

# Reconceptualizing Scaffolding: Scaffolding a Community of Learners

**Janet L. Kolodner**

**Jen Holbrook, Jackie Gray, ...**

**College of Computing**

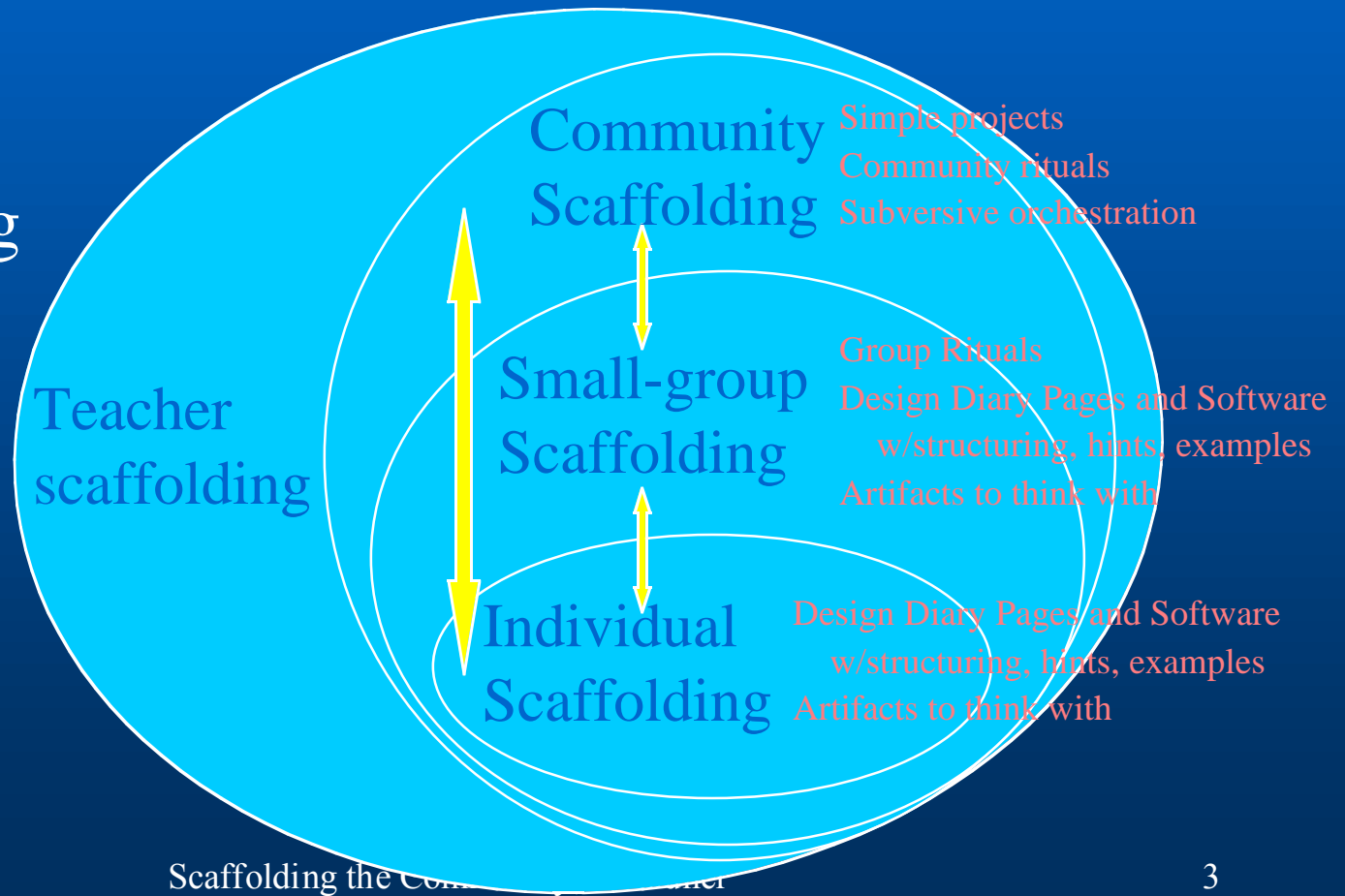
**Georgia Tech**

# What might it mean to scaffold a community of learners?

- **Common Approach:** Focus on scaffolding individuals in the community. The community will move forward through the growth of its members.
- **Proposal:** Focus on scaffolding the community (as a unit) in ways that will move every participant and subgroup forward; scaffold individuals and small groups in that context

# Systematically scaffolding a community of learners

Design scaffolding for each social grouping with other groups in mind



# Learning by Design™

- A project-based inquiry approach to science education for middle school
- Students learn science concepts and practices in the context of attempting to achieve design challenges.
- Highly collaborative
- A variety of practices are embedded in the approach to promote the kinds of experiences and reflection on them that **promote transfer**

# LBD's Community Scaffolding

- **Project experiences that expose the community to practices**
- **Community rituals**
  - public expectations and purposes
- **Subversive orchestration**
  - **Distribution of investigative responsibilities**

# The Book Support Challenge:

## An example from LBD™'s *Apollo 13*

- **Our goals: Help the community**
  - come to appreciate collaborative learning
  - begin becoming proficient at vocabulary and practices of design
- **Design and build a structure that will hold up a large textbook 3 inches above a desk using only index cards, paper clips, and rubber bands.**

# The Book Support Challenge: Orchestration

---

- **Students work in groups for 10 - 15 minutes to achieve the challenge.**
- **The class reads about "gallery walks" together (fancy show and tells).**
- **Each group presents their design; there's some discussion about each.**
- **Teacher asks students if they want to try again.**

# The Book Support Challenge: Orchestration (continued)

- Students try again.
- They hold another gallery walk.
- They accuse each other of copying.
- The teacher introduces them to the notion of building on the work of others, patents, citations, ...
- They read about collaborative learning and its benefits and requirements (e.g., giving credit)

# What's the scaffold?

- **A simple project experience and way of orchestrating it**
  - that introduces the community of learners to a set of practices
  - that asks students to carry out those practices publicly
  - that engages students in moving each other forward (through modeling and traditional scaffolding)

# Results ...

---

- **Students work on other challenges and use the practices they've experienced and talked about.**
- **Some begin to use the words collaboration, credit, iteration, ...; others follow suit over time.**
- **Students get better at practices, some adopt early, others follow.**
- **Students and teacher refer to these experiences as anchors to make points about designing and collaboration.**

# LBD's Community Rituals

- **Gallery walk** -- scaffolds explanation
- **Pin-up session** -- scaffolds justification
- **Results presentation** -- scaffolds justification and data interpretation
- **Design rules of thumb** -- scaffolds data interpretation
- **Whiteboarding** -- scaffolds question asking

# What's the scaffold?

- **A systematic way of carrying out some important skill set that**
  - **systematizes practices to make them methodical; promotes habits**
  - **situates practices in several contexts; promoting adaptability**
  - **engages students in public practice as collaborators; affording noticing, asking, discussion, productive reflection**

# Two LBD™ community rituals

---

- **Gallery walks** (explanation)
- **Pin-up sessions** (justification)
- **Ritualized public ways of participating in science practices**
- **Well-articulated expectations**
- **Repeatedly practiced and publicly discussed**

# Results ...

---

- **Students initiate their own use of these practices**
  - the pin-up session story
  - creating rules of thumb
  - messing about during interviews and performance assessments
  - whiteboards science fair projects
- **Students adapt the rituals to later needs**
  - e.g., when teacher stops calling gallery walks


# But simply scaffolding the community as a whole is not enough

- **Within the community context, need to scaffold**
  - work/learning groups
  - individuals, including the community leader
- **so that they can be successful as individuals, within subgroups, and within the community**

# Group Scaffolding

- **Group rituals**
  - Messing about
- **Design Diary Pages** (make expectations clear for group activities through structuring and hints)
  - Designing and running experiments
  - Construction, testing, explanation, iteration
  - Preparing for community rituals
- **SMILE** -- Extend design diaries, adding more specific hints and examples, focused on planning, reflecting, and articulating, and on preparing for public rituals
- **Artifacts to think with** -- the physical artifacts the students are designing


# Design diary pages

**My Experiment** 

Name \_\_\_\_\_ Date \_\_\_\_\_

What you want to find out	Data and Sketches
Predict what will happen	
My Plan	
Hints: Which variables are held constant? Which factors varied? How many trials?	Hint: Think about what you need to display.
Step-by-Step Procedure	Data Summary
	Hint: Look for trends and patterns you see in your data.
	What Did You Learn

© Georgia Tech, 2000 2

**Problem Understanding** 

Name \_\_\_\_\_ Date \_\_\_\_\_

My Statement of the Challenge

What I Must Produce to Meet The Challenge	Criteria to Meet and Constraints to Satisfy
What I Know That Will Help	What I Still Need to Know

© Georgia Tech, 2000 DD 1

# Scaffolding individuals

- **Student scaffolding**

- The same as group scaffolding -- structuring, hints, and examples that ritualize articulation, note taking, and presentation -- but individuals use the pages for homework to prepare or summarize

- **Teacher scaffolding**

- All of the scaffolding scaffolds the teacher.

# Traditional view of scaffolding

---

- Support one gives to an individual to help him or her perform beyond his/her capability within his/her ZPD
- Provided in such a way that the learner can gradually increase what he/she can do by him/herself

But aiming scaffolding at individuals is only one way of helping members of a community learn.

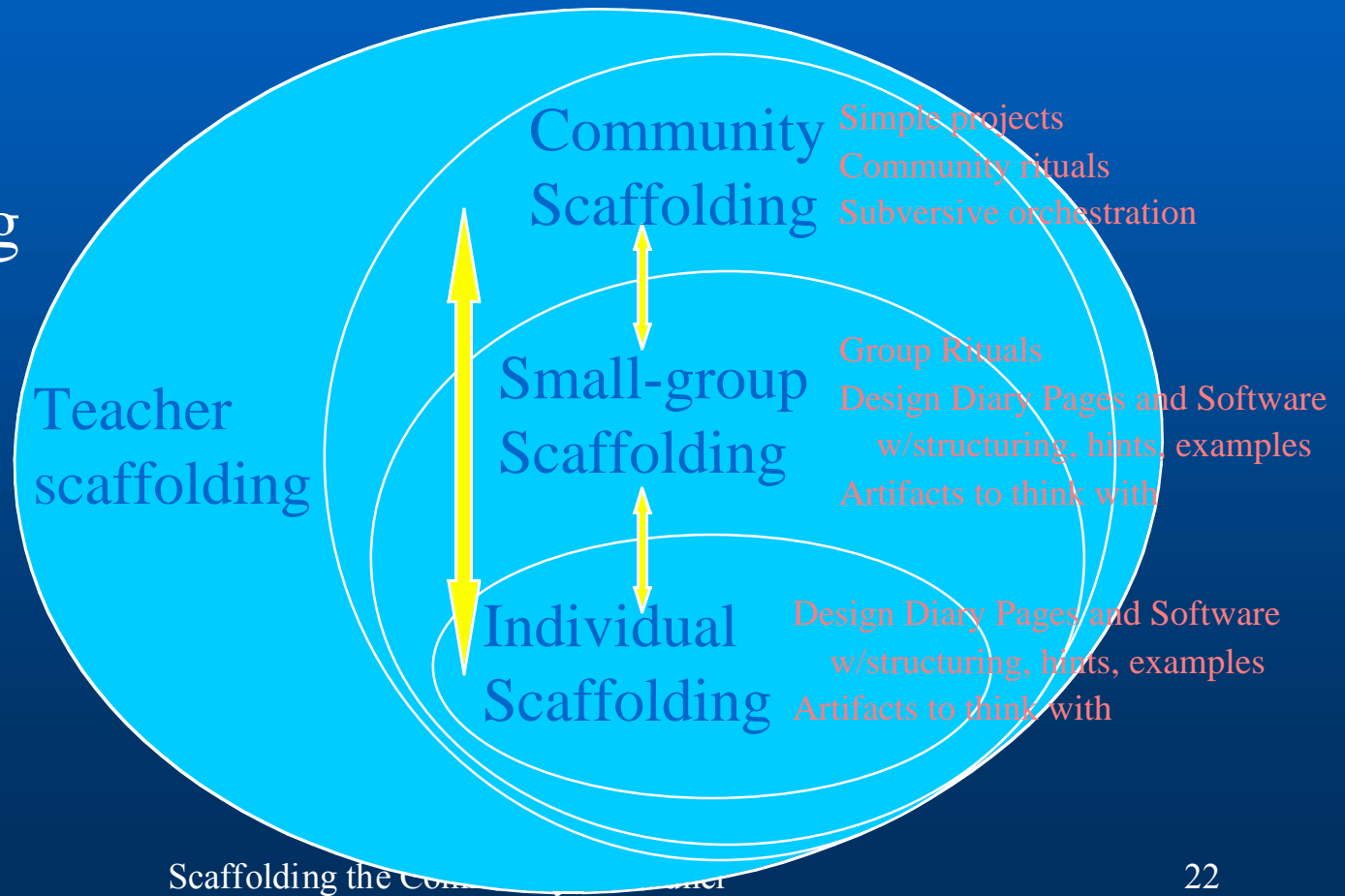
- If we take the ideas of collaborative learning and CSCL seriously, then our approach to scaffolding should go beyond a focus on individuals.

# Redefining Scaffolding

- **System of supports** provided to a community to help its members perform beyond their joint capabilities within the **community ZPD**
- Provided in such a way that learners can gradually increase what they can do by themselves and with others, **raising the level of performance of individuals, subgroups, and the community at the same time**

# Systematically scaffolding a community of learners

Design scaffolding for each social grouping with other groups in mind



# Design Principles for Community-Oriented Scaffolding

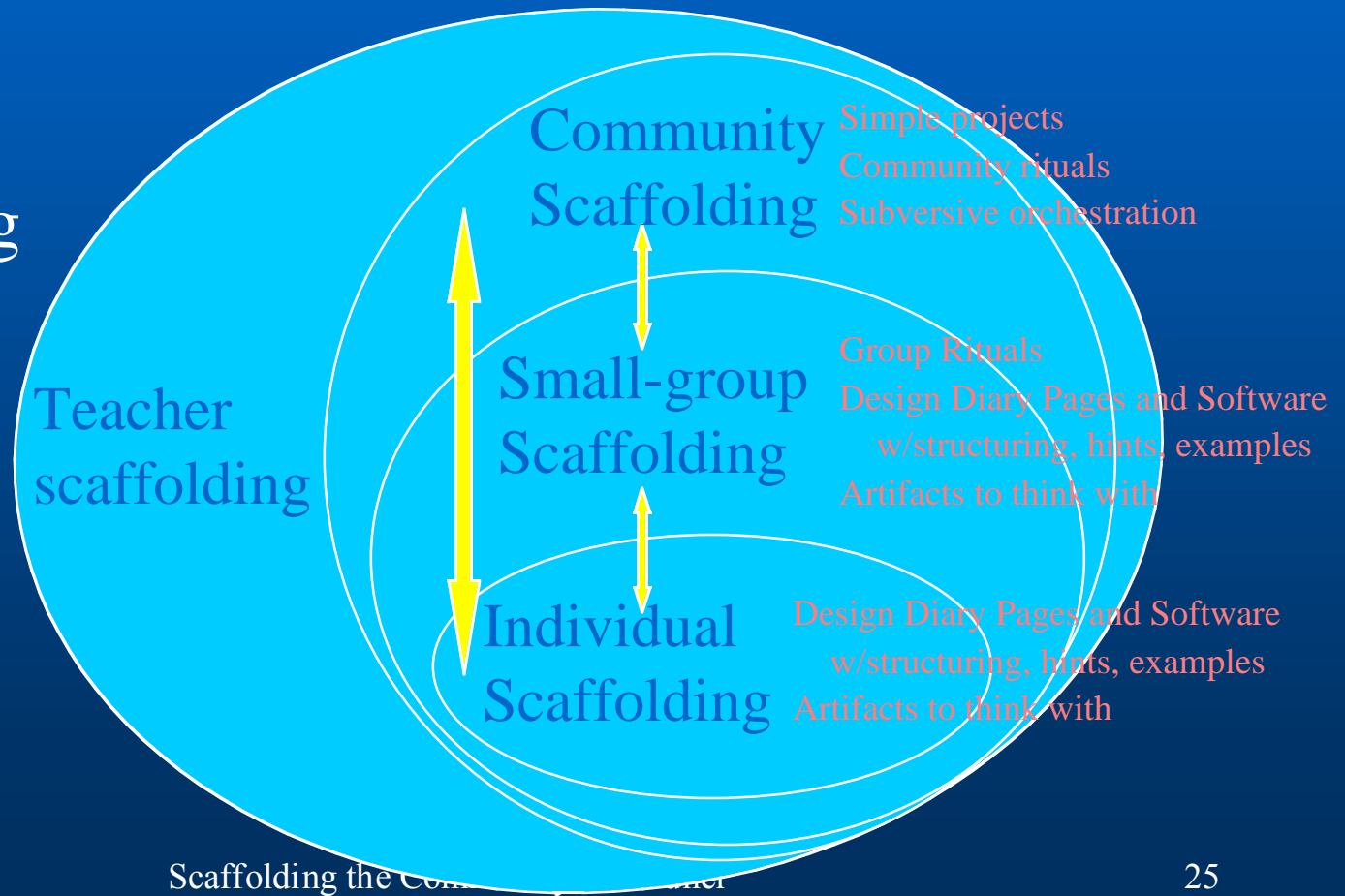
I'm not sure if I have many, but I do have lots of questions that need to be answered so that we can become systematic

# Redefining Scaffolding

- **System of supports** provided to a community to help its members perform beyond their joint capabilities within the **community ZPD**
- Provided in such a way that learners can gradually increase what they can do by themselves and with others, **raising the level of performance of individuals, subgroups, and the community at the same time**

# Systematically scaffolding a community of learners

Design scaffolding for each social grouping with other groups in mind



# Lots of questions ...

---

- **What is a community ZPD?**
- **What might it mean for a community to increase its level of performance? How do you measure that?**
- **What agents are available in the community to provide scaffolding? How should scaffolding responsibilities be distributed?**

# What do we know about putting such a system together?

- To reach every student, need multiple ways of providing the same help -- **redundancy is a value**
- **seamless integration into classroom activities** is essential
- **Iterative practice and reflection**
- **Teacher buy-in and facility**

# Systematic redundancy

- Support individuals in their participation in their work groups
- Support work groups in their participation in community activities
- Support the community such that it recognizes the need for group and individual practices
- Every activity has to have a reason that's meaningful and visible to students and **teacher**

# What is a community ZPD?

- **For LBD™**

- **In the beginning, there are skills students have that they don't know are important for science; if we make them aware, they can begin to use them**
- **Gradually, it's time to help them get better at those skills**

# What is a community ZPD (cont.)

- **Community ZPD is not simply the union of all ZPD's in the community**
  - Rather, a **mix** of developmental points that need to be hit
  - How do you choose those points?
  - We “computed” the community ZPD for middle schoolers through observation

# What agents are available to scaffold?

- **In project-based classrooms**
  - Teacher
  - Peers
  - Invited experts
  - Activities
  - Paper charts and structured pages
  - Software
  - Tools and objects under investigation

# How do you divide the scaffolding?

- Paper gets structuring
- Computer gets structuring, common hinting, and examples
- Teacher models and orchestrates
- People are responsible for special cases
- What else?

# We get different results than Betsy and Phil. Why?

- **We find that very specific scaffolding works well.**
  - Not an entirely fair question because we haven't done comparisons across different kinds of scaffolding.
  - Because the scaffolding is part of a bigger system that orchestrates introduction to, repetitive practice, incremental learning of practices, and use of scaffolds?
  - Because our scaffolding is associated with particular goals students have at the moment?

# Systematically scaffolding a community of learners

Design scaffolding for each social grouping with other groups in mind

