On the Definition of Learning

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About Anna Sfard

Anna Sfard is Professor and Head of Department of Mathematics Education at the Faculty of Education, The University of Haifa. Sfard's area of research is in the domain of the learning sciences, with particular focus on the relation between thinking, communication and learning.

She is the author of several books and articles, including the article "On Two Metaphors for Learning and the Dangers of Choosing Just One" (Sfard 1998). This article is generally acknowledged to be an important and influential contribution in the field of learning theory. Sfard draws on metaphor theory as a source of inspiration, and she uses the metaphor as a conceptual tool to classify the foundational principles at work in theories of learning. She argues that theories of learning can be classified predominantly as either acquisition-oriented or participation-oriented, though she acknowledges that most theories of learning use elements of both metaphors. She argues in the paper that both metaphors are useful in understanding the phenomenon of learning.

Currently, Sfard has come to advocate a decidedly more participationist vision of learning. Her studies of mathematical thinking and education are clearly inspired by sociocultural theories of learning. Her recent work focusses on culture, communication and discourse, and on how we actually communicate about learning. According to Sfard, the understanding and learning of mathematics arises from discursive practices. The discussion of the problem of how one defines learning is important in the research of Anna Sfard because it contributes in her view to a better understanding of the relationship between theoretical categories of learning and the actual practice of teaching.

The following interview was conducted as an email interview between Anna Sfard and Ane Qvortrup and Merete Wiberg in the period from February to April 2015.

Interview with Anna Sfard

Metaphors in educational research

Ane & Merete: *In your paper* On Two Metaphors for Learning and the Dangers of Choosing Just one *(Sfard 1998), you use metaphors as a methodological tool for understanding our thinking on learning. Where did that idea come from?*

Anna: I guess my interest in metaphors comes from two places. The first source is my childhood home, my family and, more generally, the *milieu* in which I grew up. I was born into discourses saturated with metaphors. In my native environment, one wouldn't simply say she was "in a hurry" – the person would claim that, as far as she could tell, "her things" were "burning"; and the straightforward "I'd run away" would be replaced with "I'd run to the place where the pepper grows" or even "I'd go to the place where crayfish spend their winters". Yes, for whatever you could think about, one had a whole assortment of metaphors. This omnipresence of figurative expressions created a fertile soil for an interest in language and its special devices. But it was not until I was already a researcher in mathematics education that what had been ready-at-hand turned into an object of explicit reflection.

The catalyst of this change came in the form of two formative events. First, I read Michael Reddy's seminal paper *Conduit Metaphor* (Reddy, 1979). Then, at a conference,[1] I heard about two, at that time relatively recent books with the intriguing titles, *Women, fire and dangerous things* (Lakoff, 1987) and *The body in the mind* (Johnson, 1987). I got enchanted with the ideas reportedly presented in these volumes, and this led to the study of all the publications by George Lakoff and Mark Johnson I could get my hands on. In particular, I was fascinated by their jointly written slim volume with the telling title *The metaphors we live by* (Lakoff & Johnson, 1980). I devoured all these goodies one by one. At some point, the critical mass of bigger and smaller insights accumulated and I had this 'aha' effect, a kind of sudden illumination: I saw that, metaphors were the generators of our mathematical thinking, perhaps of *all* our thinking! It was through metaphorical projection that mathematical concepts, especially those that refer to the so called "mathematical objects" – numbers, sets, functions and so on – came into being. Why hadn't I seen

this earlier? After this epiphany, I was like a new mother who sees babies everywhere. I started noticing metaphors in literally every utterance I heard. Even words as elementary as *before* and *after*, when used in the context of time rather than space, appeared to me metaphorical.

Ane & Merete: *Could you elaborate on that? What did you gain from seeing most of our concepts, mathematical or otherwise, as metaphorical? What did you know now that you did not know before?*

Anna: Above all, I now could say more, much more, about the phenomenon called *reification*, which I noticed already in the 1980's while doing my PhD research and have been studying ever since. It now became clear to me that the activity of turning a process into objects, which is extremely frequent in mathematics, was simply a special case of metaphorical projection. When we replace our talk on mathematical operations with one on abstract entities, we get a better sense of the intangible world of mathematics. Indeed, by populating the mathematical universe with objects, we make it in the image of the much more familiar physical reality, where processes are usually performed on objects and produce objects. Ample evidence in support of this insight came shortly afterwards, when I interviewed mathematicians and asked them the "simple" question: "What kind of experience makes you say that you managed to understand a piece of mathematics?" The interviewees' responses were replete with direct and indirect references to metaphor, which they presented mostly as a device that "makes things fall into place", turns complex mathematical ideas into "visible at a glance", and even endows abstract "things" with "human physiognomies". In the light of all this, it was only natural to speak about "reification as the birth of a metaphor", which I actually did while summarizing the results of these interviews (Sfard, 1994).[2]

Ever since these conversations with mathematicians, metaphors have been present in my mind either explicitly or in a kind of subconscious stand-by, always ready to jump into full view at short notice. Over the years, they have served me generously in my research on mathematical learning. Through theoretical reflection and empirical research, I have become more and more cognizant of how metaphors shape our mathematical ideas, and of how these figurative projections mold our decisions and actions.

This awareness went hand in hand with the decision to think about learning mathematics as changing a discourse. Within this framework, thinking was conceived as a multimodal discursive activity: the activity of communicating with oneself. This "discursive" approach to cognition entailed a particular understanding of what metaphor and reification are all about and why they are closely related. Metaphor, which was first defined by Aristotle as calling something by a name that belongs to something else, was now seen as occurring whenever parts of a familiar discourse were used in conjunction with another, seemingly unrelated form of talk. This rendering made it clear that metaphors are a tool for *creating* new discourses rather than just for embellishing existing ones. Reification became one of such metaphorical generative acts. It was the discursive device for turning expressions about *acting* into much more concise expressions about *things*. Whereas the utterances of the former type were saturated with verbs, utterances of the latter type were composed mainly of *nouns*. Reification was usually accompanied by yet another discursive move, called *alienation*: the procedure of eliminating the human actor by using reifying nouns in the place of the grammatical subject. Thus, instead of saying "I add 2 and 3 and get 5" one could now say impersonally "2 plus 3 equals 5". When combined, reification and alienation generated "objectified" talk, one that presented mathematical objects, the products of our own discursive constructions, as if they were a part of the non-human world, not much different, in this respect, from stars, trees and rivers. So this is, more or less, how I came to understand that metaphors, through reification and alienation, play a central role in mathematical thinking and its development, both historically and ontogenetically.

Ane & Merete: *In your 1998 paper you analyzed the role of metaphors, not in mathematics or physics, but in the discourse on learning. How did it happen that you also began to speak about metaphors and their role in research on learning?*

Anna: I just realized that there was no reason to think that all the phenomena I gleaned from my studies on mathematical thinking were restricted to that particular discourse. At closer inspection, reification and alienation turned out to be frequent occurrences in almost any type of talk I could think of, and in particular, in the one I was immersed

in on an everyday basis: the discourse of research on learning, whether mathematical or any other. Take such common learning-related expressions as "acquiring knowledge" or "constructing concepts". The verbs *acquire* or *construct* signify, first and foremost, physical activities, and this implies that while using the nouns *knowledge* and *concept*, we draw on the discourse about the world of tangible things. I could see that far from being a strictly mathematical procedure, metaphor of object allows us to tell stories about the world around us, thus helping us to make sense of what we see. Moreover, rather than just serving as a tool for narrating reality, it creates this reality in the first place.

Once I became alert to the metaphorical nature of our most common expressions about learning, I also realized that as "natural" as this "acquisitionist" talk appeared to be, there were alternatives. For one thing, we could return to speaking in verbs rather than build our sentences around nouns. Thus, we could say "This kid *has always dealt successfully* with tasks involving functions" instead of saying "He has *acquired* the *concept* of function"; or we could claim that "She can *tell* a lot about historical events" rather than just saying "She *has* historical *knowledge*". And then, as I started looking around, it turned out that this alternative was not purely theoretical. During the time I was wondering about the phenomena of reification and alienation in discourses about people and their actions, the relatively disobjectified discourse on learning was already well underway. This was due mainly to the work of Vygotsky and his followers, and to their particular answer to the question of "What is it that changes when a person learns?" While acquisitionists would answer that question by pointing at changes in *knowledge*, *concepts* and *mental schemes*, Vygotskians identified *participation in historically established human activities* as the main object of learning-induced change. No wonder that the "participationist" approach, grounded in a metaphor for learning so different from the one that underlay the acquisitionist discourse, was producing a totally new discourse on all those phenomena that we consider unique to humans.

Ane & Merete: *In that paper, after you describe the strengths and weaknesses of the acquisition and participation metaphors respectively, you end up suggesting that both metaphors are useful for understanding learning. Do you still think that both metaphors are useful for understanding learning – and if so/if not so – why?*

Anna: I feel that there were many misunderstandings about the call for peace and reconciliation issued in that paper. I must have not been clear enough. So, before I disclose my preferences, let me explain what I was trying to say.

That article was my contribution to the debate about "paradigm wars", which was taking place on the pages of *Educational Researcher* at that time. Participants in that heated conversation were arguing for either a cognitivist or a situative vision of learning. My aim was, above all, to pour some water on the fire by questioning some of the unspoken epistemological assumptions this debate seemed to be grounded upon. Basically, I had the feeling that the participants, mostly unconsciously, were drawing on the *monological* vision of research, the one that, according to Bakhtin, features the researcher as "ventriloquist" of the world. Indeed, most of the discussants were talking as if their professional narratives about reality were dictated by this reality itself. I wanted to make them aware of their own assumptions, while also arguing for the alternative stance, the one that some writers, under Bakhtin's influence, describe as *dialogic* or *multivocal*. You can also call this approach *postmodern*, if you wish.

To describe the dialogic project, as I see it, it will be helpful to use a metaphor (this should hardly surprise you, I guess?). Consider this: If you agree that the researcher's job is to forge stories that help us go about our daily affairs, you may also agree that, in many respects, these stories are to the world what clothes are to our bodies. For one thing, they are human-made rather than being a part of the world itself. They are also supposed to "fit" what they are meant to "cover". Although there is no "perfect fit" – no ultimate story about the world – it is also not true that any story goes.[3] Some narratives may be entirely inappropriate, just like a dress that is three sizes too small. For other stories, the "coverage" may seem so accurate that we start mistaking the "clothes" for the world's own skin. And there is another important parallel: our choice of stories is no less a matter of fashion (and, in the background, of our desired identities) than is our selection of garments. In a nutshell, I was trying to say that the "paradigms", or discourses, in which we engage while doing research on learning are neither perfect for all purposes, nor even equally good for most of them, and this means that we can never be fully satisfied with a single framework. In that paper, exposing metaphors underlying the existing research on

learning helped me to sharpen this message. Indeed, I was able to show that one of the identified metaphors had disadvantages of which the other was free, but it also had advantages that were lacking in the other. What can constitute a more convincing argument for having many dresses than showing that no single dress can be good for *every* occasion?

I still believe in what I said in that paper and I do not think I am contradicting myself when I say that right now, the participation metaphor is my favorite one (I qualified this declaration with "right now", because true to my 1998 self, I am always aware that this may change). As I said, the call for the coexistence of multiple discourses does not imply that all frameworks are made equal or that they are equally appropriate for all contexts. At the present moment I do believe that participationism is more beneficial – or perhaps less harmful – for my purposes than acquisitionism. Let me explain why.

When you follow acquisitionists and speak about phenomena in terms of objects rather than processes, you imply that whatever you are studying has at least some of the characteristics that we usually associate with objects. As a result, your thinking about learning becomes shaped by what you are able to say about objects, and especially about those with which you are most familiar: the objects that you came to know through bodily, physical experience. This kind of projection may be of little consequence in mathematics or physics, but if we talk about people, it is probably less benign. Indeed, it can have considerable ramifications for people's lives. The problem is that when objectifying human phenomena, we never pause to ask ourselves which properties of concrete entities may be preserved and which should be given up. While it is true that some of the uncontrolled entailments of the objectifying metaphor are harmless, or may even bring useful insights, others can be dangerous.

The talk about *discalculia* or, more generally, on *learning disability*, which is very popular these days, is a good example of this latter possibility. We are tempted to use these words whenever we face a child who has a long history of poor scholarly performance. Succumbing to the urge for objectification, we begin speaking in nouns and adjectives that indicate a property of the learner (*learning disability*), as opposed to using verbs and adverbs that make us concentrate on properties of the learners' actions (e.g., she *performs poorly*). Without realizing

it, we begin to be guided by the implicit message of the objectified discourse: properties of a person, unlike those of her actions, are more likely to be given by nature than shaped by people, to be general rather than context-dependent (after all, one remains the same person wherever she goes), and to be permanent rather than transient. This view of the student's difficulty may to lead to consequential decisions: we are likely to direct those with a "learning disability" towards a segregated life trajectory, where they will have little chance to further their mathematical education in a substantial manner. In this way, our talk about learning disability becomes a self-fulfilling prophecy: we create the undesirable reality, rather than just reacting to it.

To sum up, I feel that in the discourse of research on learning, unlike that of mathematics, the negative consequences of objectification probably outweigh the gains. Indeed, translating the properties of human action into properties of the actor often leads to decisions that may have a negative impact on the learners' lives. In my view, these possible negative consequences overshadow all the "good" things that come with objectification.

Ane & Merete: *Let us try to rephrase/interpret what you have written until now. In the beginning phase of your research, you perceived reification as a metaphor which was very suitable for understanding mathematics education. A problem with this way of understanding human processes such as learning (as opposed to those one meets in mathematics) is that the researcher's discourse becomes noun-oriented. In consequence, we are stuck with metaphors that may lead to an understanding of human learning as passive and static. Also, you say: 'The problem is that when objectifying human phenomena, we never pause to ask ourselves which properties of concrete entities may be preserved and which should be given up'. Speaking about learning in verbs instead of nouns may not only help us to understand learning in another way, it also helps us to understand students/learners differently. Does this summary reflect your thinking?*

Anna: Yes, you have said what I wanted to say, and you said it better than I did.

Ane & Merete: *OK, so now our question is this: How does thinking about learning in verbs, that is, in terms of actions, help us to understand*

human beings differently? Is it because this way of understanding human learning helps us to see students (with or without disabilities) in a more dynamic way? Is it possible that the conceptualization of learning as a change in the way we do things may change our view of human beings?

Anna: Yes to all you said. If we speak about learners in terms of what they are *doing* rather than what they *are* or *have*, not only do we protect ourselves from straying into places we don't want to visit, but we also inevitably change our answer to the question of what it means to be human. It may take more than a few words to make this point, so please be patient with me while I try to do so.

I want to begin with a somewhat unusual definition of humanity. But before I spell it out, I want you to think about your own answer to the old question of what is this one thing that makes us humans stand out so clearly within the animal kingdom. By "one thing" I mean the uniquely human property that allows us to make a distinction between ourselves and other species in an unequivocal way. You may be surprised to find out that this seemingly obvious question has no obvious answer. And the fact is that it puzzled and challenged generations of thinkers. Whatever special human feature was identified over the course of time, it always turned out that there was some animal species in which this property appeared in a nascent form, to say the least. This, it seems to me, is bound to happen as long as one is trying to make the distinction by comparing the individual human being to representatives of other types of animals. The definition I now wish to offer circumvents this difficulty by changing the scale: instead of focusing on a single human individual, I propose to take a "long-distance", telescopic look at humanity as a whole. When you alter your perspective in this way, you immediately realize that we are the only animal species that changes its ways of doing things from one generation to the next. Once articulated, this fact may appear trivial, but nonetheless, it has never been considered as the feature that *defines* humanness. Now, think about it: historical transformations can be seen in almost everything we do, be it our activity of feeding ourselves, organizing our habitats, moving from one distant place to another, communicating with other members of our own species – the list is practically inexhaustible. Another important thing to note is that historical changes in our forms

of life entail constant increase in the complexity of our activities. While saying this, I do not mean that our ways of doing things become more laborious, time consuming or difficult. Sometimes, the opposite is the case. Here, the noun *complexity* refers to the amount of developments that must have occurred before an activity could be performed. Most of these prior advances are due to people whom the present performer never met. Note also that since each of the prerequisite contributions may have prerequisites of its own, the growth of complexity becomes a non-linear, quickly accelerating phenomenon.

Let me say it again: Our seemingly unlimited capacity for building on what has been done before is where we differ most strongly from all the other creatures in the animal kingdom. This vision of the gist of humanness may resolve an old dilemma, but it also leads to new questions: What is this special something that we have and other animals don't? What is this uniquely human property that allows our innovations to live longer than the innovators themselves, and that turn every innovation into a basis for a new one, to be introduced by the next generation of innovators?

This last query is exactly the point where the participationist vision of learning proves more powerful than the acquisitionist. This claim may raise some brows, if only because it is far from obvious what learning, the activity carried out by and among individuals and consisting in reproducing old ways of knowing rather than creating new ones, has to do with innovating and with the *historical* aggregation of complexity. True, the growth of complexity is a phenomenon that can be observed in the process of *individual* learning. As stated time and again by all thinkers who have tried to fathom the mechanisms of human development, new knowing emerges from what has been known before. It is also quite clear that individuals have the means to preserve their own former achievements and to build on them whenever the need arises. And yet, as long as one thinks about learning as an acquisition – as a change in the contents of an individual mind that originate in the outside world and are then accumulated inside one's skull – the products of continuous change are, of necessity, only as durable as the individual's life. Moreover, as long as learning is seen as occurring in the "conversation" between the individual and the world, there is no reason to expect far reaching differences in the amount of complexity various individuals manage to accumulate. All this indicates that acquisitionism has no way of dealing with the question of

what makes it possible for an individual achievement to transcend the boundaries of the achiever's physical existence. This approach has no explanation for the fact that the endpoint of one's learning becomes the learner's successors' starting point.

This is exactly where participationism, with its vision of learning as the process of changing ways of acting in the world, comes in handy. Before I present my argument, let me note some relevant implications of this definition. First, the most basic form of learning, the one that constitutes the primary goal of schooling, can be described as the process by which one turns into one's own some of the patterns of acting that already exist in society. In this process, the learner may become able to perform competently, and on her own accord, such historically shaped activities as preparing food, dressing, communicating with others, solving mathematical problems or doing biological research.[4] If we think about learning in this way, *interactions with other people come to the fore as the primary source of learning*. Indeed, these historically shaped ways of acting cannot be found in any other place. Of course, also non-human reality plays a role in the process of learning. After all, only those forms of acting survive which have proved helpful in dealing with whatever was going on around us. Still, participationism reverses the roles of the two types of interaction: whereas acquisitionism views individual, spontaneous interaction with the world as the primary source of learning and hence the interaction with other humans as just secondary, participationism implies the opposite: what people around us say and do comes first and the world serves mainly as but a touchstone by which the viability of learning can be tested and regulated. The second implication is that *historical change can now count as a special case of learning*. This claim is an immediate consequence of the definition that equates learning with a durable change in patterns of acting, and of the fact that patterns of acting can appear at any level: at the level of an individual actor, of a small group, of a community or of society as a whole. When it comes to transformations in such patterns, one can thus speak about individual-ontogenetic change or about societal-historical transformation. The first type of change is tantamount to *individual learning*, whereas the latter one may be referred to as *societal learning*.[5] If that is so, we can now say that it is the *propensity for societal learning* that constitutes the defining feature of humanness.

I'm now ready to return to the question *What is it that makes humanity conducive to historical change?* This query can now be rephrased as *What makes humans capable of societal learning*? At closer inspection, the participationist rendering of the concept of learning, as discussed above, simply dissolves this puzzle. The inherently collective nature of learning and our resulting propensity for passing on innovation from one generation to the next, is now the *defining feature* of human learning. To put it in a somewhat different way, since people learn first and foremost from other people, it is only natural that whatever helpful form of acting is developed by an individual or a team, is immediately taken up by others. One can also say, somewhat metaphorically, that what appears as two kinds of change – individual learning and societal learning – is, in fact, a pair of differing images of a single phenomenon, obtained by zooming in on the phenomenon and then zooming out again. Thus, the answer to our question is now simple: It is our untameable propensity for learning from one another that makes us capable of societal learning and, in the final analysis, becomes the source of all things human.

You may be wondering why I needed this longish story to arrive at what may seem to be a rather obvious conclusion. You may also be surprised that this is the narrative I chose to try and answer your question of how participationism changes our vision of what it means to be human. To this, let me say that I needed this story to explain what I meant when I said that participationism, as opposed to acquisitionism, pictures learning as an *inherently social activity* and portrays human beings as *inherently social creatures*. You may still object that all this sounds trivial. Nowadays, you can find declarations about "inherently social" nature of learning in almost any educational publication. And yet, according to my reading – and I have developed a great sensitivity to unspoken assumption underlying these kind of statements – not every author who says things like these believes the story about humans that I just told. Indeed, in many cases, claims about the "inherently social character" of anything related to human beings proves, on closer reading, to be little more than an add-on to the good old acquisitionist discourse.[6] The discourse I am trying to promote is *incommensurable* with acquisitionism. In this discourse, the statement "learning is inherently social" stops being a cliché and regains its deep and proper meaning intended by participationists: not only is the

"object of learning" situated "on the social plane", as famously stated by Vygotsky, but also the learning subject can no longer be viewed as a lone individual. Individual learning, even if it takes place in the learner's home and away from other people, is, necessarily, an interpersonal affair. Humanity emerges from this rendering as a complex system of individual agents. None of our moves can be properly understood unless we keep in mind that, throughout our lives, we negotiate the perennial tension between our individuality and the fact of our being a part of a bigger whole.

Notes

1 This happened at the 1991 annual meeting of The International Group for the Psychology of Mathematics Education, PME, that took place in Assisi, Italy. Lakoff and Johnoson's book were mentioned by Willi Dörfler (1991) in his plenary address.

2 A similar conviction was expressed some time later by Lakoff and Núñez in their well-known volume *Where mathematics comes from*. And yet, as I soon will make clear, the epistemological and ontological assumptions of these authors differ considerably from the foundational principles of my own approach..

3 "Anything goes" is the slogan which, in the eyes of the objectors, encapsulates the postmodernist stance. The critics see this postulation as deriving from the postmodernist rejection of the idea of "absolute truth". But "anything goes" does not follow from "no story is true in an absolute manner", just as the claim that every dress is equally good for me does not follow from the fact that no dress fits me in an "absolute" fashion (see also Sfard 2012).

4 Vygotsky referred to this conversion of the activity of others into one's own as *internalization* and his followers often use the term *appropriation to refer to this process*. Because of the objectifying undertones of both these terms, I prefer the word *individualization*.

5 Note that the acquisitionist definition does not allow for such an extension of the notion of learning. According to the acquisitionist definition, the change that happens when a person learns occurs in her mental schema, and mental schemas, unlike ways of acting, are not anything that can be observed at both the individual and the collective level.

6 Jean Lave uses the term *Cognition Plus View (CPV)* while speaking about this kind of acquisitionist discourse with slight participationist touches.

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