Washington State University

College of Education, Sport and Human Sciences

Gan Jin

Will defend their dissertation on

Date: April 23, 2026
Time: 10:00 A.M.

Pullman Campus – Cleveland Hall, Room 353
Zoom: Link by request ceshs.gradstudies@wsu.edu
Faculty, students and the general public are encouraged to attend

Title:

EXAMINING THE ROLES OF COGNITIVE-AFFECTIVE FACTORS IN CONCEPTUAL CHANGE: MOTIVATION, COGNITIVE LOADS, AND REFUTATIONAL TEXTS

Chair: Robert Danielson

Abstract:

This study examined the roles of cognitive-affective factors in promoting conceptual change, focusing on the interactions among text structures, prior knowledge, motivation, and cognitive loads. Inaccurate prior knowledge can impede learning, and refutational texts have been shown to facilitate conceptual change by explicitly confronting misconceptions and presenting scientifically accurate explanations. Drawing on the Conceptual Change Model, the Cognitive Reconstruction of Knowledge Model, the Knowledge Revision Components framework, and Cognitive Load Theory, this study investigated how refutational and expository texts influence learners' intrinsic, extraneous, and germane cognitive loads, conceptual understanding, and conceptual change. Additionally, learners' topic interest and prior knowledge were examined to better understand these effects of text structures. Using a controlled experimental design, data were collected from learners exposed to different instructional texts and analyzed to explore the interplay between instructional design and individual learner characteristics. Results from this study showed that topic interest positively predicted post-test knowledge and conceptual change, whereas prior knowledge showed no significant associations. Cognitive load effects differed by text structure: in the refutational text condition, intrinsic and extraneous cognitive load negatively predicted learning outcomes, while germane cognitive load positively predicted both post-test knowledge and conceptual change. These findings suggest that text structure moderates the impact of cognitive loads on learning, highlighting the role of germane load in promoting learning in refutational texts. Findings from this study provide theoretical insights into the mechanisms underlying refutational texts and conceptual change and offer practical implications for designing instructional materials that optimize cognitive processing and foster motivation, ultimately supporting accurate knowledge construction in science education.