Verification Study

Before beginning with these steps, read the behavior descriptions provided. These descriptions were developed over six sessions, grades two through eight; have been generalized for use in grade nine through twelve. Thus, only these four grades are suitable for this verification study. Coding a five minute segment of video may take more than twenty minutes for an experienced coder , so the total video time for this study will be determined based upon performance. We should discuss any questions before beginning.

Step 1) Using the provided video segment, transcript, sample of session segments, and table of behaviors provided, code the segments with a behavior in bold below each student’s segment and provide an overall count with the table.  
  
Before progressing to the next step, we will compare and discuss.

Step 2) Using the second provided video segment, transcript, blank sample of session segments, and table of behaviors provided, code the segments with a behavior in bold below each student’s segment, and provide an overall count with the table.

Before progressing to the final step, we will compare and conclude any questions with the coding.

Step 3) Using the third video segment and transcript, create your own session segments. Segments are typically between fifteen seconds and eighty seconds in length, averaging thirty seconds, depending on how long it takes the students to transition to new actions. Code these segments using the behaviors provided, and provide an overall count similar to earlier steps.  
  
Note: Each segment is not required to possess only one coded behavior, but coding for more than one indicates two distinct actions and is typically rare.

**Coding Behaviors**

This list of student behaviors was designed to encompass all possible interactions worthy of noting. Each action may be interpreted either in an individual or group manner, depending on the particular situation. The objective was to distinguish student behaviors linked to social, cognitive, or affective motivations, and then trace which of these behaviors links to successful learning outcomes. This list is alphabetical to aid in counting, but they could be broken down into two other useful categories, which are by most frequently observed or role type.

**Alphabetical:** Administrative discussion, Argumentation, Assessing progress, Checking answer

Clarifying the problem, Communication improvement, Constructing, Collaboration, Noncollaboration, Disengagement, Emotions related to math, Extrapolation, Group solution, Off-task, Participating in class discussion, Nonparticipation in class discussion, Working during class discussion, Informal leadership, Informal presentation, Random testing, Refining concept, Related mathematics, Researcher guidance, Using tools/manipulatives, Verifying completion, Working individually

**High Frequency:** Checking answer, Informal Presentation, Disengagement, Working individually, Constructing, Researcher guidance, Informal leadership  
**Notable Frequency:** Clarifying the problem, Collaboration, Emotions related to math, Group solution, Off-task, Participating in class discussion, Verifying completion  
**Lower Frequency:** All others  
  
**Administrating type (guiding and leading):** Administrative discussion  
**Cognitive type (Strategy based):** Assessing progress, Constructing, Extrapolation, Random testing, Refining concept, related mathematics, Using tools/manipulatives, Working individually  
**Social type (Communication based):** Clarifying the problem, Communication improvement, Collaboration, Noncollaboration, Participating in class discussion, Nonparticipation in class discussion  
**Affective type (Emotion based):** Emotions related to math, Off-task  
**Mixed type:** Argumentation, Checking answer, Disengagement, Group Solution, Working during class discussion, Informal leadership, Informal presentation, Researcher guidance, Verifying completion

The following is an alphabetical list of behaviors including descriptors to help identify their coding. These must be printed and fully considered when determining coding.

**Administrative discussion –** Includes discussion about who should present work, working conditions(quieting), and group ordering. This category also includes attempts to reroute the group back onto the task.

**Argumentation –** Argumentation that goes beyond the boundaries of normal discussion. Topics of argumentation may include answers, methods, strategy, and nonmathematical reasons.

**Assessing progress –** Monitoring progress towards task completion.

**Checking answer –** This broad category includes self checking or social checking of strategy or computation. This checking may be requested or not. Unsolicited checks count as answer checking, not communication improvement. Simple agreement counts as answer checking; the depth of checking is not under observation categorically.

**Clarifying the problem –** This can be done via the group, class, or a researcher.

**Communication improvement –** Clarifying another member of the group by requesting or offering input about help or an explanation, stating or observing a miscommunication, or attempting to improve communication by any means including conflict(argument) resolution.

**Constructing –** Physical construction, drawing, or listing.

**Collaboration -** Facilitating group progress through generic means. This may include discussion, physical assistance (holding, writing, or spelling), collecting data, any form of recognizing the source of an idea, or requesting the input of another group member in any form that is not answer checking or informal presentation.

**Noncollaboration –** A direct refusal to collaborate with group members, whether acknowledged or not.

**Disengagement –** Any form of listening, waiting, or being lost during discussion. This is not necessarily negative, but indicates a lack of active participation.

**Emotions related to math –** This can occur when sharing results or guarding answers, and is indicated with excited speech, extended participation, or attachment to work.

**Extrapolation –** Predicting values, results, or expectations.

**Group solution –** The discussion and acknowledgement of a solution in terms of group acceptance rather than a general consensus of correctness. Students will typically cite a group’s solution, or make a point to mention that this is their group’s answer.

**Off-task –** Discussion or work that is not related to the problem task.

**Participating in class discussion –** Active listening, hand raising, or sharing during class time.

**Nonparticipation in class discussion –** Disengagement for class time.

**Working during class discussion –** Individual or social work during class time.

**Informal leadership –** Perhaps the most important and yet difficult to identify behavior. These behaviors change the group’s perceived progression in some way. This may include choosing a subtask and divvying the work, supporting leadership, or supporting group or individual development.

**Informal presentation –** This category does also have a formal presentation subcategory, but it is included because these tasks are primarily informal. Any type of idea sharing including discussion of new work, answer explanation, or answer repetition can be described here. This is primarily the first step before an answer is checked.

**Random testing –** Any type of random strategy as opposed to a plan or utilizing previous knowledge.

**Refining concept –** Reorganizing, checking for patterns, or rewriting in standard notation.

**Related mathematics –** Any type of mathematics discussion whether related to the task or not, especially if the problem is compared.

**Researcher guidance –** Students may request this input or not. Any type of visit that includes discussion of work with a researcher. This may include exploratory conversation, inquisitional technique, or discussion of proof or convincingness.

**Using tools/manipulatives –** This includes all types of tool or manipulative use, on or off task.

**Verifying completion –** This is a verbal group check, or self check of convincingness. Students may take time to reflect on their answer and affirm their beliefs before progressing.

**Working individually –** Any type of individual work that may involve studying a problem, computing, writing, or drawing. This is primarily used for self engagement, even if the student’s actual work in progress cannot be identified.

**Group Engagement Type Count**

|  |  |
| --- | --- |
| **Behavior** | **Count** |
| Administrative discussion |  |
| Argumentation |  |
| Assessing progress |  |
| Checking answer |  |
| Clarifying the problem |  |
| Communication improvement |  |
| Constructing |  |
| Collaboration |  |
| Noncollaboration |  |
| Disengagement |  |
| Emotions related to math |  |
| Extrapolation |  |
| Group solution |  |
| Off-task |  |
| Participating in class discussion |  |
| Nonparticipation in class discussion |  |
| Working during class discussion |  |
| Informal leadership |  |
| Informal presentation |  |
| Random testing |  |
| Refining concept |  |
| Related mathematics |  |
| Researcher guidance |  |
| Using tools/manipulatives |  |
| Verifying completion |  |
| Working individually |  |