How to utilize group tasks to facilitate a positive environment for nurturing a group of form 3 students' skill acquisition of mathematical knowledge?

Context & Setting
-School S, all-boys DSS school
-Form 3 Class
-Fairly Diverse, handful of gifted students
-Used to group work, but only projects and extra activities

-What about learning with group tasks?
-What about catering diversity with collaborative learning?

Literature Review
Kemmis & McTaggart's AR Model
-Plan->Act->Observe->Reflect

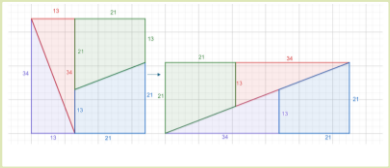
Elements of Design for Group Tasks
-Lesson Content, Process, Environment

Positive Environment for Discussion
-Presence of heuristic/ creative strategies in group interactions

Skill Acquisition for Maths
-PISA & Van Hiele: Measuring mastery without degradation

Sub Questions:
1. What are the inevitable shortcomings of group tasks? How can they be minimized or accommodated with the teacher's actions?
2. How should skill acquisition of students be evaluated appropriately so teachers can respond to the student needs accurately?

Methodology
Questionnaire: questions in Scales, open-ended questions
Homework: Assessment for learning



Cycle 1: Hypothetical
Topic: Slopes
-Mainly hypothetical, carried out with a few students
-Improvements on depth of assessment framework and orientation of group activities
"Are group tasks there just to make mathematics fun?"

Cycle 2: Testing Out New Ideas
Topic: Inequalities-Word Problems
-Practical Cycle, 70-minute
-Stepping back from the role of a leader, in becoming a facilitator
-Notion of "teaching your peers"
-Demonstration on how to use heuristic approaches in 1st task; explicit expectations for groups to follow in the same manner
"Positive collaborative environment achieved. Can it be more closely utilized in process of skill acquisition?"

Cycle 3: Final Improvements
Topic: Inequalities- Geometry Problems
-Practical Cycle, 70-minute
-Started off the lesson by loosely splitting groups
-Students have gotten very used to discussing mathematics in fun tasks, but not academic-wise
-Anchor questions are included, but focuses on "to make sure everyone in the room can solve everything".
- "Is my answer correct?", "I do not know. Can you think of a method to check it? Can you ask your neighbours for other ways?"

Conclusion
"An healthy environment is never built overnight. We teachers ought to take a flexible role, be authoritative , not authoritarian. Get your message to students loud and clear, convince them with sincerity."

Discussion: Sub-questions (Practicality)