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Truthfulness in science teachers' bodily and verbal actions

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Abstract

A dramaturgical approach to teacher's personal bodily and verbal actions is applied through the vocabulary of truthfulness. Bodily and verbal actions have been investigated among Danish primary and lower secondary school science teachers based on their narratives and observations of their classroom actions. The analysis shows how science teachers engage truthfully in pupil relations through an effort of applying classroom management, among other things. In all, this indicates that if science education research wants to understand science teachers' personal relations to teaching science it could be beneficial to address the truthfulness of science teachers' narratives and actions.

Introduction

Teachers work mostly consists of teaching and communicating with students and colleagues. In this communication teachers use voice, gestures and other bodily communications (Hwang & Roth, 2011). This means that teachers' voices and other communicative actions are fundamental in understanding teacher practice in their classrooms. Wertsch (1991) uses Habermas (1984) and Popper (Keuth, 2000) to develop sociological approaches to actions and relations between actor and environment. Habermas helps Wertsch to develop two approaches to understanding action: a teleological and a dramaturgical. The teleological approach is concerned with bringing about a desired state by choosing means that can be successful, meaning that the relation between actor and world is judged in terms of truth, efficacy and intention. The dramaturgical approach is concerned with a presentation of self that is in accordance with the personal feelings and desires, meaning that the relation between actor and world is judged in terms of sincerity, authenticity and truthfulness. Habermas (1984) further develops the communicative intents in the speech actions of a speaker:

We can identify these intuitively if we keep in mind that in communicative action a speaker selects comprehensible linguistic expression only in order to come to an understanding with a hearer about something and thereby to make himself understandable. It belongs to the communicative intent of the speaker (a) that he perform a speech act that is right in respect to the given normative context, so that between him and the hearer an inter-subjective relation will come about which is recognized as legitimate; (b) that he make a true statement (or correct existential presuppositions), so that the hearer will accept and share the knowledge of the speaker; and (c) that he express truthfully his beliefs, intentions, feelings, desires and the like, so that the hearer will give credence to what is said. (1984, vol. 1 s. 307-308).

Wertsch accentuates that he adds Leont'ev's (1978) notion on activity to avoid assuming "that the appropriate focus of analysis is the solitary actor or that there is a neat separation between ends and means" (1991, p. 12). Thereby Wertsch subscribes to a sociocultural approach in his study of mind and voice. He is however primarily interested in goal-directed actions and a teleological analysis of them. This line of research has been extensively pursued since Wertsch wrote his book within among other things teacher credibility (McCroskey, 1999; Zhang & Sapp, 2013) and efficacy (Brígido, Borrachero, Bermejo, & Mellado, 2013; Finn et al., 2009).

In the present study I will take up the dramaturgical approach presented by Wertsch to understand teachers' actions and voices. This line of research is not as extensive in teacher research as the teleological approach, though studies are coming out on the significance of embodiment (Hwang & Roth, 2011). Wertsch (1991) use Habermas to point out that the dramaturgical approach can be engaged by addressing truthfulness and sincerity. Truthfulness is a virtue, which acknowledge, that it is possible to understand statements of teachers as being based on their truly believed reasonable grounds even though these may later turn out to be false (Cooper, 2008, p. 82). Cooper builds his understanding of truthfulness on Williams (2002):

... truthfulness devolves into two dispositions, 'Accuracy' and 'Sincerity'. These are the dispositions, roughly, to take due care that one's beliefs are warranted, and 'to come out with what one believes' (Williams 2002, p. 45). The former requires honesty, objectivity and effort when forming one's beliefs; the latter, a determination to communicate what one believes and, more generally, to be trustworthy communicators who do not mislead. (Cooper, 2008, p. 81)

Sincerity has to do with the trustworthiness in the speech acts, meaning a disposition to make sure that one's assertions expresses what one actually believes. Accuracy is a more complex virtue, its basis is the effort we put into acquiring information about a certain subject matter. This informed accuracy will support a more authentic, objective and honest addressing of audiences (Williams, 2002). Cooper elaborates on William's notion of truthfulness and adds fidelity that Cooper defines as "truthfulness in discussing some topic may require 'Fidelity' to the topic - an approach to it that does not belie what one takes to be the salient, important aspects of the topic". Furthermore he adds transparency meaning that truthful communication "has no 'agenda' hidden from its audience" (Cooper, 2008, p.81). In order to make communication truthful it must be accurate and transparent and furthermore demonstrate fidelity and sincerity in dealing with its topic. Truthfulness is a characteristic for communicative actions in the subjective world (Habermas, 1984). This indicates that truthfulness is a way to address science teachers' personal and subjective experience of the complex of aims and expectations in contemporary science teaching. Wertsch (1991) accentuates the importance of an awareness of mind as mental actions that though they are carried out by individuals are inherently social in certain respects especially in their use of language and other means of communication. I will apply such a sociocultural understanding of verbal and bodily actions in my approach as well. Hwang and Roth (2011) understand mind by addressing the living body as a necessary condition for knowing and representation – "body and mind are two manifestation of the same thing: the flesh" (p. 4). In their quest to research the significance of the body in learning science and mathematics, they focus on how the body is integral to sense making in their analysis of bodily communication between teachers and students.

Taking the lead from the above cited research I will in the present paper address science teachers' bodily and verbal actions in science teaching from a dramaturgical approach. I will apply Cooper's vocabulary of truthfulness to analyse teachers' verbal and bodily actions. Similarly Wertsch (1991) put human action as his central analytical element.

When action is given analytical priority, human beings are viewed as coming into contact with, and creating, their surroundings as well as themselves through the actions in which they engage. Thus action, rather than human beings or the

environment considered in isolation, provides the entry point into the analysis. (Wertsch, 1991, p. 8).

In my approach I will add that it is important to keep in mind that actions here are to be understood as bodily as well as mental actions. Hwang and Roth (2011) use Vygotsky to stress the point that mental actions like language are copied from the social world. In reverse, the way that we can learn about other persons' mental actions is through their narratives. Narratives (i.e. verbal communication) are the best way to bring forward significant past and present experiences (Clandinin & Connelly, 1994, 2000). In order to investigate the personal aspects of teachers work you need to apply a method that is sensitive to the personal idiosyncrasies of the individual teachers. Goodson (2008, 2011) is mostly concerned with the individual teacher's relation to her own personal life and professional work. In one of his early writings he proclaimed his quest to address the teaching profession from the personal perspective: "*In understanding something so intensely personal as teaching it is critical we know about the person the teacher is. Our paucity of knowledge in this area is a manifest indictment of the range of our sociological imagination.*" (Goodson, 1980). Interviews, observations and contextual data regarding the school and local area where teachers live and work all inform research about the teacher's past and present personal life and work experiences (Goodson, 1992). Furthermore it is important to observe the teachers' actual teaching, to saturate your understanding of the teachers' narratives (Traianou, 2007). Such a methodological approach has been tried out by Goodson and Norrie (2011) and Brickhouse and Bodner (1992).

The applied method

The present study is conducted with Danish primary and lower secondary school science teachers. The teachers were participants in a study on the relation between life and work of science teachers that I made as my PhD study. The teachers and I made introductory semi-structured life history interviews followed by observations of each teacher for 2-4 workdays at their schools or during field trips to saturate and enable a thick description (Denzin, 2001). The observations were documented through handwritten logbook notes. Along with interaction with teachers some of their own produced teaching material such as pupil worksheets, curricula, etc. was collected. A second interview was based on themes and questions that appeared from the preliminary analysis of the first interview, the observations and the collected material. All data was collected from February 2009 to November 2011. The coding is performed using the Nvivo8 qualitative analysis software. The coding framework is constructed in accordance with the recommendations by Saldaña (2009) and Richards (2008) using a mixture of free nodes and tree nodes in Nvivo8. The structure of tree nodes was developed from a pilot study (Daugbjerg, 2010). The free nodes appeared during the analysis when a theme presented itself in the interviews or observations.

In my research I have the teacher voices – verbal actions - in their classroom dialogue and in the life history narratives. I have their bodily actions in their bodily communications in the classrooms, in the school corridors, in the staff room and during field trips with their pupils. I have selected cases that illustrate how the relation between verbal and bodily communication can be read as signs of truthfulness. I will ascribe it as a sign of accuracy if the teacher expresses and shows effort, authenticity or honesty in their verbal and bodily communications. I will ascribe it as a sign of sincerity if the teacher expresses and shows trustworthiness in their verbal and bodily communication. I will ascribe it as a sign of fidelity if the teacher expresses a full account in their verbal and bodily communication. I will ascribe

it as a sign of transparency if the teacher shows no signs of hidden agendas. I have to stress here that I'm not judging the teachers general personal character. I am specifically analysing the actions in the presented cases and how they can be read for signs of truthfulness. For this reason each case is presented as a teacher and his or her handling of a school element to stress the point from Wertsch above that actions are the entry point of the analysis.

Diana dealing with classroom management

Diana is very reflective in her approach to dealing with a problem of classroom management in her Physics/Chemistry teaching:

During the last years I have read a lot on classroom management. I think I have some specific tools for what you do, and what works, and what does not work in relation to quieting things down; or in relation to conflicts, how can I de-escalate rather than escalate it. Because I felt that I kept running into, and couldn't understand, there was no experience that could solve that problem.

...

The most important thing for me is that the pupils function socially in relation to each other and function in relation to the conditions we have here. They can relate well with one another; but when I give some conditions or other do it, then they suddenly do not function (...) and that I think it is the biggest task to make them function here and make them function with the other pupils. (Diana is 39 years old and has been a Physics/Chemistry teacher for 13 years).

Diana's follow up on acknowledging this problem is that she puts effort into gathering knowledge through literature on how a classroom dialogue can be managed. Her next action is to implement what she has read in her own classroom dialogue. I have seen how Diana instructs the pupils, she uses the blackboard to present the agenda for the lesson and for structuring the classroom dialogue. She uses the interactive whiteboard for presenting exercises and worksheets that the pupils can download from the school intranet to their own laptops or borrowed school-laptops. She instructs the pupils that if they have problems they first read the worksheets once again if that doesn't clarify their problem then they ask their classmates. Only if their classmates can't help them then they ask Diana. Telling the pupils to use their classmates forces the pupils explicate their problem and to relate to their classmates as potential sources of learning. This also diminishes her own number of pupil interactions giving her more time to talk to pupils with significant problems learning the subject matter at hand.

I see her actions as signs of accuracy as she honestly puts effort into acquiring knowledge on how to handle classroom management but she is also authentic as she addresses the problem in a way that communicates well with the pupils. She signals a very sincere and trustworthy follow up on her recognition of a problem instead of belying it.

Jane teaching outdoor

Jane has taken a primary science teaching module from the teacher education. As her exam project she investigated a pond and a forest near her school and made plans how to restore them and improve the education value of them. She followed up on these plans and pushed the municipality to restore the lake and the forest. The lake has been restored. The bottom mud has been dug up. The forest is being thinned, so that the remaining trees have a better chance for growing into healthy natural looking trees.

It is such a beautiful little place.. It is so full of opportunities. I even stayed overnight up there with a group of pupils once. We had wonderful evening, a clear sky and lots

of stars. Children nowadays don't see stars; they don't sleep in the wild. It is a shame. (Jane is 56 years old, and has been a primary science teacher for 32 years).

The in-service training has reaffirmed that her approach to teaching about science and nature is constructive and beneficial for the children. Jane's actions in the classroom - and other educational settings - reflects a continued relation of her 32 years of experience of teaching, and her devotion to communicating nature and natural phenomena to children, and her recent in-service education. She is and has constantly been involved in local nature conservation projects; Jane is - in spite of her seniority - still developing her own teaching. She is still engaged in social activities with the pupils such as spending the night under open air.

I see Jane's commitment to outdoor teaching as signs of accuracy as she puts a lot of effort into activating her new competencies from her primary science teaching education into her own primary science teaching. Jane's long-lasting and continued emotional relation to natural settings such as forest and ponds was founded when she was young:

We went swimming in the creek near my uncle's farm when I was girl. I remember one evening we were going home and the sun was setting, this red evening sun and there came a bumblebee very quiet (.) and the smell of bugs, these leaf bugs, who were hanging up in the trees, this sharp smell, no really (...) such an experience stands very strong for me (..).

The way that Jane gives this type of experienced voice in her life story narratives adds a lot of authenticity to her commitment to teaching enthusiasm for nature to the children using a series of bodily communicative actions and experiences. I followed Jane on a field trip, where the pupils collected insect galls from oak trees. She enthusiastically praised the pupils when one of them found a new type of galls.

In all, I see signs of accuracy in Jane's effort in restoring the pond and signs of sincerity in her trustworthy use of the pond in her primary science teaching. Furthermore I see signs of fidelity and honesty in the fact that Jane, based on her own emotional childhood experience, applies an experience-based approach in her teaching of nature and natural phenomenon to children.

Simon supporting his colleagues

Simon has taken a one year diploma education as science education guide. Today he functions as such and he heads the science teacher team at his school. He furthermore has been attached to a nature school where he functions as a guide. Simon has taken his new competencies and used them for the development of a local primary science curriculum. Simon's interest is to empower his colleagues in their work and teaching of primary science.

... last year we said in our science teacher team that Natur/teknik [primary science] was our focus and what we did actually, that there was to be something related to the curricular aims and that was really it and then people should help collect materials. I had taught something about it - that is me and a colleague - it was on how we used some material in our teaching. And this year we really have thought that it would be Physics/chemistry that needs a boost. (Simon is 39 years old, and has been a science teacher 9 years).

Simon uses his newly acquired competencies to guide his colleagues in their joint work with establishing a resource bank and database on teaching materials for primary science. Simon

has presented the material database to me and shown the teaching materials in it. Simon was able to get his colleagues involved, as his talk of “we” and “team” illustrates but also as the joint ownership to the database of materials that supplement the curriculum illustrates.

I see signs of sincerity in the way that Simon wants the colleagues to take ownership to the joint development of the local primary science material database. The way that Simon open communicates the agenda of the database and the science team work in general signals transparency. Simon bases his colleague including approach on his science teaching guide education, where he was educated to work systematically with including his colleagues to secure their ownership of the development of primary science teaching. A choice that signals the he objectively finds this a fruitful way to include his colleagues.

Truthfulness in science teachers bodily and verbal actions

I set out to investigate the relation between science teachers’ bodily and verbal actions using a dramaturgical approach and chose to use the vocabulary of truthfulness to analyse the verbal and bodily actions of the participating teachers. The above cases present how teachers’ bodily and verbal actions can be ascribed with truthful dispositions of accuracy, sincerity, transparency and fidelity in their relations to their work and pupils as suggested by Cooper (2008). The presented examples relate to diverse school activities such as teacher pupil relations, outdoor teaching, and colleague support. In the presented cases it is especially sincerity, effort, authenticity, accuracy and trustworthiness that stand out as visible signs of truthfulness.

The vocabulary of truthfulness enriches the description of science teachers’ more personal aspects of verbal and bodily actions in their teaching science and handling the complex demands of contemporary teacher work – e.g. classroom management, outdoor teaching, and colleague guidance. This indicates that if science teacher research wants to understand the person in the professional science teacher it could be beneficial to address the truthfulness of science teachers’ voices, narratives and actions. Within science learning research there seems to be a movement to broaden the understanding of conditions for learning science.

A recognition now emerges that being human means being in the flesh, acting in the world with feelings, emotion and corporeal forms of knowing. The classical theory of reason, which explains learning as the product of the conscious (rational) mind configuring itself, does not fully explain how real people learn by means of sense experiences, affect, and uncertainties. (Hwang & Roth, 2011).

Research within teacher emotions is an emerging field (Day & Lee, 2011), that also broaden the understanding of the conditions for teaching. The vocabulary of truthfulness can contribute to this movement by offering a language that brings personal aspects of teaching forward in the analysis of professional bodily and verbal communication.

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