already in the 1970s Knud Illeris was well known in Scandinavia for his developing work on project studies in theory and practice. In this work, learning theory was applied, mainly by a combination of Jean Piaget’s approach to learning and the so-called ‘critical theory’ of the German–American Frankfurt School that basically connected Freudian psychology with Marxist sociology. In the 1990s, Illeris returned to his learning theoretical roots, now involving many other theoretical approaches in the general understanding of learning, which was first presented in The Three Dimensions of Learning and later fully worked out in How We Learn: Learning and Non-learning in School and Beyond. The following chapter presents the main ideas of this understanding and is an elaborated version of the presentation Illeris made at a conference in Copenhagen in 2006 when the Danish version of How We Learn was launched. The article has never before been published in English.

Background and basic assumptions

Since the last decades of the nineteenth century, many theories and understandings of learning have been launched. They have had different angles, different epistemological platforms and a very different content. Some of them have been overtaken by new knowledge and new standards, but in general we have today a picture of a great variety of learning theoretical approaches and constructions, which are more-or-less compatible and more-or-less competitive on the global academic market. The basic idea of the approach to learning presented in this chapter is to build on a wide selection of the best of these constructions, add new insights and perspectives and in this way develop an overall understanding or framework, which can offer a general and up-to-date overview of the field.

Learning can broadly be defined as any process that in living organisms leads to permanent capacity change and which is not solely due to biological maturation or ageing (Illeris 2007, p. 3). I have deliberately chosen this very open formulation because the concept of learning includes a very extensive and complicated set of processes, and a comprehensive understanding is not only a matter of the nature of the learning process itself. It must also include all the conditions that
influence and are influenced by this process. Figure 1.1 shows the main areas which are involved and the structure of their mutual connections.

On the top I have placed the basis of the learning theory, i.e. the areas of knowledge and understanding which, in my opinion, must underlie the development of a comprehensive and coherent theory construction. These include all the psychological, biological and social conditions which are involved in any learning. Under this is the central box depicting learning itself, including its processes and dimensions, different learning types and learning barriers, which to me are the central elements of the understanding of learning. Further there are the specific internal and external conditions which are not only influencing but also directly involved in learning. And finally, the possible applications of learning are also involved. I shall now go through these five areas and emphasise some of the most important features of each of them.

**The two basic processes and the three dimensions of learning**

The first important condition to realise is that all learning implies the integration of two very different processes, namely an external interaction process between the learner and his or her social, cultural or material environment, and an internal psychological process of elaboration and acquisition.

Many learning theories deal only with one of these processes, which of
course does not mean that they are wrong or worthless, as both processes can be studied separately. However, it does mean that they do not cover the whole field of learning. This may, for instance, be said of traditional behaviourist and cognitive learning theories focusing only on the internal psychological process. It can equally be said of certain modern social learning theories which – sometimes in explicit opposition to this – draw attention to the external interaction process alone. However, it seems evident that both processes must be actively involved if any learning is to take place.

When constructing my model of the field of learning (Figure 1.2), I started by depicting the external interaction process as a vertical double arrow between the environment, which is the general basis and therefore placed at the bottom, and the individual, who is the specific learner and therefore placed at the top.

Next I added the psychological acquisition process as another double arrow. It is an internal process of the learner and must therefore be placed at the top pole of the interaction process. Further, it is a process of integrated interplay between two equal psychological functions involved in any learning, namely the function of managing the learning content and the incentive function of providing and directing the necessary mental energy that runs the process. Thus the double arrow of the acquisition process is placed horizontally at the top of the interaction process and between the poles of content and incentive – and it should be emphasised that the double arrow means that these two functions are always involved and usually in an integrated way.

As can be seen, the two double arrows can now span out a triangular field between three angles. These three angles depict three spheres or dimensions of learning, and it is the core claim of the understanding that all learning will always involve these three dimensions.

Figure 1.2 The fundamental processes of learning.
The content dimension concerns what is learned. This is usually described as knowledge and skills, but also many other things such as opinions, insight, meaning, attitudes, values, ways of behaviour, methods, strategies, etc. may be involved as learning content and contribute to building up the understanding and the capacity of the learner. The endeavour of the learner is to construct meaning and ability to deal with the challenges of practical life and thereby an overall personal functionality is developed.

The incentive dimension provides and directs the mental energy that is necessary for the learning process to take place. It comprises such elements as feelings, emotions, motivation and volition. Its ultimate function is to secure the continuous mental balance of the learner and thereby it simultaneously develops a personal sensitivity.

These two dimensions are always initiated by impulses from the interaction processes and integrated in the internal process of elaboration and acquisition. Therefore, the learning content is, so to speak, always ‘obsessed’ with the incentives at stake – e.g. whether the learning is driven by desire, interest, necessity or compulsion. Correspondingly, the incentives are always influenced by the content, e.g. new information can change the incentive condition. Many psychologists have been aware of this close connection between what

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**Figure 1.3** The three dimensions of learning and competence development.
A comprehensive understanding of human learning has usually been termed the cognitive and the emotional (e.g. Vygotsky 1978; Furth 1987), and recently advanced neurology has proven that both areas are always involved in the learning process, unless in cases of very severe brain damage (Damasio 1994).

The interaction dimension provides the impulses that initiate the learning process. This may take place as perception, transmission, experience, imitation, activity, participation, etc. (Illeris 2007, pp. 100ff.). It serves the personal integration in communities and society and thereby also builds up the sociality of the learner. However, this building up necessarily takes place through the two other dimensions.

Thus the triangle depicts what may be described as the tension field of learning in general and of any specific learning event or learning process as stretched out between the development of functionality, sensibility and sociality – which are also the general components of what we term as competencies.

It is also important to mention that each dimension includes a mental as well as a bodily side. Actually, learning begins with the body and takes place through the brain, which is also part of the body, and only gradually is the mental side separated out as a specific but never independent area or function (Piaget 1952).

**An example from everyday school life**

In order to illustrate how the model may be understood and used, I shall take an everyday example from ordinary school life (which does not mean that the model only deals with school learning).

During a chemistry lesson in the classroom, a teacher is explaining a chemical process. The students are supposed to be listening and perhaps asking questions to be sure that they have understood the explanation correctly. The students are thus involved in an interaction process. But at the same time, they are supposed to take in or to learn what the teacher is teaching, i.e. psychologically to relate what is taught to what they should already have learned. The result should be that they are able to remember what they have been taught and, under certain conditions, to reproduce it, apply it and involve it in further learning.

But sometimes, or for some students, the learning process does not take place as intended, and mistakes or derailing may occur in many different ways. Perhaps the interaction does not function because the teacher's explanation is not good enough or is even incoherent, or there may be disturbances in the situation. If so, the explanation will only be picked up partially or incorrectly, and the learning result will be insufficient. But the students’ acquisition process may also be inadequate, for instance because of a lack of concentration, and this will also lead to deterioration in the learning result. Or there may be errors or insufficiencies in the prior learning of some students, making them unable to understand the teacher's explanation and thereby also to learn what
is being taught. Much of this indicates that acquisition is not only a cognitive matter. There is also another area or function involved concerning the students’ attitudes to the intended learning: their interests and mobilisation of mental energy, i.e. the incentive dimension.

In a school situation, focus is usually on the learning content; in the case described it is on the students’ understanding of the nature of the chemical process concerned. However, the incentive function is also still crucial, i.e. how the situation is experienced, what sort of feelings and motivations are involved, and thus the nature and the strength of the mental energy that is mobilised. The value and durability of the learning result is closely related to the incentive dimension of the learning process.

Further, both the content and the incentive are crucially dependent on the interaction process between the learner and the social, societal, cultural and material environment. If the interaction in the chemistry lesson is not adequate and acceptable to the students, the learning will suffer, or something quite different may be learned, for instance a negative impression of the teacher, of some other students, of the subject or of the school situation in general.

**The four types of learning**

What has been outlined in the triangle model and the example above is a concept of learning which is basically constructivist in nature, i.e. it is assumed that the learner him- or herself actively builds up or construes his/her learning as mental structures. These structures exist in the brain as dispositions that are usually described by a psychological metaphor as *mental schemes*. This means that there must in the brain be some organisation of the learning outcomes since we, when becoming aware of something – a person, a problem, a topic, etc. – in fractions of a second are able to recall what we subjectively and usually unconsciously define as relevant knowledge, understanding, attitudes, reactions and the like. But this organisation is in no way a kind of archive, and it is not possible to find the different elements at specific positions in the brain. It has the nature of what brain researchers call ‘engrams’, which are traces of circuits between some of the billions of neurons that have been active at earlier occasions and therefore are likely to be revived, perhaps with slightly different courses because of the impact of new experiences or understandings.

However, in order to deal systematically with this, the concept of schemes is used for what we subjectively tend to classify as belonging to a specific topic or theme and therefore mentally connect and are inclined to recall in relation to situations that we relate to that topic or theme. This especially applies to the content dimension, whereas in the incentive and interaction dimensions we would rather speak of *mental patterns*. But the background is similar in that motivations, emotions or ways of communication tend to be organised so that they can be revived when we are oriented towards situations that ‘remind’ us of earlier situations when they have been active.
In relation to learning, the crucial thing is that new impulses can be included in the mental organisation in various ways, and on this basis it is possible to distinguish between four different types of learning which are activated in different contexts, imply different kinds of learning results and require more or less energy. (This is an elaboration of the concept of learning originally developed by Jean Piaget (e.g. Piaget 1952; Flavell 1963).)

When a scheme or pattern is established, it is a case of cumulative or mechanical learning. This type of learning is characterised by being an isolated formation, something new that is not a part of anything else. Therefore, cumulative learning is most frequent during the first years of life, but later occurs only in special situations where one must learn something with no context of meaning or personal significance, for example a PIN code. The learning result is characterised by a type of automation that means that it can only be recalled and applied in situations mentally similar to the learning context. It is mainly this type of learning which is involved in the training of animals and which is therefore also referred to as conditioning in behaviourist psychology.

By far the most common type of learning is termed assimilative or learning by addition, meaning that the new element is linked as an addition to a scheme or pattern that is already established. One typical example could be learning in school subjects that are usually built up by means of constant additions to what has already been learned, but assimilative learning also takes place in all contexts where one gradually develops one’s capacities. The results of learning are characterised by being linked to the scheme or pattern in question in such a manner that it is relatively easy to recall and apply them when one is mentally oriented towards the field in question, for example a school subject, while they may be hard to access in other contexts. This is why problems are frequently experienced in applying knowledge from a school subject to other subjects or in contexts outside of school (Illeris 2008).

However, in some cases, situations occur where something takes place that is difficult to immediately relate to any existing scheme or pattern. This is experienced as something one cannot really understand or relate to. But if it seems important or interesting, if it is something one is determined to acquire, this can take place by means of accommodative or transcendent learning. This type of learning implies that one breaks down (parts of) an existing scheme and transforms it so that the new situation can be linked in. Thus one both relinquishes and reconstructs something, and this can be experienced as demanding or even painful, because it is something that requires a strong supply of mental energy. One must cross existing limitations and understand or accept something that is significantly new or different, and this is much more demanding than just adding a new element to an already existing scheme or pattern. In return, the results of such learning are characterised by the fact that they can be recalled and applied in many different, relevant contexts. It is typically experienced as having understood or got hold of something which one really has internalised.
Finally, over the last few decades it has been pointed out that in special situations there is also a far-reaching type of learning that has been variously described as significant (Rogers 1951, 1969), expansive (Engeström 1987), transitional (Alheit 1994) or transformative learning (Mezirow 1991). This learning implies what could be termed personality changes, or changes in the organisation of the self, and is characterised by simultaneous restructuring of a whole cluster of schemes and patterns in all of the three learning dimensions—a break of orientation that typically occurs as the result of a crisis-like situation caused by challenges experienced as urgent and unavoidable, making it necessary to change oneself in order to get any further. Transformative learning is thus both profound and extensive, it demands a lot of mental energy and when accomplished it can often be experienced physically, typically as a feeling of relief or relaxation.

As has been demonstrated, the four types of learning are widely different in scope and nature, and they also occur—or are activated by learners—in very different situations and connections. Whereas cumulative learning is most important in early childhood, and transformative learning is a very demanding process that changes the very personality or identity and occurs only in very special situations of profound significance for the learner, assimilation and accommodation are, as described by Piaget, the two types of learning that characterise general, sound and normal everyday learning. Many other learning theorists also point to two such types of learning; for example, Chris Argyris and Donald Schön have coined the well-known concepts of single and double loop learning (Argyris 1992; Argyris and Schön 1996), Per-Erik Ellström (2001) speaks about adaptation-oriented and development-oriented learning, and also Lev Vygotsky’s idea (1978) of transition into the ‘zone of proximal development’ may be seen as a parallel to accommodative learning.

However, ordinary discussions of learning and the design of many educational and school activities are concentrated on and often only aimed at assimilative learning, as this is the sort of learning that the usual understanding of the concept of learning is about. But today this understanding is obviously insufficient, and the much-demanded generic competencies can only be built up by a combination of assimilative, accommodative and, eventually, transformative learning processes.

**Barriers to learning**

Another problem is that much intended learning does not take place or is incomplete or distorted. In schools, in education, at workplaces and in many other situations, very often people do not learn what they could learn or what they are supposed to learn. Therefore I find it important also to discuss briefly what happens in such cases.

Of course, it cannot be avoided that we all sometimes learn something that is wrong (cf. Mager 1961) or something that is inadequate for us in some way
or another. In the first instance, this concerns matters such as mislearning, which can be due to misunderstandings, lack of concentration, insufficient prior learning and the like. This may be annoying and in some cases unlucky, but simple mislearning due to ‘practical’ reasons is not a matter of great interest to learning theory as such mislearning can usually be corrected rather easily, if necessary.

However, today much non-learning and mislearning are not so simple, but have a background in some general conditions that modern society creates, and in some respects the investigation and understanding of such processes are definitely as important as more traditional learning theory to understand what is happening and to cope with it in practice.

The central point is that in our complex late-modern society, what Freud called defence mechanisms – which are active in specific personal connections (cf. Anna Freud 1942) – must necessarily be generalised and take more systematised forms because nobody can manage to remain open to the gigantic volumes and impact of influences we are all constantly faced with.

This is why today people develop a kind of semi-automatic sorting mechanism vis-à-vis the many influences, or what the German social psychologist Thomas Leithäuser (1976) has analysed and described as an everyday consciousness. This functions in the way that one develops some general pre-understandings within certain thematic areas, and when one meets with influences within such an area, these pre-understandings are activated so that if elements in the influences do not correspond to the pre-understandings, they are either rejected or distorted to make them agree. In both cases, this results in no new learning but, on the contrary, often the cementing of the already-existing understanding.

Thus, through everyday consciousness we control our own learning and non-learning in a manner that seldom involves any direct positioning while simultaneously involving a massive defence of the already-acquired understandings and, in the final analysis, our very identity. (There are, of course, also areas and situations where our positioning takes place in a more target-oriented manner, consciously and flexibly.)

However, not only the volume but also the kind of influence can be overwhelming. Not least, on television we are faced every day with so much cruelty, wickedness and similar negative impact that it is absolutely impossible to really take it in – and people who cannot protect themselves from this are doomed to end up in some kind of psychological breakdown. Other new forms of similar overloading are caused by the endless changes and reorganisations many people experience at their workplaces, social institutions, etc. or by the helplessness that can be felt when consequences of the decisions of those in power encroach on one’s life situation and possibilities.

In the most important cases, for instance when a change to a basically new situation in a certain life area must be overcome, most people react by mobilising a genuine identity defence which demands very hard work of a
more-or-less therapeutic character to break through, usually by a transformative learning process. This happens typically in relation to a sudden situation of unemployment or other fundamental changes in the work situation, divorce, death of closely related persons or the like, and it is worth realising that such situations happen much more frequently in the modern globalised market society of today than just a generation ago.

Another very common form of defence is *ambivalence*, meaning that in a certain situation or connection one is both wanting and not wanting to learn or do something. A typical example is that people who unwillingly and without any personal fault have become unemployed on the one hand know very well that they must engage themselves in some retraining or re-education, and on the other hand strongly wish that this was not the case. So they go or are sent to some courses but it is difficult for them to concentrate on the learning and they use any possible excuse to escape, mentally or physically.

In all such defence situations, learning is obstructed, hindered, derailed or distorted if it is not possible for the learner to break through the defence, and the task of a teacher or instructor will often be to support and encourage such a breakthrough before more goal-directed and constructive training or education can take place. But teachers are usually not trained for such functions, although they quite frequently are necessary if the intended learning shall be promoted.

Another psychological mechanism which may block or distort relevant learning is *mental resistance*. This is not, in itself, so very time-specific, as all human beings in any society will experience situations where what they try to accomplish cannot be carried through, and if they cannot understand or accept the barriers they will naturally react with some sort of resistance.

In practice it is sometimes quite difficult to distinguish between non-learning caused by defence and non-learning caused by resistance. However, psychologically there is a great and important difference. Whereas the defence mechanisms exist prior to the learning situation and function reactively, resistance is caused by the learning situation itself as an active response. Thus resistance contains a strong mental mobilisation and therefore also a strong learning potential, especially for accommodative and even transformative learning. Often when one does not just accept something, the possibility of learning something significantly new emerges. And most great steps forward in the development of mankind and society have taken place when someone did not accept a given truth or way of doing or understanding things.

In everyday life, resistance is also a most important source of transcendent learning, although it may be both inconvenient and annoying, not least for teachers. In any event, today it should be a central qualification of teachers to be able to cope with and even inspire mental resistance, as precisely such personal competencies which are so much in demand – for example, independence, responsibility, flexibility and creativity – are likely to be developed in this way. This is why conflict or dilemma raising may be taken in as effective
but demanding techniques in some particularly challenging educational situations.

**Internal and external learning conditions**

What has been discussed in the above – the processes, dimensions, types and barriers of learning – I regard as features which should be included in any learning theory that aims at covering the whole field of the concept. However, there are also other issues that influence learning without being directly involved in learning as such and thus can be termed the conditions of learning. These issues are also taken up in my book *How We Learn* (Illeris 2007), but in this article I shall only shortly indicate what they are about.

The internal conditions of learning are features of or in the learner that influence learning possibilities and are involved in the learning processes. *Intelligence* is supposed to be a measure of the general ability to learn, but it has always been disputed whether or not a general and measurable instance of this kind exists, and there is certainly not a general agreement about its definition. Since 1983, American psychologist Howard Gardner (1983, 1993, 1999) has claimed that there are several independent intelligences – a view which to some extent corresponds to the understanding of learning presented here because it includes not only cognitive but also emotional and social abilities. A somewhat similar concept is about individual *learning styles*, but the nature and existence of these still seem to be more an open question. In contrast to these general measures, it is obvious that the more specific individual features of gender and life age to some degree influence the learning possibilities.

The external conditions of learning are features outside the learner that influence learning possibilities and are involved in the learning processes. These can roughly be divided into features of the immediate learning situation and learning space and more general cultural and societal conditions. The kind of learning space makes up for differences between everyday learning, school learning, workplace learning, net-based learning, interest-based learning, etc. and for difficulties in applying learning outcomes across the borders of these spaces – the so-called ‘transfer problem’ of learning (Eraut 1994; Illeris *et al.* 2004; Illeris 2008). General societal conditions are dependent on time and place: obviously the learning possibilities are much more wide-ranging today than a century ago and they also differ between the countries and cultures of today.

Finally, some important questions about the use and applicability of learning theory, especially in the areas of educational practice and policy, are also briefly discussed in the book. Some very common misunderstandings in these areas are pointed out, as well as some typical connections between different understandings of learning, different schools of pedagogy and different fundamental assumptions of learning policy. In the last chapter, the book concludes by mapping the most important understandings and theorists of learning in relation to the learning triangle shown in Figure 1.3.
Conclusion

The general conclusion is that learning is a very complicated matter, and analyses, programmes and discussions of learning must consider the whole field if they are to be adequate and reliable. This implies, for instance, that all three learning dimensions must be taken into account, that the question of relevant learning types must be included, that possible defence or resistance must be considered and that internal as well as external learning conditions must also be dealt with. This is, of course, a very wide-ranging demand. To word it differently, it could be said that if for some reason it is not possible or appropriate to include all these areas, it must be clear that the situation or process has not been fully covered, and an open question will remain as to what happens in the areas that are not discussed.

I shall round off by illustrating this more concretely through two examples from my own research and practice.

The first example has to do with youth education. Many Western countries have a high ambition to the effect that all or the great majority of young people should complete some academically or practically qualifying post-16 education programme. The goal of the Danish government is for 95 per cent to receive such qualifications, but although 95 per cent commence a programme, less than 80 per cent complete it.

This, of course, has been the subject of a great deal of research, debate, reforms, etc. but with almost no or even negative effect. From a learning point of view, it would seem not to have been fully realised that today young people of this age are highly engaged in a process of personal identity development, which is an absolute necessity to be able to navigate in the late-modern, globalised market society. Therefore, young people fundamentally meet all learning initiatives – consciously or unconsciously – with such questions as: What does this mean to me? or What can I use this for? – implying that it is only worth paying attention to if it is subjectively accepted as a usable contribution to the present demands of the identity process. And the premises of this judgement lie equally in all three learning dimensions, i.e. the programme offered must not only have an acceptable, interesting and challenging content, it must also contribute to an acceptable positioning in relation to contemporary trends on the youth lifestyle market, and it must be organised in ways and by teachers or other persons who are in harmony with the personal needs of the young learners. One may think that such demands are not relevant or acceptable, and many people in the educational field are of this opinion, but the inevitable consequence will then be a continued high drop-out rate (see e.g. Illeris 2003, 2007).

The second example is about retraining of low-skilled workers who against their will have become unemployed – which is a very frequent state of affairs in today’s society. These adults are very often referred to various practical courses to acquire a basis for employment in a new trade where it is possible to get a
job. But the process leading to this has been experienced not as guidance (as it is officially called) but as placement. Furthermore, even when the person in question realises that the training may lead to a return to the labour market, which is usually a very strong wish, their identity is tied to their former trade and a strong defence blocks the engagement in new learning. If the guidance received had made time for personal reflection and participation in the decision, this defence could have been overcome. When asked, the great majority of people in this situation answer that they would probably have chosen the same course, but they had not been given the opportunity to make the mental switch before the course. Now they are forced to undergo a demanding transformative learning process at the same time as they are expected to acquire a great many new practical qualifications (see e.g. Illeris 2006).

In learning terms, in both of these examples a lot of resources are invested in endeavours that have little or no chance of success because the considerations of the ‘system’ or the authorities have not included an adequate and realistic analysis of the learning situation.

References


