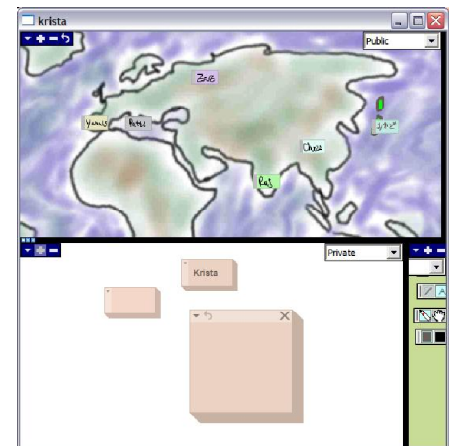
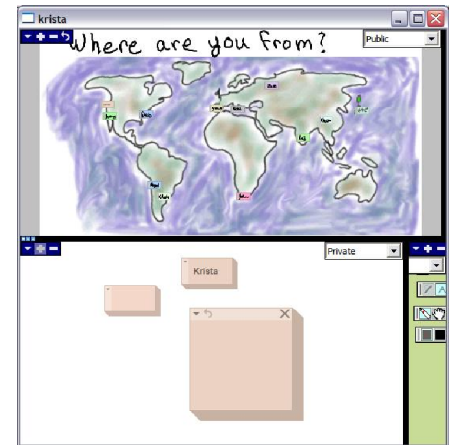


## Group Scribbles

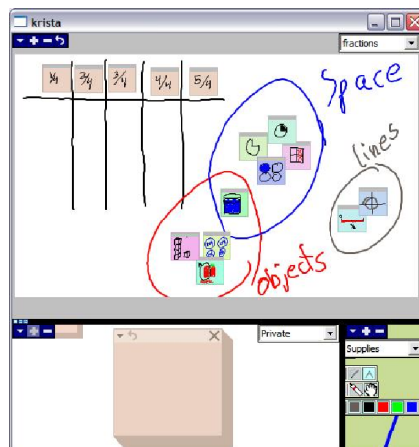
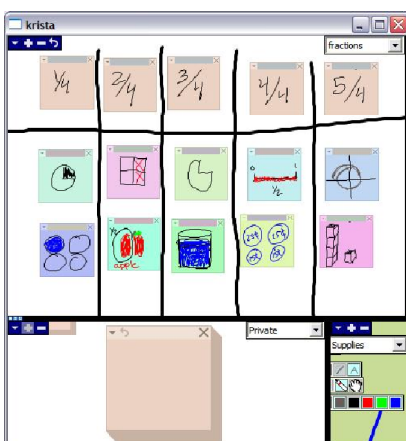
GroupScribbles enables collaborative improvement of ideas based upon individual effort and social sharing of notes in graphical and textual form ("scribbles"). An analogy to HyperCard [1] puts GroupScribbles in context. When Apple produced the MacOS in the 1980s, it had wonderful new educational capabilities, such as multimedia and hypertext. However, educators could not yet realize the potential because only programmers could access the capabilities. When HyperCard was released, educators responded with a surge of creativity. With HyperCard, educators were able to make everything from grade books to frog dissections without hiring a programmer. By analogy, today's classroom has new capabilities of wireless connectivity among handheld or tablet devices for every student. However, educators cannot tap these capabilities without a programmer and hence little innovation is occurring. With GroupScribbles, SRI introduces a way for educators to rapidly design new collaborative and group learning activities without the need for additional programming. The only limit is educator's creativity.

The GroupScribbles user interface presents each user with a two-pane window. The lower pane is the user's personal work area, or "private board", with a virtual pad of fresh "scribble sheets" on which the user can draw or type. A scribble can be shared by dragging and dropping it on the public board in the upper pane. When this happens, a tuple representing the scribble is written to a tuple space corresponding to that public board. Other participating clients monitor the space for such activity and update the client's display. Users may interact with public scribbles in a variety of ways, such as browsing their content, repositioning them, or moving one from the public board into their private space. New public boards can be created to support multiple activities or spaces for small groups to work.

**TUPLES:** GroupScribblesUserTuple, 8 render tuples (e.g., SheetRenderTuple), 7 metadata tuples (e.g., SheetMetadataTuple), and 4 board tuples (e.g., BoardDrawingTuple).



Participants share where they are from by writing their name on a label and placing their label on a public map (top). Different regions of the map can be brought into focus by zooming in (bottom).



Participants draw and share different visual representations of fractions (left) and categorize the types of representations contributed by participants (right).

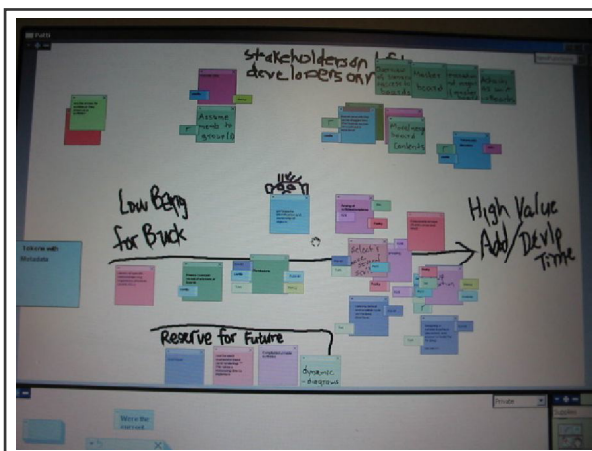
[1] Hypercard is a registered trademark of Apple Computer, Inc.

# TUPLE SPACES Project – Group Scribbles Activity

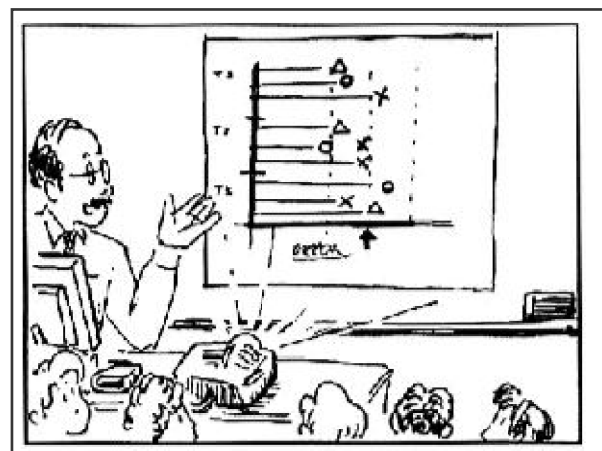
SIMPLE GENERATION, DISTRIBUTION, COLLECTION, AND AGGREGATION OF IDEAS

## Group Scribbles The Need

In the workplace and in the classroom, there is an ever-increasing appreciation of, and demand for, harnessing the collective intelligence of groups to learn faster, envision new possibilities, and reveal latent knowledge. Even so, technological supports for these real-time, face-to-face processes have fallen far behind the expanding need. Outside the classroom, the most successful such supportive technology is paper-based: “Idea Catchers©,” “Post-It Notes©,” and other “stickies” of various size and shapes. Inside classrooms, where budgets for supplies are typically very tight, these paper-based approaches are infrequently used. Instead, student response systems (SRS, sometimes called “clickers”) are growing in popularity. Clicker systems, however, support only the most rudimentary of whole-group processes: the classroom analog of voting. Employed appropriately, however, these “clickers” can be a powerful tool for stimulating important conversations, encouraging active conceptualization, and providing graphic illustration of what the class does, and doesn’t, know and believe. But, obviously, a lot of important conceptual work can’t be represented as voting. And while Post-it notes can form the medium for a much broader range of conceptual work, their physicality necessitates a lot of manual busy work (handing out, collecting, copying and duplicating, moving from place to place, etc.) as well as ongoing supply, archiving, and publication issues. Clearly there is a need for some solution that provides the light-weight, flexible support for brainstorming, deep dives, and collaborative decision making that is provided by “stickies” with the automated distribution, collection, and aggregation support that is provided by “clickers”. Such would be a solution that goes beyond take-the-pulse assessment to support group work and distributed responsibility.



Sticky notes on write-on whiteboards together make for a powerful collaborative brainstorming environment. But this model has many limitations.



Wireless student response systems that gather student responses to multiple choice questions posed by the teacher and reveal the class thinking through histograms have proven to assist student learning through peer discussions and student reflection.

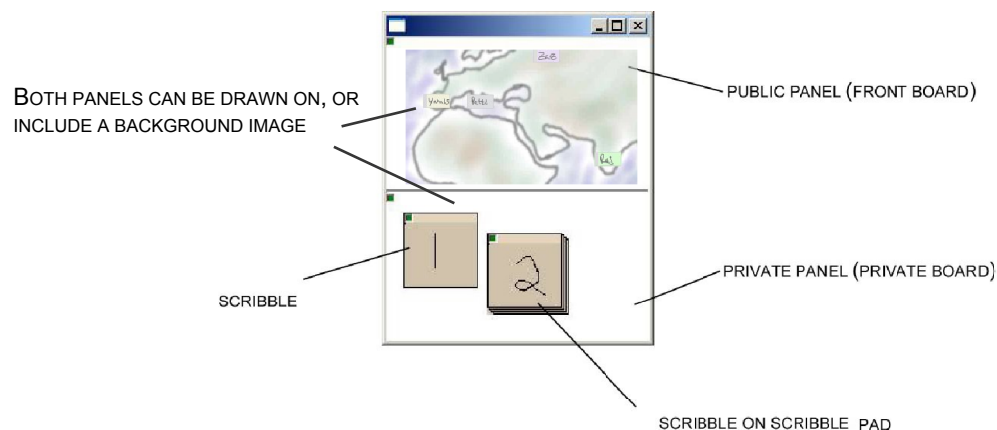
## Group Scribbles Our Approach

Our approach is to combine the robust, simple, and low-maintenance coordination power of tuple space server with a carefully selected set of functional and user interface elements on each networked client to enable a broad range of high-value collaborative work from deep dives to take-the-pulse assessment. Together, these components provide electronic support for:

- Capturing the ideas of individuals and groups in graphical and textual form (“scribbles”)
- Collecting the captured scribbles for group reflection and additional work
- Automatically publishing collected scribbles for group use
- Individually choosing one or more scribbles and visibly expressing that choice
- Collaboratively arranging scribbles to express relationships
- Individually and collaboratively prioritizing scribbles to express ordering
- Individually annotating scribbles non-destructively
- Individually labeling scribbles with labels from a pre-determined set
- Individual- and group-wise exchange of scribbles
- Combinations and sequences of the above.

The basic Group Scribbles system includes a generic tuplespace server (such as IBM’s T-spaces server), and wirelessly networked hand-held computers, each equipped with a copy of the Group Scribbles client software.

The essential metaphor of the Group Scribbles software is the combination of your desk (or board where you can work privately) and the front, public whiteboard in the classroom (where you can post your work and position it relative to others’, view others work, and take items back to your desk for further elaboration.)

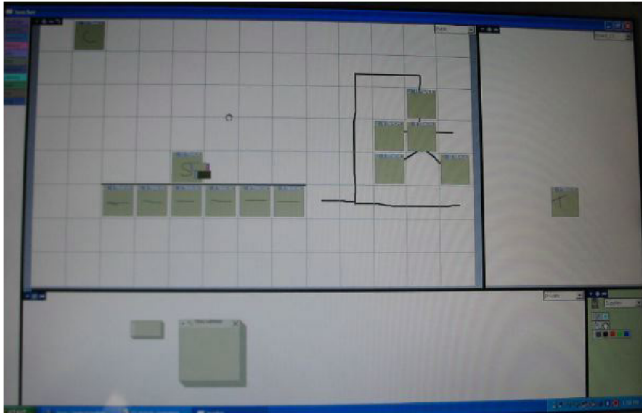


The essential gesture, facilitated by stylus-based interaction, is moving your contribution from the private space to the public space, and back.

# TUPLE SPACES Project – Group Scribbles Activity

SIMPLE GENERATION, DISTRIBUTION, COLLECTION, AND AGGREGATION OF IDEAS

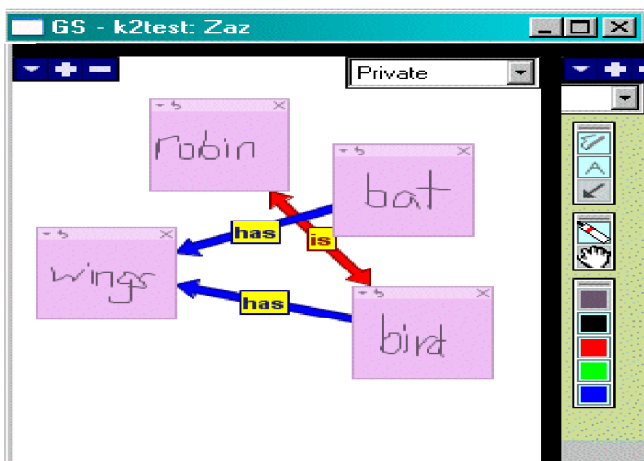
## Group Scribbles In Action



GS Hangman



Birthday Sums:  
Collaborative, distributed computation



GS Concept Mapping



Birthday Sums:  
Taking part in the group computation

For more information on Group Scribbles and the Tuple Space Project,  
visit <http://tuples.sri.com>



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