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APPROACHES TO COURSE DESIGN

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1 Introduction

In this entry *course design* is used for the tactical planning process, that is positioned between the macro strategic level of curriculum development and the micro operational level of instructional design. On this tactical level, the main goals from the overall curriculum development outcomes are organized in courses, that is in comprehensive entities of objectives, assessment instruments and instructional strategies and materials. This planning process involves analysis of the specific needs, the analysis of favourable and inhibiting conditions for implementation, and the selection and application of instructional theories. The aim of this contribution is to review current concepts and approaches as well as their application in formal and corporate education.

Although it sounds plausible to make clear distinctions between curriculum development, course design and instructional planning, practice does not show such clear separations and unambiguous definitions. Gentry's book *Introduction to instructional design*

(Gentry, 1994) focuses on course design. Romiszowski's *Designing instructional systems* (Romiszowski, 1981) applies to curriculum development (level 1 design), course design (level 2 design) as well as to instructional planning (level 3 design). Rothwell and Kazanas (1992, p. 4) state that the chief aim of instructional design is to improve employee performance so as to increase organizational efficiency and/or effectiveness. This general aim would apply to the concept of the more strategically used concept of curriculum development. However, the instructional planning process they actually describe fits the concept of course design, as well as what has

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what has been indicated as the instructional design on the operational level. Posner and Rudnitsky's book is titled *Course design. A guide to curriculum development for teachers* (Posner & Rudnitsky, 1986). In fact, their guide helps teachers to plan instruction that gears towards intended learning outcomes on the operational level. These examples show the variety of terms used and how the various authors attribute different meanings to these terms. Differences in opinion about how the learning process takes place in the individual can be reflected in the approaches to curriculum development, course design and instructional planning. As a course is an educational solution to a problem, or an educational answer to a question, it is of great interest how the designer perceives the learning process that makes part of that solution or answer. In the following sections a variety of these perceptions and their related approaches are discussed.

2 Approaches to course design

We will review the following approaches: a systematic approach (Tyler), a deliberative approach (Walker), an artistic approach (Eisner), a cognitive approach (Posner), a constructive approach (Winn). In a separate paragraph, elements of the various approaches are combined and applied to course design in a corporate setting.

2.1 A systematic approach

The systematic approach to course design follows directly from the work of the prominent American curriculum scholar Ralph W. Tyler. He was invited to construct a comprehensive outline of the questions to be answered and the steps to be taken in developing a monumental curriculum project including the program of instruction. What later became known as the 'Tyler Rationale' (Tyler, 1949), started as a framework to guide the efforts of participating schools in their development of new curricula. Tyler (1966) states: 'As the project began, the schools encountered great difficulty in identifying the problems to be attacked and in organizing and assigning task forces to work on these curriculum projects. There seemed to be little in common among the schools in their uses of terms, in the emphasis given to the subject fields, to student needs, and to social demands, and there was no clear-cut way in which the educational philosophies of the schools and theories of learning were considered'. These conditions led to the original statement of the four divisions of curriculum inquiry (Tyler, 1949):

1. What educational purposes should the school seek to attain?
2. What educational experiences can be provided that are likely to attain these purposes?

3. How can these educational experiences be effectively organized?
4. How can we determine whether these purposes are being attained?

For gathering information on the objectives (Question 1) Tyler recommends the following sources: studies of the learner (individual), studies of contemporary life (society), and suggestions from subject specialists (content), along with employment of a philosophy of education and a theory of learning. Later on, the specific emphasis on stating objectives (Question 1) grew out to an expanding culture of behavioural statements on learning outcomes. Long before Tyler formulated his rationale, it was amongst others Bobbitt who drew attention to the analysis of what is needed in educational systems: 'The curriculum-discoverer will first be an analyst of human affairs... This requires only that one go out into the world of affairs and discover the particulars of which these affairs consists' (Bobbitt, 1918, pp. 42-43). The systematic and analytical approach to course design, as advocated by Bobbitt and Tyler has led to still dominant design procedures that heavily rely on needs assessment, task analysis, stating instructional objectives, matching assessment instrument and devising appropriate instructional strategies. Programmed instruction and computer assisted instruction probably would not have come to development without the founding work of Tyler. Authoritative course design procedures that stem from Tyler's rationale are amongst others: Taba's *Curriculum development: Theory and practice* (Taba, 1962), Briggs' *Instructional design: Principles and applications* (Briggs, 1977), Tracey's *Designing training and development systems* (Tracey, 1971, 1984 revised edition), Dick and Carey's *The systematic design of instruction* (Dick & Carey, 1978, 1990 second edition), Branson and Grow's *Instructional systems development* (Branson & Grow, 1987). The initial four questions of the Tyler Rationale have been elaborated upon and developed into impressive volumes of design procedures. The logic and rational step by step approach, including the iterative use feedback from formative evaluation, is characteristic of most of these systematic design procedures.

2.2 A deliberative approach

In practice, course design often does not show the step by step approach as advocated in the previous section. Walker observed many course planners and identified three basic planning phases: platform, deliberation and design (Walker, 1971, 1990). On the basis of these findings he developed a framework for the process of curriculum planning for which he used the term 'Naturalistic Model'. This model is not a model of how course design should take place, but how it occurs in reality when planners meet and try to put together the elements for

successful learning events. In the 'platform-phase' participants talk, discuss and argue about their beliefs, 'conceptions', theories, aims, images and potential procedures concerning the project. When a group achieves clarity and consensus about these constituent elements of the platform, they move into the phase of deliberation. Walker's model specifies that the process of deliberation includes identifying relevant facts, generating alternative courses of action in light of precedents, considering the costs and consequences of all alternatives and choosing the most defensible alternative. The platform and deliberative phase involve intensive exchange of ideas and beliefs. Reaching consensus is essential for moving into the design phase. But reaching consensus can become an extremely difficult task, especially when participants hold to their adversive beliefs, or when they do not survive the frustration of emerging chaos. When the planning group does reach consensus about the most defensible alternative in course design, they move into the design phase which includes the decision making about specific subjects, instructions, teaching materials, and other activities that the planners advice. In the process of course design it is extremely important that participants make their individual beliefs and values explicit as well as their perceptions of the instructional task and their assertions about how to proceed. The importance of the deliberative approach is that it recognizes the variety of beliefs, aims and images that participants in a project on course design adhere to and that may frustrate a rational and linear design process. Walker's model also offers guidelines for reaching consensus and for how to proceed when this does not happen.

The importance of deliberation has been stressed by several other authors. Banathy (1987, p. 93) 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.' This calls for a participative design where major stakeholders are involved. Banathy (1987) emphasizes an iterative and spiralistic design process where the designer may pass several times through the various phases of the design cycle. Recently, design approaches that combine participative deliberation and iterative procedures advocate prototyping as a vehicle for course design. Gentry (1994, p. 160) defines a prototype as 'a functional version of an instructional unit usually in an unfinished state, whose effectiveness and efficiency can be tested'. It offers users an opportunity to find out what they do not like about the proposed unit, which is often easier than exactly indicating what is needed. Prototyping can be regarded as a practical way of organizing deliberation among relevant stakeholders.

2.3 An artistic approach

Eisner's ideas on course design are based on philosophical statements that social reality is not objective but subjective, constructed, multiple and negotiable. Therefore, the decision making process about curricula resembles very much an artist's approach of reality. A teacher-curriculum planner portrays his or her view of reality and the student chooses how to modify his or her own view (Eisner, *The educational imagination*, 1975). Instead of the monomadic orthodoxy of empirical-analytical approaches he advocates the artistry of teaching that offers a variety of new assumptions and methods that appreciate the richness of educational practice. He objects to the rigid use of predetermined behavioural objectives and offers strong arguments for the use of expressive objectives (Eisner, 1985) that describe the importance of an 'educational encounter'. Eisner also advocates an artful process of arriving at consensus about curriculum priorities where various participants become involved in dialogue and discourse. He strongly objects to the traditional selection of academic content and favours that a wide variety of learning opportunities must be provided to students. This requires that teachers become engaged in 'educational imagination' to transform the planned curriculum into varied, meaningful and satisfying learning opportunities for students. Eisner's artistic approach demands that many of the most important decisions about the curriculum be made in the classroom by the teacher who enacts it and who observes how students experience it. It is undeniable, that in this artistic view the enacted and experienced curriculum receive greater emphasis than the formally planned curriculum in the more systematic and logic-rational design approaches. However, Eisner offers very few guidelines for the actual planning process. The teacher in the classroom remains the key figure who enacts the curriculum and offers specific learning experiences. In fact, this approach questions the relevance of scientific course design.

Not only in formal education discussions were raised on the limitations of deterministic design strategies. In private enterprises where concepts as 'the learning organization' emerge, much emphasis is put on dialogue (Senge, 1990), the use of metaphors and the process of 'imaginization' (Morgan, 1993). The aspect of 'artistry' in curriculum design can be recognized in the work of Schön (1987), who studied the professional education of architects. The minor importance of the formal curriculum is reflected in the work of Wierdsma and Swieringa (1992). These authors strongly object to a rigid blue-print-thinking and encourage a discovery process that enables an organization to find out where they are heading for.

2.4 A cognitive approach

Posner (1982) introduces the concept of the 'curricular task' that forms the core of an approach to curriculum development and course design based on a cognitive psychology and a complementary conceptual change model of rationality. An important characteristic in this cognitive approach is that the students' interpretation of the curricular tasks and their subsequent task engagement determine what and how much they learn. This emphasis on cognitive operations instead of on instructional activities is reflected by Posner's greater interest in student's problem solving processes than in achievement-testing. Students shape their tasks or construct problem spaces on the basis of their interpretations of the task environment against the background of past experience, the availability of internal and external resources, the costs and benefits of engagements, and their purpose of being in the situation.

The cognitive approach is based on a thorough understanding of how knowledge is organized to permit storage, retrieval, and utilization of knowledge, and how a person's previous experience and existing knowledge affect perceptions, communication, learning, and performance of tasks (Posner, 1978). The book *Course design. A guide to curriculum development for teachers* (Posner & Rudnitsky, 1986) offers a framework that apparently follows a rational and linear process of goal setting, instructional planning and evaluation in a manner many other design approaches in the systematic tradition do. However, considerable attention is given to the technique of conceptual mapping. A conceptual map is a chart depicting the relationships among the important ideas with which the content of a course deals. The map describes the organization of understandings in the course. The techniques of conceptual mapping, the organization of cognitive elements into an instructional focus, and the sequencing of the units of the course, reflect the cognitive approach most clearly. In the design process of courses based on conceptual maps, the analysis of curricular tasks and the relationships between their cognitive components plays a crucial role. Patrick (1991, 1992) described many techniques for conducting task analysis that focus on human information processing, meta cognitive skills and inferential reasoning, that support course design in this cognitive approach.

2.5 A constructivistic approach

A central idea in constructivism is that students construct knowledge for themselves. From a radical point of view, knowledge construction implies that each person knows the world in a different way, that there is therefore no shared objective knowledge to teach about, and that consequently instructional analysis and prescription make no difference to what students learn (Winn, 1993). From an

extreme perspective, there is nothing that instructional designers can do to affect students' understanding and behaviour, if knowledge is entirely constructed by students. If constructivists are right that students do not react in predictable ways to instruction and that what is taught has no factual, conceptual, rule-based or procedural foundation in the real world, it is pointless to design courses. But not all constructivists take this radical position.

The main constructivist criticism of course design concerns its reductionistic analysis, the supposition as if there were an objective reality, the belief in deterministic prescriptions based on the assumption that change in behaviour and knowledge can be predicted, and finally that carefully designed instruction is replicable. Constructivism holds that learning is a process of building up structures of experiences. Learners do not transfer knowledge from the external world into their memories, rather they create interpretations of the world based upon past experiences and their interactions in the actual world (Cunningham, 1992a 1992b). In the constructivist view a course should provide contexts and assistance that will aid the individual in making sense of the environment as it is encountered (Duffy & Jonassen, 1992). The extreme constructivists reject course design methods as these assume an invalid idea about knowledge acquisition. The evident autonomy of learners in knowledge construction makes it difficult if not impossible to predict how they will learn or to plan instructional activities (Winn, 1992). However, their alternative is not very well developed yet. One of the few examples of constructivist design is offered by Spiro, Feltovich, Jacobson & Coulson, (1992) in the form of cognitive flexibility hypertexts, and refers to the design of non linear computer learning environments. The basic characteristics are 'landscape criss-crossing' that require rearrangement of instructional sequences, multiple dimensions of knowledge representation, and multiple interconnections across knowledge components. However, Winn (1993) states that as people communicate with each other all the time, meaning must therefore be shared. Thus, deciding what concepts mean becomes a social activity. Acceptance of the social nature of understanding opens the way for course design. Learning then, is conceived to be synonymous with acculturation, and is encouraged through practices no different from those found in societies having no formal system of schooling. The educational process may stress the process of making meaning rather than the end of arriving at a particular understanding.

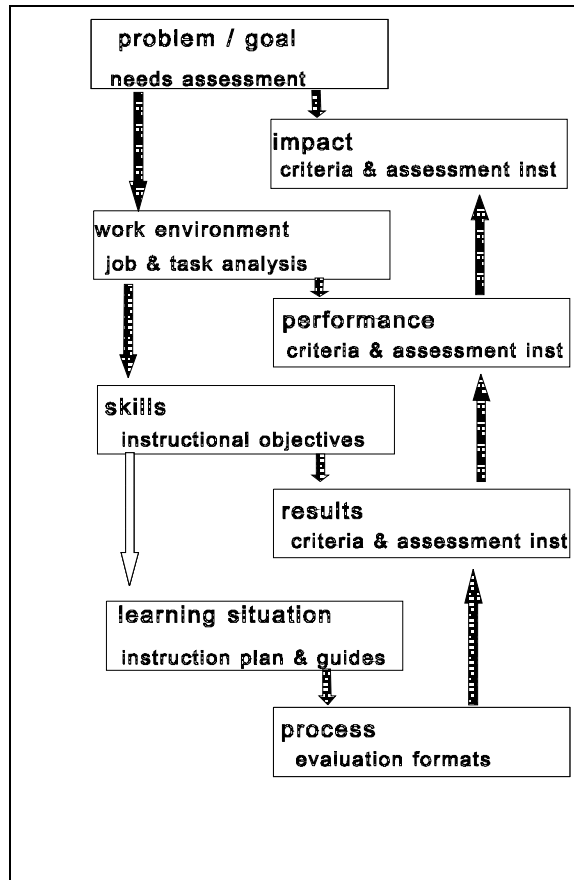
Lowyck and Elen (1993) assert that the transition in theoretical foundations of course design towards constructivism requires not only to change the design prescriptions but also to consider and investigate the mental models and cognitive skills of the instructional designer. It seems as if a constructivist approach to design is a contradiction in terms. Under constructivism students select and develop their

own learning strategies, and often their own goals and objectives. What should there still be designed? The constructivist approach probably offers help in complex, ill-structured domains of advanced knowledge. The design will focus on providing flexible and varying amounts of guidance to learners who find their own way in constructing their own knowledge. Constructivism should also be regarded as a strong reaction against the presumed predictability of learning outcomes by the use of rigid design procedures as advocated in behaviourist traditions.

3 A curriculum consistency approach for corporate course design

In organizations many kinds of educational needs arise. New employees have to socialize in their new environment and acquire the competencies to perform their tasks. Changing technology, restructuring the work environment, and setting strategic goals, all require adaptation which involves learning, that has to be organized. Especially as competition and economic reasons demand for effective and efficient procedures for facilitating the desired learning, there is a strong need for planning devices in corporate education. The curriculum consistency approach (Kessels, 1993; Kessels & Plomp, 1996) offers a synthesis of systematic approaches as advocated by Tyler and his followers, as well as of the deliberative approach as described by Walker. The consistency approach is based on two principal assumptions: a curriculum or course should be internally and externally consistent.

Internal consistency means that the constituent curriculum elements (such as the problem to be solved, the goals, the desired improvement in performance, the competencies and skills needed, the assessment instruments, the required learning environment, and the supporting materials) should be interrelated in a logical and rational way. The concept of internal consistency builds on to the *systematic approaches* of Tyler (1949), Tracey (1984), Romiszowski (1981), Posner and Rudnitsky (1986) and Rothwell and Kazanas (1992). See figure 1: An internally consistent curriculum. It offers procedures for the planning of time and resources, systematic problem solving and cost calculations.



External consistency implies that the stakeholders should share homogeneous notions about what the problem or question to be addressed is and how it will be solved or answered. The stakeholders in corporate settings are top management, local managers and supervisors, designers, trainers, coaches, trainees, and sometimes even clients. The need for external consistency emerges as soon as one acknowledges that learning is not restricted to the classroom and not exclusively controlled by the trainer. The concept of external consistency refers to the assumption that powerful learning processes not only take place in the classroom but also in the day to day work environment. Learning occurs the moment employees become engaged in working on their tasks and interacting with colleagues, managers, clients and artifacts. We could even argue that the learning processes in the work environment should be considered to be more powerful and persistent than those in an artificially created training environment. The concept of external consistency enables an organization to transform into a learning organization (Pedler, Burgoyne & Boydell, 1991; Senge, 1990). The acknowledgement that the organization offers powerful

opportunities to learn is seen as a prerequisite to develop core competencies, which enable an organization to survive in a competitive world (Hamel & Prahalad, 1994). The concept of external consistency is closely related to a *relational approach* in curriculum development and course design. This relational approach refers to the developer's activities in the domain of interpersonal dynamics of decision making, gaining commitment, involvement and support. The relational approach is based on the notion that curriculum development is a social enterprise with all the attending potentialities and obstacles associated with humans engaged in social interaction. The interests, values, ideologies, priorities, role functions, and differentiated responsibilities form the contours of the interactional and dynamic context in which curriculum decisions are made (Gay, 1986). The relational approach incorporates major elements of Walker's (1990) deliberation approach. The relational approach contains procedures for project management, critical incidents techniques, dialogues, and for decision making. Elements of the traditional systematic approach like analysis, goal setting, instructional strategy design, and material development can be incorporated in a relational mode.

The consistency approach to course design leaves considerable space for the application of cognitivist and constructivist perspectives when it comes to creating actual learning environments. In fact, the consistency approach invites decision makers, designers, trainers and trainees to become involved in a learning process that enables the construction of new knowledge about how to solve ill-defined problems in an organization. Eventually, the development process of educational provisions may become a more important learning process for an organization than the product of the program design is going to offer. The conjectures underlying the consistency approach as well as the design standards that support this approach have been empirically tested in a large scale research project. 37 private and not-for-profit organizations participated in this study, that included 45 curriculum projects in a great variety of subject matter domains. Besides the validation of the design standards, the main conclusion of the study is that educational provisions in organizations become effective when their internally consistent programs are embedded in an externally consistent environment (Kessels, 1993; Kessels & Plomp, 1996). These conclusions could also shed new light on implementation problems that occur when introducing new courses in the context of formal education. Therefore, it might be interesting to apply elements of the consistency approach to course design in formal educational settings.

4 Conclusion

In the previous paragraphs we portrayed five approaches to course design. Each

approach holds a particular perspective that determines the kind of help that is offered to guide a student or trainee in the acquisition of knowledge about the world and the development of competencies to deal with this world. Some authors strongly focus on the products that should support such help. In the systematic approaches the procedures lead towards the efficient production of blue prints for instruction, materials and control devices. Other authors, in particular in the deliberation and artistic approaches, value the articulation of beliefs, ideas, images and priorities that underlie the educational decision making process.

In the cognitivist tradition the representation of the knowledge acquisition process plays an important role. Therefore, mental mapping and sequencing of instructional foci are central in the accompanying strategies for course design. In the constructivist approach, varying from mild to extreme positions, the common point of reference is that there is no objectivist knowledge that can be transferred to learners. Learners construct their own meaning of the world, and therefore the learning takes place on the basis of past experiences, in interaction with the environment. Extreme constructivists reject the idea of course design as a reductionist and predetermined activity that inhibits learning. Mild constructivists accept the idea of course design as long as it offers learners coaching on request with multiple dimensions of knowledge representation and allows for multiple connections across knowledge components.

The curriculum consistency approach, elaborated for the context of corporate education, combines elements from the systematic design approaches with considerations that are characteristic for the deliberative approach. The basic assumption is that learning in an organization does not exclusively occurs in a training situation, confined to the classroom. The organization as a whole is considered as a learning environment. Therefore, the major actors in that environment should share coherent ideas about what the question is to be answered and how learning processes will play a role in solving that problem. Educational provisions should be consistent in itself and embedded in an externally consistent environment. The design process is regarded as a crucial learning strategy for the organization as it offers the participants an opportunity to construct new knowledge about the nature of the problems under study and about the process to solve these problems. The curriculum consistency approach is closely related to emerging concepts of the learning organization and the knowledge economy.

See also: instructional design, curriculum development, cognitive psychology, constructivism, design approaches, design models, curriculum planning.

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