

Two Days Hands-on Workshop for Teachers

On

“Supporting Students’ Sensemaking Through Karyotype: A Technology Enhanced Learning Environment and Exploring the Classroom Adaptation and Implementation”



Organized by:

Department of Botany

Holy Cross College, Agartala

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In collaboration with



Educational Technology
IIT- Bombay

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Date:

29th February &
1st March, 2024

Convener:

Dr. Debasree Lodh, HOD & Assistant Professor
Department of Botany, Holy Cross College, Agartala

Joint Convener:

Dr. Somnath Kar, Assistant Professor
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Members:

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Karyotype:

**Web-based Technology
Enhanced Learning
Environment (TELE)**

“Understand, evaluate and adopt
Karyotype in your classroom to support
students sensemaking”

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KARYOTYPE

Dear TEACHERS,

Clinical diagnosis of genetic disorders caused due to abnormalities such as change in the number or structure of entire chromosomes, or a specific part of the chromosome carrying a particular gene requires sensemaking based on the symptoms of a patient, to make decisions regarding the treatment. Students need sensemaking and reasoning skills to build a scientific explanation by analysing the symptoms and connecting it with chromosomal abnormalities. However, students often learn genetics as separate, unrelated concepts, and face difficulty in understanding how they are related. Due to the lack of experience and not being immersed in the phenomena being investigated, novice learners, when introduced to new concepts, perceive them as an activity of mere memorization of facts and procedures. Though sensemaking and reasoning are essential to the way scientists construct knowledge, the majority of science undergraduate students lack these skills. This is partly due to the undergraduate science laboratories being fact-laden, non-inquiry based, with activities that do not support the development of sensemaking and reasoning skills explicit. Apart from these cognitive aspects, clinical diagnosis also involves affective aspects such as forming a personal connect with the cases. This is important to be immersed and involved in the process of diagnosis. Being empathetic towards patients and their stories helps in relating the given situation to prior knowledge and experiences, to build explanations regarding the new situation encountered. Empathy helps the learner to be more attentive and considerate towards minute details that might be significant for the diagnosis.

Karyotype is a web-based technology enhanced learning environment (TELE) where students are given the task of diagnosing the genetic disorders of patients while assuming the role of a geneticist. It uses a case-based reasoning approach where the students are given a set of symptoms and asked to explain them with the help of given information to suggest a diagnosis. Karyotype provides **hands-on learning experience** of the diagnosis process where students build and revise their explanations while solving cases of genetic disorders through a series of learning activities.

So far we have conducted research studies using Karyotype, with **over 100 students (UG,PG Bioscience majors)** from **3 different states (Kerala, Karnataka and Maharashtra)**. Our findings suggest that working with Karyotype helps students in Sensemaking during clinical diagnosis in a TELE. We have established the design and pedagogy of Karyotype for one topic/context *i.e* Clinical diagnosis of genetic disorders.

We now wish to further expand it by exploring the possibilities of **implementing Karyotype in classroom** (during theory lecture or practical) as a tool complementary to the curriculum. We would also love to explore adapting Karyotype pedagogy for other potential topics in the Undergraduate Bioscience curriculum.

Your help with this regard would be highly appreciated.