One Prospective Secondary Mathematics Teacher's Responsive Task Design Through a Locally-grounded Experience

Colin Crawford
Towson University

Nicholas E. Witt
Towson University

Keywords: pre-service teacher education, culturally responsive mathematics teaching, curriculum

Critical mathematics (Skovsmose, 1994) can promote critical thinking about the world through mathematics, leading to a rising *critical consciousness* (e.g., Ladson-Billings, 1995). However, critical mathematics curriculum intending to be meaningful or relevant to students may lead to tensions with respect to the authenticity of the tasks and their connection to societally-valued mathematics content (Brantlinger, 2022). One proposal for teaching mathematics that supports students' deep understanding and learning of mathematics through meaningful activities reflective of students' lived experiences is culturally responsive mathematics teaching (CRMT; del Rosario Zavala & Aguirre, 2024). However, what CRMT looks like in prospective secondary teacher (PST) education remains an under explored area of research.

In this poster presentation, we share the results of an exploration of PSTs' emerging critical consciousness as they engaged in an activity based on Zavala & Aguirre's (2024) "Mathematizing Your World" (p.39). During a variation of the activity, 13 PSTs were instructed to "*Take 15 minutes to walk with your partner. Go outside, return in 20 minutes (build in any personal breaks you may need). When you return, be ready to share about this experience."* and reflect upon the following, *"(1) What do you notice about the places you visit? (2) What feelings do you have about the things you see? (3) What questions come to mind as you do this? (4) What mathematical problems might you pose about what you observe?*" For homework, PSTs were instructed to design a task suitable for teaching content to students in grades 6-12 based on their partnered walk.

This poster will share one PST's (Colin, first author) reflections about the activity and a task that Colin developed through engaging in the *Mathematizing Your World* activity. The poster will provide examples of how Colin's critical consciousness with respect to the socio-ecological (e.g., Coles et al., 2024) was activated through the activity and how this informed his task design which centered an invasive species that he encountered during the walk. For example, he noted how the observation of several spotted lantern flies (an invasive species in the region) informed his decision to construct an exploratory activity for students where they would engage with their local environment and collect and analyze data regarding the number of lantern flies they encounter. This work serves as an example of how engaging PSTs with CRMT activities can creatively inform their curriculum design, promoting a responsiveness to locally-relevant issues.

References

Brantlinger, A. (2022). Critical and vocational mathematics: Authentic problems for students from historically marginalized groups. *Journal for Research in Mathematics Education, 53*(2), 154-172.

Coles, A., Solares-Rojas, A., & le Roux, K. (2024). Socio-ecological gestures of mathematics education. *Educational Studies in Mathematics*, *116*(2), 165-183.

del Rosario Zavala, M., & Aguirre, J. M. (2024). *Cultivating mathematical hearts: Culturally responsive mathematics teaching in elementary classrooms*. Corwin Press.

Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal*, *32*(3), 465-491.
Skovsmose, O. (1994). Towards a critical mathematics education. *Educational Studies in Mathematics, 27*(1), 35-57.