

Course Title: Navigating Cultural and Linguistic Intersectionality in Science & Mathematics Education

Course Code: SCE205.2

Course: Elective

Credits: Two

Duration: Winter 2025 (**From January 07 – April 07, 2025**)

Time and location: (Tuesday, 11.30-1.30)

Contact hours: 26 hrs, 13sessions,

Instructors: Narendra D. Deshmukh and Kalpana Kharade

Guest Sessions: Prof Lee, O / Prof S. O. Oyoo (Online)

About the course

Situated in the context of National Education Policy (NEP 2020) in India, it is necessary to examine how schools address student diversity in the classrooms. Students' cultural and linguistic diversity continues to increase in educational context in general and in science & mathematics education in particular.

As scientific and technological innovation and advancement continues to impact all industries and sectors of the economy, influencing every aspect of our lives, scientific literacy is critical for all students.

Equitable access to science & mathematics education is a national and critical priority. Prioritizing equitable access to science will help to address various disparities in the economic sector; drive creativity, innovation, and problem solving; prepare a diverse workforce to meet the future needs of our economy.

In part to address this issue, it is essential to introduce the concept of intersectional reculturing of learners in science & mathematics education, as an approach for practitioners to consider.

For this the educational practitioners need to be prepared for culturally and linguistically transformative and responsive pedagogical practices in a theoretically grounded manner.

This course will provide an immersive experience of gaining insight in to cultural and linguistic intersectionality to examine deficit ideologies and biases inherent in science & mathematics as a body of knowledge as well as science & mathematics teacher education. If left unchecked, these prejudices can filter through into school science & mathematics education, reinforcing the stereotypes of who can contribute to the field of science. The course makes an attempt to develop an academic understanding among the scholars, about the learning diversity existing in science & mathematics learning to examine their personal dispositions. It may also generate meaningful discussion for exploring various pedagogical

approaches that can be adopted to facilitate the forms of deconstruction necessary for progress to be made in this area.

Course Outcomes

- To understand the cultural and linguistic intersectionality existing in science & mathematics education.
- To get acquainted with the pedagogical issues around equity in science & mathematics learning and teaching for students from diverse languages and cultures.
- To obtain hands on experience of designing a teaching trajectory for instructional scaffolding of culturally and linguistically diverse learners in science & mathematics learning.

The course consists of two main units, understanding cultural and linguistic intersectionality in science & mathematics education and Instructional scaffolding for addressing cultural and linguistic intersectionality.

Each of these units requires intense, consistent participation from the scholars. Further requirements and assessments will be communicated to the scholars in the introductory lecture(s). The course readings and useful links will be put up on the Centre's Moodle; contribution to discussions on the platform is also encouraged.

I. Understanding Cultural and Linguistic Intersectionality in Science & Mathematics Education

The literature illustrates dilemmas that arise when the nature of science & mathematics traditionally defined as Western science is in conflict with alternative views of science in diverse languages and cultures. Tensions also arise between the ways science & mathematics is taught in school and alternative views that diverse students bring to the science classroom in various settings.

For this unit we will read and critique articles which are related to the following questions, and other questions which will arise in the process:

- How does language affect science & mathematics teaching and learning?
- What is the role of language in learning science & mathematics?
- What is cultural influence in science & mathematics learning?
- How does culture and language intersect with other disparities such as gender, ethnic groups, disability etc. in teaching and learning science & mathematics?

ACTIVITIES

1. Reading articles and participating in the discussion sessions
2. Presenting a group colloquium on the theme.

ASSIGNMENT

Writing reflective essays on any two readings.

II. Instructional Scaffolding for Addressing Cultural and Linguistic Intersectionality in Science & Mathematics Learning

After getting acquainted with the issues of intersectionality this unit attempts to develop understanding about the fact that, when diverse students are provided with equitable opportunities, they capitalize on their linguistic and cultural resources in ways that may not be recognized by teachers in science & mathematics classrooms. The views -- diversity as a barrier to be overcome versus diversity as a potential asset enriching the resources of learning communities -- are contrasting but potentially complementary to each other.

This unit will explore answers to broadly some of the following questions in different contexts:

1. What does intersectionality in science & mathematics teaching, learning, and engagement look like in classrooms environments?
2. How do teachers' instructional decisions influence intersectionality in science & mathematics education?
3. How should science & mathematics teacher preparation and teacher professional development programs consider intersectionality in science & mathematics education, and why?

This unit will include readings and discussions about some of these perspectives and ideas. The unit will require a search of relevant literature, critical reading and presentation of reflections.

ACTIVITIES

1. Read, discuss and understand literature on addressing cultural and linguistic intersectionality in science & mathematics education.
2. Maintain reflective diary, and present from the same during debriefing.
3. Doing content analysis of a science & mathematics unit with an intersectional lens.

ASSIGNMENT

- Design a teaching trajectory of a science & mathematics unit with an intersectional lens.

ASSESSMENT

Students taking the course for credit will be graded on the basis of two submissions (50%) and presentations and participations during sessions (50%).

REFERENCES

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