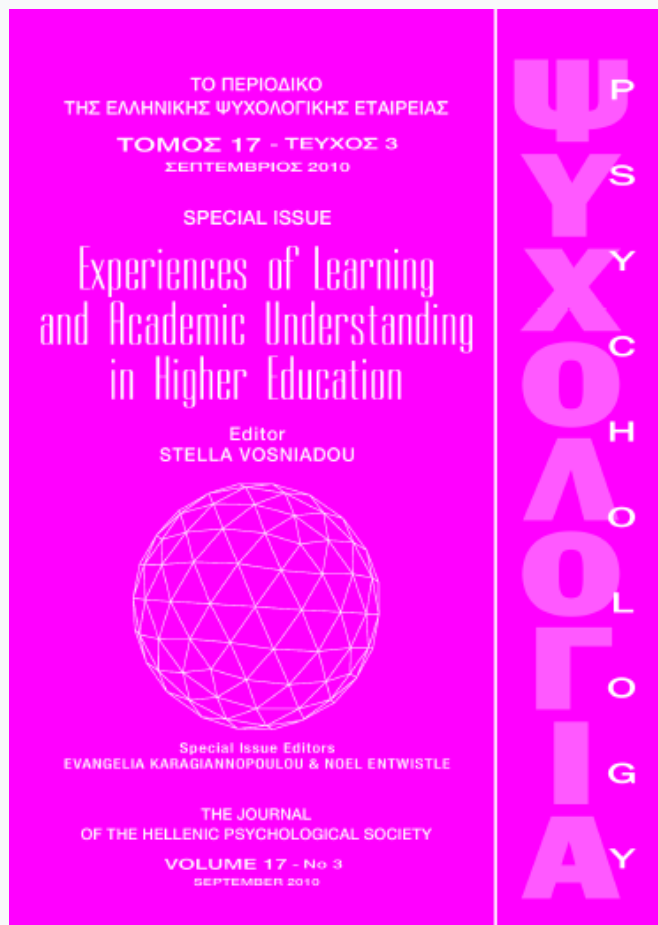


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The role of language in constituting and expressing personal academic understanding

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ABSTRACT

The use of language is central to the constituting and expressing of academic understanding. The theme of this article is set against the background of previous and ongoing phenomenographic research, with a theoretical approach presented as an alternative to main cognitive and socio-cultural approaches. One main characteristic of this research is a focus on the relation between the learner as an agent and the external situation the learner relates to, especially the subject matter, and the knowledge involved in this relation. It is suggested that to fully understand the constituting and expressing of academic understanding one has to consider the immediate personal and situational context, and to see the learner as an agent mediating the relation to, and the significance of, broader cognitive and socio-cultural contexts. This means considering the personal context in a more complete way than is done in either cognitive or socio-cultural orientations. Three cases, selected from previous interview research, are presented to demonstrate the importance of the agency of the learners, using a contextual phenomenographic approach which proved useful in discerning and clarifying the personal, situational, cognitive and socio-cultural contexts within which academic understanding develops.

Key words: Academic understanding, Language use, Conception, Learning, Studying, Phenomenography.

1. Introduction

Students' studying and learning has been an expanding field of research since the 1960s. with most of the early research focused on the prediction of study success (Lavin, 1965; Entwistle, 1972; Choppin, 1973; Biggs 1976) and on study activity, study methods and study habits (Entwistle, Thompson, & Wilson, 1974; Biggs, 1976; Svensson, 1976, 1977). Increasingly, there has been a greater focus on learning and the content of learning, and recently also more

detailed investigations of the character of academic understanding (Svensson, 1976, 1989; West, & Pines, 1985; Bowden & Marton, 1998; Entwistle, 2007). An early development in the focusing on the content of learning and academic understanding was the phenomenographic research orientation, the forerunner of which came from research in Gothenburg starting in 1970. The research presented in this article builds on that tradition.

In the phenomenographic research on student learning, there has been a concern with

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how to understand and describe students' academic understanding (Marton, 1981; Marton, Hounsell, & Entwistle, 1984; Marton & Booth, 1997; Svensson, 1997). This issue was originally raised in relation to the then dominant practices in higher education, especially the way knowledge tests were constructed and used. An alternative was sought to the psychometric tradition within research on learning and education, in which the method of measurement of knowledge could adequately describe the individual personal understanding of the students. The phenomenographic orientation provided a way forward by describing qualitatively different conceptions of the same object of knowledge among groups of students across different subject matter fields. Differences were identified in discernment, delimitation, and organizing of subject matter content into complexes of meaning, conceptions, and most frequently expressed in language.

In the phenomenographic research on student learning, the qualitatively different conceptions of subject matter were seen in relation to students' approaches to the subject matter. In particular, two distinctions were made within students' ways of reading an article; between deep and surface levels of processing (Marton & Säljö, 1976) and between holistic and atomistic cognitive approaches (Svensson, 1976, 1977). Later, the term approach to learning was introduced. Early on, these distinctions were described in the following way in relation to students' learning from an argumentative text.

In the case of *surface-level processing* the student directs his attention towards learning the text itself (*the sign*), ie, he has a "reproductive" conception of learning which means that he is more or less forced to keep to a rote-learning strategy. In the case of *deep-level processing*, on the other hand, the student is directed towards the intentional content of the learning material (*what is signified*), ie, he is directed towards comprehending what the author wants to say about, for instance, a certain scientific problem or principle. (Marton & Säljö, 1976, pp 7-8)

The *atomistic* approach was indicated when students described their activities as involving: focusing on specific comparisons, focusing on the parts of the text in sequence (rather than on the more important parts), memorizing details and direct information indicating a lack of orientation towards the message as a whole. In contrast the *holistic* approach was characterized by students' attempts: to understand the overall meaning of the passage, to search for the author's intention, to relate the message to a wider context and/or to identify the main parts of the author's argument and supporting facts." (Svensson, 1977, p 238)

These main differences in approaches were found to lead to equivalently important qualitative differences in the expressed conceptions of the subject matter. The focus on approaches to subject matter content was a central part of a relational view of learning, as learning was conceptualised as a change in the relation between the learner and an object of learning. The concern with the agency and approach of learners in relation to subject matter has been further developed into studies of the use of language, as a part of the agency and approach of the individual learner. Here, it is argued that the meanings of the deep and surface distinction, and especially the holistic and atomistic distinction, have not been fully developed in previous research. There has been a tendency to stay with the general meanings of the distinctions, rather than explore their various, more specific meanings. More importantly the meaning of the fundamental concept of approach has not been fully explored.

Research on language use in conceptualisation of subject matter, carried out in several research projects, represents a deepening of research on approaches to subject matter. At the same time, this research represents an alternative view of language use within a phenomenographic theoretical framework, compared with the dominant cognitive and socio-cultural traditions of research. Students' approaches to and conceptions of subject matter have been understood within the relational view of understanding and learning, mentioned above.

Understanding is now seen as a quality of the individual's relation to parts of the world, and learning as a change in this quality of the relation.

The relational view of understanding and learning avoids the problem of dualism between objective and personal knowledge, which is seen as problematic for the understanding of knowledge, learning, and education. This dualism distinguishes between knowledge existing outside the individual on one hand, and inside the individual on the other hand. Within cognitive traditions, in general terms, this dualism appears as a divide and relation between external knowledge, in terms of nature and/or culture, and the internal cognitive systems that interact with them. Learning is seen as change in cognitive structure developed through individuals' interaction with an external knowledge basis. In the socio-cultural traditions, the dualism tends to be seen as, and/or to be replaced by, a relation between social languages and personal language use. Learning is seen as the appropriation of understanding and knowledge through social languages by taking part in social interaction. Within the phenomenographic research, personal understanding and knowledge is not seen as a cognitive system, or as an appropriated social language, but rather as a personal relation to the world, having a responsive and intentional character. Relations to cognitive systems and social languages become secondary, as the focus shifts to agency.

2. The view of language use in learning

The use of language is central to education and the development of academic understanding. Based on previous phenomenographic research, and focusing the use of language, it has been possible to outline a contextual phenomenographic approach to the study of the use of language in learning and academic understanding with assumptions or hypotheses that are importantly different to those generally found in cognitive and socio-cultural theories. The crucial difference is that it becomes possible within this new approach to focus on the agency characteristic of the

learner by interrelating personal, situational, cognitive and socio-cultural contexts.

In most cognitive theories, the context considered is, firstly, the cognitive system of the agent and, secondly, the interaction with the environment in relation to the cognitive system. There is little room for the agent to approach the situation in a rather open way and for meaning to be constituted within this approach, which is the main focus in the phenomenographic orientation. Within cognitive theory, the view of the agents' intentions is presented in terms of predefined, measurable cognitive variables, while in the phenomenographic orientation it is both much more open and more specific, as the constitution of meaning comes from the interaction of the personal context of an agent with a specific situation. And this focus is seen as a necessary basis for understanding, in a more complete way, the development of academic understanding and educational phenomena.

From a socio-cultural perspective, the character of agency involves expressing parts of a culture, social language, discourse or genre. These parts or units are appropriated through participating in communication and applied by the agent. The social language is seen as a vocabulary or a language system with collectively established units and rules of language use. Meanings, as well as agents' intentions, are seen as more or less equivalent to those established in the social languages. There is little room for the agent to approach the situation and use language in a more open way, as is possible within the phenomenographic orientation. Meanings and intentions are not seen as constituted in the meeting between the agent and the situation. The personal context of the agent is reduced, although there is room for variation in meanings in the process of appropriation and application of meanings of social languages. The main context emphasized is the socio-cultural communicative context and meanings in language use as based on social languages.

The phenomenographic research on language use is within an epistemological perspective, meaning a focus on the use of language in constituting and expressing personal understanding.

In educational research, we have to consider language use as a part of the meeting between an agent and a total situation of material, social, cultural, and spiritual qualities, and language units as constituted through this meeting. There is a need to consider the personal context of the agent and also the external, situational context in a broader way than is done in most educational research. A strength of the phenomenographic approach, as already stressed, lies in its focus on the student and learner as an agent. A further strength is the related view of agency as a matter of the agent's constitution of activity and meaning in approaching a situation, and in expressing context-dependent meanings in a context-dependent way. Compared to the very common focus on the communicative function of language in socio-cultural research, the contextual phenomenographic approach stresses the intentional expressive function of language use, which is seen as complementary to the communicative function and necessary to do justice to the agency of the learner and to understand the development of personal academic understanding (Anderberg, 2000; Anderberg & Johansson, 2006; Svensson et al., 2009).

3. Students' use of language expressions in conceptualising subject matter

Studies focusing on students' development and use of concepts have raised fundamental questions about what contexts are relevant for understanding the use and development of concepts, which have not been sufficiently addressed so far. It has been suggested that we should view understanding and use of concepts in terms of individual cognitive frames of reference or subjective theories (Vosniadou 1994; diSessa & Sherin 1998; diSessa, Gillespie, & Esterly, 2004). Another suggestion has been that students' statements about subject matter should be seen as communication and collective discourses (Lemke, 1990, 2001; Wertsch, 1991, 1998). The focus is then more on "words" than on "concepts", but no clear distinction is made

between the two. These suggestions represent alternative approaches to results obtained in studies where students express their understanding of, for instance, cases of physical motion, as answers to questions posed. Common to both foci is a lack of differentiation between meanings of expressions given in a social language or a cognitive system, on the one hand, and meanings of expressions as given in situated specific uses, on the other hand.

Phenomenographic research has mostly been focussed on describing differences in conceptualisation of, and ways of experiencing, subject matter as expressed in language. The results from such descriptions of variation in conceptions and language use, phenomenographic and others, are somewhat difficult to reconcile with assumptions about that cognitive frames of reference or social languages form the basis of conceptions and language use. Against this background, here we examine how individuals' uses of language in constituting and expressing of academic understanding are contingent on personal and situational contexts. The aim here is to clarify the function of the use of language expressions as parts of a deep, holistic approach to subject matter. The empirical results involve cases of individual students' uses of language expressions in approaching and expressing their conception of subject matter, rather than differences between students in their conceptions of the same subject matter. We shall look at the specific relation between the personal context of use of language within an approach to subject matter and the specific situational context, especially the subject matter approached. The way of approaching subject matter and the use of language expressions represent crucial interdependent characteristics of the agency of the learner.

Three case studies from three separate previous investigations will be presented. The examples are analysed and discussed to clarify the use of language expressions as dependent on the approach and the agency of the students. The examples are used to illustrate how uses of language are related to holistic qualities within a deep approach to subject matter. The examples

illustrate different aspects of the part-whole relations that may be involved in the use of specific language expressions. The three examples presented, their similarities and differences, will illustrate the specific, dynamic contextual character of the use of language and its dependence on both the agency of the student and the character of the subject matter, leaving the broader personal and situational context in the background. The examples are more fully presented in previous publications, as will become clear.

All three examples emanate from phenomenographic investigations that have in common a similar design focusing on the use of language expressions. A differentiation of conceptions, meanings of expressions, and expressions in relation to an object of knowledge referred to, gives a possibility to interpret the interplay between these elements. This interplay has been investigated and documented with the help of a specific dialogue structure (Anderberg 1999, 2000). We were interested in how the students themselves explored how they expressed their understanding of a subject matter, which meant that we investigated a description given from a first person or an agent's perspective. Such descriptions give us a basis for interpretation of how the interplay between conceptions, meanings and expressions is constituted.

4. Interview questions

The dialogue questions were intended to stimulate the students to expand on the meanings of key expressions used, so as to bring forward their function in expressing their understanding of the object of knowledge. In the course of the dialogue the focus changed, initially bringing out students' conceptions of an object of knowledge, and then moving towards students' reflections on how those conceptions were expressed, leading to an awareness of the function of expressions in expressing their conception. The general structure of the dialogues was the following.

a) The original question

The dialogue started with a reference to, and

delimitation of, an object of knowledge, followed by an initial question asking for a description of that object, with the students being given time to elaborate on their conception of the object. In the first example we shall meet, the original questions were about what happens when hitting a puck and throwing a ball. In the two other examples, the original questions were:

- In care of patients with DIC, what do you consider to be most problematic concerning the prophylactic measures that need to be taken, and that you, as a nurse, need to think about?
- How may major floods best be prevented?

The extracts presented are, however, from later parts of the interviews described below.

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

The researcher selected some of the central expressions with which the conception was expressed in the initial phase of the dialogue, asking the student to identify what was meant by these selected expressions, why they had been chosen, and finally inquiring how this choice was related to the conception of the object of knowledge. 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; and
- Identify the expressions and the functions of the meanings expressed in further exploration of the conceptualisation of the problem

In the first example, excerpts from the student's answers that elaborate the meaning of "force" are presented, but the follow up questions leading to these elaborations were less specific. In the two other examples, questions about the meaning of superficial respiration, and water circulation and processes, are examples of questions about the function of specific expressions used and their meaning.

c) Return to the initial question about the object of knowledge

The dialogue is concluded by returning to the question addressed at the beginning, although this

part of the original interviews has not been used here, because the aim has not been to describe the conception as the object of research.

5. Method of analysis

Reflections by students in this study are an activity involving different kinds of development. The reflections differ both between the students, and between different parts of the reflection, and between different statements made by each individual student. The analysis of the examples concerns relations between uses of expressions, their meanings and conceptualisations of subject matter within each example, and the differences between the examples. These illustrate the character of the constituting and expressing of personal academic understanding.

This research represents a contextual phenomenographic approach in line with the early phenomenographic research on approaches to learning (Svensson 1976, 1977). It is a contextual analytic approach in seeing and understanding approaches to learning and outcomes of learning in relation to each other, as parts within the same whole and context. Many phenomenographic studies focused on conceptions of, or ways of experiencing, subject matter as de-contextualised units. Although these descriptions of conceptions have been arrived at through a contextual analysis, the interest has then been with their content as such, and not with the relation of the content of conceptions to context (Marton, 1981). In our research, contextual analyses have been made of the use of language expressions as parts of conceptualising subject matter, considered in a broader personal, situational, cognitive and sociocultural context, in a way that has not been made in previous phenomenographic research. (Svensson et al., 2006; Svensson et al., 2009)

In a contextual analysis, the starting point is the object of knowledge to be investigated. This object may be of any kind, physical, psychic or social. In the present investigation, the objects of research are the function of the use of language expressions in expressing conceptualisations of an object of knowledge. The phenomena

investigated are not individual conceptions or ways of experiencing the object, as in most phenomenographic research, but the use of language within the context of experiencing the object. The analysis develops by considering the context that surrounds the text, considering especially in this instance the dependence of uses of language expressions on conceptualisations of objects of knowledge, within a wider context. The aim is to reach an understanding of the relation of the use of language expressions to the conceptions/ways of experiencing as their contexts, in a way that is in line with phenomenographic investigations focussing on approaches to studying and learning.

The most apparent characteristic of contextual analysis, compared to other forms of qualitative analysis, is that it starts from a delimitation of the object of research as a whole, rather than from parts and individual data. Most forms of qualitative analysis start with individual data as meaning units, and then codify and/or categorize those, before grouping them into bigger meaning units in an inductive way. In contextual analysis, we start with the whole phenomenon investigated and search for main parts of the phenomenon, main aspects and/or components. In the investigations referred to here, these phenomena are language expressions and their meanings within the context of conceptualising an object of knowledge, and also in the wider context of personal and situational conditions. Here, the analysis is focused on the relation to context rather than on the object of knowledge (partly due to the fact that the phenomena involved are quite limited in scope).

Another main characteristic of contextual analysis is that it is interpretative in an analytic way. This means that the meanings of the objects of research, their parts and contexts are seen as dependent on, and constituting, each other. The relations between the object as a whole and its parts and context are seen as, and dealt with, as internal relations. The meanings of an object of research, its parts and context are not defined or delimited separately and independently, but searched for in relation to each other. In this article, the use of language expressions and their

meanings are considered to be interdependent, and dependent on the context of the use.

We now come to the cases of three students drawn from the three previous studies, with the first looking at “force” and the object of knowledge (see Svensson et al., 2009, for further details).

6. “Force” in explaining two cases of physical motion

The first example concerns a student’s use of the word “force” in describing and explaining two cases of physical motion. The example is from a dialogue between a university physics teacher and a student about hitting a puck on ice with an ice hockey stick, and throwing a ball into the air. This student, here called Simon, seems to think he uses the same meaning of force in describing both the event with the puck and with the ball. The meaning is that “force” is something that influences the puck and the ball initially through the contact from the stick or the hand. The force is transferred to, and contained in, the bodies and it is diminished, mainly by friction from the ice in the case of the puck and gravitation in the case of the ball. The expression “force”, and the meaning of the expression is given in the immediate context of the talk each time it is mentioned.

The following extracts are verbatim translations from Swedish, including some characteristics of spoken language. They give an illustration of the character of the interview and some of the statements that form the basis of the analysis. However, they do not demonstrate the basis for all parts of the analysis, which is more extensive than is illustrated here. After a short introduction the interviewer says:

- I: *And the first question is, think of yourself playing ice hockey. What happens then when you have hit a puck on the ice?*
- S: Yes [is it], the whole, from [when] the stick hits and transfers force to the puck, so that it glides, and where it ends up then too?
- I: *Yes, what do you think.*

- S: Yes, you hit the puck, and then, yes, you can start further back, but I’ll start there. The puck is hit by the stick and the stick transfers a force to the puck, and then the puck slides away in the same direction in which the force is directed, if it is lying still. If it is not lying still, then it will be influenced by a force in the direction that the stick influences it.

The interview continues with the interviewer asking about the meaning of transfer of force, and other expressions used by the student in the continuing description and explanation of the event with the puck. At the end of the conversation about the puck and the expressions used, the interviewer asks:

- I: *Yes, but then if we look at why does the puck eventually stop?*
- S: Yes it depends, of course, on the external influencing forces. These forces influence the puck all the time with the same force, while this force that you have got at the very hitting of the puck or what you should say, is an initial force, a force that only effects at one small occasion, so that force will be used up over time. And through this the friction force, which is the biggest that influences the whole, will in the end be equal in size to those forces, or it will even out those forces at a certain position, but it will never influence the puck, so it starts slide in the direction of the friction.

After a while, the interview continues with another initial question.

- I: *What happens when you throw a ball at an angle up in the air?*
- S: Yes, oh, oh, it is still the same thing, but I can explain it again. You throw up a ball in the air and, thereby, it gets a force in the angled direction that you want (...). It is the same thing with this, that the ball after the moment when you have thrown it away, the

ball has got a force in a direction, then the ball will be influenced by external forces in every moment, that are equal in size all the time. And in this case it is gravitation and air friction that exist. And it is the same thing there, that when the initial force is used up, it will only be influenced by the gravitational force, which pulls the ball down to the ground.

After having discussed the event with the ball at some length and used different expressions, Simon says:

S: The force that the ball has can be divided into a vertical and a horizontal force. The horizontal [one] will last all the time, because it is not influenced by anything else than, in some cases, the air resistance, while... the ball is influenced vertically by the gravitational force, and thereby you will [at] every moment have different force influences on the ball. From having a force directed upwards, you will in the end have a force directed downwards until it hits the ground.

One characteristic of the meaning expressed is that the initial force becomes a "contained force" through transfer in both cases. However, Simon also talks about friction between the puck and the ice in terms of force, but then there is no transfer of force. There is also a difference between a "hitting force", a "throwing force", a "contained force", a "driving force", and a "resisting force". In the case of the puck, there is a continuous force in the direction of the motion, but in the case of the ball, the force is divided into one vertical and one horizontal force.

If we consider the meanings expressed about the relation between a vertical force and gravitation, the variation in meaning increases even more. About the upward part of the motion of the ball, the student says there is a force that is the sum of the vertical contained force and gravitation. However, in considering the downward part of the motion, Simon only talks about a gravitational

force. Thus, the expression "force" has varying specific meanings in different uses by the same student, and these uses cannot be said to be equivalent to a general concept, or a general language meaning, even if they to some extent include common characteristics. Those common characteristics are rather implicit, and may rather be interpreted as a consequence of the experience of the physical events than as an application of a concept or a general language meaning.

The variation in the meaning of the word "force" has to be understood in the context in which the student is using it within a deep approach to the two physical events. This means that he is focusing and addressing the physical events and is not primarily preoccupied with the interview situation, with language meaning, or with the dialogue in itself. Whether, or how, he is also using the word within a holistic approach is more complicated to answer. He is using the word within an explanation of the whole event, but at the same time he is focusing on parts of the event. The variation in the meaning of the word is based on relations to different parts of the motions. He is holistic in relating parts into a whole description, but whether this is considered to be done in a holistic way depends on what demands we put on the relating of parts. He apparently does not use the same word, "force", with the same meaning in describing different parts of the motion. However, it is common to use the same word to describe different things with different meanings in everyday language. This is why uses of language have to be understood as parts of what is approached and how it is approached. So, if deep and holistic are to imply the same meaning of the same expression, in this case "force", within a whole, this student is not being holistic. Being holistic in accordance with the theory of physics means to be holistic in a very special way in the use of generalised meanings connected to specific expressions. In the case of this student, it would mean a different use of the word "force" and above all a different meaning of parts of the motions within a different holistic approach and understanding of the events.

This example illustrates how the same student uses the expression "force" with different

meanings in relation to different parts of the same object of knowledge, and within a deep approach in a general sense. Simon is talking about the character of parts of the physical event, which is here the meaning of a deep approach in relation to the object of knowledge, and that is different to talking just about the lexical meaning of “force” or about the meaning as defined in a theory or as used in communication, which would here represent a surface approach. The different meanings used might be thought of as emanating from meanings in social languages or discourses, but it seems hard to find those languages as established social systems of communication. The uses of the expression, and the meanings expressed, seem to be flexibly created in the talk, and not clearly correspond to any social language. Rather, Simon’s agency seems to be the immediate context to consider in understanding the use of the expression. Simon may rely more or less on social language meaning (risking to end up with a surface approach) and on his own experience of the object and own creation of meaning.

There is a social language or discourse which is expected to be learned, namely Newton’s theory of classical mechanics. However, the learning of this theory does not seem to have the character of appropriation of this given language. It seems to be a matter of developing the conceptualisation of physical phenomena by use of the language resources one has. This will certainly not be in accordance with the given language until after a long process of development has taken place - of the conceptualisation of physical events, and the use of expressions and meanings in the conceptualisation of the events.

In the example of talking about the puck and the ball, the deep character of the approach is quite clear, that is the student is talking about the events. The character given the wholes of the physical events is holistic in an explanatory sense, that is, the student relates different parts of the events in terms of cause and effect. The word “force” is used in this explanatory approach. However the word could be given a more general meaning in different uses of it, which would also give a more integrated and consistent meaning of

the events as wholes. This could be the meaning of force in Newton’s theory. This would take not only the constitution of this abstract meaning as a unit of meaning, but also the constitution of this meaning as part of a specific meaning, as part of the events, and of different specific parts of the events. This is more complicated than the constitution of the abstract meaning itself.

There is a strong inclination in education and educational research to start from abstract theories and to be concerned with deviations from the knowledge that is wanted and expected. Deviations from the expected knowledge are interpreted as resulting from alternative theoretical frames of reference, cognitive systems and/or social languages. However, there is no need for an explanation to presume a very similar alternative to what is found to be missing. The missing part does not require any explanation. The abstract theory and its concepts is a very special construction with special prerequisites. Rather than assuming similar alternatives, it is interesting to focus on the constituting and expressing of personal understanding. It may then also be possible to find out what approach and constitution of meaning might be more likely to lead to the expected understanding. This personal understanding of course does not have its foundation in the required understanding, but in the person’s previous experience, and knowledge, and approach to the object of knowledge. In the example of the theoretical concept of force, it is quite clear that the main problem concerns how the personal experience and understanding of physical events may be developed in such a way that meanings of parts of the events are constituted so that qualities that are general across cases are abstracted from the specific meanings of each case.

This example has illustrated how the same expression is used with varying meaning within and between the conceptualisation of two similar physical phenomena, and how this variation in use is dependent on the approach to the phenomena and the agency of the student, as well as of the character of the subject matter. There are considerable possibilities of variation in the holistic character of the approach, as a

context for using language expressions, and different students cannot be expected to make the same constitutions of meaning on their way to a more common and shared approach to and constitution of meaning, in line with a common theory and language.

We now come to the second case in the field of nursing.

7. “Rapid-superficial respiration” and “hungry for air” in describing patient syndromes

The second example is taken from an article written by Anderberg (2000). It is based on an extract from an interview with a nurse named Sara concerning symptoms of respiratory organ deterioration in patients with the DIC (Disseminated Intravascular Coagulation) syndrome, not treated on a respirator machine. Sara talked about how superficial respiration may be observed. The dialogue is about what she means by superficial respiration and she says that normal breathing is deeper and that superficial respiration movements are “smaller”. She explains that the patient turns to gentle thoracic breathing instead of using the abdomen and the diaphragm. She says that the breathing is concentrated in the thorax, and that patients start auxiliary respiration and use the auxiliary muscles. But that is not the first thing they do, she says, it’s the superficial respiration. She means that there’s a transition to auxiliary respiration. She says that, first, there’s the superficial and rapid respiration, the feeling of being hungry for air, and that they get worried.

When Sara has introduced the expression “superficial respiration” in her description the interviewer then focuses on this expression.

- I: *When you say “superficial”, what are you thinking of primarily?*
 S: When I look at the patient?
 I: *Yes, what do you see in front of you right then?*
 S: I see discreet respirat..., no, what do you call it?
 I: *There’s no special...*

S: Well, the respiratory movements are smaller.

I: *They are smaller. How do you see that they’re smaller?*

S: You see that they generally turn to gentle thoracic breathing, instead of using abdomen and the diaphragm. That the breathing is concentrated in the thorax, and they start auxiliary respiration when they use the auxiliary muscles. But some time will have passed then. That’s not the first thing they show.

I: *What is the first thing?*

S: It’s the superficial, I mean that there’s a transition to auxiliary respiration, that you help and pull with active breathing. You know, first, there’s the superficial and rapid respiration, the feeling of being hungry for air, and that they get worried.

Sara then left the DIC syndrome and talked about the hunger for air and when her focus on hunger for air was queried, she said:

No, because hunger for air is a concept that I have... it sounds stupid, but I have full control over it. Hunger for air is not a foreign term. I understand the meaning and that there are many different shades of it, and that you can be hungry for air for many reasons. I think it’s quite a good description of when you need more air than you can get for whatever reason.

Sara is using the expression “superficial respiration” within a deep approach, focusing on the DIC syndrome in patients. She has a general holistic approach to the whole of the syndrome and uses the expression to refer to a part of this whole. The part “superficial respiration” refers to a development of respiration over time and also concerning what bodily parts are involved. Sara gives a meaning to “superficial respiration”, which is not in line with the medical understanding of the syndrome, but which still forms a part of her holistic understanding of the syndrome. However, she seems unsure about its meaning. She

connects superficial respiration to rapid respiration and the feeling of being “hungry for air”. She then focuses on the meaning of being hungry for air and moves away from the DIC syndrome. She does not state how the meaning of being hungry for air relates to superficial respiration in the case of a DIC syndrome. So, she changes her holistic approach to the DIC syndrome to a focus on the meaning of being hungry for air generally, in relation to many unspecified cases. This change of focus is through the agency of Sara and influenced by her experience of being in control of the expression “hunger for air”, so she prefers this meaning and expression.

In the example with Sara’s talk about superficial respiration there is a clear deep approach in relation to DIC patients in a part of the talk. Sara describes “superficial respiration” as a part of a development of the patients breathing. However, she does not reach a clear relation between this part and other parts of the breathing or the whole of the DIC syndrome. The approach and the result thus lack holistic qualities. Sara changes her focus to the expression and phenomenon of hunger for air without relating clearly to superficial respiration or DIC patients.

She talks about this state in relation to patients in general and because she feels she has a clear picture of the meaning of this expression. Starting from superficial respiration as part of the DIC syndrome, and experiencing difficulties in clarifying the meaning of this part and its relation to other parts and the whole of the syndrome, she goes for another expression and phenomenon, which is seen as similar. So the approach is changed from the DIC syndrome and superficial respiration to hunger for air as a new group of phenomena, without Sara making clear that she is aware of this change. This form of agency, meaning a change in what is approached, as well as in meanings and expressions used, are quite common in expressing understanding and in learning.

This example is similar to the previous one in illustrating the lack of agreement with the established and required meaning of the

expression, in this case “superficial respiration”. Even in this case there will be difficulties in finding an established social meaning corresponding to the meaning expressed. Rather, the meaning expressed seems to be this individual person’s meaning. It is probable that she assumes this to be a social meaning shared with others, even though that may not be true, since those meanings are seldom clarified.

As in the previous example, the same argument, about alternative social languages, frames of references and cognitive units applies here. But, in contrast to the previous one, this example does not illustrate variation in the meaning of the same expression. What is illustrated here is a change in focus and approach related to a change in use of an expression, clearly illustrating the role of the agency of the student in understanding and expressing knowledge. In this example, there is more focus on language and a social dimension than in the previous example. Sara feels more comfortable with talking about “hunger for air” and turns away from the knowledge problem with the DIC-syndrome and its complex meaning, to the simpler meaning of “hungry for air”, without developing it in any more complex knowledge context. This is something that a focus on language and communication often may lead to, and which is very problematic in an educational context.

8. “Water circulation” and “processes” in talking about floods

The third example is from an interview investigation with students in an interdisciplinary course about their understanding of floods, published in Swedish by Elsie Anderberg (Anderberg, 2003). The theme introduced in the dialogue was how to prevent floods. Sally starts with talking about flows of water in ditches, streams and rivers, about human intervention in nature, and climate change with increased rain that increases the water flows, and about dams and the control of dams and prediction of what may happen with them. She suggests that one should make continuous measurements of flows

of water that could then be used to act on. She also includes ideas about the existence and role of the groundwater. She decides that water has its own circulation, and then includes water below ground in the water circulation. In the teaching, the technical term “hydrological cycle” has been used. Sally is very clear that she does not want to use this term because it is not her own, and it is difficult for her to explain the term to others, so she prefers her own expression “water circulation”. Asked about some other everyday language expressions she wants to use, she mentions “processes” and explains how she wants to use this word in contrast to, and relation to, the expression “water circulation”.

I: *If we take this with water circulation, do you have any other expression that also is everyday, that also describes this?*

Sy: I can think of processes then. What happens with the water at different, yes, at different levels, so that, for instance, one thing happens up there in the stratosphere, and then something happens in the trees, that they attract a certain amount of water and evaporate some part, And so each part, if one wants to look at each, one could go into metres, what happens thousand metres above the earth, what happens at five thousand, there is a process that is going on that one can go in and look at.

Sally wants to use the idea of water circulation to relate to the whole of water coming as rain, water flowing on the surface of the earth, water penetrating the surface, going down into the ground, water coming up from the ground, and water going up in the air again. Then she wants to use the word “process” when explaining specific parts of the circulation, like when talking about what happens with a river over a specific time period. She thinks that the idea of circulation gives a general frame for thinking about the problem of flooding, but that the meanings of different parts, specific processes, provides explanations and the possibility of doing something.

I: *What you said there about water; one can prevent flooding by controlling draining and circulation - if you include the process, what role does it have?*

Sy: Yes, the process, for instance that the water is coming with a certain velocity during a certain time and it deposits so and so much silt at the bottom. If we now assume that there is a raising of the water level, then you can study the process, what is happening. This small part, and then in that way, you could then take measures, or get an explanation of it, because then the process there, also becomes a tool that can be used in another way. The very circulation maybe explains the way of the water more generally, so to say, how it goes, while [with] a process, you can go into and look at [it and say] that, yes, now there is a flooding going on, and in the process, that is more that you get a picture of what is going on.

Compared to the previous two examples, this one starts with a more generally formulated and more heterogeneous group of phenomena – “floods”, and by asking how floods may be prevented. In this third example of Sally’s talk, we have a quite different relation between approaches and use of language expressions and the phenomenon introduced, compared to the previous examples. She starts to talk about flows of water that may be conditions for or parts of floods. Then she talks about the water circulation (hydrological cycle). This is very illustrative, both when it comes to what is approached, and in the choice of expressions. What is approached in using the expression “the water circulation” is a context of the phenomenon of floods. In the previous two examples, the students’ focus is on parts of the object of knowledge. At the same time, the technical term “hydrological cycle” is actively avoided in favour of her own expression, “the water circulation”. The meaning of the water circulation itself has a holistic quality, although at

the same time it may be doubtful how deep it is (talking about processes in nature or about a model). To have a deep approach here means to use the concept and model to describe and explain phenomena – here floods and prevention of floods – not to focus on the concept and models per se. She is also talking about some different processes that may form part of the water circulation and floods, without explicating any clear relations between those parts and floods and/or the water circulation. Thus, there is something missing from a holistic approach in combination with a quite global approach, in focusing on a broad context in combination with parts, without constituting the meaning of the wholes - of floods and prevention of floods - in between. This is also quite a common form of agency in approaching subject matter.

Like the second example, this one illustrates how a main expression is used based on personal meaning, rather than based on social use and meaning. In contrast to the previous examples, this one illustrates problems with finding the focus, rather than a clear focus or a change of focus. This is related to the complexity and variation of the phenomena referred to at the start. It illustrates talk about a frame or model on one hand, and parts and specific conditions on the other hand, rather than about the object of knowledge introduced. This illustrates a problem with focusing and establishing a first delimitation of the object of knowledge, and a relation between context (the water circulation) and object (floods and prevention of floods), and between parts and object (processes like raining, dams and so on, and floods and prevention of floods).

In this example, rather abstract meanings and reasoning and more concrete meanings are used without integration. This is a very common problem, especially in educational contexts, which is also relevant to the two previous examples, although not actually illustrated in them. The complexity of this object of knowledge gives many possibilities of delimitation of the object, and of parts and contexts of the object, and the meanings of those, including if they are related or not, and integrated to bigger wholes,

and a whole corresponding to the object of knowledge introduced. The discerning, delimitation and organisation of such complexes of meanings cannot be assumed to be according to some socially or even individually predefined systems of meanings.

9. The scope of the learner's agency

Within research on students academic understanding, there has been an increasing emphasis on the importance of considering conceptions of subject matter in context. Within the cognitive research orientation, diSessa *et al.* (2004) pointed out the contextually very specific character of concepts used by students. Within the socio-cultural research orientation, Säljö (1997) emphasized the situated character of action, talk and expression of conceptions. Halldén (1999) concluded that students' conceptions can be contextualised in terms of situational, cognitive and cultural contexts, while Scheja (2002) described students' personal contexts for studying in higher education and suggested that these contexts arose through a complex negotiation process. Halldén, Haglund and Strömdal (2007) suggested an interpretation of data on students' conceptions based on the identification of both competence-oriented and discourse-oriented determinants of resources for action. Entwistle (2007) provides an integrative overview of research that illuminates different aspects of personal contexts of students' conceptions, which are dependent on situational contexts. The research presented here is in line with these research developments and goes further into the agency of the learner in relation to specific meanings expressed in conceptualising subject matter.

All three examples presented here, in a general sense, represent a deep approach to a delimited subject matter whole (including a change of subject matter in the case of Sara). The quality of the holistic approach varies and thereby also the meaning of the deep approach. The use of language expressions can be understood in relation to this variation in approach and the

reverse. The variation in approach and use of language expressions have to be understood on the basis both of the character of the subject matter and the agency of the individuals. The examples illustrate variation in subject matter and individual variation, but not individual variation in relation to the same subject matter or variation in subject matter for the same individual (except the difference between the puck and the ball in the first case). But we know about such variation from the original studies these examples are taken from, and from the whole tradition of phenomenographic research that focuses on qualitatively different conceptions of the same phenomena.

In the first example, the starting point is a reference to one of two kinds of physical events, hitting a puck and throwing a ball. The starting point is not one specific observed event in each case, but a description that is applicable to a group of events. The same can be said about the second and third example: they start from descriptions referring to groups of phenomena. This type of description is typical for academic understanding. It leaves room for agency concerning specification of what is referred to and talked about. The groups of events referred to varies in terms of how homogeneous they are expected to be. The groups of phenomena in the first example are expected to be the most homogeneous, and the group of phenomena in the last example are expected to be the least homogeneous. This leaves varying room for the agency of the individual to focus different specific cases. A central part of the agency expressed in the approach is thus what specific cases or phenomena, within the group of phenomena, are thought and talked about, and how precisely this is done. This is not revealed by the general language meanings of the expressions used in the dialogue.

Another part of the agency is the delimitation of phenomena in relation to contexts, which is also a common problem in academic understanding. We can see that this differs a lot between the three examples. In the example of the use of the word "force", there is a delimitation of the whole of the phenomena that is quite clear, although there may be a variation concerning what is paid attention to,

in terms of which parts of the more extended motion should be described and explained. Should the moving of the arm or what happens when the ball has hit the ground be included, for instance? This has the character of choice and negotiation in the dialogue. When the choice is made the delimitation is quite clear.

In the second example about the DIC syndrome, the delimitation is less clear. Sara seems not to start from, or arrive at, a clear delimitation of the DIC syndrome. She has problems with establishing the meaning of "superficial respiration" and ends with focussing on "hunger for air", which may be understood as related to problems with the delimitation of a whole. Sally, in the third example, is very different when it comes to delimitation of a whole. She starts to talk mainly about flows of water on the ground and then places the phenomenon of flows of water and floods within a context of "the water circulation" (or hydrological cycle). This does not represent a delimitation of the phenomenon of floods as wholes or prevention of floods but a context within which these phenomena may be seen. In addition to this, she is talking about different processes that form conditions for, or parts of, floods, but she does not actually delimit wholes of floods. This is a quite common characteristic of approaches to subject matter, that the central phenomenon thought and talked about is not really focused on, but rather the surrounding context and or some parts, without really delimiting, penetrating and organising the meaning of the central phenomena talked about as wholes. What is expressed is clearly limited as an understanding and knowledge of floods and prevention of floods, due to the lack in holistic quality. At the same time there is another quality, which may also be termed holistic, the one of focusing on the context as a bigger whole, a focus that has the potential to contribute to the understanding of floods and preventions of floods as wholes.

A very central part of the agency is what parts of the phenomena are focussed on and how they are seen in relation as a whole. This constitution of wholes as *gestalts*, as organised complexes of meaning, is also fundamental to the delimitation of the whole and its relation to context. This is the most central problem of development of

academic understanding. Delimitations of wholes and parts and their organisation may be made in many different ways. Some of these are sometimes established on a social basis and expressed in comparatively very distinct theories and languages shared by a number of people. Such complexes of meanings are then talked about as reified units. However, they do not exist as identical units even among those few people who are most in agreement about their meaning and use. The empirical results referred to here show that the constituting and expressing of such wholes, complexes of meanings, or conceptions is a very personal, varied, and flexible process, even if it, to a varying extent, also includes shared approaches and meanings. This also means that the use of language meanings and expressions has, equally, to be personal, varied and flexible.

10. Conclusion

The main point made is that in expressing and developing understanding, the use of language is dependent on the situation external to the user, as well as on the user as an agent. The dependence of the use of language on the external situation is seen within the agent's approach to that situation. The agent's approach and use of language is also dependent on previous relations to, and experiences of, the world, including previous approaches and uses of language. There is an internal relation between the approach to the situation and the use of language within the agency of the agent. One part of the agent's relation to the situation is the knowledge aspect, and within this the understanding of a specific part of the world is focussed. The relation between this knowledge aspect of the relation to specific parts of the world, and the use of language, has been the focus in this article.

Either words and expressions, or experiences of the world, may come first in the approach to parts of the world. Words and expressions and their general meaning may steer and guide the approach in a rather fixed way, but also in a more

exploratory and flexible way, where the meanings are constituted in relation to the experience of the part of the world being focused on. On the other hand, the experiences of the world may be the basis for constituting meanings and choosing expressions to be used, and this can be done with more or less flexibility when it comes to the meanings of the expressions, compared to their meaning in known social languages.

The importance of the agency of the learner, and the approach characteristic involved in the use of language, implies that the flexibility and variation in the approach and use of language has to be considered, especially in an educational context aiming at new personal understandings. The learner's experience already contains established meanings and concepts, as well as cognitive units or meanings in social languages. These are important possible sources of the meanings expressed, but they are problematic in a learning context in which the learners are expected to constitute new meanings for themselves. These new meanings will generally be expected to be in agreement with already established meanings in the existing social languages in which subject matter knowledge is expressed. However, the constitution of personally new meanings has to be understood within the flexibility and variation of approaches, and uses of language expressions, within the agency and experience of the learner. For the learner to repeat a standard approach as a strategy, or an already known of standard meaning, would be to miss important possibilities of learning. For researchers to make generalised assumptions about the learners' use of standard approaches and meaning units would be to miss the possibility to explore the character of the learners' agency, approaches, and uses of language in learning.

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Ο ρόλος της γλώσσας στη συγκρότηση και έκφραση της προσωπικής ακαδημαϊκής κατανόησης

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Περίληψη

Η χρήση της γλώσσας αποτελεί κεντρικό ζήτημα στη συγκρότηση και έκφραση της ακαδημαϊκής κατανόησης. Η θεματική αυτού του άρθρου, κατ' αντιπαράθεση με το θεωρητικό υπόβαθρο προηγούμενων και πρόσφατων φαινομενογραφικών ερευνών, παρουσιάζει μια θεωρητική προσέγγιση ως εναλλακτική στις δύο κυρίαρχες προσεγγίσεις, τη γνωστική και την κοινωνικο-πολιτισμική. Ένα βασικό χαρακτηριστικό αυτής της έρευνας είναι η εστίασή της στη σχέση μεταξύ του μαθητευομένου ως παράγοντα και της εξωτερικής κατάστασης με την οποία ο μαθητευόμενος σχετίζεται, συγκεκριμένα με το περιεχόμενο (ενός μαθήματος) και τη γνώση που εμπλέκεται σε αυτή τη σχέση. Προτείνεται ότι, προκειμένου να αντιληφθεί κανείς τη συγκρότηση και έκφραση της ακαδημαϊκής κατανόησης σε όλη της την έκταση, πρέπει να λάβει υπόψη του το άμεσο προσωπικό και καταστασιακό πλαίσιο. Επιπλέον, να αντιμετωπίσει τον μαθητευόμενο ως παράγοντα που διαμεσολαβεί τη σχέση με τα ευρύτερα γνωστικά και κοινωνικο-πολιτισμικά πλαίσια και τη σημαντικότητα που αυτά έχουν. Αυτό σημαίνει ότι το προσωπικό πλαίσιο πρέπει να αντιμετωπιστεί με τρόπο πιο ολοκληρωμένο σε σχέση με τον τρόπο που αντιμετωπίζεται τόσο στην περίπτωση της γνωστικής όσο και της κοινωνικο-πολιτισμικής θεωρητικής οπτικής. Παρουσιάζονται τρεις περιπτώσεις, επιλεγμένες από προηγούμενη έρευνα με συνεντεύξεις, προκειμένου να καταδειχθεί η σημαντικότητα του ρόλου του μαθητευόμενου ως παράγοντα, χρησιμοποιώντας μια φαινομενογραφική προσέγγιση πλαισίου, η οποία αποδείχθηκε χρήσιμη στη διάκριση και την αποσαφήνιση του προσωπικού, καταστασιακού, γνωστικού και κοινωνικο-πολιτισμικού πλαισίου, εντός των οποίων αναπτύσσεται η ακαδημαϊκή κατανόηση.

Λέξεις-κλειδιά: Ακαδημαϊκή κατανόηση, Χρήση της γλώσσας, Έννοια*, Μάθηση, Μελέτη, Φαινομενογραφία.

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* Ο όρος «έννοια» χρησιμοποιείται ως μετάφραση του όρου "conception", ο οποίος δηλώνει την ατομική ερμηνεία της επιστημονικής έννοιας. Στα αγγλικά ο όρος "conception" διαφοροποιείται από τον όρο "concept", ο οποίος αναφέρεται στις επιστημονικές έννοιες.