

14. VALUES AND KNOWLEDGE EDUCATION.

Experiences with Teacher Trainings

INTRODUCTION

VaKE (Values and Knowledge Education) is a didactical approach in which moral and values education is combined with knowledge construction. Both is done on a constructivist base, the principle being that a moral dilemma is presented and discussed as in usual moral and values education in the tradition of Blatt and Kohlberg (1975). However, the dilemma is constructed in such a way that the students lack information to deal adequately with it, and they are highly motivated to find responses to the questions that have arisen during the values debate. This initiates the knowledge construction phase, which consists in the students defining their information needs (questions) and then searching for this information in whatever source they can find, the most important one being the internet. Next, the students inform each other about the content they found, and the moral debate can continue on a higher level. Details of this procedure have been presented elsewhere (e.g., Patry, Weyringer, & Weinberger, 2007; Weinberger, Patry, & Weyringer, 2008; see also the presentation at the first symposium of SIG 13, Patry et al., 2010) and will be repeated here only insofar as it is necessary.

VaKE is open teaching par excellence. In the section entitled 'Teachers' roles in VaKE' we will give the specific tasks of the teachers in the different phases of VaKE; these tasks differ considerably from the ones teachers assume in traditional teaching or even in moderate constructivist teaching. The main issue is to hand over responsibility to the students without giving up responsibility for students' learning. Finding the balance between handing over and keeping responsibility is very delicate, and it is quite tricky to teach student teachers or experienced teachers how to do it. In the present paper, we aim at (1) presenting the (new) role of the teachers in VaKE and at (2) discussing the problems we have encountered when trying to implement VaKE with teachers who do it for the first time.

TEACHERS' TRADITIONAL ROLE

'Traditional teaching' is quite a fuzzy concept; nevertheless it is quite present in the teachers' cognitions (Gastager, 2003); nevertheless there are some common characteristics that most teachers associate with traditional teaching, such as:

- Students are seen as 'tabula rasa,' i.e., they are empty vessels that can (and must) be filled with the content required by the curriculum.
- For this the best is to break up the content into small pieces that then are given to the student element by element.
- Therefore the teacher is the transmitter of knowledge, he or she is the central person in the teaching-learning process: He or she has to determine and control everything in the classroom, he or she has the full responsibility, unless the students practice opposition (e.g., through disciplinary problems or laziness) or are stubborn - then, the teachers think, it is not possible to convey them the knowledge. (see, for instance, Brooks & Brooks, 1993, p. 17).

This description may look like a caricature; nevertheless this kind of pattern can be found quite frequently in the teachers' subjective theories (see Gastager, 2003). Upon request, they can act accordingly (Patry, Schwetz, & Gastager, 2000), and it is quite likely that indeed they do so in regular (unobserved) teaching; for instance, in a small survey students (N=49) reported extremely few events of open teaching, i.e. forms of teaching that are not traditional in the way sketched above (Patry, 1999).

One can assume, then, that the patterns of traditional teaching are quite deeply rooted in the experienced teachers' subjective theories, and mostly they have developed corresponding habits and routines. And student teachers have experienced fifteen thousand hours of traditional teaching and very few hours of open teaching; it is difficult to imagine that this does not leave traces in the student teacher's head - this follows the dictum "Teachers teach as they are taught and not as they are taught to teach" (quoted from Messner & Reusser, 2000, p. 157). This is confirmed by the experience that when coming to the teacher's college they become less conservative, but as soon as they leave the college for practice they fall back into the old conservative attitudes, as shown in the classical study by Müller-Fohrbrodt et al. (1978).

This does not mean, though, that no changes are possible. After appropriate training teachers are able and do teach in a constructivist way at least to some degree if asked to do so (Patry et al., 2000). But it takes quite some experience and the teachers need to be convinced of the appropriateness and effectiveness of different teaching modes than the traditional ones.

The research showing that indeed this is appropriate is quite substantial. It is beyond the scope of this paper to present evidence for this statement, nor is it possible to discuss the counter position defended by Kirschner et al. (2006) and the debate that ensued. Suffice it to say that research has shown for VaKE that learning of subject matter is as good as in regular teaching (Weinberger, 2001) or even much better (Weinberger, 2006) and in some well-documented cases the students know more about the particular topic than the teacher knew before the VaKE unit (Weinberger, Kriegseisen, Loch, & Wingelmüller, 2005) while still providing the possibility of dilemma discussions that have been shown to foster the development of the moral judgment (Lind, 2003).

TEACHERS' ROLES IN VaKE

VaKE has different phases which are presented in Table 1. We describe these phases only insofar the teachers' roles are concerned.

Table 1. *VaKE-dis* (translated and adapted from Weyringer, 2008, p. 47)

Activity	Content	Grouping
0	Preparation: Clarification	Class
1	Students' concepts of values: relevant working skills	Class
2	Introduction, clarification of the content, first exchange of opinion: Where is the problem? What values are at stake?	Class
3	Reflection / proflection	Individual
4	What associations do I have with this dilemma? What opinion do I have? Why do I think this? What values are at stake?	Individual
5	Who is in favor, who against a certain solution? Who cannot decide?	Class
6	First decision	Class or groups
7	Why am I in favor or against? Why are you in favor or against? Where do we agree?	Individual
8	How do I think <i>now</i> about the problem? What opinion do I have now? What questions do I have?	Groups
9	Exchange about experiences and need for information	Groups or individuals
10	Looking for information	Groups
11	What are the strong arguments? What are the information do I need for my argumentation?	Groups
12	Collect all information that you need! Use all information sources available!	Groups or individuals
13	Exchange of information	Groups
14	Is this information sufficient?	Groups
15	Synthesis of information	Class
16	Reflection / proflection	Individual
17	How do I think <i>now</i> about the problem? What opinion do I have now? What questions do I have?	Individual
18	Who is in favor, who against a certain solution? Who cannot decide?	Class
19	Second decision	Class

Table 3. (Continued)

12	Second dilemma discussion	Why am I in favor or against? Why are you in favor or against? Where do we agree?	Class
14	Reflection / proflection	How do I think <i>now</i> about the problem? What opinion do I have now? What questions do I have?	Individual
15	General synthesis	Finalizing the process and summary (best with a project)	Class
16	Generalization and transfer	Feedback about the process; discussion about similar topics and problems	Class

There have been several versions of VaKE; here we use the version 'VaKE-dis' (Weyringer, 2008), 'dis' refers to differentiated, individualized, and specified functions within VaKE:

- Differentiated means different methods of knowledge construction and documentation of the learning progress are integrated; changing perspective is a necessary element of the process.
- The learning process is individualized through introduction of phases of reflection and proflection. Reflection is thinking about arguments and information that have been presented before, while proflection means to look for further arguments, information, and information needs to be brought into the debate; for this special instruments can be used, such as mind maps, portfolio, etc., and further instruments have been developed.
- The version of VaKE is specified because it can be adapted to the specific learner group, the intended (curricular) learning goals, and the given conditions. In addition to the prototypical VaKE process VaKE-dis includes steps of individual reflection and proflection, new didactical strategies (the possibility of delay of decision, change of perspective, feedbacks with viability checks) and other improvements. We choose this version because the respective steps show particularly clearly the changed roles of the teachers compared to 'traditional' teaching. The prototypical VaKE version (Weinberger et al., 2008) consists in the steps 1, 3, 4, 6, 7, 8, 9, 12, 13 (adapted accordingly), 15 and 16.

The whole VaKE process fosters highly autonomous student work: Once the topic of the VaKE has been decided and the dilemma has been formulated and the students have understood it, the teacher has the function of 'orchestrator of learning' (Salomon, 1992), while the students decide to a high degree themselves what will be done and how it will be done. This does not mean that the teacher's presence and activity is obsolete, rather he or she has clearly defined functions and responsibilities within the process.

Step 0

Preparation and clarification. Students who participate for the first time in a VaKE process need to be prepared for it because they are used to a different type of teaching. They need to be informed about the degree of autonomy, and they need to acquire the necessary skills such as the ability to cooperate (instead of the competition typical for traditional teaching). In particular they need to be introduced into the specific methods used within the process such as mind map, brainstorming, portfolio, etc., so that it is not necessary to learn these techniques while doing VaKE.

The teacher's role here is to 'prepare the ground,' using the typical didactical tools of social learning, which includes particularly practicing the respective skills: The teacher gives a brief introduction into the technique, and the students try it out. Hence the role is to initiate the learning process by addressing the necessary principle and then letting the students make experiences with this. Here a moderate constructivist approach is appropriate that does not differ significantly from the social learning procedures frequently practiced in class.

Step 1

Presentation of the dilemma and brain storming about knowledge and values which are at stake. It is the teacher's responsibility to determine the topic of the VaKE process so that it fits into the curriculum or takes into account other conditions; with students having experience with VaKE, however, it is also possible to conceive the topic in a common co-construction of students and teacher. Similarly, the teacher conceives the dilemma (with two possible decision alternatives for the protagonist) so that it fits the ability, interest, and other characteristics of the learners, that it addresses those values and subject matter areas that are at stake from the program perspective, and that it is balanced with respect to the probability of the two possible decisions of the protagonist – again, advanced students can participate in this construction.

The presentation of the dilemma to the class should be done in an adequate way that is adapted to the age of the students, and the teacher can use all the didactical tricks available to convey the message of the dilemma that foster understanding. This includes making sure that the values at stake are clear for the students; this can be done through a first exchange of opinions.

The beginning of this step, hence, is highly teacher directed unless the students co-construct the process; in the end (exchange of opinion), however, the teacher has mainly the function to manage the discussion, but not to express his or her own point of view or to intervene with respect to the content of the discussion.

Step 2

Reflection and proflection. The aim of this step is that each student thinks individually about the issues. The teacher's role here is to introduce this step and to

propose the tool (that has been learned in step 0), which then should be applied individually by the students (and with the consent of the teacher they can decide to use another one of the available tools). While the students work, the teacher is available for answering questions; however, unless in traditional teaching, he or she restrains from intervening to correct individual work, give suggestions, etc.

Step 3

First decision. The teacher initiates the voting about the decision the protagonist of the dilemma should take and writes down the result. This short step is purely teacher lead.

Step 4

First dilemma discussion. Again the teacher initiates the dilemma discussion; he or she might decide whether groups are formed and how these are to be composed (e.g., mixing pro and contra students or students of different argumentation levels, etc.).

During the discussion the teacher will make sure the discussion runs appropriately but will not intervene with respect to the content of the discussion. In some cases he or she might introduce some arguments that he or she thinks important, but this must always be a proposition which the students are free to acquire or reject in their debate.

Step 5

Reflection and profection. As in (2), but maybe using different tools.

Step 6

Exchange about experiences and need for information. Unless the students do not do it spontaneously (which is frequently the case) the teacher initiates the exchange between students about the arguments with a particular focus on the question that arise. The teacher must make sure that these questions are collected and the work for the next step is organized (who looks for what information?).

Step 7

Looking for information. Depending on the resources, the teacher has to manage the search for information. He or she also may suggest some sources to be used, but the students are always free to decline such propositions. In this step the teacher may also switch from the learning orchestrator to a source of its own but he or she must clearly declare this role change. As a source the teacher will answer to the students' questions about the content. This is the phase when the teacher can

use his or her subject matter knowledge, but he or she must make sure not to lecture and not to impose any point of view.

Step 8

Exchange of information. In the role of learning orchestrator again, the teacher has to organize the exchange of information with appropriate tools and to trigger a short discussion about whether the information is sufficient or not.

Step 9

Synthesis of information. In this step, different techniques can be used for the synthesis of information, and either the teacher or the group as a whole (managed by the teacher) will have to decide how to proceed. We have used role plays, mock trials, podium discussions, and other simulations of life situations for this purpose as well as posters and other tools for mutual information – the teacher will propose a technique depending on the students' priorities or with which he or she feels most comfortable and depending on the possibilities available.

Steps 10-12

Steps (10), (11) and (12) are done (with the necessary adaptations) as in the steps (2), (3), and (4), with similar teacher roles.

Step 13

Repetition of steps 5 through 12. The teacher decides whether and to what degree the constraints in the particular context permit a repetition of the process. He or she will then suggest a change of perspective, which means that the students take the roles to defend positions that they had argued against before. This can be done, for instance, by conceiving the steps 5 through 12 in such a way that in step 9 (synthesis of information) specific roles must be taken (e.g., in a mock jury, a student having pleaded that the defendant should be pronounced guilty takes the role of the defendant in the new version of the mock jury).

Step 14

Reflection and profection. As in 2 with the necessary adaptations.

Step 15

General synthesis. This can be done very differently in different VaKE processes, and usually it is either a common decision of students and teacher (maybe with the teacher presenting an option which the students may or may not decline), or it is a decision by the students alone.

Step 16

Generalization and transfer. This should be a common decision of all participants of the process. Often the students propose ensuing processes, and it is the teacher's responsibility to check whether and to what degree this can be done and to initiate its being put into practice.

As can be seen from this list, the teacher has to change the role depending on the step: from determining what is to be done in the steps 0, 1, 3, etc., through triggering certain procedures as in the reflection and profection steps, in the dilemma discussion steps, and in the information seeking steps, to making suggestions of different kinds (without imposing them) in several steps and presenting him- or herself as an expert in the subject matter (upon request) in step 7. This is quite a complex endeavor, and it requires, first, that the teacher is aware of the step the process is in at any given moment, second, that he or she knows the respective roles within these steps, and third, that he or she clearly communicates these respective roles to the students.

Overall, the teacher has the following roles:

- He or she is the organizer and initiator of the learning situations.
- He or she is the manager of the learning situations, which means that he or she has to make sure that the discussions run appropriately etc. In particular he or she has to enforce the discussion rules, but also to support the argumentation of the weaker or less powerful students (to become an advocate of them).
- He or she is an expert in certain phases, particularly when asked for by the students (step 7).
- In most steps, he or she is a learner like the students, and his or her argument - which he or she can contribute to the discussion - has the same weight as the other arguments: It will be accepted or declined based on its quality, not because of the person who introduced it. In this the teacher may have the function of a role model. This role enables the teacher also to accept that the students may know more about the subject matter than the teacher, but through the exchange (steps 8 and 9) he or she will construct the knowledge him- or herself and then be at least on the same level as the students.

TEACHERS' PROBLEMS WITH VAKÉ

For the remainder of the paper, we present our experiences with VAKÉ and its implementation in schools and in extra-curricular activities, particularly in summer camps for gifted students. We have not collected data on these topics systematically but we can capitalize on many attempts and narratives about implementation.

First we need to account for the major problems newly introduced teachers have with VAKÉ. The teachers discussed below have used different versions of VAKÉ, i.e. not all of them were supposed to apply the full range of steps presented in

VAKÉ-dis (Table 1), but still they had to practice the most important ones (see the steps of the prototypical version mentioned above).

Frequently, when first confronted with the idea of VAKÉ teachers are enthusiastic. However, when thinking about conceiving a VAKÉ unit themselves, they become more skeptical. Questions like the following arise:

- Will the students really work if I don't control them frequently? Don't do they abuse the freedom they have by doing something else than the particular VAKÉ step?
- How about disciplinary problems?
- What if I lose control? What if the students address questions to which I don't know the answer?
- How can this be integrated into the curriculum? Will the students reach the curricular goals if they are free to choose the content they want to learn?
- Will it not take too long so that other topics that must also be taught will not be achieved?

These questions are easily answered: Indeed it is our experience that the students work hard (usually over the hours), there are no disciplinary problems, and with appropriate conception the topic of the curriculum can easily be turned into a dilemma. The teacher can define how long he or she wants to take for this topic, and the students learn more than with regular teaching. The most important question, though, is about losing control. We have to convince the teacher that he or she need not be the professional 'know it all' but that he or she is a learner with his or her students all along. Further, it is necessary to underline that there might be evolutions of what is considered as truth, and under the light of new evidence - that the students may find in their search - some previously well acknowledged 'truths' become obsolete; hence the teacher is not the owner of the 'one and only' truth, even if he or she is perceived as such by the students.

Usually, the teachers accept these arguments. However, when trying to implement VAKÉ, several practical problems arise. The first problem is about the whole VAKÉ process: Some teachers do not recognize that teaching is always values laden and that VAKÉ addresses this problem particularly (Patry, 2002). So when conceiving the process they mainly (or exclusively) focuses on subject matter issues. Here the traditional role of the teacher as transmitter of knowledge (and nothing else) breaks through. Such a process might work for content, but it loses the essence of VAKÉ and therefore is not supported and strongly discouraged.

Second, designing an appropriate dilemma turns out to be quite difficult even when values education is addressed adequately. (a) It is not easy to formulate a dilemma in which both options the protagonist has are linked with ethical values. Often at least one option deals only apparently with issues like life, dignity, truthfulness, justice, care or other issues that are typically linked with ethics. In such a case the dilemma discussion will easily shift from a moral to a content debate, which is not the aim of the process. (b) Further, it is important at least for children and young adults to present a personalized dilemma, which means that there must be specified protagonists in concrete situations with a concrete

background etc.; if any of these parameters are abstract (e.g., how something is *in general*), the students will encounter difficulties in focused argumentation. (c) The dilemma must include issues that require knowledge about specific features; this relates to the curricular content aimed at, if there is one. (d) And finally the teacher must be aware that the students might argue differently than he or she. Balancing the protagonist's option so that both alternatives are about equally likely requires knowledge of the students. It can be done by tuning central aspects of the dilemma. For instance, if option x seems too obvious, option y is strengthened by introducing a sick child that will be harmed if option x is achieved. The more option x seems likely, the more life-threatening the health problem of the child is conceived. Other parameters can be introduced for this tuning. By slightly changing such conditions the dilemma can be moved from one in which the decision is very clear to one that indeed requires discussion. This means that the teacher must put much effort and imagination into formulating the dilemma, and often this is the most time-consuming part of a VaKE process. And it is often quite appropriate to discuss the dilemma that one wants to use with colleagues. We also want to provide a set of such dilemmas, but one must keep in mind that for a given class and a given goal the dilemma needs to be adapted. However, there are also dilemmas that do not support such changes. For instance, historical events ('Is Robbespierre guilty of Danton's death?') or literary pieces ('Is Woyzeck guilty of murder of his girlfriend?') do not support any change since the given facts are what they are. Nevertheless, since there is no 'one and only truth,' it might well be that the students find sources giving different facts, and the students have to weigh the reliability of the different sources themselves – this might provide such slight changes in the dilemma that makes it particularly interesting and challenging.

Third, organizing a VaKE process within regular school hours may become a problem. It is difficult to fit such a process into a 50 minutes rhythm, and often topics discussed in VaKE are transdisciplinary, which means that it might be appropriate to combine disciplines taught maybe by different teachers. This is certainly an asset of VaKE, yet from the organizational point of view it may be a problem: Coordination with colleagues is necessary. Further, material needs to be organized. In particular, the teacher must ascertain that computers with internet access are available or that other sources like age-appropriate books (encyclopedias, specialized books, etc.) and other documents can be consulted.

Fourth, when realizing VaKE, teachers often fall back in their routines of lecturing, correcting the students, giving suggestions or even directives with a strong touch of imperative (instead of propositions, to be taken or left) and building on a power relationship. When supervising experienced teachers trying to practice VaKE we have often to hold them back from intervening, even if for some time nobody said something (what teachers often cannot stand) or if a statement was accepted that the teacher thought to be wrong. It must be said that students with little or no experience in VaKE often ask the teacher to do something the 'old fashion way,' to lecture or to tell them what to do or what the right answer to a question is (for instance: 'What is the right decision in this dilemma?'). They, too, are stuck in the concepts of traditional teaching, but this time from the point of

view of the student – or more precisely: with respect to the expectations they have towards the traditional teacher. A completely different problem is that when realizing VaKE teachers are often confronted with students who want to work more than scheduled, who cannot stop dealing with the questions that arise. This might lead to the need to stay longer in school so that the students keep access to the computer etc. (Frewin, 2009). We have also made the experience that VaKE discussions transfer to other classroom situations where they may be less welcome, or that they continue at home and the parents become involved, sometimes to their dismay. The teacher must be willing to deal with problems of this kind.

Fifth, a specific problem is how to evaluate the students' performance since the teacher does not know at the beginning a priori. For this we have conceived an evaluation tool of its own, the so-called WALK (W Assessment of Latent Knowledge, Patry & Weinberger, 2010) that while focusing on particular knowledge domains is open for the specific content the student wants to address. This instrument has proved to be quite effective when comparing VaKE with traditional teaching (Weinberger, 2001, 2006).

Sixth, when attempting to realize VaKE teachers are often confronted with a set of obstacles. Let us just list some of these obstacles without going into details. Among others, the following sources of such obstacles can be mentioned:

- The school as institution: Given the contrast between VaKE and traditional teaching, in a school environment that sticks to the latter it may be difficult to practice constructivist teaching.
- The school as a social system: What happens in a specific classroom has an impact on interactions outside of the classroom; this is particularly the case for VaKE. This impact may take many forms, and it can be on the teachers and on the students of other classes in the school. The resonance provided by this impact might be favorable or an obstacle for teaching VaKE. The teacher must be aware of this and be prepared to deal with it. It makes sense, then, that VaKE is not practiced by one single teacher alone but that there are groups of teachers with mutual support who implement VaKE in a common endeavor.
- The class as a social system: Like all open teaching attempts with a strong social cooperation focus, VaKE affects the social interaction structure in the class. The students learn that they benefit from each other, that it is possible and appropriate to practice division of work and responsibilities, but they learn also to listen to each other etc. It is hoped, then, that VaKE has a sustainable effect on the social atmosphere. It is assumed, however, that this effect is not achieved from one VaKE process (unless the students meet for the first time in this process, as in the VaKE summer camps) but it takes some time. In any case VaKE fosters a sense of community within the class, particularly if it is combined with some features of Just Community (e.g., Weinberger, 2007). One condition is, however, that appropriate discourse rules are applied, particularly that the better argument must count, not the social power position of the student who articulates the argument. This means, overall, that the class as a social

system is not so much an obstacle than an opportunity or, at the utmost, a challenge that can be faced with appropriate interventions.

The individual learner: A first problem is that the students need to learn VaKE, too. For students who experience VaKE for the first time it is always quite a surprise that they get so much freedom, and sometimes they do not know at the beginning how to deal with it. They sometimes ask the teacher what he or she wants them to respond to a given question, etc. It is important that the students recognize the power of VaKE; once they have done so, they may even ask the teacher to leave or continue working after school, as mentioned above.

One central problem is that the students may lack the necessary competences or believe that they do. A consistent result of ATI studies is that less able students benefit more from direct teaching than from open teaching, so one might fear that students with lower academic confidence might be in jeopardy with VaKE. However, Weinberger (2006) has shown that it is possible to structure VaKE such that this problem does not arise by providing frequent possibilities to perform viability checks (organized feedback about the viability of one's own concepts and arguments). This is included in the VaKE-*dis* version: The reflection and profection steps are such opportunities on the individual level, while the exchange steps must be conceived such that viability checks are inherent.

Overall, teaching VaKE is not easy. It might seem as if the teacher does not do anything during classroom hours – at least in some steps, but this is only apparent, and this impression is due to a concept of the teacher's role that is dominated by the ideas of traditional teaching.

HOW TO SOLVE THE PROBLEMS IN TEACHER EDUCATION

What can be done in teacher education – whether pre-service training or continuing education – to overcome the problems? There are several approaches that have been successful so far.

Clearly the most important precondition for a successful implementation of VaKE is a clear understanding of the underlying theory. To some degree this goes against the tendency of many experienced teachers who ask for recipes that they can apply blindly. VaKE is clearly not of this kind. A corollary to this acceptance of a theoretical framework is the acknowledgment of the importance of research. This is not to say that research result are all that counts because reality is much more complex than theory can imagine, particularly theory is abstract and idealized while practice needs to take into account the whole complexity of a given situation. However research is an important player in this game.

Theory is relevant on several levels:

– When dealing with values and knowledge, it is necessary to clearly distinguish the two types of statements, normative and descriptive. We defend the meta-ethical standpoint of non-naturalism which means that drawing conclusions from descriptive statements to normative ones would be a fallacy – the so-called

naturalistic fallacy. This leads to the importance to try as much as possible to provide a full and gapless argumentation line. Very often when an argumentation line has a gap, whose bridging is seen as 'self-evident,' and it is in this very gap that creates confusion and misunderstandings because what one person sees as 'self-evident' is conceived completely differently by someone else (see also the next point).

The idea of constructivism has more consequences than just that the student constructs his or her knowledge him- or herself. Among the conclusions that are relevant we can refer to the provisional nature of truth or validity. This includes ethical issues – but this does not mean ethical relativism, rather it means that with appropriate argumentation different ethical positions are defensible. Another conclusion is to recognize that other people's concepts might – and probably will – be different from one's own; and again this includes both content knowledge and values priorities. This means also that in a communication the receiver does not necessarily receive and decode the message that I sent exactly – or even approximately – the way I intended it.

– Handing over responsibility to the students does not mean loss of control and giving up responsibility for the students' learning altogether. Rather it means being responsible to provide situations in which the students have the opportunity to learn. The claim is that VaKE is a set of such situations. One can also say that the teacher and the students share responsibility.

From this the roles of the teacher ensue. Unlike the concept sometimes defended by radical constructivists that (almost) everything should be done by the students, in VaKE the teacher has his or her role in conceiving the teaching-learning situation. As discussed in the presentation of the different steps of VaKE (in the section entitled 'Teachers' roles in VaKE') the teacher needs to become quite directive in some of the steps. However, it is important to remind that except for step 1 (deciding on and presenting the dilemma), the teacher's interventions are always to be conceived as proposition that can be accepted or rejected by the students. We have made the experience that the students quite happily accept well argued propositions where they do not feel self-confident to decide themselves, particularly with respect to moving from one step to the next. On the other hand we have repeatedly experienced that the students decline suggestions to use a specific source in step 7; several times the teacher had prepared books on the topic but the students just had a look at them and then decided that other sources were more useful to achieve their particular aim. The teacher, however, had put quite some time in finding these sources and might have been disappointed to find out that this effort turned out to be fruitless. Disenchantments of this kind are quite common in VaKE, and the teacher must be prepared to deal with it.

This means that in addition to a well-grounded theoretical base it is also necessary to change the attitudes towards and the concepts of teaching. As said above in the section entitled 'Teachers' traditional role,' the traditional view of teaching is deeply rooted in the teachers' concepts of teaching, but also in their attitudes and – for the experienced teachers – in their routines. Falling back in the

traditional ways of teaching is probably the major threat for VaKE. It must be said that they are encouraged to do so by the students if they, too, have no experience with VaKE because they expect the teacher to teach (which means to teach the traditional way).

Further, the teacher needs to accept that it is impossible to determine the learning outcomes. He or she may make propositions that might lead in the intended direction, for instance if the students focus on issues that are far away from the curricular objectives; the students usually accept these propositions if they are argued properly. It must be remembered, though, that knowledge is highly interlinked and that even if seemingly the curricular objectives are missed by far it might well be that the students have constructed the knowledge addressed by the curriculum as well. This more likely in less structured content areas (e.g., literature, biology, history) where the curriculum is not so strict, whereas adaptations may be more necessary in strict content areas like accounting (Frewein, 2009), mathematics, physics and the like.

And finally the future VaKE teachers need to learn the different steps of VaKE and the necessity to clearly distinguish them, and they need to learn the tools that can be used in VaKE. This corresponds to what has been said about the principles of VaKE above.

There is a contrast between traditional teaching and VaKE, and the teachers tend to be stuck in the traditional approach, as has been argued above. This is a good premise for the formulation of a dilemma: Obviously there are contrasting values. It might also trigger knowledge construction needs. This means that the topic of introducing VaKE to teachers is a possible topic for VaKE, too, and teacher training can be done through VaKE. However, besides the conditions of VaKE discussed above, it is necessary to take into account additional concepts. This will be done in the future, based on a proposition made at the Linnaeus workshop in April in Linnaeus University (Patry, Weinberger, & Weyringer, 2010).

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