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EVIDENCE BRIEF

The **Social Sciences and Humanities Research Council** in collaboration with the **Future Skills Centre**

SSHRC's Imagining Canada's Future initiative mobilizes social sciences and humanities research to address emerging economic, societal and knowledge needs for Canada, and help guide decision-making across all sectors toward a better future. This evidence brief addresses the Future Challenge Area of: **Skills and Work in the Digital Economy**

Teacher training in the digital era: diversity, equity, accessibility and inclusion

About the project

Canadian government bodies, industries and communities have a responsibility to prioritize equitable, diverse, inclusive and accessible (EDIA) education systems that consider intersectionalities and address systemic barriers faced by diverse youth in a variety of fields, such as digital literacy and, more largely, science, technology, engineering and mathematics (STEM). One of our primary areas of research focus is adolescents' engagement with digital literacy, and by extension this includes STEM practices as they relate to provincial curricula in Canada. While digital literacies are not the targeted focus of this review, the considerations offered impact the future of the digital economy. This knowledge synthesis review examines inclusive practices in K-12 STEM education, focusing on improving the participation of diverse youth in future professions in the digital economy. In parallel, the report speaks to the role of teacher training in the digital era, and avenues that need to be taken in that area.

Project objectives were to:

- identify studies in STEM and STEM-related education fields, such as digital literacy, that address gender and race as part of their focus;
- identify gaps and strengths in STEM and STEM-related studies to help researchers, administrators and educators create more EDIA education systems that prepare students for and promote future digital professions.

Key findings

Across the studies reviewed, there is an underlying and common thread across the research evidence that points to ongoing EDIA challenges in Canadian K-12 provincial schooling systems, including curriculum and policies that need improvement in EDIA measures. Our literature covers five major gap areas:

Curriculum: Curriculum reform is required to provide truly inclusive, diverse and equitable access to and within STEM and STEM-related education. Curriculum must be reconstructed to include more culturally responsive and constructivist pedagogical strategies that integrate real-world and hands-on learning that is informed by a diversity of cultures, languages, values and knowledge.

Teacher training: Constructivist, student-centred teaching practices include the incorporation of technology in the classroom and require skills and knowledge surrounding antiracist cultural competency, and proficiency to support and communicate effectively in meeting the diverse needs of students. Most studies suggest that this type of professional development is lacking across Canada.

K-12 student needs: Students who are marginalized by society often have a difficult time identifying with and feeling like they belong in STEM due to stereotypes imposed on them. STEM has a history of being modeled for white, middle-class, cisgender men. Stereotypes and biases in STEM must be challenged to create inclusive learning environments.

Educational policy and structures: Structural racism and discrimination in education policies continue to negatively impact diversity of participation in STEM. Future policy reform needs to address barriers and prioritize academic well-being of underrepresented students. Adequate funding and resources, as well as unambiguous policies and training, should be provided to increase student success and opportunities.

Community supports: Support systems and community connections are critical in increasing the advancement of underrepresented students in STEM and STEM-related education. Family, Elders, teachers, administrators, educators, guidance counsellors, support staff, peers and community liaisons all have the potential to provide positive support to help students feel like they belong in STEM communities.

Policy implications

To generate more EDIA futures for the digital economy, it is crucial that policies address structural racism and discrimination in education with a focus on:

- curriculum reform that adopts culturally responsive and constructivist pedagogies informed by local cultures, languages and values with an EDIA focus;
- culturally inclusive teaching practices that are consistently integrated into STEM classrooms supported by professional development with an EDIA focus;
- support systems that provide access to Elders, teachers, staff and mentors who are reflective of students' diverse lived experiences, as well as access to programs and services that provide academic, financial, cultural and mental health and wellness resources;
- community collaboration and input into decision-making processes related to curricula and service to support underrepresented students;
- future research into how the complexities of intersectionality impact student retention and persistence in both STEM and STEM-related education and careers.

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FURTHER INFORMATION

▷ **Read the full report**

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FSC is a forward-thinking centre for research and collaboration dedicated to preparing Canadians for employment success. We believe Canadians should feel confident about the skills they have to succeed in a changing workforce. As a pan-Canadian community, we are collaborating to rigorously identify, test, measure, and share innovative approaches to assessing and developing the skills Canadians need to thrive in the days and years ahead. The Future Skills Centre was founded by a consortium whose members are Toronto Metropolitan University, Blueprint ADE, and The Conference Board of Canada