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Niklas Luhmann
Education as a Social System

Springer

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ISSN 2211-1921 ISSN 2211-193X (electronic)
SpringerBriefs in Education
ISSN 2211-937X ISSN 2211-9388 (electronic)
SpringerBriefs on Key Thinkers in Education
ISBN 978-3-319-49973-4 ISBN 978-3-319-49975-8 (eBook)
DOI 10.1007/978-3-319-49975-8

Library of Congress Control Number: 2016958464

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

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Chapter 1
Why Luhmann Matters to Education

The present book introduces and explains the theory of education formulated by the German sociologist Niklas Luhmann. Luhmann is famous for his Social Systems Theory, which includes a theory of society. The choice of dealing specifically with his theory of education, which is part of his general sociological theory, requires some preliminary explanation.

Luhmann's theory is a 'multi-layered' theory. We use this term to indicate the combination of different layers of conceptualisation, which are used to analyse different and interlaced objects. The first layer of conceptualisation is the general definition of 'system', which is inspired by the developments of general system theory during the eighties, in particular the development of so-called 'second order cybernetics' formulated in physics and biology.

On these bases, the second layer is a more specific theory of *social* systems, which was originally inspired by the work of the famous American sociologist Talcott Parsons, from which however Luhmann's theory diverges for many important aspects, thus appearing as a completely new, and highly innovative, Social Systems Theory. Indeed, at present, Luhmann's theory is still the latest and most advanced example of systems theory in sociology.

The third layer is the conceptualisation of society as a particular type of social system and the description of its structure and its most important subsystems, among which the education system. Luhmann's effort of systematising a theory of society culminated in an important work published in two volumes at the end of his life (Chap. 2).

The last two layers consist in the inclusion, in his Social Systems Theory, of the concepts of interaction and organisation as specific types of social systems intertwined with, but distinguished from, society.

This multi-layered theory provides a very complex and rich background to explain and describe all the most important aspects of education, a background that may be of great value not only for sociology, but also for education theory. Luhmann's theory makes it possible to combine analyses that concern at least the following aspects of education: (1) the function and structures of education as a complex social system and the ways in which it is included in society; (2) the

C. Baraldi and G. Corsi, *Niklas Luhmann*, SpringerBriefs on Key Thinkers in Education, DOI 10.1007/978-3-319-49975-8_1

historical background of education, which explains when, why and how it became important in modern society, and how it has developed in the recent history of society; (3) the importance and structures of classroom interaction; (4) the meaning of teaching; (5) the impact of school organisation on the education system; (6) the ways in which education is conceptualised as a system, with particular reference to the pedagogical reflection on education and its reforms.

In addition, some details about the aspects that are particularly relevant in Luhmann's sociological theory of education should be mentioned. First, as regards the interconnections between classroom interaction, traditionally considered as a 'micro' social phenomenon, and the education system, traditionally considered as a 'macro' social phenomenon, Luhmann aims to overcome the traditional distinction (and contraposition) between micro and macro social realities, replacing it with a distinction between two different types of social system. These types of social system can either be explained separately or reconnected, as they are based on the same type of operation, i.e. communication. Moreover, the common reference to communication makes it possible to explain education as 'practice', not only at the level of interaction, where education can be autonomous, but also as a wider social system. This is not considered as an analytical abstraction, but as an empirical system of communication that has a function in society and is based on structures that allow the provision of education.

Second, Luhmann's theory can account for the importance of education in modern and contemporary society, in that it identifies its function and the developments of the ways of observing the specific achievements of this function. The inclusion of a theory of education in a theory of society is important to understand education in a broader context of analysis, thus explaining the social importance of education in an empirical way based on the evolution of society rather than on principles or values, i.e. as a social reality that has gained its importance historically. This also explains why the present society cannot renounce, underscore, or even 'menace' the existence of education, unless it changes its own structure.

Third, Luhmann's theory makes it possible to overcome the dichotomy between the organisation system of education and the education system. It does so by explaining how organisations such as schools and universities are autonomous in their own self-reproduction, as they are specific social systems, while at the same time being included in the wider social system of education and being necessarily dependent on the structural conditions of this system. Organisation is particularly important in the education system as it is the system in which change can be made without menacing the function of the education system and the autonomy of teaching in the interaction. However, organisation does not determine either the function of the education system or the way in which teaching is achieved in classroom interactions.

Fourth, Luhmann's theory explains the possibilities and limitations of connections between education on the one hand, and other social systems, such a families, economy and politics on the other. In particular, it makes it possible to explain the differentiation and connections between conveyance of knowledge and school selection on the one hand, and family socialisation, provision of jobs

and careers, and political reforms on the other. Differentiation and connections are framed by these social systems' (education, families, economy and politics) belonging to society, specifically by the different functions that each of them fulfils within society.

Finally, Luhmann's theory makes it possible to understand the connections between educational 'structures' on the one hand and educational 'culture' (which Luhmann calls 'semantics') on the other, including the pedagogical description of education in the latter. This understanding is linked to a very important distinction that Luhmann draws concerning communication processes, i.e. the distinction between communication as the operational basis of education (creating social structures) and communication as an opportunity to observe education (creating 'culture' or semantics). In this perspective, in which semantics does not determine social structures, pedagogy cannot determine, but only orient the meaning of education and teaching.

Against this background, a strength of Luhmann's theory is that it allows both differentiation and reconnection between pedagogical reflection and sociological analysis. In his systemic perspective, pedagogy is a theory of reflection that is part of the education system, while sociology is part of the science system and provides an external observation of education. This differentiation creates the opportunity of a twofold perspective on education, which is not based on competition but on complementarity. On the empirical level, this complementarity concerns the pedagogical analysis of conditions of learning and the sociological analysis of conditions of communication. The combination of these different types of analysis can enrich the understanding of education and connect learning to communication. However, the combination of pedagogy and sociology can also be a challenge, as the two perspectives can diverge and become incompatible. This happens when sociological and pedagogical observations are not taken as a way of doubling reflection on education, but as a way of proposing mutually 'critical thinking'.

The complexity of Luhmann's theory is challenging for all readers, regardless of their background and level of expertise, but this challenge can open up great opportunities of analysis and reflection on education. Furthermore, the additional value of this challenge consists in the opportunity to project possible future developments of analysis and reflection, which is the most important (potential) legacy of Luhmann's theory. Further developments in the sociological theory of education were interrupted by Luhmann's death. Thus, the theory is awaiting completion through new contributions and advancements in many areas. We shall come back to this topic in Chap. 8.

The volume is organised in seven chapters. In Chap. 2, we deal with Luhmann's biography, which sheds light on his thought, and explains the importance of his theoretical background and production. Chapter 3 concerns the basic concepts of Luhmann's multi-layered theory, and sets the stage for the following, more focused chapters on education. Chapter 4 includes all the basic concepts that are necessary to understand the meaning of education, in particular dealing with the connections between learning, which is based on the interiority of individuals, and communication, which can include the problem of individual learning in

education as a social system. The chapter also identifies the function and the basic features of education in modern society. Chapter 5 describes the differentiation within the education system and the connections between its structures, i.e. conveyance of knowledge and selection, teaching as an interaction system developed in the classroom, and school organisation contextualising teaching and reflecting the necessities of the education system. Chapter 6 deals with the pedagogical reflection on education and its main objects, including autonomy of education, educational technologies, and the recurrent necessity of reform. Chapter 7 deals with Luhmann's reception and legacy in sociology and pedagogy. Chapter 8 includes some final remarks on the contribution of Luhmann's theory to the theory of education.

When the English edition of Luhmann's books and papers is available, we have included both the German and the English editions in the reference citations. In case of quotations, we have systematically chosen the English edition, to facilitate the English speaking readers.

Chapter 2
Career and Background

Niklas Luhmann was born in Lüneburg (Lower Saxony, Germany) on December 8, 1927. In 1946, he started studying law at the University of Freiburg, where he graduated in 1949. In 1954–55, he worked at the Administrative Court of Appeal in Lüneburg. Then, until 1962, he worked as a jurist in the administration of the federal state (*Land*) of Lower Saxony. In some interviews (Luhmann 1987, pp. 125–134), Luhmann stated that his interest in law started when he was a student, as he was interested in the fundamental conditions determining who is right and who is wrong in judicial disputes. This interest was boosted by the conditions of Germany after the Second World War, in particular by the problem of reconstructing the administration of law and 'repairing' the damages caused by Nazism.

Initially, when studying Roman and comparative law, Luhmann was interested in practical problems and in the operational aspects of law. In this period he did not show any interest in academic research, as he saw university as a 'small place in which everything is simple repetition', but aimed to become a lawyer. However, he was discouraged by the practical and routine aspects of the profession of lawyer, for example the necessity to meet the many demands of his superiors. Luhmann's decision to work in the field of administration depended on his need for more freedom. However, even administration became too hard a job, because it did not leave enough time for his new interests in philosophy (above all in Descartes, Kant and Husserl) and anthropology (Malinowsky and Radcliffe-Brown).

From anthropology, he learned about the concept of 'function', which was his first theoretical interest. In 1960, he unexpectedly won a scholarship in the field of administration sciences, which allowed him to be a visiting scholar in Science of Administration at Harvard University. Given his scarce interest in studies on administration, however, he turned to sociological studies, as a test to decide whether to continue his career in administration and then follow a political career, or undertake a scientific career. To better understand the concept of function, he contacted the famous American sociologist Talcott Parsons, who worked at Harvard University. Through this contact, Luhmann became aware of his interest in social sciences, in particular in *grand theories*. Eventually, the study of the

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concept of function, together with the study of the phenomenological concept of meaning (*Sinn*), led him to opt for a scientific career.

Nevertheless, between 1962 and 1965, he worked in the *Hochschule für Verwaltungswissenschaften* (College of Science of Administration) in Speyer (Germany). In those years, his publications focused mainly on administration and organisation, but in 1962 he published his first theoretical paper in the famous German journal *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, with the title 'Funktion und Kausalität' ('Function and Causality'). This publication marked the beginning of his career as a sociologist and was the first of a series of theoretically oriented papers and volumes.

This first part of Luhmann's life confirms the concept of biography that Luhmann developed later: a collection of coincidences, whose continuity is provided by the sensibility to coincidences. In his case, the chain of coincidences included the political collapse of Germany in 1945, the study of law, and the interest for Husserl and Parsons (Luhmann 1987, p. 134). In 1966, he successfully applied for the University of Münster, where he studied at the *Sozialforschungsstelle* (Centre for Social Research), directed by the famous German sociologist Helmut Schelsky. Here he took his Ph.D. and qualification for professorship (*Habilitation*). In 1968, he took the professorship in sociology at the new University of Bielefeld. When he took a permanent position in Bielefeld as a professor, he was requested to declare what his research project was, how long this was likely to last and how much money he needed for it. As he wrote many years later in the Preface of his work on the Theory of Society (1997), his answers were 'theory of society', '30 years' and 'no costs'.

The most important publications of the first phase of his activity as a sociologist concerned trust (1968) and legitimisation procedures (1969). These very first volumes revealed his innovative approach to sociology. In 1970, he published a collection of the most important papers of the sixties introducing his theoretical and methodological programme under the meaningful title of *Sociological Enlightenment* (*Soziologische Aufklärung*). In 1971, he co-authored a volume that included a debate with Jürgen Habermas, in which he introduced the guidelines of his theoretical proposal. As he wrote in 1997, the title of his section in this volume was paradoxically 'social technology', while Habermas wrote about 'theory of society', which in fact was Luhmann's plan. The unsatisfactory label of 'technology' was suggested to refer to the systemic structure of his work, which originated from research in cybernetics (e.g., the concept of complexity by William Ross Ashby). The 1971 book was a turning point for Luhmann's reputation in Germany and, in the following years, at international level, as it generated significant attention for his theoretical proposal.

In the same year, Luhmann published a book on political planning. In the following years, he systematically increased the quantity and variety of his publications. Among the most important, what is worth mentioning here are the volumes on law (1972), power (1975), religion (1977), and education, the latter co-authored by the German education expert Schorr (1979). Moreover, he published two new

collections of the series *Soziologische Aufklärung*, including his most important papers of the seventies (1975, 1981a).

In the eighties, Luhmann started to pay great attention to the evolution of systems theory, in particular to the new research in so-called second-order cybernetics, introducing in his theory the concepts of self-reference and autopoiesis (see Chap. 3). These concepts were introduced for the first time in a book on the sociology of knowledge, analysing in particular the ways in which important knowledge ('semantics') is related to the structure of society (1980), and were developed in a second book on semantics (1981b), in a volume on politics (1981c), and in another one on the semantics of love (1982). These new concepts soon became part of the core of his most important book of that time, namely the book on the general theory of social systems (1984), which was the first systematic attempt to give a comprehensive account of his theory. Originally conceived as an introduction to the planned Theory of Society, but too voluminous for that purpose, *Soziale Systeme* (*Social Systems*) was defined by Luhmann his first 'real' publication, as the previous ones were part of a 'zero-series' (Luhmann 1987, p. 142). This complex and long book includes all the basic concepts of Social Systems Theory, and highlights its circular and labyrinthine structure. Each concept is defined by reference to the others, without any central pillar of the theory.

In the following years, Luhmann increased his production and publication of papers and books concerning all the most important sociological themes. In this period, he wrote a book on the problems of ecological communication (1986), he published two new collections of papers in the series *Soziologische Aufklärung* (1987a, 1990a), a new book concerning the sociology of knowledge (1989), new volumes on specific social systems, including economics (1988a), science (1990b), and law (1993), two volumes dedicated to epistemology, respectively of knowledge (1988b) and observation (1992a), and a book on the concept of risk (1992b), which opened a new important area of his sociological interest. In 1992, Luhmann published an Italian, preliminary version of a theory of society, in collaboration with the Italian sociologist Raffaele De Giorgi, who invited him to the University of Lecce for a period of time.

In those years, Luhmann also obtained a great number of academic awards, including several honorary degrees and the Hegel prize (in 1989). Luhmann taught in Bielefeld until 1993, when he retired and was appointed Professor Emeritus. After his retirement, however, Luhmann continued to expand his theoretical project and to be influential in the sociological field.

In the period following his retirement, Luhmann published the sixth and last volume of the series *Soziologische Aufklärung* (1995b), the fourth volume on semantics and the structure of society (1995c), new books on specific social systems, namely art (1995a) and mass media (1996), which were both translated in English in 2000. In 1997, he published the final version of his theory of society, in two volumes, accomplishing the original project he had when he started to work at Bielefeld.

Luhmann died on November 6, 1998, few days before his 71st birthday, after a long illness. After his death, more works were published, including the unfinished

books on subsystems of modern society, e.g. politics (2000), a second book on religion (2000), and, last but not least, a book on education (2002).

Luhmann was one of the most prolific scholar in the history of Western thought. Many of his books were translated in several languages, and his popularity spread from the United States and Brazil to Korea and Japan. The first approach to Luhmann's theory in English was the translation of a book that put together his works on trust and power (1979). In 1982, a collection of Luhmann' first important essays was published with the title 'Differentiation of Society'. This book boosted the translation of Luhmann's works. The book on the law system was translated in 1985, the book on love in 1986, the book on ecological communication in 1989, the second book on politics in 1990, and the book on risk in 1993. In the same year, Luhmann's new conceptualisation of self-reference was made available in English, through a collection of essays ('Essays on self-reference'). The translation of the book on Social Systems was publishes in 1995, and it was followed by the translation of the book on the epistemology of observation (1998). In 2000, the book on education co-authored with Schorr was also translated in English, with a considerable delay. In the same year, the books on art and mass media as social systems were also translated. In 2004, the book on the law system was translated. The two volumes on the theory of society were translated in English much later, in 2012 and 2013. Finally, in 2013, the unfinished book on religion as a social system was also translated. Moreover, in the past decade, several volumes have been dedicated to his theory. However, the first volume on Luhmann's theory was a glossary of its most important terms, which was originally published in Italian with Luhmann's preface (Baraldi et al. 1989/1995), then translated in Spanish (1996), in German (1997) and in Japanese (2013) (a translation in Korean and a new edition in English are forthcoming).

Luhmann left a great number of unpublished materials, which in the meantime have been, and are still being, published, and a famous card index, in which he used to store any idea that came to his mind and all relevant details of his readings, regardless of their possible future relevance (he described this index as an 'alter ego' in Luhmann 1981; see also Luhmann 1987, pp. 142–145). The index is not linear, but is rather a 'spiderweb-shaped' system, which can be arranged arbitrarily. Nevertheless, or possibly precisely for this reason, and thanks to the internal cross-references, it soon developed an internal, not casual structure. The perfect organisation of these notes, taken in many years of work, allowed him to write quickly and precisely on an extraordinarily large number of themes, although the system costed him 'more time than writing books' (Luhmann 1987, p. 143).

Luhmann was a very versatile sociologist. In fact, his theoretical interests coincided with the discipline. One remarkable characteristic of his career as a sociologist is that he never abandoned the framework and the general concepts he employed when he started to explore social phenomena. He remained loyal to his project of a theory of society for his entire life, eventually achieving it. However, he also reformulated many of his concepts, updating them according to theoretical advancements. Moreover, he progressively added new concepts to his theory, integrating them with the old ones.

In this book we do not aim to reconstruct the long history of Luhmann's thought, but rather to provide an account of the core elements of his theory. For this purpose, we shall use the latest versions in which these elements were formulated, which was, in Luhmann's intentions, the most accurate version. We will include the integration of old and new concepts, without distinguishing between them and providing a picture of Luhmann's complex theory with particular attention to his effort to explain education as a social system.

Chapter 3
Social Systems Theory

3.1 Introduction

This chapter illustrates the basic concepts of Luhmann's Social Systems Theory to facilitate understanding of his theory of education system. Since the beginning of his career as a sociologist (see Chap. 2), Luhmann expressed the intention to elaborate a general theory of society. As he explained in the Preface of his final book on the theory of society (Luhmann 1997:2012, pp. xi–xiv), he later decided to anticipate a book on the general theory of social systems, published in 1984 (Luhmann 1984:1995), and some books on specific subsystems of modern society (Luhmann 1988, 1990b, 1993, 2000a:2013, 2000b). The general theory of society was published, in its final version, in 1997, and translated in English in two volumes, respectively in 2012 and 2013.

According to Luhmann, a general theory of society should make it possible to understand any sociological topic. Luhmann stated that sociology is a science, rather than a philosophy, an ideology or a way of proposing values. The specificity of sociology as a science consists in studying its object (society) within its object (society). Sociology describes the society in which it is generated, and in this way it also generates itself, i.e. sociology discovers itself in its object of study (Luhmann 1997:2012: 11). In other words, sociology is both a description of society and a self-description as part of society. Therefore, the theory of society contributes to the production of the object it analyses, in particular it *changes* this object, as its production is part of it; the production of a sociological theory changes society, regardless of its effects outside sociology (e.g., political or educational effects).

Luhmann has 'imported' in sociology a great number of concepts from other disciplines, e.g. biology, mathematics, physics, cybernetics, cognitive sciences. Nevertheless, in his perspective, sociology has its own specificity as a science, and the problems (or, more precisely, the distinctions, as we shall see) guiding sociology are self-produced. Sociological theories, however, share many aspects with other scientific theories. First, they need empirical reference: Luhmann dealt with a great number of empirical problems during his career and systematically

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clarified the empirical reference of his theory of society. Theoretical abstraction and empirical analysis are closely connected. Second, they allow comparisons between different ways of identifying and solving problems. Comparison means that it is not possible to find a single, ultimate solution to sociological problems. Any attempt to find a final solution must be compared with other attempts and included in a plurality of attempts. Sociological theory is only one perspective among others and should take account of this in its analysis.

Luhman called this perspective 'functionalism' (Luhmann 1970). A function 'marks a problem (…) in such a way that multiple solutions can be compared and that the problem remains open for further selection and substitution' (Luhmann 1995a:2000, p. 138). Functionalism means identifying one problem and considering the different possible solutions that have been adopted for it. It means observing each solution as a 'functional equivalent' of other possible solutions of the same problem. Therefore, each solution is considered one among others, either actualised or possible, and 'contingent', i.e. possible in other ways. Sociology reinterprets apparently obvious solutions as improbable and as having alternatives. In their turn, different sociological theories can be compared as different ways of observing the same problems and solutions. This comparison is based on a particular theoretical perspective among others, which can thus be compared to the others. This continuous and recursive activity of comparison can lead to changing the theory.

Against this background, Luhmann's theory concerns social systems, including society, interaction and organisation.

3.2 The General Presuppositions to Understand Social Systems

3.2.1 The Distinction Between System and Environment and the Autopoiesis of Systems

The point of departure of Luhmann's theory is a *distinction*. Luhmann substitutes the analysis of 'objects' with that of distinctions, i.e. the analysis of something as distinguished from something else. This approach is based on a particular 'logic of forms', as proposed by the British logician Spencer-Brown (1969). Distinctions are based on 'directives' to draw them (Luhmann 1997:2012, p. 28): drawing distinctions means indicating a given side of a form and distinguishing it from another one, which is left undetermined ('unmarked'). The basic distinction in Luhmann's theory is between system and environment. Social phenomena are seen as social systems, indicating the system as distinguished by the (undetermined) environment.

Reconciliation or separation between the two sides of the form is impossible: a system does not exist without its distinction from an environment. There is not a 'general system' including all systems; rather, there is an undetermined world, in which each system draws a distinction from its environment. The world is observed as the unity of the difference between system and environment, and as such is undetermined and undeterminable. According to Luhmann, systems include living systems, psychic systems and social systems. Sociology deals with social systems, thus distinguishing itself from psychology and biology.

Systems only operate within themselves: they are the only side of the system-environment distinction that is determined. Therefore, systems cannot take anything from the environment. On the one hand, the environment is important, as it is a continuous source of 'irritations' for the system, which must continuously work on these irritations. For instance, living systems need chemical and physical irritations to be active, i.e. to activate defences against attacks. On the other hand, irritations are not the result of a transmission of information from the environment to the system but are self-produced in the system. The environment cannot pre-organise irritations for the system.

Systems self-produce irritations as they are operationally closed. Systems 'can distinguish themselves from the environment, but only in an operation within the system itself' (Luhmann 2012, p. 31). Through its operation, the system can create a boundary between itself and its environment. This boundary cannot be crossed: the system and its environment cannot shape each other, and the system generates all internal information and states.

Adopting (and adapting) a concept from biology (Maturana and Varela 1980), Luhmann explains the system's operational closure as based on *autopoiesis*. In biology, this concept is used to explain the basic characteristic of living systems, which can reproduce their own elements (in particular, cells) through the network of such elements and the relations established therein. Luhmann expands this concept by differentiating systems for their basic operation: cells in living system, conscious thoughts in individual psychic systems and communication in social systems.

In particular, Luhmann observes that a social system exists only if it can reproduce its operations through its operations, i.e. in the network of these operations. The autopoietic process of self-reproduction determines the operational closure of social systems. The concept of autopoiesis explains the system's *autonomy* at the operational level as self-production of its basic elements. Autonomy means that autopoiesis 'functions unconditionally' (Luhmann 1995a:2000, p. 157). The concept of autopoiesis is also used to explain the fact that there are objects in the world, and therefore in the environment, that are not systems, in that they cannot reproduce themselves at the operational level (e.g., physical objects like stones).

3.2.2 Meaning (Sinn)

Social systems and psychic systems are based on meaning (*Sinn*): they are meaning-constituted systems. Since the first version of his theory, Luhmann has drawn on philosophy, more precisely on phenomenology, to define meaning. Meaning is the observation that any content produced in the system's operations always refers to other possibilities of production, which remain in the background of what is produced. In terms of logic of forms, meaning is defined as the form of difference between actuality and potentiality: system operations are meaning-constitutive as they are based on the distinction between actual and possible; any system operation is a selection of actual content among possible alternatives, and further operations can always select (actualise) other possibilities. Any operation is thus a specific decision of making something actual, while leaving any other option possible. Meaning is made evident through the possibility to decide elsewhere. Paradoxically, meaning is the product of the operations that presuppose it, in that it can exist only in its reproduction through these operations.

Meaning can be better understood on the basis of the distinction between *medium and form*, which Luhmann borrows from psychology of perception (Heider 1926). The concept of medium indicates loosely coupled elements, 'an open-ended multiplicity of possible connections' (Luhmann 1995a:2000, p. 104). A form is constituted on the basis of a medium as a specific configuration of elements, i.e. as a tight coupling of elements. The medium does not disappear when it takes a form, it may be 'reused' at any time and it always imposes limits on the possible forms. Specific forms can be replaced; thus forms regenerate the medium by coupling and decoupling its elements. However, the loose coupling of elements allows many possible forms; therefore, forms cannot be fixed. Forms are selections in the field of a medium (Luhmann 1997:2012, p. 117).

Meaning is the universal medium of all psychic and social systems (Luhmann 1997:2012, p. 23), i.e. the medium for all forms that are generated in these systems. Meaning is a medium as it generates loose connections between actual and possible selections. It can thus allow any type of tight connection between selections in the system. Therefore, meaning is the basic medium of all forms produced in the system. It is not possible to actualise non-meaning, as the existence of non-meaning can be observed only through meaning. Any reference to non-meaning reproduces meaning; therefore, in system operations non-meaning must necessarily have a meaning. Meaning continuously generates itself as a medium of selections of particular forms in psychic and social systems. Psychic and social systems both presuppose and generate meaning in their operations: the distinction between medium and form is produced in the system, through its operations.

A meaning-constituted system (be it a psychic system or a social system) can refer to both itself and its environment, i.e. it can distinguish between *self-reference and other-reference*. Self-reference means that the system operations refer to other system operations, in particular each communication refers to other communications (e.g. the answer 'fine, thank you' refers to the question

'how are you?'). Through self-reference, the system can also refer to the environment (other-reference), as observed from the perspective of the system's operations. For instance, communication can thematise pollution as an environmental problem, or individual emotions. The system-environment distinction is not only produced by the system, it is also observed in the system (Luhmann 1997:2012, p. 19). In social systems, the system-environment distinction consists in the difference between communicating as system operation on the one hand and themes of communication concerning the environment on the other. In other terms, the system-environment distinction is generated on one side of the distinction itself (the system): there is a *re-entry* of the distinction in what it has itself distinguished. All operations are constituted in the system, regardless of the focus being on self-reference (on communication itself) or other-reference (on contents of communication). Since the distinction between self-reference and other-reference is generated in system operations, it is this distinction that establishes the boundaries of the system.

A meaning-constituted system on the one hand makes past selections available for its present operations, on the other considers its future operations as undeterminable. Each time operations refer to the past, they refer to previous operations that are available for further elaboration (it is possible to communicate on past communication). Each time operations refer to future, they refer to an infinite number of possibilities (it is possible to communicate in different and undetermined ways). In this way, the world becomes 'an immeasurable potential for surprises' (Luhmann 1997:2012, p. 19). Meaning ensures present determinations, on the basis of the past history of selections, while opening future alternative possibilities. The actual present can 'pre-orient' future possibilities, but it cannot determine them.

3.2.3 Double Contingency

Luhmann draws the concept of double contingency from Talcott Parsons' famous sociological theory (Parsons and Shils 1951). Against the background of Parsons' first elaboration of this concept, Luhmann conceives social systems as solutions of the general and primary problem of double contingency.

The problem of double contingency depends on the different positions of Ego and Alter, both Ego and Alter being positions that indicate 'open potential for meaning determination' (Luhmann 1984:1995, p. 105). Double contingency means that both Ego and Alter act contingently (i.e. in a way that cannot be predetermined) and assume that their interlocutors act contingently. In other words, double contingency concerns Ego and Alter's mutual experience of non-accessible meaning, which opens up further possibilities in any actual determination of their own actions. Double contingency implies that: (1) Ego can choose from different alternatives of action and Alter can react in different ways to this choice; (2) both Ego and Alter are therefore obliged to choose their actions taking into account

the interlocutor's action, in particular its contingency. Ego and Alter cannot get access to each other; therefore, on the one hand, they must both assume that each can determine meaning, on the other, they cannot control or forecast each other's determinations of meaning.

Mutual positioning of Ego and Alter determines a tautological symmetry that does not lead anywhere: both Ego and Alter are blocked by their observation of undeterminable contingency of each other's actions. Social systems can be generated only if this symmetry is interrupted by ensuring connectivity between Ego's and Alter's actions. This connectivity is based on communication as a specific and structured operation of social systems.

3.3 Social Systems

3.3.1 Communication as Operation of Social Systems

The specificity of social systems as autopoietic and meaning-constituted systems is that their operation is communication. They generate communication through communication, in a network of communications that is based on the medium of meaning.

Traditional sociological literature has seen action as the basic element of sociality (Parsons and Shils 1951). In these theories, actions are frequently guided by either individual motives/intentions or rational calculations. Luhmann observes that, since not all actions are admitted in society, individual intentions or aims are not sufficient to explain social systems. The alternative concept of communication stresses the fact that Ego and Alter can *both* act *and* understand. In particular, understanding is extraordinarily important in that it realises the other's utterance as well as uttered information. Communication is the unity of the difference between three selections: utterance (*Mitteilung*), information, and understanding.

Firstly, communication is always communication on something, as it always includes information. Information is a selection, in that the choice of any topic excludes other topics. Secondly, information is always uttered. Communication includes utterance, showing intentions, motives, reasons, knowledge; utterance is a selection, as it is designed in a way instead of others. Thirdly, understanding is a crucial selection to realise and differentiate utterance and information: through understanding, each communication can stress 'who has uttered what' (Luhmann 1997:2012, p. 45). Understanding makes it possible for further communication to refer to either previous utterance (who's motives, intentions) or uttered information (what), including reference to difficulties in or ways of understanding. Therefore, understanding is the selection that generates communication.

Communication can select and actualise meaning, by opening further possibilities of communication in making reference to previous information or utterance. Communication allows the reproduction of the system through the continuous production of the distinction between self-reference (reference to utterance) and

other-reference (reference to information). Communication always depends on the event of understanding; therefore, communication is an event that disappears as understanding occurs, and this allows the production of meaning and the continuous operational production of the system. Social systems exist only as a sequence of communicative events: the relation among these events is based on meaning, which allows selection of specific communications and connections among them. Double contingency is visible in participants' utterances as selections that need to be understood, i.e. in contingent events of communication which can always be produced in other ways. Through communication, double contingency is transformed in operational closure of social systems. As we shall see below, this requires the generation of social structures.

In social systems, communications can be produced only in the continuous connection with (as reaction to or stimulation of) other communication. The elements (and operations) of social systems are only communications, and this excludes both other operations (either consciousness in psychic systems or reproduction of cells in living systems) and (physical, chemical, artificial) objects.

Against this background, it is also possible to understand the importance of action. In Luhmann's theory, 'action is constituted in social systems by means of communication and attribution as a reduction of complexity, as an indispensable self-simplification of the system' (Luhmann 1984:1995, p. 137). *Attribution of action* is necessary to reproduce communication: action is not the operation of social systems but a way of making this operation visible in the system. The process of communication can be 'decomposed' in actions: each action coincides with the unity of utterance and information. This happens because only action makes it possible to observe if understanding has been achieved. In short, each action (1) shows previous understanding, i.e. achievement of communication, and (2) refers to previous utterance or information. Therefore, attribution of action provides the self-referential connection between communications, making it possible to fix the communication process as a series of observable events. As understanding is not observable as such, attribution of action is a simplification of communication that provides the possibility of self-reference within social systems.

3.3.2 Structures of Social Systems

The concept of autopoiesis is combined to the concept of self-organisation. Self-organisation means self-production of *structures*. Self-organisation is important in that it means that the system uses its operations to build its structures. Autopoiesis generates indeterminacy within the system, and the system can reduce this indeterminacy through its structures. Operational closure is the basis of organisational closure: the system needs operational closure (autopoiesis) to exist, while its internal structures, which reduce its self-created indeterminacy, can be re-used but also dismissed and changed. Autopoiesis is the only invariable aspect of systems, while structures (and self-organisation) are always variable. Structures restrict the

possibility of connecting operations, conditioning the autopoiesis of social systems. This is a necessary condition for limiting random connections between operations and ensuring the relationship between past and future operations.

Social structures give internal guidance to social systems, making their autopoietic production possible. Historical selections, which are produced through communication, are preserved in the system as the basis of autopoietic reproduction, i.e. the system's history is the basis for future selections. Social structures are 'selections schemata' (Luhmann 1997:2012, p. 50) that make repetitions possible in social systems, thus condensing their identities.

Social structures are *structures of expectations* (Luhmann 1984:1995, p. 110) that produce asymmetries in situations of double contingency. Expectations are structures that allow 'the absorption of uncertainty', enhancing connectivity in meaning-constituted social systems, and thus replacing the indeterminacy of double contingency. Social structures, therefore, consist in constructing expectations about Ego and Alter's possible contributions to communication. Ego can expect Alter's expectations; more precisely Ego can expect that Alter construct expectations about Ego's actions, and vice versa. Thus Ego and Alter can contribute to communication depending on expectations that are expected by both of them. In other words, social structures are (Ego's) expectations of (Alter's) expectations, or reflexive expectations.

The problem of double contingency can be solved through any type of reflexive expectations. All social structures are equivalent solutions of the same problem of double contingency; therefore, they are in their turn contingent and can be changed in the system according to operational necessities (necessities of communication). As we have seen, only the autopoiesis of social systems is invariable. As social structures can only be built through operations of communication, they can be changed depending on the results of these operations. Social structures are produced within society; therefore, we will further deal with them when we introduce society as a specific type of social system.

3.3.3 Interpenetration and Structural Coupling of Consciousness and Communication

Double contingency and operations of communication are generated by the impossibility for individual psychic systems to observe each other. Psychic systems are closed meaning-constituted systems, based on the operations of consciousness, which are not accessible to operations of other psychic systems in their environment. Consciousness cannot be included in social systems through communication. On the one hand, communication cannot understand what happens in participants' consciousness, although consciousness is always involved in communication. On the other hand, individual consciousness cannot control or determine communication.

In social systems, the meaning of understanding is determined in the network of communications, not in the participant's consciousness. Independently from what participants think about utterance and information, understanding is shown through further utterance, which is used to continue communication, for example by expressing doubts about the sincerity of a previous utterance or surprise for unexpected information. Therefore, utterance, information and understanding do not coincide with the content or intentions produced in participants' consciousness; they achieve their meaning only as communication. Participants' emotions or elucubrations do not coincide with the meaning of utterances in the network of communication. Participants can be moved to buy an object by their emotions, but these emotions do not determine the economic value of the object, nor the consequences of the transaction, which is fixed in the reproduction of payment as communication. Communication is generated when Ego understands that Alter is paying and how much it is paying. Researchers can be satisfied with their presentations at a conference, but this does not decide the scientific relevance of their contributions, which is generated in a network of communications in which any presentation can find (or not find) connections. In short, social systems (e.g. economy, politics, science, education, law) cannot result from either individual intentions or consent among individuals but result from the autopoiesis of communication.

Nevertheless, psychic systems are fundamental for the reproduction of communication and social systems: 'Without consciousness communication is impossible' (Luhmann 1997:2012, p. 56). This leads to the important problem of the relationship between social systems and psychic systems. Luhmann uses the two concepts of interpenetration and structural coupling to indicate the relationship between autopoietic meaning-constituted systems that are in each other's environment and irritate each other without having access to each other's operations, as they are operationally closed. *Interpenetration and structural coupling* allow the relationship between the system and its environment. Interpenetration and structural coupling are not based on some type of project, they simply happen.

The concept of interpenetration indicates that 'systems within a system's environment contribute to system formation' (Luhmann 1984:1995, p. 213). Both social systems and psychic systems can exist only if they interpenetrate: communication is based on conscious thinking and conscious thinking is based on communication. Interpenetration does not mean mutual determination or fusion between the interpenetrating systems, as both psychic ad social systems are operationally closed and can only create meaning internally. Interpenetration means that each system makes its complexity available for the operations of the other system. Psychic systems' complexity is available for the operational closure of social systems, and social systems' complexity is available for the operational closure of psychic systems. Interpenetration means mutual contribution to the selection of elements; however, it does not mean coincidence of elements, as each element is constituted in the autopoiesis of only one system. For this reason, consciousness and communication cannot coincide, although single selections can be produced

simultaneously in both systems (conscious thinking is simultaneous to either understanding or uttering).

The penetrating system (e.g. a psychic system) is co-determined by the penetrated system (e.g. a social system), which reacts to the structured complexity of the penetrating system. In fact, the penetrating system introduces disorder in the penetrated system, as its complexity is pre-structured. The penetrated system creates order from disorder, or 'order from noise', according to Von Foerster (1984). On the one hand, 'social systems come into being on the basis of the noise that psychic systems create in their attempts to communicate' (Luhmann 1984:1995, p. 214). Psychic systems work as filters of any environmental irritation for social systems. Communication requires that consciousness perceives something as relevant to utter or understand. Consciousness allows utterance and understanding and is therefore an essential environmental condition of communication. On the other hand, communication generates binary schematisations, distinguishing between two sides as forms of reduction of the complexity made available for consciousness. Binary schematisations are produced by a social system as reduced complexity and autonomously used by psychic systems, which can choose from the available options. Binary schematisations include friendly/unfriendly, true/false, confirming/deviant, attraction/aversion, and so on.

Interpenetration 'selects the structures that enable the reproduction of the interpenetrating systems' (Luhmann 1984:1995, p. 220). This means that interpenetration allows a structural coupling between psychic and social systems. Structural coupling presupposes that the reproduction of each system is based on its own structures. Through structural coupling, each system can be irritated, but irritations are always self-irritations, they are constructed as operations of the system, they arise from an internal comparison of events with the system's established structures. Continuous and specific self-irritations can trigger structural change in the system, in particular change of structures of reflexive expectations in social systems.

Communication is continuously irritated by the consciousness of those who participate in it and consciousness is continuously irritated by communication it participates in. However, meaning and connections of single operations, of communication and consciousness, are determined in the coupled and separate social and psychic systems. In this sense, structural coupling requires continuous decoupling as communications are connected to and find meaning in other communications, while conscious thinking is connected to and find meaning in other conscious thinking.

3.3.4 Social Systems as Observing Systems

Social systems are observing systems, since through communication they can attach meaning to everything. Observation means drawing a distinction and thus generating a form. It consists in drawing a distinction and marking one side of this

distinction as indication. Therefore, observing means distinguishing and indicating simultaneously, in the same operation. In social systems, communications are both operations and observations as communication always distinguishes between self-reference and other-reference, indicating either utterance or information. Communication must indicate either what is uttered (information) or how/why it is uttered.

Through observation, the system can 'open up' to the environment, where openness is based on internal operations, which does not mean that information is transmitted from the environment to the system. Openness means that it is possible to communicate on environmental aspects or problems, e.g. individual idiosyncrasies, cells or pollution, through distinctions used in the social system. Observation means selection, actualising something and opening up to other possible developments. Thus, observation reproduces the meaning-constitutive distinction between actual and possible and takes a form. Observation is the production of forms, as it is both distinction and indication. Meaning is the medium in which observation generates forms (Luhmann 1995a:2000).

In a further operation, it is always possible to cross the boundary of the distinction and change the indication, therefore changing the form. Communication can stress first masculinity and then femininity, but this always requires a new operation. If the distinction is between masculinity and femininity, it is impossible to indicate both in the same communication. Clearly, it is possible to eliminate this distinction, either communicating that there is no difference or communicating in a way that makes no distinction (e.g., ignoring the distinction in the selection of personnel in organisations). The distinction always includes the perspective of observation (e.g. the perspective of the social system that uses the distinction between masculinity and femininity). However, this perspective cannot observe itself in the distinction: the condition of observing is invisible in the observation, it is a 'blind spot'. Operations cannot observe the distinction that they use, they can only indicate one side of it. Therefore, the distinction that the system uses is a 'fact' in the perspective of the system; for example, the difference between males and females is either naturally or culturally necessary. This is a first order observation, which consists in observing facts or objects.

Each observation can however be observed from another perspective, which establishes that such an observation is not a fact but a selection. This is *second order observation*, i.e. the observation of another observation, which distinguishes and indicates an observation as observation. The second order observation deals with *the way* in which a first order observation is produced. Second order observations can be produced either by other systems or by the same systems in another operation, i.e. as self-observations. Second order observations open up possibilities of observation that are excluded in first order observations, which observe reality as it appears. They can see that any observation is an operation that generates distinctions in the medium of meaning, rather than revealing reality. However, second order observations may also have 'toxic' (Luhmann 1995a:2000) effects, as *any* observation can be deprived of authenticity; authenticity itself becomes a product of second order observation. The difference between first order

observation, i.e. the observation of 'facts' as they are, and second order observation, i.e. the observation of the ways in which 'facts' are observed, is particularly important because it highlights that 'facts' are the product of a social construction.

Second order observation itself has a blind spot, as it uses a distinction without observing its perspective in this distinction. In second order observations, a given distinction, for example the one between males and females, may be replaced by another distinction, for example the one between equality and inequality. This makes a difference in the *way* of observing, rather than in the content of the observation. The basic point in an observation is how it is produced, what distinction it uses, what form it reproduces (feminism/masculism, equality/inequality, child/adult, etc.). From another perspective, a second order observation is always a first order observation. Therefore, first-order observations can never be completely abandoned: no social system can observe what it cannot observe, as it cannot observe *that* it cannot observe. Its social structure, e.g. the expectations about male and female behaviours, or equal and unequal selections, determines its perspective of observation. In this respect, it must be stressed that changes of distinctions have radical consequences in social systems, as they are structural changes.

Sociology, as any other science, is a system based on observation. In particular, sociological theories draw basic guiding distinctions. As we have seen, Social Systems Theory draws a distinction between system and environment. Each basic distinction has important consequences for further distinctions, and ultimately for the theory and its possibility to explain social phenomena. As a theory is based on, and reproduces, distinctions, it does not deal with objects but with forms, i.e. with distinctions and indications. Social Systems Theory does not deal with systems as objects, but with the system-environment form. Sociology is a form of second order observation, in that it observes the society in which it is produced. However, it deals with its basic distinctions as facts. As Luhmann (1984:1995, p. 12) writes, 'there are systems'. This aspect of Luhmann's epistemology is named '*operational constructivism*' (Luhmann 1988b), as distinguished from 'radical constructivism' (e.g., Von Foerster 1984; Glasersfeld 1987; Schmidt 1987; Watzlavick 1981:1984), which observes knowledge as constructed in a system (usually an individual cognitive system), but fails to observe its foundations in the operational closure of systems. Operational constructivism leads to observe systems' observations, rather than facts or realities. Thus, operational constructivism substitutes the traditional difference between subjective knowledge and objective world.

Social systems that observe the unity of distinctions guiding their observations generate *paradoxes*. The question here is: what is the unity of the distinction that is used to observe? This means, for example, that one needs to observe if the distinction between true and false is true, if the distinction between right and wrong is right, or if the distinction between good and evil is good. This type of observation presupposes that the distinction is applied to the distinction. This creates a paradox, as it blocks further observations in the oscillation between the two sides of the distinction. The paradox is unfolded only by replacing it with another functioning distinction. In this perspective, each social structure, being based on a distinction, unfolds the paradox, creating an asymmetry that replaces the oscillation.

Thus, communication is normally based on distinctions that either do not create paradoxes or that hide or postpone them. Thus, judges do not question their right to distinguish between right and wrong, scientists do not doubt about the truth of truth, and moralists do not doubt about the good of good. Paradoxes, however, can stimulate the system's observation of the distinctions that it uses, highlighting blind spots and forms that condition observations.

The basic distinction of systems theory itself, i.e. the distinction between system and environment, is paradoxical, as only the system can draw it. This distinction is not a fact, but it is dealt with as a fact. Using this distinction, the system can observe its own identity as different from the environment, i.e. it can observe itself only by distinguishing itself from the environment. For instance, science calls 'empirical reality' what it constructs through its own operation, which is communication guided by a distinction between true and false.

To sum up, (1) systems observe by distinguishing and indicating, without any correspondence with the external environment; (2) the environment is only evident through the system's self-irritation, which invites the system to react, in particular if expectations are disappointed; (3) each observation is based on a paradox, which consists in the unity of the distinction; (4) knowledge means unfolding the paradox, which allows connections between the system's operations.

3.3.5 The Complexity of Social Systems

Social and psychic systems are complex systems in that they combine operational closure and the medium of meaning. Autopoiesis leads to complexity, which is a consequence of meaning, in that it depends on the difference between actual operations and non-actualised possibilities. Complexity results from the fact that meaning is open to further possibilities. This can be observed in two different dimensions.

First, complexity means that not all the elements in a system are simultaneously related to each other, but rather relations between elements increase in geometrical progression with the increasing number of elements. This condition produces an excess of possibilities of communication beyond actualised communications (elements). Second, complexity of a system is observable as simultaneity of actual and possible states. Complexity implies the necessity of selecting from possible communications in order to actualise communications, thus generating contingent states and the selective organisation of autopoiesis.

Systems' self-observations cannot reflect the complexity generated in systems' operations in the medium of meaning. Social systems must select possibilities in each operation: each communication is obliged to reduce potential complexity. The reduction of complexity allows its maintenance, rather than its elimination, as actualisations always open up further possibilities. This also means that a system is less complex than its environment, as it is in the environment that everything that is not within the system happens (for social systems: all psychic systems,

human bodies, non-human living systems, chemical and physical elements). Each event in the environment stimulates unpredictable irritations in the system, which are not necessarily compatible with the system's logic.

Social systems can be complex in various ways, as any form of complexity is a contingent organisation of the system. Social systems develop structural complexity by organising their autopoiesis in different ways. The complexity of the system can be observed in a temporal sequence: it is generated through the sequence of system's operations. The actual present (operation) of a social system is the point of differentiation between its past (the complexity that has been actualised as and in communication) and its future (what is possible in communication). The repetition of the same operation (communication) in time generates the system's structured identity. Social structures are thus shaped in time.

3.4 Society

3.4.1 Understanding Society

According to Luhmann, Social Systems Theory helps overcome three 'epistemological obstacles' to a sufficiently complex theory of society: (1) social systems consist of individual human beings and relations among them; (2) society is integrated through consent among human beings; (3) societies can be observed from the outside. Obstacles (1) and (2) are overcome using the concepts of autopoiesis of social systems and structural coupling between social systems and psychic systems. Obstacle (3) is overcome using the theory of observation as system's operation. According to Luhmann, there is also a fourth epistemological obstacle, which can be overcome at the more specific level of theory of society: societies are territorially defined entities. This obstacle can be overcome through a theory of societal differentiation.

In general terms, society is defined by Luhmann as one out of three types of social systems, the other two being interaction and organisation. These systems are different from each other in terms of the ways in which their boundaries are determined. In particular, society is defined as a specific type of social system that includes *all* communications, or, in other words, all other social systems. Society is based on communication, without any other presupposition, and there is no communication outside society. This also means that, paradoxically, society includes the other types of social systems, from which it differs for the way its boundaries are determined. Interactions and organisations presuppose society, as they presuppose the operational closure based on communication and the determination of structures of communication. As interaction and organisation are particularly important in the education system, we shall dwell on them in Chap. 5.

Boundaries of society are fixed through its operational closure. The structure of society is the form of differentiation of society. Differentiation of society has always been analysed in sociology, for example in terms of division of work or

differentiation of social classes. Luhmann is interested in the primary differentiation of the system of society, which can trigger further forms of differentiations. Society differentiates itself from its environment, in which there are not communications (*Ausdifferenzierung*), and differentiates internally in subsystems (*Differenzierung*). Internal differentiation means differentiation between its subsystems and their (even social) environments. The differentiation of society generates internal environment, i.e. it generates a re-entry of the distinction between system and environment within the system (of society).

Differentiation determines the dynamisation of society, in that it multiplies the internal structures, as structures of subsystems, and observations. This implies that societal differentiation also requires societal integration. According to Luhmann, societal integration means the reduction of the degree of freedom of subsystems, as a consequence of the delimitation of external and internal boundaries. Freedom is restricted by both cooperation and conflict between the subsystems. Integration takes place in events of communications that link different subsystems (e.g., a political decision on economic investments). Integration is continuous, but it continuously shifts to disintegration, as communications are always included in the autopoiesis of different subsystems (e.g. decisions are included in the autopoiesis of politics and investments are included in the autopoiesis of economy).

The understanding of society also requires the analysis of the communication media in which its structures take form. According to Luhmann, communication is *improbable*. Since it exists only in networks of communication, i.e. it presupposes other communications and stimulates further communication, communication must achieve connections. These connections must not be arbitrary, as arbitrary connections would interrupt the operational closure of social systems. Therefore, if the problem of double contingency must be solved and social systems must be produced, communication must become probable. The problem of communication improbability can be dealt with through communication media.

Communication media are general presuppositions for society's operational closure and its internal construction of structured complexity in specific forms. Based on meaning, which is the basic medium in social systems (Sect. 3.2.2). Society generates new media that react to the improbability of communication, making communication probable. Hence, the importance of communication media depends on the problem of improbability of connections that they solve. Firstly, language is the medium that makes understanding probable beyond mere perception, i.e. it is the basic medium to achieve communication. Secondly, dissemination media (*Verbreitungsmedien*) make participation in communication, and thus reception of information, probable beyond the limitations of participants' presence. Finally, success media make acceptance of communication probable beyond the limitations of individual motivation to accept it. Communication media shape and condition the differentiation of society.

3.4.2 Language and Dissemination Media

The constitution of society is based on the solution of the first and most immediate problem of improbability, namely understanding and thus achieving communication (see Sect. 3.3.1). Our experience seems to show that understanding is rarely improbable, as communication seems fluid and easy to understand. However, this impression depends on the function of a specific medium, i.e. *language*. Language has existed since the origins of human society and has been the basic medium for the production of communication from the beginning. Language is the fundamental communication medium that guarantees the autopoiesis of society. While it is true that there are non-verbal communications, their understanding always depend on the existence of language. Only language can ensure a fluent and effective connection between communications.

The importance of language is based on its production of a positive and a negative version of communication as a yes/no structure. On the one hand, there is always the possibility to express something in either a positive or a negative form (this *is* a book, *not* an animal). On the other hand, this structure extends the possible communication, doubling connective options of communication as either acceptance (yes) or rejection (no). This allows the generation of corrections, controversies and uncertainty, opening a space of contingency in society. Against this background, it must be stressed that according to Luhmann, in society there is no preference for consent, such preference being the result of a self-description. Rather, operational closure generates the alternatives of consent and dissent, the latter being crucial to enhance structural change.

Language, however, does not make communication probable beyond the reciprocal perception of participants. For a very long time, this has meant the necessity of participants' physical presence. Wider dissemination, involving absent participants, is made probable by other media, mainly writing, and at a later stage printing. These dissemination media desynchronise utterance and information on the one hand and understanding on the other, so that understanding can happen (much) later than utterance. On the one hand, dissemination media amplify the possibility to generate a social memory, essentially as a written or printed memory. On the other hand, they amplify the possibility of rejecting communication, reaching a much greater number of participants and overcoming the constraints of physical presence. These possibilities were produced with the invention of writing, but they were strongly amplified with printing. During the twentieth century (and, after Luhmann, at the beginning of the twenty-first century), dissemination has been increasing with electronic media, in particular television and computer. The invention of these media has made it possible to include the entire world in communication. Moreover, these media make the distinction between utterance and information not necessary and, in some conditions, not possible, because utterance is substituted by the anonymity of the medium (television and computer). These media also make systematic coordination of utterance and audience understanding

more difficult, if not impossible. In other words, these media change the significance of communication.

Dissemination media have two important effects on society: they (1) are important presuppositions for internal structural change, and (2) they transform the nature of communication as society operation. Moreover, the evolution of dissemination media creates an evolutionary trend in society, which changes from a hierarchical organisation based on direct contacts to a heterarchical organisation, in which the public opinion is important (with printing and above all television) and the authority attributed to 'experts' is undermined (with the computer and the web).

3.4.3 The Modern Society as a Functionally Differentiated Society

Differentiation of society can take different forms. The form of differentiation organises the relationship between subsystems, i.e. it organises the ways in which each subsystem can observe itself though differentiation from other subsystems. The form of differentiation also determines how the subsystems are ordered in their relationships. By defining and ordering subsystems, the form of differentiation is the general structure of society that guides the autopoiesis of communication. Different forms of differentiation can be simultaneously present in society, but there is always a *primary form* that determines the structural constraints for the others.

Apart from primal societies, which were based on simple distinctions like age and gender, society can be observed on the basis of its form of differentiation. The form of differentiation can be observed starting from the distinction between similarity and dissimilarity between the subsystems. The first form of differentiation, in order of appearance in the history of humanity, is based on similarity between the subsystems. This is a segmentary differentiation distinguished on the basis of either descent (subsystems as tribes or clans) or residential communities (subsystems as households or villages). The subsystems of this segmentary society correspond to those that are generally known as prehistoric communities. All segments (or communities) are structured in a similar way.

The second form of differentiation, based on the invention of writing and the accumulation of goods in certain segments, is the differentiation between centre and periphery. This form introduces dissimilarity between a more powerful centre (where eminent families or clans live) and a residual periphery. Examples include ancient cities (e.g. the Greek *polis*) and empires that self-described as the centre of the world (Persia, Rome). The third form is stratificatory differentiation, which develops the distinction between dissimilar subsystems. Here dissimilarity means hierarchy between smaller nobility, evolving in the powerful centre, and much larger commons. Hierarchy is based on difference in rank and wealth between

households. In particular, this has been the dominant form of society in Europe in the late Middle Ages and early modernity.

In Europe, stratificatory differentiation started to decline since the invention of printing and it was later substituted by a new primary form of differentiation, combining similarity with dissimilarity between subsystems. Luhmann describes this form as functional differentiation, which coincides with the so-called modern society, surviving as primary form of differentiation until the present time.

The functionally differentiated society developed from and against stratification, rejecting rank and hierarchy between subsystems as constitutive form. This society did not develop everywhere in the same way and at the same time; therefore, it is difficult to date its beginning. The birth of sovereign states, money economy, intimate nuclear families, scientific evidence, and other structures indicates the rising of the new form of differentiation. According to Luhmann, in the last third of the eighteenth century the passage to a functionally differentiated society was completed.

Functional differentiation means that each subsystem of society fulfils a particular function in society. Subsystems are defined as functional (sub)systems, as they are differentiated and observe society on the basis of this function. Each function refers to a particular problem of society, rather than to the self-reference or self-preservation of the specific subsystem that fulfils it. Besides the system of education, which will be the object of the next chapters, Luhmann has described, in a more or less systematic way, a number of functional systems, including the legal system (1993), the system of science (1990), the system of economy (1988), the political system (2000b), the system of mass media (1996:2000), the system of art (1995a:2000), the system of religion (2000a:2013), and, in a somewhat less developed way, families and intimate relations (1990c, pp. 189–209), and the healthcare system (1990c, pp. 176–188).

Each functional system is operationally closed, therefore being autonomous in fulfilling its function and having its own structures. For instance, the political system fulfils the function of making decisions that are binding for the overall society; the legal system fulfils the function to stabilise and generalise norms in society; families as a system of intimate communication fulfil the function to include individuals as persons; the system of science fulfils the function of achieving affordable knowledge; economy fulfils the function of providing future supply under conditions of scarcity. Each functional system differs from its environment (and in particular from the other functional systems) for its function, and each organises internal communication on the basis of this function. The most important communication in society is produced on the basis of these functions. All systems are similar inasmuch as they fulfil a function, but they are dissimilar in that their functions, and therefore their internal structures and ways of observing, are different.

Each system observes the primacy of its function, but in the perspective of the comprehensive society all functional systems are equally important, and the relationship between the functions is not regulated hierarchically. The functionally differentiated society has neither apex, nor centre, and cannot regulate the

relationships between its subsystems. It enjoys great stability, as the fulfilment of many functions makes it possible to deal with many problems and in different ways, but, given the great quantity of structural and operational couplings between the subsystems, it is also largely exposed to self-irritations, which the comprehensive system cannot regulate.

In the functionally differentiated society, each environmental problem is dealt with in different subsystems, without possible centralised solutions. This creates advantages, as possible solutions multiply, and disadvantages, as each proposed solution is insufficient as observed in only one perspective among the others. Indeterminacy (e.g. in prices, consent for government, intimate relations, legal procedures, etc.) greatly amplifies in a functionally differentiated society, as central coordination is not possible.

Each functional system observes the other systems in its environment. This way of observing takes the form of *performances* for the other functional systems. For example, the political system makes decisions supporting economy, economy finances science, science provides research supporting the care of illness. These performances create mutual interdependencies among the functional systems, integrating them in society. However, all these interdependencies are only observed from the perspectives of specific functional systems, which in this way provide self-irritations. Moreover, any change or instability in one subsystem determines self-irritations in the others, with an ensuing intensification of irritations.

These interdependencies, which indicate the integration of society, are based on structural coupling. For example, politics and economy are coupled through taxes and charges, in which both money and political power are involved; similarly, law and economy are coupled through contracts and property, which are legally determined but also economically relevant. Structural coupling does not eliminate the operational closure of functional systems, rather it presupposes it. However, structural coupling between functional systems is also operational coupling, as specific communications are contingently shared by different systems, although they are immediately connected to the internal autopoiesis of these systems (e.g. to politics and economy or law and economy).

Functional differentiation determines other forms of differentiations. In particular, role differentiation as role complementarity included in functional systems, such as ruler/ruled, producer/consumer, doctor/patient, and teacher/pupil. Such differentiation is primarily based on performances and utility. Individuals cannot be described as members of subsystems, in that they cannot belong to any specific functional system; rather, they need to have access to communication in all of them. Therefore, individuals, who have lost a given position in communities or strata, can decide their degree of involvement in specific roles.

Segmentary and stratificatory forms of differentiation do not disappear in the functionally differentiated society; they can instead be reproduced, for example as segmentary differentiation of states in the political system or markets in economy, and as hierarchy of wealth based on economy. However, these forms of differentiation are always dependent on the primary form of functional differentiation.

The segmentary differentiation of the political system determines the regional differentiation of the functionally differentiated society. According to Luhmann, this form of society cannot be identified in terms of political systems or regional territories, as it includes all communications in the world. Functional systems operate without regional boundaries. The world dimension of connections and problems is increasing historically, in particular through organisations that operate worldwide (e.g., economic organisations, universities). Regional differentiation in the world society is an effect of functional differentiation, particularly of the segmentary system of states, and its importance is amplified by the unequal distribution of functional differentiation. Hence, regional differences can be understood as 'differences in the involvement in and reaction to the dominant structures of the world system of society' (Luhmann 1997:2012, p. 96). The impacts of functional differentiation 'combine, reinforce, and inhibit one another due to conditions that occur only regionally, and consequently generate widely differing patterns' (Luhmann 1997:2013, p. 128). Differences among regions, and the possibility to compare them, depend on the world dimension of the functionally differentiated society. The world society generates both the interest in cultural diversity and the interest in common development, as observing the future within society means observing the necessity of dealing with common problems.

In the functionally differentiated society, however, generalised consent is illusory, as problems are continuously generated in communication. A secure future for society is impossible and uncertainty is endemic. This situation determines the observation of *risks* (Luhmann 1991b:1993), which is generated with the functionally differentiated society. In this society, future becomes an uncertain and undetermined horizon. Each present decision has future consequences that cannot be determined in the present, and it is always possible that present action generates damages in the future. This implies that each decision is risky for decision-makers, who are attributed responsibility for future damages. This is a generalised condition in functionally differentiated society concerning ecological problems, financial investments, political decisions, love affairs, scientific research, and so on. What is risk for decision-makers can be danger for those who should accept decisions, and this can lead to protests and conflicts, as future damages depending on others' decisions may not be accepted. For example, decisions about ways of disposing of waste can be risky for decision-makers and dangerous for those who live where disposal has been decided; people observing dangers can attribute the responsibility of these dangers to decision-makers. In these conditions, the functionally differentiated society cannot find help in any form of rationality; it is characterised by the necessity *and* impossibility of societal rationality.

3.4.4 Coding and Programming in Functional Systems

In the functionally differentiated society, the autopoiesis of each subsystem is formed through a binary code. This code is the 'basal structure' of a functional

system (Luhmann 1995a:2000, p. 185), which assures the system's self-organisation and therefore structured complexity. Functional systems produce and continuously reproduce their binary codes through their operations. The binary code includes two values, excluding third orientations and any other interference in the system. The binary code is a preference code, in that it fixes a distinction between a positive and a negative value, thus defining a preference for the positive value that can be used in the system. The binary code is thus the basic distinction between a positive value and a negative value (e.g., true/false in science, beloved/unloved in families, property/lack of property in economy, right/wrong in the legal system, and so forth), to which the system orients its own operations (communications).

The binary code guides the production of communication and its operational closure in social systems, defining on the one hand the positive orientation of communicative events (true, beloved, propertied, right), and on the other hand what needs to be avoided, i.e. the negative orientation (false, unloved, propertyless, wrong). Therefore, the code selects communications that can be included in the system, distinguishing the system from its environment. The positive value concerns the system's preferred option, legitimising the distinction itself and thus becoming the symbol of the unity of the code (the code self-places in its positive value). The negative value makes it possible to reflect on the need to change orientation, symbolising the contingency of the connections between communications, i.e. the fact that these connections can be different.

Binary codes are specific forms in that they facilitate crossing the boundary between the two sides, i.e. switching from a given value to the opposite one. This facilitation of crossing is called technicisation. One way to reach technicisation is to establish a secondary coding (*Zweitcode*). This means that a code is applied to another code. We shall see some examples in the next section, where we deal with the coding of success media.

The binary code is invariant in the system. It requires, however, criteria determining the conditions for the attribution of positive and negative values. These criteria are called *programmes*. While codes are fixed and invariant, programmes change, they are variable conditions of attribution of the values. For example, theories and methods are programmes that allow the attribution of true and false in the system of science, investments are programmes that allow the attribution of money and lack of money in the system of economy. Programmes also allow consideration of other codes; for example, scientific research (attribution of truth) can be based on investments (attribution of money).

Each code does not tolerate intrusions of other codes in the coded system. Economic communication cannot be oriented by power, and political communication cannot be oriented by money. Each code is a rejection value for the other codes. In this way, all codes of all functional systems are simultaneously important in the comprehensive society. Truth, power, right, love, and so on are equally important in society, although each of them is important only in one system.

3.4.5 Success (or Symbolically Generalised) Media

The binary code may be the structure of symbolically generalised media. These are success media that have the function of making acceptance of communication probable. They create expectations of acceptance when rejection is probable, although they cannot safeguard expectations from disappointment. Their function concerns the distinction between understanding and acceptance. Understanding is the basis of the distinction between acceptance and rejection. This distinction can be evident after communication has been understood. In further communication, 'communication transforms the difference between information *and* utterance into the difference between acceptance *or* rejection of the utterance' (Luhmann 1984:1995, p. 149). Acceptance seems the 'normal' condition in communication processes, e.g. acceptance of scientific truth, political decisions, loving actions, or payments. In fact, rejection is always possible and it would be probable in the absence of symbolically generalised media.

The importance of symbolically generalised media depends on dissemination media, mainly printing. When dissemination is wide, increasing information enhances problems of acceptance. In these conditions, the participants' shared experience and memory, and the interactional pressure towards consent, cannot make acceptance probable. Therefore, the problem of accepting communication and the forms it produces becomes relevant in society.

Rejection of communication is probable when participants do not know each other (why should one accept proposals from an unknown person?), information is not immediately plausible (why should one accept knowledge that is not based on personal experience?), and attribution of selections is problematic (what is the reason for paying taxes?). In these cases, participants' motivation to accept others' selections is improbable. Symbolically generalised media make this motivation probable by creating a highly improbable combination between selection and motivation.

Luhmann suggests that the symbolically generalised media are the following: power (supported by right), truth, property (supported by money), love, art, and, with some doubts, values. All these media are connected to the rise of the functionally differentiated society. On the one hand, these media have enhanced the new form of differentiation of society; on the other, this differentiation has allowed their stabilisation as social structures in functional systems. These are 'media' in that they constitute a loosely coupled substratum enabling forms. They coordinate selections that are initially loose, producing a tight coupling between them, such as scientific theories, proofs of love, prices, and so on. The particularity of these forms is symbolic generalisation. They are symbolic as they bridge a difference between selections, i.e. they make Ego's acceptance of Alter's selection probable. This means that selection does not presuppose previous motivation: Ego accepts to pay a fine to Alter because s/he can attribute to Alter the power of imposing the fine; Ego accepts Alter's statement that bosons exist as Alter can demonstrate a scientific truth; Ego accepts Alter's invitation to spend a night together as s/he

loves Alter. To sum up, Ego is motivated to accept Alter's selection as this selection is a manifestation of a symbolically generalised medium. Motivation and acceptance are not based on particular states of consciousness; rather, they indicate that a medium makes the reproduction of communication unproblematic. The conditions of the proposed selection (e.g. truth, power, love) are established as a motivational factor. These media generalise this probability of acceptance, covering a wide range of situations.

The different symbolically generalised media are functionally equivalent in connecting selection and motivation. Their differentiation is based on the attribution of responsibility for selections as either internal or external, i.e., to either utterance (action) or information (experience of the environment). An act of power, for example, is always attributed to the holder of power (as his/her action), i.e. internally; scientific knowledge, on the contrary, is always attributed to reality, i.e. externally as experience, rather than to the arbitrary will of the scientist. This differentiation creates an 'attribution constellation' (Luhmann 1997:2012, p. 202), in which actions and experiences are differently coupled. Each of these constellations refers to a specific problem. Luhmann identifies four attribution constellations concerning the symbolically generalised media. Some constellations refer to different problems; therefore, reference problems are more numerous than constellations. For example, the constellation combining Alter's action and Ego's action indicates that Alter's action conditions Ego's action. The corresponding medium is power. Here, the reference problem is the improbability that Alter's decisions will affect Ego's actions and that Ego will be required to obey. Another example is the constellation combining Alter's experience and Ego's experience. This constellation indicates that Alter's experience conditions Ego's experience, so that the selection of information is attributed to the environment of both participants. The corresponding media are truth and values. The reference problem for truth is that Ego accepts Alter's experience of new knowledge as the basis of his/her experience of knowledge. The reference problem for values is the improbability of a common ground for participants' experience. While truth is introduced in communication through assertions, values are introduced through indisputable suppositions.

The most important structures of symbolically generalised media is a central code, which gives the media a fixed guidance function for operational closure, and the corresponding programmes for its variable conditioning. The crossing between the values of the code is achieved through technicisation. Technicisation of some media is based on secondary coding, which can support motivation. For example, law (right/wrong) is the secondary coding of power, and conditions the shift between superior and inferior positions. Power can be more easily generalised if it is based on the secondary coding of law. In this case, the positive value is duplicated as lawful power. In other cases, technicisation is not necessary, in that the facilitation of crossing between values is based on either object (art) or person (love).

Not all functional systems are structured on the basis of a symbolically generalised medium. Coding can be sufficient for structuring a functional system without

having the function of combining selections and motivation, i.e. of making acceptance probable, particularly when functional systems are specialised in changing the environment, i.e. consciousness (education), bodies (healthcare), extra-mundane meaning (religion), information about the world (mass media). In all these cases, improbability of acceptance is not a real problem, as the function of the social system does not concern the reproduction of communication. We shall see the specific case of education in Chap. 5.

3.4.6 Semantics, Self-description and Reflection

In society, observations, in particular self-observations, can take the form of *semantics*. Semantics is the set of oral and written texts that can be repeatedly used, established and stabilised as guidelines to coordinate observations in society. Semantics is produced through communication and preserved to orient further communication. It is the set of forms that can be used to select information in the medium of meaning, preserving the themes that can be potentially included in communication. Semantics connects communications by making reference to the meaning that is preserved in texts. This enables both the re-use of existing observations and the opening up of new possibilities of observing, which can connect to existing observations. Semantics can thus generalise meaning, generating distinctions that orient operations of observation. On the one hand, semantics orients communication, therefore influencing the level of societal complexity, which may require new structures. On the other, it is influenced by structural change and societal complexity, as new connections between communications lead to the introduction of new themes and the production of new texts.

Luhmann identifies two levels of production of semantics in society. The first level includes all texts and themes. The second level is a selection of the first level, i.e. it is a refined (*gepflegt*) semantics, which is preserved and reproduced for self-descriptions. Self-description is a particular type of self-observation that is operationally produced as a description of the system within the system. It is a simplified construction of the unity of the system that makes it possible to communicate in the system about the system (Luhmann 1997:2013, Chap. 5). It is a 'retrospective operation' (Luhmann 1995a:2000, p. 244) that requires the existence of something to describe; in particular, it requires the construction of memory within the system. Self-description is selective, in that it is not possible to describe everything as identity of the system. Moreover, self-description is contingent, as it is dynamic, i.e. it can change in time. Self-descriptions change the systems in which they are produced as they are part of this system.

Self-description is produced in communication, in particular in oral narratives, written or printed texts. It can be produced in all forms of society simply based on language. However, dissemination media, as well as the difference between forms of societal differentiation, have a relevant influence on self-descriptions.

Functional differentiation of society has triggered new, more articulated, more differentiated and contingent forms of self-description.

In the functionally differentiated society, semantics and, in particular, self-descriptions are produced in functional systems. Each functional system can both produce self-descriptions concerning society (e.g., sociology) and stabilise its own self-descriptions (e.g. the political system can describe itself as State). Self-descriptions require *reflection* in the system, i.e. re-entry of the distinction between system and environment into the system. Reflection is a particular self-referential form of a social system (Luhmann 1984:1995): the system indicates itself as distinguished from its environment; therefore, the environment is described as different from the system within the system. Reflection is a specific and demanding form of self-description. Theories of reflection develop conceptualisations about reflection. In the functionally differentiated society, centralised reflection is not possible, as reflection can be realised only in functional systems. Therefore, in this society, it is possible to observe a plurality of reflections and theories of reflections (Ibid., pp. 455–456).

Luhmann connects this analysis of semantics and self-descriptions with the concept of *culture*. He describes, although very briefly, two different aspects of the concept of culture. On the one hand, the concept of culture refers to the 'the supply of possible themes that is available for quick and readily understandable reception in concrete communicative processes' (Ibid., p. 163). Moreover, this concept of culture indicates that meaning can be re-used in various situations and can be enriched through this re-use, determining new 'cultural forms' (Ibid., p. 418). Culture is the condensation of the combined effects of communication media, i.e. language, dissemination media and success media (Luhmann 1997:2012). In this perspective, culture is a synonym of semantics, produced in the history of society as a set of concepts and ideas.

On the other hand, the concept of culture refers to the possibility to compare different memories and traditions, and to introduce cultural diversity within the semantics of society. This concept has been used in Europe for this purpose since the end of the eighteenth century (Luhmann 1997:2012, Sect. 3.13). In this second version, culture is seen as an obsolete concept, which does no longer find a place in an updated theory of society and should be replaced by the concept of self-description.

It seems evident that, in Luhmann's theory, it does not make sense to observe the culture of social systems or cultural dimensions of society in the usual terms of sociological analysis. The concept of culture should be replaced by the concepts of semantics and self-description.

3.4.7 The Complexity of Society

According to Luhmann, differentiation and complexity have not the same origin. Differentiation takes form from the distinction between system and environment,

while complexity from the distinction between element and relation among elements. Differentiation indicates the re-entry in society of the distinction between system and environment, while complexity indicates the excess of possibilities of communication beyond what is actualised. However, the level of complexity within society depends on the form of differentiation of society, as the multiplication of subsystems generates a multiplication of possible relations among communications. Each form of differentiation can reduce and maintain a certain level of complexity.

The development of forms of differentiation, from segmentary differentiation to functional differentiation, increases the complexity of society, making more and more communications possible. In the functionally differentiated society, the combination of multiple forms of operational closure in functional systems, and the interdependencies between functional systems, create an exceptional level of complexity through continuous self-irritation in each functional system. The functionally differentiated society increases the number of possible available options for each subsystem and increases both autonomy and interdependence of these subsystems.

Complexity does not increase only following an increase of subsystems' operations, but also and above all as a consequence of the increase of observations and corresponding selections in each subsystem. In the functionally differentiated society, there is a strong increase of second-order observations, which become relevant as self-descriptions in functional systems. Comparison of prices, public opinion conditioning politics, scientific publications, love checking, mediated communication are all opportunities for second-order observations and corresponding self-descriptions. The trend to increase concerns both structural complexity and semantic complexity. Finally, complexity increases through the development of dissemination media, such as writing, printing and electronic media, which allow an enormous number of possibilities of communication.

To sum up, dissemination media, forms of societal differentiation, self-descriptions, and level of complexity are connected in an articulated and recursive relationship. An increasing level of complexity challenges the form of societal differentiation, possibly leading to its change. Binary codes allow reduction of this complexity, providing two alternative choices. However, through this duplication of choice they also provide possible alternatives to the current selections. Therefore, although codes limit possible choices to the alternative between two values, they do not cancel the contingency of selections, which can enhance rejection of payments, political decisions, love declarations, professions of faith, information, and so on.

According to Luhmann, against the background of the complexity of the functionally differentiated society, it is possible to understand the education system as one of its subsystems with a specific function, its coupling with psychic systems, its internal structures, and its self-descriptions.

Chapter 4
The Education System

4.1 Education: For Whom and in Which Way

According to Luhmann, the understanding of education depends on the understanding of the relationship between social systems and individual psychic systems. In Chap. 3, we have explored the meaning of this relationship as interpenetration and structural coupling based on systems' operational closure and internal formation of structures. In this first section of this chapter, we shall explain why and how this approach is relevant for understanding education.

Since ancient times, education has been linked to the nature of human beings, and the function of education has been understood as reaching human beings' perfection. When it became clear that society requires differentiated training for human beings, reference to their nature was no longer possible, as it appeared that the perfection of all human beings is not compatible with the necessities of society. Against this background, in the eighteenth century, the concept of perfection was replaced by the idea that education can turn human beings into social beings and provide human orientation to social relations.

According to Luhmann, however, the reference to human beings does not give any indication about the society for which they should be educated. Therefore, the perspective on human beings, in particular the reference to their inner incompleteness and perfectibility, is not useful to analyse the function of education in modern society. A clear distinction between human beings and society is necessary to clarify this function.

In the late twentieth century, developments in hard sciences (physics, chemistry, biochemistry, biology, neurophysiology) and psychology led to observe that human beings are instable and that human behaviour is unpredictable. As the empirical meaning of human beings can be studied through a complex set of disciplines, scientific analysis is not intended to predict human behaviours. The scientific problem consists in the lack of a viable interdisciplinary theory explaining the unpredictability of human beings, rather than in the lack of knowledge about them (Luhmann 2002, p. 21ff.). In particular, the unpredictability of human behaviour can be explained through the concept of operational closure (autopoietic

C. Baraldi and G. Corsi, *Niklas Luhmann*, SpringerBriefs on Key Thinkers in Education, DOI 10.1007/978-3-319-49975-8_4

reproduction) of psychic systems (Sect. 3.3.3). Consciousness can be observed as an autopoietic system, closed at the operational level and stimulated only by self-created states (self-irritation). The humanistic tradition assumed that the nature of human beings is in contrast to animals and other creatures in the cosmic hierarchy of being. The new humanistic approach reformulated this nature in the concept of 'subject' with the 'human being' as a subject underlying itself and everything else, and able to appropriate the world in its inner form. The empirical analysis of the consciousness of human beings breaks these assumptions, as it leads to a description of the operations that produce closed psychic systems and their self-generated indeterminacy. The analysis of autopoiesis of psychic systems does not allow any assumption about the 'essence' of human beings.

Consciousness means highly selective attention for what is perceived as the outside world. This selective attention is allowed by psychic structures, which are produced and updated through internal operations. Psychic structures, therefore, do not form a 'higher' level of essentials or constant properties of psychic systems; they exist only in their use, in orienting the transition from one operation to another. As a consequence, autopoietic operations can produce very different structural formations in psychic systems. Consciousness is based on self-referential operations of thinking that lead to self-generated uncertainty. It is a historical system with a memory, therefore discriminating between forgetting and remembering. Each operation of thinking is also an operation of either forgetting or remembering; in particular, forgetting makes further operations possible, as it prevents accumulation of thoughts from overcrowding the system. Self-generated uncertainty, which is based on forgetting, ensures the selection of further operations.

This implies that an external (e.g. educational) monitoring of consciousness is not possible. For instance, it is not possible to determine whether pupils really care about education or whether or not they stayed focused while listening to teachers. It is only possible to classify pupils' expected behaviours with the help of specific binary schemes (Sect. 3.3.3). In particular, the scheme known/unknown replaces predictability of psychic systems' internal operations; pupils are known by teachers, and although this knowledge cannot lead to predict their behaviours, it can at least facilitate communication with them by providing a social memory about their social identity.

Traditional humanistic approaches fail to deal with these complex issues. Knowledge about self-generated structural indeterminacy has replaced the traditional conceptions of human beings. Human beings are now seen as highly complex systems, continuously reproducing determination and uncertainty through their operational closure. More precisely, (1) all operations of a psychic system open a horizon of indeterminacy, especially about its future; (2) uncertainty cannot be reduced by a psychic system, and this system must therefore be prepared for surprises. Psychic systems put themselves into a state of uncertainty, continuously creating choices and distinguishing between past and future.

Nevertheless, society needs ways of dealing with human beings, who do not depend on its internal operations of communication. Individual psychic systems

are not part of society, rather they are in the environment of society as a specific type of meaning-constituted system (Sect. 3.3.3). Against this background, assumptions on the nature of human beings cannot explain participation in communication, as communication cannot be attributed to either physical or conscious states of individuals; rather, it is developed as a recursive operation in social systems. Relationships between social systems and psychic systems are built as structural coupling, which explains how autopoietic systems, without operational contact with their environment, form structures that adapt to specific environments, restricting their internal degrees of freedom. For instance, through structural coupling, children can learn the language that is spoken in their environment. In particular, education is a specific social system that can simultaneously reproduce determination and uncertainty through structural coupling with psychic systems.

4.2 The Social Relevance of Persons

Generally speaking, structural coupling means that society is relatively insensitive to human beings, as it is engaged in reproducing communication. However, the problems of human beings can be communicated since, without communication, these problems would not exist. In order to explain the sensitivity of society for human beings, Luhmann introduces the concept of *person*. In their operational closure, social systems address individuals as persons by communicating, for instance, on personal intentions, needs, and interests.

Person is not a synonym of either human being or psychic system. It is a social structure indicating the persisting identity of the environmental conditions of communication, i.e. the persisting identity of psychic systems to which social systems are structurally coupled. Person is the *form* which enables the observation of individual identity in communication. Self-identity is a psychic construction, which can be either accepted or rejected and corrected in social systems. In these systems, person is a form that makes it possible to deal with an empirical human being and her/his identity formation. Human being is the other, undetermined (unmarked) side of the form ‘person’.

The social use of the form of person can be understood historically, as person has always been distinguished from physical realisation and consciousness. In ancient Greece, person was the mask of the actor. In ancient Rome, person was used in a more general sense, either to indicate individual characteristics of human beings, or to describe attribution of status, tasks and duties of social life. In the Middle Ages, a more individualised concept of person was proposed; in particular, the legal tradition allowed the observation of legal persons to indicate ownership of rights and obligations. Persons started to be intended as results of participation in communication.

Persons can be identified only in communication systems and for the purposes of communication systems. Persons are conditions for the continuation of

communication, in that they are addressed as points of attribution and often as explanations of interest in communication processes. They are constructs resulting from the recursive operations of communication and indicating who is responsible for utterance, to whom one must ask for clarification or criticism, whom can be hurt if an opinion is contradicted. These causal attributions are schematic simplifications for communication purposes. Persons are constituted in communication systems, based on the fact that operational closure of both psychic and social systems prevents confusion between psychic and social events.

The societal value of persons is made evident in three ways, corresponding to three problems concerning communication: (1) the function of double contingency, (2) the need to assume memory, (3) the need to demand and offer reasons for behaviours through the use of a motivation scheme. All these problems could be interpreted as concerning consciousness, but such an interpretation would lead to the dissolution of the *social* reference to human beings, i.e. to the dissolution of persons. To maintain a social reference to human beings, the social construction of persons is necessary, e.g. by addressing individuals using names ('Hello, John'). Against this background, it is clear that the importance of double contingency, memory and motivation concerns communication systems, and cannot be acknowledged through psychological interpretations.

Firstly, persons are important references for *double contingency* (Sect. 3.2.3). Double contingency means that each individual both acts and assumes that other individuals act in a way that cannot be predetermined. Individual psychic systems are undetermined to each other, and each of them acts in a way that is perceived as contingent by the other. Therefore, each individual can specify her/his actions only if s/he knows how to specify other individuals' actions. In social systems, double contingency means that each selection of action can be made only considering that further selections of actions are necessary and will be conditioned by the first selection. Thus, in social systems double contingency means self-generated uncertainty, as communication is open to whether it will be accepted or rejected. The concept of self-generated structural indeterminacy indicates that in social systems all determinations also produce indeterminacy, as participants react to what happens in communication in unpredictable ways. In the education system, indeterminacy does not depend on the lack of knowledge about pupils, and is not an uncertainty which is independent from the system. Indeterminacy does not result from dependence on the environment, but on double contingency in social systems (Sects. 3.2.3 and 4.2). This self-generated uncertainty cannot be dissolved through the determination of psychic conditions of future actions, as the contingency of actions is constantly renewed in communication. Social systems define the conditions of contingent communication and manage further expected communication through either acceptance or rejection. However, double contingency would not occur as an endogenous problem of social systems if there were not an environment of individual psychic systems binding the production of communication through their consciousness. Contingency of action can thus be seen as a consequence of individual conscious calculations. In fact, individual calculations are based on the existence of social systems which have already reduced the available

options of action. On the basis of this social reduction, persons can exploit the available options of action. Thus, the person is identified as the reference point for the exploitation of available options of action in communication systems.

Secondly, persons are important to assign *memory*. Reproduction of communications presupposes that participants have a memory. It assumes, for example, that the spoken language is known and can be used and understood by participants, that participants remember to a sufficient extent what has just been said, that, in case of failure, a quick reminder is sufficient to restore a common ground of communication. In short, reproduction of communication must assume that the world is not necessarily re-designed as a complete surprise in any moment. If neurophysiological and psychic conditions of memory were not assumed, communication would collapse. One consequence is that individual psychic systems that participate in communication must systematically update their memory. Listening to stories or reading texts bring back memory to participants, and the insight of stories or texts must be extended to participation in the following communication. However, communication is not dependent on what the participants actually remember of their own history. If this were the case, communication would constantly lose itself in the exploration of the endless nuances of individual consciousness. Therefore, the memory of society cannot be intended as a sum of individual memories, i.e. as a 'collective memory'. On the one hand, this would provide too much material with too little order, making it extremely costly to include individual memories in communication. On the other hand, this would not be sufficiently tailored to the needs of communication. Therefore, society must ignore the memory that lead individuals to participate in communication, using communication to renew its own memory. For instance, the economic system must forget by whom and for what reason something has been paid, and the education system must forget the uncertainties that had to be overcome in establishing grading. Against this background, the concept of person is not defined by individual memory, and it does not indicate psychic systems that provide remembering and forgetting as internal activities. Persons are social constructs to which memory *is attributed*, thus allowing the reproduction of communication. Memory is a result of structural coupling between psychic and social systems, assuming the operative closure of the two types of systems. By attributing memory to persons, social systems allow quick operations by ignoring psychic events.

Finally, persons are important to assign *motives*. In psychological research, motives have been usually understood as psychic causes of actions. The question is if it is possible to identify specific motives as causes of specific behaviours. If psychic systems are self-referential, operationally closed systems which constantly deal with self-generated uncertainty, it is pointless to search for the internal causes of their actions. Specifying motives is a highly selective form of self-description, which is always only retrospective, as only when one has already acted, one can tell why s/he has acted. Motives are explanations and justifications of action in communication, i.e. a motive is not a cause, but a presentable reason of action. Motives are prepared for the purpose of describing action in communication. They present actions as non-arbitrary and allow conclusions on further actions,

including unexpected actions. To assign a motive to a participant, action must be presented as person-dependent so that the same motive is not expected from different participants. Therefore, motives are designed as social support for communication and the reference for motives is the person. For this reason, motives are never standardised; rather, standards provide the opportunity to reject motives and provide sanctions.

To sum up, the reference to person allows the social consideration of human beings as having options of action, as motivated to act, and as having memory. This reference is visible in the communication process and can be validated in any communication. Validation does not depend on the control of mental phenomena, as options of action, motives and memory are systematically reproduced as conditions of communication. If individuals indicate that they cannot act contingently, that they have neither memory nor motives, their cases are dealt with as pathological (e.g. as autism) and do not dissolve the reference to persons in communication.

4.3 Socialisation as a Premise for Education

If it is true that human beings are born, persons are produced in communication systems. In social systems, the person is also a point of reference for individual development, which can be observed in any social situation. This reference for development can be understood as a product of both socialisation and education. The understanding of education requires the understanding of its distinction from socialisation.

The traditional concept of socialisation indicates the transmission of culture from one generation to the next. Here, 'transmission' is an unclearly defined concept. The idea of transmission should explain that it is not an accident if social influences support the development of individuals. Firstly, theories of transmission have been criticised for the alleged structural asymmetry between socialisation and being socialised, i.e. between active society and passive individuals. Especially under conditions of dense socialisation, such as families and schools, this asymmetry must be replaced by circularity, taking into account that children can be more socialised than their parents or teachers. Secondly, theories of transmission assume that only successful transmission is socialisation. However, there are also cases of resistance to socialisation, which is particularly attractive as it can provide opportunities to develop individuality. The high evaluation of individual uniqueness is among the most important patterns of the functionally differentiated society. This leads to the question: can society provide individualisation, including denial of conformity, in the process of socialisation?

Parsons observed socialisation as a case of interpenetration (Sect. 3.3.3); the social system and personality interpenetrate in the form of socialisation. According to Parsons, interpenetration shapes psychic systems. If we adopt a theory based on operational closure of psychic and social systems, it is possible to adopt the concept of interpenetration to indicate complex productions on both

sides, taking into account that social processes and psychic processes are in any case separate.

Against this background, socialisation can be defined as 'the process that, by interpenetration, forms the psychic system and the bodily behavior of human beings that it controls' (Luhmann 1984:1995, p. 241). Socialisation is based on individual participation in communication, as either utterance or understanding. It means that the experience of socially reduced complexity contributes to structuring the complexity of psychic systems. On the one hand, socialisation is self-socialisation, as meaningful operations are produced by the psychic system. On the other hand, it is based on the binary schematisations defined in communication. Therefore, it is the difference between the psychic system and its environment, which includes social systems, that makes socialisation possible. Socialisation means that the psychic system can use, in its self-reference, schematisations attributed to the social environment. What is important in socialisation is the binary schematisation, not the specific option that it offers. For example, what is important is the distinction between attraction and aversion, not the choice of either attraction or aversion. Binary schematisations are structural productions in social systems that are successful in providing irritations for psychic systems. Increased structured complexity of social systems changes the conditions of socialisation, without denying the importance of self-socialisation.

Against this background, the concepts of operational closure and structural coupling clarify the meaning of socialisation. Socialisation does not explain how society can continue despite a constant exchange of members. Its problem is how operatively closed psychic systems respond to structural coupling with social systems. The answer is that socialisation leads to a 'structural drift' which brings psychic autopoiesis to select structures that can be tested in society. Language extends into the individual operations something completely different from its communicative function. This is also true for normative rules, causal schemes or other frames or scripts that can be used in structural coupling. As we have seen in Sect. 4.2, in social systems, the person is the symbolic substitute of psychic operations; socialisation can offer personal benefits to psychic systems, as these have to live their lives in social contexts. However, socialisation is always self-socialisation rather than an import of cultural components into psychic systems. Therefore, socialisation can also result in social difficulties and conflicts, as what matters for one individual may not matter for others.

The reformulation of the concept of socialisation in terms of structural coupling and structural drift explains why automatic socialisation and its consequences for personal actions cannot be prevented. Any attempt to limit socialisation would simply reproduce socialisation. This must be considered when analysing the society's efforts of adding education to socialisation.

4.4 The Differentiation of the Education System

Since psychic systems are operationally closed, i.e. they generate their own structures, socialisation produces permanent uncertainty in social systems. This consideration encourages the adoption of social standards to transform psychic systems into persons. These standards, however, cannot be produced through socialisation. Especially in complex societies, transformation from psychic systems to persons cannot be left to socialisation, which does not affect individuals in a sufficiently specific way and is bound to the environment in which it takes place. These limitations require the societal establishment of education.

Education may be observed in all societies. Even in the simplest societies, children are reminded that they must 'leave the hut to pee'. It would be inappropriate to wait for socialisation; on the one hand, it would take too long, and on the other, its effects would be frequently not reproduced in other situations. In these simple societies, socialisation and education are produced together, without any distinction, in small groups. Nevertheless, it is possible to observe the embryonic differentiation of education. Education became more differentiated when the increasing complexity of society led to observe that it was not possible to accept socialisation alone, in particular when children were expected to learn something that their parents did not know. In this situation, apprenticeship was established as an educational institution. After the spread of printing and the increase in the complexity of knowledge, it became evident that life in the house was not enough. Private tutors were hired to provide teaching, under the supervision of fathers. In the sixteenth century, a new system of education in colleges and universities prepared for civil service. The system spread in the late eighteenth century with the virtually completed replacement of domestic education with educational concepts, schools and universities. It was no longer assumed that children were defined by their origins, preparation for a still uncertain future became crucial. This was the starting point for the establishment of an autonomous education system. An important change occurred when educational ambitions led teachers to claim professionalism. Teachers could only rely on their own expertise. This was the starting point for a difficult and lengthy institutional development that assumed the social need for teaching, task-specific training, teachers' salaries, dedicated facilities, teaching material, etc. In this way, the autonomy of education was legitimised, and education could refer to self-discipline, self-organisation, methodology and professional self-consciousness of educators. Although it is not described as the 'pedagogical century' the eighteenth century emphasised the social importance of education.

The importance of education can be explained as a consequence of functional differentiation of society. Although education, as an activity, can be observed in ancient societies, a specific education system can be differentiated only in the modern functionally differentiated society (Sect. 3.4.3). The prerequisite for this differentiation is the recognition that pupils are independent observers of the world, and are therefore different from adults. Against this background, education becomes a problem that requires the differentiation of a subsystem replacing

the educational authority of the family, whose function is reduced to the period of preparation and transition to education that is organised in schools (Luhmann 2002, p. 111).

The differentiation of a subsystem is based on the distinction between system and environment, which is repeated within the system; the system operates a re-entry of the distinction between system and environment in the distinction itself (see Sect. 3.2.2). This leads to the production of too many possibilities, which the system must process through self-organisation by experimenting alternatives and accumulating a memory that allows gradual production and variation of structures. For this reason, the differentiation of a subsystem is an improbable process, which only takes place in particular societal conditions.

Compared to other subsystems of the functionally differentiated society, such as religion, politics and economy, education has been strengthened at a later stage. Therefore, it was not among the systems that promoted sociocultural evolution. Education was not among the factors that changed the form of differentiation of modern society. However, it became an important concern when functional differentiation was established. Interest in education as a functional system arose in the second half of the eighteenth century, when schools were opened to the whole population, relegating family education to the private sphere. Correspondingly, a specific medium for education was formed, i.e. the pupil, which made it possible to define education as different from any other system in society (Sects. 4.7 and 4.8).

The old distinction *educatio/institutio* was melted in the hybrid formula 'educational teaching' (*erziehender Unterricht*), which combined school training and pedagogical needs by highlighting the organisational structures needed for the purpose of this combination. The new need for teachers implied professional training, teaching methods, a common educational background of pupils, and education of same-age pupils.

For a long time, family education had been limited to the correction of behaviour and the development of qualities and habits associated to forms of behaviour which were considered appropriate. Against this background, the evolution of the education system determined pedagogical intentions and needs to clearly define consistent and continuous educational situations. The differentiation of an education system required the establishment of schools and therefore the employment of teachers. This raised the issue of availability of buildings and payment of teachers. In the eighteenth century, a process of expropriation of school buildings belonging to churches and religious orders took place, so that these buildings came under state control.

The autonomy of the education system also required other factors to create sufficient independence from any other functional system and from external decisions. Luhmann (2002, p. 119ff.) argues that the differentiation of a subsystem requires some 'technical' inventions that make it independent and encourage its freedom. Historical examples are the minting of money, after which money can move independently from the households that spend it, or political offices, which administer the power regardless of who occupies them. The equivalent invention,

which led to autonomous educational communication, was the classroom interactional system (Sect. 5.5).

This interactional system introduced in the education system a form of structural indeterminacy, which was combined with the indeterminacy of contents and pedagogical intentions. Classroom interaction cannot be kept under control if it is left to itself. Therefore, communication in the classroom requires decisions that cannot be made in the classroom. This obliges the education system to specify the conditions under which communication can take place in the classroom. These conditions are decisions that are made in the school organisation, as only this organisational level can circumscribe the indeterminacy which would otherwise unavoidably occur in the classroom. Teaching professionalization also reacts to this indeterminacy, for instance by taking care of the style adopted in processing teaching experiences, a style that can then be shared among teachers. The introduction of interaction triggered these developments and outlined the difference between school education and family education, to which pupils can react with effects that cannot be completely controlled. Pupils have to learn how to deal with the sharp difference between classroom interaction and family interaction.

The autonomy of organised interaction in schools is among the factors that has led education to continuously grow. Pupils increasingly stay in schools and colleges. Certificates, qualifications and training are increasingly needed, thus feeding increasing demands and expectations concerning education. An increasing number of personnel and amount of money needed to pay for them are requested. Decisions are increasingly made on the organisational level, although uncertainty and under-determinacy, and thus educational possibilities, are created in classroom interaction systems (see Sect. 6.3 on the educational reform).

These developments confirm the close and circular relationships between differentiation, autonomy and self-organisation of education, which also affects the relationship between the education system and other subsystems of the functionally differentiated society. Differentiation of a social system implies an increase in both the dependency on and the independence from the environment, i.e. both autonomy and heteronomy. Luhmann (2002, p. 129ff.) analyses all the relationships between the education system and the other subsystems in the functionally differentiated society by adopting the same criteria. Let us consider some examples.

The relationship between the education system and the economic system relies on the availability of employment. Economy expects trained and qualified people from education, and operates on the basis of criteria like rationality, cost/benefit calculation, etc. The education system cannot orient to the same criteria, but it requires instead that graduates find a job that is suitable to their training, or reflects the adequacy of training for the labour market. As the dynamics of these two systems are not coordinated, the educational questions remain unanswered. Education reacts to this discrepancy by orienting to specialisation and generalisation of the curricula at the same time, preferring either one depending on the economic trends, and recommending the corresponding reform. This does not solve

the problem, but makes the education system autonomous in its choices, and sensitive to what happens in its environment (e.g. in the economic system).

The relationship between the education system and families highlights one of the clearest indicators of autonomy of the education system. Families try to educate, and this produces a specific socialisation that generates very strong differences between pupils when they start school. Education must ensure equality of opportunity to all pupils, and cannot therefore coordinate with families. The solution is the 'homogenisation of the beginning'. All pupils must go to school at the same age, regardless of previous socialisation differences. This is the point of no return of the differentiation of the education system (Luhmann 1990a), as controlling the complete sequence of educational processes would require a dedifferentiation from the family. The education system treats different pupils in the same way, and by doing so, it ascribes to itself every difference generated in and by the school. Socialisation differences, however, do not become irrelevant in the education system, as every teacher acquires knowledge by observing the pupils (who in their turn observe each other and the teacher). The education system distinguishes between education, which is offered equally to all, and selection, which distributes inequalities (see Sect. 5.4). In this way, education is relieved of the weight of inequalities, which are managed through selection.

The relationship between the education system and the political system relies not so much on the political constraints for the school, as on the decisions that education would want from politics and that the political system does not make. Teachers react on the one hand with resignation or giving up ideas of political support, on the other by putting pressure on political parties and ministries. Autonomy is safeguarded because education is autonomous on the interactional level, and therefore also on the operational level. Whatever decisions politics should make that affects the education system, it is impossible to foresee which differences these decisions will make in the classroom.

The relationship between the education system and the system of science is particularly problematic from the point of view of the possibility to learn (*Lehrbarkeit*). Scientific truth does not guarantee teaching effectiveness, and only didactics, i.e. teaching methods, becomes the educational criterion to select and adapt scientific knowledge to educational needs. This, however, cannot guarantee good coordination between education and science. Hence, it comes as no surprise that the scientific knowledge which is taught in schools is already past in the system of science, and the contents of 'classic authors' are legitimised for teaching. Pupils learn something they should unlearn, and in some cases, such as with Greek and Latin, there is no need to unlearn, as forgetting is enough (Luhmann 2002, p. 134).

The relationship between the education system and the other societal subsystems is therefore based on a systematic paradox, as the education system is dependent and independent at the same time. This paradox has specific versions, namely specialisation and generalisation (economy), equality of the unequal (families), dependent autonomy (politics), teaching ineffectiveness of truth (science). The paradox is the form of the unsolvable problem of the impossible operational

coordination among the subsystems. As the paradox has no solution, the subsystems are free to develop their own structures.

The differentiation of the education system is evidently linked to its autonomy and self-organisation. This condition applies as well to the other subsystems, i.e. to positive law, democratic politics and market-oriented economy. The concept of autonomy does neither mean independence from environmental factors or causes, nor control of environmental dependencies. Autonomy means specification of the operations that reproduce the system, i.e. operational closure of the system (Luhmann 1986a, p. 174) or, differently said, production of the system's unity through the system's operations. Education, like any other social system, is autonomous at a basal level, as it can admit only pedagogically relevant operations. Since it is an autonomous system, it can also specify selective relationships with other functional systems, i.e. accepting legal, political, scientific or economic conditions that the education system cannot control and that stimulate the variation of its structures.

4.5 The Function of Education

In the functionally differentiated society, socialisation is frequently provided in functional systems that primarily explore the success of communication, without any specific interest for individuals. Communication media like truth, love, money and power do not deal with individual psychic systems. They can be sensitive to perception (truth), sexuality (love), actual needs (money) and physical violence (power), but this sensitivity is necessary for the function of dealing with the probability of rejection and acceptance of communication (Sect. 3.4.5). Individual psychic systems are not a primary issue for these media. Nevertheless, in the functionally differentiated society, a general problem of inclusion of individuals arises, and, as we have seen in Sect. 4.2, this problem is dealt with through the social construction of persons.

Inclusion is defined by Luhmann as 'the opportunity for the social consideration of persons' (Luhmann 1997:2013, p. 17). Society assigns persons to positions 'where they can feel at home as individuals' (Ibid., p. 18). Inclusion is the determined side of a distinction: inclusion exists only if exclusion is possible, i.e. if there are persons who cannot be included. This distinction varies in different historical conditions of society. In segmentary and hierarchical societies, inclusion is achieved in the form of membership in one segment or stratum. In functionally differentiated society, the specific subsystems regulate inclusion: individuals need to participate in all functional systems and can participate in all relevant communications according to the criteria established in these systems (e.g. voting in political elections, paying with money, staying with the beloved person). This leads to two important consequences. First, inclusion depends on differentiated opportunities of communication, which cannot be coordinated in a centralised way. Second, exclusion from one functional system (e.g. no work, no legal

protection, no intimate relations, no education) has important repercussions in the other functional systems.

As a consequence of these two conditions, functional differentiation determines a 'totalitarian logic' of inclusion in society based on a generalised provision of opportunities for personal inclusion, with important consequences for individual self-conception. When they lose clear and stable social positions, individuals must explain who they are, and construction of personal identity becomes a problem. Against this background, communicated blame and dissatisfaction for insufficient inclusion become more probable, while individual self-realisation is idealised together with mutual understanding and solidarity. Any form of exclusion becomes problematic not only for psychic systems, but above all for the functionally differentiated society. In this society, the important function of complete inclusion of persons is assigned to the education system.

Generally speaking, the concept of function refers to a problem that has to be solved; as long as the problem persists, a solution is needed, whatever form this solution takes, historically and evolutionarily. In the case of education, the problem is the adequacy and suitability of psychic systems' participation in communication. As we have seen (Sect. 4.1), Luhmann departs from the approaches that consider the 'human being' as object and purpose of education. From Luhmann's point of view, while it is true that education has effects on consciousness, it is also true that it is a social process that does not aim to produce 'better' human beings. The most important concepts to understand the function of education are operational closure and structural coupling (see Sect. 3.3.3). Consciousness is understood as an autopoietic and thus operationally closed system. It coincides with recursivity of self-produced states, as it is based on operations that implement recursive self-reference and produce an operationally closed system. The structures of consciousness can be built and dismantled only by the system's own operations and cannot be either imported from or exported to the environment. These structures exist only in their use, in that they connect each operation to the next one. Moreover, these structures can only be shaped on the basis of structural coupling, which is produced in specific circumstances. Consciousness operates without any direct contact with its environment, therefore building structures that have *more or less* adapted to this environment. What is usually called 'identity' is the construction that can be used by psychic systems to participate in communication processes and that, if necessary, can be corrected through this participation.

The function of education consists in changing the psychic environment of society *intentionally*. Neither does education simply deals with increasing individual abilities, nor does it deal with reaching consensus in communication. Education affects the skills and competences that allow individual human beings to participate in communication without considerable difficulties. This also means that educational outcomes are needed and can be used in other functional systems in society, or, in other words, that education is not an end in itself (Luhmann 1986b:1989, 1987a, Chap. XV; Luhmann and Schorr 1979a/2000, Chap. 1/II). It is in the social dimension that it is necessary to learn reading and writing.

A patient must be able to rely on the fact that the physician is trained as a doctor. Documented training makes this possible.

In other words, the function of education concerns the transformation of human beings into persons. The education system produces the standards for this transformation. It creates the conditions for both personal actions and for dealing with other persons' actions. As we have seen, Luhmann distinguishes between human beings and persons, who are born from socialisation and education (Sect. 4.2). Persons are symbols for communication, and the education system must help ensure that these symbols are not disappointing in their use. The function of education concerns the ways in which human beings become persons when socialisation alone is no longer considered sufficient for this purpose, as it is tied to the context in which it takes place. The education system provides psychic systems with a personal behaviour. As a consequence, it can be taken for granted that persons can read and write, or that physicians have received a medical education. Persons can be 'educated'; therefore, each individual can presuppose that the others have been educated, so that highly improbable behaviours can be normalized (Luhmann and Schorr 1979a:2000, Chap. 1/II). The person is a communicative symbol, and education should ensure that this symbol, when used, does not lead to disappointment. Education has been often criticised because not all individuals turn out to be the best. However, no other forms of effective individualisation have been developed; for instance, early school dropout or running away from the parental home are not considered to lead to any adequate development of persons.

Thus, education can be partly used to supplement and partly used to correct the results of socialisation. The combination of socialisation and education results from the reference to persons, which concerns both processes. The education system seeks to achieve individual change through communication. However, its effect does not consist in overcoming difficulties of acceptance of communication, but in changing individuals, specifically each single individual, and if individuals do not change, then the system has failed. Therefore, it is not surprising that educators pay attention to 'human beings' and that it is difficult for them to renounce a humanistic concept of individuals. Despite that, education deals with individual psychic systems who are not transparent for either themselves or others and do not operate linearly. The question then is: if individual human beings are understood as psychic systems, how can education be possible?

4.6 The Basic Aspects of the Education System

To answer the question of 'how education can be possible', it is important to observe four basic aspects of the functioning of the education system, which describe the solution to the problems that arise in dealing with the change of psychic systems through educational communication.

The first aspect is that education can be described as *conveyance* (*Vermittlung*) of knowledge and skills. This formulation has the double advantage of

(1) renouncing higher educational ambitions (such as 'maturity') and (2) leaving open whether what is taught is appropriate and whether conveyance is in accordance with pedagogical intentions. The concept of conveyance abstracts from the specific situations in which education is conducted; it only indicates the basic operation that must be carried out so that education takes place. Conveyance deals with all expectations in teaching situations.

While conveyance is always possible, it is difficult to check its success or failure. Assessment of pupils' behaviours is left to the teacher. However, while it is possible to observe successful and less successful lessons, it is difficult to understand why this happens. Cognitive psychology suggests to narrow down the area of non-transparent outcome of conveyance through schemes and scripts. Through these forms, the teacher makes memory available. This is not about remembering something past (although this can be helpful in certain circumstances), but about producing familiarity in new situations and, above all, gaining confidence in teaching competence. On the one hand, schemes mobilise memory by generating the impression of awareness of what is happening and by projecting informational redundancies in new situations of conveyance. Schemes make it easier to find a limited number of solutions to problems, although they cannot be applied 'schematically'. For instance, schemes producing causality do not prevent, but encourage the search for other causes and other effects. On the other hand, scripts promote acceptance of students' actions by limiting their variety; teachers cannot prescribe accurate and correct actions, but they can learn to cope with specific ways of dealing with both redundancy and variety. Teachers can proceed from certain schemes and then observe if a script either adapts to the specific situation or must be modified according to it. The teaching experience is not overwhelmed by surprises and negative experiences, as schemes and scripts can make it possible to deal with different situations.

The use of these forms leads to the observation that training for the teaching profession is based on the idea that opportunities of learning cannot be anticipated, but it is possible to prepare for them. Teachers' training cannot deconstruct complex situations in a sequence of simple passages, but it can help to look at the reasons for the lack of transparency of psychic systems and to make it clear if it is possible to create opportunities of learning through schemes and scripts. Teachers can thus observe the outcome of their efforts not as either success or failure of communication, but as success or failure of *each* pupil's development. The question is always whether teaching efforts are rewarded by conveyance of the offered knowledge or skills to each individual. Neither communication nor reference to groups of students can be an 'output' of education. In particular, successful communication and pupils' active participation are not sufficient criteria for determining the function of education, which concerns preparation of a specific individual as a person and her/his possibility to 'resume' this preparation in later phases of her/his life.

The second important aspect of the functioning of education is that education cannot be simply observed on the basis of either its contents or materials. Each choice of contents and materials leads to the question of what is excluded from it

and how this exclusion can be explained. The proposal of contents and materials must be based on the clarification of *intention to educate*. Therefore, the education system includes all communications which show the intention of educating. This explains what is excluded from education, namely unintentional actions, i.e. socialisation. In the form of education, the unmarked side is socialisation. The education system is established to supplement or correct expected results of socialisation. Everything else can be added as a limiting condition for plausible communication of educational intentions.

The intention to educate is the symbol that enables recognition of education in communication; therefore, it is the symbol for the differentiation process leading to the education system. As it should be evident from the discussion of motives (see Sect. 4.2), here intention is not meant as a causal factor produced in the teacher's consciousness. The symbol 'intention to educate' fulfils its function when it is based on a communication system. It makes it possible to describe education as a communication system which is compatible with many different states of consciousness of teachers and pupils. The plausibility of this symbol is based on the experience that educational communication cannot be assessed positively without intention, i.e. when what becomes visible as behaviour simply happens.

The education system must provide structures to ensure that the intention to educate is a plausible claim. The most important structure is an asymmetry that cannot be reversed, in that what must be clarified is who has intentions to educate (the teacher) and who has not these intentions (pupils), thus solving the problem of double contingency. Educators may expect pupils to seek to avoid education, but not to react with counter-education. Moreover, the intention to educate must be a 'good' intention. This does not give indications of the teacher's psychological state, but is a communicative requirement, with far-reaching, almost binding consequences for individuals. Good intentions must be made explicit, i.e. they must be presented as educational goals. Behaviour is assessed accordingly, as either good or bad, from the perspective of educational schemes. The teacher cannot say: 'well this is what is true, but I do not care how you adjust it'.

To sum up, the intention to educate symbolises the unity of the education system. This unity cannot be found in either the system, because otherwise the system would be something else in addition to its unity, i.e. the product of its reflection on it, or in its environment, because otherwise the intention would only be the construction of an external observer. The other side of the form of intention is on the one hand a marked side, namely socialisation, and on the other hand an unmarked side, namely anything else that society permits as communication.

The third important aspect of functioning of education is that education leads to the social *trivialisation* of pupils, to use Heinz von Foerster's distinction between trivial and nontrivial machines (1984). Trivial machines are those that, starting from a particular input and by means of a built-in function (the 'machine'), produce a specified output, while another input would lead to a different output: 2 times 2 is 4; 2 times 3 is 6. The machine can be brought to high complexity of possible inputs and outputs through suitable programming. This, however, does not change its triviality. In trivial machines, it is crucial that repetition of the same

operation leads to the same result. If this does not happen, the machine is broken and must be either repaired or replaced. One must not expect that in trivial machines 2 times 2 is 7 or that they produce a bla bla. Trivial machines are reliable machines. The opposite is true for non-trivial or self-referential machines. They operate by means of a built-in reflective loop aligning all input/output transformations at the condition of the machine, or more precisely to the self-produced historical state of the machine. Since this varies with each operation, the machines produce a virtually infinite repertoire of responses. These machines are unpredictable, therefore unreliable.

Educators may reject the description of their work as trivialisation of psychic systems. However, this is exactly what can be called education. There is certainly an increase in the complexity of possible relationships between input and output when pupils are expected to provide themselves opportunities to respond to questions or, more generally, to demands in practical situations. Pupils may like to learn English, but then they need to speak or understand the language properly. A non-trivial machine might enjoy enriching the English vocabulary with Italian words, be it for rhythmic reasons, or because pupils want to show knowledge of the Italian language. However, this enrichment of English is neither taught nor learned in school. Against this background, one might be tempted to design a counter-model of education to unreliability, surprising creativity, and nonsense production, ironic treatment of situations or permanent deconstruction of the schemes in use. This would not only have few chances of realisation, but it would also show the interest of society in giving predictability to unpredictable outcomes.

Finally, education produces *socialisation effects*, i.e. unintended effects. Individuals remain non-trivial autopoietic systems despite education. When non-trivial systems are exposed to trivialisation, they learn to deal with it through socialisation, which shows the conditions under which it is advisable to behave like a trivial machine. Therefore, acceptance of trivialisation depends on a reversal of the relationship between education and socialisation, education socialising to trivialisation. The socialisation effects of education have also been discussed with reference to the so-called ‘hidden agenda’ (Dreeben 1968). Pupils learn to cope with education, in particular to prepare for performance requirements which they have learned in school, regardless of their specific learning of mathematics, history, English, etc.

This idea has been criticised from the perspective of a critical, emancipatory education, especially because performance requirements reproduce inequality. Luhmann prefers to ask whether the effects of socialisation for education are understood adequately in the perspective of the theory of the hidden agenda. An important problem, which is not considered in this theory, is how to get non-trivial systems on the basis of trivialisation. It has always been observed that students develop their own culture, that they maintain distance from teaching, and seek opportunities for deviant actions from the perspective of education. More generally, education seems to succeed in promoting pupils’ autonomy in choosing among internally available forms of reflection. Education seems to multiply input/

output relations through which trivial machines can update themselves. In other words, education seems to promote the idea that learning requirements could be different from what they actually are. The very fact of learning makes pupils aware that learning concerns contingent schemes. The question is then to what extent education makes variations available.

The complexity of the education system can lead to wonder what the advantages of education are. Luhmann observes that the general answer is that education is necessary in complex societies as it increases the range of individual abilities. This is, however, an individual-related answer. Luhmann suggests that education also increases the ability to imagine how the other participants in communication can act. Education increases the ability of the individual to imagine how other individuals can act in communication, without knowing (or not knowing enough) their perspectives (Luhmann 2002, p. 81). Against this background, communication can be based on a continuous interpretation of behaviours and on a retrospective sense making thereof, rather than on their prediction. This perspective is based on the concept that the mutual non-transparency of psychic systems is the basis of communication (see Sect. 3.3.3), which creates both uncertainty and a sort of 'mock consensus' allowing continuation of the autopoiesis of communication. Socialisation alone cannot achieve these results (see Sect. 4.3). This does not mean that it is possible to gain a true insight in other participants' way of thinking, because what goes on in another individual consciousness remains opaque. What one gains might be a way to form ideas about what it is possible to rely on when choosing actions, even if other participants are unknown. It is important to acknowledge those frames, which further communication does not exclude. While consensus as alignment of different states of consciousness is impossible, 'mock consensus' is essential for the autopoiesis of social systems. This consensus can be achieved through education, which can open up different conditions of action, while socialisation is tied to its specific context.

4.7 The Pupil as Medium in the Education System

Education is improbable (Luhmann 2002, p. 82) in that its intention is to educate closed, self-referential and structurally determined psychic systems; as we have seen (Sect. 3.3.3), individual consciousness cannot be determined by or through communication, and this means that teachers aim to do something that is impossible (Luhmann 1991a, p. 162). Nevertheless, education works, pupils learn, and after being educated they are someone else than they would be if they were not educated.

Education works but it is not possible to know exactly how. It would be useless to look for causal relationships or for input-output relationships allowing the education system to realize what it plans. What is more important is the way in which the education system observes the pupil, seeing something that has not been yet realised. Paradoxical as it may sound, while the child is what it is, for the

education system it is what it is not (yet). Teachers consider pupils as a potential that has to be developed and the central sociological problem is to understand how education can build this potential.

The distinction between medium and form (see Sect. 3.2.2) can help understand this point. This distinction indicates the observation of homogeneous elements which are loosely coupled (medium) but can be combined (tight coupling) in forms. The elements of the medium must be compatible with each other and can be confirmed in the forms that they take, or dissolved and recombined in new ways. The elements must be available in a large number and with a minimum degree of interdependence, to provide the opportunity to imprint forms in the medium. According to Luhmann, in the education system a conglomerate of loosely coupled elements (medium) can be recombined into tightly coupled forms. The medium is the pupil.

The distinction between medium and form is *completely internal* and *exclusively relevant* in the system, without any corresponding difference in its environment (Luhmann 1995a/2000, pp. 103–106). Neither media nor forms indicate some kind of ultimately physical, biological or psychic nature. Similarly, elements are not natural constants (e.g. individuals or minds) that observers could identify as the same ones. No pupil is in itself a medium, being a psychic system that operates based on its own structures. In the education system, 'pupil' is a semantic invention used to draw a distinction with biological organisms and adult human beings. It is a construction in the education system, which turns clear differences, i.e. body size and behaviour of children and adults, in an artificial distinction. Through this distinction, the highly improbable education becomes possible. The pupil is a medium because it allows the education system to observe a sufficiently loose coupling of thoughts, making it available for tight couplings in education.

The medium does not disappear with the use, but it increases the space of combinations as it is used. 'Only forms can destroy forms and only forms can prevent other forms from using the medium. But as forms always confirm their medium they also confirm the potential for using the medium for other couplings' (Luhmann 1992a, p. 6). Forms do not exhaust the medium, rather they regenerate its possibilities. The increasing variety of forms, which is allowed by the medium, increases the elements of the medium and the possibilities of combining them. Forms are unstable and can be preserved only by activating the memory of the system, which permits to recognize them and, if necessary, to confirm them. 'The tight couplings are temporary couplings, they integrate and disintegrate, appear and vanish' (Ibid., p. 6).

Contemporary pedagogy no longer thinks of pupils as a tabula rasa on which to engrave pedagogically correct forms, but rather as a potential that can be actualised though teaching. That is why the pupil is a medium for and in the education system. However, this pedagogical construction hides the fact that the pupil remains a black box. It is impossible to see from the outside what happens in its head or control it. The pupil is non-transparent and self-determined. On the one hand, this lack of transparency allows the education system to construct the pupil as a medium; on the other hand, it clarifies that not all forms which this medium

can accept are also acceptable for education. The question is, therefore, how education can limit what it would be possible as a form of the medium, i.e. how it can prevent the arbitrariness of the educational process. The education system can give a form to the pupil as a medium only in improbable and artificial ways. Throughout its evolution, the education system has developed problems and solutions on both sides of this distinction, on the medium side as pedagogy and on the side of possible forms as didactics. The education system has primarily produced two types of solutions: (1) controlling and coordinating the relationship between teacher's and pupil's choices; (2) checking the material that can be used in teaching.

The first solution concerns a typical problem of the symbolically generalised media of communication (see Sect. 3.4.5), i.e. that communication can be attributed either internally as action, or externally as experience. In the case of education, the teacher acts and the pupil experiences. Teachers cannot attribute their actions to external factors, and whatever they do in the classroom is attributed to their decisions. The pupil's situation is more complex. There is no doubt that the pupil is also acting, but this action does not give any pedagogical directions to the education system. Therefore, the teacher must always look at the experiential world of the pupil, even when the pupil acts. When teachers sanction pupils' actions, they do so either to promote experiential effects or to evaluate these effects. While lovers need to confirm the world of experience of their beloved, teachers must correct the world of experience of their pupils (Luhmann 1991a, p. 174). This attribution to experience enables the education system to define and limit the medium, i.e. the pupil as an educational potential. However, this attribution does not say much about which forms of the medium are pedagogically acceptable.

The second solution employed to limit the possible forms of the medium concerns the conveyance of knowledge. Knowledge is not intended as a peculiar attitude towards the world, for example cognitive rather than normative attitude, or rational rather than emotional attitude. In the education system, knowledge is 'the structure with the help of which the psychic systems continue their autopoiesis' (Ibid., 1991a, p. 175), which can connect thoughts with other thoughts. This is not a matter of mental states or cognitive reserves on which the pupil can draw when s/he thinks and participates in communication. Knowledge is always actual knowledge. The teacher assumes that if the pupil learns correctly, s/he can actualise the knowledge that is needed in any situation, and can use this knowledge properly. Therefore, selected, cultivated and 'true' knowledge is conveyed, guaranteed, and legitimised by scientific criteria. The taught knowledge must be generalised and accepted (or acceptable), as well as different from what the pupils learn through socialisation in their 'normal' life. Nevertheless, pupils' psychic systems use knowledge according to their own patterns; therefore, the discrepancy between the skills requested in everyday life and the skills learned in school is not surprising. The treatment of pupils as trivial machines, although they are not and cannot become trivial machines, allows the conveyance of knowledge. The education system can irritate the pupils (Ibid., 1991a, pp. 168–170) through the structural

coupling between communication and consciousness (Sects. 3.3.3 and 4.2). In the education system, the medium 'pupil' is used to take advantage of this structural coupling, to produce structural changes in psychic systems. These changes are considered educational outcomes, although pupils' internal processes remain unclear, for instance how they learn to play the role of pupils, how they react to concessions and prohibitions, how their know-how and not-yet-known-how is produced. Learning presupposes unlearning and relearning, and a constant reworking of what has been learned. Teachers, however, observe learning possibilities, and the possibility of non-learning, as accumulation of knowledge, and thus simplify their work, observing that they can control its effects. Pedagogy collects knowledge and reflections on this simplification and creates an image of the teaching profession that can motivate teachers to continue working as teachers.

4.8 The Life Course as Medium in the Education System

In Luhmann's theory, this concept of pupil as medium was replaced in 2002, following a discussion between Luhmann and the German pedagogist Karl-Eberhard Schorr (reported in Luhmann 2004, pp. 260–277). Luhmann argued that contemporary education cannot observe the pupil as a medium. The problem stems from both the educational practices and their extension to the whole span of human life. The reference to the pupil presupposes a distinction between adult and pupil. The theory of education is centred on the pupil and not on the adult. However, the developments in contemporary education have gradually shifted educational interventions to the whole human lifetime. This has led to speaking of life-long learning, which goes well beyond school education. This evolution of education questions the centrality of the pupil, as also adults are 'clients' of the education system. Moreover, if learning becomes central in education, education cannot be limited to the pupil. Learning includes anyone who is able to learn, not only children.

These considerations led Luhmann to observe that the education system has changed its medium. The pupil has been replaced by the *life course* (*Lebenslauf*) (Luhmann 2002, p. 93). This concept, which is very close to that of career (see Sect. 5.4), is not a synonym of biography and does not merely indicate what pupils realise during their educational life. The life course is a chain of more or less improbable events, which make a difference for expectations of further events. The life course begins with birth and continues with other events, which give it a form by limiting what could be possible, without determining it. Individuals progressively experience successes and failures, thus shaping expectations about possible future developments. The reduction of what could be possible allows the construction of alternatives and the imagination of more or less probable course of events or situations. According to Luhmann's theory, this means that the reduction of complexity is the condition to increase complexity (Sect. 3.3.5). The education system attempts to limit as much as possible the sanctions for pupils' actions that

are negatively assessed. Therefore, the life course can also include what can be expected as future, which is certainly dependent on the past but still unknown. The life course is therefore a conjecture-biography, according to the definition Luhmann took from Jean Paul, i.e. a narrative (Luhmann 2004, p. 267). It encompasses past and future without any teleological structure, i.e. without the possibility to set any aim.

The life course cannot be described as either the fulfilment of destiny or as a manifestation of innate qualities. However, the life course seems to have some order and to be consequential, i.e. it gives the impression of a tight coupling de-randomising its components. In fact, it is impossible to look for causal relationships, as the complexity would immediately become so high that it would prevent the recognition of any linearity. The combination of events builds a unique sequence regarding the individual, although the components of the medium life course are more or less standardised and apply to everyone (birth, school education, university, etc.). The two ends of the life course's temporal dimension are past and future. The possibilities tend to increase at the beginning of the life course and to decrease with age; however, past and future are neither stable nor constant. This appears rather obvious for the future, but may seem strange for the past, which seems to be irreversible and closed. The point here is that each event in the life course rewrites both the remembered past and future expectations. After a negative outcome of selection in school, one feels like someone who did what s/he wanted (going to that type of school) only to find out that it was not as good as s/he had thought, so that one must rearrange the life course by eliminating the inconsistencies that the experience has produced. The life course is then constantly rewritten by combining continuity and discontinuity of the sequences of events. The description, including the explanation of what has happened, is valid in the present, but not necessarily at a later stage. The life course has neither a pre-fixed direction, nor an ultimate aim; the only natural aim, which cannot appear as such in the life course, is death (Ibid., p. 270).

The education system does not aim to provide each individual with a life course. Rather, the education system aims to manage the forms that are considered particularly important for the life course. According to Luhmann, these forms are 'knowledge', with the meaning that we have introduced above. Knowledge gives a form to the medium of life course, not only as actionable knowledge if and when one needs it, but also in that knowledge creates confidence when tackling new or unfamiliar situations (Ibid., pp. 274–277). Education allows individuals to know that they know, and this helps to avoid uncertainties. Those who learn to swim can swim and know that they can do it; they will have no fear of the water, expanding the range of their choices and possible behaviour.

The knowledge conveyed by education is not used in its scientific or technological meaning. In the education system, knowledge is only what can give form to the medium of life course. Therefore, it is important (1) to experience the learned knowledge continuously, to see if expectations can be confirmed, and (2) to learn from what has been done what else could be done. Learning opens up new possibilities, which in turn are the conditions for further learning, regardless of whether

or not the educational goals are reached. As every teacher knows, both conditions (reaching or not reaching educational goals) are always produced in the classroom.

Against this background, the traditional distinction between education and instruction is no longer suitable to describe the performance of the education system. Is teaching seniors to dance still education? Luhmann argues that, like all other functional systems, the education system combines universalism and specification, i.e. universal competence regarding the function and specification of its mode of operating. In this way, it is possible to observe the unity of the difference between schools and universities, vocational training, adult and senior education. The values and purposes of education can only be constructed autonomously in the system and can change when the system's self-descriptions (Sect. 3.4.6) lose their social plausibility.

Chapter 5
Structural Conditions of Education

5.1 The Code of Education

As we have seen in Chap. 4 (Sect. 4.7), the education system provides an internal distinction between action and experience, as happens for symbolically generalised media. However, education is not based on a symbolically generalised medium, which can make acceptance of communication probable. The reason is that symbolically generalised media are not useful for communication systems whose function is to change the environment, such as the education system, whose function is to change the consciousness of individuals. As we have seen in Chap. 4, and, as we shall see later in this chapter, this makes education heavily dependent on classroom interaction. Nevertheless, the education system is coded, i.e. internal communication is oriented to distinctions between two values, one positive and another one negative, which ensure the system's self-organisation and structured complexity (see Sect. 3.4.4).

The intention to educate is primarily shown through teachers' actions that try to impart knowledge and skills to pupils who do not yet have them. This 'not yet' is a paradox based on the assumption that something is both not possible and possible for the same person. The paradox is resolved in the time dimension. The activity of 'conveyance' (see Sect. 4.6) is seen as the basis to resolve the paradox: the teacher cannot know the future; s/he cannot know whether teaching will work, but s/he can try to convey knowledge and skills. The treatment of the paradox is therefore based on the distinction between conveyable and non-conveyable, which can be specified with respect to particular issues and particular pupils. In the final phase of his theorisation, Luhmann considered the hypothesis that this distinction is the code of the education system, as suggested by Kade (1997). Luhmann could not detail this theoretical decision, as he did not manage to complete his volume 'The Education System of Society'. He could only describe this idea very synthetically.

The positive value of conveyable refers to the operations of the system, while the negative value of non-conveyable indicates their failure and thus works as a

C. Baraldi and G. Corsi, *Niklas Luhmann*, SpringerBriefs on Key Thinkers in Education, DOI 10.1007/978-3-319-49975-8_5

reflection value of the code. The code does not only apply to specific pupils, e.g. it is not differentiated through some type of stratification, or to specific topics. The code concerns everything that can be considered in education. It is both universal and specific in that it also includes indications of what has to be conveyed. Specifications of the code are based on methods that zoom on the area of conveyable and assume that not everything is conveyable.

The code presupposes that whether or not conveyance is successful can be subsequently considered. Therefore, the code refers to the foresight of its results, which are observed through grades and tests, without, however, being able to rely on such foresight. The code does not provide a selection of its results; therefore, it is not based on the characterization of pupils, which is based on their good or poor performances, but only refers to the operation of conveying.

5.2 The Relevance of Selection in the Education System

The intention to educate leads to two rather different outcomes: education and selection. Education developed under the conditions of increasing complexity of a functionally differentiated society (Sect. 4.4). The distinction between education and selection became important in the shift from the primacy of stratificatory differentiation to the primacy of functional differentiation in society (Sect. 3.4.3). In this shift, the primacy of family socialisation, which reveals pupils' origins, was replaced by the primacy of intentional and controlled education (see Sect. 4.4).

Socialisation in families did not lose its importance, but it was increasingly important what could be expected in later life to acquire a social status. Assignments were no longer based on individual origins, but were mediated by careers (see Sect. 5.4). The integration of individuals and society, in the sense of a mutual restriction of degrees of freedom (see Sect. 3.4.1), was left to a sequence of mutually presupposing selections. This change, from individual origins to individual careers, was not triggered by the education system, although educators and reformers did their utmost to pave the way for it. The loss of legitimacy of individual origins, and therefore of socialisation in good families or in a good society, was based on the change of society into a functionally differentiated one, which dissolved all fixed assignments determined by birth positions. Against this background, the quality of the inclusion of individuals in society, and their life destiny, were based on the criteria of functional systems. This was viewed positively, highlighting the importance of individualism in society, but the dark side of careers remained unlit. Society considers itself and individuals as dependent on a self-generated uncertainty (see Sect. 4.2), whose differentiated effects are not clarified.

Against this background, an elaborated network of formal assessments has been produced in the education system. This development started in the nineteenth century, when admission to universities started to be based on final exams in secondary schools to ensure that what counted was not only the family of origin and the corresponding social status. Tests began to be considered as

inescapable requirements for admission to professions. The introduction of the system of school classes required decisions on either transferring or non-transferring students, based on a strictly binary scheme (either/or). These decisions were based on grades, which were given throughout the year for all subjects and added up into final outcomes. None of these decisions can guarantee the success of the next ones, which is left to future decisions. Schools fix the crucial directions for later opportunities in life, although they cannot determine if careers will be successful, as career management is left to external organizations.

In the twentieth century, during the sixties and the seventies, German pedagogy started to assess education and selection in different ways. It appreciated education as its special concern, while it rejected selection as something imposed by the government. Teachers were considered responsible for education only; they practiced selection only as representatives of schools. Even if selection was not rejected, its functional and dysfunctional effects on education were primarily considered. Pedagogy tried to impose the lowest level of selection to eliminate any preselection based on pupils' origins, in particular to give further chances to those who failed school tests. Even if specific measures were successful, the problem persisted, as the outcomes of education were differentiated.

Luhmann asserts that selection cannot be avoided if education is based on intentions to educate and if it must highlight positive outcomes. The education system strives for outputs, assessing abilities and learning, in the hope of reaching the desired effects. The relevance of selection is also established in the pupils' culture, as pupils take the results of selection as certificates of their assessment. Therefore, no subject can be either taught or learnt if it does not matter how pupils can deal with it. The mission of education includes commenting on learning and confirming or correcting it. Otherwise, it could hardly be made clear that education is 'serious'. Therefore teachers cannot avoid the production of selections. They deal with individual students' performances and compare them with what is expected from a pedagogical perspective.

While education operates to achieve good results, selection makes them visible as *decisions*. The achievement of results in education is based on the resolution of a paradox: the transparency of results is based on the lack of transparency of the decision-making process. It is possible to ask for explanations of decisions, but these explanations simply reproduce the problem and increase the number of critical views on selection. Decisions may be more or less justified, but the system cannot avoid selecting among different possibilities. This burden is mitigated by the temporal extension of the selection process, which goes recursively back to its own history, makes decisions on marks, promotion and examination, and does not compromise the view that results can be improved.

The expectation is that selection is based on justice in social comparison, as well as on the stability of criteria. Positive and negative performances have to be allocated correctly. The comparison is favoured by scales that makes it possible to see better and worse performances at a glance. Marks are intended for comparison. Violations are considered as arbitrary and attributed to teachers' personal dislikes. It is not possible to mark as 'failed' tests that have always been positively

assessed. However, the problem shifts to the question of how marks are produced, and on the comparability of grades of different origins. Therefore, comparison of grades must be limited to the single classroom where pupils have followed the same lessons.

Any comparison raises the question of why it is used. Its results can be used only based on a reflection on its conditions. This reflexive logic of consistency and justice, as equal treatment of equals and unequal treatment of unequals, is the main business of education. In this sense, 'objectivity' is expected, i.e. that other observers come to the same conclusion. This enhances the frequent criticism that grades are not objective, that they depend on teachers, and on different assessment occasions. If this is true, it is questionable whether assessment can enhance improvements. Performance itself, which is assessed, is a social construction; therefore, assessment cannot be produced independently from social constructions. Decisions requires that judges, in turn, may be criticised and perceived as unjust. This circular structure of assessment unavoidably limits the efforts to improve objectivity.

It is also observed that selection means application of power. However, according to Luhmann, communication of grades or decisions on promotion/non-promotion are not applications of power. Power means that the use of negative sanctions (here, poor grades) determines others' actions. This is not possible when deciding on selection in the education system. Teachers cannot determine pupils' actions by means of poor grades; they cannot oblige students to do anything. Differently from the political use of power, which is based on the threat of negative sanctions, the differentiation of the education system is based on selection mechanisms. Selection is the unavoidable consequence of the intention to educate to a socially acceptable life.

5.3 Selection as a Secondary Code of the Education System

As we have seen, if education and selection, learning materials and grades can be distinguished, they can also compete for attention. This has led pedaogues and educators to regret the distraction caused by grades at the expense of the 'real' meaning of education. Despite that, could educators be happy with education alone? In other words, what could the students' motivation be, if they only relied on their interest in a given subject? The hope that students may need this interest at a later stage is only an external motive, which is left into the unknown.

The point here is that checking the results of the education system requires selection. Corrections in education are possible based on a coding of good and bad, i.e. of better and worse performances. This code is enhanced when the forms of praise and reprimand (*tadeln*) are chosen, comparing students' performance with what can be expected from them. The ritualised method of testing allows the distinction between a pass and a fail, and, in the case of a pass, between different grades. Grades create the possibility of experiencing short-term success or failure,

as well as the risk that students may try how far they can get without too much effort. They also work as a symbolic confirmation of the successful completion of a particular phase of life. What education actually achieves is a sort of by-product of selection. Any other expectation depends on school socialisation, rather than on education. The pursuit of symbols of successful selection does not mean, however, that different socialisation, e.g. in families, does not affect the chances of success.

For a long time, Luhmann considered selection as the code of the education system, based on the distinction better/worse (e.g., Luhmann 1987a). In the last phase of his theorisation, Luhmann changed observation of selection into a secondary code (*Zweitcode*) (see Sects. 3.4.4 and 3.4.5) of the education system. In this perspective, education can only exist after the evaluation of the code conveyable/non-conveyable has taken place, as in itself this code does not guide the assessment of results. The primary code is complemented trough a retrospective method, which seeks to determine whether conveyance was successful or not. If standards of accuracy are given, the subsequent action is treated as either correct or incorrect. This is true even when the criteria allow several competing options of proper conduct, provided that two conditions are guaranteed, namely (1) there must be clearly *no* correct performances; and (2) the correct performance must, when it is repeated, remain valid.

The selection code allocates positions inside and outside the system; therefore concerning the impact of the education system on its environment. The programmes that check selection are set as requirements of the societal environment (Luhmann 1987a). If teachers try to avoid selection or provide inadequate assessments, their action is seen as irregular, thus giving the students an example of arbitrariness and injustice. If students try to reject selection by being indifferent to it, they are not classified in a third position; rather, this rejection is considered a negative position with respect to the binary code of selection.

In that it seeks to examine the results of education, the selection code operates in a complex way. This implies strict binary choices such as admission/non-admission, promotion/non-promotion or pass/fail. The unity of the selection code is based on the integration of the two options and on the requirement of consistency in assessing tests and grades. The system of grades works to buffer the harshness of the code, although it ultimately relies on a strict binary structure: good is neither very good, nor satisfactory. The grade system is also open to comparisons, either with past performances of the student (who can do better or worse), or with other students' performances, based on the average of the class or a predefined threshold. Exams and certificates are particularly relevant to highlight the ways in which the selection code operates.

Exams are interactions based on highly restricted conditions (Luhmann and Schorr 1979a/2000, Chap. 3). First, they are temporally limited and produce time pressure on the pupils, suppressing the possibility of reflecting on the situation. Second, they are suitable for reproducing routine knowledge, but they do not allow inferences on pupils' talent. As the differentiation of specific interactions for exams requires a lot of time and work, the organisation of exams must show clear advantages. The organisation of exams enables a statistical control of their

consequences, providing level compensations when necessary, and makes trends visible, so that the teacher can deal with them. Exams can be organised through rating scales that can vary depending on the pupils' performances. However, the organisation of exams could also lead to a stronger separation between teaching and evaluation, between interactions for exams and teaching interaction. This distance can only be reduced by relying on continuous assessment. This is why education is not differentiated as a specific system for evaluation and selection, which is only a secondary code within the system.

Certificates offer a functional equivalent of difficult specifications of educational purposes, as they replace purpose programmes with conditional programmes: if performances are demonstrated, than appropriate certificates can be issued. Certificates offer teachers information about the performance and allow them to focus further teaching accordingly. In this respect, what is crucial is that it is considered better that the person to whom the certificate is issued is assessed at that moment rather than at a later one and by others. Thus, certificates provide those who will assess the same person at a later stage with a quick access to complex information, which is not, or no longer, available to them, and therefore makes decisions about transitions easier.

For a long time, Luhmann interpreted educational programs as ways of allocating students' correct behaviours, on the basis of the code of selection, starting from the theoretical assumption that coding cannot exist without programming (Sect. 3.4.4), as programming allows the allocation of the values of the code (Luhmann 1987a). In particular, programmes are used to distribute better and worse positions. In the education system, learners are explained as trivial machines, i.e. as producers of a specific output for a particular input based on a prefixed rule. However, students are non-trivial machines (Sect. 4.6). In their previous existence they have developed, through learning and environmental influences, judgement capacity; they have the tendency to ask for specific inputs and to produce personal outputs. For example, interpretations of texts do not only allow one correct answer, and a large number of possible correct results bring an extraordinary burden on the education system. Nevertheless, the system educates nontrivial systems as trivial systems in order to more easily observe how they can be assessed. The need is to measure whether the transformation of input in output works properly, which is why the learning person is asked to produce the expected output. In this way, errors can be observed much better, and a better and unambiguous selection is possible on the basis of the distinction between errors and lack of errors. Against this background, teaching and learning programmes are related to the code of selection in such a way as to make it possible to check and understand their results.

In the last phase of his theoretical effort, however, Luhmann asserted that a peculiarity of the education system is the fact that, unlike what happens in other functional systems, there is no clear distinction between coding and programming. Educational goals and teaching materials cannot be understood as programmes based on the selection code, as they are not defined by giving instructions for good or bad grades. The selection code extracts the criteria for the choice of teaching

materials, but this does not mean that these criteria have been chosen to enable selection decisions.

Education and selection operate in the same system and therefore must be considerate of each other, although they do not determine each other. The unregulated but complementary codes of education and selection also lead to a problem for education. Education achieves performances, but at the same time, it also pursues the protection of students' self-respect. This educational goal can be called 'sensitivity', and leads to ambivalent forms of communication. Therapeutic work on troubled families (Watzlavick et al. 1967) understood this ambivalence as paradoxical communication, i.e. as communication that includes contradictory messages on two different levels. The problem in education is that it is not possible to conceal the insidiousness of good intentions; students may suspect that the teacher's benevolence, kindness and forbearance are strategic actions. This leads education to a crossroad, where one cannot predict whether communication will continue based on trust or distrust. Paradoxical communication can be relatively stable. One may suspect that something is differently meant when said, but it may be difficult to react. Typically, the resulting problems appear not where they are caused, but elsewhere. Education must wait for the emergence of problems, without being able to foresee them, and this can be seen as an indication of the crossroad. In this respect, education differs from families. While families always include the paradox of the relationship between love and control, education offers the possibility to ignore educational kindness and focus instead on the acquisition of grades and the existence of tests. The unfolding in education of both good intentions and selection makes the system stable at two levels. Communication can thus oscillate between sensitive and promotional forms, on the one hand, and the distribution of selection symbols on the other. Grades cannot be sensitive or tactful, and this is not expected by students. Grades cannot depend on sensitiveness, as this would violate the principle of consistency and fairness of evaluation criteria. Thus, the system operates on two tracks: one running the risk of being a paradox and the other one being technical. This contradiction does not guarantee either success or rationality in education, but it guarantees both the system operation and the possibility to move to a more 'human' communication mode, for example, to explain test failure or poor grades in sensitive ways.

In conclusion, the differentiation of education and selection does not lead to developing more generalised principles for education, but it allows the system to oscillate between the two forms of communication, thus avoiding revealing the disadvantages of either one.

5.4 Social Selection and Career

The results of selection fulfil three important functions in the education system. First, they form the memory of the education system, which makes it possible to forget both the psychic feelings of anxiety and uncertainty and the specific

knowledge that allows grading. The power of forgetting is more important than the power of remembering in the education system. Memorising grades is important as persons get the chance to be different only through the scheme of better or worse grades. This memory allows the system to open up possible change, as if memory were related to persons and these were identified with their past. Second, the results of selection enable teachers to observe their own teaching critically, i.e. to determine whether their requirements were too soft or too strict. Third, the results of selection work as proxies for either success or failure that will only become clear in an indeterminable future.

One important aspect is that successes and failures are produced in the education system and do not, therefore, depend on stratification in society. It is not possible to pass exams based on personal origins. This neutralisation of origins is achieved only partially: statistics show that children from better families still have better chances to succeed in the selection process. Nevertheless, the sequence of selection decisions and the list of better or worse grades, which refer to school performances, allow pupils to look at their participation in the education system as part of their *career*. Career is understood as the temporal structuring of an individual biography. Career means that early stages are important for later ones. The relevance of career is included in the education system, even if pupils are only interested in later professional career. Pupils must test themselves in school or university, to create favourable starting positions for their future careers.

The educational selection relates to the overall structure of social selection, i.e. to the selection for positions in society. Social selection takes place in the whole society. Each subsystem in the functionally differentiated society manages the placement of individuals in different positions and in different roles, e.g. in complementary roles such as doctor/patient, producer/consumer or teacher/pupil, at the workplace as well as in general social life. Each individual builds her/his own history by orienting to the different opportunities that s/he may have to fulfil roles in the various subsystems. Each subsystem makes selections according to its own criteria. The education system distinguishes between pedagogical selection and societal selection and, in doing so, it claims its autonomy and distinguishes the internally produced inequalities from the general problem of social 'stratification' and inequality, which in the functionally differentiated society is evaluated negatively. Pedagogical selection is a process whereby the education system produces effects on its environment (Luhmann 1986a, p. 160), although pedagogy observes itself as a 'victim' of social stratification, which may influence the pupils' performances. The education system attempts to create choices influencing the pupils' future as much as possible, but this can only confirm that risks are created in the present and that avoiding one risk implies taking another one.

The overall structure of social selection takes the form of individual *career*. In Luhmann's theory, this is a general concept going beyond the analysis of the education system (Luhmann 1986b:1989, p. 195; Luhmann and Schorr 1979a:2000, Sect. 3.9; Luhmann 1989, p. 230 ff.). Career is the modern form of *social inclusion*, i.e. the structure that allows individuals to participate in communication.

The concept of inclusion indicates the main form of the relationship between individual and society (Sect. 4.5), a form that has changed throughout history.

In premodern societies, inclusion was regulated by social origins and therefore mediated by the family, affiliation, or similarly structured contexts, such as convents or corporations. Depending on rank, everyone, from nobles to peasants, could contribute to the ideal of the 'good life' and to the harmony of the whole society. Rank differences were compensated by forms of solidarity based on membership in single social strata, which allowed dealing with destiny, to guarantee self-maintenance against external (social) dangers (Luhmann 1989, p. 230). The individual identity was then built on the past, while future was (for noblemen) the time of aging and of the duty of expressing their virtue through an appropriate conduct of life. These criteria disappeared with the functional differentiation of society. In the functionally differentiated society, participation in communication is no longer adapted to the social hierarchy, i.e. according to social status. Rather, it is left to the individual's decisions, as everyone has access to all subsystems of society in a non-predetermined way. Forms and criteria for this access are now attributed to each subsystem and to career. Discrimination (e.g. hiring someone and not others for a job, or granting a diploma to some but not all) must be motivated and legitimised at a procedural level and on the basis of the differences generated in careers.

In the functionally differentiated society, career is the most important form of individual identity, which makes it possible to manage access to all social positions. The end of the societal stratification and the rise of generalized inclusion of all individuals in all functional systems has changed the way in which social inequalities are observed and assessed (Luhmann 1975b, p. 160). While in stratified societies inequalities were predetermined, in the functionally differentiated society they are produced by the difference between careers and amplified by the orientation to performances. If compared to pre-modern societies, equalities and inequalities have both increased, as respectively equality of conditions and inequality of results. This form of inclusion requires decisions and choices, involves risks and uncertainties, produces differences, and increases the possibility to vary the sequences of career-relevant events. The 'normality' of certain sequences, such as 'studying-working-getting married-having children', disappears leaving spaces of freedom that cannot be generalised. Against this background, the only individual factor that affects careers, independently from performances and evaluations, is aging. Aging means that options and perspectives tend to be fewer and fewer and that the horizon of what will happen narrows. This entails a sort of 'cooling-off' effect on expectations, but also problems like loneliness, boredom, and leisure time to be occupied.

Careers arise when the *continuum* of an individual's life is digitized into thresholds or stages, which can have a more or less important meaning. Career is the modern way in which the individual and society are integrated, mutually restricting their degrees of freedom. It is a sequence of selections that mutually presuppose each other, but cannot guarantee the next step, which is left to future decisions (Luhmann 2002, pp. 39–40).

The main features of career are the following. First, the events that give form to career are always a *combination of self- and other-selections*, i.e. of selections made by the individual and selections made by those who decide, positively or negatively, for her/him, e.g. when the individual applies for a position in an organisation and the organisation decides whether or not to hire him/her. Second, this implies that career is a self-constructed *social* structure. Career can be influenced, but not determined, by external conditions. It creates opportunities, often using patterns such as luck/performance, i.e. external/internal attribution. This makes careers very uncertain, not only with respect to the future, but also when compared to the past. Third, every threshold or stage of the career is assessed, indicating whether the career is getting *better or worse* or if it has had a setback. Fourth, career is *contingent*. The future is uncertain because nobody can predict what will happen in the next step. The past is a source of uncertainty because one cannot know if what the individual is accumulating as past will be suitable or useful in the future. This contingency requires time-binding structures, such as degrees, diplomas, certified experience and so on, which 'capitalize' the past, adapting it to the yet unknown future situation. This articulation in the time dimension is particularly complex. Present decisions generate the past of future presents without the possibility of knowing whether they will be adequate. At the same time, concerns about the future can have negative effects in the present.

Finally, career cannot be chosen, regardless of its success or failure. Even outsiders decide about their career (or at least they are observed as decision-makers of their life), and even those who show no interest in advancements in the workplace or in succeeding in their activity, have a career. This means that there are also negative careers or non-careers. Career relies on the scheme success/failure, producing a 'performance semantics' with forms of attribution corresponding to internal or external causes. However, it also produces the difference between performance and its refusal, which may be expressed with terms like 'stress', 'outsider', and 'alternative ways of life', which interpret non-career as a form of positive life (Luhmann 1989, p. 235), or with terms like 'hopes', 'pretensions', 'fatalism', 'being satisfied with present conditions', which instead interpret it as forms of uncertainty absorption.

Educational selection limits the pupils' orientation to career, both motivating and demotivating them, depending on how they handle the uncertainty that is generated by selection. Selection produces inequalities, and can therefore both motivate and discourage. It links both successful performances and failures. Clearly, if pupils have always been good, they will not suddenly be bad. However, they cannot know exactly what will happen in their future. This indeterminacy of outputs is temporary and must be terminated by the system itself through later decisions.

School is the central agency that can direct the opportunities of later life, though it cannot determine which directions careers will take. Certificates and marks convey self-selection and recruitment processes in careers. They allow some 'mechanization' of person mobility. The contribution of the education system to the construction of careers is important enough to be a concern for both the education system itself and the pupils. The reason of this concern lies first and

foremost in the fact that the starting point of a career is particularly delicate, since it is more difficult to correct than later events. The educational period of a career is the most important part of the past that the pupil will need in her/his future life. Therefore, school failures are supposed to heavily affect the individual's career. Not surprisingly, the selection made by the education system is under systematic observation and is an important concern for teachers.

The concept of career is very similar to that of life course (see Sect. 4.8). However, while life course can be understood as the medium of the education system, and has therefore only educational relevance, career is a more general structure, for which education plays a central but not unique role. The medium life course does not match career as a form of inclusion since the education system seeks autonomy in structuring careers. The evolution of contemporary education (see Sect. 4.4) can thus provide for the educational management of life course as 'extended present', rather than future horizons. The medium of the education system generates a pedagogical potential, while careers generate a societal potential. There are important limitations to the educational orientation of careers. Methods of selection in the education system are quite different from methods of selection in the economic system and workplace. In schools and universities, there is no shortage of grades and examination successes, while in the economic system there is a shortage of positions. This means that the education system cannot provide any certainty of employment in the economic system, although it can provide references and certificates for future employment. Moreover, students can leave the education system early and without qualifications. One might think that this is a response to poor performance in the selection process. Empirical studies, however, do not confirm this assumption; therefore, it is unjustified to characterise dropouts as educational failures. Presumably, this phenomenon is also related to individuals' maturity and opportunities offered by society, in contrast to the excessive duration of formal education in schools and universities. Clearly, not all social careers are structured on the formal requirements of the educational system. It would not make sense to evaluate individual destinies throughout life as either educational successes or failures. It is not possible to claim that periods of detention, hospitalisation or marriage ending in divorce are signs of bad education, and it would be equally impossible to claim the opposite.

The transition from social origins to career as a form of inclusion is viewed as a positive achievement of modernity. Luhmann, however, points out that orientation to career can contradict the rhetoric of success and the objectivity in the evaluation of performances, producing a type of modern inequality that does no longer depend on external factors but on career (Luhmann 1989, p. 235). Those who succeed tend to take more risks, while those who fail no longer seek to seize opportunities. Opportunities are provided to those who have already had a successful career, rather than to those who have had problems. Career is a self-fulfilling prophecy or, in the language of cybernetics, a mechanism amplifying deviation (Maruyama 1968), i.e. a mechanism that reinforces the current (positive or negative) trend. This 'dark side of career' is also well known in the pedagogical reflection, for example as 'Pygmalion effect'. When expectations of success are

communicated, it is likely that the pupil will feel more motivated and thus succeed, and vice versa. This circularity of the communication process is produced through the mutual observation of teacher and pupil and can hardly be interrupted.

5.5 Teaching as an Interaction System

Classroom interaction has been the most important factor of differentiation of the education system in modern society (Sect. 4.4). Education is provided in the form of lessons, thus implying that education takes place in interactions. This interaction-based organisation of education has far-reaching consequences resulting from the way in which the interaction system is constructed. In this section, we aim to explain the features of the interaction systems of teaching (*Unterricht*) against the framework of the general theory of interaction formulated in Luhmann's Social Systems Theory.

According to Luhmann, interactions are social systems that are included in society. To be more precise, interactions are social systems that realise society, drawing a difference between themselves and an intrasocial environment. On the one hand, society is not possible without interactions (Luhmann 1984:1995, p. 417), although communication can be largely produced through dissemination media. On the other hand, interaction systems are not possible without society, as society guarantees the basic operational closure as a precondition for the production of each interaction system.

In society, interaction systems are not differentiated on the same basis as societal subsystems (see Sect. 3.4.1). Although interaction systems are included in society, according to Luhmann (1984:1995, 1997:2013) society and interaction are different types of social systems. The difference between interaction and society is based on a different system formation, i.e. on different ways of fixing the boundary between the system and its environment. The features of interaction systems, which depend on the way they fix their boundaries, are particularly important in the education system.

The boundaries of interaction systems are fixed based on participants' presence: interaction systems provide 'the processing of contingency on the basis of presence' (Luhmann 1984:1995, p. 43). In interaction systems, therefore, double contingency (see Sect. 3.2.3) takes the form of contingent perception: double contingency means not only that each participant perceives the others, but also that each participant perceives that s/he is perceived by the others, i.e. perception of perception or *reflexive perception*. Participants' reflexive perception depends on participants' presence. Therefore, the distinction between presence and absence of participants determines the difference between the interaction system and its environment. Whoever is treated as present is included in communication as someone 'whose active participation can be expected' (Luhmann 1997:2013, p. 133).

Therefore, participation in the education system is based on reflexive perception in the interaction. Reflexive perception guarantees the basal simultaneity

of participants' observation and action in the interactions included in this system. To a certain extent, it also guarantees a synchronization of different actions. Moreover, the production of simultaneous actions in the present situation is extended to the perspective on the future, as the future is assumed to be a series of present situations, each of them characterised by the simultaneity of different actions. This condition is possible because the general features of the interaction are already known to pupils, who have learned them at school.

The primary relevance of reflexive perception implies that interaction systems provide opportunities of interpenetration (Luhmann 1984:1995) and structural coupling to 'communicatively uncontrollable processes of consciousness' (Luhmann 1997:2013, p. 133) (see Sect. 3.3.3). Reflexive perception, however, becomes also relevant for the autopoiesis of interaction systems, as perception of being perceived leads participants to take each other in consideration. Thus, interaction systems are based simultaneously on perception and communication (Luhmann 1984:1995, p. 417). This does not mean that interaction systems include all participants' perceptions; rather, they make a selection of perceptions that can be communicated. Being a social system, interaction is internally structured and is therefore differentiated from individual perception. Interaction systems autonomously determine the meaning of their beginning and end, i.e. of their operational closure, through communication. As we know (see Sect. 3.3.3), structural coupling does not mean fusion of systems but presupposes their differentiation. Both structural coupling and operational closure are important for the understanding of education as a social system (Sect. 4.1). This also applies to teaching as an operationally closed and self-referential system of interaction. This system generates an excess of possibilities for the observation of psychic systems, as these cannot be controlled through communication.

Ongoing communication is an attractor for individual attention. In general terms, reflexive perception forces people to communicate, as the perception of being perceived leads to consider all participants' actions, including apparent non-actions (e.g. silence), as informative utterances. As the famous psychotherapist Paul Watzlavick (Watzlavick et al. 1967) theorised, 'one cannot not communicate in an interaction system' (Luhmann 1984:1995, p. 413). Despite forcing students' attention, the interaction system of teaching is not able to bind their mental capacities. Therefore, it must operate with a self-generated structural uncertainty: no participant, and certainly not communication itself, can recognise what is *really* going on in and through the interaction. This is also true for the teacher: if teachers saw everything that happens in the interaction, they would lose the overview and control of the situation. Nevertheless, students are present and therefore deserve observation in communication. All communicative events are relevant for both the interaction system of teaching and individual participants. There is a systematic oscillation between these two system references. It may be assumed, for example, that problems of discipline draw attention in one direction (the interaction), and learning difficulties or laziness draw attention in the other (the participants). Against this background, the structures of the interaction system of teaching emerge independently from individual participants. This does not exclude that

participation, e.g. the extent to which the teacher is informed or competent, makes a difference in the interaction. The interaction system of teaching is sensitive to differences of knowledge and pedagogical skills.

Self-generated uncertainty means that the interaction system of teaching is reproduced through a retrospective observation of what has just happened, without any possibility to foresee the future. The steps that lead to successful teaching cannot be specified in advance. Although the preparation of teachers can be careful and systematic, good lessons can have bad consequences. Although in educational interactions participants' reflexive perception is based on discipline, this discipline is often inadequate for educational purposes as it may provide an incentive to either disrespect or provoke the teacher. Through reflexive perception, each student can gain the ability to either enjoy or disrupt teaching. It is hard to explain why all this happens, and, if there are plausible explanations, they cannot be generalised in the education system. The interaction system of teaching self-explains; therefore, it is difficult to correct it.

In particular, the interaction system of teaching enhances the so-called 'hidden curriculum'. This is a latent, parallel and different curriculum with respect to the official curriculum. The hidden curriculum arises from the adaptation of pupils to the interactional situation in the classroom. This concept was proposed by Dreeben (1968, p. 44; see also Luhmann 1987b, p. 66) to indicate that what pupils learn is neither restricted to what is taught nor to what can be taught from a pedagogical point of view. Pupils learn attitudes, behaviours, 'cultural values', motives, strategies, career orientations, and fascination through the scheme better/worse deriving from the interaction with teachers and peers in the classroom. Schools do not teach only what they are supposed to teach but also something else, and not only because of extracurricular influences (e.g. from families). The interaction system of teaching generates unintended learning, and teacher are in this sense 'randomness generators' (Luhmann 1985, p. 90). Luhmann argues that the problem of unintended and uncontrollable school socialisation depends mainly on the ways in which pupils react to unexpected situations and to what can attract their attention. Therefore, the problem depends on the fact that minimal, causal factors can establish structures that may become difficult to control, and above all on the fact that pupils are treated as trivial machines (Luhmann 2002, p. 80). Pupils know that someone wants to educate them and react to this intention in unpredictable ways (Luhmann 1985, p. 80).

Why is interaction so important for the education system although it creates uncertainty and unpredictability? In general, the importance of interactions depends on the form of society in which they are produced.

In segmentary society, where communication systems are restricted to concrete localisation (e.g. in villages or tribes), and it is not possible to disseminate communication, interactions are particularly important. In these conditions, social structures, which regulate operational closure beyond specific interactions, can be reproduced only through interactions. In hierarchical forms of society (centre/periphery and stratification), interactions are relevant to produce decisions for society and the corresponding semantical orientations. In these societies, the

possibilities of producing important communication outside interactions are limited. However, the invention of writing introduced the possible achievement of both utterance and understanding outside interaction systems. Increased societal complexity influences interactions, as it increases the role commitments of participants and reduces the possibility that each interaction determines or supports relevant structures in society. The increasing importance and variety of dissemination media and the rise of functional differentiation have increased the relevance of communication that does not require presence and reflexive perception, while the experience that is accessible in interactions becomes strongly limited if compared to the wide access to the world provided by dissemination media. Nevertheless, the importance of the interaction system of teaching in the education system depends on the specificity of education in the functionally differentiated society. The interaction of teaching was introduced in the education system at the end of eighteenth century (Sect. 4.4), when the previous separation of education (*educatio*) and teaching (*institutio*) was abandoned and new expectations about the provision of education as interaction systems in school classrooms and the engagement of teachers in these systems were socially constructed. How can this be explained?

Functional differentiation does not mean that interactions are no longer relevant in society: they continue to proliferate and to be an important way of reproducing society. Functional differentiation, however, has important effects on interactions. First, interactions cannot fulfil relevant functions in society, for example coordination among different functional subsystems or creation of general consensus. This creates a gap between what can be experienced and is accessible in interactions and the complexity of society, which cannot be reduced or represented through interactions. However, interactions gain more autonomy in internal selectivity, as they do not fulfil the function of supporting the reproduction of society. This makes the interaction indifferent to what does not happen in the interaction itself. Moreover, the differentiation of interactions becomes more relevant. This can be observed both between interactions with or without reference to societal functions and between interactions that are included in different functional systems, thus gaining different degrees of importance and intensification in these systems, e.g. different degrees of importance and intensification in systems of intimate relations and in economics.

Against this background, the interaction system of teaching may gain internal selectivity, may be included in a functional system (the education system) and, above all, may gain a high degree of importance within such system. Thus, classroom interaction, which is shaped on teaching, underlies the differentiation of the education system in society. It allows the independence of this system from familial structures and from randomised occasions of education. The interaction system of teaching allows a long-term concentration of demands for education about what could be learned. Therefore, the interaction system of teaching has a social relevance that does not depend upon and does not vary with what is actually learned. This way of differentiation of the education system may be compared with the way in which courts allow the differentiation of the legal system, and churches allow the differentiation of the system of religion.

In the education system, the interaction system is limited by restrictions that allow the expansion of its educational capacity. In the family, educational efforts can be terminated when they are expected to have little success. Teaching, on the contrary, must continue. Lessons are interpreted as educating, and education is systemically attempted in the classroom. Therefore, expectations are oriented to the continuation of teaching. The increased complexity of the interaction of teaching is based on patterns of specific reduction of this complexity. The place and date of meetings among the participants can be predetermined, although this predetermination cannot guarantee the progress of teaching. Absences can be recorded. Meetings and a 'punctual' regulation of interaction chains can be shaped. It is also possible to distinguish between lesson and classroom. Brief episodes of interaction between the teacher and one single pupil are possible, but teaching cannot ignore the fact that these episodes take place in the classroom and are, therefore, observed by other pupils. The interaction system of teaching can stop, but it can be continued at a different time, i.e. it is possible to establish a time-independent thread of continuity. Moreover, the distinction between episodes and periods of education help indicate the continuity of teaching. Episodes concern a specific subject or the interaction with a specific student, under the teacher's authoritative influence. Periods are organisationally prescribed classifications, for example lessons, semesters, or school years. Periods are generated based on series of episodes, and this legitimises the continuing and dominating influence of the teacher. Both episodes and periods follow a rule of summing: the extension of a time unit erodes other time units. This affects the extension of school: schooling is achieved at the expense of the rest of life.

5.6 Structural Limitations of the Interaction in the Education System

The continuity of interaction systems of teaching is based on the inclusion of interactions in the education system and therefore in society. Society guarantees the conditions for beginning interactions and understanding what follows the end of interactions. The duration of interaction systems is limited: interactions are episodes that can only be observed in the continuum of societal communication. Interactions could not begin and end in the absence of the continuum of society. Interactions are small, ephemeral systems that are continuously decomposed and reconstituted, and they exist only in the background of the continuity of society. Society generates meaning that extends beyond the boundaries of interactions, thus connecting interactions to other communication, both produced in other interactions and disseminated by media. Interactions can transform societal restrictions in freedom to create their own autopoiesis. Therefore, interactions can contribute to the initial formation of structures, providing an 'enormous field of experiments' (Luhmann 1984:1995, p. 423). However, interactions cannot determine the destiny

of these experiments: they come to an end and thus cannot determine these experiments as new societal structures. Only society can use the experiments to change its structure. Structural change does not depend on interactions but on the form of differentiation of society. The differentiation of the education systems is not *based* on the interaction system of teaching, although this interaction system is extremely important to understand differentiation.

Society has access to interaction both in its execution (as interaction is included into society) and as environment (as interaction draws a distinction from its social environment). In particular, society fixes the structures of expectations that can both be used in interactions and ensure connections beyond interactions. These structures are coding, programmes, participants' roles and personal identities (see Sects. 3.4.4 and 4.2). They are created 'trans-interactively' (*transinteraktionell*) and orient the reproduction of interactions, thus giving interactions sufficient rapidity to create internal connections. We can easily understand this, if we imagine what would happen if every time a teacher meets the pupils, s/he had to explain the meaning of the education system.

As we have seen in Sects. 5.1 and 5.3, the code of conveyance and the secondary code of selection are the basic structures of the education system, which also condition the autopoiesis of the interaction system of teaching. Personal identity (Sect. 4.2) has also an important function in establishing the interaction system of teaching: in order to ensure continuity, this system assumes that participants can remember (or forget) and addresses them as persons. Moreover, in the interaction system of teaching, additional structures must ensure the simultaneity of talking and listening. The size and complexity of this system must be regulated to provide participation in communication in terms of both listening and speaking. This is done by means of the differentiation of the roles of teacher and pupil in the education system. Pupils and teachers are assigned to each other, and this assignment is not based on presumed affinities. The interaction system of teaching must get its own order, its self-organisation, which is based on the involuntary nature of the teacher and pupils' being together, which depends on structural requirements of the education system.

The most striking structural peculiarity of the interaction system of teaching is the unbalanced preference for the teacher's participation, i.e. the complementary and asymmetric structure of teacher and pupil roles. The authority of teachers includes monitoring the interaction and managing the speaking time. This does not mean that the teacher's structurally guaranteed superiority may work in all situations, let alone that this would be pedagogically advisable. However, limitations, which apply to all hierarchies, do not change the fact that in the interaction system of teaching it is useful to know how decisions are made and where the responsibility lies for them, above all in case of doubts. Teachers' instructions, especially teachers' questions, provide some control of the interaction history and chances of representing pupils as persons in communication. Pupils can only participate based on their experience, by waiting, rejecting, interrupting, and showing patience or resignation.

This differentiation of roles makes it possible to interpret specific interactional situations as non-unique and to take further steps in the interaction. The role of teacher also makes societal remunerations visible in the interaction. Although the interaction system operates autonomously and therefore pursues its own history, it continuously refers to society. This does not contradict the production of teaching as an autonomous, autopoietic interaction system, as this reference can be made visible only in the interaction and only through the interaction.

As we have seen in Sect. 5.5, structured as it may be, the interaction system of teaching generates internal uncertainty. On the one hand, it reproduces its structures, while on the other hand it opens new opportunities in the form of coincidences. The interaction system reproduces itself as a unity of routines and coincidences, order and disorder. The structure of the interaction system endlessly sets possibilities ('trajectories') of both favourable and unfavourable outcomes. This structural feature explains the difficulties of reaching educational tasks. It confronts the teacher with a paradox, i.e. the unity of routine and randomness, and leaves the teacher without instructions about how to resolve this paradox, as a higher level of order in the education system is impossible. The required teaching skills concern the handling of this paradox: the teacher's action can either utilise or not utilise the emerging opportunities. In organising lessons, the teacher has the role of determining time, meetings, topics for lessons, and so on; thus, the complexity of the interaction system takes a form to which it is possible to adjust. Here, 'form' means that particular actions can be connected to further actions, while other actions remain in the 'unmarked space' of not considered options. These considerations lead to see that, in Luhmann's perspective, interaction systems of teaching implement structural ambiguity in the education system, enhancing the indeterminacy and systematic need for the re-specification of pedagogical intentions.

As we have seen in the case of the education system, society provides the range of possibilities that interactions can exploit in order to exist, e.g. the range of possibilities of effective teacher-pupils communication. Society provides the 'range of freedoms and commitments' (Luhmann 1984:1995, p. 419) that interaction could not find in itself and that generate expectations going beyond interactions, such as participants' roles in subsystems and personal identity that is not limited to specific interactions. Therefore, the interaction system must also take into account what is expected from participants outside the interaction, i.e. in other social systems. In the education system, the difference between presence and absence, and thus the fixation of the boundaries of the interaction system of teaching, is particularly important for this purpose. The schools are informed that there are other people and other social conditions in the environment of the educational system, for example, parents' houses and traffic conditions of the school location. The relationship with the environment is not prequalified as either positive or negative; it is understood as inclusion of what is excluded, and thus as a result of self-organisation and of recursive operations of the system. Consequently, variations can be limited. The interaction of teaching takes place in closed, non-public places, so that deviations created by the environment can be minimised. This condition

is confirmed as a rule by the exceptions, e.g. by school trips. Access and exit of individuals are regulated and controlled so that they cannot simply depend on the history of classroom interaction ('I do not like the lesson, therefore I will leave the classroom'). Above all, the spatial segregation of education must be ensured, so that the education system can control its internal processes, although this does not by itself lead to students' attention.

Society provides themes of communication in interactions that interactions could not generate by themselves (e.g. conversation can concern political events, disasters, participants' family life, global crises, or more simply specific episodes of social life). In the interaction system of teaching, the teacher makes visible a specific and positive attitude to the theme of communication. However, the structures of the interaction system of teaching arise independently from the specific subjects and 'substance' that are taught. The structure of the interaction is not fixed by a specific theme of communication; rather the teacher expects (and the pupils expect that the teacher expect) that this structure is applied in any case. Therefore, teaching does not only concern knowledge, but also, and above all, appreciation of knowledge. In this way, the education system can determine the beginning, changing and dropping of any subject.

5.7 Organisation and Professionalization

The differentiation of the education system (Sect. 4.4) determines two important problems. Firstly, when the education system is differentiated, education can no longer simply rely on the necessity for interaction and on the possibility to reach an agreement between teachers and pupils in order to improve pupils' skills and abilities. As interactions are essential for education, in that they determine the autonomy of the education system, they cannot be sporadic and local initiatives linked to families or corporations, uncontrolled and with unpredictable effects. Secondly, the specification of pedagogical intentions requires new conditions. Pedagogical intention is the intention to convey something which can be used for the life course. It is the central symbol that enables education to recognize itself. Pedagogical intentions are very general and do not provide specifications, which however cannot be left to the individual's will. The solutions of these two problems can be found in (1) the formal *organisation* of education, and (2) the *professionalization* of teachers (Luhmann 2002, p. 142 ff.).

1. Education started to be organised around the end of the eighteenth century, with the establishment of a school system for the whole population. This system required and presupposed several conditions, which were normalised in the next period. Firstly, the teaching profession became central and could no longer be a secondary occupation for monks or sextons. Teachers had to be trained to the profession, and traditional educational contents, which were mainly related to family education, were reviewed and rewritten. Secondly, schools and

universities were distinguished as different stages of the educational process, rather than as different educational institutions. Accessing university required that students certified the completion of schooling.

Schools were organised through the differentiation of classes based on age cohorts. Pedagogy strongly criticised the existing system, in which classes accommodated pupils with great age differences. It was easy to organise classes of same-age pupils, as the number of children going to school increased significantly. Therefore, this organisational criterion spread rapidly in the nineteenth century, raising new questions, for example whether it was appropriate to teach new and much broader knowledge in a general way or to organise classes devoted to specific disciplines. Moreover, the general intention of educating was enhanced through specific tools, the curricula, which extended the organisation to the distribution of school subjects in the classroom. Thus, the time that should be devoted to each subject could be clearly differentiated. The imposition through state administration of curricular models and organisational structures created the problem of their generalisation. The territorial expansion of curricula raised the question of whether it made sense to adopt the same curriculum in different states with different traditions. These developments show that the education system turned to formal organisation to specify the general intention of education.

These developments led to an interest in the organisational aspects of schools and universities, which, from the beginning of the twentieth century, was reflected in organisational and sociological research. Against this background, the understanding of organisation in the education system requires some general considerations on the concept of organisation. The study of organisations is important in Luhmann's theory, as shown by a series of publications ending with the posthumous volume on *Organisation and Decision* (2000). Luhmann considers organisations as a type of social system (see Sect. 3.4.1) arising with the functionally differentiated society. Examples of organisation include enterprises, political parties, hospitals, and schools. Organisations solve the problem of double contingency (Sect. 3.2.3) by establishing membership of participants in communication. Membership is socially defined to select access to communication in the organisation: it defines the difference between those who can participate (e.g. teachers and pupils) and those who cannot; in organisation systems, only members can participate in communication. Therefore, organisations define their boundaries through membership, i.e. through a highly selective access to communication.

The specific operation of organisations as social systems takes the form of decisions. Therefore, organisations can be described as 'autopoietic systems on the operational basis of the communication of decisions' (Luhmann 1997:2013, p. 143). Decisions are also made outside of organisations, as individuals can always decide or they can behave in a way that can be observed as decision. However, only organisations can produce and concentrate a great number of decisions so that each decision presupposes the previous ones and invites further decisions, thus reproducing a continuous demand for decisions. Decisions are attributed to members

of the organisation, who are made responsible for their choices (e.g. teachers and principals). These choices are considered arbitrary acts of decision makers; therefore, they can and should be attributed to them. In fact, the idea of arbitrariness hides uncertainty, as it is impossible to predict how decision-makers will decide, and what option they will choose. Expectations and predictions directly influence the choices of decision-makers. Therefore, the network of observations developing in each organisation is indeterminate and unpredictable. Organisations are decision-making systems generating indeterminacy and uncertainty about future decision-making. Therefore, school organisation cannot limit the self-generated structural indeterminacy of the education system (see Sect. 4.2).

Organisations include and articulate three forms of decision premises or structures, i.e. personnel, ways of communication and decision-making programmes. Personnel is a structure as persons who fulfil the organisational roles (e.g. teachers) can or cannot meet the expectations related to these roles, i.e. they can interpret them in either usual or original ways, they can contribute to decision-making in either standard or deviant ways. Members need to be continuously motivated to act, as actions in organisations do not concern their daily life and are therefore highly improbable. Motivational factors, for example money, are needed to make members' actions probable, i.e. expected. Ways of communication distribute different skills, articulating workplaces, offices and other forms of internal differentiation, both horizontally and vertically. They determine who in the organisation should be consulted for certain decisions and what roles are binding for other roles (e.g. teachers are binding for pupils). Thus, hierarchical and technical skills can stand out and be specified relying on and strengthening the quantity and variety of existing roles. Programmes concern both the purposes and objectives that are pursued through decisions, and the conditions that trigger decisions, e.g. rules, instructions, procedures, routines. All organisations include both programmes of purposes, which are oriented to future decisions, and conditional programmes, which are based on past decisions. Some organisations (e.g. enterprises) give priority to programming purposes; others (e.g., bureaucracies and public administrations) give priority to conditional programmes.

Most organisations depend on functional systems, although not all of them adopt the perspective of these systems (e.g. voluntary associations). Opportunities of generating organisations are different both between and within different functional systems (e.g., schools and universities); they make it possible to differentiate persons based on their roles, although giving access to all of them. This does not mean that organisations can coincide with functional systems, as these systems cannot be completely organised, nor can organisations represent functional systems. In the case of organisations in the education system, this means that education takes also place outside of schools and universities, and therefore the education system cannot be transformed in a unique, all-encompassing organisation.

For a long time theories of organisation elaborated models only for public administrations and enterprises, which were considered typical expressions of decisional rationality as individual rationality in decision-making. These models proved to be of little use for analysing educational organisations, as they operate

through interactions that cannot be evaluated in terms of individual rationality. In the second half of the twentieth century, theories of organisation abandoned both the central concept of rationality and the belief in the hierarchical order of organisations. According to Luhmann, research on educational organisations can take advantage of this theoretical breakthrough, as neither individuals nor classroom interactions are 'trivial machines' (see Sect. 4.6). The structure of educational organisations is not based on hierarchies, but on the loose coupling between its various components, i.e. roles of principals, teachers and pupils, educational materials, basic values, and so on. This implies that a reliable control of the balance between costs and benefits is impossible. This is not a problem for the education system, which on the one hand requires long-term processes, on the other hand is based on a type of interaction that reduces what would be possible at the organisational level. In the education system, interactions are organised in terms of hours of teaching and classrooms, which cannot be controlled by the organisation (Luhmann 1976, p. 44).

One consequence of this situation is that educational organisations cannot legitimise themselves through their 'products'. Schools and universities educate persons and deliver certificates without affordable social feedback on the degree of success of these products. Therefore, no information can be used for rationalising educational organisations, and it is impossible to know if organisational costs make sense in relation to educational products. It is simply assumed that educational products are necessary for individuals and society.

It is clear that organisations are required to implement education. The education system needs to be organised as it takes place only in interactions, a rare case in modern society (another one is medicine). Luhmann, however, points out that the social conditions which allow education cannot be limited to organisations. Schools and universities (at least in Europe) have been differentiated on national level as state institutions, and today they still seem to be formal emanations of the public administration, like the army or prisons. It is therefore difficult to recognise the functional autonomy of the education system at this organisational level. On the one hand, the legal responsibility of those who work in schools and universities must be formalised in order to limit teachers' behaviours and to stimulate teachers and pedagogists to transform these limitations in freedom. On the other hand, this is not sufficient to explain how a 'factorisation', a mathematical term used by Luhmann to mean 'specification', of the intention to educate can be introduced so that everyone can understand what is possible and what is not possible in the system. The solution of this problem is based on the professionalization of teachers.

2. Professionalization of teachers also started in the eighteenth century through important reforms, which initially did not concern organisational aspects. Teachers began working full-time, and control of teaching activities was provided by peers, i.e. by colleagues. Teachers' autonomy was guaranteed through professional practice, so that teachers could accumulate experience. Teachers were offered good reputation and decent salaries, so that the profession became

attractive to good-quality candidates. Teachers started to be trained as teachers. Today, all these features of professionalization are consolidated.

Among the peculiarities of professions, there is a separation between person and role, which applies to both the professionals and the 'clients'. The professional activity presupposes that the person of the client can be changed (by teachers, doctors and priests), but only as far as the aspects involved in the profession are concerned. In addition, the role played by the person requires that any other role is overshadowed, including personal characteristics that do not fit in the professional specification (personal problems, sexual preference, etc.). This demarcation is one of the most sophisticated needs of professional work and therefore requires a socialisation to the practice that no administrative directive can offer. Professional work, therefore, involves selective personal involvement and engagement.

The teacher profession shows how important the person is, perhaps even more than the teaching methodology. In particular, it is interesting to observe the relations between the profession of teacher and the pedagogical intention of teaching. The pedagogical aspects are important with very young pupils, but they lose relevance in teaching subjects in higher-grade schools. There is no need to study pedagogy to teach, for example, mathematics or history in high schools. Moreover, while a physician does not want to transmit his knowledge to the patients to train them as doctors, teachers do want to transmit their knowledge to their pupils. On the other hand, from a professional point of view teachers do not want to convey their pedagogical knowledge. In higher schools, and even more in universities, therefore, the professional component is reduced to skills that are made relevant in practice. Teachers find security in knowledge about subjects and skills, rather than in pedagogical aspects: thus, in the school hierarchy, the professional component decreases from top to bottom. Finally, the profession of teacher implies hiding all doubts in the classroom, knowing the subject very well, and teaching it in the best possible way. The profession, therefore, also includes lack of sincerity and spontaneity, a competence which is not easily acquired.

Chapter 6
Self-descriptions in the Education System

6.1 Self-description and Reflection

The education system, like any other subsystem of the functionally differentiated society, includes its own semantics (Sect. 3.4.6), i.e. the communicative production of ideas, ideals, values, images of itself as distinct from its environment, concepts and theories that reflect on the specificity of education. According to Luhmann, pedagogy is the theory of education, more precisely the theory of reflection of the education system, i.e. the theory whereby the system observes and describes itself. Each subsystem of the functionally differentiated society develops theories of reflection: there are theories of knowledge in the science system, theology in the religion system, theories of law, theories of economy, theories of aesthetic in the system of art, and so on. This chapter analyses how the subsystems of the functionally differentiated society develop and construct this kind of theories, in particular the ways in which the education system develops and constructs pedagogical theories.

It is preliminarily important to highlight the distinction between operation and observation, which was introduced in Sect. 3.3.4. This distinction is perhaps one of the most abstract contributions in Luhmann's theory, and radicalises and connects different scientific developments, in particular the concept of autopoiesis, as proposed by Maturana in biology, and the concept of observation, as proposed by Von Foerster in cybernetics and Spencer Brown in logic. As explained in Sect. 3.3.1, at the operational level, social systems produce and reproduce themselves though communication. At this level, the content of communication is not relevant: a lecture in the classroom reproduces communication like a football game, a religious service or a debate in Parliament. However, when we consider *what* is communicated, we look at communication as an operation of observation. In this case, communication is considered insofar as it states something producing information, which may be attributed to someone's utterance. In short, each communication reproduces the social system on the one hand, and produces contents to which the social system can refer on the other.

C. Baraldi and G. Corsi, *Niklas Luhmann*, SpringerBriefs on Key Thinkers in Education, DOI 10.1007/978-3-319-49975-8_6

As we have seen in Sect. 3.4.6, Luhmann defines contents of communication as semantics. Semantics condenses meaning, confirms it, remembers or forgets it (Luhmann 1997:2012, Sect. 3.13). When dissemination media, such as writing and printing, were differentiated in society, semantics started to evolve in a relatively autonomous way from societal structures. Against this background, it is necessary to distinguish between *systemic structures* (the form of differentiation of society or the structures of its subsystems) and *semantic structures*, which produce distinctions, and therefore knowledge, including anything that can be used in communication. Communication observes, i.e. constructs, reality through these distinctions.

The reality constructed in a social system includes the system itself, as the system can observe itself and produce a corresponding semantics. Social systems observe themselves through communication: every communication, by referring to the previous ones, can refer to either information, thus continuing the talk about what was talked about, or utterance, e.g. by questioning motives, intentions, and interests. The determination of who has produced the utterance, what has been uttered, why it has been uttered and when it has been uttered, enables the autopoiesis of communication to continue. This implies that social systems, and in particular society, depend on continuous self-observation. In the classroom, for example, the teacher continuously focuses on specific topics or thematises the ways in which the pupils behave, and the pupils can talk about the teacher's attitudes, preferences and intentions. At this interactional level, however, self-observation can only be a topic of discussion in the classroom. Social systems can build much more complex and articulated self-observations, which are condensed in texts, which are *self-descriptions* of the social system within the social system (see Sect. 3.4.6). Self-descriptions coordinate specific self-observations and can be recognised and reused for different purposes. Self-descriptions stabilise a semantics that allows the social system to refer to itself in different conditions.

Self-descriptions lead to the reflection (see Sect. 3.4.6) of the social system upon itself when semantics is produced to indicate the unity of the system. This indication allows the social system to distinguish itself from its environment, and therefore also from other social systems. Reflection has the function to build the identity of the system; it is a selective self-indication marking the difference of the system from its environment. Identity is not a 'copy' of reality, but is rather a form of re-entry of the difference between system and environment into the system. Identity is a self-description that leads the social system to reflect on what possibilities are excluded from the form of identity itself. Therefore, reflection does not anchor the social system to some reality; rather it stimulates structural change and creates uncertainty in the social system (Luhmann 1990b, pp. 483, 537).

When its identity is problematized in the social system, reflection takes the form of reflection theory through an internal search for, and comparison of, different solutions to the problem of identity (Sect. 3.4.6). Reflection theories require sophisticated and selective methodological and conceptual criteria. They provide articulated descriptions of the structural and operational features of social systems. In the case of the education system, reflection theories provide articulated descriptions of the function of education, of educational organisations (schools and universities), of classroom interaction and of the history of the education system.

Reflection theories tend to describe themselves as *sciences*, as they are used to search for functional equivalents (see Sect. 3.1) concerning the solution of problems of identity. They describe themselves as educational or pedagogical sciences, especially in the German tradition, economic sciences, political sciences, legal sciences, and so on. According to Luhmann, however, this is an abuse of the term 'science', which is employed to legitimise reflection theories and to build trust in their capacity to loose and recombine (*Auflöse- und Rekombinationsvermögen*) conceptual semantics. Only the reflection theories of the science system are 'scientific' in a strict sense. In particular, according to Luhmann, pedagogical theories seek support in their ability to compare different educational traditions or structures, including moral and humanistic values, rather than in the descriptive power of scientific concepts. For this reason, pedagogical theories are more uncertain and unstable than scientific ones (Luhmann and Schorr 1979a:2000, Sect. 4.4).

Reflection theories are important for the self-organisation of subsystems in the functionally differentiated society. In particular, they reflect on the diversity of operational plans in these systems. The difference between the operational plans of the various subsystems leads to a differentiation of reflection theories. For example, economic theories reflect on the multiplicity of transactions, theories of law reflect on the diversity of judgments in court, and pedagogical theories reflect on the diversity of classroom interactions (Luhmann 2002, p. 202). The systematic reference to these operational plans determines important limitations for the conceptual elaboration of reflection theories, but it also lets these theories free to choose the forms of their conceptual constructions.

Reflection theories are not provided for direct use in practical contexts. The scientific style of formulations leads these theories to take a distance from the practices in social systems, although they are produced within these systems. It is beyond any doubt that theories of law concern decisions in courts, economic theories concern transaction conditions, and pedagogical theories concern the practical conditions of educational communication in the classroom. However, these reflection theories are not provided to be used in courts, transactions or classrooms, as this practical use would create strong constraints for them, preventing their abstraction and generalisation, therefore also preventing the construction of identity of the overall system within the system.

6.2 Pedagogy as a Reflection Theory of the Education System

As we have seen, pedagogy is the reflection theory of the education system, describing purposes and institutions of this system. Pedagogy is engaged not only in defining education as a subsystem of the functionally differentiated society, but also in criticising it, posing problems and looking for different and equivalent solutions of the problem of identity of education. In this sense, pedagogy aims to be 'scientific' and establishes specific needs of conceptual coherence, although not

necessarily in scientifically acceptable way. According to Luhmann, pedagogy is an academic discipline, rather than a science (Luhmann and Schorr 1979a:2000, Chap. 4).

Pedagogy began to take shape as a theory of education when it took control of the learning process, depriving the family of this authority and reflecting on the conditions under which pupils can be better educated in the absence of family ties. In the eighteenth century education was still anchored to humanism (Sect. 4.1), but with the introduction of educational interaction (*erziehender Unterricht*) and the concept of pupil, the education system started to determine its autonomy (Luhmann 1997:2013, pp. 237–238). The object of education changed, as the pupil was no longer defined as an adult under development, therefore imperfect, but as an observer with her/his own world, acting and reacting to her/his own internal dynamics. This allowed the development of a pedagogical ideal that on the one hand considered the whole humanity as perfectible and on the other promoted adult education. In contemporary pedagogy, this has shifted the focus from the education of pupils to the life course (Sect. 4.8).

Three main issues led to the development of pedagogy over the past centuries (Luhmann and Schorr 1979a:2000, Introduction): (1) the *autonomy* of the education system, which requires reflection on its differentiation as a subsystem of the functionally differentiated society; (2) the control over the effects of education which requires a specific *technology* and its application in educational practices; (3) the social consequences of education, which raise the issue of educational responsibility for the process of *social selection* (see also Sect. 5.4).

6.3 Reflecting on the Autonomy of the Education System

Reflection on the autonomy of education requires the semantic construction of 'formulas' that symbolise the unity of the education system, thus allowing the construction of its identity (Luhmann and Schorr 1979a/2000, Sect. 1.4). Symbolising the unity of a social system means that this system must be able to indicate, in a unified way, not only what it is, but also what it might be. In other words, a social system must reflect on the contingency of its structures.

An important observation in the functionally differentiated society is that everything could be different from what it is. However, this observation does not guarantee any operational connection, leading instead to indeterminacy. Semantic formulas allow the expression of contingency in a way that can be used at the operational level, leading to both imagine other possibilities and provide plausible determinations. Luhmann calls these formulas *contingency formulas*. On the one hand, contingency formulas are ideal and not specified formulas; on the other hand, they are sufficiently structured to allow specification (Luhmann and Schorr 1979a, Sect. 1.6). Contingency formulas allow the system to deal with the need of contingency, both formulating the unity of its internal distinctions and raising the question of which other distinctions would be possible.

This is a paradoxical formulation (concerning both what exists and what would be otherwise possible) forcing the system to reflection (Luhmann and Schorr 1979a:2000, Sect. 4.2).

Contingency formulas are produced in all the subsystems of the functionally differentiated society. The contingency formula in the economy system is *scarcity*, which leads to reflecting on the function of this system and raises the question of how needs satisfaction can be postponed. Political theories have originally considered the common good as a social aim, but with the development of the welfare state and its problems, the contingency formula of *legitimacy* has become more relevant, representing political preferences. In the law system, the contingency formula is *justice*, and this system systematically looks for decisional criteria that are compatible with it. The scientific contingency formula states that possibilities *must be contained* to allow the production of scientific truth/falsity, for example through the criterion of falsifiability. In all these cases, contingency is limited, but without precise indications on how the social systems should operate and on what kind of structures they should develop.

The education system has developed a sequence of contingency formulas in its history. In the eighteenth century, pedagogical theories elaborated the *ideal* of 'human perfection', distinguishing between perfection (*Vollkommenheit*) of the human being, as harmonious formation, usability (*Brauchbarkeit*) of the results of education, and happiness (*Glückseligkeit*) of human beings. In this way, the education system articulated its function in society (perfection), its performance for the other societal subsystems (usability), and its own reflection (happiness).

The idea of *perfection* in particular is very old and became relevant for education when pedagogy reflected on the way in which the (potentially perfect) human being can be brought to its natural completeness through nature, i.e. the way in which nature can be used against nature. According to philanthropic thought, education should develop all human provisions until the ideal state of happiness is reached. The purpose of education is not reaching truth, but happiness, and education is necessary because human beings are inherently selfish and must therefore be guided. This idea raised for the first time the problem of educational tools, i.e. of educational technologies. The idea of perfection refers to religion and morality, following the belief that, without religion, society cannot be improved. Perfection can therefore be specified in educational programmes only based on religion. In the second half of the eighteenth century, however, perfection was redefined as perfectibility, paving the way for different interpretations of the idea (now simply an ideal) of perfection.

In this period, family education was still important in pedagogical theories; it was based on moral and social criteria (e.g. gallantry, pedantry). It was only when classroom education became central that family education had to be redefined based on its relationship with school. However, most children of the upper class were still educated at home, and school was seen as a more constrictive institution. In the last decades of the eighteenth century, however, pedagogy stopped considering family and school as competitors and started seeing them as different phases of the educational process.

Luhmann and Schorr (1979a/2000) point out that, at this stage of differentiation, the education system did not conflict with religion and family, which were considered at the origin of the educational process. The change in reflection depended on economy. The industrial revolution began without posing the problem of training the workforce, despite placing demands on education. However, the pressure of economy caused for the first time a contrast between the function and the performance of education. On the one hand, there was still a tendency to reach human perfection; on the other, it became necessary to take into account the needs of the 'division of labour' and of the rising organised industrial economy. Work became the normal business of everyone, but it was hard to think of it as a form of perfection. Organised work required rationality, standardisation and new skills. Pedagogy had to adapt to these changes, for example setting up industrial schools where teaching and production could take place together. The economy developed rapidly and the tension between the ideal of perfection and the practical usability of education became very strong.

New important questions arose in pedagogy. How can be perfection consistent with utility, and how can both be consistent with the happiness of human beings? How is it possible to reconcile human beings and citizens? The first suggested solutions, for example through a sequence (first perfection, then utility) or a selection (upper class has more chances to reach perfection), worked for a short time. The incompatibility between the function of education (perfection) and its performance (usability) forced pedagogy to change the contingency formula.

The new formula came from Germany: *Bildung*. This term is difficult to translate into other languages while respecting the pedagogical meaning that it had in the second half of the eighteenth century, i.e. education and formation, as well as self-formation. Luhmann and Schorr (1979a/2000, Sect. 1.11) argue that the change started thanks to the organisational potential of the state, which implemented the differentiation of schools and universities and the employment of academic staff to administer them. The pedagogical semantics, however, continued to refer to the human being and to education as fulfilment of the inner form of individuals, in short to the ideal of perfection. What was relatively new was the belief that pupils should actively take part in the educational process, thus contributing to *Bildung*.

A major change came from Kantian philosophy, which overturned the traditional foundations of education, proposing that it is not education that grounds morality, but morality that grounds education. The aspects that were important in the old conception, i.e. personal interests, pleasant sensations and even the ideal of happiness, as well as confidence in the possibility of building educational technologies that could be tested and verified, were first questioned and then abandoned. Wilhelm von Humboldt contributed to this development, becoming famous in the German-speaking area, and very influential in the European debate. His contribution to education was based on two basic points. First, the ambition to build a *science-based education* by unifying different disciplines (the idea of a Humboldt-University, which is still considered the modern foundation of university); thus, education can no longer rely on scientific criteria to prefer some disciplines with

respect to others, but it must rather develop the idea of a unifying science. Second, the idea of the *subject as a self-formed individual*. According to this perspective, human beings were born as individuals and can be educated only as persons (Sect. 4.4), and no longer based on natural factors. The theory of *Bildung* arose from the combination of these two basic points as a 'harmonious' relationship between subject and science. The subject is formed and developed through knowledge and with reference to universality; the world is open for humankind, and science enables humankind to refer to the world. The individual is idealised and education loses its role of building human beings starting from their natural dispositions. Subject and education are the two sides of a circular relationship, where individuals 'form' themselves through education that 'forms' them as individuals.

The pedagogical problem is thus reformulated, reflecting on how it is possible to teach people to be individuals and to aim to universality, i.e. how it is possible to reconcile education constraints and individual freedom. The problem was formulated by rethinking the relationship between function and performance, i.e. by rethinking the question of the utility of education, rather than by reflecting on the function of education. The point was that utility cannot be opposed to *Bildung*; how individuals realise their relationships with the world is an individual business, and through *Bildung* each individual learns how to manage this relationship in an infinite variety of ways, as individuality is infinite.

The turning point that connected pedagogy to the philosophical production of the time was the detachment of education from the family. The new pedagogy needed to explain why fathers were no longer in charge of education, which was now performed in schools through educational interactions. While for fathers education was a 'quasi natural' occupation, in schools it had to be built through teaching, competence and scientific truth. The connection with the 'political-economic' ideas of the nineteenth century is clear: schools are more suitable for education because they can break the bond with the family, in the same way as alienation can guarantee the realisation of workers' self-consciousness. Pupils can understand themselves only at a cognitive level, therefore only through school education, i.e. through *Bildung*. University became the place where 'real' education takes place, because here the objective world 'resists' to scientific research, and this motivates learning. Clearly, only science was able to satisfy the needs of education, in particular didactical needs. Scientific knowledge could guarantee the ability of pedagogy to realise *Bildung*, and thus the independence of subjects, regardless of the social contexts in which individuals could try to fulfil themselves.

In this way, at both the organisational and the semantic level, and under the guidance of pedagogy, the education system differentiated itself as a subsystem of society. The individual could be considered only through *Bildung*, despite the fact that in the late nineteenth century other theories of individuality emerged, relying on different factors, for example the division of labour. Nevertheless, the contingency formula of *Bildung* began to show its limits; being centred on the individual, the education system could not reflect on itself within itself as a subsystem of society. This was clarified by the difficulty in conceiving educational performances. The idea that the individual is the centre of every educational process

excluded the possibility of distinguishing education from teaching. Nor was it possible to ground education on the idea of emancipation of the subject, as this idea only leads to a critique of society without clarifying how the infinite horizons of the world and the subject can be defined and specified. The ideal of *Bildung* became synonymous with education, even in the school organisation, and thus it became impossible to determine it. How can the education system orient itself to universality and at the same time specify itself in all the educational forms that include the whole population?

Luhmann and Schorr (1979a/2000, Sect. 1.12) argue that pedagogy has abandoned the universalism of the subject who faces the world, orienting itself to the learning process as such. Thus, the self-reference of the learning process has become relevant: the *learning ability*, i.e. learning to learn, is the new contingency formula. The idea is not new, as it can be found in Humboldt, who however confined it to the university, where the individual was supposed to be sufficiently autonomous. The real novelty lies in the connection between learning ability and school, thus concerning the whole education.

Learning does not mean acquiring knowledge or skills, but taking advantage from what has been learned to continue learning. Learning is a *future-oriented* concept, as it means continuous reworking of the learned patterns in situations that cannot be predicted and are therefore always new. Learning is not a modern virtue, rather it is a special ability that can be applied in any occasion and, therefore, should be always available. Thus, learning indicates the willingness to adapt, i.e. cognitive expectations rather normative expectations (see Sect. 3.3.2). In the education system, *reflexivity* of internal processes replaces founding principles and, although anything may be different, limitations can only be derived from these processes, therefore they can only be found inside the system.[1]

In the temporal dimension, learning ability creates the future in each present, i.e. in each moment in which what has been learned is recombined in a given situation. This involves the need to select the teaching subjects not based on the knowledge that has to be learned, but on the process of learning to learn, which requires specific curricula and educational technologies. From the point of view of the function of education, topics are interesting if they favour *adaptation*. From the point of view of the educational performance, adaptation should be *contextual*. The relationship between function and performance is thus rebalanced.

Learning ability is a contingency formula, not a target to be reached. It limits what it is possible. However, limitations cannot come from learning ability itself, because learning ability has no limits in itself; in principle, it is always possible

[1]Luhmann and Schorr underline that this kind of development is not limited to education, but can be found in all the subsystems of the functionally differentiated society. Modern science is no longer based on the relationship between concept and matter, but rather on theories of knowledge, i.e. on reflexive processes (theorising theories). In the economy system, the natural scarcity of goods is replaced by the artificial scarcity of money, which can give meaning to transactions. The law system produces constitution, rather than external natural principles, as the only criteria for creating and changing laws.

to learn more and better. Through this contingency formula, the education system becomes more and more autonomous from other subsystems, including science, which provides most of the knowledge that is taught. The reference to economy continues to be important, e.g. through vocational training, but this does not imply that education becomes dependent on economy. School and university education do not guarantee a smooth transition to work. On the contrary, the higher the education is, the more difficult it is to apply the learned abilities in the workplace. The reference to the 'professional practicality' of education underestimates this problem, which depends on the autonomy of the education system. The discrepancy between the knowledge that is learned in schools and universities and the knowledge required to work is likely to cause problems and 'reality shocks'. Problems however can only be addressed through learning ability, which is limited by this discrepancy.

To sum up, the contingency formulas symbolising the pedagogical reflection primarily allow reflection on the autonomy of the education system. Through learning ability, organisational developments, reference to work and to the adaptability of what has been learned, the education system reflects on its differentiation within society and becomes autonomous at the level of educational 'practices'.

6.4 Reflecting on Time: The Educational Technology

Another problem that arises in the pedagogical reflection is related to the temporal dimension, in particular to the creation and control of the effects of teaching. The pedagogical concept dealing with this problem is that of *educational technology*.

The problem stems from the fact that teaching must take place in a sequence and this is possible only if one can expect that it will lead to the desired effects, and that errors will be easily identified (Luhmann and Schorr 1979a:2000, Sect. 1.1, 1982: p. 14ff.). In the nineteenth century, educational technology was conceived by combining (more or less linearly) causality, rationality (according to the means-ends scheme) and sociality (involving the pupils' subjectivity). The overall picture seemed plausible, but problems arose due to the uncertainty caused by the relationship between different possible causes and the learning process. This uncertainty had to be reduced, in order to make decisions on the teaching practices. Education oriented itself to the output, i.e. to the results that can be observed in the pupils, but it also asked how causes could be identified taking into account the complexity of the classroom and what happens in the classroom every day.

Moving from the concept of *Bildung*, pedagogy was based on the Kantian scheme that distinguishes between *causality* at the empirical level and *freedom* at the transcendental level. This led to a paradoxical combination of causality and freedom. Even today 'educating to freedom' is considered an important pedagogical symbolic formula. The idea started from the observation of the possibility to influence the subject's self-reference, which led to reflect on the conditions of education. The problem, however, was formulated in too general a way and the solutions relied

on the superiority (including the technical superiority) of morality, thus entailing that education is based on morality and not vice versa. The problem was the subject's self-reference: if 'method' must realise the general in the particular, and technology must choose the means that adjust to this objective, the education process can work only under a specific condition, i.e. pupils' *participation and involvement*. If pupils are free, the question is how they can be educated and how one can ensure that they will behave correctly. Pedagogy reflects on this problem as a *technological deficit*, therefore looking for the support of morality on the one hand and science on the other, but without solving the problem. Hence, pedagogy has the task of understanding and determining what happens when school classes follow their own dynamics becoming unpredictable (Luhmann and Schorr 1979a:2000, Sect. 2.6). At the end of the nineteenth century the conclusion about the problem of time and of the relationship between causes and effects, was that it is not possible to know if the past can give instructions to the present and if present decisions can be adjusted to the (unknown) future. Pupils' past and future were no longer understood in a relation between cause (past) and effect (future). Past and future were understood as the two sides of the pupil's individuality. The pupil's present became the point of tension between these two temporal horizons, turning into an object of criticism and controversies that needed change and therefore reform.

This development made the traditional ideas of nature and humanism, as well as any anthropological or moral foundation, useless. The education system became autonomous and differentiated, but it could not yet accept the idea of technology, which was deemed to undermine the humanity of human beings. Mass education has not solved the problem of technology, but it has bypassed it. School organisation has unified the differentiated aspects of the educational process, so that the work of the teacher is ensured by differentiating its problems. The technological deficit is thus divided into pedagogical and organisational problems, i.e. in theoretical and practical problems. General pedagogy is concerned with methods and purposes of education, while applied pedagogy deals with specific means of training to educational practices. In this way, the technological deficit is almost hidden in pedagogical theories. Education and teaching can be distinguished and teaching has the function to generate situations that can be evaluated by pedagogy, either providing or not providing solutions for teaching problems. Communication can be oriented to purpose programmes (oriented to future decisions) at the teaching level, and to conditional programs (based on the past) at the educational level.

Luhmann points out that technology (and causality) are *always selections* that can be attributed to some observer. For each cause, there are countless effects, and for each effect, there are countless causes. Each observer must select the specific connection between cause and effect, and it is here that problems arise. How important is the physical space where teaching takes place? Is the teacher decisive for learning? What is better: chalk and blackboard or multimedia whiteboards? How many pupils is it better to have in a class to ensure adequate teaching and learning? Is it better to rely on 'apodictic' teaching programmes (i.e., if it works it works, if not then not) or on conditional programs (if it works there are certain consequences, if not there are others)? Does it make sense to leave space for improvisation, thus creating occasions and trying to seize them? This kind of

problems has been posed for a long time, and pedagogy has always been looking for, and producing, educational technologies.

However, the conditions that produce uncertainty in classroom communication cannot be eliminated. This uncertainty depends on *double contingency* (see Sects. 3.10 and 4.10): in the classroom the relationship between the pupils and the teacher creates uncertainty, and both the pupils and the teacher are aware of this. This condition does not rule out either causality or technology, as education is not limited to its immediate effects in the classroom. Pedagogy aims to achieve long-term purposes with few decisions at the organisational level. However, a discrepancy is generated between the pedagogical ambition to intervene on the presuppositions of individual behaviour and the possibility of providing school organisation, which can only ensure decision-making, verifying whether what should be taught is really taught and learned. Pedagogical reflection is guided by the quality of knowledge, in particular 'scientific' knowledge, while school organisation must take into account the 'micro-politics' and the exercise of power at the administrative level.

The result is that teachers cannot know whether they are acting properly or adequately, since mistakes or deviations can be attributed to either pedagogical ideals or organisational decisions, or even to their own behaviours. In this complex situation, teachers can only deceive themselves: they must act 'akratically' (Luhmann 1987b, p. 64, with reference to Oksenberg Rorty 1980), i.e. they act intentionally but the description of their actions prevents the achievement of their intentions. The meaning that they give to their actions is too generalised; therefore, it loses any contact with the concrete conditions that make their actions possible. The meaning of actions is reaffirmed, although it cannot be realised. The reason for this inability must remain latent; otherwise, communication will be blocked.

6.5 Reflecting on Social Responsibility

The issue of the relationship between social selection and the specific selection medium of the education system has been already discussed in Chap. 5. Luhmann argues that the education system produces internal differences based on the secondary code better/worse, thus exerting an influence on other social systems in society. This statement is consistent with the statistics monitoring how the privileges of the upper social 'class' condition educational success. Families having more money to spend can afford better training courses for their children and maybe even access to the best universities. Pupils growing up in privileged cultural environments can 'inherit' distinctive attitudes and habits. Families of professionals can guarantee their children jobs in already established organisations. Despite all these considerations, it is exclusively the educational system that can apply the selection code and is fully responsible for it.

The difficulties of pedagogy in reflecting on this problem can be seen not only in the pedagogical discussion on the 'social' aspects of selection, but also in the lack of attribution of inequalities to the education system. On the one hand, inequalities are attributed to societal differences; on the other, they are attributed

to individual differences between pupils. 'Talent' and 'commitment' are the key words that indicate the most important forms of attribution. These forms of attribution can be used in educational practices, but they raise a number of questions requiring very difficult answers. What are the causes of a difference of talent between pupils? Are they biological, psychological, or social causes? Is this difference a problem of character or family socialisation? How is it possible to distinguish between talent and commitment? In particular, talent and commitment are two different forms of attribution, i.e. talent, which does not depend on pupils' decisions, is attributed to external factors, while commitment, which depends on pupils' will, is attributed to internal factors. This does not mean that talent and commitment are mere inventions of teachers or 'experts', but it means that observers do not agree on them, attributing their meaning differently and noting different causes. In short, it is a dilemma with no solution.

Pedagogy discusses this issue by resorting to all sorts of external consultation. However, this is not enough, as an internal reaction is also needed, and in the education system, this results in questioning the educational structures and trying to change them.

6.6 Reforming Education

In the education system, there is great hope to solve internal problems by reforming schools and universities. It seems that education aims to educate itself, always claiming the best for itself. Quality (or in American English, excellence) and equality are the permanent objectives of education reforms. The systematic waves of reform, together with the goals that the education system aims to achieve, lead to some sociological considerations.

First, the two objectives of reform, i.e. quality and equality, are *incompatible* (Luhmann and Schorr 1988), as it is not possible to create quality without distinguishing between those who are better and those who are worse, i.e. without discriminating someone. Equality does not allow distinguishing different performances or abilities; therefore, should it be achieved, it would block any assessment of quality. It is impossible to educate all pupils in the best possible way, because, if everyone is 'better', it will be impossible to understand what 'better' means. Therefore, equality and quality cannot be pursued simultaneously, although the idea of equality can be mitigated and reduced to that of 'equality of opportunities', which leaves to 'commitment' and 'talent' the possibility to make a difference in terms of quality (see Sect. 6.3.2). Even in this case, however, it would not be possible to guarantee or prove that the produced inequalities are not due to social differences, such as class, habits (Bourdieu 1979:1984), or family origins.

The idea of quality (or excellence) hides a paradox that pedagogy rarely observes and deals with: 'quality' is not a symbolic unity, but it is a *difference*, as education cannot have the best unless it also creates the worst. Education cannot

have one side of the distinction without the other. Since selection is a code (see Sect. 5.3), a performance can be indicated as better only if it is possible to indicate another one as worse. This means that the education system always produces both sides (better and worse) and that the distinction itself is produced by the system. Reforms apply this code to the education system itself; they suggest that a better future for this system can be achieved through reforms, but this suggestion requires the awareness that the present is worse than *that* future. If we observe the education system, and not simply some specific educational organisations, we can see that better and worse are always simultaneous, i.e. education is always better and worse at the same time. This paradox is usually concealed by formulating the distinction in the dimension of time, so that today is worse than tomorrow, and tomorrow will be better than today thanks to a given reform. A well-known case is the wave of reforms of the sixties, which involved all educational institutions in the 'Western world', as it was called at that time. The triggering factor was the launch of the Sputnik by the Russians in 1957, which caused such a stir in public opinion that some pedagogists talked of 'educational catastrophe'. The socialist countries seemed far ahead of the 'free world' in terms of technological advancement, and this was attributed to the poor quality of the education system in the US. This observation led to all sorts of initiatives to improve education, in the United States as well as in Western Europe, with an emphasis and wealth of means and resources that was never reached again in the following decades.

Another sociological consideration of considerable importance concerns the object of reforms. Pedagogy talks of reform only when it plans important changes, aiming to improve society by improving education. This ambition legitimises the denomination of change as 'reform', rather than adaptation or variation of some specific factor. The question that thus arises, however, is *what* can be made an object of reform?

Luhmann proposes to distinguish three different types of system (Sect. 3.4.1): (1) society as an encompassing social system that includes all communication; (2) organisations, like schools and universities, based on membership; (3) interactions, like classroom interactions, based on the mutual perception of participants. Against this background, the question is which of the three types of system can be reformed? This question can be answered only if we identify the systems to which decisions can be applied. This limitation excludes society as an object of reform; society certainly changes continuously, both at the operational level, through each communication, and at the structural level, processing experiences through the distinction between fulfilment and disappointment of expectations; however, it is not possible to decide about these changes. As Luhmann states, quoting Fuchs (1992), society is 'unreachable'. In their turn, interactions can certainly be planned to some extent. However, the changes introduced in and through interactions become relevant only if they can go beyond the boundaries of the single interaction, and can thus be generalised at different levels, for example at the organisational level. In fact, reforms can take into account only organisational variables (Corsi 1994). Reforms concern the premises of decisions in organisations, i.e. personnel, communication ways and decision programming. Social structures can be intentionally

changed only at this level. In the case of the education system, therefore, reforms can only concern schools and universities, in particular their decision-making structures.

Reforms may concern firstly personnel, e.g. the criteria of selection of teachers, their training, their salary, their number, which determines the size of the educational establishment. Secondly, reforms may concern communication ways, e.g. teachers' administrative and educational competencies and responsibilities, in the classroom as well as in the school organisation. Finally, reforms may concern decision-making programmes, e.g. the objectives that have to be achieved in terms of curricula and syllabi, the forms of assessment and the criteria of access to and exit from schools and universities. These are the types of variables available for reform, which cannot concern the whole society or the education as a societal subsystem. Against this background, the values and desires of reformers cannot be turned into decisions; it is impossible to decide to either improve the pupils' performances or make the pupils equal or better.

These are not the only limitations of reforms. Another problem, which is common to all the subsystems of the functionally differentiated society, is that reforms are not linear processes, for example linear sequences of planning, implementation and evaluation. Here we can see the circularity that is typical of all communication processes; as soon as the intention of reform becomes visible, the situation becomes *unpredictable*. People take sides, change their preferences, fear possible developments, oscillating between old and new ideas. Consequently, decisions are delayed and/or adapted to the context, which gradually takes different forms. The realisation of a reform requires strategies taking into account these changes. For this reason, a function of reforms could be making visible *differences of interest* that would otherwise be only latent and only left to discussions and tensions in organisational interactions (meetings, administrative bodies, etc.). The advantage of reforms is that the system produces controversial, if not contradictory, self-descriptions, which makes it possible to create resistance of the system against itself. This is an advantage because in this way the system gets a more realistic representation of reality, opening up several possible scenarios and thus increasing the decision-making potential.

Conversely, reforms have *not* the function to achieve the objectives that they propose. This can be seen in the fact that reforms envisage a specific future by forgetting the past, in particular forgetting the reforms that have already been tried. Quoting Nils Brunsson (Brunsson and Olsen 1993), Luhmann uses the term 'forgetfulness': reforms forget that their objectives have been pursued in other past reforms and even forget the reasons of failure of these previous attempts. This is one of the major resources available to reformers: a new platform is proposed, from which the reform can start and thanks to which proposals seem to be formulated for the first time. Again, the expected result of reforms is the production of new possibilities of self-observation, which cannot be obtained without attempting to achieve the reform. Reforms exploit the fact that the past is known, while the future is unpredictable. However, the past is known only to some extent, as only a small part of what happened is remembered, and what is forgotten is unknown.

This forgetfulness allows reformers to present their reforms as new and transform uncertainty about the future in opportunities to determine it. Reforms are thus articulated temporal paradoxes, dealing with the indeterminable as determined; in this way, they also become a past that can be observed. If they are considered in the context of time, reforms do not have the function to achieve the objectives that they propose, but rather to promote the structural dynamics of the system.

Luhmann (2000c, pp. 330–360) proposes to distinguish between reforms as intentional change and reforms as unintentional change, the latter described as 'evolution' in sociology. Although he has not elaborated a theory of the evolution of the education system, he argues that the function of reforms is to keep the dynamics of the system in motion. The changes promoted by the reform very quickly produce forms of uncertainty and lack of transparency, which are not controllable. Often, reforms end up trying to save the situation and reconcile the conflicts. In this way, the system can become sensitive to new or changed societal conditions, such as changes in the labour market, new skills which are required by companies or other organisations, new needs of families or even of pupils as autonomous individuals, changing composition of the population attending schools, and so on. The system can get rid of at least part of the incrustations that are formed in the course of time, experimenting different structures.

Whether reforms will be successful or not cannot be predicted. Evolution does not mean improvement, not even in the sense of better adaptation to changing environmental conditions. It is very likely that, after a reform, some observers will evaluate the system as better than before the reform, while others will probably evaluate it as worse. Overall, as we have seen above, reforms do not affect the autonomy of the education system: in order to give meaning to their actions, teachers neither need to rely on the success or failure of a reform, nor are they forced to draw on the dominant opinions of the pedagogical establishment. Teachers operate in school classrooms, where they implement the system's autonomy, also observing what they do, and can do, better or worse (Luhmann and Schorr 1988, p. 488).

6.7 The Sociological Observation of Education

The sociological observation of pedagogical reforms evokes the problem of the relationship between sociology, understood as a scientific discipline, and reflection theories in other subsystems of society. This relationship is doubly controversial. On the one hand, sociology claims an objectivity that non-scientific theories of other subsystems cannot claim, while knowing that science is 'just science' and cannot replace theories of reflection in other subsystems. On the other hand, the other subsystems ask for autonomy from scientific observation, but at the same time, they know that the problems posed by sociology can be 'irritating' and therefore potentially informative.

Luhmann has clarified that science cannot be considered superior to reflection theories of other subsystems, including pedagogy. Moreover, import and export of theories, concepts or distinctions is excluded, as sociological theories of education are based on conditions that are very distant from the practical needs of teachers. In this sense, sociology cannot give any operational instruction to other subsystems, including education. It merely observes how these subsystems observe, looking for blind spots and conceptual difficulties and assessing their historical and semantic plausibility. For this reason, sociology can at best create communicative difficulties in these systems (i.e. 'irritations').

In particular, it is interesting to understand the difference of perspectives between pedagogy and sociology. Pedagogy distinguishes between education and pedagogical reflection and reflects on this difference as a difference between praxis (education) and theory (pedagogy). For sociology, this difference can refer to the distinction between operation and observation. At the operational level, education exists as communication in schools and universities, above all as communication in the classroom, and only marginally as pedagogical communication. Pedagogy observes this operation of communication by adding its specific distinctions, i.e. by elaborating theories and pedagogical concepts that could hardly be developed in schools. Pedagogy observes the difference between operation and observation not as a difference, but as a unity, conceiving itself as something that should be learned, if necessary through reforms. Sociology, however, observes that this reflection does not operate in a neutral way, as it changes the system and therefore its own assumptions. Pedagogical reflection is a continuously self-falsifying communication.

The relationships between sociology and the theories of reflection of other subsystems are regulated through the differentiation of scientific and academic disciplines, and their contacts are often triggered by either issues that can occasionally affect both sociology and reflection theory or theoretical developments that can lead to seek direct communication. The problem is whether and how the partners of the relationship between sociology and reflection theory can take each other seriously. The problem is not the imposition of one perspective upon the other, but the possibility of comparing different perspectives. A sociological theory re-enters in what it describes, in this case in the self-description of the education system; therefore, a sociological theory may also correct or enrich its idea of pedagogy, in the same way as pedagogy may take into account the contribution of a sociological theory. It is difficult to predict how this relationship can develop, in that it is based more on 'understandable misunderstandings' than on the mutual test of different concepts. Luhmann, together with Schorr, tried to plan this comparison, organising a series of volumes under the subtitle 'Questions to pedagogy' (*Fragen an die Pädagogik*), which involved sociologists and pedagogists. This is a unique case in Luhmann's scientific production. We shall report on the consequences of this attempt in Chap. 7.

The difficulty that sociology meets in being taken seriously by other subsystems is not only due to differences of function, or to the theoretical weakness of sociology itself. Luhmann argues that there is also a die-hard prejudice still

hindering the reception of sociological theoretical research and production. This prejudice is based on the difference between praxis and theory (Luhmann 2000c, pp. 473–474). All theories raise the question of what their applications may be. However, the problem, according to Luhmann, is not how to answer this question, but to ask whether the question is justified. The distinction between theory and praxis was invented in the nineteenth century. In the pre-modern tradition, theory and praxis were distinguished in a different way: theory was distinguished from everyday knowledge; practice was distinguished from poiesis, i.e. from the production of artefacts. Theory and praxis were put in opposition probably as a reaction to the differentiation of the system of science. Modern science monopolises validated 'objective' knowledge, but in society objective knowledge does not have a higher value than the reflection of other subsystems. This may have created the idea that scientific knowledge, in particular social sciences, is only legitimate if it can be applied elsewhere.

Theory is an object of study in itself, but it may also stimulate the question about its effects on the practice of education, law, politics, religion, and so on. The distinction between theory and practice is a theoretical distinction because theory is decisive on both sides. Yet, even if it is decisive on the side of practice, according to Luhmann there is no reason why theory should strive to be understandable for practitioners. Why should theory accept the limitations that would follow from this condition? It is not clear how this could improve the performance that should be expected from a theory. A theory includes its own programme of improvement, and it can only be improved based on the problems that it poses. Adapting theory to practice would only have the effect of lowering claims against theory. For this reason, Luhmann concludes that a loose coupling of cognition (theory) and action (practice) is preferable, given that this loose coupling seems to underlie the condition of stability of any system, including the education system (see Sect. 6.1).

Chapter 7
Reception and Legacy

7.1 The Reception of Luhmann's Theory

Luhmann's research focused on all the subsystems of modern society with the double intent to develop a general theory of social systems, which could be applied to the analysis of modernity, and to 'irritate' the subsystems of society, in particular their reflection theories. Some disciplines, such as political science and theory of law, have been influenced by Luhmann's theory. It is also possible to find many references to this theory in many publications on art and aesthetics. Scholars in organisation science have recently discovered Luhmann's theory, and a number of publications in this field have imported, more or less successfully, some of its concepts. Other disciplines show a limited interest (e.g. theology) or almost no interest (economic theory) in Luhmann's contribution. One obstacle that is hard to overcome is the German language in which most of Luhmann's books and papers were published. Luhmann's most important books have been translated into English only in recent years (see Chap. 2), although some translations in English appeared at the end of the eighties. In fact, the interest of the English-speaking world for Luhmann's theory has just started.

Luhmann's works on education are a special case, as Luhmann decided to organise a series of seminars and publications with the explicit intention to provoke, i.e. to 'irritate', pedagogy. These publications were edited together with the German pedagogist Karl-Eberhard Schorr and are entitled *Fragen an die Pädagogik* (*Questions to Pedagogy*). This series of edited volumes address important issues in education, such as educational technologies, curriculum design, teacher/pupil interaction, and classroom communicative structures—all issues that we have extensively discussed in the previous chapters. These volumes involved both sociologists and pedagogists, who over a period of fifteen years (1982–1996), tried to understand whether and how the perspective of Social Systems Theory could contribute to pedagogical reflection and perhaps also to educational practices.

The collaboration between Luhmann and Schorr had begun with some articles (in 1976 and 1979b) and with the book *Reflection Problems in the system of*

C. Baraldi and G. Corsi, *Niklas Luhmann*, SpringerBriefs on Key Thinkers in Education, DOI 10.1007/978-3-319-49975-8_7

education (1979a:2000). As we have seen in the previous chapters, this volume summarises and reorganises the observation of education based on the Social Systems Theory as conducted in that period. It identifies three main pedagogical problems which can also be studied by sociology, i.e. autonomy of education, social selection, and educational technologies. The two authors argue that pedagogy addresses these problems by 'hiding' rather than solving them. Sociology can see this difficulty of pedagogy but cannot offer direct help to education, let alone 'practical' help to teachers that work in the classroom. Sociology can however irritate the educational system and see how it reacts, a well-known approach in Luhmann's theory.

The reactions of pedagogists to these publications were of different types. On the one hand, the analysis of Luhmann and Schorr was seen as a contribution that pedagogy should take into account (Tenorth 1983, p. 355) and respond to. However, it was also argued that pedagogy should claim its status of autonomous discipline (Derbolav 1981, p. 363). On the other hand, some authors stated that it was difficult to understand how and to what extent such a complex and articulated theory could contribute to 'educational sciences' (Groothoff 1987), in particular considering its radical position against humanism as opposed to the traditional pedagogical concept of 'subject' or 'human being' as the centre of the educational process (Groothoff 1985). Moreover, Luhmann and Schorr's provoking assertion that education does not adequately reflect its responsibilities in the process of social selection was considered with suspicion, or even rejected, with the counter-argument that selection is a central issue not just for pedagogy but also for schools and teachers.

This discussion led to the publication in 1987 of a book edited by the two educators Oelkers and Tenorth. The book, which had special resonance, was an in-depth treatment of the topics mentioned above. In particular, it asked the following questions: is it possible to think that education, and pedagogy, can renounce moral, values and humanism? And to what extent is sociology able to observe these 'latencies' of the education system? The answers still oscillated between a self-critical approach and doubts about the scientific consistency of Social Systems Theory.

Since then it has been quite normal to find references to Luhmann's theory in pedagogical publications (see Lenzen 2004, explicitly devoted to the reception of Luhmann's theory in education science), although often limited to specific aspects that can be adapted to the pedagogical reflection. Among the pedagogical contributions, a few deserve to be mentioned here. Kade (1997), in another text edited by Luhmann with the pedagogist Dieter Lenzen, identified the code of the education system in the distinction conveyable/not conveyable (*vermittelbar/unvermittelbar*), which was taken up by Luhmann in his late publications on education (see Sect. 5.1). Jürgen Schriewer focused on comparative historical studies and on the educational institutions that involve other subsystems, such as universities, which operate both in education and in science, or vocational schools, which operate as well in the economy. Schriewer observed these institutions as areas of intersection

(*Überschneidsungsbereiche*), which enable the symbiosis of different functions. According to Schriewer (1987), this type of institution makes the modern form of differentiation compatible with the needs of different subsystems for mutual performance.

In his historical-comparative research, Schriewer (1983) published important studies on French and German school and high-school organisations. He observed an important difference between the French and German situations. He argued that in France the pedagogical reflection was based on the central role of the organisations, and therefore the development of a theoretical reflection was relatively marginal. On the contrary, in Germany, Humboldt's idea of *Bildung*, which was based on science, led to an enormous interest in theoretical abstraction. Therefore, he observed a radical difference between the two educational systems. The influence of the Social Systems Theory on Schriewer's research emerged in the following quotation, which explains the reference to second-order observation: 'comparison does not consist in relating observable facts but in relating relationships or even patterns of relationships to each other' (1988, pp. 33–34, see also Schriewer and Holmes 1988).

In the English-speaking academic world this debate was almost unknown, due to both language barriers and the theoretical and abstract way of dealing with these problems, which was unusual in the English and American debate on education. In the literature in English, the lack of knowledge of Luhmann's theory is shared by pedagogical studies on education and sociology of education alike.

An exception is the work of the Belgian sociologist Raf Vanderstraeten, who has tried to disseminate Social Systems Theory by publishing in English, and acquiring a certain international reputation. His papers apply the systemic concepts to education. For instance, he points out the differences between the pedagogical and the sociological observation of educational accomplishments, emphasizing that they are incongruent perspectives. He also claims that 'a theory of education requires a radical reconsideration of classical conceptual distinctions and determinations' (2000, p. 23). Vanderstraeten argues that the concept of double contingency (Sect. 3.2.3) can play a central role in this reconsideration, defining double contingency as the *conditio socialis* of education, which is 'recognized by both sides, teacher and pupil: both know, and both know that they both know, that each of them could also act differently' (Vanderstraeten 2003, p. 31). Given this influence of double contingency, education cannot develop a reliable technology based on causality. The education system is based on the circularity of the different perspectives, and education cannot, therefore, be controlled (Vanderstraeten 2001). According to Vanderstraeten, the question is whether instruction and education can start from these assumptions without abandoning the bulk of their conceptual tradition.

Another important aspect of Vanderstraeten's contribution concerns social selection. Vanderstraeten emphasizes Luhmann's idea that the differences that are produced by education are genuine educational products and not the effects of 'social inequalities' generated outside education, in particular in the economic

system. He states, 'the school first of all socializes for the school, not for society—because it produces its own differences and creates its own reality' (Vanderstraeten 2004, p. 268). For this reason, 'concretizations of pedagogical behaviour are laden with difference; they indicate lines of success and thereby establish the possibility of failure. Despite good intentions, pedagogical means transform equality into inequality. They motivate and discourage' (Vanderstraeten 2001, p. 274). The project of education reforms, for instance to face unemployment problems, should take into account that the variety of degree programmes, and the corresponding need for selection, are circularly linked with the demand for employment. Possibilities of training determine the requirements of the labour market and vice versa (Vanderstraeten 1997). The education system influences the other subsystems through the code of selection, rather than the opposite (Sects. 5.3 and 5.4). Probably, among Luhmann's ideas, this is one of the most difficult to accept for pedagogy.

Apart from the work of Vanderstraeten, the interest in, and the resonance of, the work of Luhmann in the English-speaking world have been very limited. In what follows, we shall suggest some possible areas of interest for pedagogy, which can be developed on the basis of Luhmann's theory.

7.2 The Legcy of Luhmann's Theory

7.2.1 Social Selection

The first area concerns social selection, which is probably also the greatest misunderstanding between Social Systems Theory and pedagogy. Pedagogy firmly states that the differences in educational outcomes are the consequences or effects of social inequalities, such as economic inequalities or 'cultural' inequalities arising from socialisation to 'taste' or 'habits' (see Bourdieu 1979:1984). This idea is supported by statistical evidence produced by sociological research. The critical question about this idea is the following: assuming that all the inequalities generated by other subsystems disappeared and that, therefore, all pupils were considered 'equal', could we draw the conclusion that all pupils would be educated in the best way and that there would not be differences among them? A positive answer to this question would mean accepting the suppression of one of the most important freedoms of the pupil (and of the human being), i.e. the freedom to reject *what* is taught (for lack of interest, boredom, aversion, or for any other reason), and/or the *intention* of teaching. It would mean accepting that the pupil cannot refuse to be educated. No perspective on teaching and no pedagogical reflection would deny pupils' freedom of rejection, regardless of their ideological orientation. Denying this freedom would be seen as absurd. However, the theories of external inequalities indirectly claim this pedagogical absurdity.

At the general theoretical level, the problem is clear (Sect. 5.3): the pedagogical intention generates the difference between acceptable and unacceptable

behaviours, i.e. between better and worse performances, which are not differences coming from the outside. If selection is the exclusive responsibility of education, however, a series of problems arise. One problem concerns where selection 'filters' should be placed. This question may be rephrased as follows: is it better to be selective during the school time and less severe at the end (diploma, degree, etc.) or vice versa? Does it make sense not to select during the first educational cycle (primary, perhaps even secondary school) and then 'cream off' in the last years of secondary school or at the university? Is it better to leave to the university or even to the labour market the unpleasant task of selection? From a sociological point of view, we could say that each preference creates both opportunities and risks. Can pedagogy gain such a degree of 'transparency'? This topic could be of great interest not only in terms of teaching and assessment, but also in terms of policies and reforms.

7.2.2 Educational Technology

A second area of potential pedagogical interest is educational technology. The divergences between Social Systems Theory and pedagogy in this regard are wide but not as extreme as in the case of selection. In recent years, many teaching methods have been developed that seek to exploit the potential of communication media, including social media, together with the potential of classroom interaction. The passage is from blackboards and chalk to interactive whiteboards, from the row of desks ordered in front of the teacher to dedicated rooms with no fixed positions for the pupils. There is no doubt that these innovations create new potentials for the education system, in particular by considerably broadening the teachers' room for manoeuvre. Luhmann's argument in this regard, however, is compelling.

On the one hand, pupils are not trivial machines and no technology can solve the problem of the unpredictability of their actions. On the other hand, teachers cannot work without causal assumptions about their actions. Against this background, teachers can exploit the potential of socialisation in classroom interaction, but in any case they need to distinguish between socialisation and intentional education. In the kindergarten, or perhaps even in the primary school, the lack of distinction between socialisation and education may not be a problem.

An interesting, and internationally well-known case is that of the Reggio Approach to kindergartners, in which the importance of socialisation, and its prevailing role over teaching, has been clearly theorised by the pedagogists who have worked in these schools and their numerous followers in the world (see Edwards et al. 1993; Thornton and Brunton 2009). This pedagogical theory is based on the observation of children's autonomy, which, being a natural feature of human beings, is conceived as a guiding principle for education. This leads to reject teaching as a form of interaction and to consider education as the promotion of children's self-socialisation. However, does that apply to higher level of

education? To what extent can teachers take advantage from the uncertainty generated by double contingency, i.e. by the fact that pupils are autonomous observers and decide based on their autonomy?

7.2.3 Classroom Interaction

The problems of selection and technology can be considered within a more general problem. Teachers and pedagogists aim to educate pupils to autonomy and freedom, but this leads to two important questions. First, how can the teacher educate to freedom without being blocked by the paradox implied in the formula 'education to freedom'? Second, how can the teacher react when the pupils become indeed free and autonomous and behave in both acceptable *and* unacceptable ways? These questions lead to a third area of pedagogical interest concerning teaching as interaction in the classroom. This area has been largely explored in the last forty years; therefore, it deserves some attention and it is interesting to see how Luhmann's theory can improve reflection and reorient sociological, pedagogical and linguistic studies on classroom interactions.

Studies on classroom interaction and teaching developed in the same period in which Luhmann produced his first theoretical effort, i.e. in the seventies, although without any explicit or intentional connection with this effort. The first important contributions to the analysis of classroom interaction (Sinclair and Coulthard 1975; MacHoul 1978; Mehan 1979) focused on what was considered a typical structure consisting of teacher's initiation, i.e. a question, students' 'exam' answers (Heritage and Clayman 2010, p. 28) and finally teacher's feedback, typically based on the distinction between better and worse performance. Mehan (1979) defined this sequence as a combination of Initiation, Response and Evaluation (IRE), indicating it as the basic structure of teacher-students interaction in the classroom.

These studies did not deal with conveyance of knowledge. They focused on the teacher's activities of questioning and evaluating, and therefore on the ways in which the distinction between better and worse is stressed in the interaction. Moreover, by focusing exclusively on interaction, they did no deal with its consequences for selection. Against this backdrop, the relevance of the systemic dimension of education was not recognised. The interaction was interpreted as a sequence of actions based on a local structure that determines teachers' initiatives, students' responses and teachers' feedback. These studies were able to identify and analyse the hierarchical structure of this interaction, but they were not able to observe the education system in which the interaction takes place, in particular the operational importance of coding. They observed teaching as a business between the single pupil and the teacher, and the involvement of the classroom in terms of seriality of single interactions, ignoring the problem of expectations.

In the following years, this approach was further developed by Conversation Analysis (see Heritage and Clayman 2010; Walsh 2011), leading to a widening gap between very accurate analyses of classroom interactions and lack of

observation of the education system and its structures. Conversation Analysis shares with Luhmann's theory two relevant presuppositions (see Chap. 5): (1) the structure of interaction arises independently from individual participants, and makes a difference in the social dimension; (2) the interaction system is reproduced through a retrospective observation of what has just happened, so that foreseeing its future is impossible. However, Conversation Analysis ignores the inclusion of the interaction in the wider education system, as it is based on the presupposition that 'institutions' are exclusively made relevant in the interaction. Moreover, institutional interactions, including educational interactions, are considered variants of a mundane structure that is typical of everyday interactions, which is seen as the basic form of sociality. Institutional forms of interaction show systematic variations and restrictions of activities when compared to mundane conversation (Drew and Heritage 1992), and their specificity depends on the fact that they are 'task-related' and involve participants who represent organisations, i.e. who have a professional identity.

Conversation Analysis has provided insightful knowledge on the structure of the interaction based on the evaluation of better and worse performances linking teaching to selection. This knowledge includes, among other aspects, the detailed analyses of: (1) the different types of teachers' questions (e.g. Margutti 2010); (2) the ways in which questions can be asked at different moments of the interaction (e.g. Lee 2008); (3) the distinction between correcting mistakes and repairing misunderstandings (Macbeth 2004), thus identifying ways in which the negative value of the code is protected against possible injustice; (4) so-called 'scaffolding' (Seedhouse 2004), i.e. the ways in which teachers pursue the positive value of the code until they can. In particular, scaffolding is designed in such a way as to both reduce the impact of selection, favouring the reproduction of the positive value (better performance), and unfold the paradox of the double level of interaction, thus increasing sensitivity for students. Conversation analytical studies applied to classroom interaction facilitate a better understanding of the structure of interaction in the education system. They are coherent with Luhmann's idea that the interaction is the system in which education can be autonomous. However, they would benefit from the observation of the education system, its coding, and the distinction between education and selection. Moreover, they would benefit from observing the self-generated uncertainty of the educational interaction, as they tend to observe regularities, rather than variability (e.g. students' rejections or interruptions).

Another set of studies in social pedagogy tries to observe the ways in which sensitivity for pupils' participation in educational interactions can be increased (see Sect. 5.3). To this purpose, they show how the paradox of the trivial machine (see Sect. 4.6) can be unfolded, observing learners as active constructors of knowledge who can express their views, challenge different ones, and explore different options (Mercer 2000; Mercer and Littleton 2007). According to this pedagogical approach, learning can be promoted through 'dialogic teaching', which is defined as 'that in which both teachers and pupils make substantial and significant contributions and through which children's thinking on a given idea or theme

is helped to move forward', and through which 'teachers can encourage students to participate actively' (Mercer and Littleton 2007, p. 41). In this view, teachers should 'orchestrate' pupils' participation (Erickson 1996; O'Connor and Michaels 1996). The value of pupils' experience is affected by the extent to which dialogue 'enables them to appreciate the purpose of the activities they do, and how these activities fit together into a meaningful sequence of events' (Mercer and Littleton 2007, p. 55). Dialogic teaching is therefore a way of stressing sensitivity as a primary mission of education, which increases the opportunities of learning. This pedagogical approach does not only try to observe if education can be separated from selection, but it also shifts the attention from hierarchical teaching to dialogic teaching, with the intent of showing the ways in which the hierarchical structure of roles in the education system can be mitigated (and probably concealed). Luhmann's theory may be useful to clarify how the system can deal with evaluations and selection, as well as discuss the possible bifurcation of the communication system in the direction of either trust or distrust (Sect. 5.3).

A different way of observing the importance of sensitivity is based on the differentiation between education and facilitation of students' participation. Facilitation is considered 'educational', but it is pursued in noncurricular activities, for instance contrasting bullying and violence, or introducing 'relational' competences (Hendry 2009). In this way, two separate types of education are introduced in the classroom, in the attempt to avoid interferences between sensitivity and evaluation/selection and the corresponding bifurcation. Following Luhmann, this attempt should move from the analysis of the reaction of pupils who can compare teaching and facilitation. Two questions should find an answer in this respect. The former is how seriously the students will consider facilitation activities that are not evaluated. The latter is what happens to conveyance of knowledge if students take the method of facilitation seriously.

A way to avoid this type of problems in the classroom could be by differentiating facilitation and education as different types of interaction systems and avoiding interferences between them (Baraldi 2014). On the one hand, this solution seems to guarantee the reproduction of the education system; on the other, it seems to ensure that students are exposed to sensitivity in areas in which education is not considered effective or relevant. How far this differentiation can be pursued in the classroom, to what extent it rather requires different settings, and what its consequences are for a functional system operating based on persons, motives and memory (Sect. 4.2) are still open questions, which Luhmann's theory can help answering.

7.2.4 Relationship Between Education and Economy

A fourth area of potential pedagogical interest concerns the relationship between the education system and other subsystems of society, in particular economy. The outcomes of education become visible at two levels, i.e. as (1) qualifications

issued by schools and universities, and (2) skills applied in the workplace or in life. The observation and evaluation of the application of the learned skills takes time, e.g. it is only possible to see if an engineer knows how to do her/his job when s/he starts working. The observation and selection of qualifications, on the other hand, are immediate, e.g. it is easy to certify that an engineer is not an accountant, and a welder is not a lawyer.

For this reason, educational policies prefer to focus on homogenisation and standardisation, based on qualifications, for instance in the well-known case of the Bologna process enhanced by the European Union. Against this background, the debate on reforms concerning the relationship between education and economy, and the adaptation of education to the requirements of employment, seems rather confused and often alarmist. If we start from Luhmann's idea that there cannot be an exact match between the performances of a system (e.g. the education system) and the needs of another system (e.g. the economic system), we are likely to understand the limits of these reforms. Universities, high schools, and vocational training institutions cannot be synchronized with the labour market. Therefore, university, in particular, should teach skills that people cannot learn while they are working.

This finding could reduce the political pressure on improving adaptation of higher education, and could grant both educators and employers greater freedom to manage educational outcomes, without imagining an impossible overlap and thus being systematically dissatisfied or disappointed.

Chapter 8
Luhmann and the Future of Education

This concluding chapter considers the contribution of Luhmann's theory to the understanding of the most important aspects and problems of education in present society. We provide here some final reflections on the most important aspects of Luhmann's theory of education, described in Chaps. 4, 5 and 6, whose foundations lie on the concepts introduced in Chap. 3. If we look back at these chapters, we can easily find out that an impressive number of aspects and problems of education can be considered through the lenses of Luhmann's theory. In what follows, we shall summarise the most important among these aspects and problems, suggesting that it is crucial to continue to analyse education based on Luhmann's theory.

8.1 Classroom Interaction, Education System and Schools

The structure and importance of classroom interaction in the education system have been stressed in various theories of education (Sinclair and Coulthard 1975; Mehan 1979; Seedhouse 2004; Walsh 2011). Luhmann, however, does not simply analyse classroom interaction through linguistic analyses of specific types of sequences, as does Conversation Analysis, or through pedagogical analyses of specific forms of support of children's learning. In Luhmann's theory, the analysis of teaching in classroom interactions is clearly connected to the basic structures of the education system, i.e. what Luhmann calls *codes*, and in particular to both the primary code of conveyance of knowledge and the secondary code of selection.

These codes cannot be explained in terms of specific interactions. Interactions, as Luhmann maintains, including teaching interactions, are ephemeral and cannot reproduce social structures by themselves. Rather, they apply, and thus reproduce, structures that are fixed at the level of the subsystem of education, which has a specific function in society. Luhmann's theory explains and connects two important aspects: (1) the importance of interactions in determining the autonomy of the education system, as teaching cannot be controlled externally and

C. Baraldi and G. Corsi, *Niklas Luhmann*, SpringerBriefs on Key Thinkers in Education, DOI 10.1007/978-3-319-49975-8_8

produces the conditions of learning contingently; (2) the dependence of teaching on predefined structures. The specific hierarchical structures of teaching in the interaction and the coding of the system are both necessary to shape education and its autonomy, and their interplay can be considered an important aspect worth further research.

Against this background, Luhmann's theory explains the relationship between *conveyance of knowledge* and *selection* in the education system. This is, however, an underdeveloped topic, as Luhmann introduced the concept of conveyance in the very last part of his work and could not elaborate on this concept. In the previous, long history of his analysis of education (which started in the seventies), Luhmann wondered whether selection could be the basic code of education, as selection actualises the outcomes of education in communication. However, he concluded that the basic condition of teaching is not selection, but conveyance of knowledge. The consequences of conveyance can be seen in interaction only though the evaluation of pupils' performance, but teaching in the classroom can only be explained through conveyance.

The solution that Luhmann eventually found was the double coding of the system, i.e. the combination of primary (conveyance) and secondary (selection) codes. The meaning of conveyance as a code of educational communication and the connection between conveyance and selection are fields that are open for further analysis. Moreover, the meaning and features of educational programmes, which depend on coding, are other theoretical aspects that Luhmann could not explore and await further research.

If it is true that the function of education, and its interactional achievement, are primarily important in Luhmann's theory, it is also true that the organisational dimension of schooling and the professionalization of teachers are very important issues. School organisation is the system in which decisions can be made about educational processes. Both teaching in the classroom and the application of the guiding structures of the education system need school organisation, which is the system that manages the personnel, the ways of communicating, and the programmes for education. Following Luhmann, the importance of school organisation can be neither underscored, given the relevance of decision making in the education system, nor emphasized as the main aspect of education. The professionalization of teachers is an important aspect of the functioning of education. On the one hand, it involves the teachers' involvement and engagement, showing that for education the teacher as a person is more important than teaching methodology. On the other hand, it does not imply conveyance of pedagogical knowledge to the pupils, thus highlighting the unavoidable difference between educational operations (in particular teaching) and the pedagogical observations of the educational presuppositions of teaching. The impact of school organisation and professionalization on fixing the conditions of teaching and applying the guiding structures of the education system deserves further research.

8.2 Learning and Understanding in Education

Another important aspect of Luhmann's theory concerns the *structural coupling* between individual learning processes and teaching activities. According to Luhmann, communication has no access to psychic interiority, which is understood as the product of a psychic system based on consciousness. Individual consciousness is both a limitation for communication, in particular for educational communication, and an opportunity for its reproduction. Individual consciousness is a general condition characterizing socialisation and participation in communication in society. However, the complexity of structural coupling increases in the education system, as this system has the function of shaping consciousness and 'using' the medium of consciousness to promote learning. The education system, therefore, needs to pay particular attention to stimulate individual participation, struggling with its unpredictability, e.g. in terms of attention, types of reactions to teachers' requests, interest in knowledge, and acceptance of selection.

Luhmann's theory also stimulates reflection on how the combination of individual operational closure and structural coupling can allow *understanding* (Luhmann 1986c). The humanistic tradition of *Bildung* in Germany (Luhmann and Schorr 1979:2000) established the idea that understanding is a problem of comprehension of texts and appropriation of knowledge. The problem of understanding was thus reduced to the relationship between 'text' and 'head'. The pupil is able to appropriate the text through her/his self-referential process; the text represents the world, and the pupil learns autonomously, i.e. on the basis of her/his self-reference, to understand the world. This autonomous understanding of the world, however, requires the teacher's control. Therefore, the teacher can (and must) check and correct the pupil's performance. Today, teachers still rely on this conceptualisation. However, Luhmann's theory observes a paradoxical condition, as the pupil's autonomy depends on the teacher's control.

In the teaching interaction, understanding is not limited to drawing a distinction between information and utterance, which is a type of understanding that is produced in any communication (Sect. 3.3.1). Teaching needs much more, i.e. understanding if something has been understood. However, as the pupil's consciousness is a closed, self-referential, and thus inaccessible, system, this type of understanding does not imply 'seeing through' or 'determining' pupils through communication. Rather, understanding means that the orientation to what is not determinable (the pupil's consciousness) makes some determination possible. Therefore, observing something that is determined, i.e. behaviours or other characteristics of the pupils, is a normal activity for the teacher. For instance, the pupil may be badly dressed and the teacher may try to understand why. This, however, does not mean that the teacher can understand the pupil's consciousness. Rather, the teacher's understanding is a projection of what the teacher observes in the self-reference of the pupil, i.e. it is the understanding of the way in which the pupil handles her/his self-reference.

Understanding the handling of a system's self-reference means observing the ways in which the observed system handles the difference between system and environment, i.e. how it handles itself as different from its environment. A self-referential system primarily distinguishes itself from its environment (Sect. 3.2.1). By drawing this distinction between itself and its environment, a system can observe and describe reality (including itself). The distinction between system and environment (or between inside and outside) is drawn by and within the system. This basic distinction allows the system to draw all further distinctions, e.g. helpful/harmful, far/near, and nice/nasty.

Both the understanding system and the understood system are self-referential systems drawing the distinction between system and environment. Thus, a system can understand another system by taking into account the environmental references of the understood system, including itself in the environment of the understood system. For example, when the teacher asks a question s/he can see the surprised face of the pupil who did not expect that type of question on the one hand, and the smile of other pupils who think they know the answer on the other. However, the effort of a system to understand another system, while seeing itself in the environment of this other system, leads the understanding system to lose understanding of itself. For example, the teacher understands the pupil's incorrect answer losing the understanding that this answer depended on the teacher's question. The more a system tries to understand another system, the less it can understand itself. This means that understanding is based on a paradox, i.e. the more the conditions of understanding are understood (the teacher's question orienting the pupil's answer) the less understanding (of the pupil's learning) is possible.

The important issue of teaching is whether the pupil 'realises' what has been uttered by the teacher. 'Realising' means understanding not only what is correct and what is not, but above all what possibilities are excluded by the distinction between correct and incorrect. When the teacher asks a question, the pupil's answer can be assessed as either correct or incorrect. If, however, the teacher wants to understand if the pupil has understood the meaning of the answer, s/he has to check whether the pupil has understood what alternatives have been excluded by the distinction between correct and incorrect. In her/his turn, the pupil must understand how the teacher realises the pupil's answer as information. For this purpose, the pupil does not need to understand the teacher, e.g. the teacher's wish, but s/he only needs to understand the difference between the roles of teacher and pupil. Pupils can understand only through communication, i.e. only by distinguishing between information and utterance, but they also need to *exploit* this distinction to realise the information uttered by the teacher. This means that they must deal with another distinction, i.e. whether or not they realise the selectivity of this information (e.g. the teacher's question). This latter distinction concerning the 'realisation' of selectivity is the main difference between educational interactions and other interactions, for example in families or with friends (Luhmann 1986, p. 101).

Luhmann's analysis shows that understanding in education is a normal but still largely unexplained concept. The analysis of the conditions of understanding in the classroom is another issue that deserves further research.

8.3 Education, Socialisation and Relevance of the Person

The difference and connections between *socialisation and education* (see Sects. 4.3 and 4.4) is another important aspect of Luhmann's theory that is worth further exploration. On the one hand, education arises because individual socialisation, in particular family socialisation, is no longer considered sufficient for individuals' effective participation in social systems. Against this background, the function of education consists in changing the psychic systems *intentionally*. On the other hand, education cannot avoid the effects of socialisation, as the theory of 'hidden curricula' as shown. Generally speaking, any communication in the classroom can produce unwanted and unpredictable effects of socialisation, including the pupils' assessment of teaching. Moreover, the education system cannot avoid relationships with external socialisation, mainly family socialisation, and at the same time, it cannot renounce the expectation that education replaces negative or unwanted socialisation effects. Therefore, the relationship between education and socialisation is much more complex than it is considered in the education system, and research is needed on the ways in which education and socialisation are both differentiated and intertwined.

Socialisation and intentional education are connected to *the meaning of the person*. As mentioned above, the education system has no direct access to consciousness; therefore, education must deal with pupils as persons. The person is a social structure indicating the persisting identity of psychic systems to which social systems are structurally coupled. The person is the form which makes it possible to observe the individual identity in communication, enabling dealing with human beings and their identity formation in the education system. The function of education concerns the transformation of human beings in persons and the production of standards for this transformation.

However, education leads to the social trivialisation of the pupil, who was long considered a medium for educational forms, thus presupposing predictability where individual observation and action are unpredictable. Therefore, the educational transformation of individual human beings into persons must lead to a reduction of complexity of human thinking. This attempted reduction has generated lack of satisfaction in pedagogy, which has suggested increasing attention to and sensitivity for the pupils as persons. This attempt cannot ignore that education must include conveyance of knowledge and selection; therefore, the sensitivity for persons can lead to relevant difficulties in preserving the structures of education. One consequence of this pedagogical trend is the worsening of pupils' (and families') observation of education. Disorientation can be created by the simultaneous improvement of the request for cognitive performances and sensitivity for pupils.

Against this background, the possibilities and limitations of combination between performances and sensitivity deserve further attention.

8.4 Education, Inequality and Work

Selection is an important aspect to understand the *relationship between education, social stratification and inequality*. As selection is a structure (a secondary code) of the education system, it cannot depend on the general stratification of society. Although many studies show that children from better-off and better-educated families have better chances of success in the selection process, this process is exclusively dependent on school performances. Inequality is primarily a product of the education system and is determined by selection. One important consequence is that pupils' experience in the education system becomes part of their careers, and the education system can thus create important starting positions for individual careers. In particular, selection can limit the pupils' orientation to career, by both motivating and demotivating them; it thus produces internal inequalities that affect their future career.

Selection in education is clearly related to the selection of positions within society, as education plays a central role in the construction of careers. However, the construction of individual careers, as based on education, is uncertain as cannot be predicted through selection in the education system. Education aims to manage the important forms of the life course, which however has only educational relevance and does not coincide with the social career. It is impossible to know whether education will be adequate for the future of the pupils. School can orient the opportunities of later life, but it cannot determine which directions careers will take. In particular, the education system cannot provide any certainty of future employment, although it can provide references and certificates for it. In fact, methods of selection are different in the education system on the one hand and in the economic system and labour market on the other.

Educational success or failure are not predictive of social careers. This explains the difficulties of relating education to employment, which are underestimated by the reference to the 'professional practicality' of education. Individual abilities learned in the education system cannot be directly applied in the workplace, as they depend on the autonomy of the education system itself. The discrepancy between the knowledge that is learned in schools and universities and the knowledge which is required to work is likely to cause problems and 'reality shocks' to individuals. Nevertheless, the contribution of the education system to the construction of individual careers is important, as the starting point of a career is particularly delicate.

This relationship between selection in education, individual careers and employments, has been the object of considerable research. However, following Luhmann, it seems clear that it deserves further theoretical studies that do not take for granted the practical benefits of education.

8.5 Pedagogical Reflection in the Education System

Luhmann dedicates much attention to the importance of pedagogy as a theory of reflection on the education system and to the sociological meaning of pedagogical reflections. Firstly, pedagogical reflections thematise the autonomy of education as concerning *learning ability*, i.e. the ability to learn. According to Luhmann, the learning ability is a symbolization of the unity and contingency of the education system, i.e. it is a 'contingency formula' in this system (Luhmann and Schorr 1979:2000). The reflexivity of learning (learning to learn) is particularly important to define what it is possible for education, e.g. to determine the subjects that can be taught or to give meaning to the future of pupils. The learning ability is considered a contingency formula as it limits what is possible as education. The contingency formula of learning ability allows pedagogy to reflect on the autonomy of the education system, i.e. on the differentiation of the education system within society and on the autonomy of educational practices. The connection between autonomy of education and observation of learning is another interesting topic for further research.

Secondly, pedagogical reflections concern the difficulty of controlling the effects of teaching, the so-called *technological deficit* of education (Ibidem). The technological deficit concerns the way in which effects of teaching can be reached. In particular, pedagogy reflects on the methods and purposes of teaching, as well as on their evaluation. However, for each causal aspect of teaching, countless effects can be observed, and for each effect of teaching, countless causes can be observed. Against this background, educational technologies can select specific connections between causes and effects, but they cannot make the effects of teaching predictable. The relationship between pupils and teacher always determines uncertainty in classroom interaction, and both pupils and teachers are aware of this uncertainty. It is never possible to verify whether what should be taught is really taught and learned, and teachers can never know for sure whether they are acting properly or adequately. In this situation, the meaning and intentions of teachers' actions are reaffirmed by the pedagogical reflection, but they cannot be verified in the classroom. How one should work with a technological deficit is another challenging task for future research on education.

A third aspect of pedagogical reflection (but also of political debates) that deserves great consideration is *the project of reforming education*. Against the backdrop of uncertainty and failures of education, the project of reform is frequent in pedagogical reflections and political debates. The permanent objective of any such reform is the increase of both quality and equality. However, according to Luhmann, there is a number of problems in planning and achieving a reform of the education system. These can be summarised as follows.

1. The increase of both equality and quality is not possible, as quality requires inequality of pupils' performances. As far as it does not allow distinguishing different performances, equality blocks quality; therefore, equality and quality cannot be pursued simultaneously. A possible compromise consists in

formulating the idea of 'equality of opportunities', thus leaving to 'commitment' and 'talent' the task of ensuring quality. However, this compromise does not ensure equality in the system.
2. Quality hides a paradox. As it is based on the code of selection, education can only have high quality (good performances) by creating low quality (bad performances). Selection therefore inhibits the generalisation of quality within the system.
3. Reforms aim to improve society by improving education. However, changes in society, which depend on communication processes and disappointment of expectations, cannot be planned. Moreover, changes in teaching interactions can become relevant in the education system only if it is possible to generalise them beyond the single interaction, a task that cannot be achieved through a reform. In particular, teachers, who implement the system's autonomy in classroom interactions, do not need to rely on reforms to give meaning to their actions, nor can they be forced to draw on the dominant opinions of the pedagogical and political establishment.
4. Reforms can only concern the structures of decision-making in school organisations, i.e. personnel (e.g. selection, salary, and number of teachers), ways of communication (e.g. teachers' responsibilities in the classroom and school) and programmes (e.g. curricula and syllabi). The school organisation is the 'real' object of a possible reform, as a reform of teaching is impossible, given its unavoidable autonomy, and a reform of the guiding structure of the system, i.e. the replacement of conveyance of knowledge and selection, would lead to destroy the system itself.
5. Reforms are not linear processes. When the intention of reform becomes visible, its realisation becomes unpredictable, as people take sides, change their preferences, fear possible developments. Consequently, decisions are delayed and/or adapted to the changing context.
6. Reform proposals are formulated as new while forgetting that their objectives were pursued in other reforms, which failed.
7. The success of reforms cannot be predicted. It is very likely that, after the reform has been implemented, some observers will evaluate education better than others.

Luhmann, however, also stresses the positive aspects of reform projects. These projects highlight differences of interest, so that the system can produce controversial self-descriptions, open up different possible options and thus increase the decision-making potential. Thus, reform proposals can promote the structural dynamics of the system, enhancing new uncertainty, which is not controllable. The education system can become sensitive to new or changed societal conditions, e.g. new requests for specific skills in the labour market, or new needs of pupils and families.

The positive and negative aspects of reform proposals and the interplay between teaching, pedagogy and politics are other important issues to explore in future research.

8.6 Education and Sociological Theory

The final important issue that must be highlighted in these conclusions is the difference and relationship between sociological (scientific) observation and pedagogical reflection. The importance of this issue was hinted at in Chap. 1 and dealt with in Chap. 7.

According to Luhmann, sociological observation and pedagogical observation are two different types of second-order observation. The request for their convergence, as well as the paradoxical request for a sociology that 'informs' pedagogy, have no chance of success, given the mutual autonomy of education and science. In Chap. 1, we wondered if some kind of 'collaboration' between sociology and pedagogy is possible. Luhmann gives a negative answer to this question based on rigorous and coherent theoretical assumptions. However, sociology and pedagogy can avoid competition.

Sociology can provide external tools for reflection on the education system, which can be autonomously used as irritations (Sect. 3.2.1) by pedagogy. This book has been a step in this direction. This kind of step requires internal coherence in sociology, which does not mean homogeneous thought, but an adequate level of theorisation. As Luhmann recurrently claimed in his reflection on this topic, sociology should provide theories that can encompass different social phenomena, including education (see Luhmann 1997:2012).

This book, and in particular these Conclusions, have attempted to show that Luhmann's theory is not part of the history of sociology. Rather, it is a living theory that can support present analyses of education in different fields (sociological, pedagogical, linguistic), and for a large number of important topics.

This raises the issue of the scarce attention given to Luhmann's theory by sociology of education (Sect. 7.1), although the theory has created so many opportunities of analysis and reflection on education. Apart from the German language problem, the high conceptual complexity of the theory does not help to understand Luhmann, above all in times in which conceptualisation is considered 'jargon'. Moreover, the preference for 'small theories' is a big challenge for a 'grand theory', as Luhmann's theory is. Finally, as Luhammn himself complained, theoretical thinking is no longer an usual activity, as 'applied science' is preferred. Against this background, the sociological milieu can prefer more popular (and above all more simple) theories that can be applied (also) to education. This approach of mainstream sociology has prevented any possible interest of pedagogical reflections in Luhmann's theory.

This book aimed to produce knowledge and stimulate reflection on Luhmann's theory of education among pedagogists, but also young sociologists and students of education. Whatever the reason of the scientific neglect for Luhmann's theory of education, we see two important tasks and needs of research on education: (1) disseminating Luhmann's theory and its potential among scholars, students, and practitioners, and (2) exploiting and developing Luhmann's theory.

Finally, it is important to highlight that 'applications' of Luhmann's theory do not need to be what Luhmann blamed as 'applied sociology', i.e. simplistic analyses of social phenomena without an adequate theoretical background. Applying Luhmann can also mean developing the analysis of problems *through* his theory, i.e. developing the theoretical potential of the theory in order to understand and explain the education system in more and new detail.

We should not forget that Luhmann was not against 'empirical' analysis, but against that kind of empirical analysis that does not concern theory. In the scientific tradition, 'empirical' has been distinguished from 'theoretical'. What 'empirical' means, however, is decided by science, not by the reality that is the object of science; therefore, the distinction between theoretical and empirical is clearly theoretical rather than empirical. This does not mean that science is an arbitrary accomplishment, which is an idea that can be confuted empirically. 'Empirical' is a necessary externalisation of all scientific research, but 'necessary' does not mean here 'external' to theoretical analysis.

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