Journal of Social Science Education
Volume 9, Number 4, 2010, pp. 26–44

ISSN 1618-5293

Bernd Remmele

Two Peculiarities of Economic Education

Zwei Besonderheiten ökonomischer Bildung

In order to model economic competences and to draw the didactic-methodological consequences it is necessary to take into account specific conditions of the conceptual development concerning economic issues and the respective learning paths. In this respect economic education has to deal with two fundamental peculiarities. First, the concept of the market as system unintendedly coordinating a multitude of actions is not transparent in the individual action. Thus, the learning paths to this concept of market cannot just build on the concept of the market as the concrete place of economic interactions. Second, the market's systemic coordination of feedback processes, particularly the negative ones, is rather unintuitive. Intuition prefers unidirectional linear causal relations. These two interrelated peculiarities are present in the cognitive development of economic concepts. Competence requirements have to be defined respectively and methodological choices in teaching systemic 'phenomena' have to reflect this constraint.

Um ökonomische Kompetenzmodelle zu entwickeln und daraus didaktisch-methodische Konsequenzen zu ziehen, ist es notwendig bestimmte Bedingungen der konzeptuellen Entwicklung ökonomischer Zusammenhänge sowie diesbezüglich relevante Lernwege zu berücksichtigen. In dieser Hinsicht muss sich ökonomische Bildung mit zwei Besonderheiten auseinandersetzen: Erstens, das Konzept des Marktes als System nicht-intendierter Koordination einer Vielzahl von Handlungen ist in der einzelnen Handlung nicht einsichtig. Daher kann der dieses Konzept betreffende Lernweg und entsprechende Lehrmethoden nicht einfach am Marktkonzept als konkreter Ort konkreter wirtschaftlicher Interaktionen ansetzen. Zweitens, die systemische Koordinationsleistung des Marktes in Bezug auf Rückkoppelungsprozesse, insbesondere negative Rückkoppelungen, ist relativ unanschaulich. Unsere Anschauung präferiert unidirektionale lineare kausale Verknüpfungen. Die beiden Besonderheiten stehen somit in engem Bezug zur kognitiven Entwicklung ökonomischer Konzepte. Kompetenzanforderungen und die Wahl von Lehr/Lernmethoden in Hinsicht auf systemische ‚Phänomene' müssen daher diese Bedingungen bedenken.

Keywords
economic competences, cognitive development, market concept, system dynamics

1. Introduction

The definition of a competence model, particularly its stages, or the respective development of a curriculum have to take account of relating scientific concepts, but also of the general learning paths and abilities in respect of these concepts. Concerning this important relation economic education has to deal with – among a lot of other issues – two fundamental peculiarities specific to the domain. First, as the capacity of the market to coordinate a multitude of actions is an unintended systemic effect it is not present or transparent in individual action. Consequently – as a way to learn – it can hardly be extracted from the analysis of individual economic interactions, where intentions are usually used as a main category of conceptualization. This is not only true for spontaneous concept development but also for didactically guided learning processes. Economic education has thus to rely on a more abstract approach to this concept, which also has to guide the definition of competences and respective stages.[1]

The second peculiarity is closely related to the first one, as wi ll be shown below. The market's systemic coordination of feedback processes, particularly the negative ones, is rather unintuitive; this implies that concrete, i.e. mainly spatially structured, metaphors are rather misleading because they cannot (easily) represent the crucial relational structure of systemic coordination. Methodological choices in teaching such systemic 'phenomena' have to reflect this constraint and resort to methods which tap other sources, particularly more temporally structured or intrinsically

1 Retzmann et al. (2010) have outlined standards for economic education for general education. It distinguishes between three main fields of learning and instruction – broadly speaking: action, interaction and systems. This is in a very specific way unlike differentiations which directly build on differentiations of science of economics (e.g. Kaminski et al. 2008: 8ff). With regard to competences it is insufficient to derive the differentiation of basic fields of economic education from the scientific domain. Due to the different learning paths particularly institutions have to be distinguished between transparent and intransparent ones, hence some 'institutions' belong to interaction and others refer to systems, as an own field of learning and instruction.

Journal of Social Science Education
Volume 9, Number 4, 2010, pp. 36–44

more reflective metaphors as well as methods which unfold the specific relational structure.

These peculiarities are consequences of a specific path of cognitive development in relation to specific economic concepts which have to be regarded in relation to their formal conceptual complexity. Definitions of economic competences and expectations concerning their development have thus to reflect the age-specific potential concerning the steps of the respective learning paths referring to – among others – formal cognitive development.

Until now these two peculiarities of economic education are not sufficiently explored in the pertinent scientific discourse – neither concerning the respective conceptual development they are based on nor concerning competence-related didactical consequences. The systemic perspective is not significantly differentiated concerning specific learning paths and their possible methodological-didactical framing. The structural dimension of metaphors is also hardly present in the discourse of economic education.

In the remainder this paper tries to bring together some theoretical approaches and some evidence as well as tentatively advance this scientific discourse.

2. The first peculiarity: two separate perspectives on economic phenomena

Economic education has mainly to deal with fostering two fundamental competences: on the one hand the ability to undertake or participate (in a reflective manner) in concrete economic actions or interactions, and on the other hand the ability to conceive and judge abstract economic processes and systems. This directly relates to two different perspectives on economic phenomena, i.e. based on the individual and its actions or on the abstract functioning of the system. Accordingly, Hodgson (1993, 398) analyses theoretical approaches based on the divergence of starting from methodological individualism or "aggregates at the systemic level". The claim of the first peculiarity that (unintended) systemic coordination of the market is not transparent in the individual (intentional) action can be rephrased as a clear separation of the participant perspective and the observer perspective concerning economic phenomena. Concerning social knowledge there is in general the distinction between the participant perspective and observer perspective. The social knowledge of the participants is transparent during social action and a specific observer's perspective taken by the interacting persons is important to control these interactions. The observer's part can however also be a theoretical ex post construction which is not and cannot be part of the single interactions. Taking account of both fundamental competences thus implies that the development, i.e. also conceptual development, of these perspectives has to be reflected.

It is a major achievement of Vygotsky (1986) that he systematically included formal instruction as an essential factor in its own right into the theoretical discussion of conceptual development. His basic distinction of spontaneous and scientific concepts and his 'zone of proximal development', which is mainly related to the latter, scaffold this inclusion. Scientific concepts can be represented verbally in instruction and can be developed by relating them to other concepts – at least partly independent of spontaneous concepts which are mainly based on 'unconscious' experience. From Vygotsky's point of view it is thus not imperative that (top-down instruction of) scientific concepts have to be based on (bottom-up experience of) spontaneous concepts. "Scientific concepts would be unnecessary if they were reflecting mere appearances of objects, as empirical concepts do. The scientific concept, thus, stands in a different relation to the object, in a relation achievable only in conceptual form, which, in its turn, is possible only through a system of concepts." (Vygotsky 1986, 173) It is an assumption of this paper that concerning the systemic nature of certain economic issues there is almost no alternative to such an conceptual approach; it has to be taught from an abstract scientific perspective – partly even wilfully distancing one's perspective from spontaneous/empirical and thus intuitive concepts.

On first sight it might however seem that also the systemic economic observer perspective could also be derived from the participant perspective by (instructionally guided) abstraction or decentration or respective learning paradigms. This might, e.g., be the case for social norms which are of course also relevant in economic interactions: "...the child can generate prescriptions through abstractions form the experience itself (either as an observer or participant)" (Turiel 1983, 43). Social norms reflect the balance of intentions (interests) and can thus be abstracted and generalized from interactions. The observer can or even has to take the role of a participant to make the situation transparent, i.e. in this regard perspective taking and abstraction from this can even be a spontaneous process.

However in relation to the market system the distinction between the two perspectives is a fundamental one. They are separate in a strong sense because the capacity of the market to coordinate a plethora of actions is a systemic and unintended effect, which cannot be abstracted from the characteristics given in the individual perspective. The core scientific concepts in economics are thus not based on spontaneous ones, but have to be based on other (scientific) concepts and thus on formal instruction.

This strong separation is thus a domain specific one as the high relevance of systems as 'object' of the observer perspective is proper to the economic domain. The economic observer is a specific observer in the

Journal of Social Science Education
Volume 9, Number 4, 2010, pp. 36–44

respect that on the one hand the degree of systemic coordination exercised by the market *forces,* which are seen as externally determining (aggregated) behaviour, is very high.[2] On the other hand economy has a high degree of relevance for everyday life in modern societies.

In accordance with the domain specific separation of perspectives there is discussion concerning false generalizations or 'micro-macro-problems' which deal with the problem of everyday abstractions from individual experiences and situations (for an overview Zoerner 2008). However it is not necessary to put wrongfully generalized lay theories under 'ideology-suspicion' ('Ideologieverdacht'; Krol et. al. 2001, 7), because it is primarily not a problem of hidden interests but of unreflected modes of thinking.

However the most salient example for the first peculiarity, i.e. the strict separation of the participant and the observer perspective in the economic domain, is the two concepts of the market itself (and that they are frequently confounded). On the one hand there is the concept of market in the sense of a concrete place where single social (inter)actions are conducted. In each (inter)action a multitude of individual and social, intentional and structural dimensions is active. Particularly economic sociology made aware of this inclusive concept of action. Analysis of individual ‚market'-oriented action should thus not reduce this action to its instrumental-rational dimension but take account of its "embeddedness" in wider social structures as well (cf. e.g. Granovetter 1985; Beckert 2003). On the other hand there is the concept of market in the sense of an abstract coordination system of social actions. This coordination is conceived in a way that it – unintendedly – interrelates only one dimension but of a multitude of actions. The one interrelated dimension is of course the instrumental-rational one with an optimization on ends and means concerning scarce resources (cf. e.g. Swedberg 2003, 109). Looking at the two concepts of market the use of the word 'market' in the derived second sense is thus hardly a good metaphor as the 'rules of reflection' are almost completely different. The relation between the two markets is thus rather catachrestic.

We cannot elaborate much on the different applications of this differentiation. Just as one example of making theoretical use of it Max Weber can be mentioned. Weber (1968, 635f) differentiates the two perspectives in the succession of barter interaction. Whereas he relates the dickering to the systemic market concept he conceives the agreement or the contract in its individual complexity. "The completed barter constitutes a consociation only with the immediate partner. The preparatory dickering, however, is always a social action insofar as the potential partners are guided in their offers by the potential action of an indeterminately large group of real or imaginary competitors rather than by their own actions alone. The more this is true, the more does the market constitute social action. Furthermore, any act of exchange involving the use of money (sale) is a social action simply because the money used derived its value from its relation to the potential action of others."

For specific business contracts or for sellers of goods it is probably ‚more true' that this is a conscious part of the social action. For the usual consumer in a Western shop this is surely 'less true' or not true. One accepts the price or not, the respective decisions of the others are not taken into account. Obviously, also Weber does not consider conscious reflection on the others as a criterion for this social action, as he surely does not assume that using money implies considerations on the social creation or accreditation of its 'value'. The process of money-based social integration of the barter partners is thus in great parts not transparent for them during that process. The example thus also shows that the temporal aspect is structurally different to spatial relations as the past and the future are not a straight line but a condensed virtual bulk of diverse interactions.

3. The second peculiarity: unintuitiveness of the market as system

This focus on the temporal dimension is crucial for the second peculiarity, i.e. unintuitiveness of the market as system, and didactic-methodological consequences as well.

The cognitive structure which yields understanding of the systemic integration of a vast multitude of the economic dimension of actions goes far beyond the comprehension of a single integral action. Not only does it imply a 'post-formal' cognitive level, e.g. the specific integration of contextual factors (cf. Basseches1984; Kramer, Kahlbaugh 1992; McBride 1998), but also – as part of it – the abandoning of intuitive forms of judgement. Though there are differences in the general psychological approach 'system competence' can be considered as one major aspect of post-formal development: in contrast to traditional developmental psychology which builds on reversibility (i.e. finally time-neutrality) for the structuration of cognitive stages, approaches of 'post-formality' build on complex dynamic concepts. This relates to research field

2 On a general level the differentiation of the two perspectives reflects the differentiation of external and internal causation of behaviour. "The active/reactive dimension articulates one of the crucial differences between economics and psychology: 'active' theories stress that human experiences and behaviour are initiated within the person; 'reactive' theories regard behaviour as a reaction to external environmental forces." (Furnham/Lewis 1986, 13) The active theories relate more to the internal and introspective dimension of the participant perspective whereas the reactive theories focus on the external and objectivist aspect of the observer perspective.

Journal of Social Science Education
Volume 9, Number 4, 2010, pp. 36–44

of systems dynamics as it deals with the behaviour of complex systems over time. In this regard systems dynamics focuses on dynamic interactions of different factors and on the aggregate systemic behaviour of multitudes (cf. e.g. Resnick 1998; Sterman 2002; Booth Sweeney, Sterman 2007). There is also evidence that particular training in systems thinking based on specific simulations or practises improves respective competences (e.g. Kriz 2000, 270ff; Pala, Vennix 2005; Plate 2010). This is important development of potential teaching methods concerning systemic phenomena in economy.

Now it can be made clear that the two peculiarities are interrelated. The strict separation of the two perspectives is an effect of the 'operational closure' (Luhmann) of the market system. The systemic effects are 'emergent', i.e. on another level than the level of concrete interactions from which they 'emerge'. Such a closure, based on systemic feedback processes, particularly negative feedback processes, however is difficult to grasp in contrast to the concrete level. The market's systemic coordination of feedback processes is thus far from being intuitive, in the sense that it is not given in a way easy to represent (eidetically).

Intuition is to be understood as the usual form things are presented in imagination. So, in the classical Kantian sense intuitions are the imaginative form of sensual impressions, and as such they are bound to the structure of the pure forms of intuition, i.e. space and time (e.g. Kant 1933 §24). Intuitions are thus formed by the way our senses work and how our mental system integrates these impressions. In relation to external objects it is the spatial aspect which is relevant. Objects thus conform to specific spatial rules, concerning e.g. the additivity of distances or the order of directions. Whereas Kant took the pure forms as static in the frame of transcendental subjectivity modern approaches, i.e. in regard to empirical subjects, have to take a dynamic stance (following e.g. Piaget, Inhelder 1948). Though there is significant individual development of spatiality, (physical) space sticks to some basics: e.g. an object cannot be at two places at the same time. What is however essential for the following argument is that forms of intuition are changeable also in the sense that they can be developed based on learning. In this regard, e.g., Schnelle (1980, 48) analyses forms of intuition in relation to the development of forms of 'understanding'.

So the point is not just the lack of a good spatial metaphor but a deep rooting inexpedience for such representation. Below some examples for this misleading aspect will be given. Chi et al. (1994) describe this problem based on the fundamental ontological difference of categories of matter and process. Whereas scientific concepts often refer to processes, initial concepts of students often refer to matter. Chi et al. conclude that conceptual change within concepts of matter is relatively easy; change from matter to process however is a relatively hard learning process.

A further aspect has to be mentioned here to explain the basic unintuitiveness of feedback processes. It is the fundamental focality of human consciousness which usually ties our imagination to certain spatio-temporal and respective causal structures. As Varela (1975, 5) self-ironically states: „Self-reference is awkward." Also for him the representational problem is a very deep one. The main problem is that on the one hand feedback loops are always already closed – i.e. from both sides. The dynamics of such structure is a major problem for our imagination because on the other hand the focality of human consciousness ties it to a single linear process: A causes B. Our usual form of awareness is fundamentally limited in this respect, we have to focus. "Apparently our cognition cannot hold both ends of a closing circle simultaneously; it must travel through the circle ceaselessly." (Varela 1975, 20)

This problem becomes evident, e.g., in the fact that in a control circuit with two elements mostly one is conceived as the controller and other as the controlled – however concerning these functions they are actually indistinguishable from a theoretical point of view (Glanville 1988). The output of one is always already the input of the other. The thermostat controls the status of the room temperature, while the room temperature controls the status of the thermostat. The teacher guides the students' learning, while the students' learning feeds back on the teacher's behaviour. A control circuit is always already a circuit. So you can chop it into process pieces as small as you like: $A(t_0)$ causes $B(t_1)$ and $B(t_1)$ causes $A(t_2)$ and follow these steps of causation. However this neglects the given closedness of the circuit: $B(t_0)$ already causes $A(t_1)$. Thus when sticking to intuitive linear analysis, which is a less elaborate approach (cf. e.g. Rosenberg 2002; Plate 2010), relevant systemic effects, like e.g. the presence of eigen-behavior, are difficult to imagine.

Only a few examples or symptoms of the problem can be given here. It relates, e.g., to a feature of bounded rationality – with obvious consequences for the systemic understanding of the market. Simon (1993, 92ff) discusses the limitations of human attention concerning certain feedback processes. Facing the relation of inflation and unemployment or energy and environmental policy the focus of the argument is always on one element while the other is neglected. Also the critique of patterns of ecological reasoning in, e.g., the Report for the Club of Rome on the 'Limits of Growth' (1972) is significantly based on this argument.

In addition to this general unintuitiveness of feedback loops the problem becomes even worse for negative feedbacks. Negative feedback has a (seemingly) paradoxical consequence: the effect of a process is the cause of an opposed process – something is the

Journal of Social Science Education
Volume 9, Number 4, 2010, pp. 36–44

cause of its negation. Consequently, developmental psychology shows that negative relations are understood later than positive ones. So, e.g., generally in processes the positive relation between its 'content' (e.g. spatial distance) and its speed is understood earlier than the inverse or negative relation between its duration and its speed (e.g. Remmele 2003, 73ff; Leiser, Beth-Halachmi 2006, 8; further, binary relations are of course easier to understand than relations with more elements, e.g. Levin 1992, 16f; Webley 2005, 49f). In our case, the market system is a constellation of many elements (costs, supply, demand, price, price of possible substitutes etc.) tied together by positive as well as negative relations. Taking into account this complexity it is not surprising that the individual (and historical) development of economic understanding requires time as well as effort and is highly dependent on respective learning contexts – including formal approaches.

Overall, the lacking intuitiveness of the market provides a conceptual frame for a set of theoretically not fully elaborated economic judgements, for which again only some arbitrary examples can be given here. In a study of Leiser and Drori (2005) about the understanding of inflation government as an (intentional) agent is taken as an isolated causal element where from an advanced (observer) perspective systemic effects are in place. "Understanding the process of inflation requires understanding beyond the level of the individual. Specifically, it needs to relate aggregate values. It seems that high school students tend to remain at the level of 'scripts', standardized accounts of who does what, and why, which leads them to attribute an excessive role to the government. In accordance with that Rosenberg (2002, 79ff) provides a more qualitative analysis of linear and systemic reasoning in relation to governmental action.[3]

Personification and the reference to single actions concerning the explanation of systemic market processes is a cognitively not fully elaborated form of reasoning (cf. Fend 1991, 141). It is a significant aspect of cognitive development in the economic domain to reduce the reference to intentional actors in relation to a systemic phenomenon like inflation. Intention is an intuitive linear relation between – in its simple variant with two elements – the intention and the intended action/aim. "The more abstract and complex the phenomena (e.g. inflation, market forces) and more particularly the more difficult it is to personify, the less children (even up to the age of 15) can understand it. Children, it seems, can understand the motives of individual actors, but not the cumulative or aggregated effect of people's economic actions." (Furnham, Lewis 1986, 28) So confounding of the two concepts of market, as expression of our first peculiarity, is itself an example of such unelaborated judgement.

The consequences of this developmental scheme are far reaching because they also affect fundamental ethical issues. At the age of 7 or 8 children frequently assume a 'just price' that corresponds with the characteristics of the traded good and implies a moral obligation for the seller. The detachment of price from concrete characteristics leading to a systemic concept which also includes the (legitimate) interests of the seller takes some years altogether (cf. Berti, Bombi 1988, 126ff).

Further, not to devaluate or not to morally judge economic action and the intention to make profit requires an advanced cognitive development. Adam Smith, who – as is well known – makes this claim for the butcher, baker and brewer etc. – makes clear in his 'Theory of Moral Sentiments' that the role of intentions is crucial for moral sentiments and that they have a fundamental social function (cf. Smith 1790, 2.3.3). To abstain from such judgement is not easy and requires, e.g., the theoretical insight into the utilitaristic efficiency of the market systems in relation to the whole society. Consequently the developmental stage of economic understanding has a significant influence on the ethical judgement of individuals concerning economic phenomena (cf. Walstad 1996). Accordingly the historical development of the theoretical (at least partial) exclusion of the economic sphere from moral claims is a major scientific 'achievement', which of course in further step can be contextually reframed again. Interestingly it was Adam Smith, who was also the first to systematically use negative feedback in his scientific considerations (Mayr 1987, 197; Remmele 2003, 22, 56ff). It could even be said that the unintuitiveness of the systemic market mechanism is mirrored skewedly in his well know metaphor of the 'invisible hand'. It might be added, that it is not just a non-visible mechanism, but rather that is not working in a possibly visible way.

Hence it has finally to be mentioned that the relation between the conceptual and the intuitive or concrete metaphorical is very complex here as it is difficult to determine whether the intuitive misunderstandings of systemic phenomena are due to the

3 Though ‚conceptual change' is a widely discussed and researched subject in the last decades Chi and Ohlsson (2005) state in relation to this scientific field that „the study of complex declarative learning is still in its infancy and has not yet produced a unified theory or paradigmatic framework." The approaches they discuss (semantic networks, theories based on the differentiation of centre and periphery, and schemas as experiential patterns) can however clearly be based on Vygotsky's claim that conceptual development of scientific concepts needs instruction which relies on providing relations to other concepts of adequate complexity and abstractness. So the unintuitive and non-spontaneous character of systemic economic issues which are at stake here needs the social framing in the ‚zone of proximal development' with an already competent teacher or learning partner as learning guide, i.e. economic education requires professional economic teachers.

Journal of Social Science Education
Volume 9, Number 4, 2010, pp. 36–44

lacking conceptual development or the chosen (spatial) image, i.e. the general inexpedience of spatial metaphors for systemic phenomena. A first example is the concept of a border. The protectionism which can be enacted at the border of a state can be referred to the difficulty of grasping the abstract concept of comparative cost advantages or the imaginative strength of this basic spatial metaphor. On the one hand it is difficult to develop this aggregate concept, on the other hand it is difficult not use an image like 'border', which contains something and 'protects' one side from the other. Another example, which uses a less concrete but still spatially structured metaphor, is the 'fixed pie' (cf. Enste et al. 2009, 63) which implies the conservation of quantity (of volume or area). The frequent separation of distribution and production of social welfare based on the intuition of a given amount of goods contradicts the 'systematization' of this problem, i.e. taking into account the incentive structure which is yielded by the distributive rule (for other distorting metaphors cf. Oberlechner et al. 2004, Mandelbrot, Hudson 2005).

4. Didactical consequences

Against this backdrop we face significant didactical questions: when and how can the market as a system be taught? On the one hand it is necessary to develop realistic age-specific competence expectations and respective curricular standards. On the other hand economic education has to make clear how concrete didactic-methodological approaches deal with the independence and unintuitiveness of the systemic concept of market.

The claim for realistic competence expectations implies a critique of the general postulation of 'deficits' based on the results of unreflected competence assessments. In contrast it is necessary to take account of developmental paths and obstacles. Based on competence measurement which did not take into account the mentioned peculiarities and their developmental background certain authors (e.g. Walstad, Larsen 1993, Sczesny, Lüdecke 1998, Klein, Meißner 1999) stated 'deficits' in the students economic knowledge and understanding. These 'deficits' might thus not be the result of intellectual laziness or insufficient schooling (due to lacking economic competence of teachers or of insufficient representation of economic issues in the curricula etc.) but might just be an expression of the age specific level of reasoning. It can be shown, e.g., that test items in the Test of Economic Literacy imply elaborate systemic reasoning, but that there assumed competence level is regarded rather low. (cf. e.g. Remmele 2009, 100) Generally it might also be argued that particularly multiple choice questionnaires are not the optimal test instrument for the evaluation of complex reasoning.[4]

It is necessary to elucidate the respective age specific competence requirements on the basis of a tested competence model for the economic domain. As such a model with validated competence levels is still a desideratum, the expectations can so far only be based on plausible argument. The paper already tried to give some orientation in this respect. Concerning the question when to expect and when reasonably to start to systematically teach systemic concepts one conclusion is that systemic reasoning – as a 'post-formal' operation – has mainly to wait until the end of lower secondary education.

So finally, we have to distinguish different approaches to deal with the problem of teaching the systemic dimension of economy. The first approach follows the insight of Vygotsky that conceptual development can and partly has to be grounded on concept based instruction. This can be called a "top-down replacement" (Chi, Ohlsson 2005), i.e. the presentation of an alternative concept in parallel with a prior or intuitive one, in a way that does not use the prior one as input. The old and the new representations then compete for the control of the field concerning explanation, problem solving etc. The more capable concept will then prevail. As often stated it is, e.g., sufficient to become a proper economist – even for a parrot – when you always say: 'supply and demand'. Supply and demand is a concept, which is hard to develop from everyday experience as it implies a specific aggregation of social phenomena, and shows thus already a scientific approach (cf. Davies 2006). So fostering the use of these concepts in instruction can work in this formal concept based way.

In addition to such top-down methods also target-oriented 'horizontal' methods could be useful to teach the market as a system. To do this more temporally structured and more intrinsically reflective metaphors have to be taken into account. It has to be remembered therefore that intuition is not static, and it is not static in two different ways, which have been mentioned above. First, intuition can be developed in line with other elements of cognitive development (cf. Peirce 1981, 404f). Second, intuition is not static in the sense that it cannot process dynamic ‚rules of reflection', i.e. that which is transferred by a metaphor from one field of understanding to the other, at all. In general transfer might be possible from fields of knowledge where a more advanced 'rule of reflection' is already valid due to relevant reasoning or some kind of instruction as well as experience.

4 'Deficits' are particularly detected for girls; a great deal of recurring gender differences in such tests might however be related to the test designs (cf. Davies et al. 2005).

Journal of Social Science Education
Volume 9, Number 4, 2010, pp. 36–44

Weather is a rather familiar phenomenon which might make it easier to grasp other complex dynamic phenomena. At least in Central Europe the weather is expected to change permanently though having seasonal characteristics and weather forecast often have a scientific appeal concerning the interdependencies of high and low pressure areas etc. Weather could thus be an adequate metaphor for equilibrium processes, which can be found also in economy from time to time. Accordingly examples from biological evolution could help to grasp feedback systems generating, e.g., ups and downs of populations of connected species (hunter and prey). One could even think of teenage cat fights as example of a complex dynamic system which is in its overall outlook constantly sensitive to nuances of individual behaviour and leads to dynamic balances of rapprochement and alienation between the bigger set of involved teenagers and which is also constantly reflective and analytic to these nuances. This last aspect might be used to demonstrate the aggregated psychological influences in market processes. It remains of course a question of individual methodological creativity to choose an adequate example for a specific topic in class. The point here is to show that there are examples, even if they might be considered strange at first sight.

Finally, a more direct approach to the topic has to be mentioned. There are methods that allow unfolding the compressed temporal-relational structure which are bulked together in certain conditions of individual action, e.g. prices. With simulations the systemic effects can be stretched and simplified in a way that the aggregate actions and decisions of an ‚indeterminately large group of real or imaginary' persons reach a state of more transparency. If the complexity of systemic coordination of economic actions cannot be experienced in reality respective virtual experience might be provided in class (cf. e.g. Egenfeldt-Nielsen 2007, 100ff). The process character of systemic economic phenomena can, e.g., be experienced in auctions or competitive simulation games. The form of the coordination can be perceived as the numerically reduced sequence (and interrelation) of decisions. A further possibility is usage of (computer-based) simulations of feedback-systems which can be manipulated by the students and thus give an impression of the causal interrelation of inputs and relational variables (e.g. Arndt 2007). This is again rather a top-down approach as the target concept is build into the structure of these interrelations. Whether top-down or horizontal it should be clear now that bottom-up from everyday experience is at best an exception.[5]

5 Purchasing power might be considered such an example: purchasing power is not experienced in everyday life as it is implicit in money. However, particularly during holidays abroad the aggregated dimension of purchasing power or its comparative nature is an eternal source of irritation: 'everything is so cheap/expensive here'.

Journal of Social Science Education
Volume 9, Number 4, 2010, pp. 36–44

References

Arndt, Holger. 2007. Using System Dynamics-Based Learning Environments to Enhance System Thinking. In: Proceedings of the International Conference of the System Dynamics Society. Boston.

Basseches, Michael. 1984. Dialectical Thinking and Adult Development. Norwood, N.J.

Beckert, Jens. 2003. Economic Sociology And Embeddedness: How Shall We Conceptualize Economic Action? In: Journal of Economic Issues, 37, 769–787.

Berti, Anna; Bombi, Anna. 1988. The Child's Construction of Economics. Cambridge.

Booth Sweeney, Linda; Sterman, John D. 2007. Thinking About Systems: Student and Teacher Conceptions of Natural and Social Systems. In: System Dynamics Review, 23/2-3, 285–311.

Chi, Michelene; Ohlsson, Stellan. 2005. Complex Declarative Learning. In: Holyoak, Keith J.; Morrison Robert G., eds. Cambridge Handbook of Thinking and Reasoning. Cambridge, 371–399.

Chi, Michelene; Slotta, James; deLeeuw, Nicholas. 1994. From Things to Processes: A Theory of Conceptual Change for Learning Science Concepts. In: Learning and Instruction, 4, 27–43.

Davies, Peter. 2006. Threshold Concepts: How can We Recognise Them? In: Meyer, Jan; Land, Ray, eds. Overcoming Barriers to Student Understanding. Abingdon Oxon, New York NY, 70–84.

Davies, Peter; Mangan, Jean; Telhaj, Shqiponje. 2005. Bold, Reckless and Adaptive? Explaining Gender Difference in Economic Thinking and Attitudes. In: British Education Research Journal, 31/1, 29–48.

Egenfeldt-Nielsen, Simon. 2007. Educational Potential of Computer Games. London.

Enste, Dominik; Haferkamp, Alexandra; Fetchenhauer, Detlef. 2009. Unterschiede im Denken zwischen Ökonomen und Laien. Erklärungsansätze zur Verbesserung der wirtschaftspolitischen Beratung. In: Perspektiven der Wirtschaftspolitik,10/1, 60–78.

Fend, Helmut. 1991. Identitätsentwicklung in der Adoleszenz. Lebensentwürfe, Selbstfindung und Weltaneignung in beruflichen, familiären und politisch-weltanschaulichen Bereichen. Bern.

Furnham, Adrian; Lewis, Alan. 1986. Economic Mind. Brighton.

Glanville, Ranulph. 1988. In jeder White Box warten zwei Black Boxes, die herauswollen. In: Glanville, Ranulph, ed. Objekte. Berlin, 119-147.

Granovetter, Mark. 1985. Economic Action and Social Structure: the Problem of Embeddedness. In: American Journal of Sociology, 91, 481–493.

Habermas, Jürgen. 1981. Theorie des kommunikativen Handelns. Bd 2. Frankfurt/M.

Hodgson, G. 1993. The Economy as an Organism – Not a Machine. In: Futures, 392-403.

Jung, Eberhard. 2006. Möglichkeiten zur Überprüfung von Kompetenzmodellen in der Ökonomischen Bildung. In: Weitz, Bernd, ed. Kompetenzentwicklung, -förderung und -prüfung in der ökonomischen Bildung. Bergisch Gladbach, 33-60.

Kant, Immanuel. 1933. Critique of Pure Reason. Basingstoke.

Kaminski, Hans; Eckert, Katrin; Burkard, Karl-Josef. 2008. Konzeption für die ökonomische Bildung als Allgemeinbildung von der Primarstufe bis zur Sekundarstufe II. Berlin.

Klein, Josef; Meißner, Iris. 1999. Wirtschaft im Kopf. Begriffskompetenz und Einstellungen junger Erwachsener bei Wirtschaftsthemen im Medienkontext. Frankfurt et al.

Kramer, Deirdre A.; Kahlbaugh, Patricia E.; Goldston, Ruth B. 1992. A Measure of Paradigm Beliefs About the Social World. In: Journal of Gerontology, 47/3, 180-189.

Kriz, Willy Christian. 2000. Lernziel Systemkompetenz. Planspiele als Trainingsmethode. Göttingen.

Krol, Gerd-Jan; Loerwald, Dirk; Zoerner, Andreas. 2006. Standards für die ökonomische Bildung in der gestuften Lehrerausbildung. Münster – IÖB-Diskussionspapier, 01.

Leiser, David; Beth Halachmi, Reut. 2006. Children's Understanding of Market Forces. In: Journal of Economic Psychology, 27/1, 6-19.

Leiser, David; Drori, Shelly. 2005. Naive Understanding of Inflation. In: Journal of Socio-Economics, 34/2, 179-198.

Levin, Iris. 1992. The Development of the Concept of Time in Children: An Integrative Model. In: Macar, Françoise; Pouthas, Viviane; Friedman, William, eds. Time Action and Cognition. Dordrecht et al., 13-32.

Mandelbrot, Benoit; Hudson, Richard. 2005. Fraktale und Finanzen: Märkte zwischen Risiko, Rendite und Ruin. München & Zürich.

Mayr, Otto. 1987. Uhrwerk und Waage. Autorität, Freiheit und technische Systeme in der frühen Neuzeit. München.

McBride, Lynda Ross. 1998. A Comparison of Postformal Operations in Diverse Adult Populations. Contrasting African Americans and Standard-Average-European Americans. Lubbock.

Meadows, Donella; Meadows, Dennis. 1972. The Limits to Growth. A Report for The Club of Rome's Project on the Predicament of Mankind. New York.

Oberlechner, Thomas; Slunecko, Thomas; Kronberger, Nicole. 2004. Surfing the Money Tides: Understanding the Foreign Exchange Market through Metaphors. In: British Journal of Social Psychology, 43, 133–156.

Pala, Özge; Vennix, Jac A. M. 2005. Effect of System Dynamics Education on Systems Thinking Inventory Task Performance. In: System Dynamics Review, 21/2, 147–172.

Peirce, Charles. 1991. Schriften zum Pragmatismus und Pragmatizismus. Frankfurt/M.

Piaget, Jean; Inhelder, Bärbel. 1948. La représentation de l'espace chez l'enfant. Paris.

Plate, Richard. 2010. Assessing Individuals' Understanding of Nonlinear Causal Structures in Complex Systems. In: System Dynamics Review, 26/1, 19–33.

Remmele, Bernd. 2003. Die Entstehung des Maschinenparadigmas. Opladen.

Remmele, Bernd. 2009. Ökonomische Kompetenzentwicklung – Systeme verstehen. In: Seeber, Günther, ed. Forschungsfelder der Wirtschaftsdidaktik. Schwalbach, 92-103.

Resnick, Mitchel. 1998. Turtles, Termites, and Traffic Jams. Explorations in Massively Parallel Microworlds. Cambridge, Mass.

Retzmann, Thomas; Seeber, Günther; Remmele, Bernd; Jongebloed, Hans-Carl. 2010. Ökonomische Bildung an allgemeinbildenden Schulen: Bildungsstandards – Standards für die Lehrerbildung. Essen, Lahr, Kiel.

Rosenberg, Shawn W. 2002. The Not so Common Sense. Differences in How People Judge Social and Political Life. New Haven.

Sczesny, Christoph; Lüdecke, Sigrid. 1998. Ökonomische Bildung Jugendlicher auf dem Prüfstand: Diagnose und Defizite. In: Zeitschrift für Berufs- und Wirtschaftspädagogik, 3, 403-420.

Schnelle, Helmut. 1980. Sprache, Anschauung, Sinnesdaten. In: Anschauung als ästhetische Kategorie. Neue Hefte für Philosophie, 18/19 , 33–57.

Simon, Herbert. 1993. Homo rationalis. Frankfurt.

Smith, Adam. 1790. The Theory of Moral Sentiments. London.

Sterman, John D. 2002. All Models are Wrong: Reflections on Becoming a Systems Scientist. In: System Dynamics Review, 18/4, 501–531.

Turiel, Elliot. 1983. The Development of Social Knowledge: Morality & Convention. New York.

Varela, Francisco. 1975. A Calculus for Self-Reference. In: International Journal of General Systems, 2, 5-24.

Vygotsky, Lev. 1986. Thought and Language. Cambridge, Mass.

Walstad, William; Larsen, Max. 1993. Results from a Nation Survey of American Economic Literacy. In: Proceedings of 48th Annual Conference of the American Association for Public Opinion Research, 1226-1230.

Walstad, William. 1996. Economic Knowledge and the Formation of Economic Opinions and Attitudes. In: Lunt, Peter; Furnham, Adrian, eds. Economic Socialization: The Economic Beliefs and Behavior of Young People. Cheltenham, 162-182.

Weber, Max. 1968. Economy and Society: An Outline of Interpretive Sociology. New York.

Webley, Paul. 2005. Children's Understanding of Economics. In: Barrett, Martyn; Buchanan-Barrow, Eithne, eds. Children's Understanding of Society. Hove, New York, 43-67.

Zoerner, Andreas. 2008. Stolpersteine und Leitplanken – Emergenz- und Aggregationsprobleme erfahrungsorientierten Unterrichts und die Antwort der ökonomischen Bildung. In: Loerwald, Dirk; Wiesweg, Maik; Zoerner, Andreas, eds. Ökonomik und Gesellschaft. Wiesbaden, 200–214.