INTRODUCTION

"Humans do a lot of learning without even trying, outside any system of instruction, simply through imitation and immersion in a problem as a result of the context they live in, and even without realising it - this is called latent learning. Learning takes place over a lengthy period through observation and imitation (approximating to the model more or less closely)".

The Imitation / Modelling event
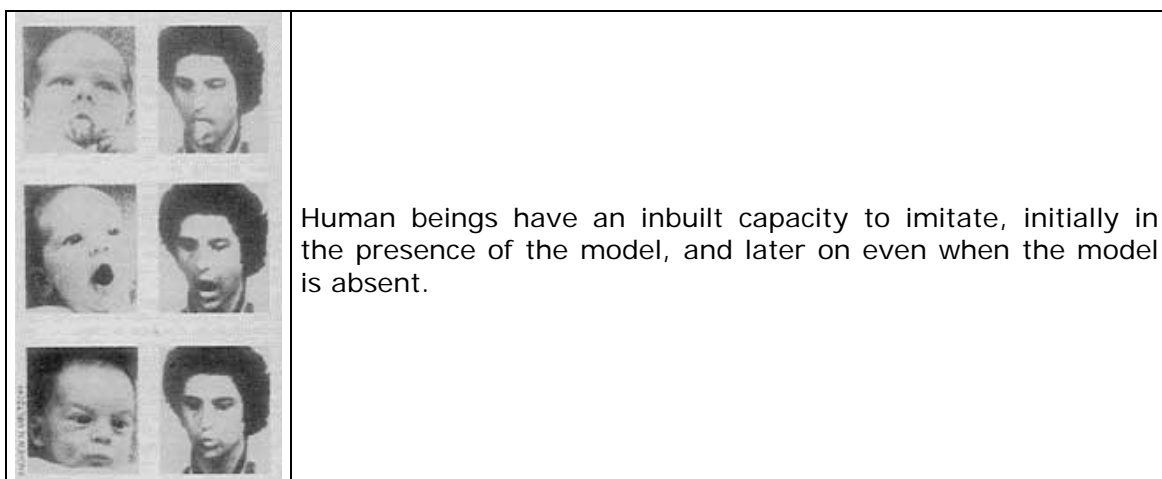

Des chasseurs achèvent
un mammouth à la lance

Since the dawn of mankind, humans have learnt by chance observation. Children have watched their parents hunting mammoths, and have exactly reproduced their actions, the cries they use to startle the beast, their way of lying in wait for it downwind. Observation and reproduction are often the prologue to other events such as experimentation or creation. Seeing a tree-trunk floating (accidentally) down a stream or river probably gave rise to the idea of boats. Seeing an animal crossing a river using a tree that had fallen across it (accidentally) probably gave rise to the idea of bridges. Seeing the heron putting its beak in the water to skewer a fish probably gave rise to the idea for a method of fishing. Seeing the warthog burying its snout in the earth in order to find truffles probably inspired the method of harvesting tubers using a hoe. Seeing an animal falling down a precipice probably led to mistrustfulness and prudence, or gave rise to the idea of a hunting technique. Seeing other humans adopting certain kinds of behaviour and experiencing their consequences enabled those who followed to avoid the pitfalls into which their predecessors had fallen.

The mechanisms of learning concepts and behaviour by observation were probably the same in the Neolithic and Paleolithic Ages as they are today.

The main differences today are that :

1. Our possibilities for observation have been multiplied by various **media** (magazines, television, films, Internet, multimedia) which can convey images, movement and sound, whether in real time (synchronously) or even offline (asynchronously).

2. Institutional initiatives make imitation far less dependent on chance happenings than in the past - indeed they impose it (**the family** systematically 'models' tooth-brushing, the use of the fork, the use of language, etc.; **school** models the use of writing, the point of reading; **the law** models which side of the road we drive on, etc.).

3. **Knowledge of the mechanisms** of imitation has increased, and is used by psychologists, trainers, advertising professionals, etc.


Human beings have an inbuilt capacity to imitate, initially in the presence of the model, and later on even when the model is absent.

	Children admire and imitate models: little girls copy what their mummy does, and little boys copy what their daddy does.

		The media, especially TV, is a source of models: crimes are committed in imitation of criminal techniques seen on TV which the perpetrators would never have thought of on their own, and series such as "Hélène et les garçons" and "Ally McBeal" are sources of imitation for generations of teenagers and young adults.

WHAT THE STUDENT WANTS/ WHAT THE TEACHER PROVIDES
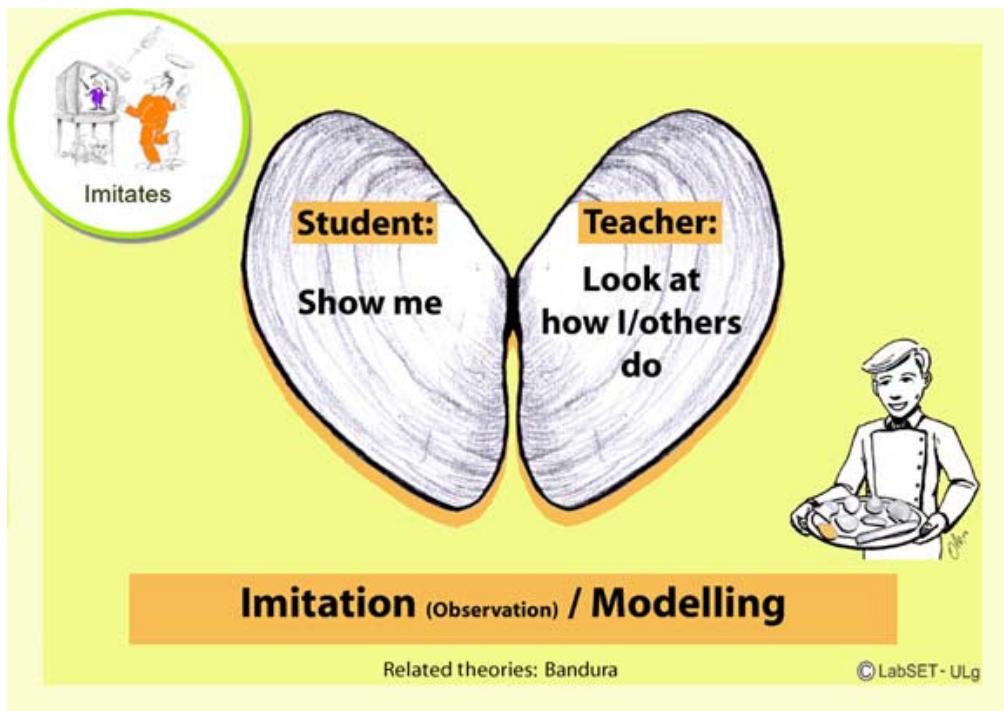
The names of the authors of the theories related to this LE appear below the image.

FOCUS ON THE ROLE OF THE TRAINER

The instructor's role is to provide models, and not necessarily to function as a model himself. For example a basketball trainer will show video clips of matches which he wants his players to imitate, or conversely to avoid imitating.

INTRODUCTION

"We all owe much of what we know to intentional communication, i.e. to the reception of messages (via the press, the radio, books, television, lectures, etc.) intended to provide us with information. This communication is encoded in a language (French, English, etc.) which the recipient must hold in common with the transmitter".

The Reception / Transmission event

The square above (taken from Hubert GERIN) represents two Chinese characters (kangis): on the left, in their most ancient form, as engraved in bone and painted on walls, and on the right, in their modern form. The top character means **teach**, and the bottom character means **learn**. In both cases, especially in the ancestral kangis, one can discern a child and hands which are grasping knowledge. By choosing these signs, we wish to bring up the subject of linguistic coding in communication.

Since the dawn of time, and universally, man has communicated with his fellow-men using **codes**. As early as the Neolithic Age, he was probably breaking branches on his way so that he could retrace his steps or show his hunting companions which way he had gone. Painting or tattooing parts of the body appears to be an age-old technique, sometimes to signify clan membership (scarifications of the face in West Africa), sometimes to signify social status (the dot or **'tika'** on Hindu women's foreheads), sometimes to signify the level of aggressiveness (war paint to frighten the enemy). The materials on which the codes are marked vary, from the heaps of stones formed at the crossing points between tracks by the Tuareg nomads of the desert to the light signals used on railways and waterways, via the insignia embroidered on soldiers' uniforms. In all cases, the meaning of the code has to be known to both the sender and the recipient for it to be understood. Thus, cartographers accompany their maps with legends, academies produce dictionaries and Egyptologists have decoded the hieroglyphs. The mechanisms of encoded communication have remained basically the same since the emergence of spoken language and especially the much more recent emergence of written language.

However, today has some special characteristics.

1. The quantity of messages has exploded since we have made the transition from GUTENBERG's universe, via MARCONI's universe (to employ MacLUHAN's terms), to the telematic universe.

2. The availability (in space and time) of the messages has been considerably increased via mediums such as cassettes, videos, mass memories, CD-Roms and above all the Internet.

3. Automatic translation from one language to another has become fairly effective, as has the automatic transcription of voice into writing, and of thought into voice.

|	
	The radio is a powerful transmission channel, because it is not restricted by distance. It is much used in Africa and South America. Of course a teacher's oral class is also an example of transmission, and it is only transmission if the iconic element, i.e. the image, is nothing more than a talking head. By contrast with imitation, you need to be familiar with the communication code, i.e. the language in which communication is undertaken by transmission. For example, a talk in Chinese or a written document in Chinese cannot be understood if you don't understand that language.

	Newspapers and writing in general are prototypes of asynchronous transmission: the emission of the message and its reception do not take place at the same time, unlike live radio and TV broadcasts, which are synchronous.
	Le magnétoscope et tous les systèmes Video recorders and all speech recording systems are media which enable the message to overcome the obstacle of time, as it can be re-received and re-heard as required. This means that synchronous exchanges can subsequently be used asynchronously.

WHAT THE STUDENT WANTS/ WHAT THE TEACHER PROVIDES
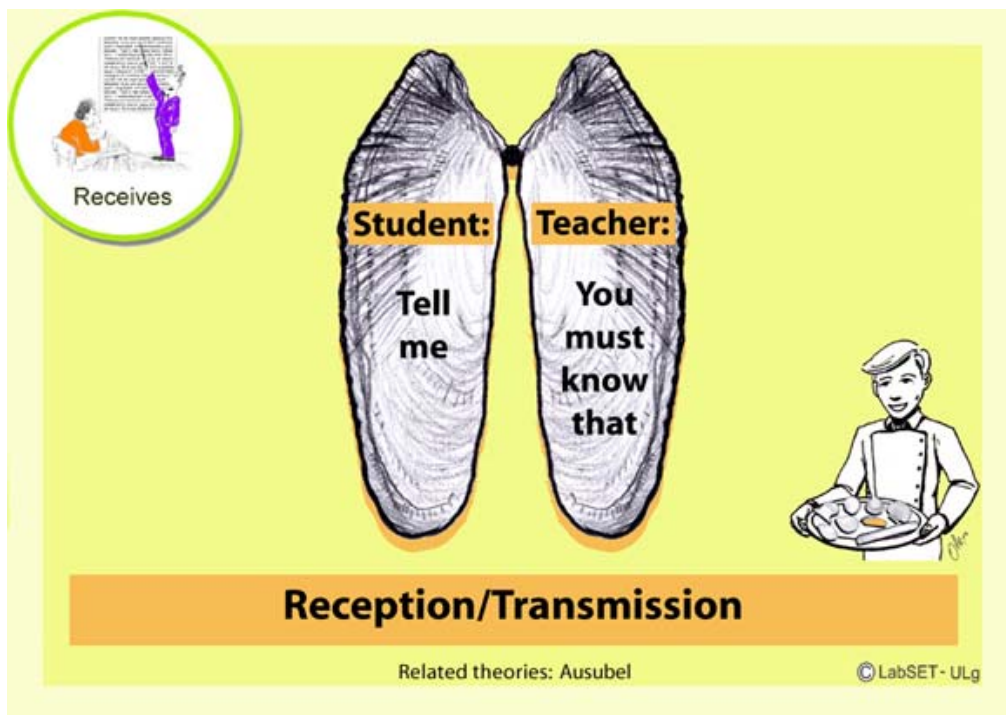
The names of the authors of the theories related to this LE appear below the image.

FOCUS ON THE ROLE OF THE TRAINER

In this paradigm or simplified model of transmission/reception, the instructor's role is obviously to transmit, or more precisely to formulate the message, to compose it, whether in writing, orally, or even using a sign system such as body language.

Exercisation

"Some fields, especially those in which it is important to devise procedures, to automate and in short to produce routines, are mastered faster if systematic practice (drilling) is provided. This is because the learner needs to interpret his internal stimuli in order to correct his actions. A good trainer is one who urges the learner to act, helps him interpret the consequences, keeps him motivated, and in short guides and corrects, during interactions which have basically been planned by the trainer (or coach). The difference between this paradigm and the previous one is that, to learn, in this case you have to act".

The Drilling / Guidance event

Exercisation

LE TRAVAIL DU SILEX

Un noyau de silex est mis en forme

Prehistoric hunters were most likely gradually initiated by the clan into the techniques of hunting, and novices, children, were not required to take on the wildcat right from the outset, but to monitor its movements, alert the tribe and drive the beast by making noise. Weapons would gradually have been entrusted to the novice; his hand would have been guided to help him hold his throwing stick, his bow or his sling. The novice's actions

- clumsy or effective - would have been appraised with shouts of anger or cries of joy. He would have practised thoroughly using easier, motionless targets, then gradually moved on to targets which were harder to hit. On the basis of these successes (positive reinforcement) and failures (negative reinforcement), he would have adjusted his actions. The same goes for his use of language. Here, it was others who would have given him feedback: by either understanding him or not.

What Bruner has termed 'social support' - learning by repeated practice, and under the guidance of others more expert than oneself - has always existed. It uses the same mechanisms today. However, today differs from the past in a number of respects.

1. We have seen a growth in the number of **fields** in which practice is used to promote learning: reading, writing, languages, musical instruments, dance, driving, typing, sport, handling an ever-increasing variety of tools and so on.

2. Theories are now available to explain the **mechanisms of learning** and making it possible to try to optimise learning.

3. **Interactive** resources now give learners access to relevant, rapid feedback on the quality of their answers, and enable them to benefit from highly progressive guidance. These software programs have an ancestor: **programmed teaching**, whose principles still remain valuable, even if its form has gone out of fashion.

INTRODUCTION

A coach undertakes both pre-performance activities such as showing what path to take and indicating the order in which actions should be undertaken, and post-performance activities, such as judging the quality of the performance, commenting on it, drawing attention to areas where improvement is needed and giving feedback.

WHAT THE STUDENT WANTS: WHAT THE TEACHER PROVIDES
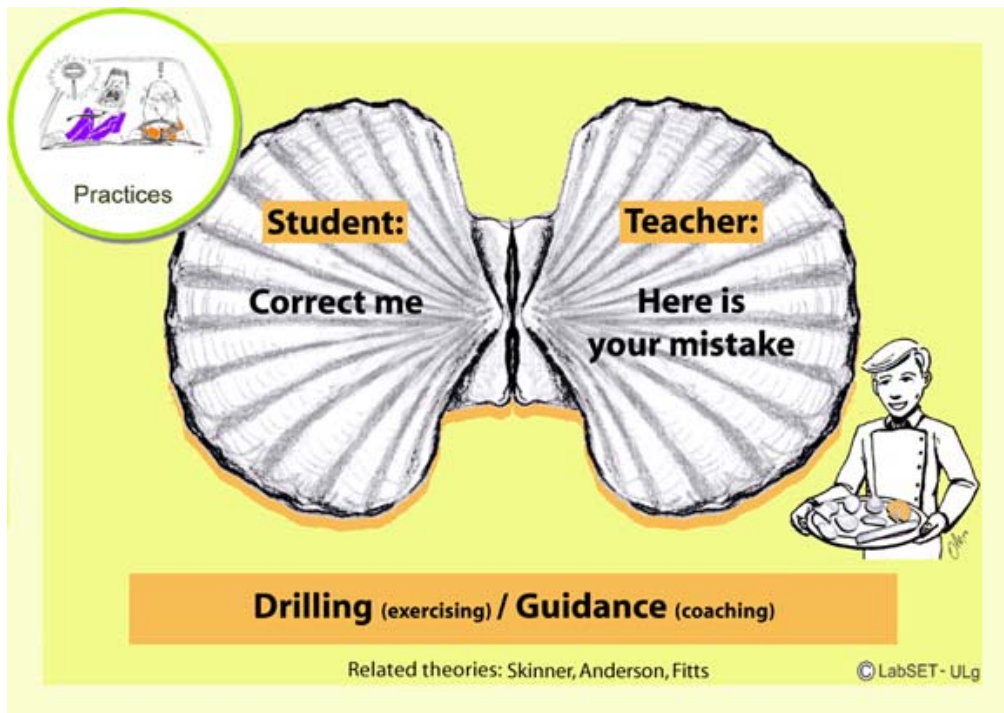
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FOCUS ON THE ROLE OF THE TRAINER

In this paradigm or simplified model of drilling/guidance, the instructor's role is to provide guidance. This guidance is twofold, occurring before the performance and after it. Before the performance he gives instructions, indicates what will be expected, and above all ensures a progression in the degree of difficulty involved. He draw's the learner's attention to potential pitfalls and difficulties to be avoided. After the performance, the instructor makes comments, provides feedback on what he has seen or heard in order to improve the performance. However, the instructor's role is to gradually bring the learner to the point where he can dispense with him and become autonomous, i.e. judge the quality of his performance for himself.

INTRODUCTION

"In certain areas, learning benefits from a personal approach. (Thus an individual tour of a city has its charms and its advantages, which are different from those of a guided tour). In a free exploration, a consultation, the initiative lies with the learner, who asks the questions, although he does not modify the subject of his exploration (he does not write in the books in the library or alter the content of the video cassette), he does not create knowledge which pre-existed him".

The Exploration / Supply event

KOLB (1984, p. 1) describes the human species as "the learning species". It is also the species that asks itself questions, the seeking species. Prehistoric man was already **exploring** his surroundings. He wandered around in order to discover resources and

refuges, and made **marks** in order to identify promising places. He cracked the cases of nuts in order to find out how the nuts tasted, opened shells to extract molluscs, climbed trees to look for nests, pulled up plants to assess their roots, smelt flowers to familiarise himself with their aroma, and chewed fruits to learn how they tasted. Each time, his **conceptual network** grew more complex. The answers to his questions varied with the environment. The steppes of desert lands did not **supply** possibilities for exploration in the same way as the coastline or the equatorial forest. And, last but not least, thanks to the appearance of language, man was also able to explore others' internal worlds by asking his fellow-humans questions. This is still the case today.

Today, however, the possibilities for exploration have diversified. To reality itself has been added the reality conveyed via the text, audio-visual media and, more recently, virtual environments (which, though not reality themselves, reproduce real effects).

The explosion of **hypermedia** sparked off by the Internet represents an infinite environment of possible explorations. It has given rise to new educational utopias, such as leaving the student in charge of his choice of subject and of deciding whether to undergo an evaluation at any given moment, or explore material, take samples, and so on. The means of communication (telephone, e-mail, forums) enable fellow-students' worlds to be explored remotely, either in real time (synchronously) or offline (asynchronously).

The museums are exploration places only if the visitor can linger over what he wants, walk around the way he wants and ask questions. The same museum is a transmission place if the group of visitors is only allowed to follow the guide and listen to his commentaries.

WHAT THE STUDENT WANTS: WHAT THE TEACHER PROVIDES
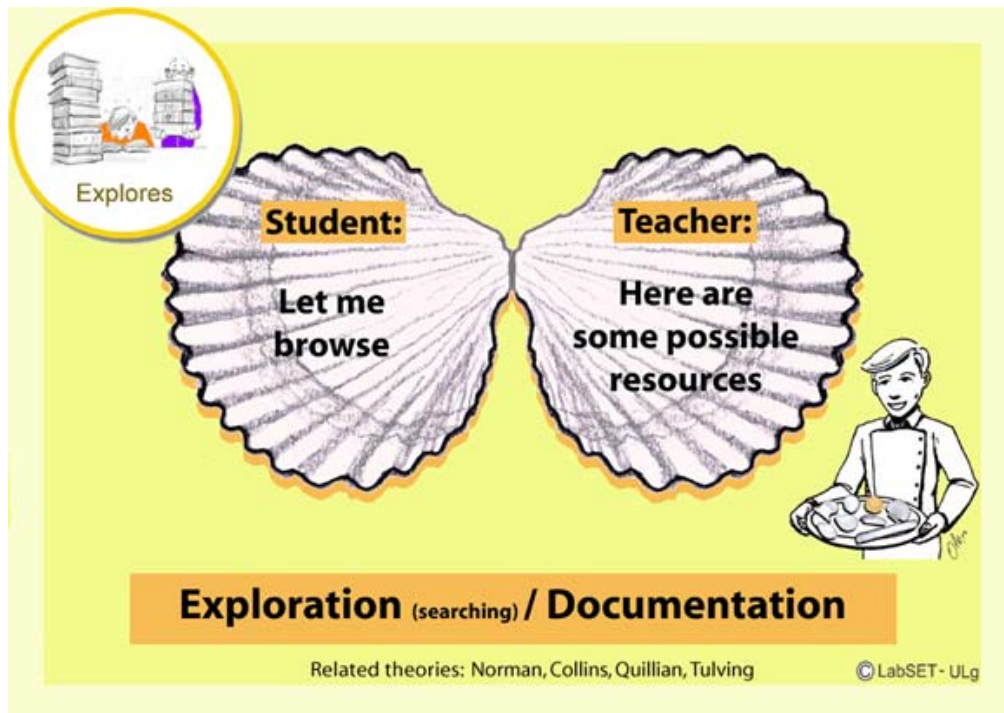
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FOCUS ON THE ROLE OF THE TRAINER

The instructor's role is to supply documents, to look after the documentation, and to document in some form; in other words, to reassure the learner that one or more environments exist which are available for the latter to explore.

INTRODUCTION

"There are cases where the learner needs to be able to experiment, i.e. to manipulate the environment - and, if necessary, modify it -, by exhaustively combining possibilities he regards as significant. In this way, he seeks to answer a question which has been set, having formulated and tried out his own personal hypotheses. PIAGET has shown that young children often use this approach, which all too often tends to be regarded by adults as simple repetition. The child's actions may be (or seem to be) the same each time, but his hypotheses differ constantly !".

The Experimentation / Responsiveness event

Once they had straightened up their spines and become bipeds, thereby freeing their hands from the task of movement, humans made those hands the servants of their ideas in order to solve their problems. Not least among these was the problem of making fire. It was a matter of trial and error. Flints could be struck together, or a vertical stick made to turn at high speed in a wooden crucible in order to produce sufficient heat to set kindling material alight. These ingredients were interchanged and tested out, and the law of effect meant that only the most effective were kept.

Other problems such as that of the dwelling-place were resolved over the ages by experimentation. Walls made of branches had dried mud and then stones added to them, resulting ultimately in the half-timbered methods of the Middle Ages. A similar process applied to food. From the Neolithic Age onwards, farmers also started selecting the most fruitful seeds, then the most productive animals, and so on.

Today, the process remains the same, although the scientific approach has been further systematised, at the instigation of Claude BERNARD, to produce the OHERIC approach (Observations, Hypotheses, Experimentation, Results, Interpretation, Conclusions, etc.).

Interactive multimedia enable experiments to be conducted in a manner which cuts down on the danger and cost involved and on the amount of time needed. Thus it is now possible to become initiated in experimentation using simulation in increasingly virtual environments - ones which, though not themselves reality, reproduce real effects.


Unlike exploration, experimentation requires the learner to be able to have contact with the world. This contact can be either real or virtual; in the latter case we refer to simulation.
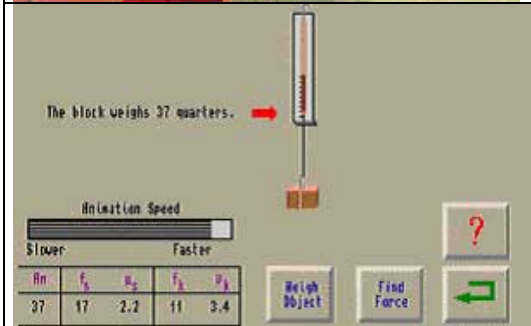
Simulations enable experiments to be performed, by changing the settings either continuously, e.g. by manipulating dials, cursors, handles or buttons, or analytically, e.g. by entering numbers via a keyboard.

WHAT THE STUDENT WANTS: WHAT THE TEACHER PROVIDES
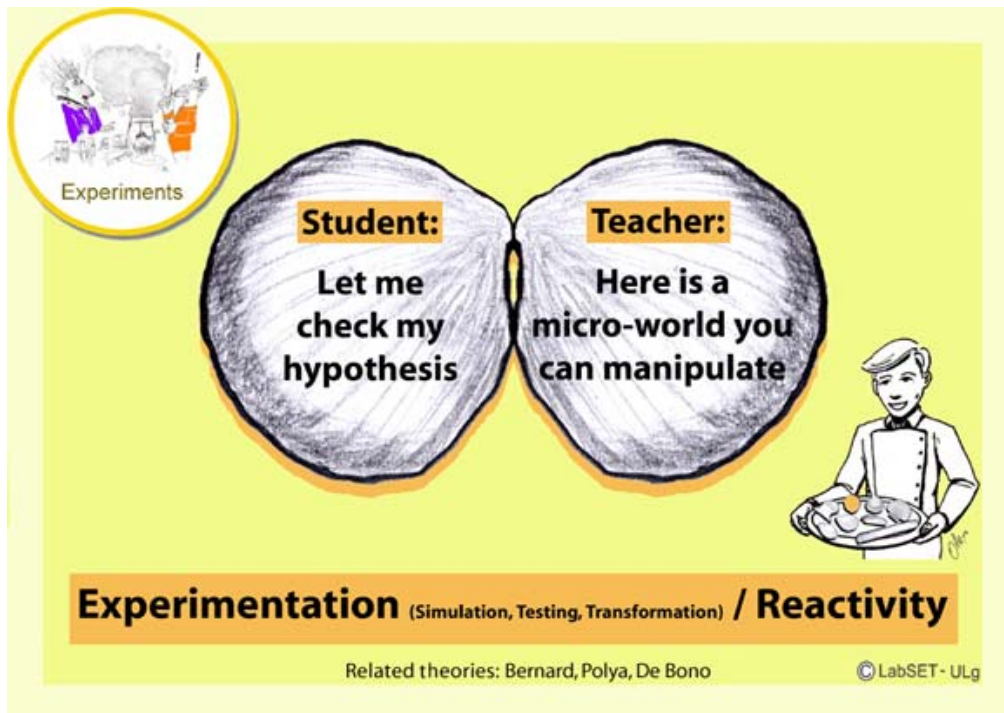
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FOCUS ON THE ROLE OF THE TRAINER

In experimentation, the coach's role is to provide a responsive environment, such as a laboratory and equipment which can be handled, or measuring devices.

Creates

INTRODUCTION

"We learn by **creating something new** (new to us), by building something up, by changing the world around us, by **producing concrete works** (texts, musical compositions, objects, buildings, shows, films, etc.) …often based on a personal idea, or an individual or collective plan. Of course, creation often reincorporates common elements. Thus, Beethoven, whose creativity is obvious, drew inspiration from Haydn"

The Creation / Reinforcement event

Creates

"Man invented art and the sacred before his belly was full". This saying of Jean-Marie ALBERTINI reminds us that prehistoric men were already embellishing the walls of their
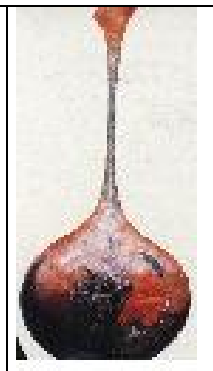
caves with rock paintings, and creating symbolic objects in bone, wood or stone to drive away evil spirits.

Their creativity went hand in hand with the observations that resulted from their experiments. Men had the idea of putting pillars in the middle of rivers to hold up their bridges, and went on to invent stone vaults and then weight-bearing arches until, with the lapse of time, they finally sent stone and glass cathedrals soaring up into the sky.

The creative artists were 'discovered' and protected by patrons at one time. Nowadays, this role is played by sponsorship or industry or the Belgian National Scientific Research Fund (FNRS). As they were starting their work, these creative artists would receive affirmation and support in the face of the difficulty of the challenges they would be meeting. But the moment of confrontation with reality or others' criticisms always came.

Today, the means of creation have been multiplied. Thanks to CD-Rom encyclopaedias and Internet navigators, a learner can build up his own collection of images and texts very quickly, and combine this basis with specialised presentation software to create multimedia or even hypermedia sequences.

Computer microworlds have been designed (such as LOGO), to enable learners, even very young ones who cannot yet read or write, to create by commanding robots. For a great many pupils, educational robotics could prove to be an elegant way of reconciling learning with the taste for a technology which makes creation possible.

The creation does not need to be unique: what counts is that it should be made by the learner, not copied.

WHAT THE STUDENT WANTS: WHAT THE TEACHER PROVIDES
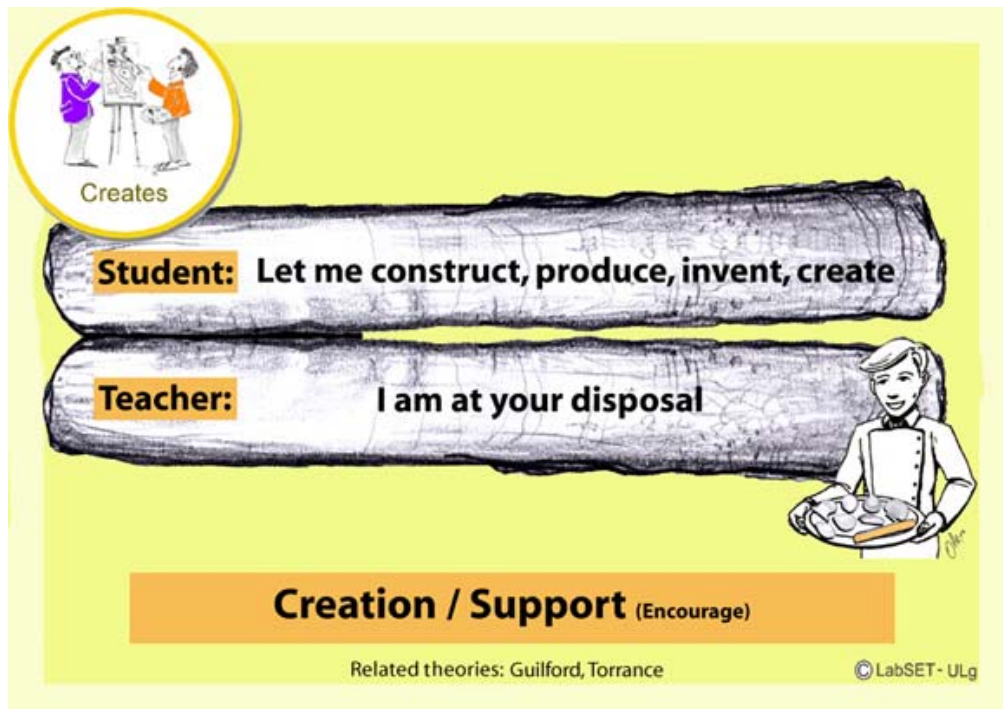
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FOCUS ON THE ROLE OF THE TRAINER

The role of the teacher is to confront, encourage because creating is a stressful process for a learner. Afterwards, the teacher will have to evaluation the production but also increase its value and the creation process of the learner.

INTRODUCTION

"Learning also occurs during social interactions among peers (socio-cognitive conflicts and collaboration). We regard these as "enzymes" or "catalysts" in the processes whereby the the learner's existing cognitive and affective structures are broken down and replaced by new ones. This learning event is very different from the others, because here, the partners are involved in a relationship which is not complementary, like that between the trainer and the trained, but symmetrical. The discussion between teacher and pupil is merely a specific instance of this debate, an extreme case of asymmetry. Moreover, social interactions are recognised catalysts in the construction of knowledge (DOISE, 1981, PERRET CLERMONT, 1979, ...), with socio-cognitive conflicts and cooperation promoting this process of breaking down old structures and replacing them with new ones".

The Debate / Moderation event

As was shown by Jean PIAGET, who devised the theory of 'constructivism' in intellectual development, each of us has to internally (mentally) reconstruct a representation of the world, the meaning of concepts and, above all, links (relations) between the latter and our own experience. This goes to show what a unique conceptual network each of us has, although we also have points in common with our fellow-humans, without which any communication would be impossible. The structure and interpretations of data with which we are 'bombarded', or the selection we retain from that data - our knowledge - is greatly influenced by what we have already acquired: our personal manner of interpretation.

Debate brings us up against other people's views, their structures, interpretations and meanings, which differ from our own and are sometimes incompatible with them. These 'socio-cognitive conflicts', as Perret-Clermont and Doise and Mugny called them, force us to defend our own viewpoint, and hence to explicitly define its foundations, logic and relevance. These conflicts also cause us to move off-centre - to emerge from our own egocentricity in order to take another's viewpoint into consideration. Either because of the difficulty of promoting our own viewpoint or because of the convincing nature of the other viewpoint, the equilibrium of our mental schemes, of the structure we have fashioned out of multiple elements, may be disturbed. This disequilibrium is then followed by a restructuring process and the achievement of a new equilibrium which is more stable, more effective and more relevant than the previous one, in that it provides an explanation for more phenomena, ties together concepts more logically and benefits from more subtle interpretations.

WHAT THE STUDENT WANTS / WHAT THE TEACHER PROVIDES

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FOCUS ON THE ROLE OF THE TRAINER

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|---|
| This seventh paradigm is very different from the rest as this time the partners are in a relationship which is no longer complementary (like the teacher and student or instructor and trainee), but symmetrical. Looked at in this way, the discussion between a teacher and a pupil is merely a specific instance of a debate, one in which the symmetry is extreme. |
| In debate, the teacher's role is to validate and make use of each contributor's suggestions, ensuring that everyone can take their ideas further. Rather than the teacher or tutor providing the answers they are familiar with and are able to find on a website, for example, they will encourage the learners to come up with their own responses. His role is also to encourage responses from those who are more shy or less inclined to express themselves, and in any case to validate the responses of those who have expressed their views. Responses always have some aspect which can be validated, although there are often aspects which can be criticised. A choice has to be made. |
| The trainer's role is to organise confrontation and debate. He should ensure that the debate takes place, and once it has started, ensure that it is held under optimal conditions, making sure, for example, that the rules of communication are observed. |

INTRODUCTION

"Metacognition is the activity in which a person reflects on his own knowledge, his own thinking, and even his own way of thinking. We therefore propose the term **meta-reflection** : thinking about your own thinking".

The Metareflection / Co-reflection event
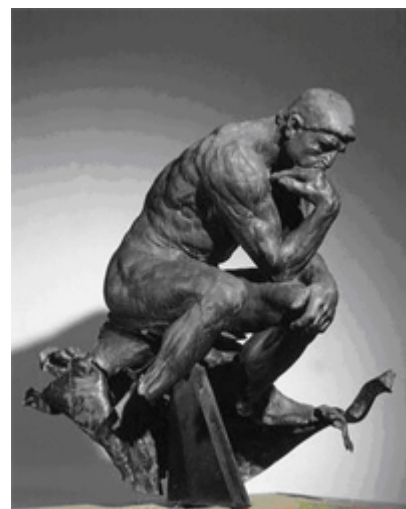
Metacognition is the activity by which a person reflects on his own knowledge, his own thought, and his manner of thinking. We would also draw the term metareflection to your

attention: reflection about your own reflection. This activity also includes the conscious, systematic management of your manner of learning, in what Bereiter and Scardamalia (1994) call 'intentional learning'. This metacognition takes various forms, such as assessing your own strengths and weaknesses or becoming aware of your preferences with regard to the way you learn (what is often called your 'learning style'), and the way you reason (what is known as your 'cognitive style').

Unlike other events which favour learning, such as modelling/observation, transmission/reception, etc., metacognition has appeared only very recently among learning mechanisms in general use. We say 'in general use' because it is clear that thinkers such as Socrates (Know yourself), Descartes (I think, therefore I am – Discourse on Method), Pascal (Decision theory), Bernouilli (Utility theory), Damasio (Descartes' Error – the sense of self) and plenty of ancient and modern philosophers have not only employed metacognition, but propounded analyses and theories of it. Nevertheless, the use that has been made of it has only concerned an infinitesimal proportion of human beings, compared with all its potential practitioners. For the vast majority of people, their personal representations regarding both the content and mechanisms of learning remain largely unconscious, and are the subject neither of evaluation nor of systematic analysis founded on stable approaches or references.

It is a challenge for contemporary education to provoke the emergence of metacognition on a mass scale, in the same way that it has emerged, under the term 'reflexivity', among teachers, in response to the work of Sch?The reflective practitioner, 1983), who distinguishes the ability to reflect both in the heat of action (in emergency situations) and about action (retrospectively). Approaches which vary with regard to their scientific foundations and methods of propagation, such as NLP (….and Grinder), self-management (Van Rilaer), mental acts (La Garanderie), etc. have sought to disseminate reflexivity.

The teacher promotes metacognition when he encourages his students to systematically evaluate the reliability of their answers to questions (with degrees of certainty, for example), to assess their progress and to diagnose the causes of their successes and failures, either in a specific course or, overarchingly, over several courses.

WHAT THE STUDENT WANTS / WHAT THE TEACHER PROVIDES
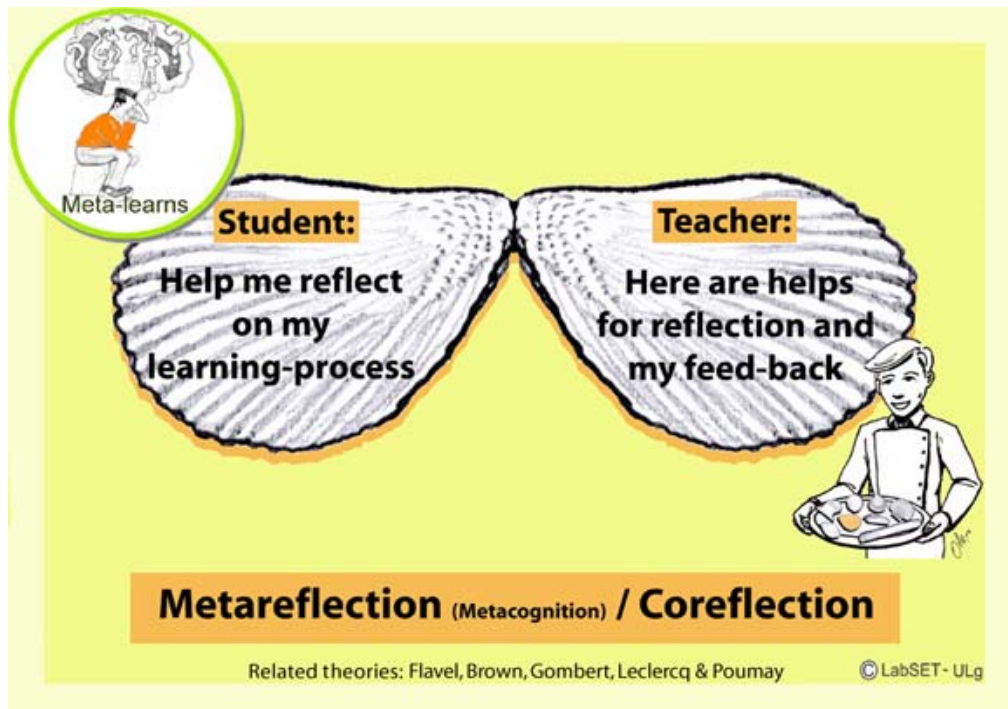
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FOCUS ON THE ROLE OF THE TRAINER

The role of the teacher in the metacognition process is to encourage the most he/she can the student to involve him/herself in that type of reflexive activity. It is also to help him/her to understand a certain number of evidences, whether they are mathematic or from another nature, in order to know to which extent he/she does overestimate him/herself, underestimate him/herself; to which extent it is occasional; to which extent the process in permanent, close to his/her personality.