

Technology Integration and Learning Theory

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Learning process is one of the most important processes that happened to human beings. In fact, learning process is happening all the time even formally or informally, even more directly or indirectly. In addition, learning theories have emerged in order to describe the way that the learners are receiving information, arranging, and retaining this information in memory. Learning theories are very important for instructional designers in order to help them create an effective, efficient and appealing instruction design such as: Cognitive Information Processing Theory, Schema Theory, Cognitive Load Theory, Situated Learning Theory, Gagné's Theory of Instruction, and Constructivism Theory.

Constructivism Theory

The word constructivism comes from the word of construction or structure. The Constructivism theory emphasizes that good and real learning information is not based on what the instructors says or the learners heard even if the learners repeating this information over and over. In addition, the constructivism theory emphasize that the learners construct and built the information inside their mind based on their experiences and prior knowledge. Even more, this constructing for the information influences the learners' environment, society and language. Likewise, each learner has their own methods, way to understanding, and experiences to build knowledge, which effecting the learning processing. In other hand, the instructors will spend so much time to repeat and confirm the information, but these ways will not help the learners to retain the information in their mental way. Additionally, there are very important points that explaining constructivism theory, which are:

- The learners working within their mind individually in order to build their own knowledge, which explains that, the knowledge is not transmitted to them in a way or another.
- The learners will use their own experience and prior knowledge to explain new knowledge.
- Learning is an active dynamic process, which the learners use their sensory receptors to build the meaning from it.
- Learning is social and related to the community that the learners live on it, which effect the individual construct information. In fact, the learners learn new things with learning a new way to learn better.
- The important components for learning a new thing are understanding the content and having old knowledge our experience that the learners built their information from.
- In constructivism the best learning will be learning form mistakes because when the learner made the mistake (he/she) try to move on from this mistake, which gives a good chance to built their knowledge on what they learn from that mistake.
- The learning experience happens, when the learner practices not from teaching or hearing the information.
- The learning is evidentiary and contextual because human being does not learn secluded facts or theories, but the learners learn cause and consequence or relationships for what they want to learn.

In fact, constructivism is not a new learning theory that rises in these days. It can be observed that constructivist theory reaches all the way from Socrates, Plato, and Aristotle (from 320 470 BC. AD) works when all of them spoke about (Creation of Knowledge). In addition, there are three top persons that made a real good impacts in order to demonstrate the pattern of constructivism theory as it become now which based on sort historic are John Dewey, Lev Vygotsky, Jean Piaget.

John Dewey (1859- 1952)

He is the early founder of constructivism theory. Dewey had his own beliefs in order to express his thoughts about constructivism theory. Additionally, he believed that construct and learns new things will not happen if the learners do not have old related experience in order to complete the learning process. Also, he believed that the learners learn better in groups because human nature is social, so when they working together they build their knowledge. Even more, he called teachers to give the student opportunities to collaborate and work through directed activities to build their learning knowledge.

Jean Piaget (1896- 1980)

Piaget is one of the leaders of constructivism theory. In fact, he added the important that explains the change in mental of human being through ages, which knew as knowledge's levels. First level, from age 0 to 2 years called Sensor motor Period. Second level, from 2 to 7 years called Preoperational Period. Third level, from 7 to 12 years called Concrete Operational Period (before learn Algebra). Final level, from 13 to adulthood called Formal Operational Period. Even more, Piaget launched important thing, which is Theory of Development. He believed that learners need to construct their knowledge through experiences. These experiences give them ways to develop schemas that are created in the mind. Additionally, Piaget described how new information can be shaped in learner's brains and it includes three types of processes, which are assimilation, accommodation, and equilibration. In assimilation, the learners integrate new information or experiences in their own thoughts. Accommodation is when the learners change old schema to another in order to include new information or experience. Equilibration is high mental development process, which include assimilation and accommodation. This process happened when learners' mind needs to adopt more deeply to conditioning experiences or information that causes modification of previous schemas in learners' brain.

Lev Vygotsky (1896-1934)

Vygotsky was one who had real good impact in constructivism theory. He developed Social constructivism. In fact, he certified that students learn effectively in social groups. Even, the students construct their meaning from social communities in their own perspectives, which is affected by culture, language and knowledge. Even more, he believed that the humans learn by meaning and individual import not from memorizing facts. He called them to be active.

Additionally, he developed a model for learning which makes the teachers very active not the origin teachers so she/he will lead the learners to discover and build their knowledge based on their thoughts. Furthermore, Vygotsky is credited with an important discovery model concept, which is Zone of Proximal Development. Model of (ZDP) explain what the students can do, build, understand, and learn when they get help, which describe potential development level in this model or by themselves, which is actual development level. Also he refuse the idea that makes the learning process just stand on absorbing information, but he emphasized that learning is a process that includes stages of adaptation and interaction with educational content in order to build their own knowledge. In addition, he was a source of inspiration for many of the important educational principles such as discovery learning and accepting the differences, individual learner, and does not force the knowledge on learner, but the learner will create knowledge by themselves.

In fact, there are different points of views about constructivism theory about challenges and benefits when the instructor uses it. Some criticisms that opponents talk about that as results of researches:

- There are basic knowledge and skills that learners cannot learn it by them through discovery, but rather it needs to be taught like math problem or the multiplication tables.
- The instructor needs more time to know individual personal Zone of Proximal Development level for each learner in order to know their needs and skills, then lead the learner's activities and tasks in effective way that help them construct their own knowledge.
- This theory has great results with learners who have a lot of experiences to construct their knowledge from, but not for the learner who do not have enough experiences.
- Sometimes working in groups not effective for learner because there is different personality's learner like some of them are very shy, that means not all of the learners can get the benefit from work in groups even they will not be able to learn from group work.

In other hand, the researches show a lot of benefits and positive points from using constructivism like:

- The knowledge that learners construct and build are able to transfer from sitting to another or information that the learner learned in one class will be able to use it in other class, for example, learn circular shape in class can transfer to another setting like wheels' car.
- Working in groups make the learners develop their skills in order to express their needs.
- Develop prior knowledge and experience of the learners.
- Learners can transfer skills and knowledge they built to their real world.
- The learners can collaborate with teachers, friends, family and society.
- Constructivism theory helps the learner solve their problems.
- Learners construct their knowledge so they actually own their information.

In fact, constructivism theory one of the most important theory that used in education setting. It is also one of the best theories that deal with any change or modification occurs in the educational environment. Along with working to harness this change to further enhance the status of this theory in the educational environment. The most significant change that constructivism theory adapts is integration of technology in education setting. Indeed, constructivism theory has been able to use technology to serve constructivism principles theory. Even constructivism became one of the main approaches that followed by integration of technology in education. Technology is developing every day and it is become involves in the teaching method. We know that the technology adapts in all age, any groups of learners, and any learning style. On the other hand, using technology in teaching randomly does not achieve the desired results of using it. But using technology with thoughtful scientific approach in order to integrate the technology in education is has big impact and it will be useful in development of education. In fact, research has proven the effectiveness of using constructivism theory on the integration of technology in education. There are so many ways that make constructivism led the technology integration in education. I choose to talk about as an example for the relationship between constructivism theory integration into technology is using Mobile Learning.

Mobile learning is one of modern technology and communication that become one of important technology, which can be used in order to encourage learning in education setting. It is an amazing technology that can carry with you anywhere and everywhere using wireless network, mobile networks' phone in order to facilitate, support, and enhance the expansion of the scope of teaching and learning. Mobile learning is not limited by smart phones; there are different forms of mobile learning such as iPad, and iPod. In fact, these devices have large number of users from all ages because it is easy and excited for people to use as well as it is very easy to carry out. Even more, it is an effective way to shorten the time and distance between the students. These features make mobile learning one of the most best and enjoyable way the learners can learn from. In the beginning, we need to focus on preparing and training the faculty to integrate technology with constructivism theory. We can train teachers by provide courses in the field, make it decisions that teach in colleges of education, train them to change their role of teaching from transmitters of knowledge to facilitators and guides for learning process. Additionally, there are important features that need to be available in the teacher which are:

- Teachers need to make sure when they work with students that they working to build the knowledge not reproduce the knowledge.
- Teachers building and construct Knowledge must be in individual and through discussions, cooperation, and social experience.
- Teachers should emphasis on high thinking skills and problem solving.

After we finish preparing the teachers in their new missions. Now, it is time to prepare learning technology curriculum to match our new technology, which is mobile learning. That's means that mobile learning is going to be the first and major tool to teach the course. So, the teacher has to decide which tools from mobile learning are going to use in this class. In this example, we are going to use loaded games in smartphone in order to teach science class using constructivism theory as our approach. In this case, the student has prior knowledge about all human body parts' names, from that we are going to let the student use the loaded games from (her/his) device and make the student determines the actual place for each parts of human body, and the actual physical job. Even more, we are going to let the student choose favorite animal then compare the parts of animal body with human. From these constructivism methods, the learner work on construct and build their own knowledge on (his/her) prior knowledge using mobile learning technology.

Another example as well, using another feature that available in Smartphone as tool that work for student to integrate technology in education along with constructivism theory is Short Message Service (SMS). Interactive broadcasting via SMS is one of great tools that students can use to communication with each other and with the teacher. The role of the teacher will be ask question for homework or ask problem that need to solve for instance, ask the student to prepare an active situation that explain how mathematic can be use in our live. The learners are going to use SMS to discuss homework and exchange their views on these assignments. Even they can communicate with student in other school or live in another city to discuss how to solve problem that related to the class in this cause will be explain how mathematic can be use in our live. So, the student has their old knowledge it might be prior knowledge about the multiplication table and explain how to use it in the supermarkets. The result will be that each student enriches their own knowledge through this meaningful discussions and exchanges of experiences in order to answer the question.

Another example with using constructivism in iPad or iPod will be simulation of virtual reality. In this example, we are going to lead the learner to simulate the reality of the real world in order to solve the problem of extinction of animals or plants or endanger once. At first, the student is going to choose their own device rather is an iPod or iPad as our example. Then, from learner prior knowledge the student know what is a good environment for their animal or plants that (he/she) choose as well as (he/she) already knew the causes of the extinction of this animal or plant. From this points, the learner are going to create simulate the reality of virtual in their device in order to provide a solution. In this example, will be create good environment to give this animal or plant chance to survive. For example, if the learner chooses Panda, so one of the good environments for this animal to survive will be environment that prevents hunting. In our situation with iPads and teacher computer with projector setting, we can create very good education environment using constructivism theory as approach integration with technology. Example one, we are going to teach the student Science class. Students have their prior knowledge about human body's parts. The teacher is going to first, download on the projector human body that has no bones or parts, then ask the students to making groups. Each group will be responsible for match the parts of the human in the right place using their iPads that related to the teacher projector.

For instance, group 1 responsible to match all the head parts from their iPads to the screen of the teacher's projector. Example two, teacher is going to build on the student old information about pollution in the environmental. So the teacher is going to ask the student to work in groups. Then, the teacher will ask them to make research about pollution in the environmental include important information about our topic, which is pollution in the environmental. For example, the important information the students need to include is what the definition of the word pollution mean in their own opinion? Where are the places that have this problem and why that happened to them? Provide the images that describe this problem and other information they would like to provide? After the student finish collaborate and collect data, they need to present that information in class using their iPads, which are connected to the teacher's projects. Third examples, in class of teach English as second languages. Students have prior knowledge about alphabet. The teacher will download on the projector's screen defiant images with letters underneath them. But the images describe the different sound of the latter than the later then seen in the screen. After that, the teacher is going to say the name of the image. So student need to use their iPads in order to choose the correct later, for example word Car the sound of the first latter is K different than the correct later which is sound C so the student must be choose C rather than K.

Conclusion

Constructivism theory is one of the most effective theories that help the learner construct and build their own knowledge. Learners build meaning and knowledge through joining to groups, collaborating, and engaging with these groups. He/she will construct knowledge based on their experiences, thoughts, and beliefs. Constructivism theory has a great impact for both the learner and the instructor. In fact, the impact will be much more especially if this theory integrates with technology. Also, the technologies get the benefit from using constructivism theory as approach in order to integrate technology in education. The technology will become more advantageous. Learners will become very active and more responsible about what they learn. Even more, this theory supports higher skills and complex and collaborative problem solving in learner mind. Constructivism theory impacts the teachers as well from change their way on teaching style from transmitters of knowledge to guiders in the learning process.

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