

**TRIGGERING INDIVIDUAL EMERGENCE: INSPIRATION OF BANATHY
THE VISIONARY**

Gordon Dyer

ABSTRACT

This paper examines how metaphors can play a key role in triggering individual emergence. Metaphor is referenced in two main ways: the enthalpy metaphor is used to provide understanding of, and guide, the process of effective conversation. Metaphor is also interpreted very broadly to define those images, analogies, concepts models and theories which define our understanding of the world and our perception. It is our perception which must change if we are to improve the future. The paper examines how sharing of appropriate metaphor through conversation can lead to collective emergence; and how, similarly, how internal conversation-with-self triggered by metaphors in (1) conversation with others (2) other external stimuli (3) internal thought processes, can trigger individual emergence. The paper examines which of the three sources of trigger may be singly/jointly or sequentially may be most powerful in their effect of triggering individual emergence, and under what context. The model presented is evaluated for the process of emergence of the paper. The reader is invited to participate in furthering the evaluation process. The author's own individual emergence is recognised as stemming from on-going association with, and inspiration of, Bela Banathy, to whom the work is dedicated.

Key Words: enthalpy, activation energy, catalyst, metaphor, metaphorm, individual emergence, collective emergence, social systems design, learning system design, the grandchild's question

PROLOGUE

I first met Bela Banathy at the 1987 Budapest Annual Meeting of the International Society of General Systems Research (ISGSR). He was by then already an eminent figure in the international systems field and Past-President of ISGSR. Though I had a background in flight testing of aircraft avionic systems from 1965 and had been involved in learning and teaching of systems thinking at the UK Open University since 1973, I was a novice to the international systems conference and research scene. However, Bela greeted me with great charm and understanding when I presented a paper to the session he chaired. Over the next few years I contributed to papers to the education stream of the ISGSR and, if possible, sought to be in Bela's session. Finding topics to write in these first few years was a real chore for me. This was because I had not found a coherent research area to develop. But this changed with Bela's gentle encouragement and persuasion as he introduced me to his ideas on

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evolutionary guidance systems, social systems design and his vision of the International Systems Institute (ISI) which he had just founded.

In November 1991 I attended the 3rd Annual Conversation of the ISI at Asilomar. No one disagreed with Bela's view of the sorry state of the world and the disappointing failure of systems thinking to contribute to reducing the major problems of inequity, inequality, failure of social systems, despoliation of the environment, crime, drugs, which he reviewed in his introduction to the meeting. He then described his personal nightmare which was having one of his grandchildren sitting on his knee, who hearing of such terrible things would say to him "But, Granddad, what did you do about it?" This proved to be the beginning of individual emergence for me, as the image of a grandchild asking the same question resonated with me. It was an image that would not go away. What was *I* going to do about it? A focus for my future research area had been clarified.

It was not an easy emergence, as what he described amounted to transcendence above the contemporary view of systems thinking and practice. Bela argued that the issues facing the future of mankind and society were so enormous, that the traditional problem-solving approach of differentiating between a system and its environment, and then agents acting to produce a feasible and desirable change in some aspect of the system concerned, could not work. He was suggesting an idealised approach involving the co-design of both the system and its environment; that everyone within the system and influenced by the system, and not just experts, be involved in the design of their own future. For example, this would involve a complete overhaul of our education system so that it would begin to develop design competence within all our children. This would involve nothing less than a change of culture. This will only be developed over time and will involve an on-going design effort. The challenge was enormous.

He provided a set of powerful questions to guide the ISI:

- What kind of society do we envisage for our grandchildren's grandchildren?
- If we have a vision of such a society what kind of education system will engender the society that we have envisioned?
- If we have such a vision of a society and an education system to support it, what arrangements and processes for learning, student support, logistics and funding do we envision?
- How do we implement such a system?

These questions represent an archetype and are adaptable for idealising any level of society (nation/community/group/family) and for social system types other than education. For example – what kind of family do we want for our children?

Over the last 10 years the issue of emergence or transcendence, has been an important area of interest for the ISI. I have indicated above the powerful influence of Bela Banathy's image of the *grandchild's question* on my own emergence, but clearly this metaphor and the conversation-with-self that it generated around is only one of a

range of stimuli which might trigger emergence. The paper which follows is my attempt to provide a model for understanding how metaphors can play a key role in triggering individual emergence, which I dedicate to Bela. ¹

INTRODUCTION

This paper offers a framework for insight into how metaphors can play a key role in triggering both individual and collective emergence, though the emphasis here is on the former. To reduce semantic difficulty it is important to provide definition of the terms used in the paper. The word metaphor is interpreted **very** broadly, and is assumed to be inclusive of the wide range of images, analogies, concepts, models, theories, and inputs from the outside world that we receive and interpret through the five senses separately or collectively. Entries relating to emergence in the International Encyclopaedia for Systems and Cybernetics (Francois, 1997) indicate the richness of this concept. For the purposes of this paper the following working definitions are proposed:

emergence – the recognition by an observer of new form, shape, pattern, structure, organisation, model or concept

individual emergence – the recognition by an individual of a new order or level of their understanding or competence, or of adjustments to perception or values, which then leads to change in their future behaviour.

As we shall see one issue is the extent to which emergence or individual emergence can be designed or planned.

The paper first makes a link to collective emergence (change in behaviour of a group). This connects to earlier work (Dyer, 1996) on a metaphor drawn from thermochemistry, namely *enthalpy change*, i.e., the change in internal energy of a system of chemical reactants. Enthalpy change can help to explain how some conversations ignite and sustain on-going interaction between participants so that their potential for creative synergy (or collective emergence) is maximised, and how other conversations flicker and die.

The aim of the paper is to show that the concept of enthalpy change can also provide useful insights on the potential for individual emergence. The enthalpy change metaphor provides the basic framework for considering problems of emergence, but metaphors also emerge as a key driving agent for triggering personal change, or learning. A basic model of individual emergence is then presented which assumes trigger categories arising from metaphors used in (1) conversation (2) other external stimuli (3) internal thought processes. The paper then discusses which of these categories of stimuli might be more/most/jointly powerful in triggering emergence in a range of contexts. The dark side of metaphor, the use of inappropriate images to try to trigger inappropriate emergence in others is included within context possibilities.

ENTHALPY CHANGE IN CHEMICAL REACTIONS

Bonding changes in some chemical reactions can release energy (enthalpy change) into the chemical system and sustain further reaction. The inherent stability of

¹ This paper is adapted from that presented at a conference “Problems of Individual Emergence” at the University of Amsterdam on 20th April 2001

chemical compounds arises from the fact that the atoms from which they are made are bonded together. The bonding itself involves energy, so the first step in any reaction between two chemical compounds is therefore an input of energy to break the bond that already exists in the reacting substances. The second step is to make new bonds which will exist in the products. The amount of energy required to start a reaction is called the activation energy - it is simply the height of the "energy barrier" or "energy hill" to overcome the bonding of the first molecules to enable them to react. Assuming the energy released from first interactions between molecules is greater than the activation energy (this is the case in the so-called exothermic reaction) then more molecules can react, and a chain reaction can occur. As the reaction develops, eventually the energy release may be sufficient not only to maintain combustion but also to release excess heat to the environment. Figure 1 below illustrates the enthalpy change concept. The chemical chain reaction can occur if h_2 is greater than h_1 , as in the exothermic reaction shown below.

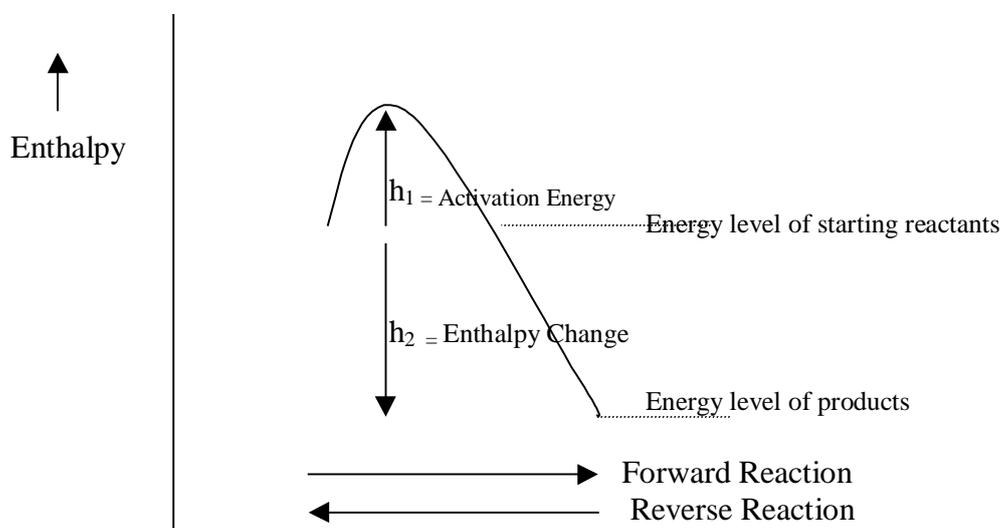


Figure 1

It is also important to introduce the concepts of catalyst and reverse reaction. A catalyst is a substance that alters the rate of a chemical reaction but may itself be unchanged at the end of a reaction. They work in various ways but their purpose is always the same - to **reduce the activation energy (h_1)**. Using a catalyst will allow reaction to proceed with lower energy input. There is another advantage to catalysts, as conditions arise where several reactions, which can lead to different end products, are possible. Catalysts can sometimes be found that are specific to particular reactions taking place. Using a **specific catalyst**, the reaction that produces the desired product can be enhanced at the expense of other possible reactions. This is an important idea for later discussion.

Some chemical reactions are reversible, particularly if the products from the reaction are still within the reactant mixture. The reverse reaction means that the products recombine to form the original starting ingredients. However the reverse reaction implies the breaking of bonds which have been made by the forward reaction and energy being diverted from the forward reaction.

ENTHALPY CHANGE METAPHOR AND COLLECTIVE EMERGENCE

The above description of chemical reaction provides a partial explanation of what happens within a situation involving human interaction. The participants will arrive with *external bonds* still partly intact. They will be pre-occupied. Hence the equivalent of *activation energy will be required to be input to the group to break these bonds*. Some form of spark must either be generated within the group or be brought in from the environment. The "wheelspin" which is a common experience in conversations can be seen as sparks which had inadequate energy to overcome the energy hill the group faced. But once the right spark has been found, and the group *reforms bonds and works collectively, then energy is released* - through enthalpy change - to enable them to interact further and "perform". As the group increases its bonding something akin to the chemical chain reaction is taking place. But something more dramatic will happen in the case of human interaction in that as the starting energies of the participants varies from day to day, not only are the activation energies different but so will the enthalpy changes. Thus *any chain reaction which results appears to provide at least a partial explanation to what is usually described as the synergy of human activity systems* i.e. the non-repeatability of group interaction and the capacity to produce unexpected results, which are sometimes very creative and positive, and sometimes the opposite.

Let us continue to compare the characteristics of chemical reactions with human interactions, including the role of catalysts in reducing activation energy, sustaining interaction and reverse reaction. A number of factors can operate individually and collectively as catalysts to reduce the activation energy necessary for conversation to start, for example:

- external environment, which can be a source of inspiration.
- internal environment, e.g., warmth, comfort and the seating arrangements. With the latter aspect, care must also be taken to ensure cultural needs are taken into account.
- circulation or tabling of ideas from input papers
- imposition of time pressures, or deadlines

Conversation largely takes place through sharing and offering metaphor, which reflects the basis of understanding, beliefs and values that the participants hold. As another has said (Gregory, 1993) "Conversation is nothing more – and nothing less - than the attempt to model the way in which we manipulate our metaphorical systems to construct shared meaning and thereby, come to agree with one another over what we understand". To sustain a conversation it is vital that metaphors that are shared are culturally and linguistically appropriate, and also possess structure, depth, and richness with an appropriate degree of familiarity and referencing for the intended purpose. In this way the metaphors serve as catalysts and triggers. For example, it may make no sense to refer to a "round table" to the bushmen of the Kalahari. Also the use of inappropriate images as metaphor can be dangerous, and have a dark side, when used for persuasion, coercion and interpreted too far.

Conversation will be sustained if the metaphors shared continue to provoke interest and the release of internal energy. The equivalent of a chemical reverse reaction will occur in the group if for any reason relationships in the conversation circle begin to break down. In effect energy is expended to break bonds, at the expense of maintaining the bonds so that energy is available for joint creativity. It follows that the group, or its facilitator, should monitor its behaviour for danger signs. The danger of bond-breaking within the group is likely to happen if any member of the group feels that they are not being given adequate opportunity to contribute, or their freedoms of

expression, action or participation is being impaired in some way; or conversely that others are trying to dominate.

A comparison between the chemical reaction and human interaction led the author to propose suggestions for planning and sustaining an effective Conversation (Dyer, 1996). A Conversation in that sense is a “collective disciplined inquiry” - an extended form of group dialogue as practised at meetings of the International Systems Institute (ISI) in the context of social systems design as proposed by Banathy (Banathy, 1996). The aim in that context is to achieve collective emergence².

INTERLOGUE

Through Bela’s continuing encouragement I have acted as convenor for the Transcultural Council of the ISI since 1992. This interest is reflected in the comments above about the need for metaphors to be “culturally and linguistically appropriate”. The Fuschl Conversations, which take place in Fuschl, Austria, every two years hold a special significance for the ISI. It was there, in 1982, that the roots for the future ISI were first laid down. The 2000 Fuschl meeting “Social Systems and the Future”, was also of special significance. One topic discussed was the Y3K issue i.e. “what would we as systems designers wish to see for humankind for the Year 3000”. The topic, the conversation, and the report (Brahms et al, 2000) owes much to Bela’s inspiration even though he was not able to attend the conversation on that occasion.

Let us now begin to introduce individual emergence.

ENTHALPY CHANGE METAPHOR AND INDIVIDUAL EMERGENCE

The discussion that follows is related to the attached systems map. The composite diagram is related to process of a conversation between Participants A and B. A dialogue *between* A and B is shown in Box 7, and indicates that if care is taken to trigger and sustain communication between them through appropriate metaphors which are accessible to both, then positive creative synergy results, i.e. there can be collective emergence. The diagram also shows the possible process of individual emergence *within* A (Boxes 1-3) and B (Boxes 4-6); only one set need be described as they are similar in principle. Box 1 presents a model of A’s mental map of experiences which is built up, and is revised by, the very wide range of possible stimuli from the external world (Box 2) over time. The stimuli, which can often be metaphors e.g. images or stories, provide the basis for individuals to understand and rationalise the world around them. Over time this leads to a personal set of core values, beliefs and to a “perception mask”, which taken together we can regard as “self”.

Any new stimuli can be random e.g. unexpected recall or sight of a scene of outstanding natural beauty, or the recall or hearing of a remark by another. Opportunity for new stimuli may also be planned e.g. embarking on a new course of study, or going to a lecture. If any subsequent new stimuli are of sufficient interest to

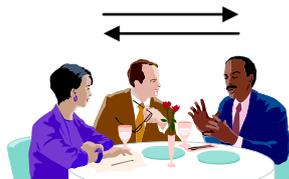
² The ISI prefer to use the phrase *transcendence*. Transcendence here means the ability and willingness of the group to escape from constraints of their current situation to engage in visioning a different future and to start the social system design process.

overcome the activation energy required to produce a “conversation with self” and deep reflection, this too can lead to internal synthesis and transformation. We may call this creative synergy-with-self (Box 3). If the interest and connection with triggering metaphors is sustained and strong enough, the creative synergy-with-self can lead to adjustments in the individual’s perception mask and to individual emergence.

However, as discussed above with collective emergence, the non-repeatability of group interaction (because of variable enthalpy change) and the capacity to produce unexpected results, also applies to “conversation with self”. The individual’s starting energy varies from day to day, as will the impact of the trigger and the activation energy required to connect to it; the enthalpy change will vary. Thus the effects of the same trigger on an individual can vary, they are sometimes very creative and positive, and sometimes the opposite. It is clear from everyday experience that the same triggers on different individuals can potentially produce very different effects. This is a key issue for those who are involved in the design of learning systems, which are intended to produce individual emergence.

EXPLORING THE MODEL

The basic model proposes that individual emergence is through metaphors arising from 3 different types of source (1) conversation with others (2) other external stimuli (3) internal thought processes. The sources constitute a system of sources in that they can act either singly or jointly, or sequentially, and might themselves be connected in certain contexts. Whatever the source, if the trigger is strong enough a *conversation with “self”* may ensue, sometimes immediately or after a delay. The intensity of this may be strongest in (1) and least in (3), especially if the conversation is extended. This is because conversation involves *two-way* (or *n-way*) interactions, and potentially provides many and variety of triggers to sustain communication, to release energy to sustain reflection and thus adjust the perception mask to produce change within the individual. Clearly time and depth of engagement in conversation is crucial. There may be other factors at play.



In a case of (2), for example, if the input is via reading a newspaper or printed text, the interaction is one-way. Thus careful design is necessary to ensure that attention of



the reader is maintained and that necessary regular triggers are present throughout. In the case of (3), emergence is least likely for most people by this source acting alone. Though this does not discount the possibility of occasional sudden extraordinary insight from within any individual; it is more likely within the creative artist or genius.

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The context might lead to a variation in conclusions about which of the 3 components of the basic model, (1) conversation (2) other external stimuli (3) internal thought processes, may be more/most/jointly powerful in triggering emergence. Let us examine context through considering sources, whether the exposure to the source is planned or not, and the case of inappropriate triggers.

CONVERSATION

The context of conversation can vary enormously. The style of Conversation used by the ISI, has already been quoted as a **potentially** powerful opportunity for change in that it takes place over an extended period with many triggers being generated to sustain bonding and internal energy. Also this context involves willing participants who are generally open to new ideas and to the possibility of change, so that the activation energy required for the group to be productive is low. As Stewart (1999) observes:

“Conversation is the antithesis of debate in that it is not based on adversarial premises and does not polarise people. Participants realise that the winning of arguments is not the issue. It opens the discussion rather than channelling it into something that may be difficult to get out of. It enables "change of mind" to occur, without fanfare or fuss. It is the foundation of community building.”

Not all conversations will begin in this ideal open way, indeed they may not even start, especially where there is a history of conflict or major cultural difference. Cultural differences of this kind may be seen as a very high level of activation energy acting to prevent the formation of new bonds. Action research into conversation, for example for peace treaties, stresses the need to search for those visions which are common and transcultural rather those issues which differentiate positions and are inter-cultural. Methods advocated are to be found in (Bohm, 1990) and in a work under development called *Searching Together* (Banathy and Jenlink (eds.) 2001). These typically suggest a period of generative dialogue before strategic dialogue. Shorter conversations whether open or adversarial, may have less effect but even within a short exchange, if metaphors offered by one person engage the interest of another, then individual emergence is possible (see reference to Banathy in Prologue and Section on Evaluation of Model below). We also note that the inevitability of unexpected outcomes arising through engaging with metaphors provided in conversation

We need to differentiate between individual emergence and its pre-conditions, and whether or not the change in the individual is generally regarded to be for the good, or for the bad. The dark side of metaphor is that they can be used to describe a vision, which has an inappropriate purpose of persuasion or coercion. Examples here are the typical images in conversations between say a blackmailer and victim, or kidnapper and victim. Statements of the form “What would your wife say if she learnt about.....”, or “Unless you arrange for the money to be paid we will...”, are quite likely to lead to unwanted individual emergence.

OTHER EXTERNAL STIMULI

The range of potential stimuli listed in Box 2 is enormous, and their impact can vary from individual to individual. For example, one person might be moved to tears, another unaffected, or another laugh at the same image. However, this type of temporary individual emergence is of less interest, compared to an emergence that leads to permanent new thinking or behaviour patterns. The enthalpy metaphor reminds us that for the internal *conversation with self* to be sustained for individual emergence to occur, then we must provide regular stimuli or metaphorical triggers.

This is of practical significance in the context of the design of learning systems, as it reinforces the need for interest and variety in its presentation, and the crucial need for it to be based around appropriate metaphors as *catalysts*. The same considerations apply to the delivery of a lecture. Again, as with conversation based triggers, there is the distinct possibility of unexpected responses in individuals when exposed to learning materials we have designed, or lectures we give. This may or may not be desirable depending on the context of the learning system. If the learning system is one where there are precise student objectives, then too many unexpected responses will be undesirable. Drawing on the metaphor of the chemical reaction, it may be important to develop *specific catalysts* for triggers where these can be identified. Evaluation will be necessary to confirm that the catalysts have acted in a specific way and that this is what is required.

It is impossible to remove all variety of individual emergence in programmes of learning, indeed it would be highly undesirable to do so. This is particularly the case in programmes which themselves are seeking to enhance creativity and design in individuals. Catalysts will be required but not those intended to produce a specific response.

The dark side of metaphor use is also evident. An obvious example is when metaphors are used in political propaganda as an excuse for war, transgression, or inappropriate exercise of power or terror. Hitler's speeches, which evoked a vision of *lebensraum*(living room) for the Germans to the East, and which described the Slavs, Jews and Gypsies as “*untermench*” (sub-human), are archetypes of this. Hitler was much enamoured of Wagner, and the visions painted in this music of Valkyrie (warriors from Hell) were drivers to the development of the phrases “*storm troopers*” and “*blitzkrieg*”. These words are themselves metaphors intended to bring terror to those who would be on the receiving end of this power (Dyer,1997).

INTERNAL THOUGHT PROCESSES

A sudden unexpected thought can act as an initial trigger, but as has been argued above by itself for most people is normally insufficient for individual emergence. The initial idea is more likely to cause the individual to seek a conversation with others,

or seek other external stimuli e.g. undertake research for models. It can also lead to a period of deep reflection, if the individual becomes bonded to the idea or image. Periods of reflection may also be planned as part of a process of thinking about ideas offered by others “Let me think about it and I will get back to you”. Periods of reflection are often planned as part of learning systems e.g. workshops.

As with conversation and other external stimuli, while the opportunity for thinking can be planned, the outcome cannot be determined. However, several writers have proposed that individuals can be trained to think in more logical and effective ways, and their suggested techniques often involve deliberately contrasting the new issue with a range of metaphor types. Siler has coined the word *metaphorm* (Siler, 1996) in contrast to the author’s inclusive definition of metaphor for the same meaning. He writes “metaphorming... refers to the act of changing something from one state of matter and meaning to another. It begins with transferring new meanings and associations from one object to another” and “Metaphorming involves not just metaphor...but all means of making connections: analogy, figure of speech, symbol, story, pun, story-writing and story telling, scenario making, visualising, hypothesising...”. Siler refers to *making connections*, whereas the author prefers to use *bonding* as this is consonant with the enthalpy metaphor and the release of internal energy after bonding to sustain the thinking process.

Sudden thoughts can also be related to an inappropriate image, e.g. “So-and-so deserves to die”. In cases of this kind, moral and ethical values can be seen as a very high level of activation energy which will normally act as the barrier to prevent bonding to, and further reflection on, this outcome.

EVALUATION OF THE MODEL

The systems model presented here needs to be evaluated. The author tested it in two ways as part of the iterative process for the emergence of the paper. The bracketed numbers in the following description relate to the 3 different categories of source defined above. The initial trigger for the author to write the case was an external stimulus (2) i.e. the opportunity provided by the conference to discuss individual emergence (an image of such a conference was the triggering metaphor). This released the energy to begin thinking and writing, drawing on concepts and evidence in external references(2) and on the images and concepts that already existed within self (3) to produce an abstract of the likely paper. After this stage a conversation (1) with a colleague, Tony Wright, provided further stimuli for reflection following his suggestions for the need for evaluating the model and using the conference opportunity to do so. His contribution (Wright, 2001), to this stage is gratefully acknowledged. An unexpected outcome of this conversation was his offer to collaborate on future work. The later stage of the development of the paper was largely seeking coherence in the ordering and presentation of the ideas, to the author’s understanding (3) of the standards required of an academic paper. The challenge of responding to the conference trigger has caused the emergence of a new paper, with some outcomes quite different to what had been envisaged in the original abstract for the conference paper. As a result the author has also undergone further individual emergence.

The sequence of ordering of triggers in this case was quite different to a second context that was examined for evaluating the model. This followed a conversation with Julie Dyer, a watercolour artist who usually paints her pictures without reference to any external image. She confirmed that sometimes when she is moved to paint a

vision of what she wants to do is created internally(3). As she begins to define her vision on the paper this then connects with the vision she retains in her head till they are close enough together, and her painting then emerges. On other occasions, the initial trigger for the painting can come from any external stimuli (2).

These two examples show that context is all-important in determining the likely source of the triggering metaphors, and the sequencing of subsequent metaphors which eventually produce individual emergence. The model seems to have the flexibility to accommodate a variety of contexts, but this needs to be tested further.

CONCLUSIONS

This paper is offered as an initial contribution to explore the general notion of individual emergence, on which others are invited to comment or build. An enthalpy change metaphor provides an overall framework for exploring both collective and individual emergence. The characteristics of chemical reactions, including activation energy, catalyst, bonding changes and enthalpy change (energy release) in chemical reactions gives powerful insights into planning and participation in conversation to sustain interaction and thus maximise the possibility of collective and individual emergence.

Metaphors also emerge as a key driving agent for triggering and sustaining progress towards individual emergence in terms of new learning, understanding, perception and future behaviour change. The model of individual emergence presented here assumes sources of metaphor from (1) conversation (2) other external stimuli (3) internal thought processes. From examples explored, the context is critical in determining which source is most likely to provide the necessary metaphors to initiate an emergence process in an individual, and which source(s) are most powerful in sustaining the emergence. Practical ideas emerge for those who are involved in the design of learning systems, namely the need to provide appropriate metaphor as catalysts to engage the learner, to continue to provide them to sustain the learning, and whether specific catalysts are desirable. The paper has highlighted some of the difficulties associated with individual emergence; we can plan programmes for learners but we must always be alert to the possibility that their emergence will not be as we expect. We must also avoid the dark side of metaphor as it can be used for coercion and inappropriate persuasion. More generally we can recognise that culture, values, current knowledge, and interests represent high activation energy levels acting against an individual engaging in change processes; the challenge is to find context relevant catalysts to reduce the activation energy level.

As part of the process of testing the model readers are invited to reflect on which for them represented the key sources of their own emergence during the reading of this paper, assuming that emergence occurred for them. Those who do so are invited to contact the author with their reflections [gordon.dyer@btinternet.com].

EPILOGUE

The Amsterdam conference provided a trigger for this paper but the metaphor which sustained my energy throughout its emergence was the image of Banathy's grandchild's question. By itself any individual paper such as this is a very small step given the challenge of building a better future by empowering every individual to participate in its design. But under Banathy's leadership, ISI members are helping to build up a knowledge and action research base for social systems design. This is

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helping to provide some answers to the four questions indicated in the Prologue. Bela Banathy has been the sustaining influence of my own continuing individual emergence over the last 15 years, not only in terms of the focus of the 20 papers/articles I have produced but in terms of my attitude to the world and the desperate need to take charge of the future. Long may our association with him and his work continue to inspire us.

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Appendix 1:

Figure 5 An Enthalpy Metaphor framework as basis for explaining emergence

An Enthalpy Metaphor framework as basis for explaining Emergence

Appendix

