Instructional Development Paradigms

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The Importance of Relational Aspects in the Systems Approach

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Introduction

The aim of the study reported in this chapter was to identify a set of practical instructional design standards, validated by empirical research, that can be used in the context of corporate education. Although the importance of learning rarely has been questioned, there is increasing doubt as to the effects of the actual activities geared towards the facilitation of learning processes. Training and development activities absorb a costly part of an organization's manpower capacity, budget, and opportunities, but the resources needed become scarce in periods of economic decline (Harrison, 1992). In organizations, the need for successful adaptation to an ever-changing environment, and thus also for learning, is most urgent in such periods of economic instability. At present, learning is widely recognized as a major vehicle for organizational survival and change, and great interest is shown in emerging and re-emerging concepts such as 'learning to learn,' 'organizational learning,' and the 'learning company' (Pedler, Burgoyne, & Boydell, 1991; Senge, 1990).

Curriculum Design. Curriculum design plays an important role in creating an educational environment that fulfils the needs for learning. Descriptive theories on how learning is organized are available, but prescriptive theories and their related design instructions are scarce (Reigeluth, 1983).

The study reported here partially fills this need, and offers a theoretical and an empirically tested basis for curriculum design standards that should lead towards goal-oriented and cost-effective learning situations. These learning situations are not restricted to the typical classroom environment. In principle, an organization offers a wide variety of learning opportunities. Specifically, the environment outside the classroom seems to play a dominant role in achieving the desired effects of intentionally organized learning situations (Broad & Newstom, 1992; Kirkpatrick, 1975; Robinson & Robinson, 1989).

Design standards for corporate education focus primarily on the acquisition of skills that are sustained by the work environment; skills that should bring about intended changes in employee performance and subsequently have an impact on the organization. The body of knowledge on public education provides the broad theoretical foundation for such design standards. Moreover, the complex mechanisms in corporate education, where cognitive operations of individual learning intertwine with social processes of an organizational context, demand not just an adapted theory, but an extended theory that seeks to explain the existing successes and failures of training systems and predicts the results of new actions. However, such a study should avoid the immodesty of presenting a grand theory that pretends to solve all problems in the field. Nor can it inquire in depth into trainer behavior and such trainee background variables as age, gender, intelligence, culture, and previous education.

Corporate education provides intentionally designed learning situations aiming at the mutual effects of individual and organizational behavior. Therefore, the curriculum design theory needed should not only incorporate indicators for the development of curriculum materials, but also prescribe approaches that relate to the strategic issues of an organization and to structural feedback mechanisms, as well as to the design of a work environment that inherently holds constructive educational values.

Research Questions. Thus, the aim of this study was to develop a prescriptive theory and validated design standards for corporate education, and as such addresses the following research questions:

1. Which factors in curriculum design influence quality in corporate education?
2. How do these factors operate?
3. Can curriculum design standards control these factors?

Curriculum Typology

Building onto Taba's definition of the term curriculum (Taba, 1962, p. 76), curriculum in the context of corporate education is defined as:

- the course of action open to an organization
- for influencing the necessary skills of employees
- that contribute to goal-oriented changes in their performance and in their work environment
- thus striving for a desired impact on the organization
- by applying planned learning activities and the resulting learning processes.

Goodlad's curriculum typology (Goodlad, Klein, & Tye, 1979) provides a springboard for the development of a curriculum typology for use in corporate education. However, for the application of these concepts in this context, other labels have been used. Furthermore, much emphasis has been placed on the contingencies among the subsequent curricula. Moreover, the consistency among the curricula will be considered as an expression of their quality. It is this concept of consistency that leads to the major hypotheses of this research. The modified version of Goodlad's curriculum typology is depicted in Figure 1. The arrows indicate the mutual influences of the related elements that are described in the following sections. The typology distinguishes between two principal curricula:

- the ideal curriculum: what should be strived for, and
- the attained curriculum: what has been achieved.

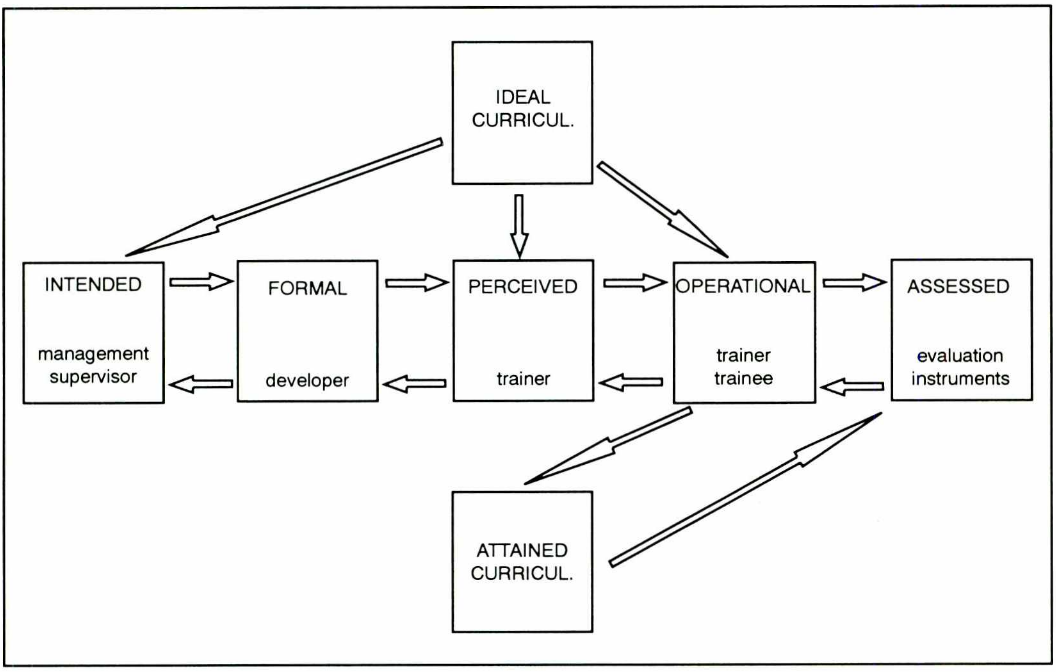

Figure 1. A curriculum typology for corporate education.

The following intermediate curricula bridge the ideal and attained curriculum:

– the intended curriculum: the assignment from management to develop and conduct training;
– the formal curriculum: the documented design of the interventions needed;
– the perceived curriculum: The trainer's perception of what kind of education is needed;
– the operational curriculum: the real learning environment;
– the assessed curriculum: the evaluation of results.

External Consistency. External consistency refers to the congruence in the perceptions of the above mentioned curricula by the actors: (top) management, developer, supervisor, trainer and trainee. Establishing such a coherence does not only depend on activities of the developer but is also favored by a positive learning climate and an active corporate education policy.

Internal Consistency. Next to the need for consistency among the actors' perceptions, a curriculum should be consistent in itself. This concept of internal consistency applies to the logical contingencies between:

– the changes that are needed in the work environment,
– the necessary skills of managers and employees to bring about these changes, and
– the learning situations that facilitate the acquisition of these skills.

By the same token, internal consistency also implies for the curriculum that learning processes should enable employees to acquire skills that influence their performance, so that the affected work environment has an impact on the organization.

The concept of curriculum consistency–the contingencies between its elements and the congruences between its appearances–is inspired by Stake's model for curriculum evaluation (Stake, 1973). Throughout this study, curriculum consistency, both internal and external, is used as a descriptive framework for quality in corporate education.

Design Approaches. The main purpose of developing and applying design standards is to improve the internal consistency of a curriculum and to gear towards a strong external consistency between the curriculum perceptions of the actors in corporate education, thus resulting in an attained curriculum that is consistent with the ideal curriculum.

When design standards are to influence curriculum consistency, the question arises as to which mechanisms bring about internal and external consistency.

> The theory developed here advocates both a systematic and a relational approach that trigger a powerful combination of systems thinking and social integration. The integration of a systematic and a relational approach in design standards is held responsible for curriculum consistency and subsequently for corporate education of a high standard.

Systematic Approach. The systematic approach implies the logical design sequence of orientation, design, development, implementation, and evaluation. (Branson & Grow, 1987; Plomp, 1982, 1992; Romiszowski, 1981, 1984; Rothwell & Kazanas, 1992; Tracey, 1971, 1984). Specific instruments and methods used are needs assessment and job/task analysis techniques, instructional objectives, learning strategies, training materials, guidelines for trainers and evaluation instruments. The systematic approach, when skillfully applied, leads to a well structured and logically ordered curriculum design with a strong internal consistency. This design on paper is referred to as the formal curriculum.

Relational Approach. The relational approach provides activities that challenge actors to become involved in the design and implementation process and that reveal their perceptions of the ideal curriculum. When the mutual perceptions of the actors involved are explicit, they can be influenced and gradually become compatible. The relational approach facilitates actors' involvement in the design and implementation process and has an impact on management commitment to corporate education. When skillfully applied, the relational approach leads to a strong external consistency among actors' curriculum perceptions, which is considered to be a necessary condition for a successful implementation of the new curriculum and its presupposed effects.

The Research Design

Exisiting theory served as an important source for design standards that result in internally and externally consistent curricula. Identification and validation of the standards were based on empirical research encompassing four main stages: analysis of 17 contrasting cases, development of design instructions, the training of 30 developers, and finally the development, implementation, and evaluation of 28 new curriculum projects.

Seventeen Case Studies. The cases, comprising existing training programs in 8 different organizations, were divided into two contrasting groups–9 successful and 8 unsuccessful (the criterion 'success' initially to be determined by the training manager). The cases were analyzed on the degree of internal and external consistency, and to see whether the systematic and relational design approaches had been applied. The characteristics found were related to the attained effects (as evaluated by independent assessors). Most successful cases showed strong internal and external consistency. They also revealed a strong systematic and relational design approach. The unsuccessful cases showed weak curriculum consistency, both internal as well as external. Both the systematic and relational design approaches were poor in the unsuccessful cases.

Development of Design Standards. In addition to theoretical justification, the case studies provided an empirical basis for a set of curriculum design procedures, which were to be tested in the second empirical study.

Training of 30 Developers. At the outset of the second empirical study, 30 developers were trained in mastering the design instructions. The training course took place over a period of eight months during which the participants worked simultaneously (but not full time) on projects to be implemented in their organizations.

Twenty-Eight Curriculum Projects. The design instructions used in this second study incorporated the systematic approach and the relational approach. The main hypothesis of the second study was as follows: the skillful application of design standards, based on a relational and systematic approach, will generate educational programs that accomplish better results than programs that are not supported by such approaches. A total of 28 projects were submitted for further research. Three judges per project assessed the curriculum documents. Up to nine months later, data on the attained curriculum were collected by means of a questionnaire from (top) management, supervisor, trainer, trainees and developer.

The Systematic Approach

A Theory of Instructional Design

This study aims at *prescriptive* models for designing corporate education, as it seeks to create optimal instructional environments directed towards desired outcomes within the framework of the specific conditions of an organization.

Plomp's generic model for educational problem solving (Plomp, 1982) provides a systems approach by:

- analyzing conditions and desired outcomes;
- designing and developing an educational environment in which methods and strategies are selected and applied;
- testing and revising the system;
- evaluating the outcomes.

This generic model involves a process of iterative problem solving and solution finding. Each following phase in the process may require further analysis of components from previous steps. This cyclic nature is required not only because of the lack of prescriptive theory, but due to the fact that activities and products in the succeeding stages often require specific information that can not be collected in the initial phase. When applying Plomp's problem solving model to the design of the formal curriculum, the systematic approach comprises activities, as schematized in Figure 2 (see also Figure 3).

1. Analysis of problems or goals on the organizational level requires needs assessment for defining the aims of the design process and for determining the educational and non educational implications of the projected solution (analysis of outcomes and conditions). This type of analysis, often called needs assessment, produces the overall goals of the project and the criteria for evaluating its future impact on the organization (Kaufman, 1982, 1990; Kessels & Smit, 1994; Rossett, 1992).

2. Analysis of the desired changes in the work environment requires job and task analysis for determining the educational and non-educational components and interventions. Analysis may include traditional hierarchical task analysis (breaking up tasks into sub tasks) and psychological analysis (revealing cognitive and metacognitive operations and knowledge

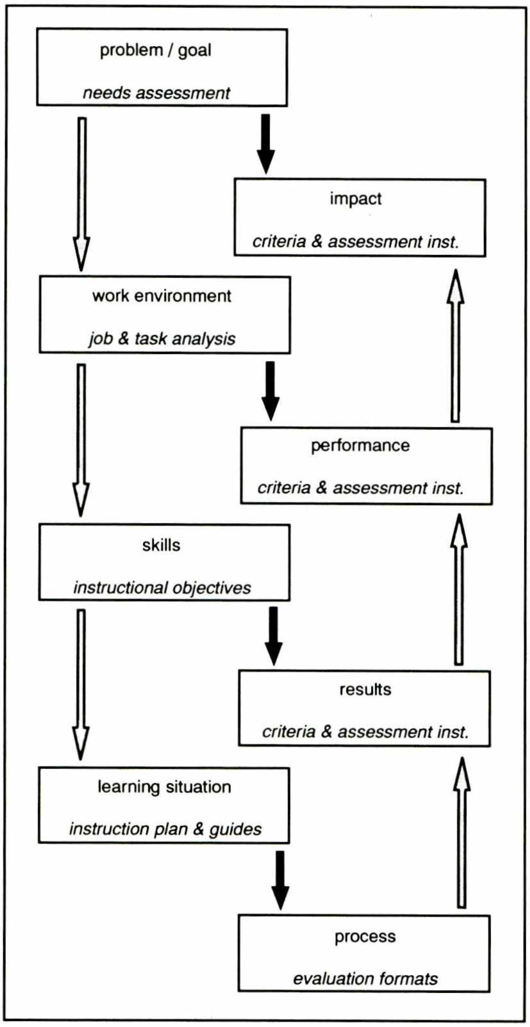

Figure 2. Design of the formal curriculum.

representation) (Carlisle, 1986; Kessels & Smit, 1994; Merrill, 1987; Patrick, 1991, 1992; Rossett, 1987). Analysis of the desired work environment also includes determination of the various target groups and data collection on their specific characteristics. This type of analysis produces specific goals of the project, types of interventions, and the basis for stating instructional objectives and criteria for evaluation on the performance level (analysis of outcomes and conditions).

3. Analysis of the required skills and the transformation of these requirements into instructional objectives, demands for in-depth examination of data collected in the previous stages. These desired educational outcomes, in terms of cognitive skills, interactive skills, reactive skills, and psycho-motor skills (Romiszowski, 1981), provide the criteria for evaluation on the level of training results and for selecting instructional methods and strategies (analysis of outcomes).

4. The design of learning situations and the development of supporting materials require careful consideration with regard to generally, training strategies and specific methods. The selection is based on instructional theory and on learning theory, but also on what is feasible in the work environment, or more generally, the corporate organization. Theories that

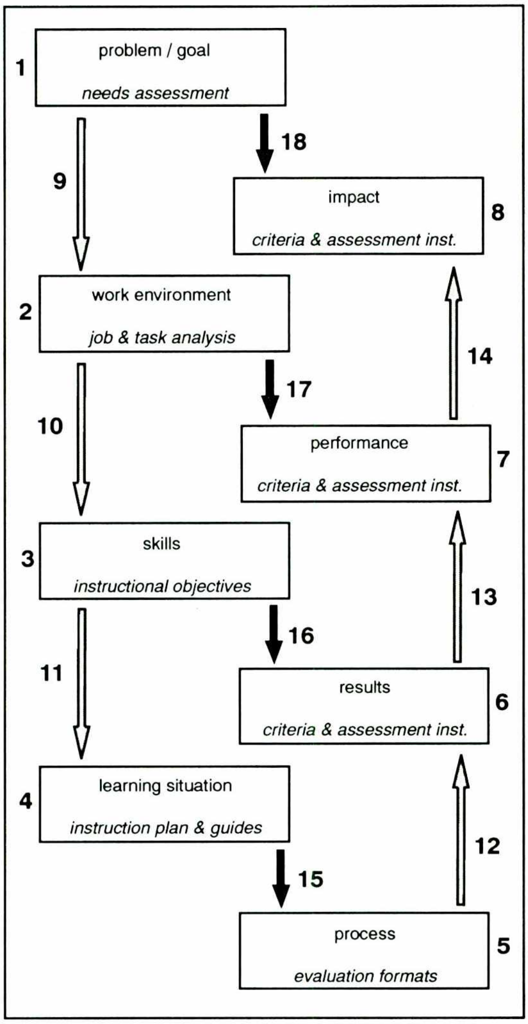

Figure 3. Adequacy and consistency of the formal curriculum.

provide information on the effectiveness and efficiency of instructional strategies, methods, and delivery systems also provide information on adequate learning processes and ways in which learning may be enhanced, induced, or controlled (Fleming & Levie, 1992; Lowijck, 1991; Reigeluth, 1983; Reigeluth & Curtis, 1987; Romiszowski, 1981, 1984). The development of materials requires subject matter expertise, content analysis, and organizing principles of instructional sequencing. These design and development activities produce instructional plans, materials, and guides for creating learning situations both in work environment settings and in dedicated training settings.

5. Evaluation on the process level requires procedures, instructions, and formats for collecting data on reactions of trainees, trainers, and other actors in the learning situations to be created. These are procedures for formative purposes, pilot testing and revising, and for more permanent control of learning processes during the project (Kirkpatrick, 1975; Stake, 1973; Stufflebeam, 1971).

6. Evaluation on the results level requires criteria and assessment instruments for collecting data on the progression in skills acquisition. These are instruments that provide a

demonstration of proficiency referenced by criteria derived from instructional objectives (evaluation of outcomes) (Kirkpatrick 1975; Robinson & Robinson, 1989). Furthermore, cost-effective analysis on training approaches is conducted (Kearsley, 1982; Nijhof, Mulder, & Van Wijk, 1992).

7. Evaluation on the performance level requires assessment instruments for collecting data on changes in the work environment, referenced by criteria derived from project objectives (Kirkpatrick, 1975; Robinson & Robinson, 1989; Seashore, Lawler, Mirvis & Cammann, 1983).

8. Evaluation on the impact level requires criteria and instruments for assessing organizational change. These include methods for data collection on progression of the projects in achieving project goals and solving related problems (Kirkpatrick, 1975; Robinson & Robinson, 1989; Seashore *et al.* 1983).

The constituent systems elements of the formal curriculum have been described by their function and products as well as by the manner in which they are interrelated. For practical use, these elements have been provided with procedures, methods and techniques described in Kessels (1993). Examination of the relationships between the various elements of the formal curriculum is an important strategy for assessing whether a systematic approach has been accomplished by the developer or the development team. The Instructional Quality Profile (Merrill, Reigeluth, & Faust, 1979) offers such a strategy. The curriculum elements should be judged for their adequacy and consistency. The Instructional Quality Profile focuses on the following interrelated elements: purpose, objectives, tests and instruction. Applying their approach to the formal curriculum, as analyzed above, the evaluation of adequacy and consistency should be represented as shown in Figure 3.

The formal curriculum can be assessed by examining the adequacy of the products in 1 to 8 and the consistency of their relations in 9 to 18.

Competencies for a Systematic Approach

The profession of curriculum design and development requires specific competencies. They have been the object of study since the 1930s, ranging from adult learning as a sort of charity given to the underprivileged to formulating guidelines for developing a graduate program for training adult educators, and from criticizing excessive reductionism and behaviorist foundations to recent statements on ethical standards. Henschke's review (1991) reports on 30 of these studies.

ASTD (McLagan, 1983, 1989) and The International Board of Standards for Training, Performance, and Instruction, IBSTPI (Foshay, Silber, & Westgaard, 1986) conducted large-scale research projects on design and development competencies. ASTD reports on 11 roles, their outputs, the required competencies and related ethical issues. The IBSTPI Standards describe sixteen instructional design competencies, each embedded in a rationale, and performance indicators and assumptions. Rothwell and Kazanas (1992) based their book *Mastering the Instructional Design Process: A Systematic Approach* entirely on the sixteen IBSTPI instructional design competencies, and claim to offer the first volume grounded on an underlying foundation of solid research (Rothwell & Kazanas, 1992). Tracey (1981) developed a 600-page self-evaluation manual for HRD managers and specialists. Part Five of this giant checklist is devoted to the development, implementation, and evaluation of HRD delivery systems.

To accomplish a systematic approach in curriculum design, as advocated in the previous sections, a selection of competencies from the above mentioned sources has been made. This selection is justified by the requirements of an adequate performance of the elements in Figure 2. The numbers refer to the specific components and their contingencies:

Conduct needs assessment (Figure 3: 1).

Identify ideal and actual performance and performance conditions and determine causes of discrepancies. Employ strategies for analyzing individual and organization behavior.

Perform job and task analysis (Figure 3: 2 and 9).

Employ analysis strategies and reporting procedures.

State instructional objectives (Figure 3: 3 and 10).

Transform job requirements into objectives, so that performance measurement and selection of instructional strategies is facilitated.

Develop performance measurements (Figure 3: 6 and 16, 7 and 17, 8 and 18).

Transform needs, performance requirements, and objectives into evaluation criteria and appropriate assessment instruments.

Sequence the performance objectives (Figure 3: 4 and 11).

Draw a blueprint for the desired learning environment, appropriate for achieving the desired changes of performance.

Specify the instructional strategies (Figure 3: 4 and 11).

Devise instructional interventions to put the blue-print learning environment into action.

Design instructional material (Figure 3: 4 and 11).

Develop print, audio-visual, or electronic-based learner materials, job aids, trainer guides, and plans to facilitate the instructional interventions.

Evaluate the educational interventions.

Appraise the instructional methods, sequences, and materials, and improve (Figure 3: 5, 15, and 12).

Assess results, performance improvement, and the related impact on the organization (Figure 3: 6, 7, 8, 13, and 14).

The Relational Approach

In the preceding sections it is argued that external curriculum consistency can be influenced if the developer applies a relational approach. As curriculum affairs are mainly activities involving human beings communicating with each other, the relational approach consists of all the contacts between the developers and relevant actors. Besides the actors referred to in the curriculum typology ([top]managers, supervisors, trainers, trainees, developers), other parties may be involved, in particular clients, customers, coordinators, sponsors, and opinion leaders. Unlike the systematic approach with its clear and rigorous logic, the relational approach may often seem fuzzy, using informal networks, balancing power and influence, and striving for consensus within the limits of culturally determined feasibility (Duncan & Powers, 1992). Political awareness, cultivating support, developing relationships and gaining visibility seem to be ingredients of this aspect of curriculum design (Warshauer, 1988). In Plomp's generic model for educational problem solving (Plomp, 1982), 'implementation' starts from the very beginning of a project by involving all stakeholders. This model implicitly suggests a relational approach, however, without elaborating it. Activities that belong to the relational approach are sometimes characterized as "walk and talk the job" (Harrison, 1992). Banathy (1987) states that the process of arriving at better decisions is not a process of optimization; it is rather a process of negotiation among those with different points of view and value systems in order to find a satisfying solution. Subsequently, he advocates a participative design approach, comprising several spiralic and iterative phases that pay attention to context and environment of the system (Banathy, 1987, p. 93).

Although chaotic design processes may produce apparently high quality programs, for reasons of efficiency, planning, and control, a more orderly application of the relational approach is to be recommended (Lippitt & Lippitt, 1986; Phillips & Shaw, 1989).

The relational approach refers to the developer's activities in the domain of interpersonal dynamics of decision making about educational planning. It aims at developing homogeneous notions among actors on what the problem is and how it should be solved, and at gaining their commitment, involvement and support for implementation. In the next sections, several tactics to help achieve these goals are discussed, such as project management, rapport-building activities during needs assessment and task analysis, involvement of line management, creating similarity between learning situation and work environment, and recruiting trainers with practical experience in the subject matter field.

Project Management

Project management is a widely accepted form of planning and control. Sometimes it is seen as an administrative process of planning activities, allocating resources, monitoring costs, and ensuring conformity to time lines and specifications. Sometimes it is seen as an interpersonal process that manages relationships through such actions as making sure the right people are involved in the right way, and adopting a style that conforms to the need or preferences of the people involved (Jackson & Addison, 1992).

Project management facilitates the various phases of educational program design (AECT, 1977; Plomp 1982). Project management is important not only for planning and control reasons, but also for disseminating innovative ideas on corporate education in general and program features, in particular among important stakeholders. In many organizations project management is an accepted strategy, if not a *conditio sine qua non*, for research, development, and marketing activities. Therefore, it is recommended for educational program design that a strategy similar to the one the organization is acquainted with is adopted.

Common project functions comprise planning, scheduling, and control (Rothwell & Kazanas, 1992), and will recur during the different phases of a project. Although labels may differ, phases referred to here comprise: Preliminary inquiry, design, construction, test & revision, and implementation and are derived from the generic problem-solving model (Plomp, 1982):

- Preliminary inquiry involves recruitment of a project leader, assigning the role of principal to one or more executives constituting a project team, needs assessment, stating goals, and planning of activities and resources.
- Design involves task analysis, stating objectives and evaluation criteria, and blueprinting the learning environment.
- Construction involves selection of trainers and coaches, devising instructional strategies, and development of supporting materials and delivery system.
- Test & Revision involve pilot testing, formative evaluation, and revision.
- Implementation involves delivery and assessing effects, evaluation of evolving needs, and adaptation of the instructional and delivery system.

In perspective of the relational approach, project management and the processes it evokes can be regarded as a most important learning process for the organization. Particularly, organizations that consider training an isolated activity to be delegated to the training department or contracted out to a commercial agency may benefit from the intrinsically educational values of project management. The developer, in the project leader's role, is offered many chances to inform participants on contingencies across needs, interventions, and outcomes. Essential conditions for successful program implementation and their implications need to be discussed extensively. Apart from the education policy-making process on the corporate level, project management is a foremost opportunity to convey that, though an organization may farm out the training process, the learning process ultimately has to take place in the work environment.

The Relational Approach to the Formal Curriculum

Some elements in the formal curriculum do not depend exclusively on a systematic approach and require a relational approach as well. *Needs assessment* and *task analysis* need to be mentioned specifically. Mostly, where management has commissioned a training program, the initial problem has already been perceived as a training problem. Subsequently, the developer introduces needs assessment in order to revalidate these assumptions. Whether management is prepared to support the upheaval of time consuming needs assessment depends largely on the image of the training function in general and on the credibility of the developer in particular. Turning needs assessment and task analysis into a model of action research requires consulting skills from the developer, so that he or she may adequately play the role of change agent. Activities of such nature require other competencies from the developer over and above mere skillful application of data collection techniques and logical reasoning.

Moreover, task analysis is not just a meticulous process of determining how things are done and should be done. It is also establishing a rapport, thus evoking critical, though often unconscious, know-how. A positive and non-threatening climate during the data collection process is of great value for the quality of the information sought (Kessels & Smit, 1994). The nature of the established relationships with management, employees and clients during needs assessment and task analysis are of preeminent importance for successful implementation, which starts here, right from the initial phase of the development process (Plomp, 1982).

Compensatory Quality of the Relational Approach

As mentioned previously, many educational programs have been conducted without any formal assignment. Others have been developed because the training staff anticipated a demand for such programs, without having first clearly analyzed any perceived problem. Education departments and commercial training agencies may offer training programs of a certain kind because these are fashionable at the time. Numerous training programs are not based on an elaborate formal curriculum. Except for the few lines in a flyer or program catalogue and some transparencies, documentation is often sparse. The program is in the trainer's head. However, these training activities can still be perceived as high quality programs, even when formal evaluation did not take place. Missing or poorly stated formal curricula will by their nature cause internal curriculum discrepancies. However, it is not inevitable that these discrepancies will cause a decrease in quality. Under certain conditions, specific factors might compensate for these discrepancies. We are hypothesizing that the relational approach bears such correcting qualities. Factors that are assumed to influence quality in corporate education comprise: the role of line management, similarity between learning environment and work environment, practical experience of the trainer, and the selection of trainees. Although we contend that weaknesses in the formal curriculum might be compensated for, the relational approach does not substitute for the formal curriculum. Nonetheless, the factors described here are of critical importance for attaining positive program results.

Competencies for a Relational Approach

The quality of the relational approach is heavily related to the personal effectiveness of the developer. However, the image of the training function and its position in the structure of an organization are the foremost conditions that determine the opportunities for a relational approach within a single project (Buckley & Caple, 1990). Management's acceptance of the developer and the extent to which management legitimizes the developer's role are essential for the problem-solving effort (Lippitt & Lippitt, 1986). Interpersonal and consulting skills seem to be indispensable for an effective relational approach.

Many sources offer analyses of competencies professionals should dispose of when they enter into the relational approach. Often the performance oriented corporate educationalist is portrayed as a 'change agent' (Clark, 1991; Phillips & Shaw, 1989; Pont, 1991). When comparing curriculum design with the planned change tradition, the profiles of the change agent may be of great value for the developer (Argyris, 1982; Bennis, Benne, & Chin, 1969; Lippitt, Watson, & Westley, 1958).

The ASTD research projects (McLagan, 1983, 1989), as well the IBSTPI Standards (Foshay *et al.*, 1986), define several competencies for developers that may apply to the relational approach. Furthermore, recent publications on consulting and coaching offer a variety of requirements and competencies for developers to adopt in their relational approach (Block, 1981; Gilley & Eggland, 1989; Lippitt & Lippitt, 1986; Phillips & Shaw, 1989; Rothwell & Kazanas, 1992; Sink, 1992; Tosti & Jackson, 1992).

The most salient competencies are listed below:

1. Communication skills: listening, observing, interviewing, relating to others, self-expression, and exchanging constructive feedback.
2. Project management skills: leadership and chairperson skills, planning, monitoring and negotiating skills.
3. Consulting skills: building open collaborative relationships, clarifying mutual expectations and responsibilities, ability to influence others and gain commitment, facilitating change, encouraging widespread participation in the design and implementation of a project, and dealing with friction and resistance.
4. Experimental flexibility, self-insight, and self-esteem.
   Ability to create an atmosphere of tact, trust, politeness, friendliness, and stability.

Hypotheses

The previous sections presented a theory of curriculum consistency in corporate education. The curriculum typology forms the basis for describing external consistency between the various appearances of a curriculum. External consistency is influenced by a relational approach of the developer. The formal curriculum is analyzed in terms of internal consistency. Internal consistency is effected by a systematic approach of the developer. This conceptual framework and its constituent factors lead to the following chain of reasoning, which will result in a set of hypotheses.

A Chain of Reasoning

The chain of reasoning developed for this study consists of a number of components which are related to each other on the basis of assumptions in the curriculum consistency theory and the supporting systematic and relational approaches (Figure 4).

1. Design standards, comprising a systematic and relational approach, should generate educational programs that bring about positive effects (acquired skills, improved performance and impact).

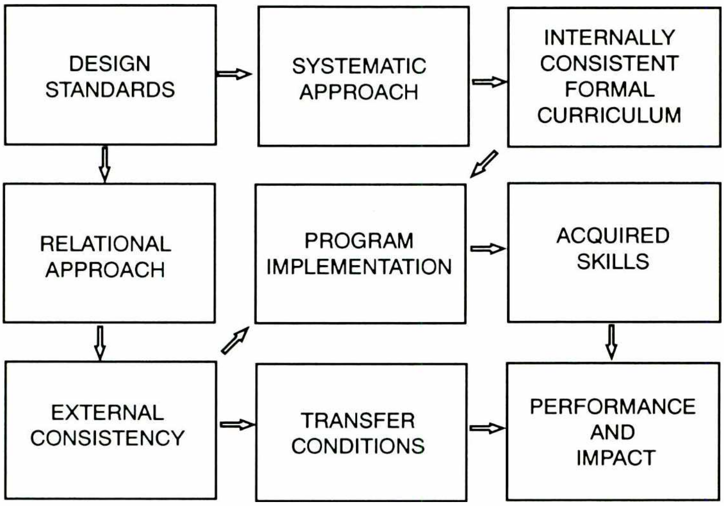

Figure 4. A chain of reasoning in corporate education.

2. Design standards are used to prepare educational programs (formal curriculum). These preparations result in tools such as plans, materials, and guides. The desired effects are assumed to be attained following proper implementation of the program according to plan. The trainer enacts the plan.
3. Effective design standards require skillful application by the developer. The developer needs to be trained to apply the design standards appropriately; that is, mastering both a systematic and relational approach.
4. The effects of a program find expression in the newly acquired skills of the participants. Ultimately, however, improved performance and a contribution to solving the initial problem (impact) are to be seen as positive effects.
5. Transfer of newly acquired skills into improved performance is facilitated or impeded by conditions in the participants' work environment.
6. Design standards should stimulate the developer to apply both a systematic and a relational approach (Figure 4).
   a. The systematic approach effects an internally consistent formal curriculum. Therefore, logic contingencies are to be found among purpose, objectives, evaluation criteria and instruments, and instruction presentation. The internal consistency of the formal curriculum enables powerful educational interventions and, subsequently, positive results.
   b. The relational approach generates homogeneous notions among parties involved as to what the problem is and how it could be solved: external consistency. If managers, supervisors, trainers, trainees and the developer share coherent opinions about the purpose and about the means to that end, their efforts will lead to successful program implementation, favorable transfer conditions and positive effects.

Hypotheses to Be Tested

The concept of curriculum consistency and the ensuing chain of reasoning lead to the following hypotheses to be tested:

1. Skillful application of design standards, based on both systematic and relational approaches, will generate educational programs that accomplish better results than programs that are not supported by such approaches.

2. Design standards advocating a systematic approach lead to internally consistent formal curricula.
3. Internal consistency of the formal curriculum and program effects are related positively.
4. Design standards advocating a relational approach lead to external consistency (homogeneous notions among concerned parties as to the nature of the problem and its possible solution).
5. External consistency and program effects are related positively.
6. The relational approach compensates for weaknesses in the systematic approach.
7. The systematic approach does not compensate for weaknesses in the relational approach.

Educational provisions should be cost effective. A cost-effective program design generates the best effects at the lowest costs. As the largest cost factor in corporate education are trainees' salaries and their opportunity costs (the loss of potential contribution to the organization), the program with the shortest training time per employee is the least costly. But the shortest program is not necessarily the most effective. Therefore, though conducting cost-benefit analysis is an important aspect of curriculum design, this activity itself does not generate better program effects. This observation leads to an additional hypothesis:

8. Though cost-benefit analyses are important for selecting efficient solutions to educational problems, they are not related to program effectiveness.

These hypotheses will be tested against the empirical findings of the two research projects described in the following sections. The results of the analyses obtained from these projects will contribute to the validity of the curriculum consistency theory. If evidence can be inferred regarding the systematic and relational approaches, design standards can be improved on the basis of the empirical findings. Skillful application of such design standards will lead towards high quality educational provisions in labor organizations.

Empirical Study #1: Seventeen Case Studies

The major research questions addressed in the first study are:

1. What factors in curriculum design affect the quality of corporate education?
2. How do these factors operate?

Study #1 was designed to find an empirical basis for the existence of the predicted relationships between the systematic approach, internal consistency, and program effects, and the relationships between the relational approach, external consistency, and program effects.

Variables

From the conceptual framework and its constructs described above, the following six variables have been derived:

Variable: Systematic Approach

A systematic approach implies adequate application of design procedures including the following items:

– adequate assessment of training needs
– adequate description of goals
– adequate task analysis
– adequate instructional objectives
– adequate establishment of evaluation criteria
– adequate construction of evaluation instruments
– adequate design of learning situations
– adequate development of course materials

Variable: Internal Consistency

In an internally consistent formal curriculum, a logical relationship exists between assignment, objectives, evaluation criteria, evaluation instruments, instructional strategies, and training materials. The formal curriculum comprises the following items:

– consistency between goals and needs assessment
– consistency between task analysis and preceding elements
– consistency between instructional objectives and preceding elements
– consistency between evaluation criteria and preceding elements
– consistency between evaluation instruments and preceding elements
– consistency between learning situations and preceding elements
– consistency between course materials and preceding elements

Variable: Relational Approach

A relational approach comprises activities that favour the involvement of managers and supervisors during design and implementation, the selection of trainers who have recent, practical experience in the subject matter field, and the creation of a learning situation that closely resembles the work environment. The relational approach comprises the following items:

– adequate assessment of training needs
– adequate task analysis
– creation of favorable conditions for implementation
– adequate selection of trainers and coaches
– adequate selection of trainees
– involvement of line managers
– design of learning situations that resemble the work environment
– selection of trainers that have experience with the work of trainees

Variable: External Consistency

External consistency refers to the homogeneity of ideas and perceptions among managers, supervisors, developers, trainers and trainees on the nature of the problem and its possible solution through an educational provision. External consistency comprises the consistency between views of:

– (top) manager and developer
– (top) manager and trainer
– (top) manager and supervisor
– (top) manager and employee (= trainee)
– developer and trainer
– developer and supervisor
– developer and trainee
– trainer and supervisor
– trainer and trainee
– supervisor and employee (= trainee)

Variable: Cost-benefit Analysis

The cost-benefit analysis variable comprises the following item:

- direct costs, salaries of trainees, overhead costs, lost opportunity costs, and estimation of benefits

Variable: Effects

Program effects comprise the acquired skills, changes in performance and the impact on the organization as perceived by:

- (top) managers
- supervisors
- developers
- trainers
- trainees

Research Design

Study #1 may be characterized as a multiple case study with multiple units of analysis, focusing on theoretical replication and not at statistical generalization, described by Yin as a Type 4 study (Yin, 1989). The within-site and cross-site data analyses were carried out by means of display techniques as described by Miles and Huberman (1984).

As these case studies aimed to detect factors in curriculum design that affect the quality of the outcomes, the research design comprises the analysis of two sets of contrasting cases: successful and unsuccessful. Unlike Empirical Study #2 (where curricula have been designed deliberately as part of the research project), Study #1 concentrates on existing, implemented curricula. In that respect, the design may also be considered as a *post-facto* design (Sprinthall, Schmutte, & Sirois, 1991, p. 71). The cases have been selected by the local training managers on the basis of their subjective measure of the Effects variable (successful/unsuccessful). During the study, a reliability test was run on the correct use of the labels 'successful' and 'unsuccessful'. The results of this test are reported later in this chapter.

Selection of the Cases

Selection of the cases raised the following questions:

- What type of organizations should be addressed?
- Which kinds of programs should be reviewed?
- Who determines whether programs are successful or unsuccessful?

Theoretically, there was no reason for the exclusion or inclusion of specific types of organizations, nor did the kind of program matter. The only criterion was that the program had to have been developed at the request of the organization. Off-the-shelf courses and packages were to be excluded. The course design could have been carried out by either the in-house training staff or by an outside agency.

At the outset of the project, the definition of success or failure was left to the training manager. The researcher was mainly interested in the contrast between programs that were considered to be successful and those considered to be unsuccessful in the context of the organization itself.

Discussing the research project with training managers soon revealed that the main problem was to obtain access to cases, especially the unsuccessful ones. In general, managers are reluctant to offer failures for outside inspection. Furthermore, the research design called for the cooperation of developers, trainers, managers, supervisors and trainees. Publicly designating their program as unsuccessful would make them reluctant to participate and inhibit a collaborative attitude. These concerns could be met by promising the participating organizations that the cases would be studied anonymously. These considerations led to the following selection process:

Fifty training managers were invited to offer two contrasting training programs: one successful and one unsuccessful. To avoid insulting anyone, the label 'less successful' was used.

Fourteen training managers responded that they were willing to participate in the project (28 cases).

When the time came to submit the cases for analysis, only nine training managers succeeded in finding (top) managers, supervisors, developers, trainers and trainees—who had been involved in the program—willing to participate in the data collection.

Nine successful and nine unsuccessful cases were examined. Yet, during the data collection, one of the unsuccessful cases was withdrawn (Case 17) because top management objected to further analysis.

The remaining 17 cases were all tailor made or adapted to the organization's specific need. They included the following types of programs:

Case:	
1, 2, 11, 12	technical skills
3, 4, 7, 8	interpersonal skills
5, 9, 10, 13, 14	computer skills
6, 15, 16	servicing skills
18	management skills

The participating organizations come from the fields of banking, insurance, public service, industry, transportation, and consulting.

Data Collection

Data collection was conducted by eight trained investigators according to a data collection protocol. The protocol contained 28 pages of detailed guidelines for the investigator. The guidelines were derived from the variables and their constituting items. The protocol covered the following sections:

A. General information on the case
B. Guidelines for the study of documents
C. Guidelines for interviews with the actors
D. A framework for writing a case report

Data reduction was accomplished by applying coding and display techniques as described by Miles and Huberman (1984). The qualitative analysis was completed by quantitative analysis. The researcher and analysts rated the items of the main variables on a 5-point scale, so that Likert scales could be constructed for the variables Systematic Approach, Internal Consistency, Relational Approach, External Consistency, Cost-Benefit Analysis, and Effect. Values <3.00 were defined as low. For the quantitative analysis, data were rejected when jury $\alpha < .60$, scale $\alpha < .70$, and sub scale $\alpha < .60$. The probability level $p < .10$ is justified by the small number of cases.

The Effect variable was quantified by means of two series of rating sessions. In series #1, two judges (expert training consultants) each assessed the actors' statements on the perceived effects by rating the statements on a five-point scale (1 = no effect; 5 = highly effective). The rating took place according to prescribed instructions from the researcher. Once all cases had been rated, the two judges compared their ratings and discussed differences. This discussion was considered necessary because the quality of the statements in the displays varied considerably. Statements referred to reactions of trainees, test results, changes in performance, and effects on the department or organization. In series #2, the same rating process was repeated in a different setting with different judges. Comparison of the two rating series showed a correlation of $r = .85$. The results of these ratings and the statistical checks allow relabelling of the cases: Unsuccessful is an Effect score <3.00, successful is an Effect score >3.00. On the basis of the two ratings, a Likert scale for the Effect variable was constructed. This scale was used to calculate the correlations of the variables Systematic Approach, Internal Consistency, Relational Approach, External Consistency, Cost-Benefit Analysis, and Effect. The ratings of the perceived effects of the 17 cases made it possible to rank the cases according to their new total scores ($\overline{X}$ of the two rating series). Tied case scores were broken by using the combined ratings of managers and supervisors as a second ranking key.

Discussion of Study #1

This section formulates answers to the research questions to the extent that it would be possible to generalize on the basis of the theory developed in the conceptual framework. To that end, the main variables and their constituting elements will be discussed, and the hypotheses will be compared with the findings.

Conclusions

To visualize the differences between the two sets of contrasting cases, data are depicted in graphic form. The cases are ranked according to their Effect value. The numeric values are represented by the graphic sign (#). Thus, Table 1 shows a graphic pattern of the results for the variables.

The observations that follow are made on the basis of the values of the main variables and the statistical comparison of successful and unsuccessful cases, combined with additional qualitative information.

Systematic Approach. In unsuccessful cases (Effect < 3.00) a significantly poorer systematic approach is applied than in the successful cases (Effect > 3.00), $t\ (12.14) = -3.18$, $p = .008$. However, in most cases, whether successful or unsuccessful, documentation on the design and development process is poor. Some conclusions from the data are:

- Reports on training needs assessment and task analysis are mostly absent in both types of cases.
- Instructional objectives of unsuccessful programs tend to be stated in terms of reproductive knowledge aspects.
- Instructional objectives of successful programs tend to be stated in terms of reproductive as well as productive skills.
- In both types of cases, evaluation criteria are neither stated nor documented.
- In both types of cases, evaluation instruments are restricted to the lowest levels of evaluation: reaction to learning processes and tests of training results. Virtually none of the cases used instruments to assess performance or organizational impact.
- In the successful cases, the designed learning situations show a greater variety of activities than in those that are unsuccessful.
- Almost all cases used elaborate training materials. Successful cases devoted more attention to guidelines for trainers.

Table 1. Display of case scores in a graphic pattern, ranked according to the Effect value.

Case	Systematic Approach	Internal Consist.	Relational Approach	External Consist.	Cost-Benefit Analysis	Effect
12	###	####	####	###	###	####
11	###	####	####	####	#	####
18*	####	###	###	####	###	####
2	####	###	####	###	###	####
8*	##	#	###	##	#	###
10*	##	##	####	####	#	###
16	####	###	####	###	####	###
14*	##	###	####	###	##	###
6*	##	#	###	####	#	###
15	##	##	##	##	##	##
7*	#	#	#	##	#	##
13*	#	#	#	###	#	##
4*	##	#	#	#	#	##
3*	#	#	#	##	#	##
9*	##	##	#	###	#	##
1*	##	##	#	#	###	#
5	##	##	#	##	#	#

Odd numbers denote the cases that were originally labeled unsuccessful. Even numbers denote the cases that were originally labeled successful.

(*) denotes that developer and trainer are one and the same person.
(#) denotes value $1 \leq \# < 2$
(##) denotes value $2 \leq \#\# < 3$
(###) denotes value $3 \leq \#\#\# < 4$
(####) denotes value $4 \leq \#\#\#\# \leq 5$

Internal Consistency. Unsuccessful cases had significantly poorer internal consistency between the assignment, objectives, evaluation, learning situations, and training materials than the successful cases, t (11.39) = −3.64, p = .004.

Relational Approach. Unsuccessful cases applied a significantly poorer relational approach than the successful cases, t (15) = −9.38, p = < .001.

From the qualitative data the following conclusions can be drawn:

– Actors' involvement during development and implementation is strong in successful programs. The successful cases show strong involvement by line managers in particular. The unsuccessful cases do not.

- The similarity between learning situations and work environment is extremely strong for the successful cases and is weak for the unsuccessful cases.
- Practical experience in the subject matter field of the trainer is extensive in the successful cases and limited in the unsuccessful cases.
- In six of the nine successful cases, special emphasis was put on creating favorable circumstances for implementation. None of the unsuccessful cases emphasized this aspect.

External Consistency. In the unsuccessful cases, consistency between actors' perceptions of the initial problem at hand is significantly weaker than in the successful cases, t (15) = −3.56, p = .003.

Cost-Benefit Analysis. In general, cost-benefit analysis is given little attention. Still, unsuccessful and successful cases differ significantly, t (11.57) = −1.91, p = .081. Some of the successful cases included records of the salary costs of developers and trainers. Records of salary costs of trainees were available in four cases. One case mentioned overhead costs of training staff. One case provided an estimation of lost opportunity costs. Only one case contained an estimation of benefits.

Findings Related to the Hypotheses

To relate the findings to the hypotheses, relevant correlations between variables have been computed. On the basis of these findings, the hypotheses are examined and discussed in relation to the conceptual framework (Figure 3). The probability level $p < .10$ is justified by the small number of cases.

Hypothesis 1: A systematic approach leads to internally consistent curricula. Significant correlation was found, r = .87, p = < .001. None of the cases reveal a high value for systematic approach together with low internal consistency (see Table 1). This hypothesis should not be rejected.

Hypothesis 2: The internal consistency of the formal curriculum and program effects are related positively. Significant correlation was found, r = .77, p = < .001. This hypothesis should not be rejected. Deviations appear in Cases 8, 10, and 6 (see Table 1). They reflect low values for internal consistency, <3.00, but are nevertheless ranked among the successful cases. Apparently, low internal consistency does not affect program effects in these cases.

Hypothesis 3: A relational approach leads to external consistency. Significant correlation was found, r = .54, p = .013. This hypothesis should not be rejected. Only Case 8 shows a high value for relational approach (3.50) in conjunction with low external consistency (2.95), although this value is close to 3.00. Cases 13 and 9 (Table 1) reveal that the relational approach is not conditional for external consistency.

Hypothesis 4: External consistency and program effects are related positively. Significant correlation was found, r = .61, p = .005. This hypothesis should not be rejected. Of all successful cases, only Case 8 has a value for external consistency <3.00 (2.95). Cases 13 and 9 contradict the hypothesis. They have high values for external consistency but are ranked among the unsuccessful cases (Table 1). Further examination of the qualitative data on these cases revealed that both cases concern computer training. In Case 9, the developer/trainer was a management trainee, who was inexperienced in both the subject matter field and in the training profession. In Case 13, the external developer/trainer was unfamiliar with the organization, the equipment, and the computer application to be instructed.

These observations stress the importance of hiring a trainer who is both a training professional and a subject matter expert. Apparently, external consistency can not compensate for poor qualifications in trainer performance nor in subject matter expertise. Selection of the trainers and their practical experience in the subject matter fields are critical elements in the relational approach. This conclusion implies that training of trainers should emphasise subject matter expertise as well as intensive coaching and mentoring of novices.

Hypothesis 5: The relational approach compensates for weaknesses in the systematic approach. Successful cases with a weak systematic approach, defined as <3.00, (Cases 8, 10, 14 and 6; see Table 1) all exhibited a relational approach ≥ 3.00. The high value for the relational approach seems to compensate for the low value of the systematic approach, as these cases are considered successful. On the basis of this reasoning, this hypothesis should not be rejected. As the relational approach and external consistency are closely related, as are the systematic approach and internal consistency, a similar method of reasoning applies to the compensating quality of external consistency in case of weak internal consistency. Cases 8, 10 and 6 show low internal consistency. Their external consistency, which is ≥ 3.00 (#8: 2.95), might compensate for that weakness.

Hypothesis 6: The systematic approach does not compensate for weaknesses in the relational approach. In the group of successful cases, none shows a relational approach ≤ 3.00. In other words, there are no low values to be compensated. In the unsuccessful group, Cases 4, 9, 1, and 5 show stronger systematic than relational approaches, although <3.00. As these cases are ranked lowest, a presumed compensating quality is not effective. Furthermore, the unsuccessful cases show a negative correlation between systematic approach and effects, $r = -.51$, $p = .096$. This figure indicates that investments in systematic design of the formal curriculum may become counterproductive when the development process does not satisfy the relational approach. The research design does not permit conclusions whether the relational approach is satisfactory alone for program effectiveness. On the basis of this reasoning, this hypothesis should not be rejected.

The combination of Hypotheses 5 and 6 might indicate that, although the systematic approach is indispensable for internally consistent curricula, it can be effective only when combined with a relational approach resulting in external consistency. This assumption would explain why successful programs have benefitted from the systematic approach (internal—effect: $r = .62$, $p = .037$), whereas unsuccessful programs have not (systematic—effect: $r = -.51$, $p = .096$).

Hypothesis 7: Although cost-benefit analyses are important for selecting efficient solutions to educational problems, they are not related to effectiveness. No significant direct or reverse correlation was found concerning a relationship between cost-benefit analysis and effect. This hypothesis should not be rejected.

One might argue that performing a cost-benefit analysis for an educational program is part of a systematic approach. Analysis of numbers of participants, of trainee salary costs and their (lost) opportunity costs direct the making of decisions about instructional strategies, course length, selection of media, group size and number of trainers, in view of the expected benefits. Here, cost-benefit analysis is treated as an independent variable, separate from the systematic approach, that apparently does not contribute to program effectiveness.

In an additional analysis, we compared the values of the main variables of the group of cases in which one individual is both trainer and developer (Cases 1, 3, 4, 6, 7, 8, 9, 10, 13, 14, 18) with the other group (Cases 2, 5, 11, 12, 15, 16), in which the roles of developer and trainer are served by two (or more) different staff members. Statistical comparison was established by performing t tests. The two groups do not significantly differ on the variable effect, t (15) = −1.01, p = .328. This finding indicates that it is unlikely that a curriculum will be effective only when the trainer is also the developer. The two groups neither differ significantly on the variable relational approach, t (15) = −1.74, p = .103, nor on external consistency, t (15) = −.48, p = .641.

However, splitting the tasks of trainer and developer appears to affect the systematic approach, t (15) = −2.32, p = .035, and internal consistency, t (15) = −3.25, p = .005. The mean values of these variables are significantly higher when the trainer and the developer are not one and the same person. It is plausible that, when an organization specifically employs the function of instructional developer, the quality of the formal curriculum is likely to be high (internal consistency) because the design procedures (systematic approach) have been applied more skillfully. When the trainer designs the program, it is likely that more attention is devoted to the operational curriculum than to the formal.

Development of Design Standards and Training Developers

The aim of this study was to develop a coherent set of design standards, validated by empirical research. The theoretical underpinnings have been explored in the context of the conceptual framework and tested in the case study research. Now, the relational and systematic approaches need to be presented in a practical format so that they can be applied by developers.

A Blueprint for Design Standards

In principle, it is irrelevant whatever practical form design standards take and in what model they are casted. One could even argue that developers should be encouraged to adapt and customise their own design model, as this is the only one that they will put into action. However, the results of Study #1 suggest that developers can increase the effectiveness of their designs and the efficiency of the development process by phrasing their models following the framework of the generic problem-solving model and by applying the elements of the relational and systematic approaches. In the blueprint for the design standards, the elements of the relational and systematic approaches are compiled and presented in the matrix of Figure 5. On the basis of this blueprint, two planning models have been drawn up, both making part of the design standards: *The Curriculum Design Model* (Figure 5: central column) and *The Project Management Model* (Figure 5: right column). A curriculum development project needs to be coordinated and controled. This management function is provided by the project management model, and assists in planning the development team and controlling the necessary resources. The presented model for curriculum design is the researchers' customized design model and reflects the logical structure of the systematic approach. *The activities supporting the relational approach in the design model are marked with * in the Figure.*

The complete set of procedures for the project management model and the design model is described fully in Kessels (1993). The formats for the two models and their operating procedures are inspired by the texts of authors on curriculum design and development that were discussed in the preceding sections. Many references are made to Tracey (1971, 1984, 2nd edition), Romiszowski (1981, 1984) and to Rothwell & Kazanas (1992). Romiszowski's analytical treatment of the heuristics in curriculum design supported the systematic approach. Rothwell & Kazanas' procedures for '*Mastering the instructional design process*' (1992), which are based on '*Instructional design competencies. The Standards*' (Foshay *et al.*, 1986), provide valuable suggestions for both systematic and relational approaches.

Notwithstanding our recommendation of spiralic, iterative, and cyclic procedures (Banathy, 1987), the graphical representation of the models reflects a linear format, as the multitude of possible iterations and simultaneity would otherwise blur the desired clarity of the presentation.

Generic Model	Curriculum Design Model	Project Management Model
Preliminary Inquiry	1. Training Needs Assessment* 2. Goals	Appoint a project manager Designate a top manager in the role of principal State the assignment Plan the project (including activities, capacity, schedule, and budget) Recruit project team Discuss operating procedure Assess the training need Determine the major goals of the curriculum
Design	3. Task Analysis* 4. Instructional Objectives 5. Evaluation Criteria 6. Evaluation Instruments 7. Design Learning Situations	Execution of task analyses Instructional objectives Evaluation criteria Evaluation instruments Design learning situations — educational format — instructional strategies
Construction	8. Select and Instruct Trainers* 9. Develop Training Materials 10. Favorable Condition for Implementation* 11. Select Trainees*	Choose the project team members, such as trainers, coaches, and mentors Compile the course material Plan the execution Instruct trainers and other members of the project team Select trainees
Test & Revision	12. Conduct Training Program 13. Evaluate Process & Results	Run a pilot program Evaluate the learning process Evaluate the learning results Adjust the learning situations
Implementation	14. Evaluate Performance and Impact	Deliver the program Evaluate changes in the work environment Assess the impact on the original problem Adjust the design Take procedural measures Conclude the project

*Activities supporting the relational approach.

Figure 5. A blueprint for design standards.

Training of Developers

Availability of design standards does not ensure skillful application. The developer must put these procedures into action. Simply knowing about the standards is insufficient for verifying their value. It is a prerequisite that developers master the design standards, and above all, that they be motivated for applying these procedures in their own organizations. To that end, 30 developers registered for a course on instructional development of which the objectives are geared towards the skillful application of the design standards. The course was taught to two groups of 15 participants. The training course took place over a period of eight months while participants devoted part of their time to training development projects to be implemented in their organizations. As the main features of the program combined working on a project with being coached by two experienced developers and by individual mentors (supported by guest lecturers on specific topics), it turned into a reflective practicum (Schön, 1987).

The participants were training officers, human resource managers and training consultants. The criteria for enrolling in the program were:

– the candidate's current position permits professional curriculum design;
– the candidate has been assigned to develop an educational program;
– the candidate has a degree from higher education.

The two program directors (the first author is one of them) interviewed eligible candidates, and discussed the implications of the selection criteria, the objectives, as well as the facilities required for practical assignments. Out of the 30 developers who started with the program, two participants could not finish their projects due to illness.

The program consisted of ten modules of two successive days each, distributed over eight months. Course materials comprised the design standards (first version), selected readings, and assignments for practical work. The program directors arranged separate meetings with the participants' mentors. They discussed the objectives and the characteristics of the course, as well as the mentor's supportive role in helping to perform the activities of the relational and systematic approaches. The mentors were provided with documents on the design standards.

Empirical Study #2: Twenty-Eight Curriculum Projects

Study #2 can also be characterized as a multiple case study with multiple units of analysis. This second empirical study is both a replication of the preceding case study and an evaluation study of the design standards. To that end, the hypotheses developed above apply also to this part of the research. As the specific use of design standards is emphasized, Hypothesis 1 above has been restated as follows: Skillful application of design standards, based on both a systematic and a relational approach, will generate educational programs that accomplish significantly better results than those of unsuccessful cases.

Variables: Study #2 is based on the same variables and their constituting elements as Study #1, with one exception: in the variable relational approach, the item of *adequate project management* has been added.

Procedures

Data Collection. Data collection was conducted by professional assessors using an assessment manual for curriculum design and by means of questionnaires for (top) managers, supervisors, developers, trainers, and trainees to obtain data on perceptions of the initial problem and program effects. The assessment manual was applied to pilot analyses by three assessors. The pilots tested whether the guidelines offered sufficient help in rating the adequacy and consistency of the various curriculum elements. These pilots led to revisions of the assessment manual, mainly rearrangements of the coding system for adequacy and consistency.

Data collection took place in three stages. The following procedures have generated values for the main variables and their constituting items.

- **Stage 1: Assessment of Curriculum Design: Systematic and Relational Approach, and Internal Consistency**

  a. In late May, 1992, the researcher received three copies of the files containing the curriculum documents for the 28 projects. Three independent assessors studied the documents and carried out a preliminary analysis guided by the assessment manual.
  b. In June, 1992, for each of the 28 projects, the three assessors and the developer of the project met to discuss specific features and aspects that raised questions during the preliminary analysis. After the interview the assessors completed their manuals and submitted these to the researcher.

- **Stage 2: Assessment of Effects**

  a. In October, 1992, for each program developed, the researcher sent out the questionnaires on effects to the top manager, the supervisor, the developer, the trainer and to the trainees.
  b. In May, 1993, the last set of questionnaires was returned to the researcher. Sets arriving after that date could not be included in the analysis.

  Effect was based on the actors' answers to the questionnaire referring to:
  = satisfaction
  = acquisition of skills
  = improved performance
  = impact on work environment and department
  = impact on the organization.

- **Stage 3: Assessment of External Consistency**

  The data on the external consistency were collected as follows:
  a. The researcher collected the answers to two specific questions of the questionnaires and entered them on a separate display for each project.
  Question 1: What instigated the development of this educational program?
  Question 2: Which new skills should participants acquire in this program?
  b. For each project, three judges assessed the consistency between perceptions of managers, developers, trainers, supervisors and trainees. The judges assigned scores for the consistency between ten pairs of actors.

In Stage 1, the assessors analyzed the curriculum documents of 28 projects. However, in Stage 2 the questionnaires could be retrieved for only 17 projects. The developers reported on various circumstances responsible for this disappointing response. Due to internal restructuring of the organization and mergers, three projects had to be postponed because responsibilities and target groups had to be redefined. Two projects were not implemented because all training activities had to be cancelled or postponed due to the economical recession. Two projects were still in progress. No data on effects could be reported at that time. The activities for needs assessment, task analysis and creation of favorable conditions for implementation finally convinced top management in two projects that major changes in the organization were necessary for successful implementation. The projects were postponed. One project was postponed because the system for which the program was developed had not yet been implemented. Another project was postponed because the trainer went on maternity leave.

Results of Study #2

This chapter presents the results of the second empirical study. The reliability of the criterion variable effect is discussed, as well as the values for the predictor variables. The chapter concludes with the comparison of implemented and postponed projects.

Reliability of Effects Measures

Questionnaires were returned for 17 projects. The number of respondents per project varied from 1 to 12. The reliability of the effect measures was secured by applying the following criterion for accepting a project: at least 75% of the actors, for whom the scores of at least four (out of five) effect items are available, should show a jury a ≥ .60. Three projects did not meet that criterion and had to be rejected. The correlations between variables are therefore based on the 14 remaining projects.

The value of the effect variable is based on the following items: satisfaction, skills, performance, impact on work environment and department, and impact on the organization. The logic of the five effect items is that (in time) satisfaction facilitates the acquisition of skills, performance benefits from skills, performance has an impact on work environment and department, and work environment and department have an impact on the organization as a whole. The correlations between the five effect variables showed the following pattern:

	satisfaction	skills	performance	department (*) denotes: sign. p < .001
satisfaction				
skills	.04			
performance	.20	.79*		
department	.06	.38	.56	
organization	−.05	.36	.51	.77*

Apart from the pair *satisfaction–skills*, the pairs of adjacent effect variables show the highest correlations. This pattern may be interpreted as an indication that the measure of an effect variable over time is mainly influenced by the variable directly preceding it. Moreover, this empirical evidence supports the conceptual relationships between the effect items as described above.

Values of the Main Variables in Projects

On the basis of the values from the assessment manuals, the questionnaires, and the external consistency judgements, Likert scales have been constructed, in a way similar to Study #1. Table 2 shows a summary of the scales. The scales for the variables systematic approach, internal consistency, and relational approach are based on the data from 28 projects. The scale for the variable external consistency is based on the data from the 17 implemented projects. The scale for the variable effect is based on the 14 implemented projects where at least 75% of the actors, for whom the scores of at least four effect items were available, showed a jury $\alpha \geq .62$.

Table 2. Scale analysis in projects.

Scale	*k*	*min.*	$\bar{X}$	*s*	scale α
Systematic Approach	5	3.33	4.00	.46	.87
Internal Consistency	5	3.07	3.74	.52	.88
Relational Approach	5	3.58	3.85	.36	.89
External Consistency	5	2.33	3.25	.63	.75
Cost-Benefit Analysis	5	3.33	4.26	.46	jury α = .62*
Effect	5	3.10	3.59	.26	.73

**As the Cost-Benefit variable is based on one item, its reliability is expressed by the jury α of the three assessors.*

k = number of scale points

Scale point: 1 = not at all adequate/consistent/effective
2 = slightly adequate/consistent/effective
3 = somewhat adequate/consistent/effective
4 = very adequate/consistent/effective
5 = highly adequate/consistent/effective

Comparison of Implemented and Postponed Projects

As implementation has been postponed for 11 projects, experimental mortality might affect the findings. Therefore, we were interested in whether the values for the variables systematic approach, internal consistency, and relational approach of 17 implemented projects differed significantly from those in the group of 11 postponed projects. For both groups, the values of these three variables were available. For this comparison, *t* tests were run for the two groups. Comparing the three variables showed that the 17 implemented projects did not deviate significantly from the 11 postponed at $p < .10$. Therefore, experimental mortality is not likely to affect the validity of the effect values at hand.

Discussion of Study #2

A general conclusion is that the projects show homogeneous values for the six variables (Table 2). Only the variable external consistency is weak (that is, <3.00) for three projects (projects 5, 10, 18). The variable cost-benefit analysis is very strong (>4.00) for all but three projects. Regarding the effects variables, all the 14 projects have succeeded when the same criterion for success was applied as in Study #1 (>3.00). This homogeneous achievement is rewarding to the group of developers and their organizations, but the limited variance in the data caused psychometric problems. Between relational approach and external consistency, no substantial correlation could be established due to small variances, $s = .36$ and $s = .63$, respectively. This was also the case with the correlation between relational approach and effects, $s = .36$ and $s = .26$, respectively.

Findings Related to the Hypotheses

To relate the findings to the hypotheses, the relevant correlations between variables have been computed. On the basis of these findings, the hypotheses are examined and discussed.

Hypothesis 1: Design standards advocating a systematic approach lead to internally consistent formal curricula. The correlation between systematic approach and internal consistency is $r = .88$, $p = <.001$. This hypothesis should not be rejected. Study #1 showed similar high correlations: $r = .87$, $p = <.001$.

Hypothesis 2: Internal consistency of the formal curriculum and program effects are related positively. The correlation between internal consistency and program effects is $r = .47$, $p = .043$. This hypothesis should not be rejected. It is remarkable that the five projects with the lowest effect values (<3.50) show a negative correlation $r = -.72$, $p = .086$.

These figures indicate that internal consistency and the related systematic approach probably have to be embedded in a prerequisite condition to be effective. These findings form a basis for a plausible explanation that further efforts to obtain internal consistency of the formal curriculum might become counterproductive when the design process does not satisfy the prerequisite elements of the relational approach and external consistency.

Hypothesis 3: Design standards advocating a relational approach lead to external consistency (homogeneous ideas and perceptions among parties involved on the nature of the problem and possible solutions). No significant correlations were found for this hypothesis. All the correlations found were close to 0. This might indicate that, from a statistical perspective, the hypothesis should be rejected. Compared to Study #1, this shift is dramatic (Study #1: relational approach → external consistency $r = .54$, $p = .013$; relational approach → effects $r = .86$, $p = <.001$).

A plausible explanation for this deviant pattern is as follows: In view of the strong correlations found in Study #1, it is unlikely that there is no empirical evidence for the theoretical construct of the relational approach and its presumed impact on external consistency and effects in the projects of Study #2. The deviant pattern may be of psychometric origin. The variance of the relational approach is too small ($s = .36$) to obtain substantial correlations.

In view of the findings in Study #1 and the small variance of the variables, it is justified not to reject the hypothesis.

Hypothesis 4: External consistency and program effects are related positively. The correlation between external consistency and effects is $r = .40$, $p = .077$. This hypothesis should not be rejected.

Hypothesis 5: The relational approach compensates for weaknesses in the systematic approach. When weakness of the systematic approach is defined as <3.00, this hypothesis does not apply to any of the projects. No empirical data are available for testing this hypothesis.

Hypothesis 6: The systematic approach does not compensate for weaknesses in the relational approach. When weakness of the relational approach is defined as <3.00, this hypothesis does not apply to any of the projects. No empirical data are available for testing this hypothesis.

Hypothesis 7: Though cost-benefit analyses are important for selecting efficient solutions to educational problems, they are not related to program effectiveness. As no significant correlations between cost-benefit analysis and effect could be found, this hypothesis should not be rejected.

Hypothesis 8: Skillful application of design standards, based on a systematic as well as on a relational approach, will generate educational programs that accomplish significantly better results than those of unsuccessful programs in Study #1. The minimum value found for the systematic approach is 3.33. The minimum value for the relational approach is 3.58. These values justify the conclusion that in all projects of Study #2, the systematic approach as well as the relational approach have been skillfully applied. The programs in Study #1 were not developed on the bases of the design standards that the developers in Study #2 applied. In the Study #1, the criterion for success is effect >3.00. All projects in the second study present effect values >3.00. Provided that it is permissible to compare the effect values of the two studies, the conclusion that skillful application of the design standards generates educational programs that accomplish results that are significantly better than those of unsuccessful programs in Study #1 is justified. This hypothesis should not be rejected.

Conclusions

Answers to the General Research Questions

The aim of this study was to develop a prescriptive theory and validated design standards for corporate education. It addresses the following research questions:

1. Which factors in curriculum design influence quality in corporate education?
2. How do these factors operate?
3. Can design standards control these factors?

The questions will be answered here, to the extent permitted by the limitations of the study:

Question 1: *Which factors in curriculum design influence quality in corporate education?*
A theory has been developed in which the systematic and relational approaches of the developer are related to the internal and external consistency of a curriculum. Curriculum consistency is used as a descriptive framework for quality in corporate education. The paradigms of the theory are:

A. Systematic Approach. A systematic approach generates logical contingencies between purpose, objectives, evaluation criteria and instruments, and the instructional presentation. The systematic approach results in an internally consistent formal curriculum and enables powerful educational interventions. Consequently, an internally consistent curriculum enables the acquisition of new skills, improvement of performance and a positive impact on the work environment.

B. Relational Approach. A relational approach stimulates management involvement and team work during the design and implementation process. It engages trainers with practical experience in the subject matter field and facilitates learning situations that resemble the work environment. The relational approach generates external consistency, defined as homogeneous notions of the parties involved, on the nature of the problem and possible solutions through educational provisions. When managers, supervisors, developer, trainers, and trainees share coherent opinions about the purpose of a program and the strategy to follow, their efforts will lead to successful program implementation, favorable transfer conditions and positive effects.

> The research findings have inferred empirical evidence for the application of the systematic and the relational approaches. External consistency appears to be conditional for internally consistent curricula to become effective. Moreover, without these prerequisites, an internally consistent curriculum can become counterproductive.

Question 2: *How do these factors operate?*

The systematic approach involves a logical and intellectual endeavor. The developer collects and analyzes data on the desired outcome and the target group, draws up a plan, selects instructional strategies and constructs course materials. Intellectual versatility and skillful application of instructional theory are major ingredients.

> The study shows that efforts to take a systematic approach increase the internal consistency of the curriculum. Internal consistency of the formal curriculum and program effects are related positively.

The relational approach involves social intervention and skilled communicative interaction. The developer organizes meetings and interviews managers, supervisors, employees, potential trainees and trainers. These procedures entail consulting with concerned parties, problem solving, negotiating, reaching a consensus, gaining support, and strategically applying gentle pushes and decisive pulls. The goal of these efforts is to achieve a consensus among parties involved on methods of solving the problem, implementing the program, and creating favorable transfer conditions in the work environment.

> The study shows that the relational approach, external consistency, and program effects are positively related. The creation of favorable conditions for implementation, adequate selection of trainers, coaches, and trainees, project management, and involvement of line management are essential elements in the relational approach.

Question 3: *Can design standards control these factors?*

The developers who participated in the second study were trained in the application of design standards, that emphasise both the systematic and the relational approach. Experienced specialists with excellent reputations in the training profession assessed the curricula they developed. The average values for the systematic and relational approaches and for internal consistency, as well as those of their constituting elements were all satisfactory (>3.00). When we investigated the effects of the programs, all projects passed the criterion for success (>3.00). All but three projects satisfied the criterion for external consistency (>3.00).

Cost-benefit analysis is the easiest factor to influence by design standards. The values for the adequacy of this variable were among the highest. This result was in contrast with the preceding study, which showed very poor performance on this item. However, the cost-benefit analysis does not have a significant impact on program effects.

> The procedures for systematic curriculum design were learned and adopted successfully and generated programs with high internal consistency. This quality has a distinct impact on effects, provided the program is embedded in an externally consistent environment.

The procedures that encouraged the developer to apply a relational approach were implemented properly. Unfortunately, their intended impact on external curriculum consistency could not be measured, because the variance in the data was too small. Nevertheless, comparable achievements in Study #1 clearly show effects on external consistency and program outcome.

In the framework of a single program, the developer is unlikely to achieve high external consistency when the organizational system fails to respond. Management involvement and close links with the work environment are essential for establishing external consistency. If the training function is isolated or has a negative image, the first attempts at a relational approach will not automatically result in strong external consistency and consequently in effective programs. It is obvious that, apart from the inductive activities of a single program developer, an organization will benefit most from the relational approach when the educational policy at the managerial level advocates curriculum design that integrates the systematic and relational approaches. Thus, quality in corporate education is not solely dependent on skillful application of relational and systematic approaches of the developer, but also on the organizational climate in which an integrated educational strategy can flourish.

> External consistency is a prerequisite for optimal benefits from the formal curriculum. It appears, however, that external consistency does not increase in proportion to the amount of energy the developer puts into the relational approach. The organization must also react positively to the developer's efforts. It really does take two to tango.

In view of the preceding findings, the answer to the third research question is affirmative. The design standards with which the developers were provided could be mastered within a period of eight months and successfully applied to their projects.

> The curriculum projects in Study #2 performed significantly better than the unsuccessful cases in Study #1 as to effect, systematic approach, internal consistency, relational approach and cost-benefit analysis.

In addition to these observations, it should be stated that this study only investigated the program effects when design standards were being applied deliberately. For most developers, this project was the first they ever developed according to prescribed operating procedures. The findings do not predict whether the developers of this study will continue applying these design standards in future projects.

Suggestions for Further Research

This study has not questioned the foundations of internal consistency (the logic contingencies among purpose, objectives, evaluation criteria and instruments, and instructional strategies). Whereas external consistency is viewed as conditional, internal consistency is considered the driving force behind a curriculum. It might, however, be interesting to investigate curriculum design procedures that neither are rigorously rational nor strive for logical contingencies in the formal curriculum. If curriculum design were also perceived as professional artistry, additional categories of design principles could be explored, for example:

- the learning situation mirrors the work environment
- the manager is the prime educator
- the trainer is an experienced colleague
- trainer and trainee agree on the importance of their educational encounter.

The research design did not permit separate statements on each of these postulates detached from the framework of the systematic approach. Of course, the application of these relational design principles should be applied in a systematic way, but emphasis would primarily be put on the dynamics of the interactional context of curriculum design. The findings of the present study justify the conclusion that in striving for quality in corporate education, gaining external curriculum consistency should be a high priority. As a consequence, design standards that strive only for an internal, rigid logic, but meanwhile hinder the integration of the actors' interests, values, believes and priorities (external consistency), should be abolished and replaced by intervention strategies mainly focusing on the interpersonal dynamics of educational decision-making: procedures that aim at reaching a consensus on the practical implications of the above mentioned alternative design principles. In particular, professional curriculum designers (not being the trainer) should be alerted not to focus unilaterally on the structured and internally consistent formal curriculum. Curriculum development should be regarded, more than up till now, as a social enterprise. Therefore, developers should also elaborate on their management role within that social enterprise of the educational decision-making process.

Thus, the end of this study states some 'daring and fresh hypotheses that do not take for granted as true what has merely become habitual' (Bruner, 1966, p. 171):

- Curriculum development that unilaterally focuses on internal consistency and neglects external consistency may create a major source of design inefficiency.
- Effective educational provisions are not constructed, but negotiated (as part of the relational approach).
- To become effective, curriculum development should be embedded in a positive educational environment. Such a climate is supported by a formal and sophisticated education policy, as well as by informal and personal commitment of top managers.
- Successful curriculum designers are above all competent social engineers, who skillfully manage the social enterprise of educational decision-making.

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