Basic conceptual systems (BCSs) – tools for analytic coding, thinking and learning: A concept teaching curriculum in Norway☆

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ABSTRACT

The role of basic conceptual systems (for example, colour, shape, size, position, direction, number, pattern, etc.) as psychological tools for analytic coding, thinking, learning is emphasised, and a proposal for a teaching order of BCSs in kindergarten and primary school is introduced. The first part of this article explains briefly main aspects of the theory behind and the approach of systematic concept teaching (CT), including a description of a model for concept teaching and examples of analytic coding. This part forms the rationale for the second part of the article which focuses on a curriculum for the teaching of BCSs and related concepts in kindergarten and primary school, developed as part of a project on concept teaching in the municipality of Balsfjord, Norway. The main outline of the curriculum is presented and commented upon. Finally this article provides some data regarding evaluation of this project to date.

1. Part one: Main aspects of a theory of learning and the corresponding educational practice

1.1. Concept teaching (CT) – what, how and why?

Concept teaching (CT) refers to systematic concept teaching of basic conceptual systems (colour, shape, size, position, place, direction, (surface) pattern, direction, number, time, etc.) and related basic concepts, which are made verbally conscious by means of oral language skills. These basic conceptual systems and related concepts are taught by means of a model for concept teaching which was developed by Dr. Magne Nyborg in Norway.

The approach also aims to help children with negative experiences concerning their learning possibilities develop positive expectations towards learning. In addition it aims at teaching them to direct and take control of their attention, and to train them in prolonging and expanding their Short Term Memory/Working Memory by consciously applying language in these processes (outer as well as internalized private speech). Moreover, it makes children aware of and trains them in the use of language as a tool for further thinking and problem solving. In short an important aim for CT is to teach children how to learn (better). The approach also includes training the children in applying a precise and decontextualized[1] (or situational independent) language when it is needed in communication, thinking and learning.

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[1] This refers to communication about objects and events that possible communication partners cannot look at or inspect together while communicating. The general assumption is that as much as 40–60% of the conceptual meanings attached to words and sentences applied in ordinary conversation can be derived or understood in light of the immediate context, when communication partners have the opportunity to look at or inspect together what they are talking about. Via CT one aims at teaching a more common conceptual basis for a precise communication represented by "a language" consisting of words and sentences that function and convey meanings across situations or contexts, i.e. a language that to a much lesser extent is dependent upon what the "partners" can view together while talking. Thus, a language that functions in this way may be termed "a precise and decontextualized language".

Teachers are recommended to deliberately apply BCSs and related concepts as tools for teaching of school subjects including skills of different kinds as children learn more and more BCSs and related concepts.

1.2. Nyborg's four instruments for educational thinking, planning and teaching practice

Magne Nyborg (1927–1996), professor at the University of Oslo for many years, carried out extensive research on learning difficulties by means of which he developed a comprehensive theory of learning in close collaboration with colleagues a corresponding educational practice. Nyborg's theoretical and empirical work has resulted in the following four instruments for educational thinking, planning and teaching practice (Nyborg, 1993):

A. A theoretical model of a learning person – the PSI-model (person–situation-interactions during learning) – which is a depiction representing central parts of his theory of teaching/learning, cf. the explanation of central aspects of the theory in this article.
B. A survey of basic conceptual systems and related concepts – the BCSs-model. The BSCs are of great importance for performing analytic coding, cf. this article.
C. A concept teaching model (the CTM).This is a model developed for teaching of (Basic) Conceptual Systems rather than merely "single" concepts, cf. the brief explanation in this article.
D. A model for the teaching/learning of skills.

Throughout his research, which stretched over more than 30 years, Nyborg focused upon how teaching in school could be improved, so that the pupils' general ability to learn could be facilitated. A major notion in Nyborg's educational thinking is that ability to learn in a general sense is dependent upon prerequisites for learning in terms of what has previously been learned and stored a Long Term Memory (LTM). In his search for what might be important prerequisites for learning, Nyborg asked himself the following main questions.

1.3. Which kinds of previous learning may be assumed to transfer positively to further learning and to thinking in terms of what is learned?

As a result of his research Nyborg argues that concepts about, and conceptual systems concerning, classes of phenomena, may be considered major instruments for positive transfer; that is, especially when they are involved in principles, explanations, definitions, rules, laws, equations, etc. In particular basic conceptual systems (BCSs) and related basic concepts integrated with and symbolised by language skills, have proved to be important in positive transfer. That is because when they have been adequately taught/learned by means of the concept teaching model, they have proved to become bases for analytic coding[2] or multiple abstractions in all further learning, both in further concept and in skill learning. Later in this article an example of analytic coding of a letter will be provided by directing attention to some basic conceptual systems.

Another main question, asked by Nyborg and closely related to the preceding one, is given below.

1.4. Which processes, in the learner, may be assumed to be involved in positive transfer?

The answer to this question is to be found in Nyborg's construction of a general theoretical model of a learning person in dynamic interaction with his environments, the so-called PSI-model. By means of this theoretical and depicted model, Nyborg argues that the process of analytic coding (cf. the example of analytic coding of a letter below) and thinking processes, are dependent upon what has previously been learned/stored in a person's Long Term Memory. In his theory LTM is divided into three main structures, which Nyborg views as important prerequisites for performing analytic coding, and accordingly for positive transfer, for learning:
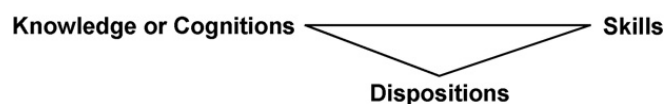
To the left are symbolised the *knowledge or cognition structures*, with four kinds of cognition at rising levels (images of specific phenomena – concepts about classes – systems of concepts – propositionally[3] organised meanings). To the right is the *structure of skills*, which includes both non-verbal and verbal skills of all kinds. According to Nyborg verbal skills play an important role as symbolising and organising factors in the learning of cognitions/in knowledge acquisition. The third structure is *dispositions for becoming emotionally and motivationally activated* by what is sensed, remembered or thought of

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[2] According to Nyborg analytic coding is synonymous with multiple abstractions or multiple classification.
[3] That is, concepts and conceptual systems sequentially organised by means of symbols ordered by grammatical rules to prepositional meanings. Sequentially organised experiences.

by the person at each moment. This third factor may also considerably modify the transfer process; in other words hinder or facilitate the process. These three LTM-structures are mutually necessary for each other, as well as usually activating each other. And to repeat – they constitute the LTM bases for transfer to further learning as well as the bases for thinking – and preferably, for positive transfer to further learning and for more optimal thinking.

The strategy of concept teaching including the application of the concept teaching model (The CTM) aims at modifying and changing all the three LTM structures and at teaching children strategies for learning.

1.5. The difference between numerals, words and other symbols – and concepts of classes

In Nyborg's theoretical framework there is a distinction between *numbers, words and other symbols*, on the one hand, and *concepts of classes*, on the other hand. The former category may be looked upon as a naming of or as labels for concepts of classes and other kinds of meanings.

Concepts of classes are defined as learned/stored knowledge about *partial similarities* between different members of classes (that is within-class similarities – for instance between (all) members of the class DOG). Knowledge about *partial differences* between members within classes is also central, making it possible to identify and distinguish between sub-groups belonging to the class (in this case differences between sub-groups of dogs). This second criterion makes it possible also to constitute a conceptual system of related class concepts; organized by names of sub-groups and – in this case – by the super-ordinate name DOG. Finally – as a third criterion – concepts of classes should also include knowledge of *partial differences* between the classes to be learned about and other classes with which the class in question can be confused (in this case the differences between dogs and, for instance, cats or other kinds of animals).

Concepts of classes can be learned (1) by observing members of the class to be learned about as well as by observing members of classes that easily can be confused with that particular class, or (2) concepts can be merely learned by definitions heard or read. The outcome of such "definitional" learning will largely depend on the learner's conceptual understanding of words and other symbols used in the definition. Finally, concept learning can take place (3) by some kind of combination between learning by observation and learning by definition.

1.6. Two kinds or two sub-groups of concepts and conceptual systems

Nyborg also distinguishes between two kinds or two sub-groups of concepts and conceptual systems. Somewhat simplified it's possible to talk of:

Sub-group 1: Basic concepts and basic conceptual systems, e.g. concepts regarding Colour, Shape, Size, Number, Position, Place, etc. (representing attributes of and relations between wholes and their parts).
Sub-group 2: More "complex" concepts and conceptual systems (e.g. regarding whole phenomena and their parts such as whole plants, animals, persons, objects and events such as trees, horses, rooms, boats, towns, and to go, to dance, etc.).

The first mentioned sub-group of concepts and conceptual systems are called basic because they – according to Nyborg – are necessary in order to learn the latter and more "complex" group of concepts and conceptual systems more completely than otherwise, based upon analytic coding or abstractions.

1.7. An inventory of words for basic conceptual systems and some related basic concepts – the BCSs-model

1. *Colour:* Red, blue, etc.
2. *Shape:* Linear shapes: straight line, bowed/curved, angular.
   Surface shapes: round, triangular, four-sided etc.
   Spatial shapes: spherical, cubic, prismic, cylindrical, etc.
   Shapes named according to the look of the object, like egg shaped, heart shape, etc.
3. *Change in colour, shape*, . . ., etc.
4. *Position:* Vertical, horizontal, diagonal/slanting, sitting, kneeling, lying, etc.
5. *Place:* Placed on, under, at, over, beside, to the left/right of . . ., etc. Also placed first, second, behind, between, in front of, etc. in a row.
6. *Size(s):* 1-dimensional, 2-dimensional and 3-dimensional sizes in relation to . . . and their measure units (e.g. for line sizes: great/small/greater/smaller etc. length, height, breadth, depth in relation to. . ..).
7. *Direction:* From the left to the right, upwards, etc.
8. *Number:* Small/large, etc. number in relation to. . . Number of ones, of tens, to increase/decrease numbers, etc. (Also exact numerals symbolising numbers).
9. *Sound/phoneme:* |a|, |f|, |g|, etc.
10. *Surface pattern/design:* Dotted, striped, checked, flowery, etc.
11. *Use or function:* To drink from, to sit on, to write with, etc.
12. *Substance/material:* Wood, glass, metal, plastic, leather, etc.

13. *Surface attributes of substance:* Smooth, rough, glossy, matt, sandpapered, painted, etc.
14. *Physical attributes of substance:* Hard, soft, elastic, firm, etc.
15. *Weight:* Great/heavy, small/light etc. in relation to... Also precise measures of weight.
16. *Temperature:* Cold, warm, boiling hot T, freezing cold T, etc. Exact temperatures.
17. *Smell:* Nice, nasty, smell of food, etc.
18. *Taste:* Sour, sweet, bitter, apple-taste, etc.
19. *Time*
20. *Speed/movement*
21. *Value*

> It is especially important to teach the first 10 (minus no 3) (plus possibly 11–14th) listed basic conceptual systems by means of the concept teaching model. Most of the others can be taught in a more traditional way by naming the concept and conceptual system (heavy Weight, sour Taste, etc.) in relation to children having rich sensorial experiences from the near surroundings.

1.8. The concept teaching model (the CTM)

The concept teaching model is divided into three different phases that are named according to the processes that are specifically represented in each phase. However, a fourth and basic process named analytic coding underlies the learning in all of the three phases. Analytic coding refers to the process by which a person analyses and selects the proper feature to be learned about during the work in the three phases; in the following example roundness named as round shape (Hansen, Hem, & Sønnesyn, 2002; Hansen, 2006). Analyses and comparisons corresponding to this are presumed to take place initially in an intuitive way. As children learn BCSs and related concepts in a verbally conscious way, analyses and comparisons way be performed at a conscious level.

Phase 1: Selective Association (the SA-phase) or learning associations.

First the teacher presents:
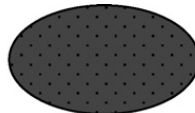A round shape
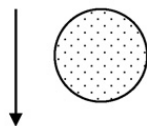
while verbalising as a model for the children:

"This figure has a round shape (because...)"

Then the children are asked and helped to do the same verbalisation while inspecting and touching the round shape.

Afterwards the teacher presents and the children make varied examples of objects, drawings, etc., which are similar in having a *round shape* with various degrees of roundness. At the same time the teacher systematically varies other features of the examples such as Colour, Size, Pattern, Place, etc., to help the learning person detect and abstract *roundness* as the adequate feature.

Phase 2: Selective Discrimination (the SD-phase) or learning differences.

In this phase the teacher will present examples of objects or drawings etc. like.

The task of the learner is to point out or otherwise identify the figure which has *a round shape* and – of course to answer *a round shape* – and preferably as part of a sentence, if questioned about the shape of the figure.

In the last part of this phase the children are asked to point out or identify by themselves figures in the surroundings or tell about figures elsewhere that have *a round shape*.

Phase 3: Selective Generalisation (the SG-phase) or verbally formulated discovery of similarity.

During this phase detected *partial similarities* (in this case round shape), which have repeatedly occurred during the work of the preceding phases, are described and made verbally *conscious* by means of symbols and language skills.

Example: The teacher presents situations with examples of objects or drawings etc. that vary in many ways while asking: "in which respect[4] are these figures *similar*?"
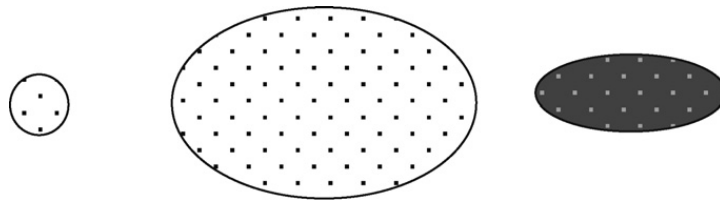
An appropriate answer would be: "they are similar in having a round shape." Thus the detected partial similarities are mediated and made "verbally conscious" through an inductive conclusion.

Of course, this illustrated way of answering must sometimes be learned through several examples and by imitating the teacher and other children's repeated verbalisations. In spite of this, for pupils with severe verbalisation problems, one must sometimes still be satisfied with a shortened phrase reflecting what has been detected and abstracted, like: "similar in – round shape."

In order to secure success for children on this task the teacher formerly has to teach and make the children aware of the difference between the concepts of "complete similarity" (being completely alike) and "partial similarity" (being partially alike), thus mediating verbal tools that may help them to direct their attention in the search of partial similarity and differences.

1.9. Analytic coding of a letter by means of (words for) basic conceptual systems

The example below demonstrates how attention may be directed very precisely towards different and characterising features of the letter L by means of (names for) basic conceptual systems. This is an example of analytic coding applied in the teaching/learning of letters.

Possible answers[5] to the questions are to be found at the bottom of this page.

A. How many parts is it possible to say that this letter consists of?
B. What shape do the parts have?
C. What positions do the parts have?
D. How are the parts placed in relation to one another?
E. What is this letter a symbol for in reading and writing?

Anecdotal experience suggests that pupils with learning disorders – when having performed such precise analysis with the help of the teacher – learn the letters and what they symbolise faster than otherwise, and that they learn to read and write sooner and better than in situations when basic conceptual systems are not used as tools in such teaching/learning.

1.10. The teaching of more complex conceptual systems – also as part of school subjects

The principles of the CTM-model can also be used for teaching/learning more complex concepts and conceptual systems (of whole objects and events such as rooms, boats, towns and to go, to dance, etc.). At the same time one may train children in being a kind of "small researchers" in asking themselves questions like:

1. In which aspects are all rooms (doors, windows, gardens, roads, rivers, mountains,
2. towns etc.) similar?
3. How can rooms be different?
4. What can rooms be mistaken for?

The answers to such question may considerably help the children in their construction of precise and verbally conscious meanings hierarchically organised into conceptual systems. To master this kind of inductive approach to learning the children need extensive training.

It can be argued that basic conceptual systems including basic concepts are generally helpful in teaching/learning school subjects as well as for learning skills of different kinds. In other words – BCSs are tools for learning in different areas and

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[4] This can be asked in other ways, e.g. "in what way are these figures similar/what are all these figures similar in?".
[5] (A) This letter consists of (the number of) two parts.
(B) They both have straight line shape.
(C) One is in vertical position; the other in horizontal position.
(D) The vertical one is placed on the left-hand side of the other; and the horizontal one is placed at the lower end of the vertical line.
(E) The letter is used as a symbol for the phoneme /L/ and is articulated "la".

at different levels of learning. This can easily be illustrated, by turning, for instance, to teaching/learning about the Solar System, and the logic of this is as follows: Besides using three-dimensional models, pictures and sometimes data-programs in teaching persons about the Solar System, the outcome for the learner is heavily dependent upon her/his understanding of the teacher's use of sentences loaded with BCSs and related concepts concerning Colour, Shape, Position, Place, Size, Direction/Movement, Temperature, Surface, Substance, Weight, Time and so on. In other words basic conceptual systems and related concepts are central with respect to learning about the Solar system.

The same process is likely to apply to persons with learning difficulties: Having gradually – via concept teaching – learned the conceptual bases for and the strategy of performing analytic coding, many of them will become better learners in a broad sense; in other words – they can become more intelligent (Nyborg, Nyborg, & Hansen, 1997).

2. Part two: A curriculum for the teaching of basic conceptual systems (BCSs) and related basic concepts in kindergarten and primary school

2.1. Background information

The development of the booklet "A concept teaching model. A curriculum for the teaching of the of basic conceptual systems (BCSs) and related basic concepts in kindergarten and primary school (Hansen, 2009)", presented at the IACESA conference in Cape Town in February 2009, builds on a curriculum for concept teaching that was made compulsory from 1.1.2008 in the municipality of Balsfjord, Norway. This booklet is free available on the internet, cf. the internet address in the reference list.

As a response to the introduction of the Norwegian National Curriculum for the Development of Knowledge from 2006 and the new Framework Plan for Kindergarten from 2006, the Municipality of Balsfjord introduced a joint supplementary teacher training program for all kindergartens and schools, focusing on how to utilize systematic concept teaching on a regular basis. The supplementary training was carried out by Andreas Hansen, National Support System for Special Education in North-Norway, through three courses in 2005/2006 through spring 2007. The 'Balsfjord Curriculum for the teaching of basic conceptual systems and related concepts' was then developed by school and kindergarten leaders in collaboration with Hansen in order to ensure that the schools and kindergartens would continue to utilize concept teaching after the educational project/program was finished.

2.2. Main objectives in the BCS curriculum in the municipality of Balsfjord

The main objectives for the curriculum in Balsfjord are stated in the following ambitious points:

- The curriculum shall be a tool utilized for the application of concept teaching with the objective of helping children develop prerequisites for learning in terms of oral language skills.
- The curriculum shall help prevent learning difficulties due to inadequately developed language skills.
- The curriculum shall increase children's mastery of basic skills, including reading, writing and mathematics.
- The curriculum shall promote cooperation between schools and kindergartens, and promote continuation with regard to language development from kindergarten to primary school.
- The curriculum shall prevent and reduce differences among children related to language development, and learning, and promote the development of social skills.

The objectives mirror what the leaders in kindergartens and primary schools and Andreas Hansen believe might be possible to obtain if CT is carried out over years in the prescribed order and to the proposed extent. The last objective being the most ambitious and widely stated.

2.3. The content in the expanded BCS Curriculum booklet

The expanded BCS Curriculum booklet is divided into two parts. Central in part one are a description of the concept teaching model (the CTM) and a proposal for the teaching of basic conceptual systems and related concepts in kindergarten and schools. Part two consists of 14 appendices, each selected as a means to assist people who might want to try out and work in kindergartens and schools according to the principles of concept teaching as part of their educational repertory. Among these are the following:

A. In Appendix 2 thirty-three pages with detailed, but at the same time abbreviated versions of exemplifying situations or "programs" for the teaching of BCSs and related concepts are to be found, such as programs for the teaching of "part of a whole, blue colour, round shape, curved shape, angular shape, large in height (high) compared to. . ., vertical position, horizontal position, striped (surface) pattern, place(d) first (in relation to. . .) with reference to spatial and temporal orientation, place(d) to the left of something, direction from the left to the right, group, finding the number of a group by counting: the number three".

Note that the program for teaching the "number three" proposes five counting strategies or steps which could be of help for children having problems with acquiring basic counting skills. The five steps graded from the most concrete to the more advanced are named (1) counting while moving objects, (2) counting while touching with a finger, (3) counting by pointing, (4) counting while nodding, and finally (5) counting while only looking at. These steps are also graded from the idea that the first two are especially important in helping children develop an understanding of "one-to-one-correspondence" in terms of saying only one numeral for each perceived element of a group, cf. the cardinal aspect of number. The steps are similar in having thinking as an underlying process and the naming of each perceived element of a group in common.

B. An important expanded inventory of the basic conceptual system and related concepts is presented in Appendix 3 compared to the abbreviated version of a BCS inventory in the first part of this article.

C. A proposal for exercises in performing analytic coding or multi-faceted descriptions of objects and events, also contributing to the development of a precise and decontextualized language, can be read about in Appendix 4.

D. Appendix 5 contains a list of words denoting BCSs and related concepts suitable for the description of letters, numerals etc. This is probably the best existing list for performing precise analyses of the mentioned kind of symbols. This appendix also contains examples of precise analyses and descriptions of the letter p and the speech sound /p/.

E. As stated before, BCSs and related concepts can be looked upon as important prerequisites for the teaching/learning of various school subjects. In accordance with this fact Appendix 6 contains a table with summary of BCSs as prerequisites for learning different school subjects.

F. A description of a model for the teaching of skills, which probably will be of considerable assistance during the process of reflecting on and organizing the teaching of skills, is presented in Appendix 7. This model is divided into three phases: (1) the cognition phase, (2) the imitation and fixation phase, and (3) the phase for exercises directed towards automation.

G. Appendix 12 is a memo with examples of transfer- or application/utilization "areas" for different BCSs and related concepts: BCSs used in nature study and environmental subjects. Examples from the BCS SHAPE-section: Analyze shapes used as symbols – in traffic, – on maps (geography), – on charts, etc. – Why are most balls spherical? (Cylinders are also able to roll). Why are wheels circular or round? Why are pots often cylindrical? Why are bases of houses, tabletops, walls, floors, etc. often rectangular?

2.4. The proposal for a teaching order of BCSs and related basic concepts

The formal teaching of basic conceptual systems and related basic concepts is divided between kindergarten (age 4–5) and the following two years of primary school (grade 1–2). If necessary, the teaching of BCSs can be extended and followed up grade 3 through 4.

As shown in Table 1 below, the focus is on teaching BCSs in the final year of kindergarten and the two following years of primary school (grade 1–2).

The possible follow-up of teaching BCSs alluded to above, can be carried out by a variant of the proposition for CT presented in Appendix 11: "Proposal for concept teaching for pupils without learning difficulties, when starting with CT from the 3rd – 5th years". This particular proposition for CT could also function as a form of repetition and possible assessment of the level of mastery in previously taught/learned BCSs.

2.5. Concept teaching (CT) as a preventive measure divided between kindergarten and primary school

CT in kindergartens should formally start with groups of 4–5 year olds. The groups should be small, consisting of no more than 3–5 children receiving 2–3 sessions a week. The amount of time for each lesson may be around 15–20 min at this level. In kindergarten a "learning through play"- kind of CT may be wise to apply given the children's young age. The session should be carried out in various settings and situations.

In accordance with the principles of the concept teaching model the language must be applied in a way which helps promote the children's learning of basic conceptual systems beyond single concepts (round shape, curved shape, triangular shape, instead of only round, curved or triangular).

When CT is taught at the school beginners' level (grade 1) and still as a measure for language development and for preventing learning difficulties, the children should receive 2–4 sessions per week, each lasting 25 min. In 2nd grade the proposal is 2–3 sessions.

In 1st grade the group should be relatively small; no group should consist of more than 7–8 children, preferably as few as 4–5. This is also true for the 2nd grade. In case of larger groups the teacher must be proficient in concept teaching and the groups should also be somewhat homogenous.

If the teacher chooses to continue with (and exercises in analytic coding) up to 3rd through 4th grade, the work should consist of repetition and an expansion of basic concepts within chosen BCSs. Consult Appendix 11 in the BCS Curriculum for the mentioned variant of CT which may be suitable for this purpose, as well as Appendix 3 which contains two inventories of words denoting BCSs and related concepts.

Regular practice in analytic coding is included in the basic CT-approach. When children have learned about two basic conceptual systems, the teacher introduces exercises in analytic coding, based upon objects (and events) one by one. The

Table 1
An excerpt of the proposal for a teaching order of BCSs in kindergarten and school, exemplified by the first two out of 21 basic conceptual systems and related concepts.

Words denoting basic conceptual systems (BCSs)	Institution/grade	Words denoting basic concepts	Comments Most general – cf. Appendix 2 with proposal for teaching programs for various basic conceptual systems
1. *Colour* Please notice: The concepts "completely similar/-alike" and "similar in" should be taught before starting with tasks in phase 3: Selective Generalization of the concept teaching model, cf. pp. 22–26.	Kindergarten	Red, blue, green, yellow, brown, black, white.	Drawing-pad. Crayons etc. Colours – inside and outside, including changes in colour that occur in nature during the various seasons. Note: Even if BCS-Change in. . . is listed as BCS # 19, the application of it already starts from BCS-Colour.
	1.–2. grade primary school	Teaching of more colours, e.g. pink, violet/purple and orange. Also repetition of learned colours in varying contexts.	Mixing colours – observe and talk about how they change.
2. *Shape*	Kindergarten	Straight line, round, curved/bowed, triangular, four-sided, cubic, spherical.	Various materials. Shapes found or made inside and outside.
	1.–2. grade primary school	Teaching of circular, oval, conical, cylindrical shape etc. Also repetition of previously taught concepts by application in various contexts, or possibly by means of the concept teaching model, if regarded as necessary.	Shape concepts suitable for describing letters and numbers are repeated, especially in connection with teaching reading, writing and mathematics.
	3.–(4.) grade primary school	Possible repetition and further elaboration of Shape as a basic conceptual system via various applications, cf. the survey of basic conceptual systems in Appendix 3.	

easiest form of analytic coding incorporates simple questions about colour and shape and perhaps function/use. After additional BCSs are learned and understood, the number of questions will be expanded, and will include colour, shape, size, place, surface pattern, weight etc.

Analytic coding describing similarities and differences is performed in the following way. The teacher presents two or more objects and asks: Are these objects similar in colour, in shape etc.? Another more demanding task is presented to the children when asking: How are these objects similar and how do they differ? Possible answers could be that these objects are similar in colour, but they differ in shape, etc. As just pointed out, the number of BCSs questions and expected answers will increase as the children are taught additional basic conceptual systems.

Exercises in analytic coding can be incorporated towards the end of a CT-session in a small group, or possibly in a larger group. Exercises in analytic coding should start in kindergarten. When children attend 1st and 2nd grade in primary school, exercises in analytic coding should be carried out 2–3 times per week, for 5–10 min at a time.

Not every child will have the same need to participate in all the situations of basic concept teaching. It is however important that everyone participates in the preliminary situations in phase 1: Selective Association. All children will then receive the same structured opportunity to gain experiences based on the "stimulus world", and experience how words can denote basic conceptual systems and related concepts. From this perspective all children should also participate in preliminary situations in phase 2: Selective Discrimination, and phase 3: Selective Generalization.

It is up to the teacher to assess the children in order to determine which of them possesses a high level of proficiency in language. Children with a high level of language proficiency only need reduced participation in CT. At the same time it is very important that children who do have language problems, receive proper and enhanced concept teaching, beyond that of preventive measures.

As BCSs are taught and learned the teacher is expected to deliberately apply BCSs as tools and analytic coding as a strategy in his/her teaching of various school subjects, including skills of various kinds, when this is considered appropriate.

Teachers are advised to keep written accounts of their experiences with the CT-model, including the utilization of BCSs in different subjects areas, with the goal of being able to share experiences and ideas with other teachers and with parents when this is required.

2.6. A preliminary evaluation of the outcome of concept teaching in the municipalities of Balsfjord (and Karlsøy) as implemented to date

As stated above, the curriculum for the teaching of BCSs in Balsfjord municipality has been compulsory for all primary schools and kindergartens since January 2008. This is a rather short period of time regarding an evaluation of the outcomes of the curriculum. However, most kindergartens and schools started as early as 1–2 years previously with the teaching of BCSs in accordance with a little less developed, but in principle the same curriculum. So there are some experiences to report on.

As expressed in the introduction, a series of courses on CT were started in the Autumn of 2005 and continued until Spring 2007.

In the Spring of 2008 each school and kindergarten received a questionnaire on the implementation of CT: Which BCSs and related basic concepts had been taught? What had the children actually learned? How did the children like CT? What was the teachers' opinion on the outcomes of the concept teaching model with regard to its effect on language development? On reading/writing? etc.

The answers were generally positive. Most of the teachers reported that more children than before in kindergarten and grade 1 seemed to have developed a better basis for learning school subjects in terms of better developed language, than children before the implementation of concept teaching. Some teachers reported explicitly that this made the teaching of reading, writing and mathematics, etc. easier.

In August 2008 a report on the supplementary training on CT in Balsfjord municipality and Karlsøy municipality (another collaborating municipality) was delivered to the County Governor in Troms, Norway. Translated into English the title of the report is as follows: "A Final Report. Concepts to Understand With – an inter-municipality project for the implementation of systematic concept teaching in Balsfjord and Karlsøy". The report was written by the chief municipality education officer in Karlsøy of behalf of both municipalities on the grounds that the two municipalities had received a large amount of money from the County Governor in Troms in order to carry out this project.

In the report the main objective for the project is cited as "to develop insight and performance competence regarding the theory behind and concept teaching as an educational approach among the participants." At the same time, the implementation of CT aims at contributing to help children learning to learn in a better way, as well as contribute to the development of a precise and decontextualized language.

In addition to these more superordinate goals there were goals more specifically defined for the expected outcomes of the implementation of concept teaching in kindergarten and school which correspond very much with the above presented main objectives for the curriculum in Balsfjord municipality, made compulsory from 1.1.2008.

Under a heading on what has been achieved, the report concludes that the main objective with the participants' outcomes to a large extent have been reached. The same applies with regard to the children's outcomes. The comments regarding the more specific defined goals were on the positive side, as well. This is no more than 'soft' evidence, but it does endorse the CT approach and indicate that further evaluation would be worthwhile.

The report also indicates that teachers in kindergartens and primary schools are applying CT as part of their daily work. The same questionnaire as in Balsfjord was sent to each kindergarten and each school in Karlsøy municipality at the same time, in the spring of 2008. The report reveals that on a rating scale from 1 to 10 (10 being the highest score) each employee gives a score of between 8 and 10 when evaluating the outcomes of CT as an approach to help children develop their language. The report also informs us that teachers in grade 1, grade 2 and grade 3 report less problems with teaching reading and that more children learn to read in less time than before CT was introduced.

The report concludes that the effects of CT as evaluated by the employees in this project in the short term are very good, as up to August 2008. However, the report points out, the effects in the long term of this project still remains to be demonstrated and evaluated.

A more thorough evaluation concerning the effect of the project on CT in both mentioned municipalities will be carried out by the end of 2010 in order to study possible long term effects.

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