Communication

Towards Realist Constructivism: Implications for Teaching & Training

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Constructivism is a popular but often misconstrued worldview. This article strengthens the constructivist position by showing that it can withstand a knowable real world. Such a position helps to correct many widespread practices in the name of constructivist education such as equating hands-on experiences with active learning. Further, it spans constructivism over the entire training life cycle. It makes a strong case for constructivism as a way to have a world that knows to live with diversity.

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What can people possibly know: an object as it is or their idea of the object? This question is central to the way people look at the world. If one can know a thing as it is, then the world must be real. Only a real world can have objects whose reality is inherent in them. Whoever knows a thing as it is must get the same knowledge about it. On the other hand, if people can only know the idea of a thing and not the thing as such, the world as they know must be an idea!

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There are people who look at the world as their idea. They take all human knowledge as mental constructions. They are the 'Constructivists' and their position is called 'Constructivism'. This article attempts to enquire into the constructivist worldview and its implications for two important ways of human resource development viz. teaching and training. It takes a catechistical approach to explain the idea of constructivism to the general reader.

- It shows that knowledge construction is possible while assuming a know-

able reality. Constructivism would be more useful if it accepts knowledge-reality correspondence. Such a position can justify constructivist teaching and training.

- It shows that in a knowable real world the need for generalization or abstraction strengthens the constructivist position. It dispels the widely prevalent notion of equating hands-on experiences with active learning.
- It positions constructivism as a comprehensive approach to look at training. Further, it outlines the lifecycle of a constructivist training.

Do People Construct Their Own Mind-worlds?

To do that they must be able to influence the way they know the reality. The world doesn't appear as colourful to dogs as to humans (Plonsky 1998). Human physiology has indeed enabled us to see the world differently. One can still argue that it is a case of setting limits by one reality viz. physiology over the other viz. colour. Probably a more appropriate question would be to ask whether the observers influence reality.

Consider a scenario where Mr. Reji awaits the train to Kerala. A train passes by in which he spots a child throwing a ball in the air and managing to catch it. Sitting snugly on her seat, the child did it again by the time the train covered around two meters. While the child knows that she has taken the catches sitting at the very same place, Mr. Reji knows them as separated by a distance of two meters. Whose knowledge is correct? Can someone answer this question without taking the frames of reference of the observers into account? One can still argue that this is the nature of physical reality as explained by the theory of relativity (Einstein 2000).

Can something uniquely human such as the points of view and culture influence the way people know the world? Consider the discovery of a new fossil. Must it mean a missing link between two related species? Can't it be taken as just another animal created by God? It depends on the interpreter. Materialists would explain it along evolutionary lines because they have closed themselves to God; creationists would see God's intelligence at work because only He can create life. These two explanations flow primarily from the inherent beliefs of the interpreters rather than the reality per se. As theories are by definition falsifiable (Popper 1963), a theory can never be proved once and for all. The dominant social paradigm ends up judging the validity of the competing explanations to declare one as knowledge and the other as opinion (Kuhn 1970). The effect of culture on the way people look at diverse phenomena is well researched (Clark 2002, Hofstede 2001, House et al. 2004). Indeed, uniquely human influences seem to affect the way we look at the world!

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Much of the human knowledge results from the coherent systems of explanations. Now the known world as an idea appears

to be a plausible proposition. Notice that such knowledge is the result of the questions posed. A different kind of knowledge might result from a different set of questions. People do seem to construct their own mind-worlds!

Are We New to a Constructivist World?

On the contrary, we humans seem to have been living in it since the very beginning! *Rig-Veda*, the oldest text known to humanity, declares that the truth is one, even though it is explained in diverse ways (1.164.46). *Upanishads*, the celebrated Indian texts, take a constructivist outlook in expounding some of their teachings. Accordingly, they allow the readers to build their own interpretations by using catechism, illustrations, stories, parables and discovery learning (Mookerji 1969). Such thinking can also be traced in Buddhism, Taoism and the Zen.

In the West, it can be traced in the philosophy of Heraclites who looked at the world as a process. In the relatively modern times, it is often attributed to the works of Giambattista Vico (1668-1744), David Hume (1711-1776), Immanuel Kant (1724-1804), Arthur Schopenhauer (1788-1860), Hans Vaihinger (1852-1933), John Dewey (1859-1952), Lev Vygotsky (1896-1934) and Jean Piaget (1896-1980). The list is only indicative in nature.

What Allows Knowledge Construction?

This question is central to the constructivist theories. It has received typical constructivist treatment: diverse answers. The preceding discussion indicates various possibilities to allow constructed knowledge instead of an objective one: -

- If reality cannot be known, then constructing knowledge remains the only possibility. It imposes an epistemological necessity to construct knowledge. Radical constructivism takes this position (Glasersfeld 1995).
- If what people know depends on how their mental structures are organised, then knowledge has to be a mental construction. It imposes a cognitive-psychological necessity to construct knowledge (Kelly 1963, Piaget 1954).
- If the human brain can produce all experiences without any sensory inputs, then what people know might be a constructed reality like dreams. What if the sensory inputs are taken into account to produce experiences? All sensory inputs, irrespective of the physical nature of their objects, are electrochemical in nature. What they convey is mere intensity of the sensory contact rather than the real nature of their objects. Thus brain must construct reality even with sensory inputs. It imposes a neurobiological necessity for knowledge construction (Foerster 1973, Llinás 2001, Maturana & Varela 1979).

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- If the physical reality depends on the observers, then they must be constructing their reality by their presence. It imposes a physical necessity for knowledge construction (Diettrich 2001).
- If knowledge must build upon the previous knowledge, then society comes into the picture. Social acceptance must be there for any previous knowledge to survive. Here society need not mean society at large; it can be a small social group as well. Thus social interactions construct much of what people know (Berger & Luckmann 1966).

A lot many variants using these possibilities in various combinations are present in the constructivist literature. They simply indicate that there are many answers to the question. Notice that knowledge construction can be allowed on at least two distinct grounds: personal and social.

What Characterises Constructivism?

Riegler (2005) suggested 10 characteristics, which can be regrouped under five common themes: -

What people know is their own construction.

i. It neither accepts nor rejects an objective reality. It simply maintains that what people know is their own construction. As a consequence, knowledge cannot even approach reality. Thus knowledge cannot represent reality, whatever it may be. Therefore, instead of investigating reality, constructivism investigates what constructs it.

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ii. It rejects the separation of objective reality from subjective experience. It holds that the knower and the known exist in relation to each other. As a consequence, it makes inclusion of the observer a criterion for valid scientific explanations. Inter-subjectivity replaces objectivity in the constructivist science.

iii. It studies the systems that reference themselves. Such systems interact necessarily with their own states and thus are operationally closed. Their output is actually aprocess itself as there is no real input to be converted into output. Constructivists treat mind and nervous system as examples of such systems.

iv. It emphasises usefulness as the primary criteria for knowledge to be valid. Useful knowledge empowers humans to have a better control of their worlds. They keep on anticipating events in the light of their previous knowledge. As they keep on validating their anticipations against their experiences, individuals act like personal scientists. Accordingly it holds that individuals engage in useful social interactions. The more individuals accommodate within the framework of social interactions, the more

sociable they become. It doesn't accept any meaning or knowledge in texts. They are useful as long as they help readers build their own interpretation.

v. As knowledge remains a process rather than an output, the constructivists prefer processes to structures in explaining their worlds. Accordingly, they are ready to revise knowledge as and when required. They consider it useful for expanding the scientific frontiers.

Can Constructivism Account for Learning?

Yes, if learning is equated with modified mental structures or schema. Radical constructivism cannot account for learning from any external influence as anything external to mind remains completely unknown. Social constructivism can account for learning from external influences as well.

In the constructivist worldview, there is nothing in which meaning or knowledge or learning is inherent. Thus no activity is a learning activity; no opportunity is a learning opportunity. No teacher can cause learning; no environment is a learning environment. Once the learner interprets an activity as learning activity, he or she can construct knowledge. One can interpret an activity as learning activity only if there is a prior experience of learning or knowledge construction. Hence learning is taken as an active process of knowledge construction based on the existing knowledge of the learners,

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which enables them to go beyond the information given (Bruner 1966). Thus people learn to learn as they learn! Because knowledge must keep pace with changing social interactions, learning and knowledge construction must be a lifelong process. However learning can be of any use only if it results in useful knowledge.

Can Constructivism Account for Useful Knowledge?

Knowledge is useful if it can help someone do something. How can knowledge help someone do something? Imagine that there is no reality outside the mind. In that case all tasks must also be mental constructs like knowledge. Hence thoughts must be sufficient to accomplish any task. Constructing the idea of effort and errors to complicate things hardly seems useful. Now imagine that there is a reality outside the mind though one can never know it. Can knowledge affect something that is beyond its purview? Thus it is clear that the agnostic position of constructivism with regard to reality poses insurmountable difficulties related to the nature and scope of knowledge itself.

Can socially constructed knowledge be useful? In as much as it enables social interactions, knowledge remains useful in the social constructivist worldview. But social construction can only account for social conventions. It cannot account

for anything whose existence doesn't presuppose society. Thus a socially constructed knowledge is of limited use.

Can Constructivism Account for Teaching?

Can one teach how to think without assuming some 'real' ways of thinking? A constructivist would reply that usefulness is enough to teach, reality is not necessary. Why should usefulness of knowledge be emphasised? Useful knowledge helps people gain a better control of their worlds. Must people aspire for a better controlled world? Yes, if they want to survive. Is survival real? Is destruction real? Neither can be said with certainty as reality can never be known. Is destruction necessarily less useful than survival? Indeed, it is if one assumes that something ceases to exist with destruction. But if that 'something' was a mere construction of a self-referencing system called mind, it can be reconstructed. Self-referencing systems don't depend on inputs anyway. The value of such reconstruction can be less only if the original was more than a mere mental construct. But such conclusion violates constructivist assumption! One can argue that mind constructs knowledge and not the knower as such. If the knower is not the construct, then it must be real. Again constructivism stands violated.

One can still argue that there is no real knower and known; they result from the knowledge construction process. Is knowledge construction process real? If not, then what constructs knowledge construction? The same question can be asked about every proposed constructor. It leads to an infinite regression and hence doesn't offer any useful insight. Thus a real knowledge construction process appears more useful and hence valid! This again violates the constructivist assumption. Besides, if mind must interact with its own states, then no input can have an effect on its operations, not even teaching inputs. Thus teaching doesn't make sense in a personal constructivist worldview.

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Can social constructivists teach? Social constructivism assumes a fluid knowledge body to account for the dynamic nature of social interactions. Can teachers teach in absence of a largely static body of knowledge? They can teach only if they need not appeal to a real knowledge body all the time. Wouldn't it mean allowing learners to construct their own knowledge? Indeed, it would. Teachers have the role of facilitators to facilitate knowledge construction. As the representative of the fluid knowledge-base of the society, they can even judge the usefulness or validity of such knowledge. Thus knowledge becomes a collective enterprise and shared meaning becomes the way to access it. However, teaching is of limited use if the domain of socially constructed knowledge itself is limited.

Can Accepting a Knowable Reality Help?

Assume that reality is such that it

cannot be completely known. In that case, one can only know the reality partially i.e. in one or more aspects. Hence one must construct knowledge in order to explain the complete reality. If no knowledge is going to completely describe a reality, then every reality must enable multiple perspectives. Thus constructivism still holds good.

Now assume that one can completely know a reality. In that case, the senses must be able to represent the reality to the mind. Can senses capture general abstractions such as humanity? One only meets with Tom, Dick and Harry, never with humanity as such. Hence all common nouns and other generalizations must be mental constructs. Imagine the plight of a medical student who must pass a medical degree for each patient he or she might treat! Knowledge has to generalize to be widely applicable. If generalizations are mental constructs, then much of the knowledge must also be constructed.

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Reality sets the limits for both personal and social construction. An unchecked social construction will make social acceptance as the only measure of valid knowledge. Social acceptance has its own inertia that fosters status quo. Personal construction can hardly account for knowledge as the collective enterprise. Can our present generation take the entire credit for the development of human civilization? Accepting a knowable reality can account for the continuous progress of humanity because it makes knowledge-reality correspondence the supreme measure of valid knowledge.

What difference remains if both constructivism and objectivism accept a knowable reality? Objectivism demands a single explanation for a particular reality. Such insistence compels it to attempt to explain as many things as possible on that basis. Constructivism, on the other hand, accepts multiple valid explanations for a particular reality. It remains a much broader approach to comprehend the world. In essence, constructivism can withstand a real world. Constructivists should reconsider their position about reality. A knowable reality is much more useful, even for the constructivist, than an unknowable reality or an unreal world.

How Should Realist Constructivists Teach?

A realist constructivist position is essentially a constructivist worldview that accepts knowledge-reality correspondence. Thus its way of teaching would directly flow from the constructivist position on teaching and learning. For teaching to be a learning experience: -

i. It must engage learners' minds. Engaging their hands is not enough, not even essential.

ii. It must take their prior knowledge into account.

iii. It must foster a democratic environment where learners should feel free to put their views forward for scrutiny.

iv. It must be based on a learner-driven curriculum. On the one hand, the curriculum should take the learner step-by-step into the higher realms of knowledge construction, on the other; it should allow them to skip some steps if required.

v. It must provide sufficient time to learners to facilitate knowledge construction.

A constructivist approach to teaching and learning assumes individualised consideration to learners. It may not be useful when the number of learners per teacher is too large. However, this doesn't mean a rejection of learning in groups. On the contrary, it would emphasize learning in groups to facilitate social construction of knowledge.

Unlike personal or social constructivism, a realist constructivist position can account for useful knowledge in all spheres. Thus it actually justifies teaching while broadening its scope and relevance. In practice, constructivist pedagogies end up taking a realist constructivist position without acknowledging it.

Making learners discover things for themselves need not be the hallmark of the realist constructivist pedagogy. Using the wheel is more useful than keeping on reinventing it. However, a structured discovery can be used to help learners gain rich experience. A discovery can be structured in two or more steps with a debriefing at each step. Debriefing can focus on the step, the students' interpretations and the choices that they entail. The teacher should discuss what the discoverer thought at this stage while explaining the rationale for the next step. Trivial historical facts that might interest the students can be shared at each step. How the prevalent social conditions shaped the ideas of the discoverer would make a great debriefing. It might help students see how the present social conditions are influencing their own choices. A structured discovery would be more efficient and effective in facilitating knowledge construction than a completely unguided discovery.

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Constructivism, by its very nature, allows divergent views and hence cannot claim to be the only view to look at the world. It reserves its right to reject objectivism, but cannot deny its place in the world. Teachers who want to improve their pedagogy by basing it on constructivism should take usefulness as its Holy Grail. If it is useful to adopt objectivist methods such as instruction for a while, they should be employed. Can children learn to write if they are allowed to interpret alphabets in their own ways? Can new employees assimilate if they interpret the internal language of the organisation in the way they like? Who would allow cardiac surgeons to hold divergent views while performing cardiac surgery? Issues such as these need an objectivist treat-

ment and they better get that. Choosing an objectivist method when it is likely to work best would be in sync with the constructivist emphasis on usefulness.

Does Constructivism Support Assessment?

Can assessment take place without assuming reality? It can if social acceptance substitutes reality as the reference criterion; however, that undermines the very justification of a constructivist worldview - the dynamism of knowledge. The problem of status quo is unavoidable in the social construction paradigm. Accentuating it further by introducing summative assessment can undermine the constructivist position itself. Summative assessment would reinforce the current social thinking. Hence summative assessment cannot find a place in the constructivist teaching. Note that realist constructivists would not face such a problem regarding summative assessment. They can justify its use for administrative purposes.

Can assessment facilitate learning? It can if it indicates the need to develop a more useful interpretation. If the teaching activities provide feedback to learners regarding the usefulness of their present construct, then assessment would boost knowledge construction. Thus formative assessment becomes important.

Is formative assessment essential for constructing useful knowledge? Yes, if its absence can lead to useless ideas. Consider a management classroom on training and development. The teacher is engaging the students in a discussion on handling difficult situations in training. By the end of the class, the students reach a consensus that trainers need to avoid getting angry with unruly participants. What if the students believe that their performance in training need not be consistent with their statements in class? Such deep rooted beliefs defeat the very purpose of the class. Can the teacher do anything about it without knowing about their belief systems? Assessment provides the way for teachers to know what they should while they still have the time to influence the knowledge construction process. Thus formative assessment becomes integral to constructivist teaching (Brooks & Brooks 1993).

Are Constructivism & Technology Compatible?

Technology is also a construct in the constructivist worldview. Hence there is no reason why they should not be compatible. In fact, new technologies in education have renewed the interest in constructivism (Collins 1991, LeBaron & Bragg 1994, Mann 1994). Manipulating a live dog may not be safe, but manipulating an animated dog poses no danger whatsoever. If technology can help learners safely manipulate various constructs in diverse ways, then the quality of knowledge construction might improve. It may also increase the pace of learning.

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Can technology help if it promotes constructs that are far removed from life? Constructs that are far removed from life are less likely to find use there. If the technological constructs closely represent life constructs, then learners get a chance to create useful knowledge. Education technology must be based on a comprehensive understanding of educational issues and effective practices. Ineffective educational processes are unlikely to become effective simply by virtue of automation (Campoy 1992).

Tools like multimedia and hypermedia hold a great potential to boost constructivist teaching and learning. Not only the learners have fun with them, but also they get a rich environment for knowledge construction (Bagley & Hunter 1992). As with everything else, no technology is constructivist in itself. It all depends on how it is used and how well it is integrated into the effective pedagogical practices to facilitate knowledge construction (Strommen & Lincoln 1992).

It is clear that creating technology to facilitate learning would be easier if one assumes a certain degree of knowledge-reality correspondence. In fact almost all the existing so called 'learning technologies' actually end up making such an assumption.

What Does It Mean for Training?

Can training begin without assuming a performance gap, present or future? If it can't, then the performance gap becomes central to training. Can training assume the gaps to be either unreal or unknowable? The very fact that it can't makes a knowable reality the core training assumption. Thus the implications of realist constructivism would determine its usefulness in training.

When should a constructivist position be considered in training? The need for widely applicable knowledge provides constructivism a place in the fully knowable real world. Accordingly the need for a constructivist training would be there if the participants are supposed to apply their learning in diverse contexts. After all, they can use only their own constructs in diverse situations. If, on the other hand, they need to use their training almost as it is on their jobs, then instructions and drills would be more efficient. Training for machinists can fruitfully use instructions and drills; training for managers can fruitfully use case studies, discussions, simulations, games, movies and hypermedia.

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Will a constructivist training follow objectivist training design? Will a constructivist design result from an objectivist training need analysis? These questions indicate that it is not appropriate to call a training constructivist on the pretext of having the so called 'constructivist' sessions. A constructivist approach to training would span its entire life cycle.

- *Training need analysis*: A constructivist training need analysis would focus on the existing interpretations of the situation and the processes of their formation in an organisation. It would identify the role that the structures, policies, strategies and values play in facilitating the existing interpretations in people's minds. It would analyze the shared idea of the job as well as what the incumbents think about it. Inter-subjectivity would help in identifying useful issues. It would also use this opportunity to know about the deeply held beliefs of the people. In case it mandates training, the need analysis should provide trainers an idea about the competencies and the context that the participants would be bringing in.

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- *Training design:* Constructivist design would be learner-centred, even learner-driven. Involving them from the planning stage itself would encourage them to take the responsibility to learn. Concept maps and mind maps can be used instead of rigidly defined objectives to provide focus to the training. A constructivist design must identify what requires facilitation. Topics that can be safely learnt by individuals or groups need not claim session time. Trainers can give assignments on such topics. It is important that trainers make provision for critically reflecting on those topics for knowledge validation. Thus the constructivist design would be somewhat relaxed but focused. It would be able to accommodate some pertinent diversions as well. What is required is a lively, mentally engaging training rather than a clock-led drill. If that means using technology to augment effective pedagogical practices, so be it.
- *Training implementation:* The need for dry runs and pilot tests remain intact even in the constructivist training. They would help the trainer develop improved ideas about handling the program. The trainer must understand his or her role as a facilitator. Often hands-on experiences are equated with active learning. Trainers must appreciate that the need for generalization or abstraction demands constructivism in training, not the need for concrete experiences. Unless learners engage mentally to form appropriate concepts, learning cannot really take place. Critical reflections are essential to engage learners mentally. A democratic training environment allowing the participants to experience the joy of learning is a must for any constructivist training.
- *Training evaluation:* Formative evaluation is more useful for training than summative evaluation unless, of course, the training is for certification. Participants should be involved in deciding about evaluation requirements during the design phase itself. They should know what is expected

Peer-evaluation itself would promote peer-learning.

of them once they go back to their jobs. They should perceive their role in taking their organisations to the next level. These serve to provide them with a focus. During the training program, they should be involved in assessing each other's learning. Thus peer-evaluation itself would promote peer-learning.

Why Should Constructivism be Considered?

Are humans facing incessant struggles based on religious dogmas? Are not even scientists found reluctant to accept anything that goes against current scientific knowledge? Are societies divided along various rigidly adhered to 'realities' such as caste, class and race? Are people able to deal with other cultures from a position of equality? Myriads of such questions keep challenging humanity because of our belief in only one possible explanation of the reality. Constructivism offers a solution, not by completely denying real knowledge, but by acknowledging divergent viewpoints. It brings democracy to knowledge. It opens a theoretical possibility to develop thinking minds. It need not murder a beautiful fiction by a brutal fact; it acknowledges their value in different domains. As Riegler (2005) suggested, constructivism must be considered as a way to get rid of the dogmatism that prevents science from becoming more fruitful and productive. Constructivism must be considered as a way to deal with different cultures to facilitate global business operations. Constructivism must be considered as a way to have a more accommodating world that knows to live with diversity.

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