

Model for Architectural Design Education (*MADE*) Theory



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What is the Model for Architectural Design Education (*MADE*)?

The Model for Architectural Design Education is a professionally orientated teaching model for the training of students of architecture in the form of organised learning in a planned, methodically¹ structured procedure. Starting with the design task, it encompasses the totality of those activities leading to the definition of objectives, preparation and production of a design and the compilation of the documents required by the planning authorities. It must however be noted here that a design task in its totality cannot be solved exclusively in an objective, formalisable manner, but that intuition and creative decisions are also required.

Content

1. [Design theory in general](#)
- 1.1 Ways of teaching
- 1.2 Ways of designing
2. [How did the Model for Architectural Design Education \(MADE\) come into being?](#)
- 2.1 My experience as a student
- 2.2 My experience as a lecturer and university teacher
- 2.3 Development of a teaching model for architectural design education
3. [The approach and intentions behind the Model for Architectural Design Education \(MADE\)](#)
4. [Description of the Model for Architectural Design Education \(MADE\)](#)
- 4.1 Introductory remarks
- 4.2 The guiding idea and points of emphasis in MADE
- 4.3 Subject matter and course content of MADE
- 4.4 Learning goals of MADE
- 4.5 Structuring the teaching and design process to reflect the content and goals
- 4.6 The Model for Architectural Design Education with projects

[Epilogue](#)

[Bibliography](#)

“Fundamentally, however, we are all collective beings, no matter what image we choose to adopt. For how little we have and how little we are of what we call our property in the purest sense! We all have to be receptive and learn, both from those who went before us and those who are with us now. Even the greatest genius would not go far if he planned to draw only on his inner self. But very many good people fail to understand that, and spend half their lives groping around in the dark with their dreams of originality. I have known artists who boasted of following no master, but rather owing everything to their own genius. The fools! As if that alone would do!”

Johann Wolfgang Goethe – Conversations with Eckermann, 17 February 1832

1 Methodical procedure:
„methodical = planned, considered, thought-out, proceeding step by step. The following components are required:
1. There is a process of transformation which is characterised by a large number of individual steps.
2. The individual steps take place in an intended, random or intuitive sequence.“ (Arbeitsberichte, 1970)

Foreword

I studied and taught architectural design for forty years at various educational institutions in Germany and abroad. The experience I gained, initially as a student and then as an architect, academic assistant, tutor and university lecturer ([Biography](#)), induced me during my architectural work and especially my teaching activities to consider the following problems:

What can – or has to – be done if architectural design is to be *taught* more effectively than before?
How can traditional design theory be supplemented by a *didactically* orientated design theory?

1. Design theory in general

1.1 Ways of teaching

Learning architectural design in Germany has up to now taken place in academic courses held by university lecturers in the subject of “design”. These lecturers are qualified architects with practical experience. Whatever qualities they may possess on a practical, scientific or even research level, they will most probably not have learned how to teach. They will seldom or never consciously use a consistent teaching method, or even conduct their courses in accordance with didactic principles, of which most of them are in any case unaware².

The adoption of specific teaching methods by lecturers in the subject of architectural design has always been regarded as a two-edged sword. Their consideration of the subject has frequently been subject to periodic fluctuations, and often influenced by fashions in education, such as

- the traditional **master/pupil approach** à la beaux arts, where the master gathers his pupils around him to learn by extensively uncritical acceptance),
- teaching in **project work**, which results in active learning with a specific objective, planned activities structured in phases, independence and co-determination on the part of the students, holistic learning, creativity and research, interdisciplinary learning, and work in small groups or with a single partner, and
- **self-determined learning by discovery**, in which the students build up their knowledge mostly by their own work, setting their own objectives, for example, for when and what they learn. Coping with this presupposes that the student has previously learned how to work systematically. The teacher has the task of arranging problem situations and providing the tools for their solution, and the course of the project should also be discussed with the students so that they can prepare or follow up their work as they require. As an alternative, work in small groups is possible, with three to five students cooperating in an independent approach to clearly defined sections of a project. The teacher then predominantly acts in an advisory capacity.

It is a fundamental aspect of university education in Germany and many other countries that the teacher is free to choose his own teaching method. This is justified when it protects the teaching and learning process from excessive outside influence (for instance from political, ideological or official intervention). This freedom is however subject to certain constraints resulting from the nature of the matter itself. There are, namely, logical relationships between the learning objectives and course content on the one hand and the teaching and learning methods on the other hand, which teachers ignore at their own peril.

For that reason, university lecturers should be trained in teaching, with special attention to teaching at university level. At least in Germany, however, little of the kind occurs, and their “pedagogical training ... is almost non-existent. In the vast majority of cases they have never heard a single word about how to teach. They just get on with it any old how.” (Der Spiegel, 1978). That is certainly a reflection of the fact that educational theory is often perceived as abstract and far removed from reality. The path a teacher of architectural design would have to follow from daily practice and teaching through educational theory and back to a clearer, improved teaching style seems too stony for most. Furthermore, education has itself become a discipline which – similarly to psychology and sociology –

2 Apart from the traditional term “teaching method”, one encounters expressions such as teaching process, teaching form, teaching model, teaching organisation, teaching strategy, learning/teaching method and so on. A number of these are synonymous with teaching method and used in the same way. In other cases, however, the “teaching methods” referred to are merely part of the process, such as game plans or case studies. An attempt to disentangle this confusion would go beyond the scope of this article.

has developed its own systems and concepts. For those teachers, including the writer, who have practised as architects, this acts as a deterrent. That is partly due to the subject itself, but also to the tendency of many authors on education to float off into superfluous abstraction and indeed at times become incoherent. The upshot is that we wouldn't touch it with a bargepole.

One escape from this dilemma is presented by seminars on university education³ which assist the professors, lecturers and tutors in considering what is appropriate for teaching at university level.

1.2 Ways of designing

Designing is both the architect's favourite activity and the central term for those actions which lead to solutions and results in a building project. Creative thought, original ideas and constructive vision are indispensable. In general, there are two basic approaches to designing, which are characterised below.

Basic approach I („Imagination“)

This is characterised by intuitive⁴, imaginative and holistic “envisioning” of a solution. A holistic solution is conceived on the basis of the problem and the knowledge available to the solver at the time. Two aspects are characteristic of this process:

- a) A sensually perceptible vision is created as a whole with no intermediate steps.
- b) The attachment of high priority to formal and creative aspects can be discerned in that vision.

Only when this vision has taken shape in three-dimensional models, isometrics, sketches of elevations, etc., is the plan thus created generously filled in to make it usable for the required functions and fulfil the requirements of the building project. Any spaces left over in the specification are then frequently “fiddled” into the grand scheme, rather like ramming a square peg into a round hole. In this approach to architectural design, careful preparation is as a rule lacking.

Basic approach II („Logic“)

The second basic approach is characterised by the derivation of a solution from preparatory documents which have previously been carefully compiled. A typical feature is the attempt to arrive at the design in a systematic procedure⁵. The focus here is on function and usability before any work on the form is carried out. The form of the building just “happens” in passing: it is not consciously designed.

The advantages and disadvantages of the two basic approaches to design have already been indicated in their characterisations:

- Basic approach I has advantages with regard to creative ambition, and disadvantages in relation to fulfilment of the task.
- Basic approach II is exactly the reverse.

3 For example those at the University of Essen or the Ruhr University in Bochum (both in existence since 1975). The course in university teaching at the University of Bochum, for instance, lasts one year and is divided into four parts: while stages one and two deal predominantly with the behaviour of the university teacher, stages three and four focus on the question of student behaviour.

4 Intuitive procedure:
 „Intuition = direct, visualised cognition in contrast to cognition by deduction and proof.“ (Georg, 1995)
 „Intuitive problem solving in design is connected with a surprising idea which establishes unexpected links between previously conceived thoughts to form a new whole. The idea arises spontaneously and sporadically, and not always logically. Flair and a feeling for the problem are required.“ (Norberg-Schulz, 1974)

5 Systematic procedure:
 System = assemblage, structure and principle of order. Systematics = planned presentation and uniform design. Systematic = involving a system or plan, regularly structured. A systematic procedure firstly involves the intensive clarification of the task to be performed. The given conditions are to be broken down into absolute requirements and wishes. Reformulation of the task is possible. The abstract basic principle is developed into a catalogue of solutions, from which the optimum solution is identified by assessment and selection.

Hybrid approaches

In addition to the pure instances of the two basic approaches described above, they both appear in various hybrid forms, although normally one of them is then dominant.

On account of the disadvantages of the two basic approaches, it can be assumed that a suitable hybrid approach provides the best opportunities for an optimum design process.

The Model for Architectural Design Education (MADE) is just such a hybrid approach.

2. How did the Model for Architectural Design Education (MADE) come into being?

2.1 My experience as a student

After a one year work placement in a carpentry business I took and passed a three day entrance examination and studied architecture at the Hochschule für Bildende Künste (HBK) in West Berlin from 1951 to 1958⁶.

The career of a university student commenced with two half-year basic course (Grundlehre) à la Bauhaus. This was taught by a former Bauhaus pupil, undoubtedly with the intention of calling the students' own aesthetic preferences into question. We became familiar with "new" aesthetic yardsticks, aimed at increasing the receptiveness of the architectural novices we were to matters of design. I greatly enjoyed the work set, as it fired the imagination and assisted in the development of craft skills.

After the basic course was completed, our entire further education took place in design and construction seminars in which the students worked directly and permanently together with the professor in charge. At the start of my first seminar, I felt as if I had entered another world. Suddenly, all the experimental games of trial and error and the creative exercises were over. There was no more education in or support with fundamentals to accompany the design exercises which had now begun. This sudden break was incomprehensible to me. Why was there no longer any "applied basic theory" to cover the creative aspects of the commencing education in purpose-related design? I would have found it useful and inspiring.

Whereas five days a week were spent working in the seminar on the design task set by the professor, traditional lectures and exercises in all the individual scientific and technical subjects took place on the sixth day. Unfortunately, however, there were no interdisciplinary links between these subjects (e.g. building construction, town and country planning or interior design) and the design tasks set in the seminars.

The teaching⁷ of design also received no attention whatsoever, although it should have occupied a central position as a preliminary stage to the learning of design. Guidance of the students by the teacher to the design result with the aid of methods, forms of organisation and learning materials did not take place, and as such the process of design itself was neglected. The design exercises were

6 "The Architecture Department at the Hochschule für Bildende Künste provides a full academic course of study regulated by a curriculum and examinations. Applicants are only admitted to this course on the basis of an entrance examination in which talent, a good general education and suitable character are the decisive factors. ...

The study of architecture at the HBK facilitates close contact with the fields of fine and applied art, and close personal contacts with the students of those two departments. In this way, the connections between building and art which have almost been lost in the present day can be recognised by all those involved during the courses and redeveloped as an aid to their future work.

Admission as a student to the Architecture Department is dependent on ... above average artistic talent and a good general education. Admission is further dependent on evidence of practical work for at least six months in the construction industry or a related trade. A student of architecture must in total provide evidence of twelve months of practical work in the construction industry or a related trade before the first examination and six months of office work after the first examination and before the second and final examination." (Hochschule, 1959)

7 "Teaching: The intentional and planned dissemination of knowledge, abilities and skills, mostly in a professionalised and also institutionalised form." (Schüler-Duden, 1989)

concerned with a particular building to be designed, and not orientated towards intermediate goals in the form of abilities and skills to be acquired by the students. The decisive objective in these efforts to disseminate knowledge was the solution to a specific design problem, and not the way in which to arrive at that solution.

Instead, any spontaneous ideas that came to mind were developed intuitively, using little information in the process. And the information that was used were developed intuitively and spontaneously. Little information was used in the process, and the information that was used merely referred to the building required and the circumstances of the site. Extensive thematic studies were missing. Decisions were therefore based on the students' own small experience of design, with which they attempted to solve the problem set. Following the various corrections by the lecturers, the greater part of the design work merely involved honing and improving the incipient designs and possibly modifying the structure or the construction details.

As a result, the design efforts of the students and the associated stress were concentrated on submitting something "new" to the professor in due time for the next review.

This way of "learning to design" was the general rule at that time. The status of an undergraduate student was that of an ignoramus⁸. As a result, he was constantly dependent on the professor, the omniscient master, who had the experience, knew how to do things and made the fundamental decisions when correcting the drafts.

Corrections to designs by my professors at the HBK took place according to the following ritual: The professor would take a seat on the stool, respectfully vacated for him, in front of the student's drawing board. Standing beside him, in an attitude of nervous curiosity and expectation, the student would ceremoniously spread out his sketches before the master, who would peruse them, pronounce upon them and correct them. When the correction was finished, the result was accepted as a judgement from on high, and the india-rubber or razor blade was set in motion to expunge the design errors or even make a new start. Students in their final years were admittedly allowed to have an opinion of their own, but the younger ones were not yet "mature" enough for that.

I can still precisely recall a "special" correction session bestowed upon one of my fellow students in the seminar. He dared, although still a "minor", to question the professor's opinion on a detail of his draft and refused to change it despite the authoritarian pronouncement, "It's done this way!" We who were there were shocked at this behaviour by a student, and found him extremely presumptuous and ill-mannered. Only many terms later was I able to regard this incident as a historic event and no longer to accept the "master/pupil" teaching method uncritically. I mention this example to illustrate how education aimed at producing mature and responsible people should not be, as severing the ties to the master's apron strings in such a situation is extremely difficult.

In our design seminars, then, learning to design was conducted by the trial and error method. Necessarily so, due to the inadequate didactic competence of the masters who did not know how to give their pupils the necessary tools to enable them to design.

These experiences and the memory of them led to my later intensive search for ways of training the abilities and skills of students as well as possible at an early stage, and of making the process of designing more comprehensible and the teaching and evaluation of results more functional, understandable and transparent.

2.2 My experience as a lecturer and university teacher

In 1963, I took up a teaching post at the architecture department of the Folkwangschule für Gestaltung in Essen-Werden. That year, the book "Conference on design methods" (Jones, 1963) was published. The conference papers it contained provided me with the impetus to develop my own method of teaching for my subject, "Building Design".

I did not as yet have a teaching model as such. However, I did doubt that usable design results could be achieved by intuition and spontaneity alone. If such results were successful, it would only be by chance, and they would certainly not be lasting. Even the most beautiful design fails when, for

⁸ The effects are even more adverse today, as applicants for a course in architecture are no longer required to work for at least six months in the construction industry or a related trade before commencing their studies.

instance, stipulations of building and planning law are violated, or specified distances from boundaries are infringed.

I therefore wanted to enable beginners to follow a systematic path from a defined design problem to its solution. That meant the end of unsystematic teaching and learning by the trial and error method, and the end of procedures which had no defined objective and whose rationale could seldom be perceived. For creative thoughts, original ideas and constructive inspiration, all of which are indispensable in design, are more apt to prosper on carefully thought out and purposefully prepared ground, where the specific problems and the direction required by the design task are clearly signposted and the theoretical basis and the way towards the solution are immanent in the basic structure.

2.3 Development of a teaching model for architectural design education

Inspired by the book "Conference on design methods", I embarked on fundamental research into the design process itself and into traditional methods of teaching design from the 19th century onwards. This was supplemented by evaluation of familiar planning and development methods in the German and English literature on engineering, design and technology. The research provided me with a host of ideas on how to develop a teaching model for the training of architects in design, which I prepared during my lecturership at the Folkwangschule für Gestaltung and completed from 1973 to 1996, when I was working as a professor in Department 9 (Architecture, Biological Sciences and Earth Sciences) of the University of Essen. I called my system the **Model for Architectural Design Education (MADE)**. Valuable assistance on matters of education theory was provided by my colleagues in Department 2 (Education) of Essen University, and by numerous others.

Furthermore, I received feedback from my students for many years, having requested them to examine the procedures employed in MADE critically and make suggestions for improvements where appropriate. In this way, MADE passed through a variety of probationary phases with sundry ups and downs, but in general a trend towards the up. In that context I found that one can also learn by teaching. In the final analysis, practice decides on theory.

The Model for Architectural Design Education (MADE), the structure and essential components of which are presented below, was not only tried out in practice at the University of Essen for many years, but also documented (see www.methodisches-entwerfen.de under Model of Architectural Design Education (MADE)).

3. The approach and intentions behind the Model for Architectural Design Education (MADE)

Designing has become more difficult over the years, for today's building projects are in part so complex that their implementation requires architects to possess a growing body of knowledge and ever increasing efficiency, and to bear more and more responsibility both for the quality of the building itself and its appropriate, ecologically sound incorporation in the environment. Furthermore, other professionals and interest groups are involved in the planning. All this necessarily has effects on the quality of architectural education required.

Some quotations from practising architects on their training in design illustrate the deficiencies: "The architects do not learn how to think. In their training to date, architects have had the opportunity to sweep much too much under the carpet. ... They have done too much architecture, too much building design, but a more serious fault is that they have not learned the method of designing. They have learned how to design a hotel, but not how to design." (It is a) "general deficit of architects that they have not learned how to approach a problem systematically, but rather play around with their sketching pads and 6B pencils in the usual way until they think they have got it right. ... The decisive thing is for architects to practise explaining what they have done. The drawing pencil is not sufficient as a language. ... The ability to argue is highly important. Language and thought are connected, and verbalisation makes the process and the working method more transparent." (Rautenstrauch, 1974)

The rising demands therefore call for expertise in teaching and the acquisition of expertise by learning. A good design is not created in a vacuum, but is based – above and beyond its creative aspects – on experience, knowledge, skill and, last but not least, on carefully thought out and properly prepared systematic procedures.

4. Description of the Model for Architectural Design Education (MADE)

4.1 Introductory remarks

A number of important terms require some discussion and explanation for better understanding of the Model for Architectural Design Education (MADE).

Architecture

The scope and reference of the term *architecture* have changed in the course of history, as the relationship between people and their physical surroundings has also changed in line with the development of society.

In ancient times, the term *architecture* (as used by Vitruvius) encompassed not only civil and ecclesiastical buildings but also the entire field of mechanics. In the Middle Ages it was seldom used, with building being the province of masons. In the Renaissance, with renewed interest in Vitruvius and under the influence of the Italian architectural theorists such as L.B. Alberti, its reference is limited to buildings and their construction, once again both civil and ecclesiastical. An interesting phenomenon occurs in Germany in the late 17th century, when “*Architektur*” as a term is replaced almost entirely by “*Baukunst*”, i.e. the art of building, or indeed the building as art. In the early 20th century, this usage is once again reversed, and from the mid 20th century onwards the term becomes increasingly devalued, leading to the statement that “Everything is architecture” (Hollein, 1987).

What do I mean by “architecture”?

I am inclined to follow Johann Wolfgang Goethe’s remarks in “*Baukunst 1795*”(Goethe, 1887-1919), and regard architecture as not only the art of building, but also the “highest purpose” of building. Goethe identifies four *methodical* steps which have to be climbed before a building can become a work of art. These are as follows:

1. Knowledge of the material: “*The art of building requires a material which can be used in stages for three purposes. ... The building artist familiarises himself with its properties and either allows himself to be ruled by those properties ... or he forces the material ...*” into complicated structures by means of mechanical knowledge and insight.
2. The use of the building: “*... being able to accomplish what is necessary with convenience.*”
3. Harmony in sensual perception and physical motion: “*The difficult and complicated theory of proportions, by which the building and its various parts achieve their character⁹, comes into play here.*”
4. The poetry¹⁰ by which a building really becomes a work of art. “*which ... undertakes to overwhelm the senses and raise an educated spirit up to astonishment and delight; this can only be produced by the genius which has made itself master of the other necessities; this is the poetic part of the art of building, in which the fiction¹¹ is properly deployed.*”

I made use of these principles formulated by Goethe in arranging the teaching stages and course material of the Model for Architectural Design Education (MADE). I am however of the opinion that only the first three steps named can be taught. The fourth step, namely the poetry, cannot.

Building

In its origins, building has nothing whatsoever to do with art. Building per se means only an activity performed by living beings aimed at a particular practical purpose – that of creating a space in which

9 “Character”. “In aesthetics, the word character denotes the particular expression, the idea which is to be represented of a work of art which depends on the means peculiar to the spheres of the various arts, and which may not and cannot surpass them. The character of poetry in its widest sphere is thus totally other than that of gardening or architecture.” (Meyers, 1844)

10 “Poetry, originally that artistically creative activity, the capacity for absolute freedom of the spirit, the free, individualised representation of an ideal formed to reflect elements of reality, according to which the term comprises the whole of art.” (Meyers, 1850)

11 “Fiction. The fiction is expressed in the “*character*” of a building. (Kruft, 1982)

they are protected from inclement weather and safe from their surroundings. Such a space can be a room, an apartment or a building. The latter is defined as follows:

“Buildings are independently usable roofed structures which persons may enter and which are apt or intended to provide protection from other persons, animals or objects.” (German Building Code, 1998)

Art

“is the highest form of aesthetic appropriation of reality by mankind.” (Milde, 1972)

Design

The term “design” denotes “a plan or scheme conceived in the mind of something to be done; the preliminary conception of an idea that is to be carried into effect by action” (Onions, 1984). It can therefore be deduced that designing is a process which leads to a sequence of events. This process (for instance in the design of buildings) extends from the design task or problem to a solution, the finished design and the building.

Method

In relation to *teaching*: “A systematic, planned procedure. In connection with education, it comprises systems of procedure which influence learning processes with reference to defined pedagogical objectives. Methods are the most sensible, purpose-related and economical ways between the participant’s starting position and his goals.” (Baumgart, 1998)

4.2 What is the Model for Architectural Design Education (MADE)?

The Model for Architectural Design Education is a professionally orientated teaching model for the training of students of architecture in the form of organised learning in a planned, methodically¹² structured procedure. Starting with the design task, it encompasses the totality of those activities leading to the definition of objectives, preparation and production of a design and the compilation of the documents required by the planning authorities. It must however be noted here that a design task in its totality cannot be solved exclusively in an objective, formalisable manner, but that intuition and creative decisions are also required.

4.3 The guiding idea and points of emphasis in MADE

The core of the Model for Architectural Design Education (MADE) is shown in [figure 1](#) in the form of an MADE teacher/student. In a nutshell, MADE is

- a) a model developed for university lecturers facilitating planned teaching in the design of buildings, and
- b) a model developed for students facilitating the planned and systematic design of buildings.

MADE assumes that teaching – like every other professional activity – can largely be learned, and that special features of personality such as creative talent¹³, intuition and charisma merely influence teaching actions to a certain extent. (Becker, 1984)

The definition of the Model for Architectural Design Education draws attention to an important characteristic of the design process, namely the proportion of intuitive and creative decisions. Just because these are not objectively verifiable and above all not clearly reproducible, it would be wrong to conclude that systematisation of the design processes is impossible. Indeed, in the course of further

12 Methodical procedure:

„methodical = planned, considered, thought-out, proceeding step by step. The following components are required:

1. There is a process of transformation which is characterised by a large number of individual steps.
2. The individual steps take place in an intended, random or intuitive sequence.“ (Arbeitsberichte, 1970)

13 „Skill and capacity in a particular field, eg art, music, etc.“ (Page, 1977)

observation it will be demonstrated that these intuitive processes can be embedded in a series of decisions whose structure and sequence make it thoroughly systematic.

Whereas the decisive factor in architectural practice is the solution, the decisive factor in teaching design is the way towards the solution.

4.4 Subject matter and course content of MADE

Professional education is concerned with the acquisition of subject matter in a manner determined by the profession. The starting point for teaching considerations must therefore also be found within the profession. Analyses of workflows, tools and equipment, working methods and their social aspects permit us to determine what qualifications the students need and to connect them with corresponding requirements for educational courses.

The subject matter to be conveyed by MADE as a central discipline in the education of architects is, accordingly, the design process leading to the successful completion of design tasks. This process had to be analysed and its structures identified for the Model for Architectural Design Education.

This could not of course be done in isolation from the activities of architects as a whole. A frame of reference had to be constructed to locate design within the overall context of the planning, engineering and cost-effectiveness of buildings, landscapes, cities and so on. The importance of the subject matter and the factors influencing it can only be identified within such a framework.

The field of work of the architect¹⁴ provides just such a frame of reference. It can be described in the form of a conceptual coordinate system. [figure 2](#) shows the interrelationships in the coordinate system. They can be characterised as follows:

“A variety of disciplines are necessary to plan and build an *individual building* or a *city*. Drawing upon all the relevant scientific principles, utilising certain techniques and methods, integrating all the influencing factors and transforming these into a visual form together constitute the real process of planning and construction... Each object (has to) be guided through all the phases of planning and construction ... A series of institutions are involved in this process (see right-hand horizontal axis in figure 2), and finally, various disciplines have to be called upon to solve the problems which have arisen (see left-hand horizontal axis of figure 2, “Conceptual coordinate system”). Similarly, we should speak of object-orientated, process-orientated, institution-orientated and discipline-orientated viewpoints.” (Pfarr, 1976)

By linking the components of the field of work in a heuristic frame of reference, the coordinate system provides a summary of the present and possible activities of architects. The vertical, process-orientated axis thus represents the sequence of the individual work phases aimed at solving the design problem. The arrangement of this process is based on Article 15 of the “Description of services for object planning on buildings, outdoor structures and interior spaces” in the German Scale of Fees for Architects and Engineers (Verordnung, 1998). There, the activities to be performed were grouped together for the first time in a process-orientated manner to form self-contained, empirically determined “service phases”.

Service phases 1 to 9 comprise individual activities bundled together, formulated according to their results. The individual service phases cover all the activities which experience shows architects generally perform in the implementation of a building project.

The design process is the sequence of activities aimed at achieving an acceptable solution to the design problem. The design of building objects is in any case a process of problem and conflict solving within specific economic and social parameters with the aim of implementing the requirements for that object in terms of use, gestalt, technology and cost-effectiveness. The activities required are located in service phases 1 to 4¹⁵, and the character of the object to be designed determines the nature of those phases.

Pre-design research, preliminary planning, scheme design and approval planning in the process-orientated axis of the conceptualised field of work thus constitute the subject matter of the Model for

14 “The field of work of an architect comprises ... the sum of all architectural activities which the architect performs and is capable of performing ... as a result of his acquired knowledge, abilities and modes of behaviour.” (Arlt, 1985)

15 “If we ask which activities are directly required in the design of an object, i.e. all those activities required to reach a scheme design, and couple these individual activities together via the institutions involved and disciplines required, we have the complete design process. While the “object” and “institution” axes are original in character, the “process” has to be regarded as an axis derived from the others.” (Pfarr, 1984)

Architectural Design Education (MADE) (see vertical axis of [figure 2](#), Conceptual coordinate system). We should not lose sight of the fact that the design process for a selected object within a particular MADE project is exemplary for the design process involved in a number of similar objects or for objects in general, and covers both the internal structure of the object (spaces for individuals) and the external structure of the object's environment (communal and public spaces).

The course content¹⁶ results from the linking of the individual services contained in these phases with the object to be designed, the required disciplines and the institutions concerned, insofar as these are relevant to the design process.

4.5 Learning goals of MADE

In general, the subject matter is the means towards achieving the learning goals. In the day to day teaching of architecture at a university, however, and in particular in the teaching of design, the setting of learning goals meets with rejection on the part of the students, as they say it cramps their style. The real reason for this rejection is surely however their ignorance of how teaching and learning systems work.

All effective teaching, of course, proves itself by stating what it wants, what changes in behaviour it seeks to effect among the students, and therefore what aims it sets out to achieve. Without the goal of a professional qualification, teaching remains largely a matter of chance, exposed to the whims of individual teachers. Planned teaching and learning in the education of architects, particularly in design, can only be carried out when the goals are defined in advance. The teacher should orientate his plans for teaching and learning towards these learning goals, and use them to evaluate how much has been learned. For the student, the setting of specific goals makes the process sufficiently transparent for him to arrange his own learning and working procedures accordingly.

Learning goals are encountered on a variety of levels. On the highest level, they are incorporated in the general targets of architectural education, which are as a rule set down in the curriculum and examination syllabus. The course requirements for the study of architecture at the University of Essen thus demand that students be qualified for their subsequent professional activities to such an extent that they are in a position as architects "to delineate their area of responsibility, analyse problems and perform planning tasks independently on the basis of a corpus of scientific and artistic knowledge. Furthermore, they must be able to implement their planned projects in practice." (Studienordnung, 1979)

The basic aim of the Model for Architectural Design Education (MADE) within the terms of these course requirements is to enable the students to compile a professional design for an object independently observing a variety of legal, technical and financial restrictions. This still relatively abstract guideline had to be firmed up in connection with the activities of the architect to be described in greater detail below. The following general goals were the result:

- I. The ability to conduct pre-design research
- II. The ability to create a design
- III. The ability to obtain approval/planning permission

Below this level, a series of broad aims can be defined:

- I.
 - A The ability to manage project procedures
 - B The ability to identify the situation and acquire information
 - C The ability to plan and ascertain use, gestalt and technology factors
- II.
 - D The ability to weight and rank aspects of quality
 - E The ability to create and evaluate possible solutions
 - F The ability to complete the scheme design
- III.
 - G The ability to compile the planning documents for submission

¹⁶ "Course content ... is not to be seen in isolation, but rather in close connection with the learning goals set. Without the course content, the learning goals cannot be achieved. Together with learning goals, teaching methods and monitoring of achievements, course content is one of the categories of a curriculum." (Köck, 1997)

The broad aims listed above

- are already related to concrete topics and exercise descriptions,
- are as a rule the same for every project task, irrespective of whether this involves the design of new buildings, reconstructions, extensions, conversions or modernizations, and
- ensure that the teacher has a certain degree of freedom necessary to project his own, individual architectural design theory

Orientation towards the broad aims provides an incentive for both teachers and students to identify and formulate the specific project modules to be worked on in the course of a project task (see [figure 4](#)), and whose successful completion fulfils the appropriate broad aim, on their own initiative. These specific project modules are inextricably concerned with the particular object in the project task, and can lose all validity when a different object is selected. It is of no consequence who contributes the modules to the teaching and learning process, whether this be the teacher, the students, or both as a result of discussion and agreement. To this extent, both teachers and students work together to formulate more precise activities and goals within the broad aims. Operationalisation of the learning goals down to the level of specific aims is, however, not considered appropriate in MADE as that would draw the life out of this experience of building design, and restrict the opportunities for independent action.

It is, however, important if this teaching and learning process is to succeed, for the students to identify with the goals, and for these goals to appear sensible to the students in the context of the teaching and learning process and the performance of the mutually agreed project task.

4.6 Structuring the teaching and design process to reflect the content and goals

The question of which phases, stages or steps teaching processes in general have to follow has always occupied and continues to occupy the minds of teachers, educational psychologists and educationalists, and there are a host of schemes for planning the development of those processes. The same applies to the process of design and construction for building projects¹⁷. Here, there are a number of patterns developed by architects, engineers and by specialists in construction management and operations, all with the aim of making designing, among other activities, more effective, less labour intensive and less time-consuming.

Opinions on the value of such patterns differ. For MADE, a pattern of this type was considered necessary for the following reasons:

- Every proper teaching and learning process is structured, and individual points, sections or phases which follow on from and expand previous ones can be identified in each planning concept. A structured teaching sequence provides both teachers and students with orientation in the process (Witzenbacher, 1976), for it helps teachers to recognize what has been taught, and students to realise what they have learnt (Becker, 1984).
- Every design process can be divided into various general stages or phases which are typical of such a process. It would be senseless to think that the wheel had to be reinvented in each design process and to act accordingly. Unfortunately, just that is the case almost everywhere in architectural practice and especially in the training of architects. „Indeed, it is even consciously held up as a ‘creative act’, the necessity of which is propounded with all kinds of metaphors and catch-phrases.“ (Arlt, 1985).

Macro-Strategy

The result of these deliberations was the MADE Process Plan (macro-strategy) (see [figure 3](#)). It serves the purpose of arranging the teaching and design processes in clearly distinct main and subsidiary phases, and can be regarded as a macro-strategy for designing and teaching design. It is not in any

17 For example those from professional bodies in Germany such as the “HOAI” (Architektenkammer, 1998), “VDI” (Verein deutscher Ingenieure, 1977, or from specialists in construction management and operations (Pfarr, 1984) and in building research (Schofer, 1982), (Bishop, 1969), or in England “RIBA” (Powell, 1983) or in the USA “AIA” (Perkins, 1987).

way a universal tool for an ideal design, but merely a rough guidance system to point the way to an optimal result.

The plan covers a complete design process and in doing so models the work of the student on a project task. The phases of the MADE Process Plan provide a relatively open, but nevertheless structured, framework. They leave enough room for the teacher and the students to contribute their own ideas, modifications and creative adaptations¹⁸.

The MADE Process Plan has three main phases: “Conducting pre-design research”, “Creating a design” and “Obtaining approval”.

- The first phase is concerned with determining the requirements for organization and planning leading to a solution of the project task, and creating a design guideline image for the object.
- The second phase comprises the compilation of the fundamental parts of a solution to the project task.
- The third phase concludes the design process in the Model for Architectural Design Education (MADE) with the compilation of the documents for the construction application.

Each of the three main phases is subdivided into further subsidiary phases which lead to the six broad aims identified in section 4.5 “Learning goals of MADE”.

The individual phases are linked in a systematic sequence, build upon each other, and are provided with a feedback loop to previous phases. Each phase contains a group of didactic procedures and design activities, is a self-contained teaching/learning and design sequence, and leads to a learning and design result.

The phases are orientated towards both learning and design results. The learning and design results aimed at in individual phases can be achieved either by a single student or by several of them. The solutions arrived at (column 3) are then checked in monitoring and evaluation stages (column 4) to verify whether they come up to the performance expectations of all concerned. If so, these are “rewarded” by positive marks from the teacher, and the design process can be continued. If not, the relevant phase and possibly preceding phases are repeated, so that the solution finally meets the desired performance level. The learning results can therefore be constantly checked by the teacher and by the students themselves in a design study control loop.

The caesuras between the phases have been positioned at points where the teaching and design processes have reached a stage which permits an overall judgement of clearly grouped “learning result packages”.

Micro-Strategy

The problem solving scheme (see [figure 5](#)) is a guideline which can be used several times within each phase and subsidiary phase of the MADE Process Plan. The micro-strategy focuses on the following four sequential stages of action:

- Preparation
- Organisation
- Implementation
- Monitoring and assessment

In relation to teaching design, the problem solving scheme is classified as a “formal stage” (formal, because it applies equally to all course content) in the teaching process. The fundamental purpose of formal stages is to structure the learning situations and assure the success of the course. Only the

¹⁸ Or, as required or intended by the teacher, alterations to parts only, in which case the student still has a view of the whole in the form of the MADE Process Plan.

problems posed by a concrete design task, however, can illustrate the basics of practical design thought and action, and promote creative abilities, initiative, productive thought, willingness to take decisions, cooperative and social behaviour and responsibility on the part of the students.

The fundamental advantages of the MADE Process Plan can be described as follows:

- Ideal adaptability to all design tasks, as these are always processed in the same main and subsidiary phases.
- Easy handling, as both simple and complex design tasks can be controlled and monitored in the same way.
- Less effort in preparation, as the basic structure for the sequence of each individual MADE project is already available, and the decisions on future action are thus made easier.
- Good method of communication for joint preparation and implementation by the teacher and students.
- Open to all kinds of teaching and learning methods, materials and media, as the MADE Process Plan gives the teacher every freedom of selection, decision and arrangement of his or her architectural design theory.
- Easier timetabling, as experience will gradually build up, allowing the duration of the subsidiary phases to be reliably estimated.
- A high level of transparency during the teaching and design process, as all those involved know from the standardised phases where he/she or the others are at any time.
- Simple expansion, as additional main phases (similar to the scope of services detailed in the HOAI (see Verordnung 1998), (see “process-orientated” axis in [figure 2](#)) can be added.
- Generally better design results, as the structured procedure guarantees continuous work on the project, completion of the design on schedule, and higher quality than with spontaneous, purely intuitive work.

All in all, the MADE Process Plan represents a standardised, generally applicable plan which makes provision for a broad range of specifics from highly different design tasks, and thus brings uniformity and clarity into the variety of possible design activities.

4.7 The Model for Architectural Design Education with projects

The Model for Architectural Design Education contains methods ([figure 1](#)) of arranging the teaching process. The “project method”¹⁹ was selected from the many possible forms of university teaching, and is implemented in the form of “MADE Projects”.

Typical features of MADE Projects (Kath, 1985) are as follows:

- Problem solving processes, regarded as learning strategies, occupy a central position.
- More than one solution is always possible in designing objects.

19 Where does the “project method” come from?

„The term originated in 16th century Italy and is also found in early 18th century France. There, the students at the Academie Royale d'Architecture in Paris were regularly required to submit “projets”, e.g. to design plans for a chateau, a memorial or a pavilion cooperatively, originally and independently as part of their education. But this procedure is not identical to what we mean by projects today. The method then came to Germany (in around 1831) through the building academies and technical universities.

The American philosopher and educationalist John Dewey (1859-1952) was the first to develop an all-encompassing concept from the points of view of didactics and educational psychology, and this is what we now call the “project method”. (Gudjons, 1979)

- Purpose-orientation, allowing the specific objectives (learning goals and design objectives) to be reached.
- Team teaching, teamwork with students as well as group work and/or individual work by the students.
- Interdisciplinary work.
- Processing and creation with the aid of a variety of different methods, materials and media.

Above and beyond this orientation towards the project method, the following principles are also incorporated in MADE:

- System-orientated thought²⁰ as a holistic way of thinking both with regard to the teaching process itself and to the understanding of complex MADE projects or objects, which are considered as a system. (see [figure 6](#))
- Extended function-orientated thought²¹ as a comprehensive way of looking at the interactions between the user (with his needs, motivations²² and possibly handicaps), the functions of an object (with its components of use, gestalt, technology and costs), and the environment²³. (see [figure 6](#))

Epilogue

In the Model for Architectural Design Education (MADE), considerable value is placed on confronting the students with real building projects or with current problems which can lead to building projects. They should not be prepared for any idealised version of reality, but for reality itself. Indisputably, design draws upon that “certain something” which we generally refer to as “talent”. Talent is therefore an indispensable condition for a successful artistic or creative activity. It is not however the only one. A sound education is just as necessary.

20 System-orientated thought is always concerned with systems. Systems are holistic entities comprising components. The components themselves can also be systems. The holistic nature of a system results from the fact that its components do not form an unstructured mass, but are related to each other in certain ways. This wholeness requires an understanding of the totality of processes, constellations of situations and phenomena. An isolated part provides too little information or even false information on the whole. In order to understand something or someone, we must recognise the wholeness and the system, and include these in our thought processes. The holistic nature of building design is also emphasised in architectural theory, and the author traces it back to the three basic categories of use, gestalt and technology. These correspond to the three Vitruvian categories of *utilitas* (usefulness), *venustas* (beauty and imagination) and *firmitas* (strength and durability).

21 In my understanding, the functions of building objects are extremely extensive. In this sense, “extended” function-orientated thought means considering the interaction between different types of function, viz. those of use, gestalt and technology (e.g. the protective functions of a building against noise, fire, moisture and sun), and those of costs, with the user and the environment. Last but not least, the individual function which allows the designer to choose to accept or reject customary practices or suggests that he should modify inherited maxims.

22 Motivation is generally taken to be the reason for a certain behaviour which we deduce from actions. “Only when actions are performed in a certain manner do we enquire as to the motive.” The process of discovering motivation is that of finding evidence of a connection between an action and the reasons behind it, which may not be a necessary connection, but certainly a sufficient one. (see Scherhorn, 1959)

23 „Meaning the totality of the space inhabited by a living being. This includes the geophysical (landscape, climate, weather), family, school, professional, social, racial etc. influences which are determinants of the individual and his development. There are constant interactions between individuals and their environment, i.e. the individual is changed by environmental influences, but also changes the environment, and so forth.“ (Georg, 1995)

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