
From Creativity to Responsible Createlligence® as Future Competence*

Klaus. K. Urban**

Distinguished colleagues, ladies and gentlemen,

it is a great honour and pleasure for me to talk to you today, a special day since it is my birthday, a special day since you have invited me to share my ideas and visions with you, all educational experts from quite a different region of the world, compared to that where I come from. But it is mostly relevant and necessary to exchange ideas and expertise, since what we are learning more and more today is that the world is a global village, that we all are connected into global systems, that we all together are children of that one and only mother earth, and only together can survive and develop.

Creativity as evolution and personal adaptive power

The well-known creativity researcher Csikszentmihályi (1990, p. 204) talks about creativity as "a special case of cultural evolution". I would like to go still further: From an evolutionary point of view creativity is the specifically human contribution to the development of planet earth with all its material and organismic resources and possibilities, and especially the human evolution. Creativity is the highest form of human evolution or *ideavolution* and creativity leads to evolution. At the same time: Evolution challenges and needs creativity. I would like to stress a metaphor saying that creativity at the same time is the engine

* Keynote address, delivered at "Conference on Teacher Training ..." College of Education, University of Qatar, Doha, Qatar, April 27-29, 2002.

** University of Hannover, Germany.

and the fuel of the human specific part of evolution, which has strong effects on all kinds of human and non-human environment.

Thus, from an evolutionary perspective creativity is a most valuable human resource, and the key to innovation. But, it becomes more and more obvious though that not all human creative ideas and products are positive in an evolutionary sense. Modern technology, science, medicine, biology open ways for developments which seriously have to be checked for their implications and effects for the future of individuals as well as for the total globe. Just in the past decades we had to learn that human activity has created even such environments which are not liveable or are inhibiting further creative thinking and doing. Human and humane *evolution*, not based upon anticipated responsibility, on responsible foresight, on high ethical standards and humanistic foundations, is always in danger to lead to "*Devolution*" or, let me play the nasty (word)game a little further, even to "*DEVILution*". I will come back to this at the end of my presentation.

We live in the information age; information is a very cheap commodity on the one side but was and is very valuable on the other side. Information is produced for consumption, its amount is unimaginable and growing. The speed of life and progress is increasing continuously, changes in all areas of daily living conditions are occurring faster and faster. All this is part and outcome of what I call "cultural evolution". This cultural evolution is not the necessary consequence of and determined by natural laws; lastly it is men's creativity which is responsible, the capability to consciously use, change, shape and create the environment. While on the one hand this speed and these changes are men-made, it seems at the same time on the other hand that men have steadily growing difficulties to cope with this shifting.

What looks like so-called progress from the one side, may cause handicaps on the other side. The adaptive potential of men's intelligence seems to come to its limits. If people should not become more and more passive recipients flooded by the "streams of life" and in danger of being "drowned", we need to wake up, develop and increase our creative potential which may give the possibility to become more active constructors of our lives now and in the future. Thus the outcomes of cultural evolution as a result of men's creativity challenge and require individual creativity in order to cope with it. Negative outcomes of so-called progress we have experienced during the last decades. So we are responsible.

According to Carl Rogers (1959) creative adaptation is the only possible way to keep up with the kaleidoscopic changes in the world. To quote Erika Landau: "A creative attitude towards life does help to master changing conditions instead of leaving them rule over us. Education for creativity procures those traits and abilities, which are necessary to expose oneself to uncertain situations and inconsistencies and to cope with them consciously." (Landau, 1990, p. 9). Due to her long experiences with creativity in education and psychotherapy she is deeply convinced that creativity involves the most important and meaningful ways and means to prepare everybody for life.

Thus, creativity as human potential and manifestation is not only psychologically important topic, but goes even far beyond science and arts, touching everybody's daily life as well as political, societal, and moral and ethical, global issues.

As every child is born with the disposition for creativity, society and education has to nurture this fragile capacity. The key for future innovation lies in the nurtured, unfolded, developed, freed creativity of our children. Thus creative education becomes a key issue for each responsible pedagogical concept for the future.

Creative education

"Creative education" as a key to innovation has multiple meanings:

- Education needs to be a creative one, since learning, teaching and instruction need to be creative, need to be flexible and innovative. These functions have to adapt on the one hand side to changing challenges and conditions from the outside, like changes and expansions in knowledge, curriculum and technologies, in organisation and structure, and on the other side teaching and instruction has to adapt creatively to inside conditions, to the personal and learning presuppositions of the individual learner.
- "Creative education" means an education towards creativity as an educational goal and principle. Again in a twofold manner: on the one hand creative education shall lead to the capability of effectively applying creative techniques, shall lead to the acquisition of certain thinking skills and styles, including divergent or lateral thinking, strategic, evaluative and meta-cognitive thinking, on the other side it shall contribute to building up a personality which is characterised by a general open and creative attitude.
- "Creative education" means education for the creative and talented person. Based on a qualitatively high level education for all there should be special consideration of gifted, talented, and creative individuals who still too often in today's schools are neglected or not even recognized and appreciated. I am stressing this idea especially in my function as President of the World Council for Gifted and Talented Children (www.WorldGifted.org), a global network of educators, psychologists, researchers, administrators and others interested in gifted education and research.

If creativity is a key to innovation, then creative education is the key to creativity. This sounds trivial and self-evident; but if we look into

most schools' instructional reality, then this simple, but essential message obviously has not arrived or been received.

We know that development and manifestation of creative potential are very much dependent on environmental conditions; education in school plays a major role here. It is astonishing though that there are only very few empirical studies in the literature dealing with creative education in schools.

Empirical studies

Does formal education influence top creative achievements?

By means of his quantitative-biographical method Simonton (1976) has investigated the question, how the degree of formal education, an individual had benefited from, influences the degree of eminence, that means the extraordinary expertise and capacity a person attains in his/her life, mainly because of creative achievements. Simonton's sample consisted of that group of 301 "geniuses", already Cox (1926) had studied in the frame of Terman's "Genetic Studies of Genius" with her historiometric method. Simonton came to the interesting result, that the relationship of the two variables of "eminence" and "formal education" could be described by a function in the form of an inverted U-curve. That means, up to a certain point formal training, school and university instruction seem to increase the probability of creative top achievements, but too much of formal education may diminish the individual chances to reach the top, probably since too strong a linkage into traditional perspectives of scientific or arts-specific contents takes place.

Simonton's answer to the question what amount of formal education is necessary in order to maximise the development of creative potential, reads preliminarily: a "moderate" degree, which includes the undergraduate studies at a college or the bachelor-degree at university. Finally a doctoral promotion seems to lessen remarkably the likelihood of

eminent achievements as compared to a masters degree, since the curve goes down then in a very steep manner. Positively formulated, formal education in school including the so-called higher education is by all means an indispensable presupposition for creative top achievements.

There are several reasons though, why this astonishing result may not become generalised without further empirical verification. Firstly, formal education may affect differently in different disciplines, different knowledge and achievement areas (for example, arts versus sciences). Secondly formal education may have changed substantially in the course of the centuries in which the person's from Cox's study have lived in. Thirdly, even today formal education cannot be described in an undifferentiated way; different organisation of school, college and university, different curricula, methods and teachers are of different value as far as their influence on development of creativity is concerned.

Again, we are responsible that creative thinking is not destroyed even in our most intelligent and diligent learners, that curiosity and quest for the unexpected remains implanted.

Have schools changed?

For schools in the USA Torrance et al. (1989) state in their article "A quiet revolution" , that in the last 30 years there has been a positive change regarding the promotion and nurturing of creativity. In his country-wide TALENT-study Flanagan (1976) had reported remarkable gains in scores for creativity and abstract thinking. These observations are seen as results of increased and stronger consideration of creative problem solving in curricula and teaching.

This is in contradiction to statements of Alencar (1995) who had found for her country, Brazil, that in school books creative challenges are neglected totally, like tasks asking for searching for new information, for

using imagination and fantasy, divergent thinking or for application of higher level cognitive thinking processes. But even for the United States she asserts, that there is too much focus on repetition and reproduction of contents, that most of the time, energy and resources are used up or wasted for tasks of lower thinking level or repetition in reading and recitation methods.

In my country I have the impression that demands and challenges for creative thinking offered by school books are higher than their real use in concrete instructional settings. For the primary grades, the increasing implementation of more open concepts of teaching and instruction have enlarged and broadened the chances for development of creative potentials in children.

I cannot make any judgement about your countries. It is up to you to evaluate chances and opportunities as well as barriers and limitations. I hope that my model, which I will present later, may give you some idea and framework in these stock-taking endeavours.

Very often there is good will and the intention to foster creativity, but the transfer into practice does not work, or something is called creative education which does not deserve that name.

Some studies investigated the relationship between the degree of autonomy, given/allowed by school or teacher, and the creativity of students. According to a survey by Rejskind (1982) there are no uniform but a majority of results, that support the assumption of a positive relationship between creativity and the allowance of certain autonomy in learning or an education towards independence.

How is the teachers' view on creativity?

There is no doubt about the fact that the influence of the teacher is critical for development of creativity during school time, but there are nearly no studies investigating how teachers themselves see creativity and its development.

In an own study it became evident that all teachers regarded fostering of creativity as important and necessary. Reasons given were that education for creativity:

- has broad developmental effects,
- helps developing and stabilising the personality,
- supports self-reliant acting and development of independence,
- strengthens fantasy,
- is basis for developing strategies for problem solving,
- allows the personal expression of thoughts and feelings,
- compensates deficits from home.

There was a more critical and negative assessment though about practical realisation in school; as main reasons for difficulties were named: organisation of school in general, certain subjects, personnel, lack of material, role of marks/grades, restrictions of time and space, large class groups, time needed for knowledge acquisition, and lack of consensus among colleagues.

Years ago Urban (1982, 1983) had studied attitudes towards educational goals for students. For teachers and teacher students the high importance of "creativity" became obvious (third rank behind "independence" and "tolerance"). It is astonishing though that related goals, like "autonomous thinking" and "cognitive flexibility" were only ranked in the middle of the 15 goals named. For parents creativity is much less important (rank 7), traditional virtues are ranked higher.

The only recent large study, known to me, was done by Fryer (1989) with more than 1000 British teachers. I will not go into methodological details here but mention a few general results. Terms most often assigned to a definition of creativity were: imagination, original ideas, and self-expression. Surprisingly two thirds of the teachers see creativity as a rare trait. This is explained with the fact that in Great Britain creativity in schools is only considered in relation to gifted students and their education. Encouraging though is the common agreement that creativity can be developed. As methods and factors influencing fostering of creativity were named: building up confidence (99%), having a creative teacher (94%), to a certain degree free choice at home (93%), engaged and supporting family (89%), to a certain degree free choice of learning methods in school (75%), informal teaching and learning (75%). The last is not synonymous with permissive atmosphere, which was thought to be helpful by 50%. Exams and grading were considered useful only by a few teachers.

There were some gender specific and subject specific differences between the teachers. These differences suggest that recommendations for instructional ways and methods must reflect on individual person characteristics and may not be taken like recipes.

Is the ideal pupil a creative pupil or vice versa?

Westby & Dawson (1995) put the attention to an interesting contradiction. On the one hand side fostering creativity does not seem controversial and teachers report that they like creative pupils. On the other side it is very surprising that several studies identify a picture of the ideal pupil which shows no or nearly no correlation with creativity. In their own study Westby & Dawson asked teachers for their favourite pupils and for those they did like least.

These two groups were compared to a prototype of the creative pupil. The results revealed a negative correlation between favourite pupils of teachers and the creative prototype; that would mean that teachers don't like creative students!

In order to explain the contradiction between these findings and teachers' reports, according to which they liked creative children, Westby & Dawson (1995) investigated the hypothesis, that the implicit concept of teachers about creativity and creative traits is different from scientific research outcomes and common concepts from laymen. Indeed, as results showed, traits teachers considered most typical for creative children were: "responsible", "good-natured", "logic", and "serious". As less typical "impulsive", "emotional", "makes rules as fits", "non-conform", "tends to not recognising own limits", "tries to do something other think to be impossible". In a re-analysis of the first study then the favourite pupils very well fit into the picture of the creative prototype as sketched by teachers. But this is totally different from the scientific prototype which is very much agreed by laymen (students; 95% coherence). The coherence with teachers' list of traits was only 45%.

According to the authors such more or less implicit and negative attitudes towards creative children may have lastly detrimental effects in a threefold manner. Firstly these pupils could become increasingly alienated from general class activities; secondly, creative pupils could try to suppress those creative characteristics, not beloved by the teacher. Thirdly, though less probably, some pupils could try successfully to adapt to the teachers' wishes and ideas, while at the same time they keep up their creativity. Their concurrent endeavours towards seriousness, responsibility, and friendliness may help adaptable pupils to stay successful in the traditional class. The question is how few pupils are capable of such a kind of lastly destructive behaviour and which possible negative consequences for future behaviour this may imply.

Such discrepancies between attitudes, own perception and practical behaviour of teachers underline the necessity of an adequate and responsible education and training for teachers.

What about the importance of creativity in teacher training?

For the USA Mack (1986) in a small study and McDonough & McDonough (1987) in a country-wide survey have investigated the perception of importance and the realisation of creativity courses in teacher training institutions at universities and colleges. According to Mack 85% of teacher trainers and 90% of teacher students believe seminars on "methods of creativity fostering in children" to be important, but only 50% of them say, that such courses really take place.

McDonough & McDonough (1987) asked 1500 universities and colleges if they offer formal creativity courses, i.e. courses, which beside an introduction into concepts of creativity aim to develop and foster creative abilities of the participants, too. 81% of about 1200 respondents though reported no formal creativity courses, 19% offered courses, but only 6% were courses in the closer sense of the survey. This is quite a low percentage, which for my country, I guess, is even lower.

Baloche et al. (1992) interviewed more than 100 scholars who offered creativity courses at universities and colleges. These were the goals named, listed according to their priority:

- Providing a climate, in which students can feel safe and free to investigate their own creativity;
- Give opportunities for the students to participate in creative experiences, including such which apply different creativity techniques;
- Understanding the psychological processes of creativity;

-
- Show concepts and techniques to students by means of which they become able to teach more creatively or to foster the development of creativity in others;
 - Improve the creativity of individual students by directly teaching creativity techniques and methods.

Teacher - and teacher students - need processes of becoming aware, perhaps in form of supervision, in order to reveal those subversive learning processes, attitudes, and hidden curricula. The reflection should focus on the own role and its effects as well as the inner picture of the pupil.

What is creativity?

If we talk about the so-called „nature“ of creativity, we may not forget that creativity does not have a nature, it is not natural or an entity in itself. Creativity we talk about remains a hypothetical construct which describes or explains (to a certain extent) a special kind of special human potential or aptitude. Creativity is not a power in itself, it is a human-bound potential, linked with, dependent on, demonstrated and manifested by a person, his/her thinking, acting and doing. This special human activity results in a new, innovative product, which is experienced by others as meaningful and significant.

Let me give my definition including a process description from problem to product at this point:

Creativity means the:

- (1) the creation of a new, unusual, and surprising product as a solution of an insightfully and sensitively perceived problem or of a given problem whose implications have been perceived sensitively;
- (2) on the basis and by means of a sensible, insightful, and broad perception of existing, available and open data as well as of information searched for and acquired openly and purposefully;

- (3) by analyzing, by solution-oriented but highly flexible processing and utilizing unusual associations and new combinations of these information and with the help of data from own broad and comprehensive knowledge bases (experiences) and/or with imagined elements;
- (4) by synthesizing, structuring and composing these data, elements, and structures into a new solution-gestalt (whereby the processes in #3 and #4 may partially run simultaneously on different processing and consciousness levels);
- (5) a new solution-gestalt, which is elaborated as a product resp. in a product in whatever shape or form,
- (6) and which finally through communication may be grasped directly via the senses or via symbolic representation and experienced by others as meaningful and significant (Urban, 1990).

A componential model

This definition attempt is still strongly cognitive-oriented; but specially (cognitive) creative functions are bound to a whole set of personal traits. Therefore it is important and necessary to ask what components of the personal structure may be responsible for creative behaviour, the creative process and thinking and action. What aspects of the human personality may become identified as creativogenic, what are the components considering the mutual dependencies of person and environment in the development and the process of creative activity?

In education towards creativity we must realise that creativity is not a singular, simple, uniform trait or disposition, but a complex construct and process, which involves personality components as well as cognitive components. Such a more holistic view on creativity is illustrated by Urban's Components Model of Creativity which has been described and explained, for example, in Urban (1994, 1995, 1996, 1997, in print).

Responsible and defensible creative education must be based upon a sound foundation; such a conceptual comprehensive framework, which at the same time allows to consider and stress single components without neglecting the complex structure is offered in the following, as a components model of creativity.

The first three components representing the cognitive side are:

- (1) Divergent thinking and acting;
- (2) General knowledge and thinking base;
- (3) Specific knowledge base and area specific skills;

the other three representing the personality components are:

- (4) Focusing and task commitment;
- (5) Motivation and motives;
- (6) Openness and tolerance of ambiguity.

Divergent thinking and acting

The component everybody links to creativity at once, at least since Guilford (1950), is ***divergent thinking***, with its subcomponents of *fluency*, *flexibility*, *originality*, *re-structuring*, and *elaboration*. Presupposition and critical starting point for creative processes is the *problem sensitivity*, the ability to find problems. The same status of facts may evoke a question stimulus in one person while the other sees nothing questionable. To ask questions seems to be given naturally to all normal children, it is one of the very first verbal expressions. This ability of asking is closely linked to their natural curiosity, the drive for exploration and knowledge. Here the relation of thinking activities, the divergent thinking in our case, to other personal, non-cognitive traits becomes obvious. We will find this interactive relationship between different main components and their subcomponents of creative thinking and doing again and again; it is substantial to this functional system.

General knowledge and thinking base

Not only the sensitivity for problems but all divergent subcomponents are related to the second component. Divergent thinking must found on *broad perception* and general deep knowledge and thinking base. Quick perception and processing of information and data, and storage in a flexible, accessible *memory network* are presupposition for fluent, flexible and associational thinking. Reformulations, redefinitions, reconstructions of problems need to be *analyzed* and *evaluated* in regard to their usefulness. *Analysing*, and *reasoning* and *logical thinking* is necessary for collecting and preparing the information required in the starting phase of the creative process, and again, together with *critical* and *evaluative thinking* in the final phase, when realisation and elaboration of the creative idea or product comes about.

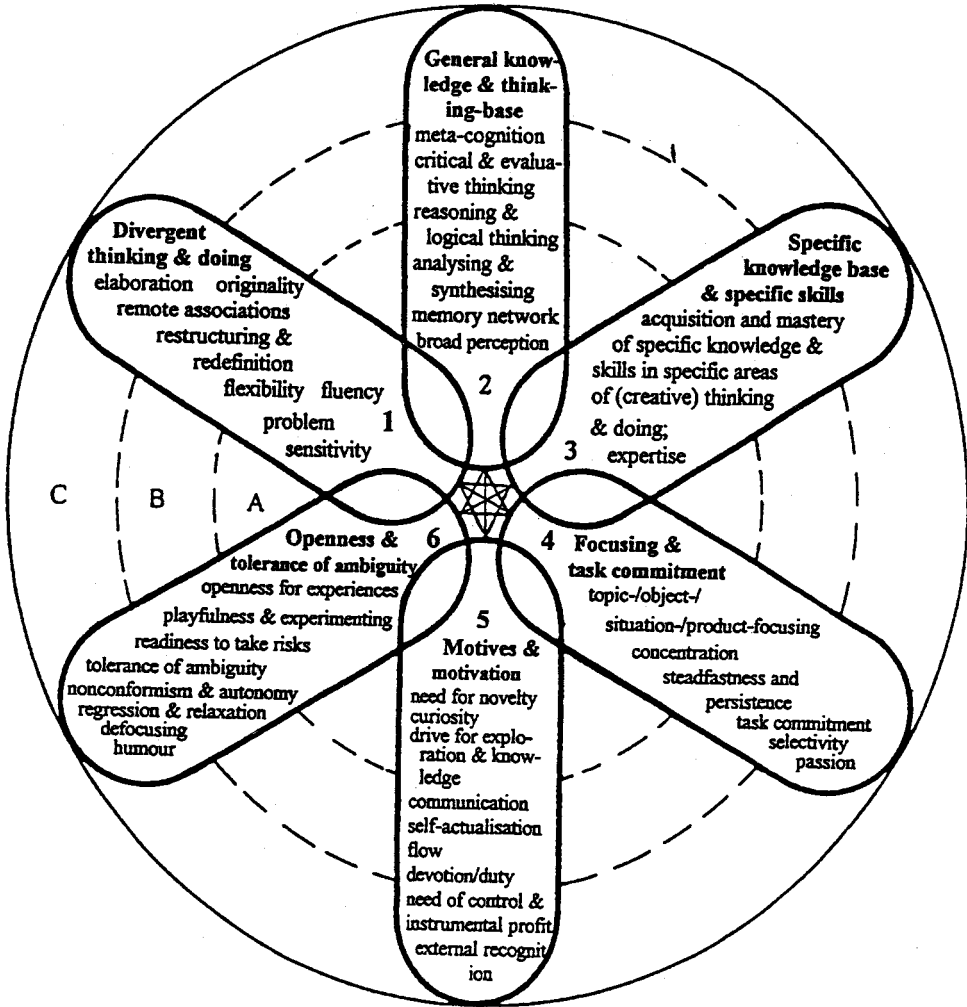
Specific knowledge base and area specific skills

Divergent thinking alone will not lead to creative excellence in a special field without *special field mastery*. In recent years more and more attention has been given to *area specific knowledge* as a presupposition for generating creative ideas and products, especially for those of outstanding and original, of historic and revolutionizing importance.

In following Amabile (1983) Brown (1989) considers area relevant skills as being fundamental. A similar position is held by Hayes (1989) pointing at convincing evidence for the statement that in many areas years of preparation and committed work are necessary in order to achieve in really creative products.

Even Weisberg's (1986) results, regardless of his attempts to destroy several so-called myths about creativity, support the component of area specific knowledge. They clearly show that insights are not very likely if task relevant knowledge is missing; insights are dependent on the

These components with their subcomponents will be explicated in the following.



- A: individual dimension/environment
- B: group- or local dimension/environment
- C: societal, historical, global dimension/environment

Figure 1: Components model of creativity

availability, accessibility, and integration of knowledge representations which are necessary and useful for a given task.

Focusing and task commitment

The acquisition of comprehensive and detailed area specific knowledge and skills requires disciplined *topic commitment* and *persistence* on a high level. The problem in question and the connecting thematic field has to be kept in the *focus* of attention over a longer period of time and with varying intensity. *Concentration* and *selectivity* are necessary for collecting, analyzing, evaluating, and elaborating information and data.

Motivation and motives

Here, again, an appropriate motivation, preferably intrinsic in nature, is presupposition. Amabile (1983), having this component in the focus of her research, emphasizes the role of *intrinsic motivation* which emerges as the reaction of the individual to intrinsic traits of the task. Her research shows the relevance of social and contextual factors for creative productions which may become negatively influenced by external factors, like the expectation of evaluation or even by reward or the lack of choice regarding the own engagement.

Hayes (1989), too, stresses the essential role of motivation for creative achievements. According to him no purely cognitive variables have been found suited to differentiate between creative and non-creative people. Thus differences in creativity seem to have their origin in differences of motivation which lead to cognitive differences, for example, by the differing intensity of acquisition and the extent of necessary knowledge and skills; together, according to Hayes, they explain the observed differences between creative and non-creative individuals.

The *need for novelty, curiosity, drive for exploration and knowledge* is inborn to each child, but too often suppressed by parental or other educational environment.

Openness and tolerance of ambiguity

Finally, in dialectic relationship with focusing and task commitment, the component of *openness and tolerance of ambiguity* is of substantial relevance. Using Einstein as an example, Lesgold (1988) demonstrates an essential difference of creatively productive to "normal" problem solving processes. This lies in the obvious importance of the change between focused, intense activity and the withdrawal, the taking back of this intensity, that is, *defocused* phases.

Thus the genius of Einstein lies, on the one hand, in the adequate combination of mighty and focused thinking and his expertise in natural sciences and, on the other hand, in his ability to withdraw and muse from time to time. Here again, we find the balance of oppositions. An additional factor is the possibility to *postpone quick solutions*, to inhibit or stop too quick (an) execution of products and simply allow that less directed thinking is dominating by spreading patterns of activity.

Here the interplay between processes in the musing phase with unconscious divergent, associational thinking, connected with deep domain-specific knowledge and broad, open perception resp. „internettet“ processing and storing of data, information etc. becomes obvious.

Other related subcomponents are the resistance to group pressure, to maintain *nonconformist* behaviour and *autonomy of thinking* at least at certain times and intervals. The *readiness to take risks* allows for remote associations, *playfulness and experimenting* go with fluency and flexibility; *tolerance of ambiguity* is supported by passion.

This dialectic combining of subcomponents could be continued at length. To keep it more general, no single component alone may be sufficient or responsible for the whole creative process leading to a creative product. I consider this model as a *functional system*. The (sub) components are used for or participate in or determine the creative process to differing degrees and with differing subcomponents resp. combinations of subcomponents. Each (sub) component plays its interdependent, functionally adequate role at a certain stage, a certain level, a certain situation. Each component is presupposition and result of the others and has to be seen in relationship to the environmental frames A, B, and C.

Creativity and the creative process as well as the degree or level of creativity are not defined by process and componential variables alone but by the final creative product and the quality of its new gestalt. Its success and acceptability depend on its inherent communicative, innovative, "infectious" power on the one hand and on the receptivity and evaluation of significant others on the other hand.

The dynamics and mechanics of the componential functional system are dependent on discouraging/inhibiting or nurturing/stimulating/inspiring/cultivating influences of the various environmental (sub) systems in which the creative individual becomes active. Considering the criterion of newness and the aspect of creative development in childhood it is necessary to work with the components model with three different, but interacting "reference levels" (A, B, C):

- A: the individual, subjective dimension with the direct, situational material and social environment,
- B: the group or local dimension with family, peer group, school, local educational system, the micro-environment, and
- C: the societal, historical, global dimension with the cultural, political, scientific conditions, the macro- and meta-environment.

The assumption of the three reference levels is important under at least three aspects. To differing degrees the environmental frames are influencing more or less directly,

1. the development of and education for creativity in children,
2. the actual and concrete course and success of the creative process,
and
3. the evaluation, acceptance, and appreciation of a creative product.

Creativity, as rooted in the curious and playful behavior of the little child, may develop in spiral patterns, becoming broader with increasing creative experiences, developing to full (adult/mature) creativity containing all componential dimensions. As far as possible the respective subcomponents in the figure are listed in a developmental order from the inner to the outer dimensional circle.

Stock-taking questions on the basis of the components model of creativity:

If we consider creativity, development of creativity and the creative process in such a complex view - as I think we should do this evidently has consequences, too, for the assessment of creativity as well as for nurturing, for education. The question of how to nurture creative functions and abilities becomes difficult and complex, too. Education for creativity is not a matter of just getting better in having as many ideas as possible in the shortest possible time, creative education refers to the whole person and whole personal development. And, firstly, it has to start early in life if we really expect creativity as a key to innovation to open new doors in the future; and, secondly, it does not end with childhood or schooling, it needs to be focussed upon during teacher training as well as in practice, it is a lifelong learning, specially for teachers.

The proposed model can be used for assessing and evaluating educational settings in order to examine the creativity hindering or fostering conditions. In a "stock-taking" intention, referring to the various components, questions like the following may be put – in a school setting as well as in a teacher training college or in university:

Component 1: Divergent thinking

- Does there anything happen in school or in college studies which could be named divergent thinking? Or is learning nothing else than regurgitation of accumulated knowledge which has been mediated by textbooks or teachers?
- Are problems offered which are open-ended or so-called weak- or ill-structured problems?
- Is the teacher sensitive to problems of the students?
- Does s/he try to make students aware of open questions, sensible to their environment, use all their senses?
- Does time and organisation allow more than one attempt of solution?
- Are things, topics considered from different aspects?
- Is there a critical openness for redefinition and reformulation?
- Is a „deviant“ way or solution, is originality appreciated?

Component 2: General knowledge and thinking base

- Do learning tasks require and further broad and differentiated perception or do they restrict focus?
- Does learning use different sense channels, varying methods and ways, so that experiences and knowledge may become anchored and accessible in memory storage in various ways?
- Is the structure of learning objects/subjects analysed, a focus on the learning process, not only on the result?
- Are „why“-questions asked and answered, so that cause-effect relations are studied?

-
- Is there instruction on systematic analysing and synthesizing of problems, topics, facts, situations etc.?
 - Are there challenges of inductive and deductive reasoning?
 - Is evaluation asked for and desired?
 - Is the learning process observed and reflected with students so that meta-cognitive thinking is initiated and furthered?

Component 3: Specific knowledge base & specific skills

- Is the development of special interests encouraged? For example, by additive or extra-curricular provisions, mentor systems, competitions etc.?
- Are individual interests brought or built into school work?
- Are there opportunities/possibilities for students to get the experience of in-depth-studies?
- Do students have the opportunity to build up a special competence profile? To focus in special areas?
- Is expertise appreciated?

Component 4: Focusing & task commitment

- Is longer lasting occupation with/by a special activity of interest allowed or supported (for example, school year or semester accommodating research work, common projects)?
- Does time schedule support those activities?
- Is task commitment rewarded?
- Is there a chance for self-control of own achievements?
- Is there expectation that tasks have to be fulfilled and brought to an end?

Component 5: Motives & motivation

- Is the natural curiosity of the young child stimulated and supported?
- Are there opportunities for self-determined learning, discovery learning, in order to endorse intrinsic motivation?
- Do students participate in research?

- Is there a fruitful and related change of theoretical, research, and practical studies?
- Can children identify themselves with their activities? Do students identify with their studies?

Component 6: Openness & tolerance of ambiguity

- Is school not only a place for traditional instruction, but a place of living, of fun, of (mental) adventure, open for surprise?
- A place for fantasy and imagination?
- A place for eu-stress and relaxation?
- Is individuality and uniqueness of each person appreciated, or conformist behaviour?
- Are errors allowed, or just quick and correct results?

Environmental settings

- In which way micro- and macro-environments influence the development of componential dispositions?
- In which way micro- and macro-environments influence the full functioning of developed components?
- Are components or sub-components furthered or hampered to the same degree?
- Are there different or even contradictory effects between micro- and macro-environment?

It is possible that there are discrepancies within and between different environmental levels as far as educational goals, role of teachers, role and importance of creativity etc. is concerned. These differences may occur with different opinions between parents, different approaches of single teachers as compared to school authority, of educational scholars as compared to certain political ideas etc. Certain societal conditions may challenge and further certain ways, ideas, and products of so-called

individually important „everyday“- creativity, but at the same time may hinder societal relevant innovations.

Responsible Createlligence®

Finally I will try to embed the components model of creativity into a capacious model structure which could provide a foundation for general deliberations not only about creative education, but for curriculum planning- not only for the gifted and talented - concerning the challenges and tasks of the future, the cultural evolution, the competence for the future.

The components model itself already signals an increasing integration of formerly more separated concepts of intelligence and creativity as it is stressed in recent publications (Cropley & Urban, 2000; Ambrose, Cohen & Tannenbaum, in print). I consider intelligence and creativity in function as complementary and penetrating each other. In order to give it more efficacy as far as intelligently successful acting is concerned, namely the concrete transfer from idea to action, the six components should be supplemented and supported by a bundle of another six components. These are:

- Foresight
- Planning
- Strategic Thinking
- Flexible Adaptation
- Constructive Shaping
- Decision Making

In connection with the creativity components they are necessary capacities needed for successful, effective innovation; insofar, like the other components, they are, firstly, desirable personal abilities as well as, secondly, educational goals, and, thirdly, curricular content. "Foresight" is used in the sense of "outlook"; this does not have the same connotations as "prediction", which would be closer to "forecasting". Based on

expertise in field as well as on broad general knowledge foresight identifies future trends, makes future questions and demands more clear. Regarding the foreseen developments planning under consideration of strategic thinking takes place. Since foresight gives no guarantees flexible adaptation is necessary as well as active and constructive shaping of ideas, trends, and actions to be realized by decision making and transfer into operations and products.

The combination and interchange of both components' levels I call "Createlligence®"; but for a cultural evolution with a positive progress we need more than just createlligence, since it could be directed towards negative or destructive ends, too; such a case we had to experience some month ago in a most brutal way and such cases we are confronted with day for day! What we need is "Responsible Createlligence®". Therefore the model needs to become supplemented by two more levels of components.

Such responsible createlligent action must be based upon individually and socially oriented conditions which represent personal capacities as well as societally agreed worths and strengths, as there are :

- Responsibility
- Autonomy
- Co-operation
- Self-consciousness
- Leadership
- Communication.

These personal and social stamina get their content and meaning by basic beliefs, attitudes and values which mirror the positive outcomes and aims of evolutionary and historical developments of mankind:

- Humanistic Belief
- Moral Strength

- Peace
- Democratic Attitude
- Freedom
- Ethic Awareness.

These four levels as an interactive system are framed, hold, and influenced by an environmental, ecological scaffold (see Fig.5) which at the same time is result of the levelled componential system. It firstly includes the historical and (cultural) evolutionary background, since there is no future without past. This, by the way, is no negative, destructive or pessimistic view; past has always given the opportunity to learn, and if we take future in one part as the fruit of what we have learned in the past, we have a direct connection from roots to foresight. Secondly, the scaffold includes the current natural, social, societal, cultural, political environment in a macro-, meso- and micro-perspective. That means, we are children of our parents as well as children of our (ethnic) group, of our society and of mother earth; and our creative ideas and products can have an effect not only on our direct environment, but could change our group's conditions and lives and could even be of societal and historic impact. This environment is in permanent change because men are active and creative; the grand task and challenge is to make sure that these changes finally are not detrimental to the world, but lead into real positive progress shaping a better, joyful, happy, and peaceful future for each individual, for societies, for mankind. In these accomplishments and endeavours the gifted and talented as well as their educators have special responsibilities, since it is probably on them to be of major force in the shaping processes. Only with such a foundation in mind, with those capacities, strengths and values internalized, individuals and groups will have an adequate competence for the future at their disposal: responsible createlligence. For me it seems necessary to conceptualise creativity or better Responsible Createlligence as future competence embedded in such a comprehensive model in order not to limit creative education and

education in general, specially for the gifted and talented, to a mere technical training or to ignore and neglect important personality aspects as well as societally bound conditions and influences affecting responsible creative thinking and acting in favour of a "liveable" future.

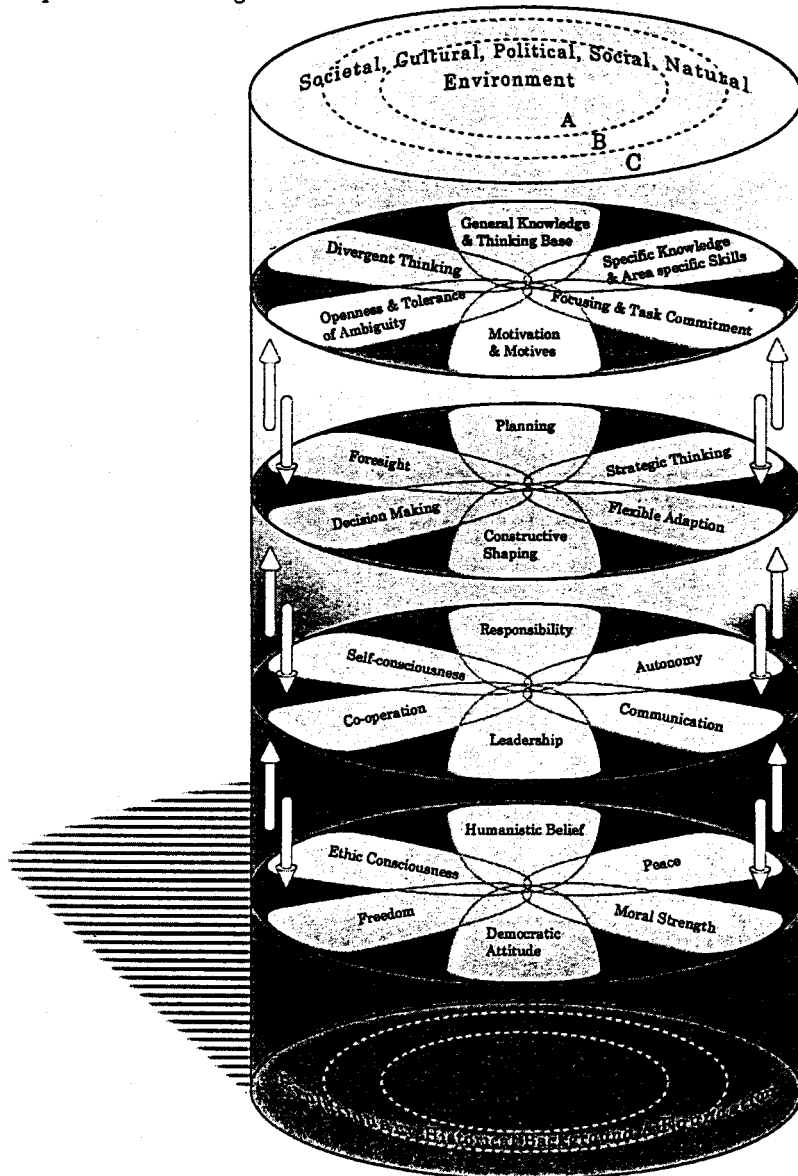
Creative education or better education towards Responsible Createlligence® as a key to future competence is a challenge and task not only for the single teacher in the individual classroom, but, too,

for kindergarten and family education,
for content, structure, and management of curricula,
for curriculum and textbook development,
for pedagogical methods and provisions,
for administration and organisation of schools,
for vocational and professional training,
for politics, not only in education,
for culture and society,
yet for the global societies.

I am very glad that you gave me the opportunity to share this message with you.

Fig.2: Urban's Future Competence Model: Responsible Createlligence®

Urban's Model
of Responsible Createlligence



Research & Studies

References

- Alencar, E. M. L. Soriano de (1995). Challenges to the development of creative talent. *Gifted and Talented International*, 10, 5-8.
- Ambrose, D., Cohen L. M., & Tannenbaum, A. J. (Eds.). (in print). *Creative intelligence: Toward theoretic integration*. Cresskill, NJ: Hampton.
- Baloché, L., Montgomery, D., Bull, K. S., & Salyer, B. K. (1992). Faculty perceptions of college creativity courses. *Journal of Creative Behavior*, 26, 222-227.
- Cox, C. (1926). *The early mental traits of three hundred geniuses*. Stanford, CA: Stanford University Press.
- Cropley, A. J., & Urban, K. K. (2000). Programs and strategies for nurturing creativity. In K. A. Heller, F. J. Mönks, R. J. Sternberg & R. F. Subotnik (Eds.), *International handbook of giftedness and talent* (2nd ed.) (pp.485-498). Oxford: Pergamon.
- Flanagan, J. C. (1975). The definition and measurement of ingenuity. In C. Taylor & F. Barron (Eds.), *Scientific creativity: Its recognition and development* (pp. 89-98). Huntington, NY: Krieger.
- Fryer, M. (1989). *Teacher's views on creativity*. Unpubl. PhD thesis, Leeds Polytechnic, England.
- Landau, E. (1990). *Mut zur Begabung* [Encouragement for giftedness]. München: Reinhardt.
- Lesgold, A. (1989). Problem solving. In R. J. Sternberg & E. E. Smith (Eds.), *Psychology of human thought* (pp. 188-213). Cambridge: Cambridge University Press.
- Mack, R. W. (1986). Are methods of enhancing creativity being taught in teacher education programs as perceived by

- teacher educators and student teacher? *Journal of Creative Behavior*, 20, 22-33.
- McDonough, B., & McDonough, P. (1987). A survey of american colleges and universities on the conducting of formal courses in creativity. *Journal of Creative Behavior*, 21, 271-282.
 - Rejskind, F. G. (1982). Autonomy and creativity in children. *Journal of Creative Behavior*, 16, 58-67.
 - Rogers, C. R. (1959). Toward a theory of creativity. In H. H. Anderson (Ed.), *Creativity and its cultivation* (pp. 69-82). New York: Harper.
 - Simonton, D. K. (1976). Biographical determinants of achieved eminence: a multivariate approach to the Cox data. *Journal of Personality and Social Psychology*, 33, 218-226.
 - Torrance, E. T., & Goff, K. (1989). A quiet revolution. *Journal of Creative Behavior*, 23, 136-143.
 - Urban K. K. (1982). Ansichten und Einstellung von Lehrern und Eltern zu schulischer Erziehung und Erziehungszielen bei „normalen“, behinderten und hochbegabten Kindern [Opinions and attitudes of teachers and parents toward school education and educational goals for "normal", handicapped and gifted children]. *Vierteljahresschrift für Heilpädagogik und ihre Nachbargebiete (VHN)*, 51, 324-336.
 - Urban, K. K. (1983). A comparison of attitudes toward the education of "normal", handicapped, and gifted children. In B. Shore, F. Gagné, S. Larivée, R. H. Tali & R. E. Tremblay (Eds.), *Face to face with giftedness* (pp. 111-129). New York, NY: Trillium.

-
- Urban, K. K. (1990). Recent trends in creativity research and theory in Western Europe. *European Journal for High Ability*, 1, 99-113.
 - Urban, K. K. (1991). On the development of creativity in children. *Creativity Research Journal*, 4, 177-191.
 - Urban, K. K. (1994). Recent trends in creativity research and theory. In K. A. Heller & E. A. Hany (Eds.), *Competence and responsibility*, Vol. 2 (pp. 55-67). Seattle: Hogrefe & Huber.
 - Urban, K. K. (1995). Different models in describing, exploring, explaining and nurturing creativity in society. *European Journal for High Ability*, 6, 143-159.
 - Urban, K. K. (1996). Encouraging and nurturing creativity in school and workplace. In U. Munandar & C. Semiawan (Eds.), *Optimizing excellence in human resource development* (pp. 78-97). Jakarta: University of Indonesia Press.
 - Urban, K. K. (1997). Modelling creativity: The convergence of divergence or the art of balancing. In J. Chan, R. Li & J. Spinks (Eds.), *Maximizing potential: Lengthening and strengthening our stride* (pp.39-50). Hong Kong: University of Hong Kong, Social Science Research Center.
 - Urban, K. K. (in print). Towards a componential model of creativity. In D. Ambrose, L. M. Cohen & A. J. Tannenbaum (Eds.), *Creative intelligence: Toward theoretic integration*. Cresskill, NJ: Hampton.
 - Urban, K. K., & Jellen, H. G. (1996). *Test for creative thinking - Drawing production (TCT-DP)*. Lisse, Netherlands: Swets & Zeitlinger.
 - Westby, E. L., & Dawson, V. L. (1995). Creativity: Asset or burden in the classroom? *Creativity Research Journal*, 8, 1-10.