MARSAL FAMILY SCHOOL OF EDUCATION

GeT: The News!

Volume 5, Issue 2
Spring 2024

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Sustainability in a Year Between Funding Cycles

by Pat Herbst

In the Spring of last year, I wrote a note about what I envisioned the next stage of GeT: A Pencil could be. At that time, I noted that our first funding cycle was coming to an end at the end of August, and I indicated that we would write a grant asking for financial resources to support the development of a repository of primary and secondary resources for instructors to tinker with as they decide what to use in their GeT classes. We did write the grant but, unfortunately, it was turned down. We were advised to revise it and we did so this past June and July. A decision on it will likely come toward the end of 2024 or the beginning of 2025.

This state of affairs brings us to consider sustainability for a year between funding cycles. GeT: A Pencil has fulfilled an important role for GeT instructors. We are very active: producing an edited book, meeting in three working groups, offering biweekly seminars, and, in spite of the delay with this issue, publishing a newsletter. We also benefit from the participation of some high school geometry teachers, a feature that could grow as we move ahead toward the creation of resources. We want to maintain that positive momentum, but without funding, the work will need to continue being done voluntarily. In late June, we

secured volunteer commitments from individuals to help take care of the basic functions of the community: organizing the GeT Seminar (e.g., scheduling speakers, sending invitations) and stewarding *GeT: The News!* (e.g., recruiting authors for the various sections).

We have also discussed how the working groups could be reshuffled and organized for next year, especially given the possibility that our revised grant proposal might get funded. The structure and focus of the working groups could help us not only sustain momentum but also prepare our community for the new funding cycle. For example, having developed the SLOs, our community is ready to start generating materials to teach the SLOs. Indeed, some of that has begun with the ESLO group, as members spent the 2023-2024 year discussing different tasks that might be used to review important content from high school geometry, hence supporting SLO3.

I envision the work ahead will consider resource development across three different dimensions:

1. What do we mean by resources to teach an SLO? Anything beyond tasks to give students?
2. What is involved in the development of a resource? Anything beyond writing them and publishing them?
3. How are we going to cover all the SLOs?

In regard to the first question, this is something that the community will need to eventually settle on. However, to get us started, it is useful to consider a distinction between primary and secondary resources. Primary resources include tasks used with students as well as texts that we might want students to read in order to be able to do those tasks. Some tasks may be self-explanatory but others may require knowing definitions or taking some statements as known, and yet other tasks may be done for the sake of introducing important concepts that we might want to write in the way the students are supposed to remember them. Hence, primary resources are everything that the students would see. Secondary resources, meanwhile, are everything else that might support the use of the primary resources. The answer key to problems or a rubric to grade students' work on problems are initial examples. Secondary resources may also include a description of errors students make when doing the problems, or a roadmap of possibilities that the instructor could use as they respond to how students work on a task. This consideration of primary and secondary resources suggests that we might need some precision in terminology. I am proposing to use "module" to refer to a set of primary and secondary resources that can be used to aim at at least one SLO. Each module encompasses both primary and secondary resources.

With this clarification, the second question above can be restated as "what could be involved in the development of a module?" And indeed, the development of a module seems to involve much more than writing a task. It surely starts from having an idea of the task or tasks around which the module would be developed, but it would also be important to write the texts that students would need to read before and after engaging with the task/s. In addition, the suggestion that secondary resources would make the modules richer implies that module development involves more than writing. It could also

involve anticipating student work, trying the modules out with our classes, collecting real but anonymized student work to include as secondary resources, examining the student work to inventory the difficulties students had in the task, and possibly using that information to improve the writing of the tasks and texts. The development of a module would surely take some time and it could use having access to classes where the instructor is willing to try the tasks. Furthermore, having a group of members of GeT: A Pencil involved in developing each module would make the work not only more fun and more of a learning experience but it would also bring to the work the variety of talents present in our community. It would be reasonable for this development to take a full year of meetings for each module.

This brings me to the third question. Our working group structure would allow us to gather individuals interested in working on developing specific modules. In the past, we have had three concurrent working groups. Moving forward, three groups could continue to run, and the scope of work of the new grant proposal could provide a suggestion of what they could be doing. At a recent meeting to discuss the sustainability of the community, an idea was proposed of choosing three different days and times in the week and asking community members to sign up for the day and time they would be most likely to make.Then, at their first meeting, each group could decide on one SLO to focus on, taking care not to choose one that has already been covered. Each working group could use the year ahead to focus on developing a module for their chosen SLO, and we could use the newsletter, community meetings, and the seminar for people to share across groups. That idea seems worth a try. We'll be sharing a "whenisgood" calendar to identify three meeting times and will then ask you to sign up for the one that is best for your schedule.

To conclude, in the coming year we will not have any financial resources to offer conference support, incentives, or much staff support. Despite this, we are hopeful that some functions can be maintained at a smaller scale and on a voluntary basis. In particular, I am optimistic that the continuation of the seminars, the newsletter, and the working groups will support the continuity of our community while paving the way for new developments in future funding cycles. We hope you are able to join us for this next stage of GeT: A Pencil!

GeT: A Pencil Community Flourishes with Recent Updates and Exciting Opportunities

by Anthony Davis

Since our last newsletter, there has been a lot of activity taking place within GeT: A Pencil. We last convened for a Community Meeting on January 19, 2024, and many of us had the pleasure of reconnecting at RUME in February. These gatherings, whether formal meetings or spontaneous encounters at conferences are cherished opportunities to share insights, collaborate on projects, and

engage in stimulating discussions. Notably, they also offer a chance to welcome new colleagues into our thriving community. We have, however, had some hiccups occasioned by being short staffed: One noticeable absence was our Winter issue which we could not produce in time. In this update, which combines numbers 2 and 3 for this volume, we will delve into the highlights of recent happenings and hope that for the Fall we are able to produce a more fully developed issue.

GeT Sustainability Summit

The GeT Sustainability Summit occurred on June 28, 2024, from 2:00 to 3:30 pm, and offered a unique opportunity for members to connect, share updates, and discuss the future of the GeT: A Pencil community. This event was an engaging session focused on sustainability and community growth. The event was attended by leaders of the GeT Community Julia StGoar, Steven Boyce, Stephen Szydlik, Sharon Vestal, Nathaniel Miller, Mara Markinson, Dorin Dumitrascu, Pat Herbst, Amanda Brown, and Anthony Davis.

A key highlight of the summit was the presentation by Pat Herbst outlining a vision for sustaining the GeT:A Pencil's core activities, emphasizing their importance in maintaining the community's momentum and engagement.

This segment continued with brief descriptions from GRIP lab members outlining the original intent and purposes of three core activities that the lab plans to continue through shared leadership: Newsletter, Seminar, and Working Groups.

Regarding the GeT: A Pencil Newsletter, Anthony Davis shared details including that the newsletter is released tri-annually, serves as a vital tool for fostering community, sustaining engagement, and showcasing valuable content. It also highlights member stories, celebrated achievements, and encourages active interaction. Amanda Brown shared about the weekly seminars, which features both internal and external speakers, and provides a platform for professional development, community building, and collaborative scholarship. The seminar also enables instructors to stay connected and share their work. The working groups, as described by Pat Herbst, focus on specific objectives and principles, aims to drive sustained engagement and communication among members, and ensures the growth and effectiveness of the GeT community.

Participants then engaged an interactive discussion to clarify questions, share feedback, and propose next steps. These discussions provided a platform for members to voice their concerns, offer suggestions, and collaboratively shape the vision for sustaining the work of the GeT: A Pencil project.

The summit concluded with breakout sessions to address specific questions and gather feedback, followed by a summary of next steps. This collaborative effort aimed to strengthen the GeT community

and ensure the sustainability of its key activities.

The afternoon of meaningful discussions and community building was a time to work together to shape the future of the GeT: A Pencil initiative. It is our hope that the summit serves as a crucial step in the ongoing journey toward creating a sustainable and engaged community.

Community Member Updates from our Community Meeting and Sustainability Summit

Both our Community Meeting and Sustainability Summit kicked off with engaging updates from various community members. It was a privilege to hear about recent presentations and research findings related to the ongoing work taking place within GeT: A Pencil. If there are any updates we missed or overlooked, we encourage you to reach out; we are eager to learn about and share your contributions across the community. These updates are not only informative but also serve as opportunities for collaboration. They allow individuals to explore possibilities for future presentations building upon prior work.

Here are some noteworthy presentations we learned about:

Sharon Vestal from South Dakota State University was recognized with the Edward Patrick Hogan Award for Teaching Excellence. She was awarded this in February. Congratulations, Sharon!

Paul Dawkins from Texas State University has finished co-editing and publishing a book along with Andy Norton and Amy Hackenberg. The book is titled " Piaget's Genetic Epistemology for Mathematics Education Research". This was a multi-year endeavor. Congratulations on your new publication!

Dawkins, P. C., Hackenberg, A. J., & Norton, A. (Eds.). (2024). Piaget's Genetic Epistemology for Mathematics Education Research. Switzerland: Springer Nature. https://doi.org/10.1007/978-3-031-47386-9

Julia St. Goar from Merrimack College has an upcoming sabbatical and the opportunity to resume teaching the GeT Course again in the Spring!

Stephen Szydlik from University of Wisconsin-Oshkosh will be on sabbatical in the Fall! He is planning on visiting high schools in northern Wisconsin and upper peninsula in Michigan this fall. At the high schools, they will talk to administrators and teachers about their experiences during the pandemic, how their teaching has changed since the pandemic, and whether they have observed changes in their students' content knowledge or "mathematical identities".

Mara Markinson from Queens College had the opportunity to present at AMTE! She discussed ideas for using Chat GPT as a meta-cognitive assistant for method students in lesson planning.

Pat Herbst from the University of Michigan gave one of the two plenaries at the ICMI Study on Advances in Geometry Education in April 2024 in Reims, France.

Amanda Brown from the University of Michigan was recently promoted to Associate Research Scientist.

Members of the GRIP LAB at the University of Michigan shared partial results of analysis of the GeT Instructor Survey at the AERA 2024 conference, in a talk entitled “How do Geometry Courses for Teachers Support Learning to Teach?”.

Nat Miller, **Amanda Brown**, **Srikanth Lavu**, and **Pat Herbst** recently attended a workshop on Open Educational Resources supported by an NSF IUSE grant to the University of Southern Alabama. They hope what they learned will help our community rally around the production of texts and tasks to teach GeT courses that aim at attaining the SLOs.

We are always eager to receive updates from the community, whether they pertain to presentations, new publications, or personal or professional accomplishments. In every newsletter, we feature a community member, and we look forward to hearing from you. While our community continues to grow, it remains tightly knit and thrives on celebrating each other’s achievements. So, if you have an update—no matter how big or small—please share it with us by filling out this form.

A Note and Updates on Working Groups

At the close of another academic year, we want to extend a note of appreciation to the hard work and engagement of each member of the working groups. Back in January, during the Community Meeting, we had the privilege of hearing updates from various Working Groups, each diligently working on projects related to curriculum development and research. These groups play a pivotal role in our collective mission to use the undergraduate geometry course as a lever for making a positive impact for increasing the capacity for teaching high school geometry. Here are the highlights from their updates:

Updates on Transformations Group

Julia St. Goar from Merrimack College and Steve Boyce from Portland State University have stewarded the Transformations Working Group this semester. In the fall, the group focused on sharing innovative methods for teaching transformations in their different curricular activities. Several members presented a special approach being used in their classes. The collective aim was to create a universal lesson plan centered around transformation geometry that could be implemented in each of their classes, despite the diverse teaching methods. Moving forward into the spring, the group is considering which student learning outcomes (SLOs) to integrate into this new plan, with an interest in including elements of proof and definitions. Technology use in education was also a topic of lively debate. As they advance, the group

plans to refine their objectives in order to effectively develop this lesson plan. There is interest in conducting a lesson study in parallel, similar to what was done with Steve's Adinkra lesson plan and working group.

Updates on Adinkra Group

Steve Boyce from Portland State University has stewarded the Adinkra Working Group this semester. In the fall, two main initiatives were taken by the group. First, they began developing an observation protocol for the lesson study on the Adinkra Lesson, incorporating a framework featuring the 5 R's and principles of culturally responsive teaching. The observation protocol is still a work in progress. Secondly, another round of the Adinkra lesson study was conducted, with a member teaching the lesson over two shorter class periods—one at the beginning and another at the end of the semester—to explore a variation of the lesson delivery. In the current semester, the group is analyzing observations from the recent teaching of the Adinkra lesson and plans to teach the lesson again in at least one more classroom.

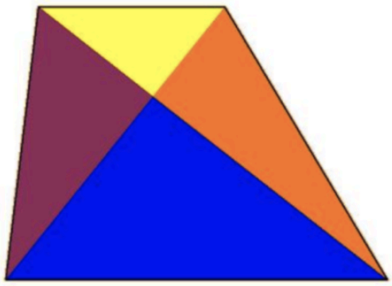
Updates on the Teaching GeT Working Group

Nat Miller from the University of Northern Colorado has stewarded the Teaching GeT Working Group. The group's activity during the last semester was not as intense as before because many members were preoccupied with writing, reviewing, and revising chapters for a book. However, they still managed to convene, and their primary focus has been on reviewing the ESLO group's responses to certain SLOs (Student Learning Outcomes). They have been discussing these responses and how they might shape revisions to the SLOs.

Updates on the ESLO Working Group

Mara Markinson from Queen's College shared about how the ESLO Working Group is going. The ESLO group is in its second year and includes high school teachers and college instructors, meeting every other Thursday at 4 PM. Each week a participant brings a task that could be used with GeT students to review knowledge needed to teach high school geometry and which can also be generative of more advanced ideas. The figure on the right shows one task presented by Michele Macke in early May. The discussion centers on anticipating what students may do and discussing how the task helps cover content needed for high school instruction.

The diagonals of a trapezoid divide it into 4 regions.



What can you say about these regions?

Is it possible to draw a trapezoid where 2 of the regions have equal area?

Where 3 of the regions have equal area?

What about all 4 having equal area?

*Did you justify your conjectures?

Is there anything you can say about the ratio of the areas you see?

2023-2024 Get Seminars

We have had an exciting semester of incredible GeT Seminar Presentations. The GeT Seminar presentations provide an opportunity to learn about the great work members of our community have done. Over this last semester, we have heard from:

Presenter(s):Eisso J Atzema (University of Maine)

Seminar Topic: Euclid in the Eye of the Beholder: Which Elements Should We Honor?

Link to Seminar Recording

Presenter(s): Martin Flashman (Emeritus from Humboldt State University in California)

Seminar Topic: Do We Need a Separate Philosophy of Geometry?

Link to Seminar Recording

Presenter(s): Michelle Cirillo (University of Delaware), Amanda Seiwell (University of Delaware), and Casey Griffin (University of Delaware)

Seminar Topic: Considering the Structure and Logic of Definitions and their Critical Role in Geometry Courses for Teachers

Link to Seminar Recording

Presenter(s): Orly Buchbinder (University of New Hampshire), Sharon Vestal (South Dakota State University), Tabitha Mingus (Western Michigan University), and Tuyin An (Georgia Southern University)

Seminar Topic: Enhancing Students' Proficiency with Proof in Geometry for Teachers' Courses

Link to Seminar Recording

Presenter(s): Nathaniel Miller (University of Northern Colorado), Henry Escuadro (Juniata College), Steven Boyce (Portland State University)

Seminar Topic: Extending and Elaborating on the Role of Definitions in GeT Courses

Link to Seminar Recording

Presenter(s): Patrick Callahan (Math ANEX, Callahan Consulting)

Seminar Topic: How Understanding Geometric Transformations Helps Students Improve Their Problem Solving

Link to Seminar Recording

We've learned so much this semester! Thank you to all of our presenters and community members for your participation in the GeT Seminars. If you missed a seminar, please find the recordings on our Canvas Site! If you are interested in presenting this next year, please reach out to the grip@umich.edu email address.

Future Community Gatherings

We express our deep appreciation to the active participants in our community for their unwavering commitment to the advancement of mathematics. Your efforts inspire us, and we look forward to our next meeting and the opportunities to learn and grow together that will come from it. To those who have recently joined our community, we warmly welcome you! If you have not yet been added to the canvas community page, please reach out to grip@umich.edu to request access.

To submit a paper to be highlighted in a future newsletter, please fill out this form.

GeT Support

Sponsored by NSF DUE-1725837. All opinions are those of the authors and do not necessarily represent the views of the National Science Foundation or the University of Michigan.
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Get Support is housed in the GRIP Lab at the University of Michigan