

Multi-User GeoGebra with Virtual Math Teams

The Math Forum @ Drexel University

www.mathforum.org

vmt.mathforum.org

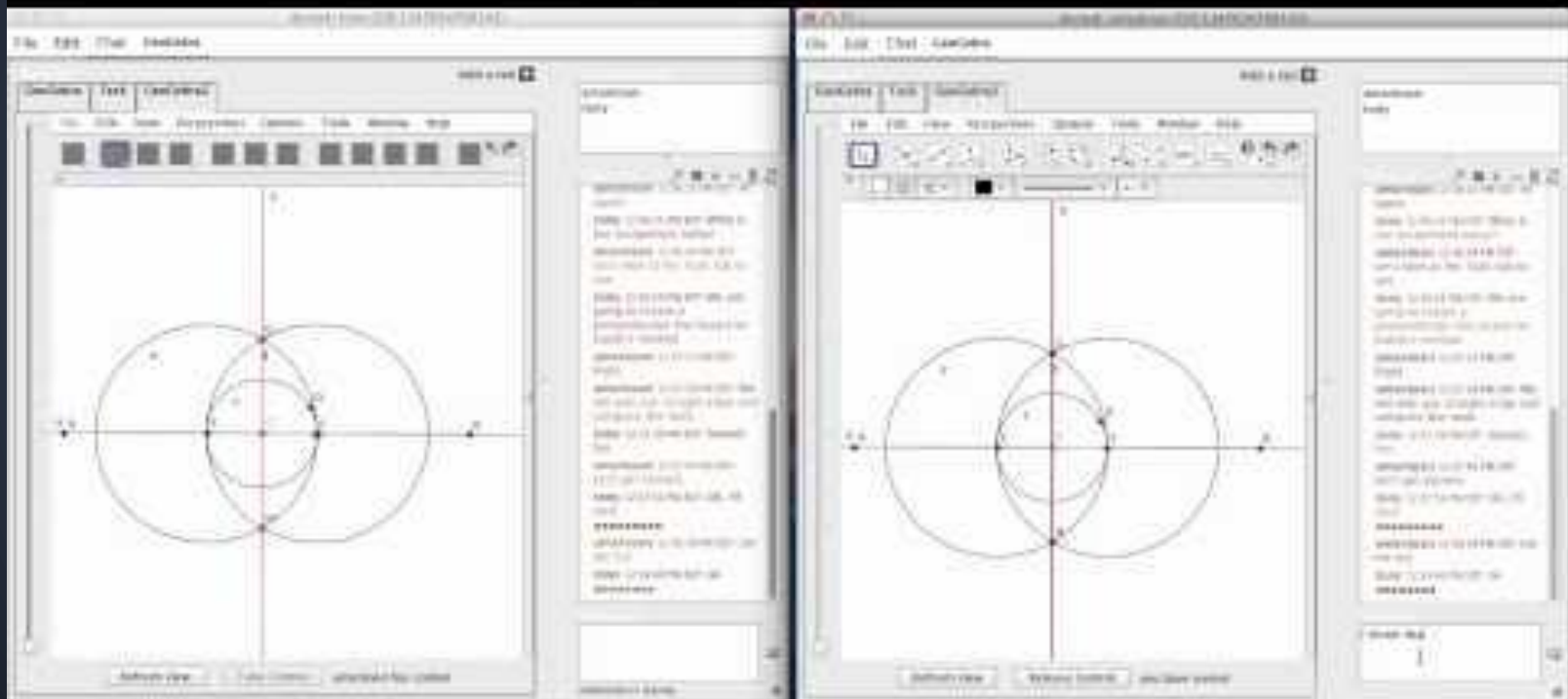
Virtual Math Teams (VMT)

- VMT is an online environment for students to work on and discuss math problems synchronously.
- VMT combines support for dynamic geometry with media for collaborative learning.

Integration with GeoGebra

- Remote students can synchronously work on a shared construction together.
- Users can take turns manipulating the construction.
 - Adding, deleting, modifying and moving objects
- The construction will stay in sync on each user's screen.
- Users can chat about the problem as they work.

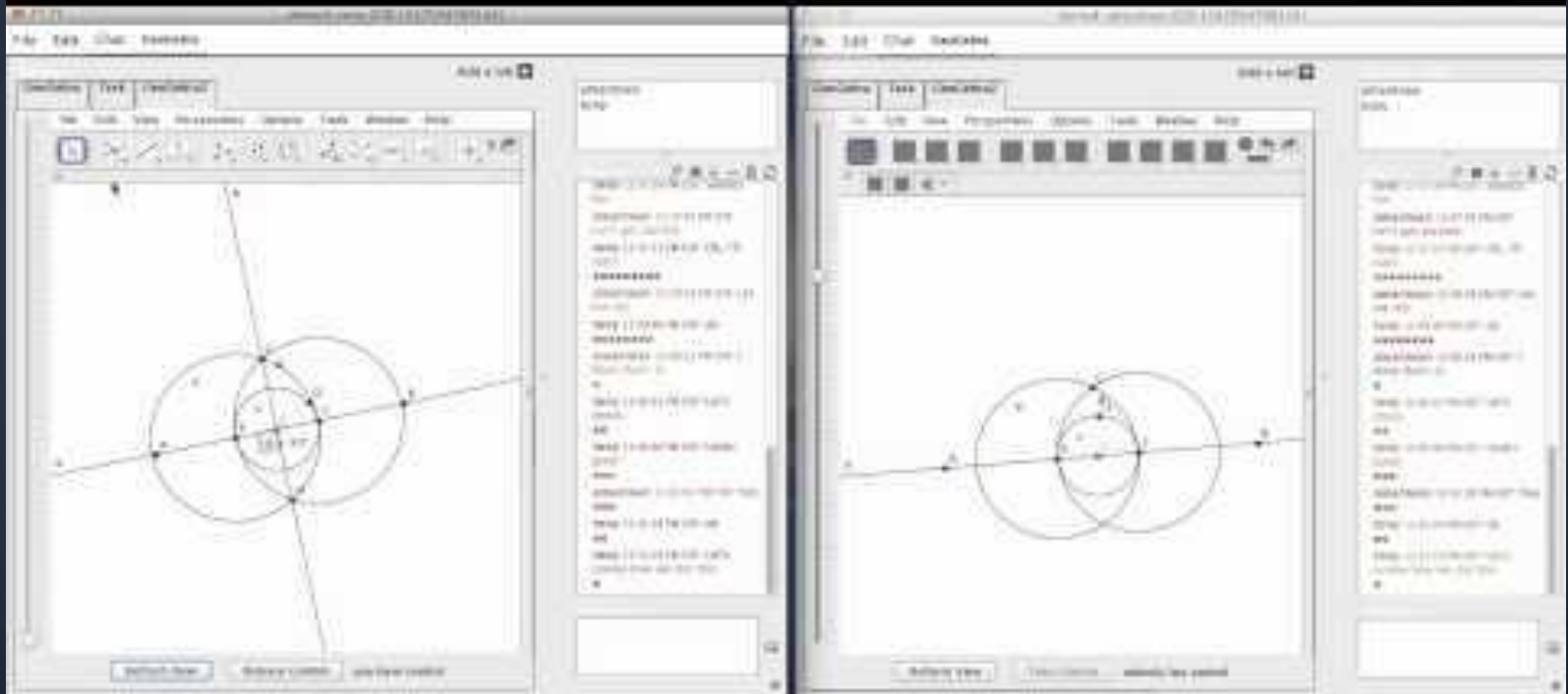
Integration with GeoGebra



History Tracker

- Built in history tracker allows users to scroll back and forth in time to see how the construction developed.
- Shows everything that happened including style changes and object movements.
- Each GeoGebra workspace is tracked separately.

History Tracker In Action



Other Shared Tools

- Shared Whiteboard
 - Users can doodle on the shared whiteboard
 - Draw simple shapes
 - Summarize work, draft shared statements, note observations or hypotheses in text boxes
 - History of the whiteboard is also tracked.
- Web browser
 - Simple web browser
 - Can be used to show instructions for the student's assignments or other related information on the web.

VMT has built in tools for session analysis

- VMT records every chat, and action in the session.
- Provides a session replayer to go back and forth through the session step by step.
- Chat, whiteboard, and GeoGebra events all playback in the order they occurred in the original session.

The VMT Session Replayer



VMT has built in tools for session analysis

- Spreadsheet log files can be downloaded for each VMT room.
- Log files and the VMT Replayer provide unique insights for teachers and researchers.
- Allows teachers to go back and see anything they missed during class.

Session Log Files

	A	B	C	D	E	F	G	H
1	Line	Date	Start Time	Post Time	Duration	EventType	tony	<u>amantoan</u>
2	1	09/06/2012		10:38:42	00:00:00	chat	joins the room	
3	2	09/06/2012		10:39:54	0:1:12	chat		joins the room
4	3	09/06/2012		11:24:49	0:44:55	chat	Hello	
5	4	09/06/2012		11:25:07	0:0:18	chat		Hi. Lets start by looking at the task description.
6	5	09/06/2012		11:25:11	0:0:4	chat	Ok.	
7	6	09/06/2012		11:25:31	0:0:20	chat	Alright, I'll start.	
8		09/06/2012		11:25:42	0:0:11	<u>Geogebra: GeoGebra</u>	added point:Point "A"	
9		09/06/2012		11:25:44	0:0:2	<u>Geogebra: GeoGebra</u>	added point:Point "B"	
10		09/06/2012		11:25:44	0:0:0	<u>Geogebra: GeoGebra</u>	added line:Line "a"	
11		09/06/2012		11:25:50	0:0:6	<u>Geogebra: GeoGebra</u>	added point:Point "C"	
12		09/06/2012		11:25:52	0:0:2	<u>Geogebra: GeoGebra</u>	added point:Point "D"	
13		09/06/2012		11:25:52	0:0:0	<u>Geogebra: GeoGebra</u>	added conic:Circle "c"	
14		09/06/2012		11:26:01	0:0:9	<u>Geogebra: GeoGebra</u>	added point:Point "E"	
15		09/06/2012		11:26:02	0:0:1	<u>Geogebra: GeoGebra</u>	added point:Point "F"	
16	7	09/06/2012		11:26:18	0:0:16	chat		Great, I'll take it from here.
17		09/06/2012		11:26:29	0:0:11	<u>Geogebra: GeoGebra</u>		added conic:Circle "d"
18		09/06/2012		11:26:33	0:0:4	<u>Geogebra: GeoGebra</u>		added conic:Circle "e"
19		09/06/2012		11:26:40	0:0:7	<u>Geogebra: GeoGebra</u>		added point:Point "G"
20		09/06/2012		11:26:43	0:0:3	<u>Geogebra: GeoGebra</u>		added point:Point "H"
21		09/06/2012		11:26:52	0:0:9	<u>Geogebra: GeoGebra</u>		added line:Line "b"
22	8	09/06/2012		11:27:00	0:0:8	chat		That;s it.
23	9	09/06/2012		11:27:04	0:0:4	chat	Lets check.	
24		09/06/2012		11:27:15	0:0:11	<u>Geogebra: GeoGebra</u>	added angle:Angle "?"	
25	10	09/06/2012		11:27:21	0:0:6	chat	Looks good.	
26								
27								

Classroom Materials Available

- The VMT research team has developed materials specifically for collaborative use of GeoGebra.
- Developed by leading researchers in Computer Supported Collaborative Learning (CSSL) at Drexel University
- <http://GerryStahl.net/vmt/activities.pdf>

VMT Is Publicly Available

- VMT is open source.
- Our Math Forum VMT server is available for all to use - vmt.mathforum.org
- Anyone may set up their own VMT server.

For More Info

- Tony Mantoan, lead VMT software developer
- Steve Weimar, director of the Math Forum
- Gerry Stahl, PI of the VMT research project

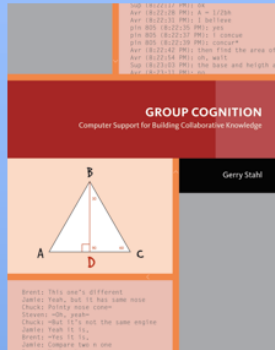
tony@mathforum.org

steve@mathforum.org

gerry@mathforum.org

The Virtual Math Teams Trilogy

Group Cognition (2006)

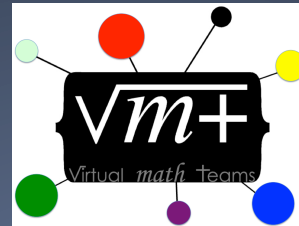


Computer Support for Building Collaborative Knowledge

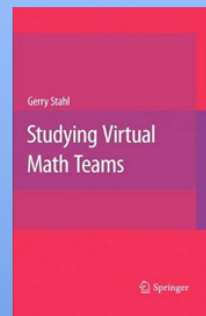
MIT Press, 510 pages
Available for Kindle

The theory of group cognition emerges from several studies of CSCL and CSCW technologies. Analysis of interaction. Theory of CSCL.

www.GerryStahl.net/elibrary/gc



Studying Virtual Math Teams (2009)

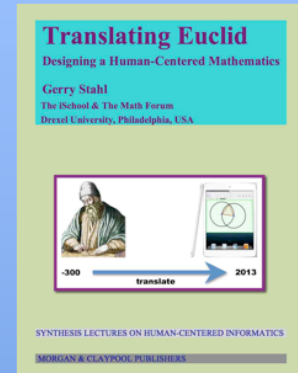


Springer Press, 626 pages
CSCL Book Series, paperback

Studies of the VMT Project technology, pedagogy, analysis, theory by team members and international collaborators

www.GerryStahl.net/elibrary/svmt

Translating Euclid (2013)



Creating a Human-Centered Mathematics

Morgan Claypool Publishers,
325 pages, e-book & paperback

Latest results of this design-based CSCL research from many perspectives.

www.GerryStahl.net/elibrary/euclid