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## COVID-19 CHALLENGES AND EDUCATION IN INDIA

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### ABSTRACT

In chemical education too much consideration is given to Chemistry and not enough attention to education. A lot many difficulties are experienced by the students in Organic Chemistry. Organic Chemistry is only introduced at the surface level in the secondary classes. The Organic Chemistry formula, nomenclature, curved arrow diagram, mechanization of reaction have been considered the most difficult topic at grade 11. To alleviate the misconception and difficulties in chemistry and to facilitate cognitive development the context based programme and 9 E learning cycles are some innovative teaching methodologies to be inculcated. The researcher and the practicing teacher has developed innovative programmes to germinate the thinking skills. It focuses on the concept of role and particulate nature of a substance. Result of the present paper reveals that it is effective in enhancing students understanding any conceptual chemistry.

### KEYWORDS

Organic, Chemistry, Difficulties, Topics and Conceptual change.

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### INTRODUCTION

“We have been busy changing the menu in the ship’s restaurant while the ship had been sinking” - Johnstone<sup>1</sup>.

The major intention of the chemistry education is to channelize the students in building mental replica of chemical phenomena and to ensure the close congruence of scientifically developed model. The area of chemistry where the students of Senior Secondary School demonstrate huge challenge with respect to building authentic mental model is organic chemistry. For human care adequate knowledge of conceptual understanding of organic chemistry is pre-requisite. Organic chemistry is the

key to develop innovative products in the society. It is the foundation for the food flavor, plastics, clothing, tires, fuel, cements, pharmaceuticals and house cleaning agents. It is also significant to the forensic department for investigation. Senior Secondary Chemistry students are expected to have satisfactory understanding of the aspects of Organic Chemistry. Organic Chemistry constitutes 40% of the Chemistry syllabus. Though it looks small but it is important to study Organic Chemistry. A better understanding of Organic Chemistry fosters students to see chemistry in food, medicines, detergent etc. Organic Chemistry is pre-requisite for studying nutrition, bio chemicals, medicine and pharmacy in addition to other fields. Hence students are required to study Organic Chemistry with proper conceptual understanding of the subject.

Students consider Organic Chemistry as a big hindrance to study chemistry at Senior Secondary School level. Organic Chemistry is not only difficult but also hardly mentioned elsewhere. Three-dimensional thinking: microscopic, macroscopic and symbolic domains are vital for the conceptual understanding of Organic Chemistry. If Aspirin tablet is dropped into the test tube, molecules are not perceivable by sense (macroscopic) and hence artistic chemical formula, symbols and equation are drawn to represent the formula of Aspirin (Symbolic). There are several factors which affects the student's performance like:

1. Poor conceptual foundation.
2. Environmental/social facts/home/school.
3. Teacher's content knowledge.
4. Student's preparedness.
5. Large class-rooms.
6. Psychological foundation of the students.

Students are not having clarity about the nature and the connection with three dimensional levels of the substances. Hence students represent the flaw on the basis of chemical phenomena in the Organic Chemistry. The student's poor performance is liable to the reduced retention capabilities, low motivation, poor academic achievement, inappropriate social group and parental issues. A

teacher plays a significant role in the learning process and influences the student's attitude towards chemistry. Teacher's behavior affects the student's performance. Enthusiastic teachers facilitate students to participate in constructive activities, ensure students to feel free and enable them to take responsible action and learn to construct their own knowledge. Organic Chemistry, in a very simple term it is a chemistry of carbon compounds excluding, oxides, metal carbonyls, metallic carbonyls and other related components. Organic compounds are huge class of compounds. Such compounds are formed by one or more atoms of carbon which are covalently bonded with the atoms of other elements most frequently with nitrogen, hydrogen or oxygen.

## METHODOLOGY

Identify the difficult concepts in Organic Chemistry. Design/develop/ facilitate Teaching - Learning in Organic Chemistry. Implement / evaluate the effectiveness.

The present research is conducted in three stages. The stage one is the investigation of chemistry teachers and students. The outcome of the investigation is to identify the key concepts of the topics which include: IUPAC (The International Union of Pure and Applied Chemistry) Nomenclature, Functional group, characteristics of organic compound, reaction types and reaction mechanism.

The stage two is to fabrication the intervention programme. The stage three involves the implementation and investigation of the intervention programme in school. The study is conducted for 12th batch students from 2008 to 2020, and 300 students. The intervention programme is investigated by using three lenses:

1. Participation of Teachers
2. Participation of students
3. Comparison of the experimental group with the control group. (n=110)

The intervention programme is designed by using the findings from stage one and from the secondary source. Ten key elements are used to fabricate the

outline of the intervention programme. The animation illustration illustrates the importance of the use of contextual link to create interest among students for teaching organic chemistry. The Teaching-Learning ground is designed for the overall content of the curriculum. The Teaching-Learning methodologies are integrated and fabricated with a specific focus on the key difficult areas/topics.

## RESULTS

Result of the study reveals that the intervention model is an effectual design as per the teacher's opinion. The teacher's are concerned over the non related content of the syllabus which differs from the exam related preparation.

A significantly higher percentage of the study group (72%) has joyful learning experience of Organic Chemistry than the control group (53%) ( $n_2(3) = 8.882$ ,  $p=0.02$ ). The students of the study group (51%) find organic chemistry as easy topic to learn for the examination than the control group (39%). The students of the study group are more confident about attempting the questions of organic chemistry and they perform better than the students of the control group in past year examination questions in test conducted for knowing their conceptual understanding. The organic chemistry intervention model is very effective in preparing the students for improving their conceptual understanding, interest and their performance in critical examination.

## CONCLUSION

The result of the present inquiry-based teaching methodology which is designed to the develop the cognitive skills and to relate chemistry to the real life context is effective in addressing some of the difficulties in Teaching-Learning process of Organic Chemistry at Senior Secondary School level. This Teaching-Learning approach is applicable to other core subjects also.

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## CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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