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Brittani Oyster  
*South Dakota State University, Brittani.Oyster@jacks.sdstate.edu*

Jesse Bobbit  
*jesse.bobbit@jacks.sdstate.edu, jesse.bobbit@jacks.sdstate.edu*

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The Use of Constructivism in Agricultural and Physical Education

Brittani Oyster and Jesse Bobbit

South Dakota State University
Finding ways to enhance and engage students in learning is something that teachers strive to do every day. Through a variety of instructional methods, teachers provide the best opportunity for each student to receive the specific instruction they need to be successful. Finding out what strategies will motivate students and give them the desire to learn is the holy grail of education. One key theory that has been utilized effectively in education is the theory of constructivism. This theory was brought about largely through the influences of Lev Vygotsky and Jean Piaget. Piaget discovered two mental activities which he called assimilation and accommodation. Assimilation refers to an individual's ability to use previous experiences to interpret new information while accommodation refers to the modification of previous experiences and how it applies to new information. Piaget also acknowledged that these two mental activities work together to create harmony between dependence on previous experiences and acceptance of new information (Seifert & Rosemary, 2009).

While Piaget focused on the individual, Vygotsky focused on how constructivism is observed in a social setting. Vygotsky researched and observed how the influence of expert individuals shapes the learning of a child with little or no experience on the subject. According to this theory, children or students who are learning new skills will have increased success if they are guided by an individual who is an expert at that skill. Jerome Bruner named this type of support “instructional scaffolding – literally meaning a temporary framework, like one used in constructing a building, that allows a much stronger structure to be built within it” (Seifert & Rosemary 2009, p. 35). Blending individual understanding and social interaction with those who are experts in their field creates an environment for students where knowledge can be organically created.
The theory of constructivism has important implications in the fields of agricultural and physical education. Both subjects are unique in that many of the courses offered in high schools require a certain amount of hands-on learning. Through the constructivist theory, when creating a curriculum, instructors allow students to engage in active, hands-on learning, use previous knowledge to expand on learning, and increase self-confidence along with problem-solving skills.

Preparing students to be successful not only in school but also in life outside of the educational setting is a responsibility placed on educators. As teachers create their lessons through the constructivist approach, they allow students to combine their knowledge of school content with real-life experiences. This method then increases the students' levels of understanding of the given content. In contrast to teacher-led instruction, the students take on the learning as their own with the guidance of their teacher. The constructivist approach has continued to be implemented more over this past decade and we firmly believe this is because of the world that we live in today. In an article written by Morris (2019), it states, “Self-directed learning seems imperative in a world that is becoming ever more complex and changeable, where much benefit is gained from adapting behavior accordingly.” It is evident through the many research studies reviewed that engaging students in active learning greatly increases their knowledge and understanding of the topic at hand.

According to a study conducted in Kenya by Aholi, Konyango, & Kibett (2018), the availability of hands-on resources such as greenhouses, farms, and laboratories enabled students to take classroom learning and apply those skills to real-world situations. Showing students the application of things learned within the classroom has a lasting effect on what information the student can retain. Another study that observed three different agricultural
programs in the United States found the benefits of a constructivist approach to learning. One agriculture teacher from Northside High School stated, “I feel students learn best on a continuum. I spend time in the classroom providing context and the basics but then allow them to touch the curriculum outside in our barn or on a field trip…” (Yopp, McKim, & Homeyer, (2016, pg. 23).

As a physical education teacher, I am in a sense, forced into using this constructivist instructional method because of the nature of how PE is taught. When teaching my younger students skills such as locomotor movements, I need to let them practice and experience the movement on their own. I am not able to verbally state the skill of skipping and expect them to be able to do it. By using a constructivist approach, the students will be able to take the movement skills that they already know and see how they can build off those skills to accomplish the movement of skipping. As a health teacher, constructivism was not as easily used without planning and preparation through lesson planning ahead of time.

Allowing students to build on past experiences and use skills learned elsewhere offers an opportunity to create a different kind of understanding of the material. Krahenbuhl (2016) states, “...students need to be given guidance to be directed in the right direction, with having ample amount of background and prior knowledge to construct a true understanding of the new information.” According to Olusegun (2015) “Learners will be constantly trying to derive their own personal mental model of the real world from their perceptions of that world. As they perceive each new experience, learners will continually update their own mental models to reflect the new information, and will, therefore, construct their own interpretation of reality” (p. 66). I found this approach evident in an
on-farm study conducted by Morgan and Cox (2005) where students were expected to use the information learned in the classroom and apply concepts to a working cattle operation. Students were given little background information about the operation and instead were encouraged to use previous knowledge to solve on-farm problems. Instructors and farm personnel were available to answer limited questions with most of the responsibility for learning falling on the students’ shoulders. “Consistent with constructivist theory this design protects against students being cognitively depended on their instructors and also provides relevance and authenticity to student learning.” Involvement in Supervised Agricultural Experiences (SAEs) is another great example of how the constructivist method can be integrated into education. The student begins an enterprise related to a future career choice. Agriculture teachers, family, and friends are used as “experts” to gain additional knowledge that the student uses to build on what they already know to enhance their business. Participating in such programs as SAEs and on-farm tours allow students to be more responsible for their learning outcomes.

As a physical education teacher, it is important to use the constructivist approach to relate new activities or sports to ones that the students already know. In doing so, they can take that knowledge and apply it to the new information being given to them. For example, there are a lot of skills that are used in football that are also used in baseball or soccer. Each sport uses the concept of defense and offense, and the participants need to have the ability to throw and catch a ball, along with a variety of movement skills. When comparing and contrasting these activities, students can construct an understanding of the content faster because they are already familiar with the individual aspects that make up this new activity or sport that they are learning.
Many times, students feel mentally trapped in thinking that there is only one right answer to a problem. While that might be true in some cases, most of the time there are multiple ways to solve a single problem. Removing some of the "structure" in a traditional classroom setting can often benefit students that have a more difficult time learning. When referring to the benefits of on-farm education for students with certain learning difficulties, Smeds, Jeronen, and Kurppa (2015) stated, “It allows them to focus more on what they already know and use that information to develop their knowledge further without the pressure of traditional learning methods. More pupils with learning difficulties would be able to participate in normal education instead of special-needs education if appropriate authentic learning environments were to be included in education. That could improve these pupils’ understanding of themselves in the role of a learner while also improving their self-image and self-efficacy, as well as their image amongst their peers and teachers.”

As Vygotsky observed through observation, there is a social aspect to constructivism that greatly enhances the ability of students to process and retain knowledge. Bush, Friedel, Hoerbert, & Broyles (2017) conducted research observing the problem-solving styles of students and how carefully pairing students with different styles can help increase their knowledge and help them view problems and solutions in a variety of ways. "Cooperative learning allows for students engage in group work that leads to greater achievement of problem solving and teamwork skills, which provide students with transferable skills to the workforce" (p. 36).

The constructivist instructional method allows students to gain confidence and problem-solving skills through the ownership that comes from this teaching strategy. Olusegun (2015) states the purpose of constructivism is, "To encourage ownership and a
voice in the learning process (student-centered learning).” Giving ownership to the students for their learning is such a powerful strategy because it allows them to connect with the content being taught, rather than the information just being given to them without any self-exploration of the content.

As a teacher, one of my best lessons was at the beginning of the year when I allowed the students to work together as a class and use self-exploration to determine the best warm-ups that they would do throughout the year. I initially demonstrated a variety of exercises and activities and told them that it was up to them as a class to decide the most effective way for them to warm up each class. The ownership that I gave them was very effective in my opinion because it was the class that chose what they wanted to do each day they came in and it was not something that they were being forced to do by their teacher. Another reason why it is so important for teachers to give their students ownership of their learning is that students are more alert and in tune with what they are learning. In an article by Krahenbuhl (2016), it states, "Students who are learning and using strategies are anything but passive; rather, they are alert to what they are doing and how they are doing." When a student can take strategies given to them and truly understand their own learning styles, this is when the student's confidence will increase. If students understand how they learn best, then they will be able to use the skill of problem-solving in their learning by taking the content and figuring out how they can best comprehend it. They do not have to wait for a teacher to instruct them with the perfect strategy or method, rather they can take the information given and use the strategies they know to build on their previous knowledge.
We believe Benjamin Franklin said it best when he stated, "Tell me and I forget. Teach me and I remember. Involve me and I learn." By using a constructivist approach to teaching, educators will be able to better engage their students in learning new concepts. Allowing students to take more responsibility for their learning will give them more personal reasons for furthering their knowledge of material. Incorporating constructivist theory into traditional teaching methods will also help students retain information and give them the ability to apply what they learned in the classroom to real-world situations whether it be on the playing field or on the farm.
References


