

# Educational Dimensions of MicroLearning – Towards a Taxonomy for MicroLearning

Peter Baumgartner

Baumgartner, Peter. 2013. "Educational Dimensions of MicroLearning – Towards a Taxonomy for MicroLearning." To be appear in: *Designing MicroLearning Experiences - Building up Knowledge in Organisations and Companies*, edited by Martina Roth Peter A. Bruck and Michael Sedlaczek, ?? Innsbruck: Innsbruck University Press.

*The paper presents an educational taxonomy as an overall framework for planning and designing educational interactions. The proposed categorization system involves a two dimensional table consisting of different stages of didactical descriptions (X-Axis) and different levels of educational actions (Y-Axis). The paper explains the pedagogical motivation and rationale for this taxonomy and its functionality.*

*In the second part of the paper I will show where MicroLearning is situated in this general classification framework. I will deal with the genuine differences to other educational fields in the taxonomy and the main reasons why a different theoretical approach for this area of the taxonomy is necessary. To strengthen the research I will suggest an adaption of the theory of communicative action, developed by Jürgen Habermas and will demonstrate its usefulness for further advances in the MicroLearning paradigm.*

## Introduction – The Need of an Educational Taxonomy

There is a lot of skepticism in some areas of the humanities and especially by educational practitioners in using formalized tools and methodological frameworks. It is suspected that these aids cannot cover the extremely broad range of educational activities and it is therefore assumed that these tools constrain innovative educational practice. They could be helpful for novices but experienced teachers will be hindered in their creativity for a learner oriented instructional design. Most of the current didactical guidelines, which are used in teachers' education, support this critical claim. Examples are the templates still used in many training institutions to assist the lesson planning process of schoolteachers. These forms are too narrow in their use concerning time schedule and almost block teachers from developing a holistic outlook on the realizing their broader educational goals. In contrast to these restraining templates we need a framework, which may not only support but also generate creativity and educational variety. Such a systematic framework has to meet at least two characteristics in order to support diversity (Baumgartner 2009, 13–44):

1. **Innovation:** Didactical innovation is not constrained if (a) the taxonomy provides a sufficiently large repository of cases and (b) the classification system is well founded and transparent. A huge repository which clusters educational scenarios under systematic and theoretically sound premises nurtures didactical diversity for the following reasons:

Inexperienced novices will not only discover many instances of what they are looking for, but the dazzling array of exemplars, cases, opportunities, strategies and scenarios they encounter will already be grouped and "tamed" into categories. They will therefore not be overwhelmed by complexity and be encouraged to experiment with as yet unknown situations.

Experienced experts, on the other hand, will take the reduced complexity as a starting point for their inquiry. They will modify, amplify, add, and substitute where necessary. Taxonomies are tools that can be adapted and should not be considered holy, sacrosanct and inviolate shrines.

2. **Heuristic:** Serving as heuristic tool is a very important property of all classification systems. Special attention is drawn to all inconsistencies, as they are a challenge to the whole taxonomy and its underlying principles. Either these discrepancies disappear or the taxonomy itself will be discredited. On the other hand, finding solutions to the inherent problems of the taxonomy helps to improve it and demonstrates the usefulness of the constructed classification schema.

A lucid example of this function of a taxonomy is the discovery of the periodic table of elements as the observed gaps inspired scientists to investigate these inconsistencies and find ways to fill in the blanks, which – as we now know – resulted in a success story and confirmed the periodic table.

If discrepancies are observed in taxonomies, their resolution supports the continuing process of “discovery” and the accompanying theory construction. Either solving the puzzle or not solving it leads to a revision or even replacement of the theory.

## Taxonomy of Instructional Methods

Working in teacher education for nearly 30 years I have noticed the lack of such a reference system in many training sessions. Trying to overcome this problem for many years I have developed a two dimensional taxonomy table (cf. Figure 1) as a proposal to fill the mentioned gap. The formal idea of a taxonomy of two dimensions was inspired by “A Taxonomy for Learning, Teaching, and Assessing” (Anderson et al. 2000) and my realization of the table dimensions as different layers of educational actions and different levels of descriptions was motivated by Karl-Heinz Flechsig, a late German

#	Layers of Educational Actions	Levels of Educational Abstractions					
		Descriptions	Methods		Principles	Dimensions	Categories
			Patterns	Models			
		1	2a	2b	3	4	5
H	Internat. Systems						
G	Nat. Systems						
F	Institutions						
E	Curricula						
D	Modules						
C	Ensembles						
B	Scenarios						
A	Interactions						

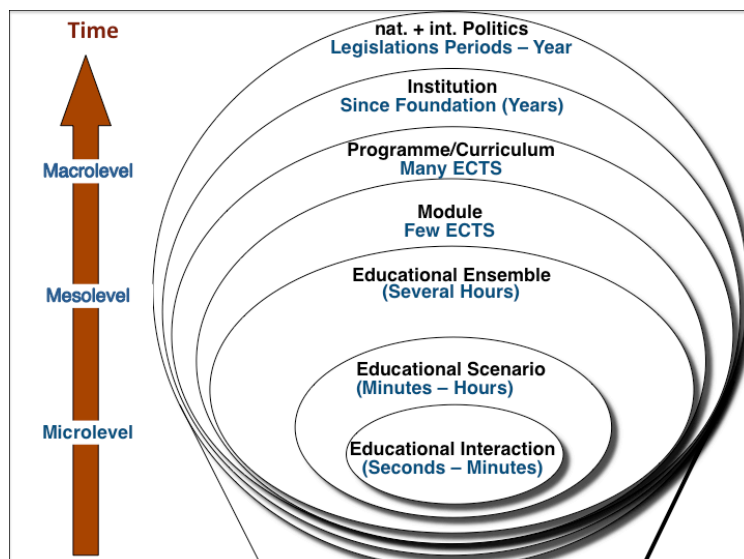
**Figure 1: Educational Taxonomy**

Educational Scientist (1996; 1996).

To understand the system of categorization I will comment on these different columns (action levels) and rows (description levels) and present a series of definitions for a better understanding how to handle this taxonomy. For a detailed discussion of the significance of different columns and rows of this two dimensional table see my German book (Baumgartner 2011).

### Action Levels for Learning Settings

The idea of action level is motivated by the philosophical premise that the real world is structured hierarchically into different layers. Philosophers like Nicolai Hartmann and Michael Polanyi (Hartmann 1964; Polanyi 1974) have argued that each of these distinctive strata follows characteristic laws. A water molecule, for instance, contains of one oxygen atom and two hydrogen atoms and behaves complete differently as their individual atomic components. Water as a chemical substance form an even higher-level stratum as H<sub>2</sub>O molecules and has properties (like liquidity), which cannot be found on the molecule tier. You cannot take out just one molecule and describe it as liquid. It is the specific relation of their (lower-level) parts, which generates the new attributes of the (higher-level) compound chemical substance, a process designated with the philosophical notion of “emergence”.



**Figure 2: Action Levels and Learning Time**

Under a monistic worldview the same idea, which is valid for physical objects, has to be applied to the realm of humanities and social sciences as well. It follows that there also exists a hierarchy of (educational) interaction levels, where the specific laws of each of these tiers are to be observed. This is especially important for planning and designing (educational) interactions.

Figure 2 on the previous page not only shows the different levels but also their distinguishing feature “learning time”, which is generally very different to physical time. It means “learner workload” in EU parlance and is measured in ECTS (European Credit Transfer and Accumulation System) or

ECVET (European Credit System for Vocational Education and Training). It functions as a standard for comparing the study attainment and performance of learners.

For educational design purposes especially the levels from A-E are especially interesting and theoretically rewarding. The layers D and E are important for planning and designing curricula for formal education, which underlies special laws in combining different courses to build up certified competences. I will not go further into details of these higher levels for educational design. The tiers from B-C on the other hand are more basic and consists of laws which genuine educational background.

As these two layers are educationally very important most of the books on teaching methods are dedicated to explain their laws and how to design situation which are pedagogically sound and effective.

**Definition 1.** A Scenario is defined as an educational setting in the time frame of several minutes to about one hour of learning time. It describes an educational arrangement designed or set up to provide a methodological educational unit. This action level creates didactical driven units under the aspects of time, space and social configuration.

**Definition 2.** An Ensemble is defined as an educational setting in the time frame of about one hour to several hours of learning time. It describes the learning goals for a specific subject and the formation of different scenarios for reaching the specified learning target. This action layer creates thematic driven units under the aspects of scenario configurations.

Comparing both definitions you will find a special relationship between them: The “higher” educational action layer contains the “lower” layer. The proposed taxonomy is therefore an inclusive hierarchy; the “lower” layers are included in the “higher” ones. The different educational action layers are defined by their learning time but they can also be grouped by their difference in scope.

**Definition 3.** A scope of an educational action layer is defined by its range of influence, its extent of impact to the educational system. It is a yardstick of the action radius for educational design.

But in this paper I will concentrate on the lowest layer A, which – in my point of view – gives rises to the domain of MicroLearning.

## ***Description Levels for Learning Settings***

The X-axis of the taxonomy table is divided into different levels of educational abstractions. I distinguish between six levels, whereas in Flechsig’s conception only exist three levels of generalizations. Twice as many description levels are of practical importance because it reduces the cognitive distance between different levels.

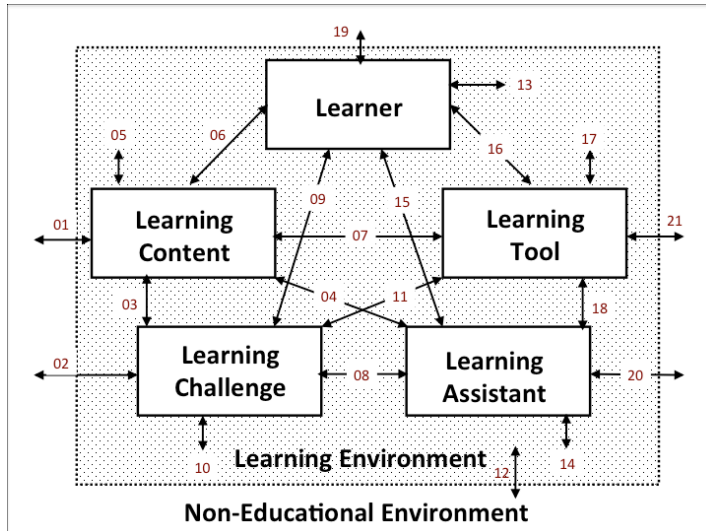
Grasping the idea of description levels is more complicated than understanding action layers. In contrast to the Y-axis of action layers “lower” levels of descriptions are not included into “higher” levels but they represent the *same* phenomenon with a different – more abstract – description than the “lower” level. In the following section I will specify not only the most interesting row 2 of educational methods (including educational models 2b and educational patterns 2a) but also briefly outline the other description levels. For didactical reasons I will start with the most general abstraction tier 5.

**Level 5** is formed by a very general educational model, which only consists of categories of the main classes of objects involved in the educational process and their relationships. This so called categorial model is composed by the most important categories of the underlying educational theory.

A very famous but in the meanwhile outdated categorial model is the “educational triangle”, consisting just of the classes “teacher” (which forms the top of the triangle), “pupil” and “content”. It is not only antiquated because of its simplicity – lacking other important categories like learning environment and learning tools – but also of its teacher-centrism. In the original form its relations are unidirectional, starting from the top (teacher) to the “pupil” which has to learn and reveal the “content” in special test situations to the “teacher” who evaluates and starts the triangle process again.

My proposed model is much more complex and consists of seven interrelated categories (cf. figure 3): In the center there is the category of “learner”, surrounded by the concepts “learning assistant” (in contrast to the

traditional “teacher”), “learning requirement”, “learning material”, “teaching/learning tool”, “educational learning environment” and “ambiance” as the environment which is given and cannot be designed educationally.



**Figure 3: Educational Categoricalmodel**

The abstract notions of the categorical model do only have theoretical implications as they serve as a repository for further educational research (how do these concepts interact and influence each other?) and the construction of educational theories. For practical usage it is necessary to go into more details in order to provide a less abstract systematic for the educational practitioner.

**Level 4** is formed by a so-called dimensional analysis, which investigates the characteristics of the educational categories. There are eight

dimensions directly inferred from the seven educational categories, which are

very crucial for every learning process. These educational dimensions I call educational modes. They are as follows: Number of learners, role of learner, role of learning assistant, type of learning requirement, structure of material, role of teaching/learning tool, role of educational learning environment and type of reference to the non-educational environment. But there are many other dimensions which are derived from the relationships between educational categories like type of learning action, cognitive process, knowledge type, competence level, learning style, type of feedback, degree of responsibility, degree of participation, degree of trust respectively reliance etc. In my book I distinguish as a starting point 26 essential educational dimensions knowing that some important other dimensions like type of motivation and type of assessment (evaluation) are still missing.

These educational dimensions are coordinates for the (multidimensional) design space for pedagogical interventions. They provide a kind of checklist, which expands the search room for attributes to change or design situations pedagogically relevant. They are still very abstract and therefore lacking immediate practical educational usage. But they give theorists like educational practitioners a first clue where to look for significant educational variables.

**Level 3** is formed by a composition of the word “learning” specified by an important aspect of the learning process like independent learning, holistic learning, enquiry-based learning, discovery learning etc. These educational principles are derived from the higher-level educational dimensions.

Each dimension consists of five ordered educational principles and is therefore a ranking scale including educational principles between two opposites. These opposites are not antagonistic but polar, meaning they can be differentiated. For instance: Between the two poles hot and chilly exist warm, lukewarm and cold. Similar with educational principles: The educational dimension “cognitive process”, for example, is divided into learning by remembering, understanding, applying, analyzing / evaluating, and creating (cf. the cognitive process notions by Anderson et al. 2000)

Educational principles are still very vague. They only give you the direction where to go to construct a situation pedagogically valuable but not all the details you have to observe and to control for educational design. But these principles do already have an immediate practical application: They give you the so-called educational surplus value for a specific situation. Every conceivable situation has to be understood as a multidimensional space built up by all educational dimensions. The differences between the situations are characterized by different educational principles within these dimensions. It follows that every situation is defined as a special configuration of educational principles.

**Level 2** is the common central description format for educational methods. This abstraction level is subdivided into the Level 2b and 2a. The first one is the more abstract one and is formed by the traditional way of

describing instructional methods. Here the essence and main characteristic of the method is explained as an abstract model in a context free way. In contrast the pattern format of Level 2a is closer to the practical situation and therefore better suited for a context sensitive application.

The pattern format is a special way of doing an educational description. I have drawn and adapted this format from the ideas of the architect Christopher Alexander, who developed a so-called pattern language (1977; 1979). Originally it was meant as a description framework only for building and planning houses and cities. This pattern approach – as it was called later on – emerged in the late 1970s and several years later researchers in different fields like software engineering, user interface design adopted it for their domain. In the late 1990s the work on pedagogical patterns started.

**Definition 4. "A pattern is, in short, at the same time a thing, which happens in the world, and the rule which tells us how to create that thing, and when we must create it. ... Each pattern is a relationship between a certain context, a certain system of forces which occurs repeatedly in that context, and a certain spatial configuration which allows these forces to resolve themselves" (Alexander 1979, 247).**

Thus, the three key elements of a pattern are just "context" or "forces", the "problem" and a "solution" which has already proved of value. The natural dominance of spatial configurations for architecture is replaced in my adapted proposal for educational usage by a similar importance of social configurations in education. This social arrangement in turn is characterized by my system of educational categories, dimension and principles.

Alexander says: "To make a pattern explicit, we merely have to make the inner structure of the pattern clear" (1979, 249). But to make the inner structure clear is in practice the most difficult task in pattern creation and has to be based on a thorough analyses of the forces which are involved in creating the situation and/or solution. Forces can be understood as the intention of actors with the qualification that in a metaphorical sense artifacts can also be viewed as actors. This view is not new in social sciences: Bruno Latour (2007) for instance is talking of non-human actors in his groundbreaking book on a new paradigm in sociology. Actor-Network-Theory (ANT) stipulates that human intentions are inscribed into artifacts by humans so that we can say for instance that a door "invites" to enter or leave a room. Objects, like teaching/learning tools for example, one of my seven main classes of the categorial model, can therefore be viewed also as actors. So the traditional main aspects of an educational setup (time, space and social configuration, cf. definition 1 of an educational scenario)" in the end boils down to a social arrangement resulting by foregoing social interactions.

To summarize the differences between the two tiers of level 2 we can say that a pattern catches the concrete processes of interaction whereas educational models are an abstract and therefore idealized description of the structures of educational interactions. A detailed example how the pattern format can be used for concrete educational descriptions is presented by a collection of 37 patterns for the application of electronic portfolios in educational settings (Bauer and Baumgartner 2012).

**Level 1** – to finish my explanation of the different description levels – is a very detailed but not formalized description, mostly reported as a chronological history of occurrences. It does not contain generalized conclusions of the applied instructional methods and is therefore not very beneficial for educational purposes.

As a summary of the description levels for learning setting we can say that the X-axis starts with very concrete statements lacking specified educational vocabulary and ends with very abstract notions lacking the necessary concreteness to guide teachers actions. The columns 3-5 designate description formats so abstract that even the distinguishing attribute of time for separating the action levels does not apply anymore in the same way as in column 2a and 2b.

In the remaining part of this paper I will focus on description level 2 (pattern and models) at the lowest action layer A where MicroLearning is situated. My main purpose is to discover the laws, which govern this special educational area.

# The Theory behind MicroLearning

## *Three prototypical models of education*

In "The Zen Art of Teaching" (Baumgartner 2004) I have outlined three prototypical models of education. I have explained these educational archetypes from the teacher's point of view and therefore called Teaching I, II and III. In line with the paradigm shift from teacher to learner orientation I will now use the concepts of Learning I, II and III and adapt the characterization accordingly.

1. **To absorb knowledge (Learning I):** In this model the origin of students' knowledge is based on knowledge possessed by the teacher. Teachers are not only supposed to know what students need to learn but also how they can absorb this required knowledge. It is therefore the teachers' responsibility to transfer this knowledge into the student's mind as easily as possible providing and helping the student to use well known cognitive strategies. The knowledge to accommodate is abstracted knowledge prepared in a special way (the so-called didactical preparation), so that students are able to capture the content not only fast, but also to memorise it on a long-term basis. (Model I has certain traits derived from behaviourism.)
2. **To acquire knowledge (Learning II):** This learning model assumes that learning is an active process, which has to be planned, revised and reflected by the learner. The learner itself is an active entity and it is his/her activity, which supports or even is a necessary condition for the learning process.

To understand the differences between Learning I and Learning II better I have to refine my arguments. Even the simplest form of knowledge transfer (Learning I) needs some activities by the learner (e.g. attention, listening etc.). The very dumb mode of learning by heart requires already a lot of engagement by the learner (e.g. rehearsal of the material to memorise). So even in Learning I nobody will claim that the learner is not a human being in some kind actively involved in learning. The differences are on a more subtle level: In Learning I the teacher is not interested to control or even observe the actual learning activities undertaken by the learner. What counts are just the results governed by the input of the teacher whereas in Learning II the whole learning process with all its intermediate steps, its difficulties and provisional results are under surveillance by the teacher. In the absorbing model learners essentially get the feedback "wrong answer" or "true answer" whereas in Learning II teachers try to help to overcome wrong assumptions, wrong learning attitudes and to assist in the reflection process in order to aid the student to build up a consistent internal mental model of the subject domain. (Modell II has kinship to cognitivism)

3. **To construct knowledge (Learning III):** In the model of Teaching II all problems and tasks are presented by teachers. This has various consequences:
  - a. Only the teacher practices the art of inventing and presenting problems. The student is taught to solve problems but not to "invent" and present them.
  - b. For pedagogical reasons the problems chosen have only one clearly defined solution.
  - c. For didactical reasons the problems are clearly cut and cleaned up so that the task at hand is evident and the solution is straight forward so that the problem can be solved in the limited time the curriculum guarantees.

In real life advanced knowledge especially professional knowledge (Schön 1984; 1990) is irreducible complex, uncertain, instable, unique and governed by value conflicts, which are not solved by reason but by power. Without going into details (Baumgartner 1993) the characteristics of professional knowledge mentioned above assumes that we live in an inherently turbulent environment with indeterminate problematic situations, which "are not in the book".

If we want to teach students to step onto the shoulders of teachers, to invent new things and to produce and generate new knowledge we have to provide a special challenging learning environment, which is authentic and therefore sufficiently complex, uncertain, instable and unique so that old traditional knowledge or solutions do not work anymore. (Learning III has strong links to constructivism.)

## *The Competence Spiral*

It is possible to see the different teaching models as different methods to provide optimal scaffolding for the individual learning career of a student.

1. **Learning I:** At the starting point the beginner needs some abstracted knowledge to provide the theoretical foundations and to get some signposts, road markings and orientation points. This kind of factual knowledge is static and has no value by itself in a real and complex situation. It serves just as a shortcut to prevent to fall into traps and to help to organise his or her experiences without too many failures.

2. **Learning II:** In this section of the individual competence career the learner applies the abstract knowledge and makes his or her own experiences. In order to limit the action and reflection possibilities the learner interacts with a somewhat restricted, artificial environment, which is reduced of complexity and easy to control by the teacher. To provide feedback this environment is designed in a way that includes some devices where learner can deposit their interim product and teachers can inspect it. It is a kind of Zen art to construct this observation points in a way that they fit naturally into the learning environment and do not disturb or alter the learning process.
3. **Learning III:** Teacher and learner work together to master problems. This model includes the generation or invention of the problem. The environment is constructed in a way that it represents at least in certain aspects reality or it is reality constrained by certain variables. There is a two-way communication on equal terms using either linguistic representations or other adequate kinds of languages.
4. **Learning I+:** After the first competence loop is completed the learner starts the loop from scratch but on a higher level or in another domain. Instead of just acting learners are revising their actions and experiences and try to improve or debug their performances. This is the reason why I do not call it a competence loop but a competence spiral.

### ***Action Structure on the Micro Level***

When we inspect all the different types of actions during the competence loop we will notice a specific relation between knowledge and action respectively between human and the external world. Based on the work of Donald Schön (1984; 1990) I am going now to describe these relationships in more detail.

#### **Knowing-in-action and Knowing-on-action**

It is pretty difficult to express and describe exactly our actions verbally. Well, everybody can utter the sentence: "I drive a car". But the feeling what that means varies among people. It is different to people who never drove a car and is different to people who own a fast car in contrast to people who never used a fast car. We live in the act and we feel what it means during the execution of the action.

But this is only the case with activities we use everyday, activities which are already (over)learned and routinely done. This kind of action knowledge is internalised, it is inseparable interwoven with the action itself. We call it with Donald Schön "Knowing-in-action". As an example imagine a skilled typewriter thinking or worse describing every action of his or her fingers. Sure, a beginner has to look at the keyboard and even to think which finger to move. However this is not a skilled action but an action to be learned. The knowledge is not in the action but separated from it. It is just Knowing-on-action which has still to be converted through a lot of practice into Knowing-in-action.

The main link in this learning phase is the relation of the learner to the external ("objective") world. In this case other humans can also represent (from the point of view of the learner) the objective world.

#### **Reflecting-in-action and Reflecting-on-action**

During the process from Knowing-on-action into Knowing-in-action verbal language (oral or written) is the perfect mode to transfer this kind of knowledge. Whenever the knowledge is settled into the body we need other means of communication. The performance itself demonstrates if the knowledge is already converted into Knowing-in-action. The only way to correct (to learn) the action is a reflection concerning the action execution and/or action product.

It is important to understand that this reflection process is inseparable from the action process itself. Imagine a jazz jam session where the musicians adopt to each other *during* their performance. In a certain way the adoption process *is* the performance, e.g. an artful jam session is nothing else as a skilled adoption process. This kind of reflection is called Reflecting-in-action whereas whenever we separate the reflection from the adoption we've got Reflecting-on-action.

The main link of this action structure is the relation to other humans, but in this case not as objects to "manipulate" but as a partner in a communication on equal terms.

#### **Reflecting-in-practice and Reflecting-on-practice**

**Definition 5:** Under "practice" I will understand a series of skilled activities, which can be separated into more or less similar "cases".

It is not necessary that these cases have the same characteristics; it is not even necessary that every pair of cases share a minimum of features. The connections between the cases are built by a specific pattern formed by a specific similarity in their characteristics, a similarity which Wittgenstein calls family resemblance (1984, §67).

Reflecting-in-practice and Reflection-on-practice characterizes the same process from two different perspectives. It is Reflecting-on-practice when a practitioner reflects *on* a series of actions *on* a meta level: S/he reflects all the different cases in order to change the whole practice which in turn has consequences *in* every further case (Reflecting-in-practice).

The main link of this action structure is the relation of humans in their mutual actions towards each other and toward the external, objective world.

## Communication Processes on the Micro Level

The type of communication used forms an essential property for each learning model. In this section I will try to specify the different elements of this communication process. My reasoning is based on the theory of communicative action by Jürgen Habermas (1995; 2006), which itself has one of its foundation in the theory of speech acts elaborated by Searle later on to a complete theory of mind (1969; 1983)

### Speech Act and Communicative Action

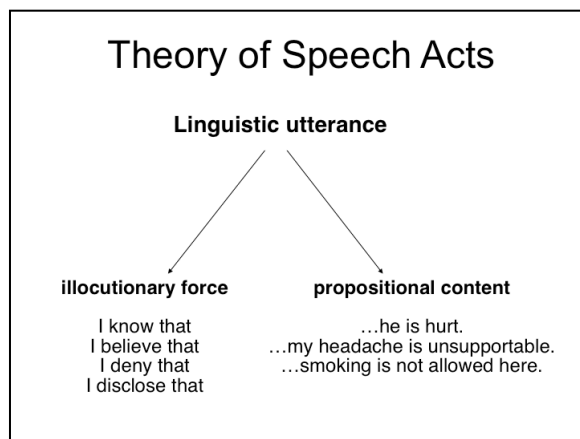


Figure 5: Structure of Speech Acts

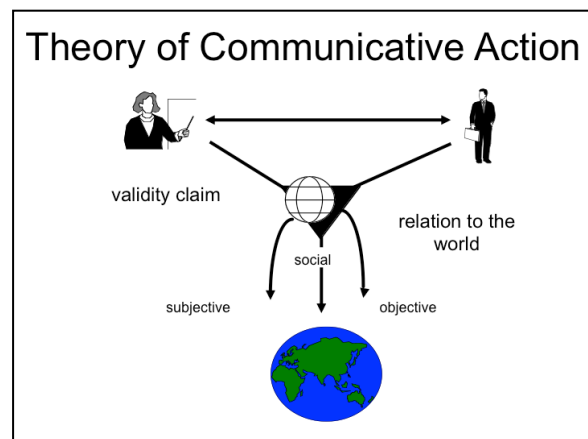


Figure 4: Threefold Validity Claims

In the theory of speech act each linguistic utterance is divided analytically into the content of the sentence (predicate) and into the relation of the speaker to the world. These two parts – the propositional content and the illocutionary force – are not only linguistically represented but can also be represented by actions. Whenever we enter a room we indirectly make the claim that the door is open so that we are able (or allowed etc.) to enter. On the other hand it is possible that the linguistically utterance itself is the action. For instance in the sentence: "I declare this conference open."

Habermas elaborates this model in two directions:

- There is no direct relation from the propositional content to the world. The content is a representation of the state of the mind of the person. It is a claim that a certain condition in the world is valid but it is not the condition itself. Take for instance the sentence "I believe that he is hurt." This phrase could be wrong or true on two different levels: First he is not hurt and second I do not really believe it.
- Every validity claim hidden in a propositional content can be discussed exactly in three ways: As a challenge to the objective, subjective or social world. This threefold argumentation structure is valid for every claim. Let's take the above sentence as an example. I could deny that he is hurt because I have seen him and talked to him recently. (Challenge against the objective world.) I could deny that you believe that he is hurt, because you are a liar. (Challenge against the subjective world). I could deny that you have the right to conclude that he is hurt, because you are not in a responsible position to know, e.g. because you are not a doctor. (Challenge against the social world.)



## Purposive and communicative action

Habermas distinguishes two fundamental types of coordination of action: control and consent. Control is characterised by purposive action. The aim of this type of action is to produce an effect on the world. Purposive action can be further differentiated by the distinction where the intended effect is produced - on the material world (instrumental action) or on other human beings (strategic action). Strategic action already is a form of social action: it includes another actor, but it is exclusively oriented toward a purpose (purpose-oriented).

It is easy to see that in Learning I this kind of control-oriented action is dominant. In this model of action, the actor (the teacher but also the learner!) is exclusively interested in the consequences and the success of its own action. This orientation towards success isolates the actor from the social environment: For him or her, the other actors are but antagonists. In this model of action, humans become social objects that are indistinguishable from other elements of the situation, i.e. physical objects. When the means-ends-relation is considered the only form of human action, the lonely rational actor is confronted with an objective world that has to be controlled. The actor's attitude towards the world is one of objectifying. Relations of power and exchange are typical examples of strategic action. This can be seen clearly in the model of Learning I. The teacher not only dominates the discourse and interactions, but s/he has also the power to classify right and wrong and to sanction the actions of the learner.

In contrast to this action and communication model Habermas develops the notion of communicative action. Here the aim of the actor is not to get confirmation for his egoistic plans, but to constitute understanding and shared knowledge. Therefore language as a medium of communication plays a decisive role. Although in Learning II the predominant goal is to convince the learner from a certain aspect it is still oriented to understanding and shared knowledge. The teacher draws on different strategies (s/he demonstrates, explains, describes, shows, etc.) to build up shared knowledge but s/he does not use power and sanctions. In Learning III the communication is more action oriented (as language is not feasible in any case) and it is more open to all kinds of communicative actions (teacher and learner describe and explain but they also disclose, admit, demand, permit etc.)

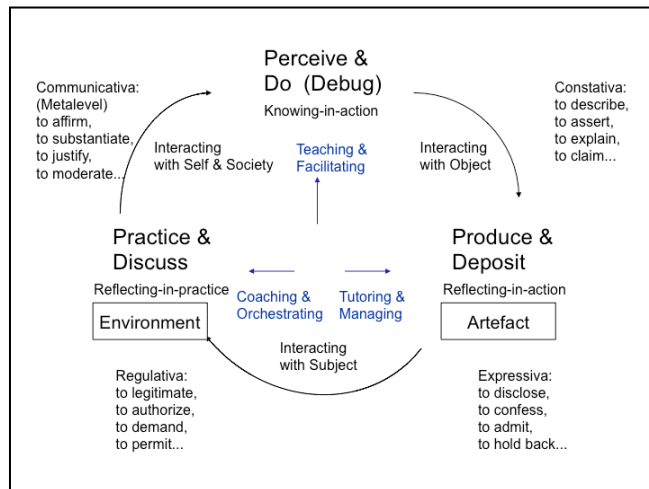
In this model of action, actors are mutually dependent on one another because they must agree on and coordinate their plans of actions. Where, in a teleological model of action, action can be regarded simply as a relation between an actor and the world, the case of the understanding-oriented model of action is much more complex. Here we presuppose, for each actor, the same actor-world-relationship, but this time in the form of reflective relations. The actors do not relate directly to things in the world, but qualify their (speech)acts given that their validity can be challenged or criticized by other actors. The actors try to coordinate their plans of actions by consent and to execute them only under the condition of a collectively achieved agreement.

## Summary – MicroLearning and its Underlying Laws

This section will focus again on field A2 of the educational taxonomy and merge the prototypical educational models, the competence spiral and the action and communication structure explained so far. Instead of developing a new MicroLearning theory holistically I will in a first try just outline my main hypothesis separately and still very general:

- a) The lowest level of educational interaction is governed by a combination of reflective and communicative action. To grasp and understand the more abstract reflective component (field 2b) the theory of the reflective practitioner by Donald Schön can be applied whereas the theory of communicative action by Jürgen Habermas, an elaboration and refinement of the theory of speech acts is a useful tool for analyzing and designing field 2a of the educational taxonomy.
- b) Inside the MicroLearning area A2 we pass different stages of the competence spiral: From interacting with the object (artifact or subject matter) via the interaction with the subject (teacher and co-learner) to the interaction and reflection with the society. The prototypical educational models of Learning I, II and III represent these three different phases of the learning circle respectively of the competence spiral.
- c) There is a direct match between these three moments in the competence career of a learner and the theory of practitioner (Level 2b): Learning I of a competent learner is represented by Knowing-in-action, Learning II by Reflection-in-action and Learning III by Reflection-in-practice.
- d) There is also a fit between these three stages of the competence career and the theory of communicative action (Level 2a): Learning I as the interaction with the object is represented by constativa, Learning II as the interaction with other humans is represented by expressiva and Learning III as the interaction with society is represented by regulative, whereas the reflection on the society is represented by communicativa.

- e) There is another outstanding feature on the MicroLearning level of the educational taxonomy: As the time frame is very narrow the two different types of time (physical time and learning time) collapse to each other and are therefore identical.



So far I have only sketched some basic ideas, which can be seen as underlying laws for MicroLearning. It is now necessary to investigate these concepts in the framework of the presented educational taxonomy. I believe that this could be the grounding for research and therefore for further advances in the MicroLearning paradigm.

**Figure 6: Competence Spiral with Theory of Practitioner and Theory of Communicative Action**

## Bibliography

- Alexander, Christopher. 1979. *The Timeless Way of Building*. Oxford University Press.
- Alexander, Christopher, Sara Ishikawa, and Murray Silverstein. 1977. *A Pattern Language: Towns, Buildings, Construction*. Oxford University Press.
- Anderson, Lorin W., David R. Krathwohl, Peter W. Airasian, Kathleen A. Cruikshank, Richard E. Mayer, Paul R. Pintrich, James Rahts, and Merlin C. Wittrock, eds. 2000. *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Longman Publishing Group.
- Bauer, Reinhard, and Peter Baumgartner. 2012. *Schaufenster Des Lernens – Eine Sammlung Von Mustern Zur Arbeit Mit E-Portfolios*. Münster: Waxmann.
- Baumgartner, Peter. 1993. *Der Hintergrund des Wissens - Vorarbeiten zu einer Kritik der programmierbaren Vernunft*. Vol. 26. Klagenfurter Beiträge zur bildungswissenschaftlichen Forschung. Klagenfurt: Kärntner Druck- und Verlagsgesellschaft m.b.H. [http://www.peter.baumgartner.name/schriften/publications-de/pdfs/hdw-buch.pdf/at\\_download/file](http://www.peter.baumgartner.name/schriften/publications-de/pdfs/hdw-buch.pdf/at_download/file).
- . 2004. "The Zen Art of Teaching - Communication and Interactions in eEducation." In *Proceedings of the International Workshop ICL2004, Villach / Austria 29 September-1 October 2004*, ed. Michael E Auer and Ursula Auer. Villach: Kassel University Press. [http://www.peter.baumgartner.name/material/article/zen\\_art\\_of\\_teaching.pdf/download](http://www.peter.baumgartner.name/material/article/zen_art_of_teaching.pdf/download)
- . 2009. "Developing a Taxonomy for Electronic Portfolios." In *The Potential of E-Portfolio in Higher Education*, ed. Peter Baumgartner, Sabine Zauchner, and Reinhard Bauer, 13–44. Innsbruck-Wien-Bozen: StudienVerlag. [http://www.peter.baumgartner.name/material/articleTaxonomy\\_for\\_ePortfolios.pdf/at\\_download/file](http://www.peter.baumgartner.name/material/articleTaxonomy_for_ePortfolios.pdf/at_download/file)
- . 2011. *Taxonomie Von Unterrichtsmethoden: Ein Plädoyer für didaktische Vielfalt*. Münster: Waxmann.
- Flehsig, Karl-Heinz. 1996. *Kleines Handbuch didaktischer Modelle*. Eichenzell: Neuland Verl. für Lebendiges Lernen.
- Habermas, Jürgen. 1995. *Vorstudien und Ergänzungen zur Theorie des kommunikativen Handelns*. 2nd ed. Suhrkamp.
- . 2006. *Theorie des kommunikativen Handelns*. 6., Aufl. 2 vols. Suhrkamp.
- Hartmann, Nicolai. 1964. *Der Aufbau der realen Welt. Grundriß der allgemeinen Kategorienlehre*. 3. A. Gruyter.
- Latour, Bruno. 2007. *Reassembling the Social: An Introduction to Actor-Network-Theory: An Introduction to Actor-network-theory*. New Ed. Oxford University Press.
- Polanyi, Michael. 1974. *Personal Knowledge: Towards a Post-critical Philosophy*. University of Chicago Press.
- Schön, Donald A. 1984. *The Reflective Practitioner: How Professionals Think in Action*. Perseus Books.
- . 1990. *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions*. 1. Auflage. John Wiley & Sons.
- Searle, John R. 1969. *Speech Acts: An Essay in the Philosophy of Language*. New Ed. Cambridge University Press.
- . 1983. *Intentionality: An Essay in the Philosophy of Mind*. Cambridge University Press.
- Wittgenstein, Ludwig. 1984. *Philosophische Untersuchungen: Werkausgabe Band 1*. Suhrkamp.