Constructivism and Constructionism are two different routes to learning that are unconsciously employed by learners. The two have similarities but take critical diversions. Piaget's Constructivist theory explains that learners learn through their own mental language. For example, ask a German-speaking person what a pigeon is called in German- and then ask a French-speaking person, they are bound to sound very different. But they mean the same thing. Analogous to this, Piaget hypothesised that learning was based on development of isolated knowledge structures, and the knowledge structures that each individual learner develops is unique. The technology that would be required to cross-compare these structures did not exist at the time, and still does not. Papert's Constructionism shares constructivism's connotation to learning as building knowledge structures irrespective of the circumstances of learning, but then further elaborates that felicitous learning happens when the learner is **consciously** engaged in constructing a public entity that can be critiqued, analysed and be used by the public. It therefore focuses on the connected nature of knowledge with its various dimensions (P1-36). An example would be the Logo programming language, which uses a turtle simulator. I did the exact same simulation in one of my first-year courses, CS101. The goal is to be able to draw complex patterns on the screen, like spirals and tesseracts using simple commands like PENDOWN (starts drawing), PENUP (stops drawing), and the directions with the lengths of those sides. Some shortcuts like REPEAT are allowed, which repeats a certain algorithm number of times. For example,
`pendown();forward(10);right(90);forward(10);penup();` would produce an inverted L. This language allows children to identify with the computational object(the turtle) in many ways. The turtle is *body syntonic* and *ego syntonic* (P1-37) and the children could identify with it more. In other words, this was an authentic learning experience because it provided concrete entry into the world of mathematics and programming and allowed learners to connect their personal experiences to mathematical concepts and operations. It also supported a metacognitive approach to learning, because learners would "debug" the code whenever they did not produce the pattern they desired. Also, pre-existing conceptions about certain physical attributes like direction and length are exploited to benefit. Since the children are constructing an 'artifact' that can be used and critiqued by other children as well, the Logo programming language is a pioneer of ***constructionist*** learning. However, a lot of studies have been conducted on pre-existing conceptions themselves, and this area of study is called misconceptions research. Misconceptions are assumed to be certain preconceptions that to a degree, resist instruction and interfere with learning. It is the general notion of misconception-oriented instruction to **confront** and **replace** those misconceptions. Constructivist theories opine differently; that knowledge arises from complex cognitive structures and every pre-conception is unique and plays a role in the understanding of a certain topic. Such instructionism is targeted at confronting the misconceptions and obliterating them so as to re-program the cognitive structures associated with that particular knowledge. Learning is summed up as "the *process of removing misconceptions from students' cognitive structures and inserting appropriate expert concepts in their place*" (P3-125). There are a few drawbacks to this, however. If concepts are more complex intertwined clusters of related ideas, replacement of "misconceptions" seems less plausible as an effective learning process. If a physicist takes a course on Continuum mechanics, which is a rigorous field in mathematics in itself, he should not be forced to unlearn physical laws and approximations. Instead, he should approach learning it from a different perspective; maybe use all the knowledge from the fields of physics that apply to this topic. A polyglot must approach a new language with remnants of residual knowledge that are obtained from learning and mastering other languages. The translation of the word "father" resembles very close pronunciations in most Nordic/Slavic languages. Russian derives many of its word roots from Sanskrit! So, it would be implausible for a person to teach himself Russian by "*trying to forget*" Sanskrit, as is the opinion of the theory of misconceptions research. However, in some cases, learners will be required to transform and refine the pre-exiting knowledge so as to retain competency and adequacy to explain phenomena and solve problems. However, a constructivist approach to learning made by the learner can be mined by the instructor and proportional to the severity of misconceptions, they can be confronted. In the field of mathematics and logic, there is a prime example of such instruction by confrontation. It is called ***counter-example*** making. If I were to ask you what number squared gives you 9, you would reply with a confident "3". Then, I would ask if that is the only number that when squared, gave you 9, and you would still be confident. Then, I would explain to you that -3 also when squared, gives you 9. That would destroy a few preconceptions in your mind that arise from common sense. (P3-124~ "*student ideas conflict with expert opinions*" and P3-126 "*students' general efforts to understand are fundamentally flawed*")

Up until grade 4, $3-5$ would be an "incompatible operation" and it is only later that we are taught that there is actually a number that equals the above quantity, and that it equals -2. We are also taught that there are decimal numbers and that force is not necessarily required to keep a body moving. (Newton's 1st Law of Motion)