

Constructivism, Sociocultural & Habits of Mind

Gerardo Zavala

Claremont Graduate University

Abstract

Constructivism, sociocultural, and habits of mind are the three major learning theories to be analyzed throughout the paper. The similarities, differences, and areas of compatibility between the three learning theories previously mentioned will be identified. Moreover, it will be demonstrated how the three learning theories support and compliment each other. Finally, the writer will state the implications of his findings in regards to his own teaching practices.

Radical constructivism starts from the assumption that knowledge is in the head of persons, and that the thinking subject has no alternative, but to construct what he or she knows on the basis of his or her own experience. Whereas, social constructivism states that groups construct knowledge for one another, collaboratively creating a small culture of shared artifacts with shared meaning. Where one is immersed within a culture of this sort, one is learning all the time about how to be a part of that culture on many levels. Noddings states, that social and radical constructivist agree on the following:

- All knowledge is constructed, and that mathematical knowledge is constructed, through a process of reflective abstraction.
- That there exists' cognitive structures that are activated in the processes of construction. They explain the result of cognitive activity in roughly the way a computer program accounts for the output of a computer.
- Cognitive structures are under continual development. Purposive activity induces transformation of existing structures. The environment presses the organism to adapt.
- Acknowledgement of constructivism as a cognitive position leads to the adoption of methodological constructivism (pg. 10).

Constructivism can dictate guidelines for effective teaching. Pedagogical constructivism suggests sophisticated diagnostic tools that uncover patterns of thinking, systematic errors, and persistent misconceptions (Noddings, pg.14). Noddings contends that, "in order to teach well, we need to know what our students are thinking, how they produce the chain of little marks we see on their paper, and what they want to do (or want to do) with the material we present to them" (pg. 14). Simon points out, that although constructivism provides a useful base for thinking about mathematics learning in classrooms, it lacks instructions as to how to teach mathematics (pg. 3). He states that in order for mathematics teachers to foster students' construction of powerful

mathematical ideas, mathematics teachers must provide a structure and a set of plans that support the development of informed exploration and reflective inquiry without taking initiative or control away from the student (pg. 9). Simon continues to describe constructivist pedagogy by mentioning that “the mathematics teacher’s job is to propose a learning situation within which students seek a response to the milieu not a response that is solely intended to please the teacher. If the situation leads students to a particular response, no real learning takes place”(pg. 10). From a constructivist perspective, class lessons should consist of small group problem solving and teacher-led whole class discussions. Simon declares that,

The teacher has the dual role of fostering the development of conceptual knowledge among his students and facilitating the constitution of shared knowledge in the classroom. Teachers’ plans must be informed by the mathematics of students. The most basic responsibility of constructivist teachers is to learn the mathematical knowledge of their students and how to harmonize their teaching methods with the nature of that mathematical knowledge (pg. 12).

Sociocultural approaches to learning emphasize the interdependence of social and individual processes in co-construction of knowledge. Education is thought of in terms not of transmission of knowledge, but of transactions and transformations (Mahn, pg. 1). According to Mahn, “The approaches are distinguished from constructivism by the importance they place on cultural variation and its interrelationship with development, and the significant role of cross-cultural comparisons in theory construction and development of educational practice” (pg. 14). Sociocultural points of view establish the need to re-shape educational institutions to deliver instruction, which meets the needs of all students, especially the linguistically and culturally diverse, who historically have been marginalized by traditional models of pedagogy (Mahn, pg.

27). Mahn explains, that sociocultural approaches help educators understand the culturally patterned learning styles children bring to school. The integrated influences of culture and language are then examined in practical application of Sociocultural approaches to classroom learning and teaching instruction. In contrast to constructivism, sociocultural theory helps educators provide instruction, which recognizes and empowers linguistically and culturally diverse students (Mahn, pg. 15). Similarly to constructivism, sociocultural theory creates a guide for educators and curriculum development, emphasizing co-participation, cooperative learning, and joint discovery as effective pedagogical tools.

Habit of mind as a theory of learning differs from the previous theories in that it is more specific and less ambiguous as to identifying the elements a good lesson should contain. Habits of mind considered in a mathematical context are guiding mathematical principles for design of mathematical curricula, development of school mathematics culture and individual mathematical reasoning (Leikin, pg. 4). Leikin contends, that habits of mind are manifested in human's ability to behave intellectually when one does not know the answer, in the situations of dilemmas and uncertainties. These situations usually demand strategic reasoning, insightfulness, perseverance, creativity, and craftsmanship. (Leikin, pg. 4) Habits of mind calls for a curriculum that lets students in on the process of creating, conjecturing, and experimenting. It helps students look for logical and heuristic connections between new ideas and old ones (Cuoco, pg. 2).

Constructivism, sociocultural, and habits of mind in different ways have the following in common, as defined by Leikin, "learning has to be active, meaning that learners construct their individual knowledge through mathematical explorations and other forms of doing mathematics with emphasis on conjecturing that leads to mathematical discuss" (pg. 5). Furthermore, it states

specific habits that can be applied to any subject and some specific to mathematics. The habits are similar to elements and guidelines provided by constructivist and sociocultural approaches.

The main habits of mind are:

- Students should be pattern sniffers
- Students should be experimenters
- Students should be describers
- Students should be inventors
- Students should be visualizers
- Students should be conjecturers
- Students should be guessers

All of the habits of mind can be defined through a constructivist or sociocultural lens. For example, students should be experimenters could easily be rationalized from any learning theory. Constructivists call for the teaching process to allow shift of pupils' interest from being a practitioner to becoming a theoretician (Simon, pg. 11). Through experimenting theoretical points of view are reached.

Based on several educational journals it can be argue that all of the previously mentioned learning theories compliment each other. All three perspectives seem to define learning and education from a different perspective or point of view. In order to create an effective curriculum and an educational goal all perspectives must be applied. Cobb states, that constructivism and sociocultural perspectives are complementary, that sociocultural perspective informs theories of the conditions for the possibility of learning, whereas theories developed from a constructivist perspective focus on what students learn and the process by which they do so. He continues to specify that mathematical learning should be viewed as both a process of active individual construction and a process of enculturation into the mathematical practices of

wider society (pg. 13). Habits of mind goes a step further by providing educators a guideline or check list to follow when developing mathematical curriculum or classroom lessons. The three perspectives address different problems and issues. Cobb identifies the following,

A sociocultural analysis of a classroom episode might both locate it within a broader activity system that takes account of the function of schooling as a social institution and attend to the immediate interactions between the teacher and students. In contrast, constructivists are typically concerned with the quality of individual interpretive activity, with the development of ways of knowing at a more micro-level, and with the participants' interactive constitutions of classroom social norms and mathematical practices (pg. 15).

Whereas habits of mind focuses on specific elements of successful lesson, and what are students expected to do or experience within a lesson. According to Cobb, education is to consider what various perspectives might have to offer relative to the problems at hand. He suggests that the sociocultural perspective gives rise to theories of the condition for the possibility of learning, whereas theories developed from the constructivist perspective focus on both what the students learn and the processes by which they do so. In his view, both of these perspectives are of value in the current era of educational reform that stress both students' meaningful mathematical learning and the restructuring of the school while simultaneously taking issues of diversity seriously (Cobb, pg. 18). On the other hand, habits of mind goes a step further by wanting to empower students for the life after school, to prepare them to be able to use, understand, control, and modify a class of technology that does not yet exist (Cuoco, pg. 23). Cobb identifies that by coordinating perspectives as we attempt to cope with our specific educational problems, "we would give up the quest for an acontextual, one-size-fits-all perspective. Instead we would

acknowledge that we, like teachers, cast around for ways of making sense of things as we address the situated problems of our practice”(pg. 19).

The implications in my teaching practices based on the findings of analyzing the three major learning theories are significant. I will use all of the three theories as a guide for my teaching practices from a curriculum, lesson delivery, and creation of lessons point of view. From the constructivist perspective I would strive to learn the mathematical knowledge of my students, to adapt my teaching practices and plans based on the mathematics of my students. From a sociocultural point of view I will attempt to learn what is the best environment for my students to learn. I will use Mahn’s idea of a perfect classroom as a guide or goal for my students. According to Mahn, successful classrooms must contain co-participation, cooperative learning, joint discovery, and situations in which students are able to build upon the culturally shaped knowledge and value systems that they bring to school (pg. 21). From the habits of mind perspective I will develop lessons in which students get an opportunity to become experiments, pattern sniffers, describers, inventors, visualizers, conjecturers, and guessers. I will use the mathematical approaches as a checklist when designing lessons or curriculum.

Conclusion

Constructivism, sociocultural, and habits of mind learning theories all compliment each other. They should not be used in isolation, as mentioned by Cobb, in order to solve the complex educational problems of present and future all perspectives should be considered and applied.

References

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