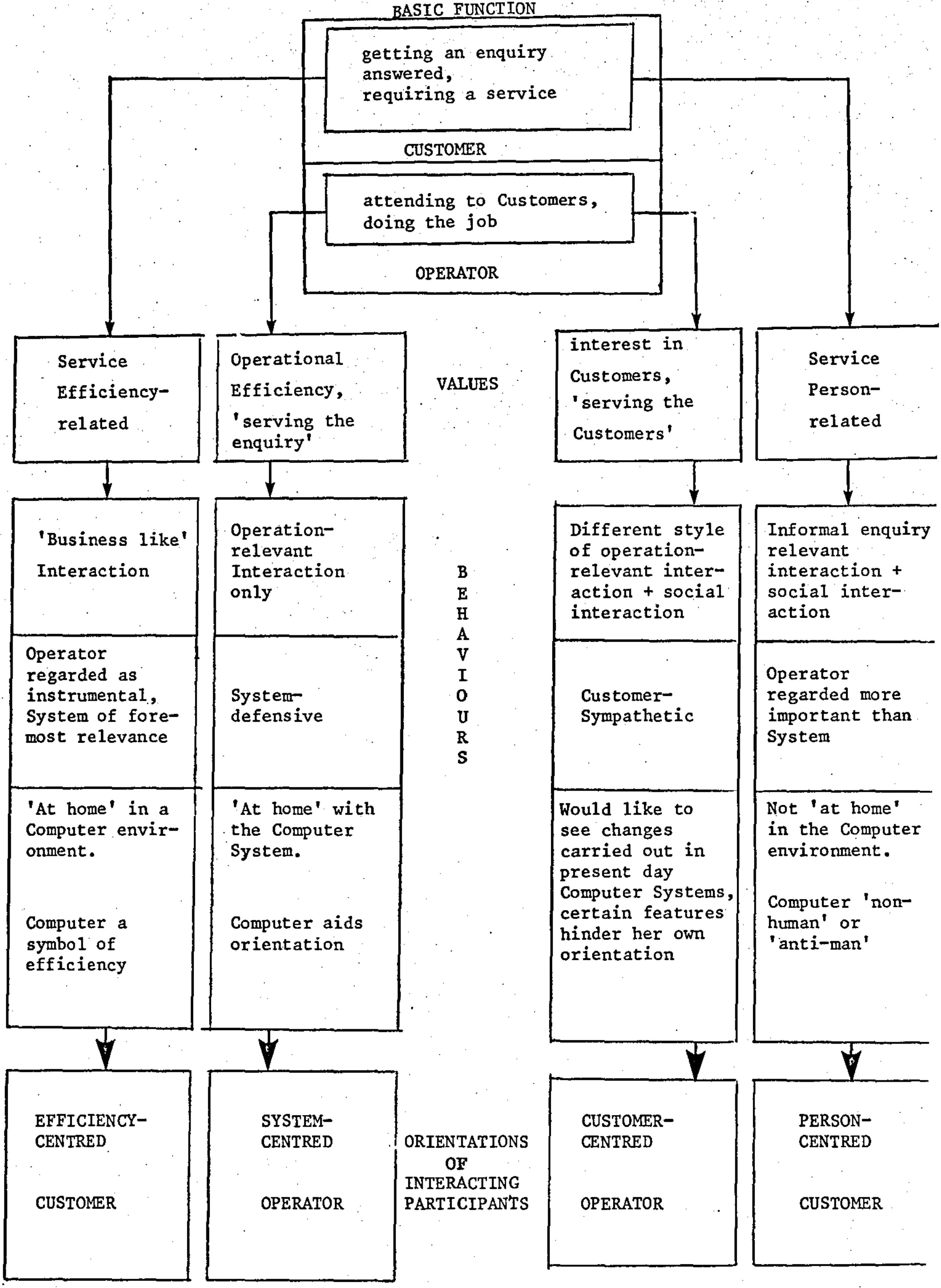

BASIC FUNCTION
getting an enquiry answered, requiring a service
CUSTOMER
attending to Customers, doing the job
OPERATOR
Service Efficiency-related
Operational Efficiency, 'serving the enquiry'
VALUES
interest in Customers, 'serving the Customers'
Service Person-related
'Business like' Interaction
Operation-relevant Interaction only
BEHAVIOURS
Different style of operation-relevant interaction + social interaction
Informal enquiry relevant interaction + social interaction
Operator regarded as instrumental, System of foremost relevance
System-defensive
Customer-Sympathetic
Operator regarded more important than System
'At home' in a Computer environment.
Computer a symbol of efficiency
'At home' with the Computer System.
Computer aids orientation
Would like to see changes carried out in present day Computer Systems, certain features hinder her own orientation
Not 'at home' in the Computer environment.
Computer 'non-human' or 'anti-man'
EFFICIENCY-CENTRED
CUSTOMER
SYSTEM-CENTRED
OPERATOR
ORIENTATIONS OF INTERACTING PARTICIPANTS
CUSTOMER-CENTRED
OPERATOR
PERSON-CENTRED
CUSTOMER

Diagram 26: Qualities of the Human Participants in a Double-Interaction

A single framework is now needed to illustrate the inter-relationships between the 4 components of Double-interaction. The model developed will serve to illustrate this point and appears below in its updated version. Also, rather than use it to illustrate 'Customer Satisfaction' we can generalize towards overall 'transaction harmony'. See Diagram 27.

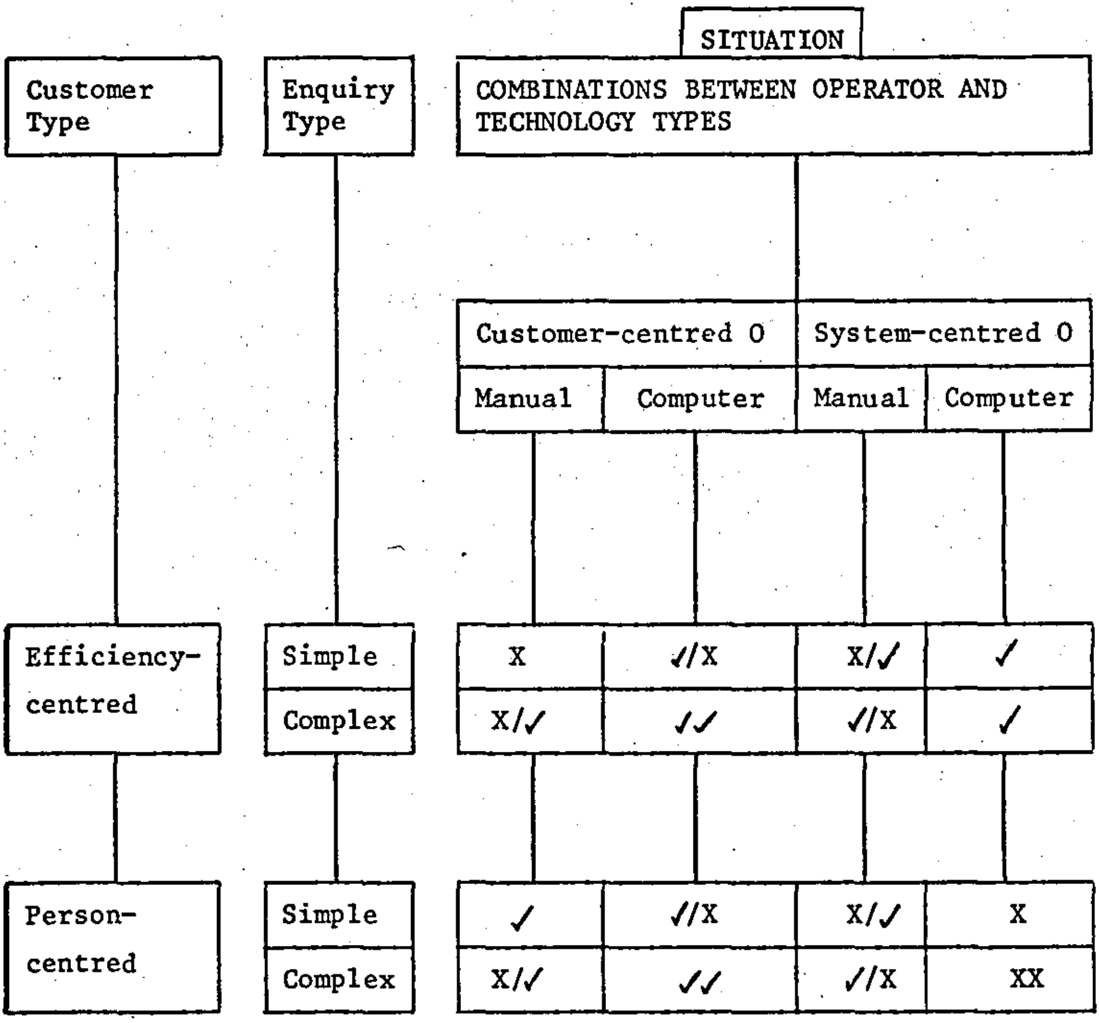
The classification is based in the first instance, on the Person- or Efficiency-considerations of the participants. Predictions can then be made rather along the lines of the Exchange Theory, according to the degree of compatibility along Person- and Efficiency-lines, of the interacting components, namely:-

the Customer,
the Operator,
the System,
and the Enquiry.

Although it is early to offer a checklist for the System-designer - indeed a checklist may never be possible or even adequate - certain points are worth noting:-

1) Looking down the columns of the model, the middle ground that provides maximum satisfaction to 'all parties', is the situation combining a Customer-centred Operator with a Computer Technology.

2) If the Customer-centred Operator is provided with a framework enabling her to understand how the System is directly aiding both her and the Customer, she may find that the Computer environment relates directly to her own orientation, and thus begin to offer satisfaction.



Customer Type	Enquiry Type	SITUATION COMBINATIONS BETWEEN OPERATOR AND TECHNOLOGY TYPES			
		Customer-centred O		System-centred O	
		Manual	Computer	Manual	Computer
Efficiency-centred	Simple	X	✓/X	X/✓	✓
	Complex	X/✓	✓✓	✓/X	✓
Person-centred	Simple	✓	✓/X	X/✓	X
	Complex	X/✓	✓✓	✓/X	XX

✓✓ = A high degree of transaction harmony.
XX = A low degree of transaction harmony.
✓/X = An intermediary degree of transaction harmony.

Diagram 27: States of Harmony in Double-interaction

3) For the System-centred Operator, a Computer environment seems inherently suitable. Indeed a System designed specifically to be 'Customer-centred', may enable her to appreciate the more Person-related aspects of Task-related Interaction and influence her conduct beyond a purely Efficiency-centred approach to the Customer.

4) There is also a feature of relevance to the area of Operator training, although this emerged as a side-line of the experimental findings. There may be merit in educating the Operator on criteria for service and to motivate her towards a particular approach towards the Customer. This, however, is not an answer in itself. For example, when the Operator in the Experiment, with a 'natural' orientation towards the Customer, was asked to take on an Efficiency- or System-orientation, she struggled to achieve this in an environment supported by the manual technology.

   Systems may have to be designed to support directly the desired orientation, or success may be hard to achieve.

General Plan

1. Introduction
2. Field Study
3. Discussion
4. Experiment
5. Discussion
6. ➤ Summary and Conclusions

6. SUMMARY AND CONCLUSIONS

1. Double-interaction refers to the simultaneous conduct of man-man and man-computer interaction.

2. This report is an outline of research currently undertaken on the face-to-face aspect of Double-interaction, between the Customer, the Operator and the Computer, as it occurs, and is likely to increase to occur, in the near future.

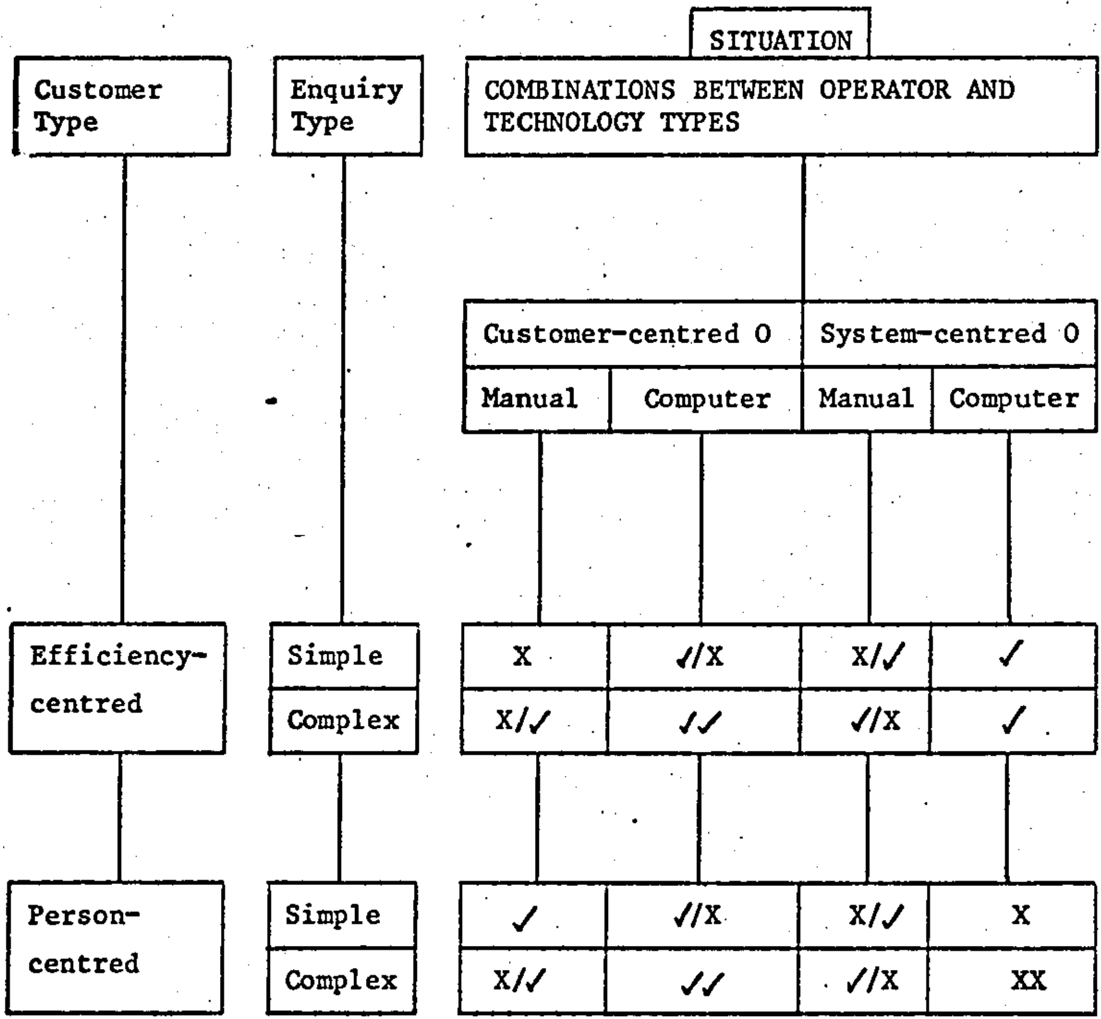
3. It is suggested that it is useful:-

   i) to examine the issue within a broadly Social Psychological/ Ergonomic framework,
   ii) to 'map' Double-interaction participants along Person-related and Efficiency-related dimensions,
   iii) to view the inter-relationships of the components of Double-interaction along these Person- and Efficiency-lines, and examine how the overall harmony may be affect.

4. Double-interaction may be sectionalized into 4 main components:

   The Customer
   The Operator
   The Computer (or Technology)
   The Enquiry (or Task)

5. The model (illustrated) suggests how the 4 components may inter-relate to promote varying levels of harmony. It has been subjected to experimental verification and appears below in its updated version.



		SITUATION			
		COMBINATIONS BETWEEN OPERATOR AND TECHNOLOGY TYPES			
		Customer-centred O		System-centred O	
Customer Type	Enquiry Type	Manual	Computer	Manual	Computer
Efficiency-centred	Simple	X	✓/X	X/✓	✓
	Complex	X/✓	✓✓	✓/X	✓
Person-centred	Simple	✓	✓/X	X/✓	X
	Complex	X/✓	✓✓	✓/X	XX

✓✓ = A high degree of transaction harmony.
XX = A low degree of transaction harmony.
✓/X = An intermediary degree of transaction harmony.

Diagram 27: States of Harmony in Double-interaction

6. Finding suggest the existence of 2 kinds of Operator. The Customer-centred Operator sees the Customer as a special dimension of her job. She attempts to offer a personal individual service to her Customers. The System-centred Operator is aligned with the System, rather than with the Customer, offers a purely operational conduct to the Customers and is primarily interested in the Efficiency aspects of the job.

   The following statement serves as a simplified comparison of the two kinds of Operators. A Customer-centred Operator serves the Customer; A System-centred Operator serves the Enquiry, drawing only on its Efficiency aspects.

7. Parallel can be found in Customers. These may be classified as Person-centred or Efficiency-centred. A Person-centred Customer shares his values with a Customer-centred Operator. An Efficiency-centred Customer shares his values with a System-centred Operator. Diagram 26 on page 150 , summarises the inter-relationships between the 2 kinds of Double-interaction participants.

8. Current systems may be subject to a bias attached by users. The strongest bias is attached to the Computer. For the Person-centred Customer, and the Customer-centred Operator, the bias is a stigma, on the lines of the Computer being 'non-human' and 'the anti-man'. To the Efficiency-centred Customer and the System-centred Operator, the Computer is a blessing, a symbol of Efficiency at its best.

9. Further, current Systems are suspected, in practice, of living up to their respective images. Systems may not be designed in the first place to serve the Customer and the Operator, but their relevance may be, at best, 'assumed'.

10. Systems must be 'seen' to be aiding the Customer, and to be working for and with the Customer. The first step towards this achievement would be a shift in focus at the planning stage, towards the Customer and towards special Systems to suit special Double-interaction situations.

11. Inside the organisation, Systems may be highly complex and successfully serve specialized groups of users. At its boundary, where the organisation comes into contact with the general public, the System-interface has to be directly compatible with the perceptions of the general public. This is to say, the development of Systems designed to aid the Customer must move with the education and perceptions of the general public.

12. Looking down column 2 of the model, it can be seen that the second situation (Customer-centred Operator/Computer Technology) provides the ideal middle ground for promoting a Double-interaction harmony that pleases both parties. If Systems can be designed specifically to be 'Customer-centred', the Customer-centred Operator will be happy to find the Computer aiding her own approach towards the Customer. The Person-centred Customer may begin to appreciate much more the role of the Computer in direct relevance to the human aspects of Task-related Interaction. The System-centred Operator as well as the Efficiency-centred Customer, seem naturally 'at home' in any Computer environment. Indeed, the approach of the System-centred Operator may be positively influenced beyond purely a functional approach to her job, if the System itself incorporated features which were Customer-centred.

13. As long as Systems fall short of a primary Customer-centred consideration - and an 'assumed' consideration may not relate to the true state of affairs - Double-interaction harmony may be achieved by 'devious' means. If Systems promote a novel Interaction practice far removed from naturally occurring Man-Man Interaction, the Operator will be under heavy pressures to bridge effectively the interactions between the Customer and the System. Viewing the System as 'given' and 'unchangeable' while the Customer offers the 'adaptive' counterpart, an outlet to this dissonance may be to align herself with the Customer. If the Customer has to make a continued resort to the service provided, he may be relied upon to adjust his own conduct and align himself with the Operator. A long-term trend is possible therefore, whereby more and more Operators become System-oriented and more and more Customers Efficiency-oriented.

14. Technology must serve man rather than man serve technology.

7. REFERENCES

BLAKE, Robert R. and MOUTON, Jane Strygley, 1964, 'The Managerial Grid'. Houston, Texas: Gulf Publishing House.

CHAPANIS, A., OCHSMAN, R., PARRISH, R. and WEEKS, G., 1972, 'Studies in Interactive Communication - I', Human Factors, V.14, N.6, 487-509.

CHRISTIE, B. and HOLLOWAY, S., 1975, 'Factors affecting the Use of Telecommunications by Management', J. Occ. Psy., V.48, Pt 1.

DAMODARAN, L., EASON, K.D. and STEWART, T.F.M., 1973, 'The Needs of the Naive Computer User', 384-392, Datafair 1973, British Computer Society Conference.

EASON, K.D., DAMODARAN, L. and STEWART, T.F.M., 1974, 'MICA SURVEY: Report of a Survey of Man-Computer Interaction in Commercial Applications', Report No. LUTERG 144, October, Loughborough University of Technology, Loughborough, England.

FESTINGER, L., 1957, 'A Theory of Cognitive Dissonance', Stanford University Press, Stanford, California.

GAGE, N.L. and CRONBACH, L., 1955, 'Conceptual and Methodological Problems in Interpersonal Perception', Psychol. Rev., 62, 411-422.

HOMANS, G.C., 1961, 'Social Behaviour: Its Elementary Forms', NY: Harcourt, Brace and World.

HORNEY, K., 1945, 'Our Inner Conflicts', NY: Norton.

JONES, E.E. and DAVIS, K.E., 1965, 'From Acts to Dispositions: the Attribution Process in Person-Perception', In L. Berkowitz (ed.) 'Advances in Experimental Social Psychology', V2, NY: Academic Press.

KELLEY, H.H., 1971, 'Competition, Co-operation and Social Responsibility', B.Ps.S. Conference, Social Psychology Section, September, Durham, England.

KENDALL, M.G., 1948, 'Rank Correlation Methods', Chapter 6, London: Griffin.

LITTLE, B., 1969, 'Studies of Psychospecialists', Psych. Rep. 52.

LITTLE, B., 1971, B.Ps.S. Conference, Social Psychological Section, September, Durham, England.

LUCAS, Henry C. Jnr., 1974, 'Systems Quality, User Reactions and the Use of Information Systems', Management Informatics, Aug., V3, N4, 207-212.

MILLER, E.J. and RICE, A.K., 1967, 'Systems of Organisation', Chapter 7, 83-87, London: Tavistock Publications.

SHACKEL, B. 1969, 'Man-Computer Interaction - The Contribution of the Human Sciences', Ergonomics, July, V12, N4, 485-500.

APPENDICES

Page

APPENDIX I : On-line Information Service (Library Document) 162

APPENDIX II : On-line Information Service, Data Bases 163

APPENDIX III : On-line Information Service, Data Bases: Further Information 164

APPENDIX IV : Airline Bookings Enquiry I 165

APPENDIX V : Airline Bookings Enquiry II 167

APPENDIX VI : Airline Bookings Enquiry III 168

APPENDIX VII : A Report on the Visit to British Railways Information Centre, Leicester 171

APPENDIX VIII : A Selection of Enquiry Guidelines as used in the Experiment 176

APPENDIX IX : Pre-Test Questionnaire Specimen 184

APPENDIX X : Post-Test Questionnaire Specimen 187

APPENDIX XI : Customer-relevant Data (Enquiry Type, Sex, Occupation, Orientation) 190

APPENDIX XII : Customer-orientations 192

APPENDIX XIII : Customer Satisfaction Scores 193

APPENDIX XIV : Ranks and Spearman's Coefficients 195

APPENDIX XV : Study of Factors Governing Customer Satisfaction 197

APPENDIX XVIQ : Significance Table for Kendall's Coefficient of Concordance 198

APPENDIX XVII : Rank Aggregates depicting Order of Priorities attached by different Customer-Types to the 4 Situations 199

APPENDIX XVIII : Measuring Operator-orientation Method 1: Ideal-linked 200

APPENDIX XIX : Measuring Operator-orientation Method 2: Job-linked 201

APPENDIX XX : Operator Feedback Sheet 205

APPENDIX I

ON-LINE INFORMATION SERVICE

The Library has recently been awarded a grant by the Office for Scientific and Technical Information towards participation in an experimental information network.

The project is initially for one year and forms part of a larger programme concerned with on-line information handling, the aim of which is to explore the use of on-line computing techniques for information handling and to provide data for the planning of future information services in the U.K.

We would like to give you an opportunity to use our on-line bibliographic service and record your attitudes and reactions to the use of such information systems (it's free!).

Using key-words and selected subject terms and by keying them in on the terminal in the Information Office, the system will search the most recent literature using data bases from Science Citation Index and Computer Control Abstracts.

Introductory services are available, including a demonstration of the system using a transdata 300 data transmission terminal and a tape slide presentation describing the system.

If you are unable to participate personally perhaps you could nominate a postgraduate student working with you to operate the system on your behalf.

APPENDIX II

ON-LINE INFORMATION SERVICE, Data Bases

You may already know that the Library is participating in an experimental on-line information retrieval project. The project has been running now for several months and numerous members of staff have used the services available successfully.

We would like to give you the opportunity to make use of the data-bases offered and record your attitudes and reactions to the use of such information systems.

The data-bases available are:

1. MEDLINE (MEDLARS On-Line). This is an on-line bibliographic searching service provided by the National Library of Medicine (U.S.A.). The data-bases contains more than 450,000 citations to articles from about 1,200 biomedical journals. It holds 3 years' past data plus the current years' data added monthly. Several members of the Chemistry Department and Department of Ergonomics and Cybernetics have already used this data-base with excellent results.

2. SCISEARCH 2. A commercial system using the most recent 4 weeks' output of I.S.I. tapes covering the fields of Chemistry, Physics, Engineering and Technology, Life Sciences and Social & Behavioural Sciences.

3. RETROSPEC 1. This data-base consists of English language journal articles and papers on computer and control engineering. It is, in fact, the magnetic tape version of Computer and Control Abstracts and goes back 3 years.

APPENDIX III

ON-LINE INFORMATION SERVICE, Data Bases: Further Information

The experimental on-line information retrieval project which has been running for several months in the library has several new data-bases for limited use.

The data-bases available are:-

1. MEDLINE (MEDLARS On-line). This is an on-line bibliographic searching service provided by the National Library of Medicine (U.S.A.). The data-base contains more than 450,000 citations to articles from about 1,200 biomedical journals. It holds 3 years' past data plus the current years' data added monthly.
2. MEDUSA. This contains citations in English, French and German from the most recent three months of the Medlars data-base.
3. INSPEC Physics. The machine-readable version of Physics Abstracts from 1972 onwards.
4. INSPEC Electrical and Electronics Engineering. The machine-readable version of Electrical and Electronics Abstracts from 1972 onwards.
5. INSPEC Computer and Control Engineering. The machine-readable version of Computer and Control Abstracts from 1972 onwards.
6. COMPENDEX. The machine-readable version of the Engineering Index data-base which indexes the world's significant engineering literature and conference proceedings. Time span covered is from 1972 to present day.
7. ERIC (Educational Resource Information Center). ERIC is the educational data-base developed and maintained by the National Institute of Education (U.S.A.). Time span covered is from 1972 to present day.
8. CAIN. The CAIN tapes contain bibliographic data on documents acquired by the National Agricultural Library(U. S.A.) on a world wide basis in the broad field of agriculture, including agricultural economics and rural sociology, animal industry, agricultural products, entomology, food and human nutrition, forestry, perticides plant science, soils and fertilizers and related subject fields. Includes both monographs and journal articles. 1972 onwards.
9. Psychological Abstracts. From 1967 and covering the worlds literature in Psychology and related disciplines.
10. Abstracted Business Information (ABI). ABI comprises of 271 business-oriented periodicals and oovers business, accounting, marketing, banking, industrial relations, finance and advertising.

Available shortly will be Chemical Abstracts from Volume 76 onwards.

APPENDIX IV

AIRLINE BOOKINGS ENQUIRY I

---

1. Name of Organisation

---

2. Type of situation

---

3. Number of Operators: total ☐
studied ☐

---

4. Plan of working space:

---

5. Own Terminal ☐
Shared Terminal ☐
Number of Terminals ☐

---

6. Client actually present ☐
on telephone ☐
both ☐
others ☐

---

7. Airline Bookings a main duty? Yes ☐
No ☐

---

8. What other duties?

---

9. Nature of enquiry Fixed ☐
Variable ☐
others ☐

---

10. Task description: Interaction Mode
Medium and Structure

APPENDIX IV (contd)

---

11. Examples of Customer Needs:

---

12. Additional comments:

APPENDIX V

AIRLINE BOOKINGS ENQUIRY II

OBSERVATION CHART

TRANSACTION NUMBER	TYPE	TIME TAKEN	DIALOGUE CONTROL	ERRORS		O/C RELATIONSHIP			
				O	C	O	CHARACTERISTIC		C
						0 1 2 3 4 5	anxious	cheerful	0 1 2 3 4 5
						0 1 2 3 4 5	unsure	sure	0 1 2 3 4 5
						0 1 2 3 4 5	submissive	dominant	0 1 2 3 4 5
						0 1 2 3 4 5	functional	chatty	0 1 2 3 4 5
						0 1 2 3 4 5	impatient	patient	0 1 2 3 4 5
						0 1 2 3 4 5	cold	warm	0 1 2 3 4 5
						0 1 2 3 4 5	angry	calm	0 1 2 3 4 5
						0 1 2 3 4 5	dissatisfied	satisfied	0 1 2 3 4 5
						0 1 2 3 4 5	anxious	cheerful	0 1 2 3 4 5
						0 1 2 3 4 5	unsure	sure	0 1 2 3 4 5
						0 1 2 3 4 5	submissive	dominant	0 1 2 3 4 5
						0 1 2 3 4 5	functional	chatty	0 1 2 3 4 5
						0 1 2 3 4 5	impatient	patient	0 1 2 3 4 5
						0 1 2 3 4 5	cold	warm	0 1 2 3 4 5
						0 1 2 3 4 5	angry	calm	0 1 2 3 4 5
						0 1 2 3 4 5	dissatisfied	satisfied	0 1 2 3 4 5
						0 1 2 3 4 5	anxious	cheerful	0 1 2 3 4 5
						0 1 2 3 4 5	unsure	sure	0 1 2 3 4 5
						0 1 2 3 4 5	submissive	dominant	0 1 2 3 4 5
						0 1 2 3 4 5	functional	chatty	0 1 2 3 4 5
						0 1 2 3 4 5	impatient	patient	0 1 2 3 4 5
						0 1 2 3 4 5	cold	warm	0 1 2 3 4 5
						0 1 2 3 4 5	angry	calm	0 1 2 3 4 5
						0 1 2 3 4 5	dissatisfied	satisfied	0 1 2 3 4 5
						0 1 2 3 4 5	anxious	cheerful	0 1 2 3 4 5
						0 1 2 3 4 5	unsure	sure	0 1 2 3 4 5
						0 1 2 3 4 5	submissive	dominant	0 1 2 3 4 5
						0 1 2 3 4 5	functional	chatty	0 1 2 3 4 5
						0 1 2 3 4 5	impatient	patient	0 1 2 3 4 5
						0 1 2 3 4 5	cold	warm	0 1 2 3 4 5
						0 1 2 3 4 5	angry	calm	0 1 2 3 4 5
						0 1 2 3 4 5	dissatisfied	satisfied	0 1 2 3 4 5
FREQUENCY PER HOUR									
ADDITIONAL COMMENTS									

APPENDIX VI

AIRLINE BOOKINGS ENQUIRY III

Interview-Questionnaire

---

1. Subject Code ☐

---

2. Time spent on the task:

L.T. 1 month ☐
1-6 months ☐
6-12 months ☐
1-2 years ☐
M.T. 2 years ☐

---

3. Period of Training:

1 week ☐
2 weeks ☐
3 weeks ☐
1 month ☐
3 months ☐
6 months ☐
M.T. 6 months ☐

---

4. How easy is it to translate verbal statement to computer compatible input?

very easy ☐
quite easy ☐
so-so ☐
quite difficult ☐
very difficult ☐

---

5. How easy is it to translate back computer output to verbal response?

very easy ☐
quite easy ☐
so-so ☐
quite difficult ☐
very difficult ☐

APPENDIX VI (contd)

6. If so-so or worse, why?

Input	Output

7. What is your ideal sort of customer?

8. What is your worst sort of customer?

9. What is the typical sort of a customer?

10. If typical far from ideal, can you give any reasons why this would be so?

11. Can you site instances when the System was down? What happened?

12. How did you react?

13. Could you tell what was wrong?

14. How did the Customers react?

15. Before the Computer, you performed your present task differently. Can you describe how you found the job then? How do you find it now?

Conclusions:

The Operator was/is

	previously	now
very happy		
quite happy		
so-so		
quite unhappy		
very unhappy		

16. Additional Comments:

Appendix VII

A Report on the Visit to British Railway Information Centre, Leicester

B. Maldé & R. Penn 27th February, 1975

1. Objectives

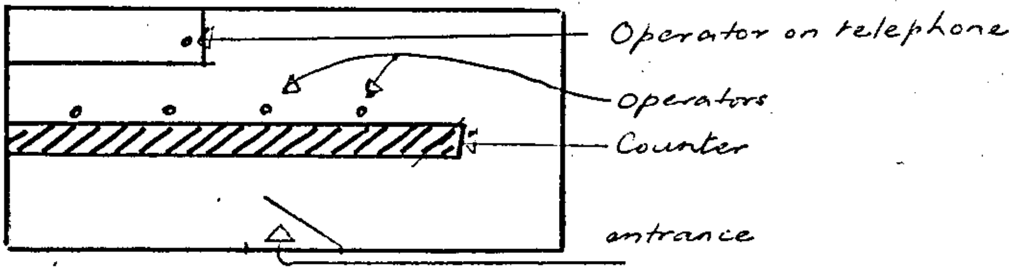
An experiment is currently under design that is expected to examine the "human strains" involved in double-interaction (the simultaneous conduct of man-man and man-computer interaction). The study is based on a simulation of a double-interaction activity as it may occur in real-life. The task involves an Operator answering Customer enquiries on Train Travel.

1.1 To assist further with the task of simulating the system sufficiently to resemble its real-life occurrence, a need had arisen of two types of information which were not easily accessible from the literature. available to the general public. These were:

1) Fare information relating to the 13-Station Route employed by the System.
2) A sample of public enquiries faced by an Information Counter.

The visit was planned to obtain this information, and the study focussed mostly on the face-to-face aspect of double-interaction in line with the current research interest.

2. General Plan of the Information Centre



The Counter was manned by 4 "Operators". In addition the Supervisor dealt with telephone enquiries as well as enquiries that involved ringing up other sources. She also helped out with Counter activities when necessary.

3. The Activities

1) The activities undertaken related mostly to British Travel.
2) Some Operators specialized in dealing with Continental enquiries.
3) Enquiries also came in about Package Tours.

Replies often involved a multiple-resort to various text-sources (including maps).

4. Findings

4.1 The Fare Information

Was compiled as necessary.

4.2 Customer Enquiries

4.2.1 "Typical" Enquiries were difficult for the Operators to generate. The Operators were asked to describe the enquiry addressed by 'the last Customer' at the end of each transaction.

Examples

	Customer	Operator
4.2.1.1	What is the Period Return to ------- ?	How long are you going for?
	(Answer)	Period Return not possible.
	How much is the Ordinary Return then?	(looks it up and answers)
4.2.1.2	I will be travelling to ---- quite often in the future. What are the times like?	Before or after May?
	Oh ... um	Because the times will be different then.
	(answer)	(Looks it up and answers)

	Customer	Operator
4.2.1.3	I would like to travel to Scotland.	Where in Scotland?
	To.. um I can't pronounce the place. It begins with the letter -. I rang up last night, remember?	Oh yes. You mean ------ What information would you like?
	How do I get there?	(looks it up, jots down the Route, hands C the note)
	How much do I pay?	(retrieves the note, looks it up, adds on the note, hands it back)

4.2.1.4 In addition, there were many enquiries such as:

1) ones dealing with the Strike (e.g. "Am I O.K. to travel to ----- and return?")

2) "Next train to -------- ?"
"Back at ?"

4.2.2 Awkward Enquiries were easy for the Operators to cite examples on:

Examples

Operators reported on meeting the following types often:-

4.2.2.1 iterative enquiry: C asked O about one train. When O replied C asked about the next one. When O replied, C asked about the one after that, etc.

4.2.2.2 incompatible enquiry:

a) Operators reported that complications arose when information had to be "dug out of" the Customers. e.g. C would state the destination and nothing else.

b) Language (and cultural) problems also aggravated the task. Many travellers and residents were of foreign origin.

c) Some times, C's stated one destination when they meant another.

4.2.2.3 reassurance enquiry:

a) C would ask a question that was answered - "even spelt out" - in the official leaflet he carried with him.

b) C would ask to confirm a piece of information outlined in the official leaflet he carried with him.

c) C's often "got stroppy" when travel alternatives were not possible, in the event of Strikes etc. (e.g. Thursdays).

The multi-resort that the Operators had to carry out, especially in the case of complicated routes, often made matters worse when the Customers were also "being clumsy" at the same time, as outlined.

5. Comments

The Operators seemed to be very critical about Customer behaviour in general. They could not appreciate why:

1) a Customer may address an enquiry that was incompatible to deal with.
2) A Customer may seek to confirm official information displayed on time-table cards, etc.
3) a Customer may elaborate on his initial enquiry as he went along.

Theproblem of mismatched Operator/Customer Role Expectations, as found to occur with other double-interaction situations, seems also to play a significant part in the present situation.

6. Conclusion

The Route used by the simulated system (Sheffield to London) seems too restricted to pose any enquiry problems met in real-life. However, it is felt that a number of enquiries dealing with the system as it stands, may be "generated" with the help of the present findings, that will serve as examples of "awkward" enquiries.

A Selection of Enquiry-Guidelines as used in the Experiment

SUBJECT CODE: ENQUIRY CODE: EA1

NO: 1

SAY YOU WOULD LIKE TO CATCH THE NEXT TRAIN TO

PLEASE GO IN TO ASK ABOUT THE DEPARTURE AND ARRIVAL TIMES.

SUBJECT CODE: ENQUIRY CODE: EA1

NO: 2

SAY YOU WOULD LIKE TO CATCH THE NEXT TRAIN TO

PLEASE GO IN TO ASK FOR THE TRAVELLING DETAILS THAT YOU WOULD NEED E.G. TIME, CHANGES, AND FARE.

SUBJECT CODE: ENQUIRY CODE: EA1

NO: 3

SAY YOU WOULD LIKE TO CATCH A TRAIN AROUND ON A TO . PLEASE GO IN TO ASK FOR THE TRAIN NEAREST TO THAT YOU CAN CATCH.

SUBJECT CODE:

ENQUIRY CODE: EA2
NO: 10

PLEASE FIND OUT THE TIME OF A TRAIN NEAREST TO

THAT YOU CAN CATCH TO TRAVEL BETWEEN AND

. BECAUSE YOU ARE TRAVELLING AROUND

, YOU COULD DO WITH A

ON BOARD. SO PLEASE SEE THAT YOU FIND ABOUT A TRAIN SUITABLE TO YOUR NEEDS.

SUBJECT CODE: ENQUIRY CODE: EA3

NO: 21

SAY YOU WOULD LIKE TO TRAVEL TO FOR A DAY. YOU WOULD LIKE TO KNOW THE FARE THAT WILL APPLY TO YOU. PLEASE GO IN TO FIND OUT ABOUT IT.

SUBJECT CODE: ENQUIRY CODE: EA3

NO: 22

SAY YOU WILL BE REQUIRED TO TRAVEL BETWEEN AND REGULARLY IN THE FUTURE. YOU WILL BE STAYING THERE FOR VARYING PERIODS. YOU WOULD LIKE TO KNOW ALL THE DIFFERENT SECOND CLASS FARES THAT APPLY TO YOU. PLEASE GO IN TO OBTAIN THE INFORMATION YOU NEED.

SUBJECT CODE: ENQUIRY CODE: EA3

NO: 23

PLEASE GO IN TO FIND OUT ABOUT THE FARE BETWEEN AND

CHECK TO SEE IF THE FARE IS LIKELY TO GO UP AGAIN IN A FEW WEEKS.

SUBJECT CODE: ENQUIRY CODE: EA3

NO: 24

SAY YOU WANTED TO TRAVEL TO FOR A DAY. NOW, IT WAS POSSIBLE THAT YOU MIGHT GET A LIFT BACK. PLEASE GO IN TO FIND OUT ABOUT THE SINGLE FARE AND THE DAY RETURN FARE TO HELP YOU DECIDE WHAT TICKET YOU SHOULD BUY.

SUBJECT CODE: ENQUIRY CODE: EA4

NO: 30

SUPPOSING YOU WOULD LIKE TO TRAVEL BETWEEN AND . YOU HAVE HEARD SUCH A LOT ABOUT A SPECIAL TRAIN CALLED

THAT YOU COULD TRAVEL AND WOULD LIKE TO FIND OUT ABOUT WHAT TIME AND DAY IT LEAVES . SEE IF YOU CAN GET THE INFORMATION YOU NEED FROM THE COUNTER.

SUBJECT CODE: ENQUIRY CODE: EA2

NO: 16

SAY YOU ARE TRAVELLING BETWEEN AND . PLEASE FIND OUT THE EXACT TIME OF THE TRAIN LEAVING FROM 'AROUND

ON A

SUBJECT CODE: ENQUIRY CODE: EB1
NO: 41

SAY YOU WOULD LIKE TO CATCH A TRAIN FROM TO . YOU WOULD LIKE TO CONSIDER THE TRAVELLING DETAILS OF MOST OF THE TRAINS SO THAT YOU CAN THEN DECIDE ON THE BEST ONE AMONGST THEM. DECIDE FOR YOUSELF WHAT SORT OF TRAVELLING DETAILS YOU ARE LOOKING FOR, THEN GO IN TO ENQUIRY ABOUT THE SORT OF INFORMATION YOU NEED.

SUBJECT CODE: ENQUIRY CODE: EB1
NO: 42

SAY YOU WILL BE TRAVELLING BETWEEN AND . YOU HAVE BEEN TOLD THAT THE SCENERY ON THE WAY IS SOMETHING TO LOOK FOR. SO REALLY YOU ARE LOOKING FOR A TRAIN THAT WILL TAKE ITS TIME TO REACH THE DESTINATION. ALSO, IF YOU ARE GOING TO ENJOY THE SCENERY, YOU MIGHT AS WELL HAVE A DRINK OF SOME SORT AT THE SAME TIME. SO YOU WANT A TRAIN THAT WILL OFFER YOU THAT SORT OF A FACILITY. PLEASE GO IN TO ENQUIRE ABOUT THE AVAILABLE TRAINS SO THAT YOU CAN PICK THE BEST ONE.

SUBJECT CODE: ENQUIRY CODE: EB1
NO: 43

SAY YOU WANT THE BEST TRAIN FROM TO . YOU WANT TO BY, SAY, , BUT BECAUSE YOU ARE GOING TO MISS , YOU WOULD LIKE TO HAVE THAT ON BOARD. PLEASE GO IN TO ENQUIRE ABOUT ALL THE AVAILABLE TRAINS IN TURN TILL YOU THINK YOU HAVE GOT THE BEST ONE.

SUBJECT CODE: ENQUIRY CODE: EB2
NO: 51

SAY YOU WOULD LIKE TO TAKE A HOLIDAY TO THE NORTH. YOU WOULD LIKE TO BEGIN YOUR HOLIDAY ON A DAY WHICH WILL OFFER "THE BEST TRAIN" OF THE WEEK. PLEASE GO IN TO ASK ABOUT THE BEST TRAIN OF THE WEEK SO THAT YOU KNOW WHEN TO START YOUR HOLIDAY AS WELL AS ABOUT THE TRAVELLING DETAILS REGARDING THE TRAIN YOU ARE GOING TO CATCH.

SUBJECT CODE: ENQUIRY CODE: EB2
NO: 52

SAY YOU ARE A REGULAR TRAVELLER BETWEEN AND . YOU HAVE BEEN UPSET ABOUT THE RECENT DELAYS AND STRIKES THAT HAVE BEEN "MESSING YOU ABOUT". YOU HAVE MEANT TO VOICE YOUR GRIEVANCES BUT HAVE NOT HAD THE OPPORTUNITY TO DO SO, SO FAR. WELL HERE'S THAT OPPORTUNITY. PLEASE GO IN TO COMPLAIN ABOUT THIS INCONVENIENCE AND TO SEEK ASSURANCES THAT THE TRAINS IN FUTURE ARE GOING TO RUN ON TIME AND THAT THEY ARE GOING TO DO A BETTER JOB OF SERVING TRAVELLERS THAN THEY ARE AT THE MOMENT.

SUBJECT CODE: ENQUIRY CODE: EB2
NO: 53

SAY YOU WOULD LIKE ALL THE LITERATURE THAT YOU CAN GET ON TRAIN TRAVEL TO SEND TO A FRIEND ABROAD. PLEASE GO IN TO SEE HOW THE INFORMATION DESK CAN HELP YOU.

SUBJECT CODE: ENQUIRY CODE: EB2

NO: 54

SUPPOSE YOU ARE FEELING A BIT "DOWN" AT THE MOMENT AND FRIENDS HAVE SUGGESTED THAT TRAVELLING WILL DO YOU "NO END OF GOOD". YOU HAVE DECIDED TO TAKE THEIR ADVICE. PLEASE GO IN TO ASK ABOUT THE TRAVELLING DETAILS TO A PLACE YOU HAVE DECIDED TO VISIT.

SUBJECT CODE: ENQUIRY CODE: EB2

NO: 55

SUPPOSE YOU NEED TO COMPILE A LIST OF TRAINS FROM TO , INCLUDING ALL THE RELEVANT TRAVELLING DETAILS. YOU HAVE TO SEND SUCH A LIST TO A SCHOOL IN THAT WOULD LIKE TO SEND SOME SCHOOLCHILDREN TO AN EXHIBITION IN . DIFFERENT GROUPS OF SCHOOLCHILDREN WILL BE TRAVELLING AT DIFFERENT TIMES SO THAT THEY NEED AN ENTIRE DAY'S TRAVELLING DETAILS. SEE IF YOU CAN GET THE INFORMATION YOU NEED TO SEND TO THEM.

SUBJECT CODE: ENQUIRY CODE: EB2

NO: 56

SAY YOU HAVE TO REACH QUEENS STREET, , WHICH IS ON THE ROUTE FROM HERE. ALTHOUGH YOU KNOW YOU COULD GET TO BY TRAIN, YOU DO NOT KNOW HOW YOU WOULD REACH THE PARTICULAR ADDRESS YOU ARE TRAVELLING TO. PLEASE GO IN TO ASK ABOUT THE EXACT ROUTE YOU WILL HAVE TO TAKE AND THE TRAVELLING CHANGES INVOLVED INCLUDING CHANGE OF TRANSPORT SUCH AS TRAIN TO BUS OR VICE VERSA.

SUBJECT CODE: ENQUIRY CODE: EB3

NO: 62

SAY YOU HAVE ALREADY BEEN GIVEN SOME TRAVEL INFORMATION YOU NEED BY SOMEONE. WHAT YOU WOULD LIKE TO KNOW IS WHETHER THE INFORMATION YOU HAVE BEEN GIVEN IS CORRECT SINCE YOU NEED TO TRAVEL TOMORROW AND DO NOT WANT TO SEE THINGS GO WRONG. PLEASE GO IN TO SEE WHETHER YOU CAN GET A CONFIRMATION ON THE FOLLOWING INFORMATION:-

FROM TO

DAY:

DEP. ARR.

FACILITIES AVAILABLE:

CHANGES INVOLVED:

RETURN FARE:

OTHER INFORMATION:

SUBJECT CODE: ENQUIRY CODE: EB3

NO: 63

SAY YOU ARE AT THE MOMENT FEELING A BIT "FED UP" WITH LOUGHBOROUGH. FRIENDS HAVE SUGGESTED THAT YOU GIVE YOURSELF A BREAK AND VISIT

FOR A WHILE. YOU CANNOT DECIDE WHERE EXACTLY YOU WOULD LIKE TO GO AND WONDER IF SOMEONE COULD ADVISE YOU. PLEASE GO IN TO SEE IF THE KIOSK CAN OFFER YOU ANY SUGGESTIONS OR ADVICE.

Appendix IX

Pre-Test Questionnaire Specimen

SUBJECT CODE: ENQUIRY CODE: PRE

DATE: ARRANGEMENT:

Suppose you walk into a Travel Information Office with an enquiry or enquiries.

Please answer the following questions by ticking the appropriate box along each scale.

EXAMPLE

Do you think the weather makes a difference to the service you would receive?

	1	2	3	4	5	
YES, A Great Deal	☐	☐	☐	☐	☐	NO, Not at all

If your answer was "a lot" you would tick box no. 2 thus:

	1	2	3	4	5	
YES, A Great Deal	☐	✓	☐	☐	☐	NO, Not at all

1A What kind of SERVICE would you EXPECT to get?

(Please tick the appropriate box along each scale)

	1	2	3	4	5	
Complete (i.e. you get an answer to each part of your enquiry						Incomplete (i.e. you do not get an answer to all of your enquiry
Cold						Warm
Slow						Quick
Friendly						Functional
Unsystematic						Systematic
Personal						Impersonal

1B Describe your IDEAL kind of SERVICE by ranking, in order of importance, the following qualities:-

Complete	
Warm	
Quick	
Friendly	
Systematic	
Personal	

2A What kind of OPERATOR would you EXPECT to be served by?

(Please tick the appropriate box along each scale)

	1	2	3	4	5	
Slow						Quick
Friendly						Functional
Unsystematic						Systematic
Warm						Cold
One interested more in the OPERATIONAL aspect of your enquiry						One interested more in the SOCIAL aspect of your enquiry
One who treats you as SOMEONE SPECIAL						One who treats you as JUST ANOTHER CUSTOMER

2B Describe your IDEAL kind of OPERATOR by ranking, in order of importance, the following qualities:-

Quick	
Friendly	
Systematic	
Warm	
One interested in the OPERATIONAL aspect of your enquiry	
One who treats you as SOMEONE SPECIAL	

Appendix X

Post-Test Questionnaire Specimen

SUBJECT CODE: ENQUIRY CODE: POST

Please answer the following questions by ticking the appropriate box in each case, as previously:

EXAMPLE

How did you feel?

you would tick box no. 2 if you meant "Quite happy":

	1	2	3	4	5	
HAPPY	☐	☑	☐	☐	☐	UNHAPPY

1. How much of your enquiry did you get answered?

	1	2	3	4	5	
ALL OF IT	☐	☐	☐	☐	☐	VERY LITTLE

2. Did you feel you were being led away from your actual enquiry or needs:

a) by the Operator?

	1	2	3	4	5	
VERY MUCH SO	☐	☐	☐	☐	☐	NOT AT ALL

b) by the Situation?

	1	2	3	4	5	
VERY MUCH SO	☐	☐	☐	☐	☐	NOT AT ALL

3. Did you feel you were being helped along:

a) by the Operator?

	1	2	3	4	5	
VERY MUCH SO	☐	☐	☐	☐	☐	NOT AT ALL

b) by the Situation?

	1	2	3	4	5	
VERY MUCH SO	☐	☐	☐	☐	☐	NOT AT ALL

4. How would you describe the SERVICE you have just received?

	1	2	3	4	5	
Complete						Incomplete
Cold						Warm
Slow						Quick
Friendly						Functional
Unsystematic						Systematic
Personal						Impersonal

5. How would you describe the OPERATOR you were served by?

	1	2	3	4	5	
Slow						Quick
Friendly						Functional
Unsystematic						Systematic
Warm						Cold
One interested more in the OPERATIONAL aspect of your enquiry						One interested more in the SOCIAL aspect of your enquiry
One who treated you as SOMEONE SPECIAL						One who treated you as JUST ANOTHER CUSTOMER

6. How would you comment on the following aspects of the situation you met?

VERY SATISFACTORY	1	2	3	4	5	NOT AT ALL SATISFACTORY
Pace of transaction						
Style of conversation (e.g. warm, businesslike, sociable unsympathetic etc.)						
How easy it was to decide on the issue you went to enquire about						
Operator Qualities						

7. In conclusion, how would you say you got along generally?

EXAMPLE

(Please tick the appropriate box along each condition) e.g. You would tick box no. 2 if you meant "I quite enjoyed taking part" thus:

	1	2	3	4	5	
I very much enjoyed taking part		✓				I did not enjoy taking part at all

	1	2	3	4	5	
I found the ENQUIRING in this situation very strenuous						I did not find the ENQUIRING in this situation at all strenuous
I found myself VERY MUCH AT EASE						I did NOT find myself AT ALL AT EASE
I feel that the situation ENCOURAGED me to enquire						I feel that the situation DISCOURAGED me from enquiring
I would ENJOY meeting the same situation again						I would DISLIKE meeting the same situation again

8. What changes (if any) would make the existing situation personally more agreeable to you?

9. Any other comments please?

CUSTOMER NUMBER	ENQUIRY TYPE		SEX		OCCUPATION		ORIENTATION		
	SIMPLE	COMPLEX	MALE	FEMALE	STUDENTS	NON-STUDENTS	Efficiency	Person	Mixed Values
1		✓		✓		✓	✓		
2	✓			✓		✓		✓	
3		✓		✓		✓	✓		
4	✓		✓		✓		✓		
5				ABSENT					
6		✓	✓			✓		✓	
7	✓			✓		✓	✓		
8		✓	✓		✓				✓
9	✓		✓		✓			✓	
10		✓		✓		✓	✓		
11		✓	✓		✓		✓		
12		✓	✓		✓		✓		
13	✓			✓		✓			✓
14	✓			✓		✓			✓
15	✓			✓		✓	✓		
16		✓	✓			✓			✓
17		✓		✓	✓		✓		
18	✓		✓		✓				✓
19		✓		✓		✓			✓
20	✓			✓		✓		✓	

Appendix XI: Customer-Relevant Data

Appendix XI (continued)

CUSTOMER NUMBER	ENQUIRY TYPE		SEX		OCCUPATION		ORIENTATION		
	SIMPLE	COMPLEX	MALE	FEMALE	STUDENTS	NON-STUDENTS	Efficiency	Person	Mixed Values
21		✓	✓		✓		✓		
22	✓			✓		✓	✓		
23	✓		✓		✓		✓		
24	✓			✓		✓	✓		
25		✓	✓		✓		✓		
26		✓		✓		✓	✓		
27	✓			✓		✓		✓	
28	✓		✓		✓			✓	
29	✓		✓			✓			✓
30		✓		✓		✓	✓		
31		✓	✓			✓	✓		
32	✓			✓		✓		✓	
33	✓		✓		✓		✓		
34	✓			✓		✓	✓		
35		✓	✓		✓		✓		
36		✓		✓		✓	✓		
37		✓	✓			✓	✓		
38		✓	✓		✓			✓	
39	✓		✓		✓		✓		
40	✓		✓			✓	✓		
TOTAL 39	20	19	20	19	15	24	24	8	7

CUSTOMER NUMBER	E:P SCORE	CLASSIFI-CATION	CUSTOMER NUMBER	E:P SCORE	CLASSIFI-CATION
1	30:12	E	21	30:12	E
2	19:23	P	22	23:19	E
3	30:12	E	23	27:15	E
4	23:19	E	24	24:18	E
5	ABSENT		25	29:13	E
6	19:23	P	26	25:17	E
7	27:15	E	27	16½:25½	P
8	21:21	M	28	15:27	P
9	16:26	P	29	22:20	M
10	30:12	E	30	28:14	E
11	25:17	E	31	26:16	E
12	28:14	E	32	15:27	P
13	21:21	M	33	25:17	E
14	21:21	M	34	25:17	E
15	29:13	E	35	30:12	E
16	21:21	M	36	30:12	E
17	25:17	E	37	27:15	E
18	22:20	M	38	15:27	P
19	21:21	M	39	23:19	E
20	19:23	P	40	25:17	E

E:P = Efficiency:Person
E = 'Efficiency-oriented'
P = 'Person-oriented'
M = 'Mixed-Values oriented'

Appendix XII: Customer-orientations

	SATISFACTION SCORES				DEVIATION SCORES *			
CUSTOMER NUMBER	Situation No. 1	2	3	4	Situation No. 1	2	3	4
1	33	43	39	35	0	10	6	2
2	40	41	40	48	-4	-3	4	4
3	41	41	30	41	-1	-1	-12	-1
4	37	37	39	34	7	7	9	4
5	ABSENT							
6	38	40	37	41	2	4	1	5
7	36	31	31	40	5	0	0	9
8	35	36	33	33	-5	-4	-7	-7
9	35	34	35	29	-9	-10	-9	-15
10	21	26	28	34	-11	-6	-4	2
11	38	38	38	40	-2	-2	-2	0
12	41	42	34	36	3	4	-4	-2
13	36	32	36	39	-2	-6	-2	1
14	42	40	37	38	11	9	6	7
15	41	43	44	44	-1	1	2	2
16	37	38	39	36	3	4	5	2
17	32	38	32	38	-7	-1	-7	-1
18	43	39	33	37	6	2	-4	0
19	33	34	33	40	-11	-10	-11	-4
20	34	34	38	32	0	0	4	-2

* Deviation Score = (Actual-Expected) Score

Appendix XIII: Customer Satisfaction Scores

Appendix XIII: Customer Satisfaction Scores (continued)

	SATISFACTION SCORES				DEVIATION SCORES			
CUSTOMER NUMBER	Situation No. 1	2	3	4	Situation No. 1	2	3	4
21	34	49	36	48	-9	6	-7	5
22	39	36	38	39	1	-2	0	1
23	44	45	42	46	0	1	-2	2
24	34	33	41	30	-1	-2	6	5
25	43	38	38	35	2	-3	-3	-6
26	45	46	45	45	6	7	6	6
27	32	30	39	31	-9	-11	-2	-10
28	37	33	23	34	8	4	-6	5
29	40	34	30	32	6	0	-4	-2
30	38	46	39	33	-4	4	-3	-9
31	42	40	39	41	7	5	4	6
32	40	34	40	34	4	-2	4	-2
33	38	40	36	42	-2	0	-4	2
34	37	42	35	41	7	12	5	11
35	45	47	40	44	7	9	2	6
36	37	51	35	51	-6	8	-8	8
37	38	38	36	37	1	1	-1	0
38	33	40	37	31	-7	0	-3	-9
39	29	36	35	42	-6	1	0	7
40	32	35	40	37	-2	1	6	3

CUSTOMER NUMBER	RANKED SITUATIONS					SPEARMAN'S COEFFICIENT
1A	4	1	2	3	0	-0.105
1B	3.5	3.5	2	1	.5	
2A	3.5	3.5	1.5	1.5	1	-0.894
2B	1	2	3	4	0	
3A	2.5	2.5	4	1	.5	0.833
3B	3.5	2	3.5	1	.5	
4A	2.5	2.5	1	4	.5	0.500
4B	1.5	4	1.5	3	.5	
5A 5B	ABSENT					
6A	3.5	1.5	3.5	1.5	1	0.00
6B	3	1	2	4	0	
7A	2	3.5	3.5	1	.5	-0.833
7B	2.5	1	2.5	4	.5	
8A	1.5	1.5	3.5	3.5	1	0.236
8B	1	3.5	2	3.5	.5	
9A	2	2	2	4	2	0.775
9B	1	2	3	4	0	
10A	4	3	2	1	0	0.316
10B	2	3.5	3.5	1	.5	
11A	3	3	3	1	2	0.544
11B	4	1.5	3	1.5	.5	
12A	1.5	1.5	4	3	.5	0.632
12B	1	3	4	2	0	
13A	2.5	4	2.5	1	.5	0.833
13B	3.5	3.5	2	1	.5	
14A	1	2	3.5	3.5	.5	0.833
14B	1	2.5	4	2.5	.5	
15A	4	3	1.5	1.5	.5	0.500
15B	2.5	4	1	2.5	.5	
16A	3.5	1.5	1.5	3.5	1	-0.943
16B	1.5	3	4	1.5	.5	
17A	3.5	1.5	3.5	1.5	1	0.447
17B	2	3	4	1	0	
18A	1	2	4	3	0	0.316
18B	2.5	1	2.5	4	.5	
19A	3	3	3	1	2	-0.775
19B	3	2	1	4	0	
20A	2.5	2.5	1	4	.5	1.00
20B	2.5	2.5	1	4	.5	

A = Derived Scores
B = Direct Scores

Appendix XIV: Ranks and Spearman's Coefficients

Appendix XIV: continued

CUSTOMER NUMBER	RANKED SITUATIONS					SPEARMAN'S COEFFICIENT
21A	4	1.5	3	1.5	.5	0.949
21B	4	2	3	1	0	
22A	1.5	4	3	1.5	.5	-0.056
22B	1.5	1.5	4	3	.5	
23A	3	1.5	4	1.5	.5	1.000
23B	3	1.5	4	1.5	.5	
24A	3.5	3.5	1.5	1.5	1	1.000
24B	3.5	3.5	1.5	1.5	1	
25A	1	2.5	2.5	4	.5	1.000
25B	1	2.5	2.5	4	.5	
26A	3	1	3	3	2	0.816
26B	2	1	3.5	3.5	.5	
27A	2.5	4	1	2.5	.5	0.949
27B	2	4	1	3	0	
28A	1	2.5	4	2.5	.5	-0.632
28B	3	2	1	4	0	
29A	1	2	4	3	0	0.400
29B	1	3	2	4	0	
30A	2.5	1	2.5	4	.5	0.500
30B	3.5	2	1	3.5	.5	
31A	1.5	3.5	3.5	1.5	1	-0.894
31B	3	1	2	4	0	
32A	1.5	3.5	1.5	3.5	1	-0.943
32B	3.5	2	3.5	1	.5	
33A	3	2	4	1	0	-0.316
33B	3.5	3.5	1	2	.5	
34A	3	1.5	4	1.5	.5	0.056
34B	1	3.5	3.5	2	.5	
35A	2.5	1	4	2.5	.5	-0.833
35B	2	3.5	1	3.5	.5	
36A	3	1.5	4	1.5	.5	1.000
36B	3	1.5	4	1.5	.5	
37A	1.5	1.5	3.5	3.5	1	0.00
37B	1	4	3	2	0	
38A	3	1	2	4	0	1.000
38B	3	1	2	4	0	
39A	4	2.5	2.5	1	.5	0.333
39B	4	1.5	1.5	3	.5	
40A	4	3	1	2	0	0.200
40B	4	1	3	2	0	

Factor	Coefficient of Concordance	Significance
1. 'Simple' enquiry	0.029	NS
2. 'Complex' enquiry	0.201	S 0.01
3. Efficiency-Customer	0.141	S 0.05
4. Person-Customer	0.287*	S 0.05 ≏
5. Mixed-Values	0.509	S 0.05
6. Students	0.177	S 0.05
7. Non-Students	0.033	NS
8. Male Sex	0.124	S 0.05 ≏
9. Female Sex	0.069	NS
10. Overall Group	0.039	
11. Order Effect 1	0.104	
12. Order Effect 2	0.057	
13. Order Effect 3	0.061	NS
14. Order Effect 4	0.029	
15. Week 1	0.029	
16. Week 2	0.063	
Interaction		
17. 1 and 3	0.236	S 0.05 ≏
18. 2 and 3	0.224	S 0.05
19. 1 and 4	0.259	NS
20. 2 and 4	1.000*	S 0.05

* Direct Scores

Appendix XV: Study of Factors Governing Customer Satisfaction

K	.01		.05	
	S	W	S	W
3	42.80	0.951	36.45	0.810
4	61.70	0.771	49.50	0.619
5	80.60	0.645	62.55	0.500
6	99.50	0.553	75.60	0.420
7	118.4	0.483	88.65	0.362
8	137.3	0.429	101.7	0.318
9	156.2	0.386	114.7	0.283
10	175.1	0.350	127.8	0.256
11	194.0	0.321	140.8	0.233
12	212.9	0.296	153.9	0.214
13	231.8	0.274	166.9	0.198
14	250.7	0.256	180.0	0.184
15	269.6	0.240	193.1	0.172
16	288.5	0.225	206.1	0.161
17	307.4	0.213	219.2	0.152
18	326.3	0.201	232.2	0.143
19	345.2	0.191	245.3	0.136
20	364.1	0.182	258.3	0.129
21	383.0	0.174	271.4	0.123
22	401.9	0.166	284.4	0.118
23	420.8	0.159	297.5	0.112
24	439.7	0.153	310.5	0.106
25	458.6	0.147	323.5	0.104
26	477.5	0.141	336.6	0.100
27	496.4	0.136	349.6	0.096
28	515.3	0.131	362.7	0.093
29	534.2	0.127	375.7	0.089
30	553.1	0.123	388.8	0.086
31	572.0	0.119	401.8	0.084
32	590.9	0.115	414.9	0.081
33	609.8	0.112	428.0	0.079
34	628.7	0.109	441.0	0.076
35	647.6	0.106	454.0	0.074
36	666.5	0.103	467.1	0.072
37	685.4	0.100	480.2	0.070
38	704.3	0.098	493.2	0.068
39	723.2	0.095	506.3	0.067
40	742.1	0.093	519.3	0.065

Appendix XVI: Significance Table for Kendall's Coefficient of Concordance

Key:

K = Group Size or Set Size
0.01, .05 = Levels of Significance
W = Kendall's Coefficient of Concordance
S = Numerator of Formula for deriving W

		ENQUIRY TYPE							
		SIMPLE				COMPLEX			
		SITUATION				SITUATION			
		1	2	3	4	1	2	3	4
CUSTOMER TYPES	EFFICIENCY-ORIENTED	30½	27	26	16½	37½	26	44½	32
	PERSON-ORIENTED	13	14½	12½	20	6	2	4	8
	MIXED VALUES	5½	10	14	10½	8	6	8	8

Situation 1 = Customer-oriented Operator/Manual Technology
Situation 2 = Customer-oriented Operator/Computer Technology
Situation 3 = System-oriented Operator/Manual Technology
Situation 4 = System-oriented Operator/Computer Technology

Lower Rank Aggregate = Greater Satisfaction

Appendix XVII: Rank Aggregates depicting Order of Priorities attached by different Customer Types to the 4 Situations

Appendix XVIII: Measuring Operator-Orientation
Method 1: Ideal-linked

1. Describe the IDEAL kind of SERVICE you would like to offer to your Customers by ranking, in order of importance, the following qualities:-

Complete	☐
Warm	☐
Quick	☐
Friendly	☐
Systematic	☐
Personal	☐

2. Describe your IDEAL kind of CUSTOMER by ranking, in order of importance the following qualities:-

Quick	☐
Friendly	☐
Systematic	☐
Warm	☐
One interested in the OPERATIONAL aspect of your enquiry	☐
One who treats you as SOMEONE SPECIAL	☐

Appendix XIX: Measuring Operator-Orientation
Method 2: Job-linked

This is a questionnaire to obtain a description of your work at the Counter. Please tick the box that you think provides the best fit with your own views about your job. Please answer all the questions and with sincerity.

Thank you.

1. I think that efficiency was of paramount significance to my job

Yes ☐ No ☐

2. I did not think it right to indulge in the affairs of the Customer beyond PURELY the business at hand

Yes ☐ No ☐

3. I preferred Customers to be interesting

Yes ☐ No ☐

4. I suppose I was more interested in helping each Customer's enquiry as much as possible than to take alarm about the size of the queue or about other work to be done

Yes ☐ No ☐

5. I really did not think that Customers ought to chat to the Clerks any more than the matter demanded

Yes ☐ No ☐

6. I did mind Customers who could not or would not express themselves well enough for me to be able to offer a quick and complete response

Yes ☐ No ☐

7. I did not think one needed to extend a "personal service" to each Customer. After all it is more important to sort out many more Customers in a given time than to fuss over each one of them any more than is necessary

Yes ☐ No ☐

8. I must admit there were many times when Customers tried my patience a little

Yes ☐ No ☐

9. I saw Customers as people who added a special dimension to my job, a very welcome dimension

Yes ☐ No ☐

10. I think the work at the Post Office was of paramount significance, and I felt I really had to make sure that the Customer did not waste my time by wanting to chat or wanting to know exactly what was happening as to why the response was taking time, or even wanting to know the exact details why a particular enquiry could not be entertained

Yes ☐ No ☐

11. I preferred Customers to be "nice and polite"

Yes ☐ No ☐

12. I felt rotten when I could not do anything about a particular Customer-need or complaint

Yes ☐ No ☐

13. I preferred Customers to be brief and concise in the way they expressed their needs

Yes ☐ No ☐

14. I do not really believe there are "difficult" Customers. I am more inclined towards the philosophy that they are what you make them to be

Yes ☐ No ☐

15. I did not tend to go much for the personal qualities of the Customer nor for the aspects of their enquiry that were unnecessary to the response that could be given

Yes ☐ No ☐

16. I did not particularly like having to tackle "stereotype", "to the point" type Customers

Yes ☐ No ☐

17. I did not think that the Customer was any more important than all the other work that had also to be undertaken at the Counter by me

Yes ☐ No ☐

18. I found it hard to accept Customers who could not appreciate our side of the job

Yes ☐ No ☐

19. I felt it was easy to be over-critical of Customers should they not follow an efficient line in their enquiries. To tell you the truth, I rather preferred to serve those who did not or could not take an efficient line

Yes ☐ No ☐

20. I suppose I got maximum satisfaction out of helping each Customer's enquiry however complex, as much as I could, so that he left visibly pleased and satisfied.

Yes ☐ No ☐

Appendix XX: Operator Feedback Sheet

BEFORE YOU BEGIN EACH SESSION, PLEASE READ THROUGH INSTRUCTION A OR B AS APPLICABLE.

AT THE END OF EACH SESSION, PLEASE ANSWER THE FOLLOWING QUESTIONS BY TICKING THE APPROPRIATE BOX.

HOW DIFFICULT OR EASY DID YOU FIND FOLLOWING THE INSTRUCTION FOR THIS SESSION?

Session 1

	1	2	3	4	5	
VERY DIFFICULT	☐	☐	☐	☐	☐	VERY EASY

Session 2

	1	2	3	4	5	
VERY DIFFICULT	☐	☐	☐	☐	☐	VERY EASY

Session 3

	1	2	3	4	5	
VERY DIFFICULT	☐	☐	☐	☐	☐	VERY EASY

Session 4

	1	2	3	4	5	
VERY DIFFICULT	☐	☐	☐	☐	☐	VERY EASY