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ABSTRACT

Methodological aspects of a study are reviewed to illustrate the utility of the case study approach in researching the effectiveness of a motivational intervention in an instructor-facilitated learning context. In the study, learners were prompted via motivational messages into modifying their disposition to engage in learning tasks. The setting was an instructional design course for training personnel connected with a ministry in Mozambique. Subjects were 22 regular employees of the ministry and seven special students with limited time to participate; the sample included 19 males and 10 females. A naturalistic mode of inquiry was identified as the most appropriate one for the inquiry and a case study approach, from an embedded multiple-case perspective, was chosen. Basic research questions included: (1) the validity of the motivational messages; (2) how and why the messages worked; and (3) the messages' optimal function and its continuation over time. Of the 10 propositions formed about the messages and the learners, instructor, and environment, nine were found to hold true when tested in the original study and a second study 3 years later. It is concluded that motivational messages should be considered an integrating part of a complex motivational system. The case study approach was found well-suited to the research concerns. (SLD)

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THE USEFULNESS OF CASE STUDY RESEARCH IN THE STUDY OF A MOTIVATIONAL INTERVENTION

by

Jan Visser

ABSTRACT

This paper discusses the methodological aspects of a study, the content and results of which have been presented more comprehensively, and with different objectives, elsewhere (Visser, 1990). Conclusions focus therefore particularly on design features and their effectiveness of the case study approach applied in conducting the study, as well as on questions of scientific rigor in that connection.

The paper reports on a disciplined inquiry into the area of motivation to learn and systematic ways of influencing learners in this regard. Learners, in adverse motivational circumstances, were prompted, by means of, usually written, messages, normally delivered outside the classroom periods, to adjust their disposition to undertake learning tasks. Such messages were designed and used according to a systematic, replicable process.

The study identifies a naturalistic mode of inquiry as the most appropriate one for the particular research interest. Within that mode, it calls for a case study approach, from an embedded multiple-case perspective.

Three basic research interests were addressed in the study, i.e. that of the validity of the motivational messages strategy under consideration, the question as to *how* and *why* the messages work, and the issue of their optimality. An extensive data base was established which could be analyzed with a view to substantiating or insubstantiating research propositions related to the three basic research interests. The proposition that the motivational messages strategy worked similarly well in the case of two of its applications almost three years apart was found substantiated by the available evidence. Of a total of ten propositions regarding the interaction between the messages and the learners, the messages and the instructor, and the messages and the environment, nine were found substantiated and one insubstantiated in the light of the data collected. Evidence also supported the contention that the strategy adapts itself to the circumstances of its application.

As to the overall interpretation of the totality of phenomena discussed, the study concludes that motivational messages should not be looked upon in isolation, but as an integrating part of a more complex *motivational system*, in the context of which they enhance the effectiveness of the other components involved.

The research reported on in this paper was carried out in Mozambique. While it was conducted for its own sake, to serve as the basis for improvement of instructional practice, it was at the same time taken advantage of for a dissertation thesis, defended at the Florida State University, Department of Educational Research, Instructional Systems Program, Tallahassee, Florida, 32306.
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INTRODUCTION

PURPOSE

In the present paper I shall analyze the usefulness of applying a case study approach in researching the effectiveness of a motivational intervention in an instructor-facilitated learning context. The motivational intervention in question was one in which learners were prompted into modifying their disposition to engage in learning tasks by administering to them, regularly and frequently, so-called motivational messages (Visser, 1988). The usual format of motivational messages used is that of a letter size sheet of paper folded twice in directions perpendicular to each other. Folding the paper once produces a double piece of paper, the size of which is half that of the original, that can be opened and closed along the second fold. It therefore has a cover and an inside, each of which can be used in different ways. The cover would normally contain some kind of logo representative of the learning task in question, e.g. the name of the course, and a graphic or verbal attention getter. The inside was used to transmit the main motivational content, which could be of a general nature, addressing all participating learners in exactly the same way, or it could be personalized, or made personal. The content of each message was designed so as to respond adequately to the motivational state learners were found to be in, as determined on the basis of continuous analysis of the motivational behavior of the learners in terms of the ARCS model (Keller, 1987a&b), i.e. interpreting observations regarding the students along the dimensions of Attention, Relevance, Confidence, and Satisfaction. The purpose of this paper is in the first place to present the various features of how the study was carried out and to discuss these features in terms of the requirement of scientific rigor. A brief account will also be given of the results of the study, particularly with a view to elucidating the breadth of information that can be obtained in one single study. A more complete account of the results can be found elsewhere (Visser, 1990).

PROBLEM

In the context of the purpose of the present paper, the problem addressed by the study reported on was a two-fold one. In the first place there was the actual research problem, reflected in the research questions to be answered by the study. The second problem was a methodological one. Could the method used to address the research questions be shown to be effective? It is particularly this last question that will receive attention here. However, in order to discuss the effectiveness of *how* something was done, one has to look as well at *what* was done and *for what reason* it was done. It is simply a question of means and ends. Particular modes of inquiry and specific research methods are used and can be effective for certain well defined problem areas, they may fail to work in other areas.

When the study under discussion in this paper started, the following situation prevailed:

1) The strategy called the *clinical use of motivational messages* had once been used in the framework of an instructor-led course that had simultaneously served as a basis for its development and the preliminary testing of its effectiveness in helping learners in adverse motivational circumstances to cope with their motivational restraints (Visser & Keller, 1989). While a study of the validity of a strategy in circumstances in which that strategy was developed as a means to cope with these circumstances is certainly useful, it cannot be denied that one capitalizes heavily on chance if one wishes to generalize from such circumstances and claim success beyond that single event.
2) A new occasion had presented itself, several years separated from previous one, in which a course would have to be taught to students in circumstances that should be expected to hamper significantly their disposition to undertake and persevere in a difficult learning task. The course in question was one in instructional design technology. It was taught to personnel of different entities pertaining to one particular ministry in Mozambique. The adverseness of the motivational conditions in these circumstances will be analyzed later. The clinical use of motivational messages was now a candidate strategy to solve the motivational problem existing in connection with that second course. It was selected, and now the question was, will it work again? The opportunity to carry out a second study concerning the same strategy was seized upon as a possibility to either disconfirm the previous findings or to strengthen their validity, depending on what the outcome of the second study would be in comparison with the first one. Either outcome would be of interest from a research point of view.
3) The person asking the above question, and therefore intending to carry out a study about it, happened to be the same one who had developed the motivational strategy in question and who was requested to teach the course in which the strategy was selected to be applied. This introduced a considerable risk of researcher bias, that should be eliminated in designing the study. A particular question of interest in that connection was whether the clinical use of motivational messages could be looked upon independently from the instructor who used it.

The kick-off point for the study being as described above, the central problem facing the researcher was: Can a sound form of inquiry be designed through which answers can be obtained regarding the effectiveness of the motivational messages strategy and of the underlying motivational problem solving analysis tool, Keller's (1984, 1987a&b) ARCS model, as well as regarding the conditions under which the strategy works and why and how it works?

METHOD

MODE OF INQUIRY

In selecting the mode of inquiry for the study envisaged, it was considered that:

* the application of the clinical use of motivational messages is a complex matter, involving a wide range of interaction patterns between instructor and students, in a context in which learner motivation can be affected by an almost infinite number of external factors
* the clinical use of motivational messages involves a *process* which assumes that the instructional facilitator concurrently adopt the role of motivational facilitator, i.e. by interacting with the learners in a variety of ways s/he monitors changes in the motivational variables of the learners, while, through the same channels, s/he provides feedback to the learners that helps them overcome their motivational restraints.

Considering the above, the focal point of the research interest was the process, rather than just the final result. In other words, if anything was to be generalized from the study that generalization should be based on understanding the mechanics underlying the process involved in applying the motivational messages strategy. That process is characterized by the development over time, within changing contexts, of complex patterns of interaction between inputs, actions, outputs and feedback. Stake (1978, 1986, 1988) refers in this context to *naturalistic generalization*.

"The crucial role of *pattern and context* in achieving knowledge" has been identified by Campbell (1984, p. 9) as an important reason to adopt research modes that go beyond the traditional laboratory settings, particularly those that involve conducting *case studies*. Others, e.g. Guba (1981) and Guba & Lincoln (1981, 1982), have emphasized that the concept of *disciplined inquiry* (Cronbach & Suppes, 1969) does not necessarily refer to the exclusive use of the *rationalistic paradigm* - as much of the existing educational research base would perhaps want one to believe - but that it can just as well be based on a *naturalistic paradigm*. Various reviewers of existing research in different areas, e.g. Clark & Angert (1979) and Schramm (1977) have pointed to the wastefulness of research that does not attend to "the totality of the learning environment" (Clark and Angert, p. 7) or, in Schramm's critique of media research, that does not aim at "trying to identify the unique strengths and weaknesses of a given medium for a given purpose, and [that is not conducted with a view to] trying to *maximize* the learning from a particular medium and thus considering *how* it can be used and how it can be used *best* (p.36, the former emphasis is mine, the latter two are Schramm's). The idea of maximizing learning in a given purposeful context as an important research concern is taken up again, more than ten years later, by Reigeluth (1989). He urges researchers to "place greater emphasis on *optimality* as opposed to *validity*" (p. 73, my emphasis). Again, optimality is a process related concept. It has to do with the possibility to show that the way an intervention is used has built into it adequate mechanisms for its continued improvement, i.e. for its *iterative effectiveness*.

All the above concerns point to the appropriateness of a naturalistic mode of inquiry for the research in question. Visser (1990) discusses that the philosophical underpinnings of this emerging research paradigm in the study of instructional processes have long been recognized as the basis for important developments of the natural sciences, particularly in twentieth century physics, concluding that these developments should have increased our awareness "the importance that should be attached to the *reality of description*, rather than to the *description of reality*" (p. 34). The use of the naturalistic paradigm leads to a fullness of description, often in complementary terms, which it would be impossible to attain under the rationalistic paradigm.

TYPE OF RESEARCH STRATEGY

Yin (1984) lists the following three criteria for the choice of an appropriate research strategy:

a) the type of research question asked
b) the degree of control that can be exercised over behavioral events in the research context
c) the question whether the research deals with contemporary or with historical events.

The research envisaged, as indicated in the introduction, concentrated on contemporary events in a real-life context, i.e. in a setting in which virtually no control existed over behavioral events. Besides, the research questions asked in that context attached particular importance to the *how* and *why* of what happens as a result of the clinical use of motivational messages. Yin (1984) points out that under such circumstances a case study approach is typically called for. However, before proceeding to analyze what specific kind of case study design would be the most adequate one for the research concerned, the research questions, as well as the ensuing research propositions, should be discussed in more detail.

SPECIFIC RESEARCH QUESTIONS AND RESEARCH PROPOSITIONS

It has been mentioned before that the motivational intervention which was the object of the study had been researched on an earlier occasion, i.e. in the instructional context in which it had been developed. This being so, an excellent opportunity existed to use the data base pertaining to the earlier study as a frame of reference for comparison with data to be collected in the context of the study under discussion. A first research question was therefore related to that particular interest. Two other research questions were added to the first one, particularly to explore the *how* and *why* aspects of the clinical use of motivational messages, and to address the question of optimality as mentioned before.

The three questions and their related research propositions , the latter sometimes summarized, are presented below.

Table 1
Research questions and their related research propositions.

RESEARCH QUESTION	RESEARCH PROPOSITION
1. In applying the motivational strategy under scrutiny in the given instructional context, will similar patterns of data regarding the relation between the clinical use of motivational messages and the capability of learners to cope with their motivational restraints be found as those that emerged from the previous study.	1.1.1 *The clinical use of motivational messages in the given instructional context will be similarly effective as in the case of the previous study.*
2. How and why does the clinical use of motivational messages work?	*Motivational messages work because they have the following effects on the learners:* 2.1.1 *They help learners assess their own progress.* 2.1.2 *They remind them of goals and intermediate goals.* 2.1.3 *They allow them to correct their own study behavior.* 2.1.4 *They enhance their perception of self-control.* 2.1.5 *They prompt them to optimize their time-on-task.* 2.1.6 *They enhance their satisfaction about accomplishments.* *Motivational messages work because they have the following effects on the instructor, influencing his/her face-to-face interaction with the students:* 2.2.1 *Their design and delivery process enhances the teacher's awareness of students' actual and potential problems.* 2.2.2 *They prompt the instructor into adopting a continuous mode of being motivational, thus influencing his/her in-class behavior.* *Motivational messages work because they have the following effects on the instructional environment:* 2.3.1 *They enhance the instructional environment directly, as they contribute to students and instructor feeling themselves jointly responsible for that environment.* 2.3.2 *They enhance the instructional environment indirectly through changes brought about in that environment as a result of the messages' content.*
3. Can it be shown that the clinical use of motivational messages is iteratively effective?	3.1.1 *The clinical use of motivational messages is continually effective over time.* (This means that the strategy, by virtue of the way its application is structured, adapts itself to changing circumstances, always seeking to attain optimal effectiveness.)

UNIT OF ANALYSIS

The research questions, as formulated above, were based on the general proposition that a relation exists between, on the one hand, the clinical use of motivational messages in a given instructor-facilitated learning context, characterized by adverse motivational circumstances, and, on the other hand, the capability of learners to overcome their existing motivational restraints. The interaction between the motivational messages and the learners' capability to cope with the adverse motivational conditions of the instructional environment was analyzed in the study at the levels of

- perceived motivational status
- perceived motivational needs
- learning behavior (process)
- instructional attainment and achievement (product),

attending to both group and individual aspects.

Analysis was structured such that generalizations from the case - *naturalistically* (Stake, 1988) to other applications and *analytically* (Yin, 1984) to theory, but certainly not statistically to populations - could be made fundamentally in terms of similar, but not necessarily identical technology that could be developed and used according to the same principles.

TYPE OF RESEARCH DESIGN

Yin (1984) classifies types of case study design along two dimensions, i.e. *single-case vs. multiple-case* and *holistic vs. embedded*. The research activity under discussion in this paper fitted in that scheme as follows. In terms of data collection it was an embedded single-case, considering that data of the previous case were already there, and that both the data of the past study and those collected for the present one reflected on diverse subunits of analysis. On the other hand, in terms of data analysis, particularly as regards the first research question, the data collected in the framework of the study under consideration were looked upon within an embedded multiple-case perspective, which encompassed both the previous study (Visser & Keller, 1989) and the case under consideration.

RATIONALE FOR SELECTION OF THE CASE

Considering that literal replication (Yin, 1984) was one of the aims of pairing the previous case with the one under discussion, the rational for selecting the second case had been the same as that for the previous one. Like on the previous occasion, the new case had been chosen on the basis of the consideration that it was a *critical* one (Yin, 1984). The motivational conditions present in the instructional environment were so adverse that it would be difficult to explain motivational effects in ways different from those that could be related to the motivational intervention which was the object of the study.

RESEARCH SETTING AND SUBJECTS

As mentioned earlier, the setting for the study reported on in this paper was an instructional design course for the training of personnel pertaining to different entities of a particular ministry in Mozambique. The course expected of the learners that they would engage, during a period of at least three months, in an intensive program of autonomous study, both individually and as a group, involving work in compulsory classroom sessions as well as, to a large extent, outside the classroom. Students were furthermore expected to complete an individual instructional design project, the product of which should be a developed and formatively tested instructional module, as well as an extensive report documenting the entire design process. Strict performance referenced evaluation criteria were set for the above.

Particularly adverse motivational conditions surrounded the course, such as absence in the learners of a positive individual choice to participate in the course; lack of individual commitment; absence of material rewards; distracting difficult material circumstances; a dwindling socio-ideological frame of reference, related to profound changes taking place in society at the time the course was given, causing confusion and lack of stable subsumption of individual motives in societal aspirations; dissonance with expectations based on past, normally far less demanding, experience of participating in courses; discrepancy between course demands and normal expectations as regards performance in the job context; incompatibility of course demands with professional and personal obligations; uneasiness felt by the learners because of the expectations inherent in the course objectives that their work routine should change in the future; frustration related to the frequently to be expected consequence of formative testing of the instructional modules under development to start all over again; possible threat to their authority for those participants who were taking part in the course together with personnel whose work they were supposed to guide; unfamiliarity of the Portuguese speaking audience with the Spanish language in which a large part of the instructional materials was written; and excessive demands on individual and collective inventiveness to solve organizational aspects of the design projects. This list, although extensive, should not be interpreted as exhaustive.

Subjects participating in the course constituted a group the composition of which had come about naturally in the context in which the need for the course had been identified. Employees of the different entities of the ministry in question had been selected on the basis of the relevance of the expected improvement of their instructional design capabilities for their professional performance. The choice had normally been the employer's. His or her perception of what was good for the employee should not be expected to coincide with a need felt by the employee. The researcher himself had also been appointed to teach the course independently from his research interest. This put him in an ideal position to take on, together with two of his students, participant observer roles.

The group of participants in the course, who were therefore subjected to the motivational intervention under consideration, included 22 regular students, for whom no particular limitations were known at the time of their admission as to their possibilities to complete the course, 7 special students (including two research assistants, performing participant observer roles), for whom it was expected that their regular work conditions would not allow them to fulfill all course requirements, 2 invitees, who were allowed to participate in activities of their choosing, without any obligation to fulfill particular course requirements, and 1 observer, who entered the course after a considerable part of it had already been completed, and who was allowed and expected to attend all remaining course activities. His status was later changed in that of a special student.

The 29 regular and special students considered for the study had a bimodal age distribution, with most participants in the age group between 25 and 30 years (M = 31.2 years, S.D. = 7.2 years). Their gender distribution was 19 male (66 %) and 10 female (34 %). The number of years during which they had received professional schooling, including university level training, showed a bimodal distribution, with almost equal groups having up to three years or between four and seven years of training (M = 4.1 years, S.D. = 2.0 years). Seven of them held university degrees at the bachelor level, and seven at the level of a *licenciatura*, a degree obtained after 5 years of university training. Their content specializations varied widely. Four of them had Portuguese, the official language of Mozambique, as a mother tongue, whereas two grew up bilingually, with Portuguese as one of the local languages spoken at home. Twenty had a local language as mother tongue, and three were speakers of languages foreign to the Mozambican environment. As to their demographic background, 10 were rural, 6 came from small provincial towns, and 13 had an urban background. Of the total of 29, 26 were of Mozambican nationality. For most of them their course participation came a considerable number of years after the last occasion on which they had received training where performance standards had to be reached. For three of them this period was more than ten years, for another three it was between five and ten years, for 14 between two and five years, and for nine less than two years.

The group described above had characteristics largely similar to the one used for the previous study (Visser & Keller, 1989), except that for the new study the group was twice as big as the previous one, a larger proportion held university degrees, less students had Portuguese as mother tongue, their demographic background was to a somewhat larger extent urban, and the period of time lapsed since their last experience with in course in which performance standards had to be met was slightly less.

It should also be observed that the group of subjects used for the second study was made up of different subgroups, pertaining to the different entities of the ministry in question. There was therefore far less cohesion between the students at the start of the second course than had been the case in the previous study. One of the subgroups, on the other hand, the largest one, showed particular similarity with the totality of the subjects used in the previous study.

The existence of both similarity and divergence of characteristics between the groups of subjects used in the two different cases created excellent conditions for the type of comparison referred to in the first research question, providing an opportunity for strengthening the validity of the motivational intervention as well as for broadening the basis of its naturalistic generalization.

DATA COLLECTION

In order to enhance the possibility of corroboration of data obtained from different sources and by different means, a complex system of data collection methods was used. Fundamental in that process was the role played by three participant observers. One participant observer was the lead researcher, whose research role was embedded within his function as instructor and motivational facilitator of the course. The other two participant observers were both students of the course. While students of the course were made aware, in the context of the course content, that research of any instructional activity, including the course itself, was a natural part of the instructional designer's concern, all specific tasks of participant observation were performed in a totally unobtrusive way. In a debriefing after the course, the role of the two student participant observers was finally revealed to the other participating students. The occasion constituted an opportunity to establish that the objective of complete unobtrusiveness had indeed been attained.

The two student participant observers went through a one-month training/briefing period preceding the course, in which they enrolled as real students. Apart from their observations regarding their colleagues, they could also observe their own behavior and that of their fellow participant observer. Besides, independent observation of and reporting on the instructor's behavior had been included as a fundamental part of their tasks.

Their incorporation in the research effort played a vital role in enhancing the internal validity and reliability of the study. With that aim in mind the process of their participation was structured such that, after their training, they were working on the basis of research protocols established during the training process, in a way independent of the lead researcher. Their observations have resulted in an independent research assistants' report which is included in the data base of the study.

The joint effort of the research team (lead researcher plus two research assistants) concentrated on the following data sources:

1) Open-ended anonymous questionnaires, administered to participants on a regular, usually weekly basis. Information obtained through these questionnaires also played a role in the design process of the motivational messages.
2) Three end-of-course questionnaires that were either anonymous or, if not anonymous, unobtrusive, i.e. hidden in a course exercise. On two of these questionnaires students rated the importance they attributed to the motivational messages (designated as "little notes", the name used by the students themselves) among other components of the instructional strategy of the course as well as in relation to other media used. Besides numerical rating of perceived importance, the audience was requested to justify their answers. The third questionnaire asked participants to list the five most important things they had learned during the course.
3) An open-ended discussion about the course during the last class session.

4a) Lead researcher registration of spontaneous and solicited remarks by students and other individuals interacting with the course environment.
4b) Independent research assistant registration of the type of remarks referred to under 4a.
5a) Recording by the lead researcher of immediate, observable effects of particular messages.
5b) Independent recording by the research assistants of the type of effects referred to under 5a.
6a) Lead researcher observation of participants' reactions and attitudes towards the medium as such.
6b) Independent research assistant observation of reactions and attitudes referred to under 6a.
7) Instructional outcome of the course, both in terms of attainment and achievement.
8) Pre-instructional and structured post-instructional interviews with course participants.
9) Research assistant observation, as well as systematic audio recording, of teacher behavior.

Inclusion of the research assistants' findings in the data base followed a process of initial briefing, i.e. the one-month training period mentioned before, and subsequent research debriefing sessions held at regular, usually weekly, intervals. Research debriefings covered the whole period of the course, as well as a considerable period after it, to attend to follow-up interests and to monitor post-instructional impact. A period of six months elapsed between initial briefing and final debriefing.

Research debriefings generally followed the model of initial reporting by both research assistants of their individual findings, interpretative discussion of these findings on the basis of the pre-established research propositions, discussion of possible alternative interpretations, possible re-interpretation of past conclusions in the light of the expanding data base, and planning of follow-up activities. In the interest of validity and reliability, all research debriefings were recorded on magnetic tape. They have as such been included in the data base. Besides, type written accounts based on these recordings have also been included in the data base. For the sake of completeness, it is recalled here that the research assistants produced, at their own initiative, an independent report, likewise included in the data base, describing their involvement in the research effort, analyzing their findings, and discussing a number of their conclusions about the effectiveness of the motivational messages strategy. Particular attention was paid in this report to the need for independent reporting on the role of the instructor, as opposed to the lead researchers own informed perception of his role as such.

DATA ANALYSIS PROCEDURE

Prior to the data collection it had been established how data obtained from the various sources would respond to the various research questions, by either substantiating or insubstantiating the different research propositions. The overview presented on the next page shows the connection.

The way the data sources were intended to be used in relation to the different research questions depended on these questions and their specific research purposes - validation, explanation, or exploration.

In connection with Research Question 1, which concentrated on comparison with the previous case (Visser & Keller, 1989), it is observed that analysis of the new data had to follow a process similar to the one used previously, so that the description of the two cases would be in commensurate terms, and the comparison could hence be made on the basis of pattern-matching (Yin, 1984).

Table 2
Overview of the relation between research questions and particular data sources planned to be used for the purpose of substantiating or insubstantiating related research propositions.

QUESTION 1	Data Sources 1, 2, 3, 4a, 5a, 6a, 7 to be used to analyze the extent to which the clinical use of motivational messages is similarly effective in the proposed case as in the previous case. Data Sources 4b, 5b, 6b, 8, 9 to be used additionally, particularly for corroboratory purposes.
QUESTION 2 First set of propositions (interface between motivational messages and learners)	Data Sources 1, 2a+b [open-ended part], 2c, 3, 4a, 4b, 5a, 5b, 8 to be used for explanation building. Data Source 9 to be used additionally for corroboration.
Second set of propositions (interface between motivational messages and teacher)	Data Sources 1, 2a+b [both structured and open-ended parts], 2c, 3, 4a, 4b, 8, and particularly 9 to be used for explanation building.
Third set of propositions (holistic view of instructional environment including motivational messages)	Data Sources 1, 2a+b [open-ended part], 2c, 3, 4a, 4b, 5a, 5b, 6a, 6b, 8, 9 to be used for explanation building.
QUESTION 3	Data Sources 1, 2a+b [particularly open-ended part], 3, 4a, 4b, 5a, 5b, 6a, 6b, 7, 8, 9 to be used for assessment of continuous effectiveness of motivational strategy over time and adaptability to changing circumstances.

Specific techniques in connection with data analysis related to the first research question concentrated on:

- content analysis (e.g. Fetterman, 1989) of the weekly questionnaires, the three end of course questionnaires, the open-ended discussion at the end of the course, and the post-instructional structured interviews (Data Sources 1, 2a,b,c, 3, and 8)
- statistical processing of numerical data obtained through responses to the end-of-course questionnaires (Data Sources 2a,b)
- analysis of tendencies and patterns over time and across learners of students' remarks, observed effects of the messages, and students' reactions and demonstrated attitudes towards the medium (Data Sources 4a,b, 5a,b, and 6a,b)
- analysis of statistical indicators of student achievement and of compliance by students with deadlines (Data Source 7)
- analysis of convergence/divergence between observational findings reported from different angles (Data Source 9).

Using the above techniques, and combining the results of the analysis of the different aspects concerned, a synthetic description could be obtained, providing the broad picture within which the various details referred to above could be integrated. That broad picture could then be compared with the description resulting from a similar analysis of the previous case (Visser & Keller, 1989). That comparison, in turn, pursued situating the two cases in a yet more general framework that could account for convergence as well as inconsistency and contradiction both between and within the two cases (Mathison, 1988).

The second research question was of particular importance from the point of view of explanation building (Yin, 1984), thus calling for content analysis of spontaneous and solicited information provided by students and of observations recorded by the research team. The different sets of propositions related

to this research question represent potentially different explanations for the way in which the clinical use of motivational messages may or may not affect the learner's motivational behavior. Convergence, consistency, and contradiction of the collected data as regards these sets of propositions were explored as a means to assess rivalry and complementarity of propositions. Yin (1984) emphasizes in this connection the "iterative nature of explanation-building" (p. 108). In building towards the explanation one goes through a series of successive steps in which the comparison of findings with initial propositions may lead to revising the propositions and consequently comparing further details of the case against the revised propositions, repeating this process as many times as necessary. The process of continuous research debriefings and preparation of subsequent research tasks was a powerful means to ensure this iterative character of the knowledge-building process.

The third research question called for time-series analysis (Yin, 1984) of relevant information provided by the various data sources addressing that question. The exploration of both quantitative data, e.g. those regarding timely completion of learning tasks and achievement obtained (Data Source 7) and qualitative data from interviews, questionnaires, and observations (Data Sources 1, 2a+b, 3, 4a, 4b, 5a, 5b, 6a, 6b, 8, and 9) was of importance as regards the search for patters over time that could be looked upon in the light of the proposition of continuous effectiveness of the motivational messages strategy. Important deviations from continuity of overall motivation or learning results, that could not be related to discontinuities in the application of the motivational strategy, would serve as indications that the proposition could not be supported. On the other hand, possible relations between changes in the application of the motivational strategy and observed effects on motivational indicators of learner behavior were considered to support the proposition.

Finally, while analysis is an important process in linking specific questions to particular answers supported by data, the case would have lost one of its most important aspects, its "wholeness", if the effort of carefully looking into the details described above were not carried out from the perspective of "embedding the empirical data at hand with a holistic understanding of the specific situation and general background knowledge" (Mathison, 1988, p. 17) about the phenomena being studied.

RESULTS AND DISCUSSION

RESEARCH RESULTS AS PROCESS

It is beyond the scope and purpose of this paper to report in detail the results of the study and the argumentation that led to its major conclusions. That discussion can be found elsewhere (Visser, 1990). What will be given here is a summary description of the results and their discussion.

It is first of all emphasized that the results reported on in the major account of the present research (Visser, 1990) reflect themselves a process, rather than just the final outcome of that process, as would have been the case had the study been an experimental one. A picture is shown of what happened over time, not just in an overall sense, but revealing the detail of individual, interacting, developments. This is seen as a specific advantage of the case study. As it relates to a real-life context, the dynamics of which it unveils, the knowledge it provides constitutes a basis for purposeful re-interpretation in different contexts to which possible generalizations are intended to be made.

If the result of the usual experimental study can be compared to the information provided by four single photographs, two at the beginning and two at the end, documenting different changes in an experimental and a control group, the result of a case study should be compared with a documentary film. The two processes of documenting an argument serve different purposes. Showing the four pictures leaves no doubt as to the fact that the intervention reported on has had an effect (assuming significant difference). However, little gets known about how and why the intervention worked, and a blind repetition in a different context not based on knowledge about the underlying process may well lead to failure to reproduce the effect. The documentary film, on the other hand, is perhaps less convincing, in the immediate sense, as regards the overall effect of the intervention. However, it very carefully shows not only what has happened, but also the context in which what has happened took place. That more complete piece of information is likely to contribute to more successful generalizations from the given research. In other words, it allows the user of the research to go beyond the immediately given.

The major account of the research reported on in this paper (Visser, 1990) is referenced to an extensive data base, the contents of which are specified and summarized in that same account. While

parts of that data base are, understandably, of a confidential nature, it is kept available and accessible for the purpose of future research. It consists of approximately 100 hours of audio recordings and two bookshelf lengths of written or graphic material, comprising course related documentation, circumstantial documentation, photographic documentation, and researcher and research assistants' field notes.

The account given shows interesting interactions between the research activity as such and the instructional process in which the motivational intervention under discussion was embedded. Such interactions worked both ways. Research interests slightly modified the instructional process, e.g. in that a unit on motivation, not planned previously, was introduced in the course program, besides for its instructional relevance also as a means to unobtrusively collect data regarding the students' evaluation of motivational aspects of the course itself through exercises in which the course was taken as a concrete example to be analyzed. On the other hand, also the quality of the instructional effort gained from fact that simultaneously research about it was carried out. The gradually better understanding of what happened in applying the motivational messages strategy contributed to improvements in the use of that strategy. Because of the operational interconnectedness of research and instructional aims it has been possible to apply the various research techniques and instruments in a way that was completely natural, from the point of view of the participants, in the context of the instruction, as well as logical and ethical from the point of view of the instructor.

THE VALIDITY ISSUE (RESEARCH QUESTION 1)

The extensive array of data collected basically conformed the finding of the earlier study (Visser & Keller, 1989) that "both on the basis of observation, and as substantiated by report and self-report, the motivational intervention is considered to have been successful" (p. 34), thus enhancing the validity of the clinical use of motivational messages in the embedded multiple-case perspective of the two cases.

Two types of indicators were used to come to the conclusion that the strategy had been similarly effective in the two cases. they referred respectively to the instructional and the motivational outcome of the students' participation in the course.

Comparing cases of students in the second course whose conditions of participation were similar to the ones that prevailed in the previous one, it was shown that the same pattern of learning task completion and achievement occurred, taking into account differences in entry behavior. Comparing the totality of the students who participated in the second course with those of the first one, it is still found that only slight differences occurred in student achievement, results of the second course being approximately five percent lower than those of the first course, whereas their distribution pattern was strikingly similar. Much larger differences occurred in the time needed by the students to complete their learning tasks. Both types of differences, however, could be accounted for, the former ones taking into consideration differences in entry conditions of the students, the latter ones considering the differences in circumstances surrounding their participation. As far as the motivational messages have played a role in both courses, it was therefore concluded (Visser, 1990) that they have been similarly effective in terms of instructional outcome of those students who completed the assignments they had undertaken to complete. No comparison turned out to be possible for those students of the second course who, for various reasons, did not live up to their, and the researcher's, initial expectations as regards completion of the course assignments. Other evidence, however, indicated that even in these cases the motivational messages had positively influenced those students' behavior.

An important part of the evidence in support of the validity of the motivational strategy under scrutiny was related, besides the instructional indicators, to motivational indicators. In that connection particular attention was paid to students' responses to the various questionnaires, to certain exercises that served the dual purpose of instruction and data collection, to their reactions in the open-ended end-of-course evaluative discussion, as well as observed verbal and attitudinal behavior of students towards the messages, and their reactions in interviews. Observed influences of the use of the motivational messages on the instructor also contributed to that evidence.

Statistical data found, in conjunction with students' verbal references and observational data of a qualitative nature, interpreted in the context of the particular history of each of the two courses, substantiates the research proposition related to the first research question. Comparatively speaking, it was found that motivational indicators pointed to a stronger influence of the motivational messages in the second course than in the first one, despite the fact that the instructional result was less impressive. This is in accordance with the objectively higher degree of development, substantiated by data, of the use of the motivational messages in the second course. Also other aspects of the instructional strategy, and accompanying use of media, in the two courses show interesting differences.

The pattern of these differences is such that it can be explained entirely on the basis of one single assumption, i.e. that the effect of motivational messages should not be looked upon in isolation, but in the context of a *motivational system*. Within that context the motivational messages constitute the main instrument through which the motivational facilitator manages the motivational system. A higher degree of effectiveness of the management of the motivational system, as was the case in the second course, results in changes in the patterns of differential appreciation of the importance of media and instructional strategy components that can indeed be explained on the basis of the interactions within the motivational system. Influences of the use of the motivational messages, not only on the students, but also on the instructor, as observed by the research assistants, were likewise in accordance with his role in managing the motivational system. The scope of this paper does not allow to present the underlying analysis of available data in support of the above claim, as it constitutes too lengthy an argument. The reader is referred in that connection to the more extensive account of the study (Visser, 1990).

Considering the above it is concluded in the study that in response to the question: *Did the motivational messages work in this instance, and did they work in a way similar to what had been the case in the previous course?*, the answer, in the light of the above evidence, should be: *Yes, they worked in a way that can be explained within the context of a general interpretative framework that encompasses the two cases.* That interpretative framework served as a basis for the rationale presented in the more complete account of the study (Visser, 1990). One of its most particular features is its reference to the concept of *motivational systems*. The way the motivational messages were looked at in the previous study (Visser & Keller, 1989) should, in the light of the new, more extensive, and particularly more varied, evidence now available be classified as having been too narrow, too exclusively concentrating on the medium as an isolated thing, rather than on its functionality within a context. In other words, looking at the use of the motivational messages in an embedded multiple-case perspective helped raise the conceptualization of the phenomenon in question to a higher level.

THE ENVIRONMENTAL ISSUE (RESEARCH QUESTION 2)

The above considerations necessarily had to lead to a redefinition of the *clinical use of motivational messages* in terms of a strategy using a medium of a highly interactive nature within the context of a larger environment. That means that the functionality of that medium should also be analyzed from an ecological point of view. The second research question, and its related propositions, attended particularly to that interest.

The environmental question poses itself at two different levels, that of the interaction between the medium and the persons acting within the instructional environment, and that of the interaction of the medium with the environment as such, i.e. the instructional habitat, jointly created and managed by those same persons, by the motivational messages, and by other components that are part of it. At the former of these two levels, there are two different types of actors. The first type is made up of the learners, incorporated in the instructional environment, the second kind refers to the person whose role it was to take the initiatives that would most likely result in the students' learning, i.e. the facilitator. That splits the area of interest indicated by the second research question in three sections: one dealing with what happened at the interface between messages and learners, the other one asking the same question as regards the interface between messages and instructor, and the final one dealing with the message-environment interface. The totality of these three concerns reflects the content of the second research question: *How and why does the clinical use of motivational messages work?* In connection with that question, and related to each of the three areas of concern, three sets of propositions were formulated to guide the research team in the process of collecting, analyzing, and interpreting the data.

A large section of the major account of the study (Visser, 1990) presents evidence, with reference to the data base, in support of all but one of the ten research propositions related to Research Question 2. This evidence is fundamentally in the form of matching between, on the one hand, a substantiated description of how the content of the particular proposition was reflected in concrete features of the use of motivational messages, and, on the other hand, citations of students' spontaneous or solicited remarks, and descriptions of the development of their reactions to the motivational messages, with reference to observed and recorded behavior, using the data sources indicated in Table 2.

It should be noted in this respect that students had a widely varying performance history while taking part in the course. This resulted in different ways of interaction with the medium of motivational messages. The "wholeness" of the information collected in the data base made it possible to follow these

different reactions independently from each other and to match more complex units of student behavior, rather than single indicators, with the particular features of the motivational messages strategy.

A lengthy piece of evidence cited in the comprehensive account of the study (Visser, 1990) shows that indeed, in accordance with the first set of propositions related to the second research question, the motivational messages work because they help learners assess their own progress, reminding them of goals and intermediate goals, allowing them to correct their study behavior, enhancing their perception of self-control, prompting them to optimize their time-on-task, and enhancing their satisfaction about accomplishments. Besides, it was found that students attached particular importance to this way of communicating with them. Some hard truths presented in the messages were more easily digested when presented this way, as opposed to if they had been communicated directly, the latter type of communication about such matters being perceived as 'aggressive'.

As regards the messages-teacher interface, evidence presented supported the proposition that the motivational messages work because, through the process of their design and delivery, the teacher becomes more aware of the students' actual and potential problems, so that he can adjust the instruction accordingly. No evidence, however, was found in support of the proposition that the messages work because, by virtue of their prompting the teacher into adopting a continuous mode of being motivational, they influence his/her in-class behavior. Evidence available actually seemed to indicate that this was not the case.

It was due to the role played by the two research assistants that valid and reliable evidence related to the messages-teacher interface could be collected. The comprehensive account of the study (Visser, 1990) describes their role in this regard in detail. It is also shown how the students' perception of the teacher's role in the presence of the use of motivational messages finds a place within the earlier developed overall interpretative framework of a *motivational system* of which messages and teacher, and indeed numerous other components, are integrating parts.

The same holds true for the evidence related to the last set of two propositions that the motivational messages work because they enhance directly (first of the two propositions) and indirectly (second proposition) the instructional environment.

Using the comprehensive evidence available in the data base made it clear that the three sets of propositions should not be looked upon as the basis for three different rival explanations. The evidence available reveals the existence of a complex set of direct and indirect interactions. Each set of propositions looks at a subset of these interactions, providing an incomplete, and indeed distorted, picture. A case in point is the view expressed in the previous study (Visser & Keller, 1989), the implicit research propositions of which concentrated mainly on linear interaction between the motivational messages and the learners. The present study reveals that that view must be paired with others, related to different interactions, as well as to indirect mechanisms by which the effects of the various media, including the motivational messages, are transmitted. Those various views are not mutually exclusive, but complementary, and should be placed within the context of a higher level conceptualization, that of a motivational systems approach. Most striking, perhaps, in that respect is a written comment by one of the students of the course, found on the do-you-have-any-other-observations part of a questionnaire and cited in support of the above contention (Visser, 1990), which says:

> *Finally, I should perhaps say that the integrated use of media was found to be extremely efficient and motivating. It was possible to create a kind of interaction between the different media, in such a way that the instruction, which at first had appeared to be a gigantic challenge, took on a more facilitated outlook and far different from the routine patterns to which we were used.*

The higher level conceptualization referred to above provided the necessary context in which the multi-faceted data base could be explored and interpreted in a consistent way.

THE OPTIMALITY ISSUE (RESEARCH QUESTION 3)

The final question addressed in the study reported on in this paper was that of optimality, particularly in the sense of iterative effectiveness of the strategy under scrutiny. How well does it work, and can it be made to maintain its effectiveness over time under changing circumstances by adjusting itself to those circumstances? The relevance of that question is related to the consideration that many instructional interventions last for considerable periods of time. In the case of the two workshops on which the study was based periods of more than three months were involved. Many school based instructional programs are built on the assumption that students and instructor have to live with each other for at least that period of time, and often longer. Can the medium be managed by a single

instructor over such periods of time, and is it sufficiently sensitive to react adequately to changes in the environment?

Analysis of events over time, as documented in the data base of the study (Visser, 1990), showed that indeed the strategy reacted adequately to changes in the environment. Two particular instances of quite dramatic drops in performance occurred, one related to students not meeting deadlines, the other one to deterioration of punctuality and assiduity. Subsequent recovery could be shown to follow documented intentional attention to the underlying problems of the two events through the motivational messages.

Iterative effectiveness, i.e. the capability of the strategy to strive towards optimality through gradual improvement in the process of its application, was likewise documented (Visser, 1990) on the basis of evidence available in the data base. Strong arguments in that regard could be presented on the basis of comparison between the first and the second course. Qualitative evidence could be corroborated for that purpose using the statistical analysis of numerical data presented in connection with the first research question.

CONCLUSIONS

WAS THE STUDY WORTH ITS WHILE?

The purpose of the present paper has been to draw attention to and to discuss the various features of the kind of approach used to respond to the research concerns that prompted the study reported on. It has not been my intention to inform the reader in great detail about the object of research and the results obtained. Interested researchers and instructional practitioners are referred in that regard to the comprehensive account of the study (Visser, 1990).

In concluding this paper, the fundamental questions that should be answered are: Did the study live up to its expectations? Was valid knowledge created? Does that knowledge contribute to expanding the existing knowledge base? Can this knowledge be used by others? What are possible limitations?

THE LINK WITH THE EXISTING KNOWLEDGE BASE

The research reported on here is rooted in an existing knowledge base. Regarding the motivational intervention as such, a preliminary case study had already been carried out (Visser & Keller, 1989), whereas a large body of knowledge regarding the underlying analysis tool, the ARCS model (e.g. Keller, 1987a&b), and the field of human motivation to learn in general, was also drawn upon (Visser, 1990).

There is an intimate link between the *clinical use of motivational messages* and the ARCS model. In that context, a study which contributes to strengthening the validity of the motivational messages strategy, at the same time also contributes to the further validation of the ARCS model.

The design process of the messages, as pointed out in the comprehensive account of the study (Visser, 1990), takes place in the four-dimensional continuum in which the motivational variables are defined according to the ARCS model. Learners' motivational needs, motivational objectives to be achieved, strategies devised to meet those objectives, and monitoring progress towards the achievement of the motivational objectives, can all be expressed in terms of Attention, Relevance, Confidence, and Satisfaction. As shown in the study, the features of the motivational messages and of their use can be varied such that they can be made to respond to learners' constantly changing individual and joint motivational requirements as assessed over time.

Keller's (1987a&b) ARCS model was found to be singularly suited to serve as an analysis base in connection with the above. It does typically not provide a standard answer to questions about what should be done motivationally, nor is it a model that provides its users with a simple algorithm to find such an answer. Models of the latter nature basically assume 'the right action for the future' to be deterministically related to identifiable and measurable variables of the present. Contrary to that position, the ARCS model assumes its users to take on a continuous problem solving mode, i.e. a way of involvement in motivational intervention which assumes motivation to be a continuous concern, the nature of which cannot be linearly derived from initial conditions, requiring analysis to be an ongoing process as the basis for addressing motivational problems creatively.

The present study emphasizes the need to approach the problem of attending to learners' motivational requirements from a *motivational system* perspective, as opposed to the conceptualization inherent in the previous study (Visser & Keller, 1989) in which the instructor/motivational facilitator was conceived as an outside agent, sending out messages, looking at what happened as a consequence of these messages, and taking the feedback received into account in designing and delivering subsequent messages. In contrast, the additional evidence, collected in the framework of the study of the second case, analyzed in conjunction with the evidence related to the previous case, called for a conceptualization in which the facilitator was looked upon as himself being part of the process. He was not only sender, but also receiver, and conceived as being subject to influences of the motivational communication process. Solving motivational problems could therefore, much more than on the previous occasion, become a joint effort of students and facilitator. The use of the ARCS model in that different perspective of designing and delivering motivational messages was found to be considerably more effective than it had previously been, as could be concluded from both the qualitative evidence collected about the two cases as well as from the comparative statistical analysis of the numerical data regarding the students' perception of the importance of the various instructional media used and of the different components of the instructional strategy of the two courses (Visser, 1990).

VALIDITY, RELIABILITY, AND GENERALIZABILITY

In pursuing the research interest underlying the study discussed in this paper, a naturalistic, rather than a rationalistic, mode of inquiry was chosen. Within that mode of inquiry, a case study approach, and within that approach an embedded multiple-case perspective, were chosen as most suited to circumstances and intentions. The rationale for these choices has been presented in detail in the comprehensive account of the study (Visser, 1990). Major arguments contained in it have been dealt with in the present paper under *method*. Concerns regarding reliability, validity, and generalizability have likewise been discussed in that context. In concluding this summary account of the study, and looking back at the results and their discussion, can a claim that valid, reliable, and generalizable results were obtained be upheld?

In response to the above question, it is recalled that one of the possible threats to validity was the simultaneous involvement of the same person in the role of lead researcher, as well as in those of instructor and motivational facilitator. Researcher bias was a real risk resulting from this combination of interests. On the other hand, the advantages of this construction are equally obvious. As the teacher of the course that served as setting for the research effort, the researcher was in the best possible, and most natural, position to act as a participant observer from within the teaching-learning process of the course. To eliminate/reduce the risks, while retaining the advantages, a number of measures was taken.

A well organized, accessible data base was created using diverse data sources and different ways of interacting with the research environment to obtain data. The comprehensive account of the study (Visser, 1990) presents in extensive detail an overview and summary description of the content of the data base, which is kept available and accessible for future research and inspection. It also details the process by means of which it was established. Such a careful and comprehensive description of process and content is felt to be an essential requirement in the interest of establishing validity and in order to create a basis for replication as well as for research efforts aiming at extending the scope of the study reported on.

The inclusion of two research assistants, trained and briefed to work independently from the lead researcher, was another essential feature in reducing researcher bias. For this claim to be a valid one, it is equally essential that a comprehensive account be given, and complete and reliable records kept (Visser, 1990), not only of the training/briefing process, but also of the implementation of the research assistants' tasks, and of the way their work contributed to the data base. In the case of the present study, and addition to the above, audio recordings were made of research debriefings, and research assistants produced independently a signed report, included in the data base, documenting how they perceived their training and their participation in the research effort, and how, from their perspective, they analyzed part of the evidence collected.

The use of multiple sources of evidence, as well as multiple ways of accessing these sources, were an intentional part of the research strategy, greatly facilitating corroboration of data. The extent and complexity of the data base reflect the degree to which the implementation of this strategy was taken seriously. Incidentally, in order for such extent and complexity to remain beneficial and not to

become a burden, sound data base management is an important requirement for studies of the kind under discussion to be effective.

Unobtrusiveness in carrying out the research, both on the part of the lead researcher and the research assistants, was another important feature. All procedures used could be, and in fact were, perceived by the students as serving the interest of the course. The way this was achieved was by taking maximum advantage for research purposes of the instructional procedures, which were planned autonomously in the framework of the development of the instructional strategy of the course. At the same time, what was necessary from the point of view of research was planned such that maximum benefit would result from it for the instruction. This way of interlinking instructional and research objectives has not only resulted in total unobtrusiveness, it was also a very satisfactory way of operating from an ethical point of view. In a country like Mozambique I would have felt it to be unethical if the target population of the instructional intervention in which the research was embedded would not have benefitted to the maximum from the instruction offered. The degree of unobtrusiveness was so high that, when in a final debriefing the audience was told that two of their colleagues had performed participant observer roles, this news came as a total surprise, as evidenced by data available in the data base and discussed in the comprehensive account of the study (Visser, 1990).

Data were collected and analyzed taking into account both qualitative and quantitative concerns. Strong evidence could be derived from analysis of the numerical data (Visser, 1990), that was found to converge with evidence collected from a qualitative perspective. As subjects had not been selected and assigned randomly, no techniques for statistical analysis and inference could be used that would have been based on that assumption. The descriptive techniques used, however, in conjunction with the concern for naturalistic generalization, revealed eye-catching numerical differences (Visser, 1990) which, in conjunction with the qualitative evidence available, constituted a strong basis in support of the claims made in the study.

Particularly towards the end of the course, opportunities available in the context of the instructional process, were increasingly used to feed back to the audience, in an unobtrusive way, important provisional conclusions that started to surface in the data base, with a view to validating them by corroboration with audience opinion. The end-of-course open-ended evaluative discussion was a case in point in that regard. On other occasions, instructional procedures were used in the context of the teaching of a unit on motivational design, to have students debate their own motivation as regards their participation in the course. Those debates showed consistency between conclusions drawn on the basis of the data base and views expressed by the audience. Audio recordings have been included in the data base to provide evidence in respect of the validity of such discussions. The process was furthermore monitored by the research assistants, who were specifically instructed to record any instances of possible threat to validity of the research procedures used.

The high degree of rigor applied in documenting the study, as evidenced by content and structure of the data base, was an important asset of the study under discussion, particularly as regards reliability and generalizability. Literal replication of the study was not part of the intentions of the mode of inquiry chosen to pursue the interests of this research effort. Naturalistic replication, on the other hand, was, though, a concern. The two cases analyzed in the embedded multiple-case perspective which governed part of this study, constituted in fact naturalistically similar instances of the application of the motivational strategy under scrutiny. The fact that these two cases were not only naturalistically similar, but also, in some other aspects, different from each other, provided a broader basis for naturalistic generalizability than each of the separate cases would have established.

One of the reasons why a case study approach was chosen for this study was the flexibility of that method in allowing to reveal the *dynamics* of the process under investigation. The way the study developed proved indeed to be in accordance with that expectation. The constant interaction between research team and research setting, and the awareness within the research team of the need to take advantage of opportunities whenever they arose, has proved to be an important characteristic of the approach used. Adjustment of planned research procedures, in order to obtain more valid data, was another important feature of the case study approach. Particularly towards the end of the course, for instance, when a certain questionnaire fatigue became evident, anonymous collection of data was substituted by instructional procedures that could unobtrusively be used to obtain the same data. Also the approach to substantiating or insubstantiating the research propositions changed during the course of action. Where initially these propositions had been looked upon as possible expressions of rival explanations, it became gradually clear that most of them could be looked upon as providing conversion with a higher level perspective, lifting the messages out of their isolation and placing them in the context of the motivational system as a whole.

A case study of the nature discussed here, an extensive part of the data base of which is made up of qualitative evidence, has its own way of presenting convincing arguments in support of its claims.

Unfortunately, that type of description needed to communicate its rationale so as to convince others of the validity of conclusions drawn cannot compete with the economy of procedures used to defend conclusions based on statistical inference.

This paper did not have the purpose of presenting the full rationale of the study discussed. For that purpose the reader is strongly advised to get exposed to the richness of information contained in the comprehensive account of the study (Visser, 1990). The present paper should be merely seen as a study about a study. It has communicated details about the research itself only in as far as such information was thought to be relevant for the purpose of exposing and discussing the mechanics of the research process involved. I have discussed the different features of the particular approach used, emphasizing their importance for maintaining scientific rigor. The case study approach was found to be singularly suited to respond to research concerns of the nature I have described in this paper, in which a high degree of attention is devoted to questions of process and pattern. For that approach to be not only adequate, but also effective, due attention to the concerns of scientific rigor, like in the case of any research method, is an important requirement.

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