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Radical Constructivism and Social Justice: Educational Implications

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> Upshot • Gash describes some very interesting and exemplary work using RC-influenced research and practices. I worry that his third stage of a three-stage emergence of constructivist epistemology in the study of cognitive development is consistent with a distinction between focus on individual cognitive development and focus on knowledge not in the mind but in the group, inconsistent with RC. An alternative is given and the issue of an RC perspective on social justice is discussed.

« 1 » In his target article "Constructing Constructivism," Hugo Gash provides us with an important perspective on the influence of RC on research and practice in education. In §4 he suggests we might think in terms "of stages in the emergence of the constructivist epistemology." This is one possible view, but I would like to suggest that the apparent distinction between the individual and the social, as it is typically made, is not consistent with RC.

« 2 » In §29 Gash uses the phrase: "social construction of knowledge." Normally, in educational literature, it is used with a Vygotskian perspective. But Lev Vygotski was not RC and neither are his advocates now. (Dykstra 2009: 194–199) Yet in §10 Gash suggests:

> "When a researcher emphasises the individual construction, the social side remains a part of the context; and alternatively, when the social context is emphasised, the individual interpretation plays a critical role."

His §10 sounds more consistent with RC than his §29, but in §10 there is still the "social context" as distinguished from "individual construction" or "individual interpretation," as if the "social context" is a kind of given for all while the individual constructions are personal. This is an example of how this language is not consistent with RC. Each of us has to construct our understandings of social contexts, just as we have to do so about why an object appears to move.

« 3 » In §§12–21 we find descriptions of research on students' conceptions of others and the notion that students can change their conceptions of others. This is much more like RC. In this respect, Gash's target article seems to pull the reader back and forth between a view that is RC and one that is not. It is not easy to free oneself from language that is not RC. This may be part of what is going on in Gash, but we are writing in a venue for trying to clarify our RC thinking for ourselves and others.

« 4 » Jean Piaget was firmly against the notion that development was constituted of an accumulation of learnings. Instead, he maintained that each learning is a function of the current development of the individual (Piaget 1964: 171). In the *Proceedings of the First Annual Symposium of the Jean Piaget Society*, Piaget talks about the factors that influence development (Piaget 1972). To summarize, he indicates three classical factors that play a role in development: maturation, experience, and social interaction. However, he maintains that these three alone cannot explain development without a fourth factor, equilibration. Equilibration explains the changes that constitute psychological and cognitive development. There is a coordination between the first three factors that is a kind of dynamic equilibrium. In addition, in the construction of new cognitive operations, there is an iterative trial-and-error process, which uses the results of the previous trial to inform the generation of a new trial (Piaget 1972: 14). The results of a trial are anticipated on the basis of existing cognitive operations and models of the world. When the results are not what was anticipated, the trial has resulted in an error, which gives rise to speculative changes in the cognitive operations and/or models for a new trial. The search for a resolution to the disequilibration ultimately results in a new equilibrium, cognitive operations, and/or models of the world for which trials do not result in errors, at least for a while.

« 5 » In his discussion of the experiential factor in development, Piaget suggests there are two kinds of experience (Piaget 1972: 7). One is the effect on our nervous systems by objects, and events involving objects, in the physical world. The other kind of experience is our manipulations of objects, in effect experiences of objects in the mind. A simple example is having a number of objects and choosing to line them up and count them. One might then decide to count them in the other direction. Lining the objects up, counting them, and then counting them in the opposite direction are not properties of the objects themselves. To line them up and count them are mental inventions, hence, experiences with objects of the mind.

« 6 » Human beings are cognizing entities in a person's world. They are much more complex and much less passive than most physical objects in our constructed realities. However, just as with physical objects, we each must construct mental models of those around and important to us. One can argue that in the experiments Gash describes, students are engaged in constructing more effective models of other human beings. At one level this is no different than constructing a more effective mental model of a bicycle. However, with a bicycle, if one subjects it to a certain set of conditions, it will always behave a certain way, as will all bicycles made to be the same. Not so with human beings. They are so complex and subtle, it is virtually impossible to establish the same conditions twice.

« 7 » Luckily, we can discern patterns in the behaviors of human beings. These patterns are our first foothold into making mental constructs to associate with other human beings. Culture has a powerful effect on the behavior of human beings, giving more footholds on making mental constructs to associate with those around us. Culture provides us with one more tool, language. Language gives us a very powerful tool for both giving and receiving feedback as we experience others. Language, and therefore culture, also has effects on how we think as we are mentally constructing our models of the world around us.

« 8 » The stances of both Piaget and Glasersfeld with respect to our fellow human beings are to treat all as epistemic entities. We acknowledge that each of us bears the responsibility to make the most effective constructions of our worlds, but that these constructions will not necessarily all be the same as our own. We know that, apparently,

some have started more recently than us and others seem to have stopped their constructions of their worlds.[7] In both cases, language is the tool for interaction, engaging others in continuing in or getting back to the construction process. This respect for others as epistemic beings is a fundamental element of social justice as the practice of and an outcome of RC.

« 9 » It can be argued that we have three kinds of experience: physical, mental, and social.[8] We could argue that there is some kind of hierarchy composed of these three kinds of experience, temporal or of complexity, but such arguments are probably neither productive nor solvable. It is apparent that school and culture should engage students in constructing ever more effective reasoning patterns and models of how the world (including other human beings) works. *But, is this what is happening?*

« 10 » Unfortunately, we have known that schooling is not engaging students in constructing more powerful reasoning patterns and constructions of the world since at least the 1970s. When the work of Piaget and his colleagues was introduced into science education in the US, people started trying to assess the stages in the development of reasoning in their students. Early on this was done using interviews modelled after those of Piaget and using paper-and-pencil puzzles, which grew out of the kinds of tasks Piaget's group were using. In the mid-1970s it appeared that about 1/3 of people were still displaying reasoning at the level of concrete operations, about 1/3 were displaying reasoning at the level of formal operations, and the remaining 1/3 were sometimes displaying concrete operations when formal operations were appropriate and other times displaying formal operations. It also was documented that these proportions did not appear to change in in any significant way from the ages of about 13 to 45 (Arons & Karplus 1976: 396). Clearly, schooling through college and culture were not resulting in further increases in the proportion displaying formal operations. Yet it is possible for human beings to have developed formal operations by the age of 18. There is no evidence that this situation is different today.

« 11 » At the same time, physicists reading the work of Paget and his group noticed in the interview transcripts that not only could one see evidence of the reasoning the subjects were doing, but one could also see evidence of how the subjects thought the phenomenon in the interview task worked. This gave rise to a large quantity of work investigating students' conceptions of the phenomena studied in physics and other science classes. Two important findings of this work are:

1 | Students come to class with strongly held conceptions of the phenomena that do not match what their instructors are telling them.

2 | Standard instruction results in no real change in the students' conceptions of the phenomena.

Schooling appears to have no effect on either development of reasoning or on students' understanding of the phenomena.

« 12 » One can ask why this is the case, if these results are widely available? Of course, if teachers are trained in the conventional methods, they teach as they were taught and trained to teach. One way to explain the situation is that standard instruction is couched in a paradigm that promotes neither development of reasoning nor conceptual development. Paradigms define what is appropriate, what questions can be asked, and what questions are not asked. In the following, this standard instructional paradigm and an RC alternative will be described.

Paradigm one: prevalent in most standard instruction

« 13 » Schooling in this paradigm is about transmitting knowledge considered important by the culture to young members of the culture. While it is not explicitly taught, one of the lessons most thoroughly absorbed is a view of categories of students in school, a kind of caste system, which is then translated to their views of the world outside of school.

« 14 » Teaching under this paradigm becomes the presentation of the official canons of the culture by approved methods. Students are tested on how well they can give back the knowledge presented and skills at which they have drilled and practiced. Students who do not do well in such tests are assumed not to be members of the upper caste in school. The descriptions of the characteristics of the castes of students are in terms of mental ability or "gifts," thus not under the control of the teachers. Students who do not do well are at the mercy of their own genes and upbringing, both of which are out of the teachers' hands. In essence, the victims of the paradigm one pedagogy are blamed for their failures. When the teacher has presented the official knowledge by an approved method, then the teacher's responsibility has been successfully discharged.

« 15 » A more complete description of teaching in this paradigm is "the presentation of the established canon by approved methods for the benefit of the deserving"

7 | By "stopped their constructions of their worlds," I am referring to the second of two basic options one has in the presence of a disequilibration. This option is to choose to avoid resolving the disequilibration. It is as if one is walking away from it and hoping it will not arise again. I believe that one can choose to live a life in which only minor refinements or adjustments to one's mental models are called for. This involves carefully choosing what inputs to immerse oneself in. I have certainly seen students who seem to be operating in this way. Because not all instructors are there just to present information, as these students believe school is all about, these students justify the low grades they earn by the claim that the instructor did not do a proper job. This, I admit, is a kind of resolution to the uncomfortable situation of a bad grade, but there is no change in understanding on their part about what school is about, nor is there any change in understanding about any phenomena that were the subject of the course. Could these students change? Of course, but it is clear that the process will take more than one semester's worth of exposure to this alternative to just being lectured at in college.

8 | At the deepest level there is only experience. Signals into the brain from the eyes are indistinguishable from signals coming to the brain from the ears or other sensory organs. Since, for example, the quality "red" is not apparent in these signals, red is apparently produced in the brain instead of coming into the brain from the "outside world" through the eyes. We are left with the conclusion that *everything* we construct as our world, we construct in response to these indistinguishable signals. *Each of us* organizes all these things our brains generate; thus it is we, the observers of these experiences, who decide to categorize experiences into types such as physical, mental, and social. Thus, these types of experience are our constructions and are *not* ontological.

(Dykstra 2005: 54). The students who have the requisite mental capacities and diligence of work characteristics count among the deserving because they can appropriately repeat back what the teacher has presented. This deserving group is considered elite and superior. The rest are the lower caste, the undeserving.

« 16 » This folk theory of teaching described in the previous paragraph is unchallenged. It has little to do with cognitive and intellectual development. In fact, it appears to retard such development and promote the caste system. These "lower caste" students are subjected to a social injustice that is unfortunately pervasive in our culture.

Paradigm two: consistent with RC and socially just

« 17 » In the second paradigm, *all* human beings are understood to construct for themselves working models of the world around them. These models enable them to function in the world. These models constitute their understanding of their world. Because these models are constructed in their minds, the conceptual entities of which the models are constructed are only in the realm of the mental.[9] Since in this paradigm no distinctions are made between human beings in this theory of the development of understanding, there are no class and racial undertones.

« 18 » Further, in this paradigm it is observed that human beings are motivated to adjust their models when their expectations based on the models fail to be compatible with their experiences in the world. This is the trial-and-error process mentioned earlier in this commentary. There is utility in models that fit experience and predictions of future experiences. Human beings are driven by a need to have their models fit their experiences.

« 19 » Schooling becomes something entirely different in this paradigm. Instead of "giving" the canon to students, the goal is to engage them in constructing new models of the world or revising existing ones, i.e., deepening, strengthening, and expanding their understandings of their worlds. In a sense there is nothing to present, because understanding is constructed in and exists only in the mind. As such, understanding cannot be presented or transmitted. Students can only construct their understandings for themselves. As students are constructing new models for themselves in concert with others, they are also developing new reasoning patterns.

« 20 » What is a teacher to do in this paradigm? An appropriate goal would be for students to leave having developed a different, more powerful understanding of the phenomena under study than they had when they started. Since human beings adjust their understandings of the world when existing understandings fail to fit their experiences, then a teacher's task is to engage students in situations in which they are likely to notice a mismatch between their mental models of their world and their experiences. This mismatch between one's personal mental models and personal experience, when one perceives it, is called disequilibration. The teacher's job then is disequilibration. This is in contrast to the paradigm one teacher, where the teacher's job is to make the "deserving" students comfortable.

« 21 » To accomplish this task a teacher needs two things, after first buying into the RC view. One is to have effective models of the students' understandings of their worlds, their initial conceptions. These enable the teacher to imagine how students might react to various possible experiences that might be introduced into the instructional setting. This is what Gash is describing in §16. The other is an extensive knowledge of possible experiences that might not conform to the mental models or cognitive constructs of the students.

« 22 » Gash seems to be saying something similar:

> "A constructivist approach was not one that prescribed what the teachers and student teachers presented to the children in primary schools during these interventions. Instead, researchers asked questions and provided counter-examples to challenge children's ideas about the topic." (§15)

« 23 » To paraphrase Gash in §10: The emphasis in paradigm two is on the student/experience interface instead of on the teacher/student interface, which is central in paradigm one.

Conclusion

« 24 » I have pointed out that social interaction can be considered a type of experience that influences cognitive and psychological development in a way consistent with RC. One pitfall of considering social interaction as different from experience of the physical world is the introduction of the idea of a kind of knowledge that is a phenomenon of the social group, outside of mind. This notion of knowledge is counter to a basic premise of RC that knowledge exists only in the mind.

« 25 » I have also illustrated how the social injustice of convincing students they are not among an elite class of "deserving" students perpetrated by paradigm-one schooling can be avoided by shifting to the RC-based paradigm two. We know that social injustice is perpetrated against students on the basis of race and economic class, but not so obvious is the caste system of deserving vs. non-deserving in almost every classroom in the realist paradigm one.

« 26 » For all of the valuable research he describes, Gash has left us with a picture

9| There is often a discussion on this issue about the existence of the conceptual entities in the "real" world. The argument goes: If we cannot know the "truth" of our theories, then is it not possible that a theory could be "true" even though we do not know it? The question is couched in the realist point of view. In RC, we know that we make up our theories to fit our experience. When they are found to fit experience and predict the outcome of future tests, the best we can say is that a theory fits experience and has predicted future tests accurately. We cannot say such theories are closer to some truth or "mind independent reality." It is a trivial constructivism to believe that our constructed explanations describe or might describe what is "actually" going on or actually exists. In the sciences, we know from history that we have experienced a sequence of explanations of most phenomena. Each time we thought we finally knew what a phenomenon really was, we found that the seemingly "solid" theory failed to explain certain new experiences. It seems the height of realist hubris to believe that *now* we finally know the "true" explanation. It is certainly not RC. Hence, I believe that the sentence "end noted" here can also appropriately be written: *Because these models are constructed in their minds, the conceptual entities of which the models are made do not exist outside of the mind.*

concerning social interaction distinguished from experience with our physical worlds that is not clearly RC. We are not engaging our readers in constructing understanding of RC effectively when the language we use too easily implies something other than RC.

Dewey Dykstra has spent 45 years as a high school physics teacher, a graduate teaching assistant in physics, and a university physics professor. Along the way, he found the work of Piaget answered a fundamental question about teaching and learning for him and the work of Glasersfeld helped him strengthen his understanding of the nature of RC.

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Author's Response: Perspectives on RC and Teaching

Hugh Gash

> Upshot • In response to the issues raised in the OPCs, I emphasize the following aspects: teaching cannot be transmitting knowledge, stages are too constraining a model, RC focuses on the individual construction and talking about social context invites the spectre of social constructivism.

« 1 » My target article "Constructing Constructivism" is about a narrow selection of either personal educational applications of RC experience or of constructivist research undertaken by colleagues. I welcome the challenges in the careful and thoughtful comments in these OPCs and I am very grateful to all the authors for their comments. As RC is a theory of knowledge, issues raised in the OPCs investigate the interpretation of RC epistemology and RC teaching, deepen ideas presented and raise important interpretive questions. The comments are discussed in sections on teaching and epistemology, the place of the social, trivialising constructivism and psychological issues. There are also a number of suggestions for the future.

Teaching and epistemology

« 2 » Education plays a central role in the *continuity* of culture and knowledge. If, however, we say teaching plays an important role in the *transmission* of culture and knowledge, then the RC position is compromised by the metaphor "transmission." This metaphor is commonplace, and Janet Bowers and her colleagues (§3), Arne Engström (§§2–4), Theo Hug (§5) and Thomas McCloughlin (§§5f) have each raised interpretive issues about teaching and its relation to RC in their OPCs.

« 3 » RC was introduced as a call for epistemological clarity in relation to Jean Piaget's theory (Glasersfeld 1974). Ernst von Glasersfeld agreed with Nell Noddings's characterisation of RC as a post-epistemology (Engström §3), but it remains an epistemology, being concerned with the nature and limits of knowledge. So while an epistemology cannot prescribe teaching methods, and while epistemological educational and psychological issues can be examined separately and in isolation, it is fruitful for insights in associated domains to cross boundaries and influence relevant neighbouring disciplines. It is important that the identity of the form of information (epistemological, educational) does not become a block to the possibility of exploring implications and relations between the domains. Also, the relationship we have to knowledge at any moment influences our relationship to our own cognitive processes and to the person(s) to whom we are talking. If we are startled, we may be caught off guard and less circumspect. If we are outraged, we may want to impose our Reality. It is notoriously difficult to respect alternative realities when they violate our own boundaries and expectations. In Humberto Maturana's (1988) terms, we orient to either objectivity-without-parenthesis or objectivity-in-parenthesis. Objectivity-in-parenthesis is when one recognises that objectivity is an illusion as there cannot be a match between reality and experience, consistent with RC, and one accepts responsibility for the concepts one uses to model experience. Objectivity-without-parenthesis is when one believes that knowledge is about matching what one knows with reality, reality is separate and the goal of knowledge is to represent reality. We position ourselves as separate from reality in objectivity-without-parenthesis or as connected in objectivity-in-parenthesis. People are never in greater moral danger than when they believe they have the truth.

« 4 » RC teaching is where the teacher is sensitive to the process of construction in the learner with all the possibilities this awareness poses for considering alternative interpretations in the learner and in the teacher's view of the learner. RC teaching is firmly in the domain of objectivity-in-parenthesis and valuing process. Using RC as a model of knowing requires putting teachers, pupils, knowledge, teaching, learning and all other categories used describing education in parenthesis, together with the links between categories. So in writing in an RC context, care is needed by the writer and reader to come to common understandings.

« 5 » If learning is about requiring the child to learn what the teacher knows, about learning about Reality, then the process the learner uses is irrelevant. An alternative view from the learner is an error. However, we might want to talk about the teacher's teaching as though it were divorced from learning, for example, to make some point about the activity of teaching. Teaching remains a process that is interactive with learners and ceases when the learners have stopped attending. As William Glasser (1986) indicated, teaching becomes very difficult when the learners have decided that they do not want to learn.

« 6 » I agree that the word "teaching" has connotations that what is learned is passed directly from the teacher to the pupil (Bowers et al. §3) and so runs counter to the need within an RC perspective to sidestep this commonplace meaning. This is why many now prefer the phrase "teaching-learning." An alternative in the wider educational community is to use the word "teaching" and explain what this means for a constructivist teacher.

« 7 » Dewey Dykstra (§§13–16) outlined a traditional educational approach (paradigm one) that he contrasted with an RC-based paradigm two. I think some of the difficulties with the concept of RC teaching may be alleviated by Dykstra's presentation of RC teaching in his second paradigm (§§17–23) and I agree with his interpretation of some of the probable effects of the RC-based teaching model. McCloughlin (§6) also emphasises