

By

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When Michael Tempel asked me whether I would respond to responses to the question "What is advanced Logo?" I secretly hoped for a fight. But when the statements came, my initial disappointment at their non-belligerent tone soon gave way to an enjoyable sense of having acquired from them a more advanced sense of "advanced." And the opportunity to spend an hour with a fourth grade class in between writing my first draft and this draft allowed me to feel quite concretely how this acquisition could give rise to advancement in my skill as a Logo teacher. Thank you, Michael, for a very good idea.

Every teacher has (more or less consciously) developed strategies for responding to a set of intellectual statements. Among my own, the following were drawn out when I thought about writing this piece:

Classify: Make a taxonomy of the various positions.

Theorize the taxonomy: Make up explanations of why who says what.

Quibble: Even if you agree with most of what everyone says, exploring objections creates a tension that contributes to energizing intellectual work.

Appropriate: However many objections to an idea you have found, think about how you can use it.

Personalize: However much you like the language of the original author, recast it in another way.

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Dorothy Fitch articulates most explicitly a relativistic position that could be expressed as: One Logoist's advanced is another's elementary.* She is suggesting that one should think about *advancing* as a process, a direction of movement, rather than *advanced* as a destination or terminal state. But whether one opts for continuous movement or for discontinuous jump, there is a further subclassification based on what it is that moves (or jumps).

Mitchel Resnick most cleanly opts for Logo as the moving object; his discussion of "advanced Logo" refers to a changed Logo rather than the same Logo used in different ways. Of course, given that his own work has been so largely concerned with creating new forms of Logo, it is not surprising that change in Logo would be most salient in his response. For the same reason one is not surprised to recognize in Brian Silverman's piece a similar emphasis, though in his case it is secondary to what he shares with Brian Harvey, Alberto Cañas, and Sharon Yoder who talk of the movement of the Logoist rather than of the Logo – movement *in* Logo rather than movement *of* Logo.

The advancing movements of Logoists are classified by all the commentators (though in subtly different ways) into two subclasses exemplified by (a) someone who uses the same set of Logo primitives, methods and ways of thinking to tackle more complex projects and (b) someone whose progress is seen not in the projects tackled, but in the way Logo is used to tackle them. Finally

an important distinction (a subclassification) within (b) is brought out by thinking (b1) of a Logoist coming to use more primitives and (b2) a Logoist coming to think differently about the primitives being used.

The last distinction is very relevant to a view of advanced vs. elementary that is far more strongly represented in thousands of classrooms than in the discussion of the sophisticated people writing here. Many teachers have been taught to think in terms like: elementary Logo is about graphics primitives; advanced Logo is about lists. This definition can't be taken quite literally, since a list is present in instructions used by beginners such as **repeat 4 [fd 50 rt 90]**. But a more modulated form of the distinction can be cast in terms of steps that mark a direction of advancing such as the following three stages. In stage 1 the [...] used in a **repeat** instruction is an unanalyzable cliché without any list-related meaning. In stage 2, understanding instructions like **repeat 4 readlist** shows that **repeat** is actually seen as a primitive with two inputs, a number and a list. Stage 3 is marked by being able to discuss reasons for choosing Logo's syntax, rather than simply using **repeat 4 fd 50 rt 90**. A major fallout for me of writing this column is a decision to think a lot about how to incorporate such discussions more explicitly in teaching Logo at all levels: Let's have more talk about why Logo is as it is and how it came to be so.

This resolution appears to place me in the taxon defined by advancing the Logoist rather than the Logo, and advancing in thinking about Logo rather than in what you do with it. But it is quibble time for the classification. Brian Harvey (whose reference to **make** and **quote** exactly parallels my **repeat** and []) refers to the distinction as a paradox for the "party line" view that favors thinking of Logo as a tool. My sense of the party line is that indeed the way to introduce Logo is as a tool with lots of uses. But I see nothing paradoxical in a firm focus on the fact that all tools to a large extent, and this tool to a very

large extent, cannot be used well without being understood. People often cite the hammer and the automobile as tools that don't have to be studied as objects. But this is because relevant knowledge is so embedded in our cultures that we don't recognize it as knowledge.

I'd take this a step further: we can use hammers so well because we know a lot about nails. Knowing about the tool and knowing about the use are not easily separated. I am prepared to quibble about the distinction between using Logo in a more advanced way versus using it for more advanced purposes – say mathematics. Maybe a central component of what makes mathematical thinking more "advanced" is exactly the same reflective attitude that makes Logo thinking more advanced.

From this point of view the most important criterion for judging the evolution of Logo might be whether the change advances the ways in which Logoists think about Logo. There are many allusions in the papers to how this might happen. An unexpected one was Sharon Yoder's observation that students with an advanced attitude enjoy comparing different versions of Logo – I'd add that the cause and effect here is a two-way street: playing with the differences also fosters the growth of the "advanced" way of thinking. A more deeply controversial case is Brian Silverman's reference to directions of development that favor greater concreteness in thinking.

A distinction between epistemological and instrumental criteria pervades Mitch Resnick's discussion of what is more advanced about new versions of Logo. Multi-processing is an advance because it allows more people to do more things. It is also an advance because it facilitates ways of thinking. I use it as a springboard to end with a question that will allow lots of quibbling.

It is obvious to me that Logo requires and facilitates ways of thinking about itself and about other stuff. But does it do these good things to one fundamental way of thinking

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* Two linguistic observations: Brian Harvey says "Logoite" where I say "Logoist." I couldn't decide whether this reflects a different view of Logo users, a difference in taste in linguistics, or a mere "neutral" accident. The commentators are collectively shy about using a word for the opposite of advanced. Is this because elementary has (unfortunately) acquired a pejorative connotation? Or another neutral accident?

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or to a multitude of them? Talking about movement *of* Logo, Mitch Resnick and Brian Silverman pick what looks like different features. But I see the abstract-concrete tension in the galaxy of possible mindsets as intimately related to the centralized-decentralized mindsets and both as related to hard-soft, hierarchical-heterarchical and a host of other slants on multiple ways of knowing that have become prominent (if not faddish) in the recent discussions of alternative epistemologies. Is it possible that on the deepest level there is *one* direction in which Logo facilitates thinking? I understand how this very question might appear to be a proof that I have not been able to break away from the “canonicalist” mindset – even in rejecting one canon I can’t resist looking for another. But this may not be so bad if the canon is based on extending the principle with which Alberto Cañas ends his paper: the only really advanced Logo would be one that would allow the Logoist to reject anything and everything about it by building his own. ▲