Emotions in Social Justice Mathematics

College Precalculus Students' Experience

PME-NA 46, Cleveland OH

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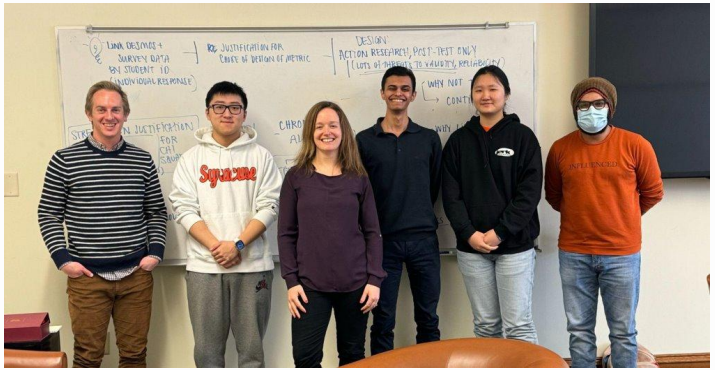
Introduction



Meaningful Math Research Group (February 2024)

- Our Broader research project: MMRG
- Students’ engagement in contextualized mathematics lessons
- Experience emotions when learning about social issues

Research Question

How did learning about a local social justice issue affect students' expression of emotions in a college precalculus classroom?

Theoretical Framework

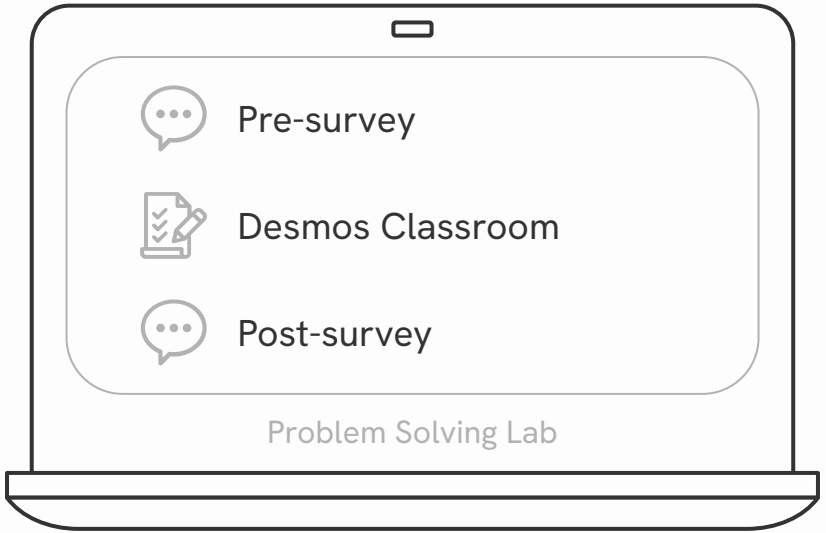
Affective Pedagogical Goals
(Kokka, 2022)

Supporting students' expression of emotions related to the local social injustice issue and ongoing efforts to address the issue.

Historically Responsive Literacy
(Muhammad, 2020)

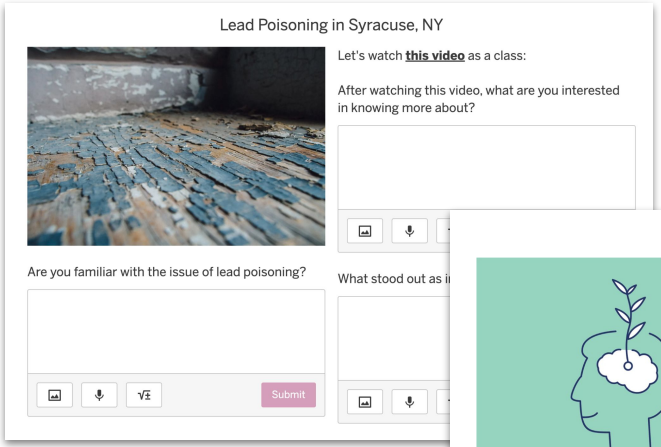
- Identity
- Skill
- Intellect
- Criticality
- Joy

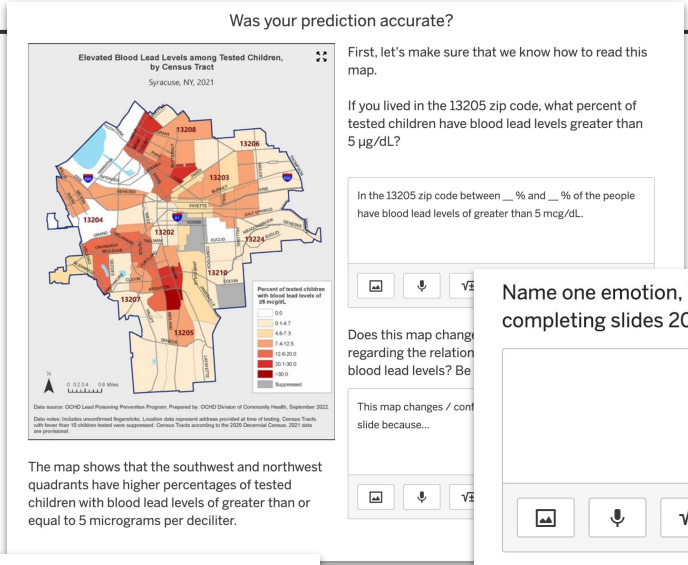
Research Methods

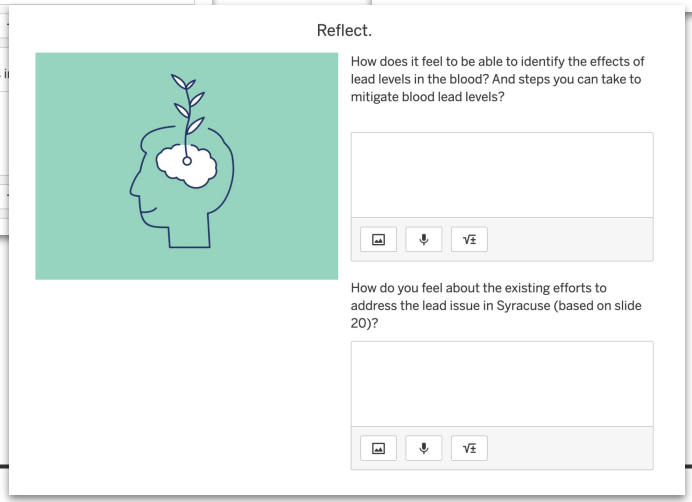


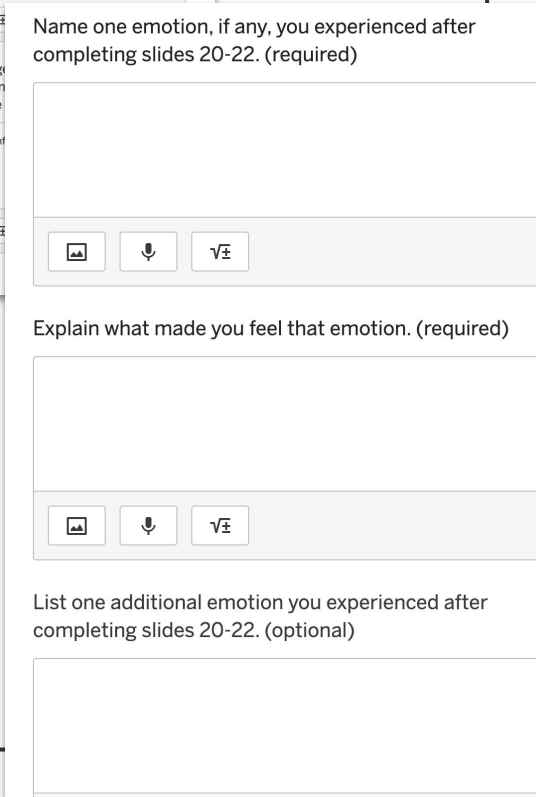
Research Context

Team MMRG designed Desmos Classroom Slides (open sourced)









Thematic Analysis

Braun and Clarke (2006)

Phase	Description of the process
1. Familiarizing yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Thematic Analysis

Braun and Clarke (2006)

Six-phase Inductive Thematic Analysis

- Lack of awareness about lead poisoning
- Empathy for children / tenants
- Knowledge about lead poisoning and/or determination to help
- Views on existing solutions efforts to mitigate lead poisoning

Lack of awareness about lead poisoning

Students experienced **shock, disbelief, and concern** upon learning about lead poisoning due to their prior lack of awareness about the issue.

Their responses highlighted the severity and prevalence of lead poisoning, as well as how easily one can be affected by it.

"It is frustrating that people don't put in a effort to help others and fix this issue."

"never thought about lead poisoning being a problem"

Students' Emotions:
Shock, Concern, Sad, Annoyance, Curiosity, Disbelief, , Disturbed, No emotion

Empathy for children / tenants

Students express **empathy for children, tenants, or families** who have lead poisoning or have to live in homes with lead poisoning issues.

Students expressed empathy for the tenants, families, and children who had to choose between having a roof over their heads or being safe from lead poisoning.

"I feel concerned for the welfare of the children still subjected to live in those areas."

"It is sad that young children are exposed to major health risks due to their living conditions."

Students' Emotions:
Sad, Compassions, Pity, Guilty, Concerned, Anger, Bad, Sympathy

Knowledge about lead poisoning and/or determination to help

Students share their knowledge about lead poisoning and a **desire to help** solve the cause of lead poisoning issues.

The theme also includes answers expressing students' willingness to help solve or raise awareness about this issue. Students demonstrated an understanding of the issue and a willingness to help the cause.

"I would say that I feel disturbed about the severity of issue and the potential consequences of lead poisoning."

"I feel the emotion of sadness and a desire to help these people."

Students' Emotions:
Guilty, Motivated, Shocked, Upset, Disturbed, Sadness

Views on existing solutions efforts to mitigate lead poisoning

Students **express their views on the current solutions and efforts** to solve the problem of lead poisoning.

Students know that their learning has an impact on the real world, which fosters a sense of self-empowerment, encourages them to take a forward-looking perspective, and allows them to look to the future where their newfound mathematical skills and social awareness contribute to social progress and justice.

"I'm happy to see that the problem of lead poisoning is being addressed in the community."

"It feels good to know that issue is being addressed and that there is things that are beginning to get done in order to combat the problem."

Students' Emotions:
Optimistic, Happy, Promising, Hopeful, Confidence, Enlightened, Knowledgeable, Grateful, Relieved, Excited, Motivated

Discussion & Conclusion

This study emphasizes the critical role of emotion in social justice mathematics.

- Deepen students' understanding of mathematical concepts
- Develop empathy, critical thinking, and a sense of social agency
- Emotions and the 'why'
- Better prepared to teach social justice lessons
- Practical/Research takeaway for the community

Thank you!

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Here's some additional information we'd like to share. Please scan the QR codes.

Desmos Classroom we used in this study (open sourced)

Dr. Waleed Raja's dissertation on Learning Emotions