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# **The epistemological role of language use in learning. A phenomenographic intentional-expressive approach.**

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## **Abstract**

In research on learning, one of the fundamental questions concerns issues of language and thought. A number of empirical studies have revealed the interplay between understanding of subject matter and meanings of language expressions to be more dynamic and ambiguous than is commonly acknowledged. The aim of this article is to outline an alternative intentional-expressive approach to the interplay between use of language and understanding of subject matter as a contribution to the theoretical development in research on learning. The approach is based on a conception of language that focuses on the function of learners' language use in relation to subject matter in developing and expressing understanding. The learner is seen as an agent, and the focus is on the use of language from the learner's perspective. Four aspects of the relation between learners and subject matter are described and discussed. Conclusions concern the value of this approach as a complement and alternative to the dominant communicative and cognitive approaches to the role of language in learning.

## **Key Words**

Language, learning, understanding, meaning, phenomenography.

## **1. Introduction**

Critique has been advanced in the last decade, from a philosophical point of view, against the dominance of the communicative and cognitive conceptions of language (Carruthers & Boucher, 1998), conceptions that are also represented in current socio-cultural and cognitive theories on learning. In the communicative conception, language is seen as medium of thought, and tends to be conceptualised from the point of view of the social and communicative functions of language, rather than its function in individuals' development of understanding and knowledge. This conception is present in socio-cultural theories that focus use of language in learning, building on the work of Vygotsky (Wertsch, 1991; Wells, 1999; Mercer, 2000). In the cognitive theories, on the other hand, language has historically been seen as a vehicle of thought, supporting individuals' cognitive processing (Johnson-Laird, 1983). A common argument in cognitive theories is that individuals construct thoughts through the formation, organisation and re-organisation of thought structures assisted by language (Piaget, 1959; Carey, 1985; Vosniadou, 1994; di Sessa & Sherin, 1998). This research has been criticised for ignoring the social and communicative function of language,

and for reducing the function of language to a representational function. Some researchers have undertaken the goal of synthesizing a Piagetian and Vygotskian approach (for instance Britton, 1992; Smith, Dockrell & Tomlinson, 2000). A critical examination (Johansson et al., 2006) shows that both these dominating conceptions of language have certain fundamental similarities. There is a strong tendency to consider the role of language in learning in terms of use of a vocabulary or of expressions in a system. In the intentional-expressive approach, the function of language in expressing understanding is studied from the learner's perspective. The aim of the article is twofold: to present a theoretical outline of the intentional-expressive approach to the study of use of language in understanding subject matter, and to put forward some empirical findings from research based on the approach. The approach was first introduced by Anderberg (2000), on the basis of phenomenographic research on learning. Although earlier phenomenographic research included a certain approach to the use of language, it had not focused on the role of language in learning as a research object in itself, but rather investigated the understanding of subject matter in terms of different conceptions and ways of experiencing subject matter.

The intentional-expressive approach has particular relevance to research on learning. When applied to a study of the epistemological function of language use, this approach invites a thorough investigation of the ambiguous and dynamic features of what we call the interplay of conceptions, meanings and expressions. The term 'interplay' is here used to refer to the various relations that may exist between conceptions of complex units of subject matter, meanings as part of understanding this subject matter and language expressions used to express these meanings. In the article, we present evidence and argue for the value of an intentional expressive conception of language use that makes it possible to explore the epistemological function of language use from the learner's perspective. With the epistemological function of language use we here mean how expressions are used by learners in their ongoing conceptualisation of objects to express their conception.

## **2. Theoretical background in phenomenography**

Phenomenographic research on learning (Marton 1981; Marton, Hounsell & Entwistle 1997; Prosser & Trigwell, 1999) developed within a constitutionalist framework that differs substantially from a constructivist framework (von Glaserfeldt, 1995; Gergen, 1985) in the understanding of human knowledge. The primary focus of phenomenographic research on learning is to describe qualitatively different conceptions of how the surrounding world (objects of knowledge) is constituted. Variation in conceptions occurring both within and between individuals has been studied extensively in the phenomenographic tradition, and described as differences in ways of experiencing, understanding, comprehending and conceptualising. For an outline of the historical background and development of classical phenomenography, see Svensson (1997). An overview of phenomenography is provided in *Learning and Awareness* (Marton & Booth, 1997). Variation theory is a more recent strand of phenomenography, often referred to as "the new phenomenography" (Marton & Morris, 2002; Marton & Tsui, 2003; Pang & Marton, 2003). Emphasis is shifted from the aim in classical phenomenography of describing variations of conceptions or ways of experiencing a phenomenon, to instead characterising and describing particular ways of discerning and presenting variation in teaching. Variation theory assumes that learning presupposes experience of variation. Individual learning is perceived to be strongly related to variation in how subject matter is presented in instruction, and therefore teachers need to be aware of how they use variance and invariance in their teaching. Another recent direction that has emerged

from classical phenomenography is the intentional-expressive approach to the study the epistemological function of the use of language in learning, an approach which is presented more extensively in this article.

The bulk of phenomenographic research on learning has concerned interpreting and analysing individuals' use of language in expressing conceptions of subject matter, but has not focused on this use of language as an object of research in its own right. However, in an early study in the phenomenographic tradition, Svensson (1978) illustrated how a particular conception could be expressed in very different words, while widely differing conceptions were expressed in rather similar language. This led him to argue for the relevance of studying the relation between the form of verbal expressions, on the one hand, and the conception as a unit of thought, on the other hand. Later, a series of empirical and theoretical studies, using an intentional-expressive approach within a phenomenographic framework, made more extensive and thorough studies of students' use of words and meanings in expressing conceptions in a special dialogue setting (Anderberg, 1999, 2000, 2003; Alvegård & Anderberg, 2006, Johansson et. al., 2006; Svensson & Alvegård, 2006). The studies were carried out in different educational settings in higher education, and involved different subjects, including nursing, mathematics instruction, classical mechanics and geography.

Contrary to much of mainstream research on the role of language in learning, the starting point in these studies was not the communicative activity. Instead, the intentional-expressive approach focuses on how individuals use socially and culturally constructed language when expressing their understanding in a given situation and developing knowledge. The social and cultural aspects of the activities performed are in this approach only considered as a background to the expression of knowledge. Emphasizing understanding and reflection, rather than communication, does not imply a failure to recognise the communicative aspect of language meaning, or that the influence of social and cultural factors is ignored, but rather that other aspects are focused. Findings from the studies showed that many students were apparently able to communicate well, but without displaying a close and consistent relationship between the meaning of expressions they used and their conceptions of the problem under discussion. Although, students "understood" central technical expressions in mechanics, and used such expressions in their explanations, this did not imply that they had any scientific/disciplinary understanding of the physical events explained. The empirical studies show the dynamic and ambiguous character of the role of language in learning. Frequently, the meaning of expressions used by students to express their understanding of subject matter differs considerably from the meaning of those expressions in collectively shared meaning systems, social languages or discourses. In particular it can be noted that the meaning accorded to various expressions by these students clearly differs from the theoretically defined meaning system represented by the subject matter theory the students are expected to learn. The same students often use the same expression with different meanings from one instance to another, in very similar contexts (that is, talking about the same kind of event, in the same kind of dialogue situation).

These and similar results lead us to argue that there is a need for deeper insights into the epistemological role of language in learning. Also, the interplay between expressions, their meanings and conceptions should be seen as an integral part of learning processes. The intentional-expressive approach to the relationship between language and thought can be seen as a contribution to the study of basic issues of language and thought in learning in general, as well as complementing previous descriptions in phenomenographic research concerning approaches to learning (Marton & Säljö, 1976; Svensson, 1976, Entwistle & Ramsden, 1983).

### 3. The theoretical outline of the intentional-expressive approach

The focus on conceptualisation in phenomenographic research was originally very much inspired by the Gestalt tradition. Phenomenographic research on learning does not start from a vocabulary or verbal language system, but from the function of the use of language in a situation as an individual-world relation. An intentional approach to a part of the world means that the approach can be characterised both by directedness and content (Brentano, 1973). This is in line with the Gestalt dimension of the later philosophy of Wittgenstein (1974), developed by Baker and Hacker (1980) and Schulte (1995).

Gestalt theorists rarely handled relationships between thought and language in an explicit way, and earlier phenomenographic research has not done so either. This is because the focus of the theory is on recognising Gestalts, and the analysis of Gestalts is given priority over the analysis of language. According to Köhler (1959), however, an additional step is necessary: to give these Gestalts language meaning. Differentiation between thought and language leads to questions about the character of the relationship between them. In *Productive Thinking* (Wertheimer, 1959), we find many examples of such questions when Wertheimer discusses the organisational dynamics of Gestalts and their specific relation to expressions. The description of dynamic Gestalts as organised wholes, for instance, brings forward the issue of how these Gestalts are related to ways of expressing, a question which the first generation of Gestalt theorists did not take into consideration. The issue was instead raised by Wittgenstein, especially in Part Two of *Philosophical Investigations* (1974). There is no doubt that Wittgenstein was deeply influenced by Gestalt theory, more particularly by Köhler, who he read in the 1940s:

/.../ Köhler's book was the most important single influence on Wittgenstein during those years. (Schulte, 1995, p. 76)

According to Schulte, it was the concept "perspicuous" that led Wittgenstein to Gestalt theorists. It is not richness in detail that facilitates thinking, both Köhler and Wittgenstein proclaim, but rather the extent to which we are able to recognise, compare and organise similarities and differences between these details in a functional way. This, in turn, is dependent on the *purpose of the thinking activity in practice*. Gestalt theories about the phenomenon of "seeing-as" - one of the issues discussed by Köhler (1959) - were of particular interest to Wittgenstein. Schulte (1995) and Thornton (1998) argue, with reference to Wittgenstein, that thinking is not a matter of "naming" thoughts into a language, but of how an *intended content* is constituted into *expressed meaning*, the actual use of language. This argumentation goes deeper into the relationship between language use and understanding from the individual's perspective than research on learning that is limited to the communicative and cognitive conceptions of language (Johansson et al., 2006).

Creating meaning in expressions is a complex activity, influenced by emotions, values, aesthetics, interpretative frameworks, conceptions, discourses, etc. Wittgenstein pointed out the mistake in assuming that the use of language could be described in a collectively determined lexical way, rather than intentionally. The later Wittgenstein also strongly rejects the focus on language use as a system, a view represented in both socio-cultural and cognitive theories. The problem Wittgenstein dealt with was the function of language in use, how experiences are expressed (Schulte, 1995), considering that language does not have the capacity to exhaustively codify the experience. The idea about incomplete correspondence

between immediate experiences and language expressions results in Wittgenstein's rejection of the idea of a phenomenological language, but not the phenomenological idea of "intentionality" (Park, 1998).

The priority of Gestalt over language goes back to assumptions about what "visual objects" stand for. According to Köhler (1959), different Gestalts are different visual objects. A person may recognise objects or groups of objects as Gestalts, thus seeing them as visual objects, and then continue in a second step to give them "whole-qualities". Nevertheless, Wittgenstein had a problem with Köhler's "visual objects", because they have the character of physical reality, so he made a distinction between "seeing an object" and "seeing an aspect". A change in organisation is a change in "seeing-as", and not a change to actually seeing a new object. Wittgenstein explains that there is a change in the organisation of the experiences, a switch in Gestalts. However, in his view, Gestalts are more related to language use than to perceptions, whereas Gestalts in Köhler's view are more related to perceptions than to language use.

The position adopted in phenomenography differs slightly from both these standpoints: phenomenographical conceptions are instead seen as more related to experience in general. Organising our experience of the surroundings in a different way may lead us to a change in language use, just as organising language in a different way may lead us to a change in organising experience. However, the link between conceptions and language use is not automatic, but characterised by intentionality and focal awareness (Marton & Booth, 1997). This ambiguity and dynamic features of relatedness in conceptualisation are of core interest in describing learning, and the aim of the intentional-expressive approach is to capture this complexity of the role of language in learning.

Expressions always have a broad spectrum of possible meanings, while any given meaning could be expressed by different expressions. As a result, expressions or vocabulary in themselves do not have definite meanings, but are given meanings by individuals in a given context. Results from our empirical studies shows that clarifying meanings and reflecting on what is meant is more central for the students when they develop understanding than using well-defined expressions (Johansson et al., 2006; Svensson & Alvegård, 2006). Meaning is usually more dependent on the overall understanding of subject matter, than on the exact wording that is used, and what is said needs to be distinguished from what is meant by the learner. These results lead us to claim that conceptualisation in the individual is not primarily a question of how conceptual structures or language systems represent collective conventional meanings, one of the underlying assumptions in cognitive and socio-cultural theories on learning.

According to socio-cultural theories (Vygotsky, 1975; Wertsch, 1991; Wells, 1999) conceptualisation is a process in which language use is mediated between different planes of social speech: communicative speech and inner speech. In this view, speech mediates meaning, and meaning follows the sign/word. Semiotic mediation of meaning has its base in language as a system (Bakhtin, 1986). Conceptualisation concerns how communicative speech gradually is internalised and systematized. This internalisation of meanings expands the individual's potential of language in learning in terms of linguistic semiotic resources. However, our results indicate that conceptualisation is also a question of how individuals meet these linguistic semiotic resources and make use of them in expressing *intended meanings* in their individual-world relation, in different specific situations. The *intended meaning* is therefore not mediated in the same way as the linguistic semiotic resources are internalised. The intended meaning is constituted in relation to how a conception of the object

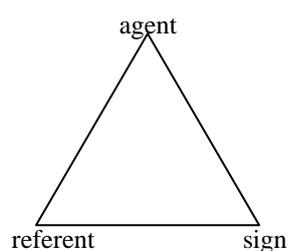
is developed. This is why more scope needs to be given in theories of learning to an expressive conception of language, since the expressive conception of language captures the ways individual use of language expresses the individual-world relation and how this relation is constituted.

#### 4. The interplay between conceptualisations, meanings and language expressions

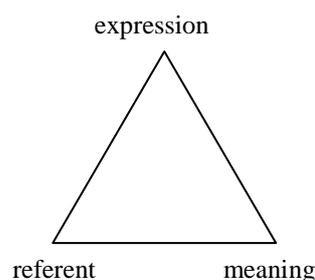
It is both helpful and problematic to express conceptions of relations by means of a picture. Triangles are used by **different** authors to illustrate **various** ideas about relations when dealing with matters of language. We would first like to differentiate between the semiotic triangle, based upon C. S. Peirce's ideas of 'semiotic triad' (Peirce, 1867) and 'Ogden's triangle', introduced by Ogden and Richards (1923).

**Figure 1**

Semiotic triangle



Ogden's triangle



Peirce's idea was to illustrate the agent's understanding of objects as interpretations of a sign. In the semiotic triangle we therefore have the agent in one corner, the referent in another. The agent is the interpreter of the sign that *represents* an object (the 'referent'). This model is different from Ogden's triangle. In the semiotic triangle, the agent is included as a component of the model, and the triangle relates the agent to a sign that represents a thing. Ogden's triangle is instead based upon ideas of language that Ogden and Richards borrowed from G. Frege and the early ideas of Wittgenstein in his *Tractatus*. The triangle shows which components language is considered to be based upon, and relates them to the world. Understanding language amounts to understanding how these components are related to each other. Ogden's triangle has in the first corner an expression, and in the second corner, the meaning of that expression. In the third corner, we have the referent. The relation between the expression and the meaning is the semantic content of the expression. The relation between the expression and the referent is that the expression is the name of the object, which the expression *names*. The relation between the meaning and the referent is that the object falls under the meaning. If the expression is a predicate the meaning is a concept, and if the expression is a whole sentence the meaning is a proposition. This idea of expressions, their content and their relation to the world has often been a starting point for discussions about

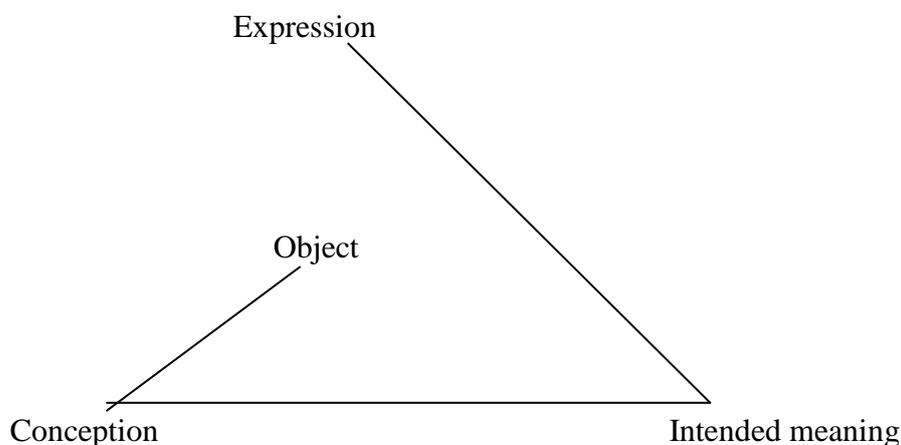
language, although it has been criticised and modified by several philosophers, such as Quine (1960) and Davidson (1967).

In our research, we started with Ogden's triangle and modified it into the "broken triangle". (Figure two), in order to differentiate between what we think are the relevant components in language use that are used in understanding and learning. The agent is not graphically represented in the broken triangle, because this triangle illustrates which components/elements we think should be investigated in analysing how language and thinking interplay in the conceptualisation activity of the agent as a whole (Johansson et. al., 2006). The agent's intentions underlie the entire activity, so the agent is not a component as in Peirce's triangle.

It is important to be rather precise in explaining the illustration, its limitations, what it is meant to say and not to say. Firstly, the "broken triangle" is not intended to illustrate relations within a language system, or between such a system and objects in the world. It illustrates the actual use of language by a person or agent as part of expressing a conceptualisation of an object. Ogden's triangle and similar triangles have in common that they illustrate a one-to-one relation between the elements, i.e. the expression corresponds to the meaning that corresponds to the object/referent. The broken line in our triangle is intended to show something different, in that the meaning does not correspond to the object in the figure. The meaning instead relates to a part or aspect of the object within the individual's conceptualisation of the object as a whole. This point is central when focusing the epistemological role of language in learning.

What is illustrated in the "broken triangle" is the common everyday situation, where a person uses a specific expression as part of talking about a rather complex phenomenon or object. This is the usual situation in education, and also what is focused in phenomenographic research in general. The focus lies on the conception of the object, which is also what is illustrated in the figure. However, in the series of studies carried out by our research group, the aim was not primarily to describe qualitatively different conceptions (as Gestalts) of something that is externally delimited as one and the same object. Instead, the aim has here been to describe the use of language in conceptualisations, where the conceptualisations are focused as contexts for using language expressions and their meanings. The focus is thus on the function of the use of a specific expression and its meaning in conceptualising a complex object.

Figure 2 The broken triangle



Since general standard language units do not capture the complexity of experienced wholes, a differentiation between units of language and thought must be made. When viewing learning as a process of “meaning-making”, differentiation in terms of conceptions, meanings and expressions provides possibilities to better grasp the ambiguity and dynamic character of the role of language in learning. *Figure 2* and the “broken triangle” illustrate what we regard as components in expressing understanding of subject matter, as well as some of the fundamental characteristics of the interplay between these components. At the base is what we regard as the foundation of the interplay, while we consider the tip to be more arbitrary with respect to meaning-making in knowledge formation. By “meaning” in the triangle, we refer to how the individual makes use of the linguistic semiotic resources that expressions offer. The expressed meaning is the *intended meaning* that is used by an individual speaker in expressing his or her conception. This meaning is not represented or named, but constituted in actual use of the expression, since any particular expression could be given a number of different and/or overlapping meanings. The broken part of the triangle illustrates that there is no direct knowledge relation between the expression and the object, or between the expression and the conception. The function of the expression is constituted through the ways the conceptualisations of the object are developed and manifested over time.

The broken character of the triangle illustrates two points of importance. One is that the object that is talked about is placed, not at a corner, but in the middle of the triangle. This illustrates the use of language as related to objects talked about, where the directedness towards the object (in a phenomenographical sense) is put at the centre of the understanding of the use of language. The other point illustrated by the triangle is the idea that there is no direct knowledge relation between a specific expression and conception of the object talked about, but only an indirect relation as part of the conceptualisation of the object. This is illustrated by the fact that there is no line between the expression and the object talked about, nor is there a direct line between the expression and the conception expressed. The triangle does not say anything about the causal or temporal direction of relations between expression, meaning, conception and object. Directions could be in both ways, or interchangeably in one and the other way. The picture illustrates a set of relations between the four components in a situation when a person is using a specific expression to express a meaning that forms part of his/her conceptualisation of a complex object focused and talked about, at a given point in time.

The part-whole character of the relationship within the conceptualisation of the object is not illustrated in the figure. This may vary from being rather fragmentary to very organised and consistent conceptions (a good Gestalt). The meaning of the expression is part of a context of conceptualisation on the basis of focusing on an object, and the meaning is dependent on the manner in which the individual focuses this object. Over time, the conceptualisation of the object may change, including a change in the meaning of the expression used. What is interesting from an educational perspective is how the relationships between elements are constituted, and similarities and differences across situations and individuals.

Empirical investigations reveal problems with students' ways of relating expressions, meanings and conceptions (Anderberg, 1999, 2000, 2003; Alvegård & Anderberg, 2006). Students used technical expressions, relevant to the subject matter, while the meanings and conceptions of the problem they expressed were very seldom scientific. The empirical example below is chosen to illustrate the kind of results obtained, and to show the ambiguity and dynamic character of the interplay between the components in the broken triangle. The example is extracts taken from one student dialogues in classical mechanics (Alvegård & Anderberg, 2006), a second year student of technology. The question (object focused) at the start of the dialogue in this investigation was: What happens when you throw a ball at an angle up in the air? This particular problem was chosen in order to compare the findings with earlier research that used the same example. The extract shows how Oskar's way of reasoning turns out to be problematic, since he uses the expressions 'force' and 'energy' with dual meanings. This is common in dialogues with the students and using the intentional-expressive approach to analyse the dialogues, it has become clear that they have problems with the interplay between meaning and conception, illustrated as the base of the broken triangle.

On the one hand, in Oskar's way of conceptualising the motion, "force" gives "energy" and, on the other hand, both "force" and "energy" influence and explain changes in the way the ball moves:

*R: It's the same thing – I see a picture in front of me with a ball moving through the air, and I see different forces affecting the ball. I don't think directly, because kinetic energy is just a kind of energy affecting the ball. Then you have a lot of other forces, such as gravitational force and potential energy and things like that. So kinetic energy is actually just a form of energy affecting the trajectory of the ball.*

Here Oskar uses the expressions 'force' and 'energy' in order to express his conception of what influences the actual motion of the ball. He puts kinetic energy on the same footing as gravitational force and potential energy, as examples of force.

*I: What are you thinking of when you say that it is a form of energy which affects the trajectory?*

*R: Well, there are many other forces that change the ball's energy, such as air resistance and gravitational force and other forces affecting the ball's final energy. That is how I think.*

*I: Final energy? What's that?*

*R: When all the forces have cancelled each other.*

In this part of the dialogue, the expression 'force', for example gravitational force, is given the meaning of being a cause of change of 'energy'. The expression 'force' could thus be seen, both as a more general expression for summing up the meanings of "force" and "energy", and with a more limited meaning of force as a cause of change in energy.

*I: What about potential energy? How did you get to the idea of using that expression?*

*R: Yes, well the potential energy of the ball changes when the ball rises and sinks, as you might say. Of course I know that the term exists if you take a body and raise it to another height, so I know it exists as a term, potential energy. So that was just something that popped up.*

*I: What do you mean when you say "I know that the term exists"?*

*R: What I mean? Well, I have really studied so much physics that it, well, it feels self-evident. Particularly throwing movements and kinetic energy and that sort of stuff. I actually don't know why I used it. It feels so trivial. (p.5)*

Oskar avoids the issue of the uncertainty he experienced when using these expressions to describe his conceptions of the ball's movement, and he shows no ambition to further reflect on how the expressions are used. He rather expresses self-confidence about knowing the expressions, in spite of not knowing how to use the terms adequately when explaining the ball's movement. Oskar's reasoning in this dialogue is an example of vague processing (see p. 13) of the interplay between the components. In spite of the problems he has to find out the function of the meanings used in expressing his conception and explaining the ball's movement, he shows no ambition to further clarify the relations between the elements. It was "trivial" for him to find out the relationships between the meanings suggested and the conceptions of the object (in other words, to explore the baseline of the broken triangle). Rather he seemed to be satisfied to assume a direct relation between expressions and conceptions of the object (what we have called the broken line of the triangle). The problem with his use of the expressions illustrates a central and general problem students have, that reproducing disciplinary language use/ways to communicate disciplinary subject matter, does not guarantee a disciplinary understanding.

Findings also revealed that the character of the relationships between conceptions, meanings and expressions, as well as the ways these relationships developed over time, varied both within and between individuals. The ways conceptions and meanings were related to the technical expressions used in different learning settings in higher education differed considerably. Therefore, we see the tip of the broken triangle as more contingent than the base. It is the meanings of the expressions used that are central when expressing conceptions, not the expressions in themselves. The relation between meaning and conception can be analysed as a matter of a relation between the intended meaning of an expression and the context of an individual experience of the Gestalt character of subject matter, what we call "the relatedness in conceptualisation". Findings suggest that the relation between meaning and expression is arbitrary and associative, as well as depending on convention. This creates a very important and interesting educational problem, consisting in problematic tensions between conventional lexical meanings of expressions and *intended meanings* of expressions, expressing individual conceptions.

## **5. Four aspects of the intentional-expressive approach**

The approach and research presented here has focused on the individual learner's or agent's use of language in understanding subject matter, in other words, the epistemological function of the role of language in learning. The following four aspects that build up the intentional-expressive approach have been developed against the background of theoretical and empirical investigations of students expressing their understanding of objects in the subject areas of nursing, mathematics, teaching, geography and mechanics. We consider the four aspects

summarised below (for a more detailed description see Johansson et al., 2006) to be critical of the complexity of the expressive role of language in learning and the interplay between the elements illustrated in the broken triangle (see *Figure 2*).

### *5.1. The interplay in the learner's perspective*

Differentiation of conceptions, meanings and expressions in relation to an object referred to gives the learner a space for reflection on and interpretation of the interplay between these components. This interplay has been investigated and documented with the help of a specific dialogue structure (Anderberg, 1999, 2000, 2003; Johansson et al., 2006; Johansson & Svensson, 2006), which aims at directing the students' attention to the meanings the expressions are intended to express, and how these meanings relate to each other in the students' conceptualisation of the object that was used as a starting point for the dialogue. We were interested in how the students themselves explored how they expressed their understanding of a subject matter. This means that we investigated a description given from a first person or agent perspective. Investigating descriptions of the function of language use in different contexts in an agent perspective gives us knowledge about how the interplay between conceptions, meanings and expressions is constituted (Johansson & Svensson 2006).

The dialogue questions are intended to stimulate the students to expand on the meanings of key expressions they used in expressing their own understanding of the problem. Thus focus is shifted in the course of the dialogue, initially bringing out students' conceptions of an object (a problem), and then moving towards students' reflections on how conceptions were expressed, leading to an awareness of the function of expressions and meanings in expressing their conception.

#### a) The original question

The dialogue starts with a description of the object in the form of a problem, followed by an initial question about the problem itself. Time is spent to allow the student to elaborate on his/her conception of the problem.

#### b) Analysis of the function of expressions used and their meanings

The researcher selects some of the central expressions with which the conception was expressed in the initial phase of the dialogue, asking the student to identify what he/she meant by these expressions, why he/she had used that particular wording, and finally inquiring how this choice is related to the conception of the problem. Follow-up questions are used that lead the students to

- Recognise relations between expressions used and meanings expressed
- Explore functions by means of synonyms, related expressions and their meanings
- Identify the expressions and the functions of the meanings expressed in further exploration of the conceptualisation of the problem

#### c) Return to the initial question about the problem

The dialogue is concluded by returning to the question addressed at the beginning.

This kind of reflection is an activity involving different kinds of progress in the dialogues with the students, illustrated in the empirical examples (p. 9 and 14). The reflections differ both between the students, and between different parts of the reflection, as well as between different statements made by each individual student. The qualitative interview setting

developed in phenomenography provides opportunities for the respondent to elaborate on experiences and expressed meanings in a dialogue. By reflecting back to the respondent some of the key-expressions used, the scope provided for elaboration has been further extended, using follow-up questions that focus the function of language use in expressing conceptions. Issues concerning the qualitative interview as a research instrument and as an instrument to create self-reflective activity during a dialogue have been extensively discussed by Theman (1983).

### 5.2. *The function*

By “function” we here mean not the definition of the expressions or associations made, but the way the expressions are used as tools in expressing something, the epistemological function of language in learning (within the individual-world relation). The dominance of the communicative and cognitive conceptions of language in research on learning – and here we also include the functional semantics theories (Halliday, 1993) - has led to relatively few studies of intentional-functional features of the function of language use in the development of understanding and knowledge. The use of language to develop understanding corresponds to a conceptualisation (a way of experiencing, understanding and expressing something) - within an individual-world relation - and is not only based on how a specialised system of a language is internalised (Svensson, 1997). The focus on the function of language use in the intentional-expressive approach concerns the variation in how conceptions could be expressed. The relationships are not seen as “named”, “complete” and/or “established” in a system. This offers the opportunity to engage the students in considering the interplay between expressions, meanings and conceptions as something possible to reflect and act on as a dynamic whole. This view of the function of language use concerns learning processes, and focuses how the individual constitutes relationships between conceptions, meanings and expressions. This is not the same as seeing learning processes as a matter of “bringing” or internalising a specialised language system, “into being”, for example the language of physics as it is described by Halliday and Martin (1993), nor does it correspond to the way the semiotic word meaning is mediated in dialogue inquiring (Lemke, 1990; Wells, 1999; Mercer, Dawes & Wegerif, 2004).

Our concern with intentionality and expressive purposes leads us to explore and identify the function of the expressions and meanings used, related to how they satisfy the individual speaker’s requirements and needs, concerning which conceptions should be expressed, and in which manner, as illustrated by the broken triangle (*Figure 2*). In one investigation (Anderberg, 1999), we described intermediate steps taken in the students’ reasoning, and the role they have in the process of constituting relationships between conceptions, meanings and expressions. The steps were described in terms of: re-consideration, framing and exemplification. These intermediate steps facilitate the constitution of intentional-functional features of the students’ reflection. ‘Reconsideration’ refers to reflection on how relationships between the components are shaped and established. ‘Framing’ is a way of recognising and identifying implied circumstances, which helps clarify relations between the elements. ‘Exemplification’ is an indicator of how relationships between elements are identified and constituted. Together, they constitute distinct and major features of the reflection, supporting the development of increased consistency in the relations between conceptions, expressions and meanings.

### 5.3. *The context*

Contextualisation, the third aspect, is dependent on the previous experience and background knowledge of the students, as well as on how personal contexts, discourse contexts, object contexts and situation contexts are involved simultaneously in the way the interplay between the elements is experienced from the learner's perspective. As noted earlier, wherever we have a case of learning, we also have a specific meaning provider, a context, for constituting the relationships between understanding objects and understanding language, especially the disciplinary language specific to different educational settings. Important questions to reflect on concern how relevant contexts and transfer between contexts are recognised, identified and specified. Without consistency in contextualisation, the function of meaning in expressing understanding and knowledge will only be vaguely identified.

That the meaning of an expression is its actual use was one of Wittgenstein's core assumptions in his notion of "contextual features", and in discussing the possibilities of delimiting relevant contexts for the use of expressions. Contexts of learning are not the same as any physical, cognitive and/or socio-cultural contexts given independently of the learner's activity. Instead, the contexts have to be delimited from the learners' perspective, since conceptions, meanings and expressions recognised, identified and specified are internally related within the learners' activity (Svensson, 1976, 1997). The most immediate context for learning is the activity itself, if we think of learning contexts as that which is closest to and surrounding learning. It is this activity that represents the most immediate context for the individual learner, and for interpreting how relationships between conceptions, meanings and expressions are constituted.

#### *5.4. The process*

How relationships between understanding of subject matter and language use are constituted has implications for how the learning process proceeds. Three parts of the intentional-expressive approach are of great importance for the study of this aspect. The first is a focus on learning as concerning the individual's relation to the world. The second is an emphasis on the character of the interplay between conceptions, meanings and expression. The third part concerns changing constitution between the components.

The view of learning as a change in the individual's relation to the world is typical of research on learning in phenomenography. It assumes that the activity in relation to objects varies, and observation of this variation provides us with information about how content could be treated differently in understanding, thereby forming various conceptions of the objects referred to. It provides the opportunity to describe understanding in terms of whole characteristics (or Gestalts), rather than linear discourse processes or mental processes based on collective/public norms or mental structures. Phenomenographic research has shown how an object may be experienced by students in different ways, depending on which discerned aspects of the object are brought into their focal awareness, and which aspects remain in the background (Marton & Booth, 1997).

The second part of the meaning-constituting process concerns the role of language in understanding objects, reflected upon and seen from the learners' perspective. Three kinds of processes have been identified and categorised (Anderberg, 1999, 2000; Anderberg & Alvegard, 2006) in three descriptive categories, forming parts of 74 dialogues, in a wide range of subject areas in higher education (mathematics instruction, nursing, geography, classical mechanics). These different kinds of processing are:

1. Vague processing
2. Stabilising processing
3. Developing processing

Findings show a number of dialogues that present an “atomistic” reflection on lexical meanings without relating to the understanding of the problem, which we have categorised as representing a vague processing (Category 1). Students’ reflection is here not related to the object/problem. In contrast, in other dialogues, by creating and identifying functional-intentional meaning, relationships were developed through active constitution and reconstitution of meaning, involving recognising, specifying and identifying contexts, conceptions and expressions, used when working through the object under discussion (Categories 2 and 3). Intermediate stages took place during the search for relationships, involving both superficial and deeper explication of relationships, and such intermediate stages were in the empirical data linked to feelings of confidence in some instances, and lack of confidence in others.

Cunningham (1976) describes the process of language use as the interplay between the active constitution, reconstitution and the passive reception of meaning. Active constitution and reconstitution involves temporal differences between recalling and creating meaning, while passive reception simply involves recalling pre-established meaning. Our findings are in some respects close to the character of constitution between expressions and meanings described by Cunningham. Also, these ways of processing represent essential qualities inherent in a holistic approach to learning (Svensson, 1976; Marton & Säljö, 1976; Entwistle & Ramsden, 1983), in that they enable close relationships between conceptions, meanings and expressions relating to the problem (object focused) as a whole (that is, as a Gestalt).

The third part of the meaning-constituting process is represented particularly in the third category (developing processing), which concerns change in constituting relationships, “intra-change”, displaying hitherto unexplored dimensions of change. Investigating more closely the developmental character over time of relationships between expressions and meanings, similarities and differences found in the developing type of processing were grouped in the following way:

- Shift in expression
- Shift in meaning
- Shift in meaning and expression

Qualitative micro-process analysis of the empirical material shows that students sometimes use the same expression, but shift the meaning used. Sometimes they use the same meaning, but shift the expression, and in other instances shift both meaning and expression.

In another empirical investigation, Anderberg (2000) gives an example of a shift of meaning of an expression used by a nurse, but not a shift in expression. The question of departure was: Concerning the care of patients with DIC (Disseminated Intravascular Coagulation), what do you consider most problematic relating to the prophylactic measures that need to be taken and that you as a nurse need to think about? The conception focused in this dialogue by Sara, a nurse, was the cause of unstable blood pressure and how this may be observed. She began by giving the expression ‘unstable’ blood pressure the meaning of “fluctuating” blood pressure in regard to DIC patients:

I: *This unstable pressure. What do you mean?*

R: *Unstable pressure for me can mean either that he has a, that a fluctuating pressure just. (p. 6)*

In further steps in her process of recognising and exploring meanings of this expression, she was not satisfied with her earlier statement that 'unstable' blood pressure would mean fluctuating blood-pressure in her conception of DIC patients, the overall object focused. The meaning "fluctuating" of the expression 'unstable' could not be identified as functioning well. After reflecting further, she instead identified that fluctuating pressure was rather common, and that fluctuations could sometimes be safely attributed to stress, drugs and illness:

R: *It can be that he is unstable, that he can get all stressed so that he varies from high pressure to lower pressure. But unstable can also be that he is wholly dependent on medicines. That it's the drugs that keep the pressure at a reasonable level. But if you lower your internal (?? inaudible word) with drugs then his pressure goes down too. Which is drug dependent. That's unstable too. (p. 7)*

R: *Yes, a fluctuating pressure doesn't need to be, so to speak, a direct cause of disease that you fluctuate in pressure because of stress for example. I don't see that as a cause of disease exactly. (p. 7)*

The ensuing exploration confirmed her conviction of what safe blood-pressure was, and what she regarded as unsafe, and ended in the following way:

R: *An unstable pressure is an unsafe pressure.*

Sara focused in her conception of unstable blood-pressure for DIC patients the fact that it does not usually fluctuate, but is still an unstable pressure. She found that patients with DIC usually have a blood-pressure at a uniform level, but that patients with DIC shift blood-pressure suddenly. Therefore, she did not give the expression 'unstable' the meaning "fluctuation", since fluctuation for her also reflected a safe stable blood-pressure that was not supposed to shift suddenly:

R: *Well, unstable means that it's not really safe. Fluctuating pressure could be that he just has that kind of pressure and that's that. Then you can feel secure in that situation in any case. But a stable pressure that suddenly becomes unstable does not give any security to the patient - and not to the staff either for that matter.*

I: *No. And in relation to this patient that you said, you said unstable pressure. If you now after this discussion, how would you, will you if you look back how do you perceive the pressure, his pressure was then?*

R: *Unstable. (p. 7)*

Here we have an extract that shows how the interplay between the components, illustrated by the base line of the triangle, was involved in the reflection. We could also follow how Sara recognised, explored and identified different meanings of the same expression. She also realised that the meanings referred to different characteristics of blood-pressure, depending on the context and which type of patient she reflected on, that is, depending on the object. In our earlier example, Oskar (see p. 9) was unable to find such relations between the meanings explored and his conceptions.

Sara also shifted meaning of the same expression 'Unstable blood-pressure' was related to the fact that different kinds of ill-health were identified: stressed patients, patients treated with drugs and with different kinds of illnesses. It was through the identification of these objects

that the meanings of fluctuations (“safe” and “unsafe”), became obvious, and then the meaning of the expression ‘unstable’ shifted to a “stable pressure that suddenly becomes unstable“, but the expression remained the same. This meaning of ‘unstable blood-pressure’ expressed her conception of DIC patients’ blood-pressure. Intra-change in the dialogue above thus shows a shift in the meaning of the same expression. During the process, the same expression is used to express the conception of observing DIC patients’ blood-pressure, but the meaning of the expression ‘unstable blood-pressure’ shifts from “fluctuating” to the new meaning “uniform level that suddenly could shift”.

These extracts from dialogues show the importance for the individuals to reflect on the function of meanings in expressing conceptions (the base line of the triangle). Oskar evaded the issue of reflecting further on how the meanings discussed were related to his conception of the problem, in spite of the fact that it was not clear to him. By contrast, Sara found that it was not clear to her what she meant by the expressions explored, which led her to further reflection so that she eventually discerned a meaning she found useful for expressing her conception of the object. The extract also illustrates the importance of exploring how the expression is given different meanings, and how these meanings clarify the epistemological function of language use, illustrated as the base line of the broken triangle (*Figure 2*).

## **6. A contribution to the development of research on learning**

We suggest that the approach outlined here has great significance for research on learning and that the theorising presented in this article can more specifically be seen as a contribution to the theoretical development of phenomenographic research, particularly concerning the role of language in learning. The starting point of the intentional-expressive approach is the internal relation between the individual and the world, which is a main interest in phenomenography in general. This means that the starting point is neither the individual nor the world, but instead the relation between them, observed in terms of the activity of the individual, and variations in that activity (Svensson, 1997; Johansson et al., 2006). The approach clarifies the role of language in developing understanding, concerning how the individual, the world and the use of language are interrelated from the learner’s point of view:

*.../ learning and knowledge are manifested in an observable way, as individuals’ relation to the world. Although the nature of learning and knowledge, as well as their underlying conditions, reside both in the character of the individual and of the external world, these phenomena may best be understood by observing their manifestations. (Johansson et al., 2006, p. 21)*

Conceptions are seen as fundamental to understanding the surrounding world, and are described as having the character of being specific, uncertain, more or less expressed, delimited, central, and developed through the activity of the students (Marton, 1981; Johansson, Marton & Svensson, 1985; Svensson, 1997; Booth & Anderberg, 2005). A relation having the character of conception is developed when an object possesses whole-qualities (Gestalt) from the students’ perspective. The relational view on how relationships are constituted draws attention to students’ intentions in social and cultural contexts.

However, there is not only a variation in conceptions, but also in how the conceptions are expressed. Different conceptions of an object involve both a variation in the relationship to the object as a whole, and a variation in how these relationships are expressed and identified in language.

A conception is a way of seeing something, a qualitative relationship between an individual and some phenomenon. A conception is not visible but remains tacit, implicit, or assumed, unless it is thematized by reflection. (Johansson, Marton & Svensson, 1985, p. 236)

A conception may in itself be a whole, more or less captured by a language. Thus, conceptions within phenomenographic research refer to content of thought as entities of intended-referential meanings that are more or less accessible through different symbols.

Conceptions may be expressed in different forms of action, but they are most accessible through language. One variation is from an implicitly expressed not articulated conception to an explicitly focused on and formulated conception. (Svensson, 1997, p. 166)

Svensson (1978, 1989, 1997) discusses conceptions as a basis for differentiating between thought and language, to get deeper insight into the function of language use in developing and expressing conceptions.

Marton & Tsui (2003) find that experience of variation is closely related to the structural aspect of expressing a conception in a “space of learning”. The semantic dimension of the space of learning focused refers to how the child is enriched with different meanings by being provided with different linguistic resources by the teachers in different ways, to thereby widen the shared space of learning. The classroom investigations reported in the study focus particularly on how the exchange of meaning between the adult and the child in social acting develops the child’s “meaning potential”. However, the function of this meaning potential used by children in expressing their understanding, the epistemological function of language use, illustrated by the baseline of the broken triangle, is not the focus. In Marton & Tsui’s study, the role of language in learning is seen from the perspective of language acquisition and language use in communication, while the intentional-expressive approach focuses the function of language use in the development of understanding and knowledge. The main difference concerns the need to focus how the child makes use of their widened meaning potential, and is aware of how it may be related to their experience - the *intended meaning*. Our findings show that in spite of well developed meaning potentials, in Marton & Tsui’s sense, the relationships to the conceptions were fragmented and vague.

### 6.1. Methodological principles

The special design developed in our research to capture the function of language use from the learner’s perspective is in most respects much in line with methodological principles developed in phenomenography (Svensson, 1976, 1997; Dall’Alba & Hasselgren, 1996; Bowden & Green, 2005). Methods for data collection preferred were in-depth qualitative interviewing, using semi-structured techniques in the dialogue, in order to probe, clarify and get access to the respondent’s distinctions concerning their conceptions of the object referred to. A question about a subject matter (the original problem or the object referred to) framed the interview, and this is a core element in phenomenographic studies. This is in line with the view that the individual-world relation forms the basis of the research, since learning is seen as a change in this relation. Thought is always directed towards something, and is therefore best understood in terms of intentionality. Our design for collecting data focuses on this relatedness and directedness, exploring the role of language from the learner’s perspective.

The data analysis was carried out in several steps, in a micro-process analysis. The micro-processes in the course of the dialogue show the different kinds of interplay of the components (conceptions, meanings and expressions). The first step of the analysis concerned

the delimitation of significant parts of the interplay illustrated in the broken triangle (see *Figure 2*). In the dialogues as wholes, shorter sequences and parts representing the interplay between the elements illustrated in the broken triangle were identified and analysed. Later steps of the analysis concerned a specification and comparison of these parts, grouping them into similarities and differences in descriptive categories. This phenomenographic qualitative micro-process analysis aims to capture both inter- and intra-individual variation of the interplay.

## 7. Conclusions and implications

In this article we have outlined an approach to the study of the role of language in learning. The intentional-expressive approach aims to grasp and describe the complexity of the role of language in learning, and goes beyond previous and current phenomenographic research in this respect. The factors illustrated in the broken triangle and the four aspects that together form the intentional-expressive approach appear fundamental and critical in research on learning. The analysis of those components and aspects shows how it is possible to go deeper into the complexity of the conceptualisation than in research on learning based on cognitive and socio-cultural approaches. The intentional-expressive approach is not directed towards concepts and expressions as part of a learner's cognitive system (Johnson-Laird, 1983) or language systems/discourses (Davidsson, 1967; Bachtin, 1986), but towards the function of language use in the development of understanding and knowledge: the epistemological function (Wittgenstein, 1974). This represents a relational and holistic approach to the function of language use in learning seen from the agent's perspective. It is the activity of the learner in relation to parts of the world that represents the most immediate context for interpreting the function of expressions and meanings used in expressing understanding and knowledge, rather than cognitive structures or languages/discourses as systems (Anderberg, 2000; Johansson et. al., 2006).

An example illustrating the limitation of the socio-cultural approach is Mercer, Dawes & Wegerif's (2004) classroom study of ways of helping children to use language to learn science. The authors argue that intermental (social) activity will promote intramental (individual) intellectual development, referring to Vygotsky, and they claim to have demonstrated this in certain cases under certain conditions. Individual learning goes on more or less all the time. Learning is an aspect of our relation to the surrounding world. We agree that a very important condition and context for that on-going learning is the socio-cultural context, the interaction and communication with other human beings, so it is natural to expect that intermental activities lead to intramental development (without here going into the choice of words and the understanding of intermental and intramental). However, what the study of Mercer, Dawes and Wegerif demonstrates, as well as other similar studies, is that it is not enough for individuals to participate in general school discourses to develop adequate understanding of subject matter. Research has also shown that collaborative talk is not a guarantee for development of understanding, but learners have to be taught to use language for reasoning and development of knowledge, and not only for communication.

Mercer, Dawes & Wegerif show that by directing individuals and groups in their activity towards focusing on the subject matter, listening to each other, sharing ideas and arguing, and through training them to do, so the participants learn more of both reasoning skills and subject matter. However this research does not clarify how the learners' use of the communicative role of language in learning is a condition for and a source of variation in understanding

subject matter, which is the focus in our approach. The qualitative analysis investigates how the target classes use more “exploratory talk”, an explicit collaborative way of reasoning that according to Mercer (2000) stimulates non-verbal reasoning. In their classroom study, Mercer, Dawes & Wegerif claim that “exploratory talk” is also related to improvement of subject-related understanding and knowledge.

The problem in this claim, as we see it, is the test used to assess individual understanding. The test used is a kind of concept map, where the key words are selected beforehand, and the children were asked to make links between these key words. This type of test is an example of analysis of the role of language in learning from a third person perspective, and where the function of language use in expressing knowledge of subject matter is not investigated. The test does not give any description of which meaning is used and how the meaning is related to understanding of the object (in other words, the type of relationships that we have illustrated by the base line of the broken triangle). The use of the test presupposes a direct relation, naming, between the listed key words (expressions), and the object and the understanding of the object (the relation between expressions and conceptions is what we have illustrated by the broken part of the triangle). The significantly better scores the target class got provides evidence that the target class has gained more “linguistic semantic resources”, and that it can handle these resources in reasoning and communication, but these scores do not show how these resources are used in expressing knowledge. The epistemological function of the role of language in learning is not investigated, since according to socio-cultural theories, knowledge is internalised in the same way as language use is internalised (Wertsch, 1991).

#### *7: 1 Meaning used is not primarily based upon expressions*

The problem lies in their underlying concept of language, where language is viewed as a discourse or as a system of expressions. Meaning would then be based upon expressions, and acquisition of vocabulary is supposed to mediate meaning and knowledge. As outlined earlier, we claim that meaning used is not primarily based upon expressions. The dominance of language seen as a medium (and content) in education and teaching leads to an emphasis on the socio-cultural communicative context in both education and teaching, as well as in research on education and teaching. This focus is common both to traditional research on teaching and to socio-cultural research claiming that students’ learning is a discursive process. The focus on the socio-cultural context has increased through the continued development of socio-cultural theories and their application to the study of education, teaching and learning.

We distinguish between the expressions and the meanings of those expressions, and claim that it is the intended meanings that are the base for the function of language use in developing understanding and knowledge in learning. The vocabulary is secondary to the meaning of expressions. Our empirical results concern the role of language in learning considered from the first person perspective (Johansson & Svensson, 2006). Focusing on the intended meaning of language expressions used by learners, we are able to investigate conceptualisations made by the learners as individual-world relations in the development of understanding and knowledge. The intentional-expressive approach raises new, central and basic questions concerning how fruitful relationships between understanding of subject matter and language use are recognised, specified and contextualised from the learner’s perspective. Also, these questions concern how we best could help students to become aware of the interplay between language meaning and the understanding of subject matter, in order to facilitate and deepen the learning process and the quality of knowledge development.

Since the development of variation theory (Pang & Marton, 2003), the focus in phenomenographic research has been on the teachers' use of language in creating conditions for learning, rather than on teaching students to use language, like in the study by Mercer, Dawes & Wegerif (2004). However, the focus has frequently been much more specific when it comes to the use of language in relation to subject matter, in a way that is similar to our approach but does not include a focus on variation in students' use of language. We find that the intentional-expressive approach to students' use of language and the function of their language use in developing knowledge has much to offer by bridging the gap between a focus on individual learners and their cognition at one end of the spectrum, and a focus on the socio-cultural context and social languages, at the other. Students can not only learn to direct their attention to subject matter and reason about it, they can also learn to reflect on and change their use of language, thereby achieving a better match between the expressions they use and their own understanding and conceptualisation of subject matter. Reflecting on their own language use additionally allows students to become aware of inconsistencies, and vague areas in understanding, allowing them to further develop understanding and target more specific learning goals.

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