

Innovations in Teaching & Learning

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Abstract

Biochemistry is a fundamental basic science subject but criticized to be most volatile as it contains many intricate reactions. Various methods were tried to make subject illustrative and simple to keep interest of students alive as it is volatile with intricate reactions. Here I am focusing on three interactive teaching learning methods we have used by involving the students in the process of teaching learning. There are some topics in Biochemistry where memorization matters much than the understanding. Here students Seminars are effective. In student seminar, all responsibility comes to student and intervention of teacher may appear as interruption. This drawback can be overcome by Team teaching where teachers' intervention is structured. Teachers teams with students to present topic. Though role play is commonly used for teaching communication skills it can be designed to teach academics. Despite growing digitalization, constitutional methods of teaching like role play is still appreciated by students and teachers as a useful and effective teaching learning tool.

Keywords: Innovations, Teaching Learning Methods, Student seminar, Team teaching, Role play.

Biochemistry is a fundamental basic science subject but criticized to be most volatile as it contains many intricate reactions. Various methods were tried to make subject illustrative and simple to keep interest of students alive as it is volatile with intricate reactions.

Benjamin Franklins Quotes says:

**“Tell me and I forget,
teach me & I remember
involve me and I learn”**

In my efforts to build interest of students by involving them, we have tried few innovative methods:

Students Seminar: There are some topics in Biochemistry where memorization matters much than the understanding. I prefer to take students seminar as narration part can easily done by them. Student's involvement makes them more responsible. Even students share their own ways of learning which helps other students too. More over teachers can correct them. It's like peer learning under expert supervision.

Example: Mucopolysaccharides, Diagnostic significance of Enzymes. Properties of proteins.

Advantages of Students Seminar:

- **Breaks monotony**
- Increases student's involvements
- Students may share their techniques to remember the things.
- Builds confidence in students.
- Reinforcement can be done by teachers



Fig. 1

Team teaching: In student seminar, all responsibility comes to student and intervention of teacher may appear as interruption. This drawback can be overcome by Team teaching where teachers' intervention is structured. Teachers teams with students to present topic.

This method can be preferred for well acquainted topics like Glycolysis & TCA cycle.

Example: Glycolysis & TCA cycle.

Metabolic cycles with energetics covered by students while Regulation of Glycolysis by teacher.

TCA Introduction, metabolic reactions covered by students & Amphibolic nature & Anaerobiosis was covered by teacher.

Simple parts covered by students & complicated parts by teachers.

Advantages: Increases teacher students' interaction. Confers sense of responsibilities in students.

Role play: Teaching fatty acid synthesis used to be night mare for me as the concept of three-dimensional structure Fatty acid synthase complex, its loading with

different substrates were difficult to explain. After a long thought I used extempore role play using five students to explain loading of fatty acid synthase complex. Rounds of applaud by the students inspired me develop full pathway as role play. Next year we involve 12 students and demonstrated whole pathway with help of placards.

Students not only participated but contributed to designing of pathway by role play. After three practice sessions, we presented roleplay in class room in front of students and teachers.

Step 1: Demonstration of Enzymes of FAS-MEC:

Fatty acid synthesis is characterized by its key enzyme that is Fatty acid synthase multi enzyme complex. FAS MEC is dimer each having 7 enzymes with one Acyl carrier protein. Each unit and its enzyme was demonstrated by students holding placards.



Fig. 2



Fig. 4



Short hand model of MEC- FAS

Fig. 5

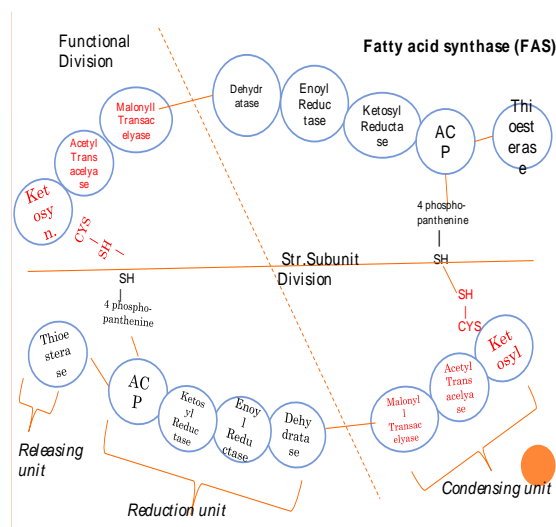


Fig. 3

Step 2: Describing three-dimensional structure of FAS-MES:

Demonstration of three-dimensional structure was necessary to imprint in students mind to understand

concept of working FAS_MEC. (How 2 moles of palmitic acid are synthesized at once). Two students enacted as short hand model of FASMEC to show the alignment of dimer and how it acts as anchor to hold metabolites of the pathway.

Step 3: Enacting the Metabolic Pathway:

4 students represented 5 enzymes by holding placards of names of the enzyme are sitting on the dais while another 4 students standing on a dais enacted as intermediate products formed, one more students helped in removal & addition of water as well as reducing equivalents. Whole pathway was gradually portrayed with narration and use of placards.

Interchanging position of metabolic intermediate, repetition of cycles up till the synthesis 16 carbon palmitic acid & its release from FAS MEC was beautifully shown.



Fig. 6



Fig. 7

Impact of role play: Role play on fatty acid synthesis was highly appreciated by the students & teachers as it helped them understanding structure & mechanism FAS complex. By creating mental image on the brain of students it has enhances retention of knowledge & better reproducibility. However, teachers felt that reinforcement should be done with the power point presentation. Teachers and students do not feel that role play is either outdated or time consuming. During practice & performance role play has promotes teacher student communication. It has motivated students and teachers to further participate in such activities.

Conclusion

Though role play is commonly used for teaching communication skills it can be designed to teach academics. Despite growing digitalization, constitutional methods of teaching like role play is still appreciated by students and teachers as a useful and effective teaching learning tool.