

# An Experience Report

## What Students Say Could Be Done to Promote Dispositions



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# What Students Reported about Course Improvements: *Choose the Disposition*

“Time set aside during class to work with our group members even just 10 minutes per class since most people have different schedules meaning sometimes everyone’s available doesn’t line up.”

“Maybe an assignment where we create our own problem to solve through a series of functions, rather than just figuring out the definition functions provided.”

“I think more materials to help us course correct and understand our mistake would help improve...”

## **Dispositions:**

Collaborative

Meticulous

Persistent

Responsive

Self-directed

“Tasks could be broken up into smaller chunks to help guide students so they do not give up from being daunted by the grandness of a large assignment.”

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## Responsive

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# What Students Reported about Themselves:

## *Choose the disposition*

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“...I can also keep trying after hitting a road block and find other solutions to a problem...”

“...If we communicated more, we would be able to spot issues that we have better and be able to work together to overcome these issues.”

“I could focus more on reviewing examples of code to learn different approaches and techniques to how the functions and classes are implemented.”

“I could’ve definitely responded faster to the feedback or comments my partner gave me.”

“It helps to have a pattern that I follow as I code my programs. Good practices like completing shells for loops or if, else statements, as well as separating different sections with comments take longer, but are much more beneficial in the long run.”

# What Students Reported about Themselves:

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“...If we communicated more, we would be able to spot issues that we have better and **be able to work together** to overcome these issues.”

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“I could **focus** more on reviewing examples of code **to learn *different* approaches and techniques** to how the functions and classes are implemented.”

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# Overview



- Why Promote Dispositions?
- Asking Students for Feedback
- Context, Students, and Analysis
- What Students Said
  - Course improvements
  - Personal responsibility
- Takeaways for Educators

## Knowledge

Know - what

+

## Skills

Know - how

+

## Dispositions

Know - **why** and  
know - **who we are**  
“intent and willingness to  
apply knowledge and  
skills in a given context”

= **Competency**

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Computing Curricula 2020

CC2020

# Dispositions

- Desirable in the workplace
- Personal qualities of learning and professional development
- Recognized through observable behaviors



- Key components
  - Observable behaviors
  - Awareness
  - Intention
  - Strategies

# Dispositions from CC 2020

| Element      Elaboration |                | Element      Elaboration |                                               |
|--------------------------|----------------|--------------------------|-----------------------------------------------|
| ★                        | Adaptable      |                          | Flexible; agile, adjust in response to change |
|                          | Collaborative: |                          | Team player, willing to work with others      |
| ★                        | Inventive:     |                          | Exploratory. Look beyond simple solutions     |
|                          | Meticulous:    |                          | Attentive to detail; thoroughness, accurate   |
|                          | Passionate:    |                          | Conviction, strong commitment, compelling     |
|                          | Proactive:     |                          | With initiative, self-starter, independent    |
|                          |                | Professional:            | Professionalism, discretion, ethical, astute  |
|                          |                | Purpose-driven:          | Goal driven, achieve goals, business acumen   |
|                          |                | Responsible:             | Use judgment, discretion, act appropriately   |
|                          |                | ★ Responsive:            | Respectful; react quickly and positively      |
|                          |                | ★ Self-directed:         | Self-motivated, determination, independent    |

*From CC2020: Table 4.4 on page 51*

## Motivation

Even though dispositions are identified in the CC2020 curricular report, few studies exist about **developing dispositions in computing students**.

Our work includes the ★ -dispositions and persistence (included in the CS2023 report).

# Asked students for feedback after assignment

*What could be done differently in this course to help you be more <disposition>?*

| Disposition   | Description                                                                                                                                                                                                 |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collaborative | Work with other people as a group, exchange, share and discuss ideas, thoughts, feedback and solutions to a given problem or task.                                                                          |
| Meticulous    | Paying attention to detail even when the detail is incidental to the success of a solution and addressing it may or may not be expected or rewarded                                                         |
| Persistent    | Stick with a task until it is completed, even when the task seems difficult and even when you have doubts about your ability to complete the task                                                           |
| Responsive    | To respond to requests, feedback and suggestions promptly even when promptness is neither expected nor rewarded                                                                                             |
| Self-directed | Learn new tools, techniques, etc. on your own to complete a task, even when the tool/technique is only minimally used or discussed in class, and you may not receive additional credit just for learning it |

# Student Population

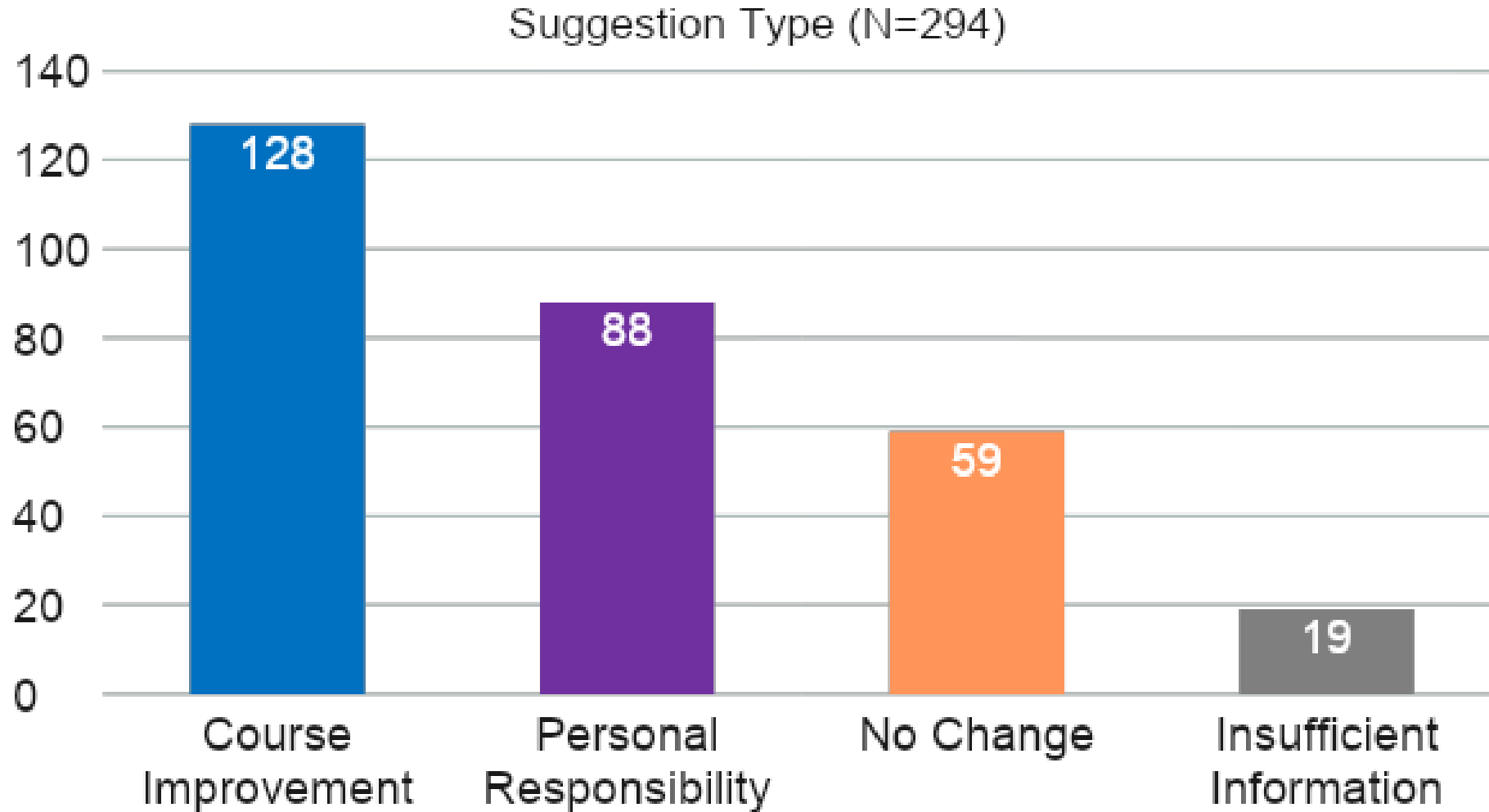
Collected data from students

- at three institutions
- in four courses
- in 2024-2025.

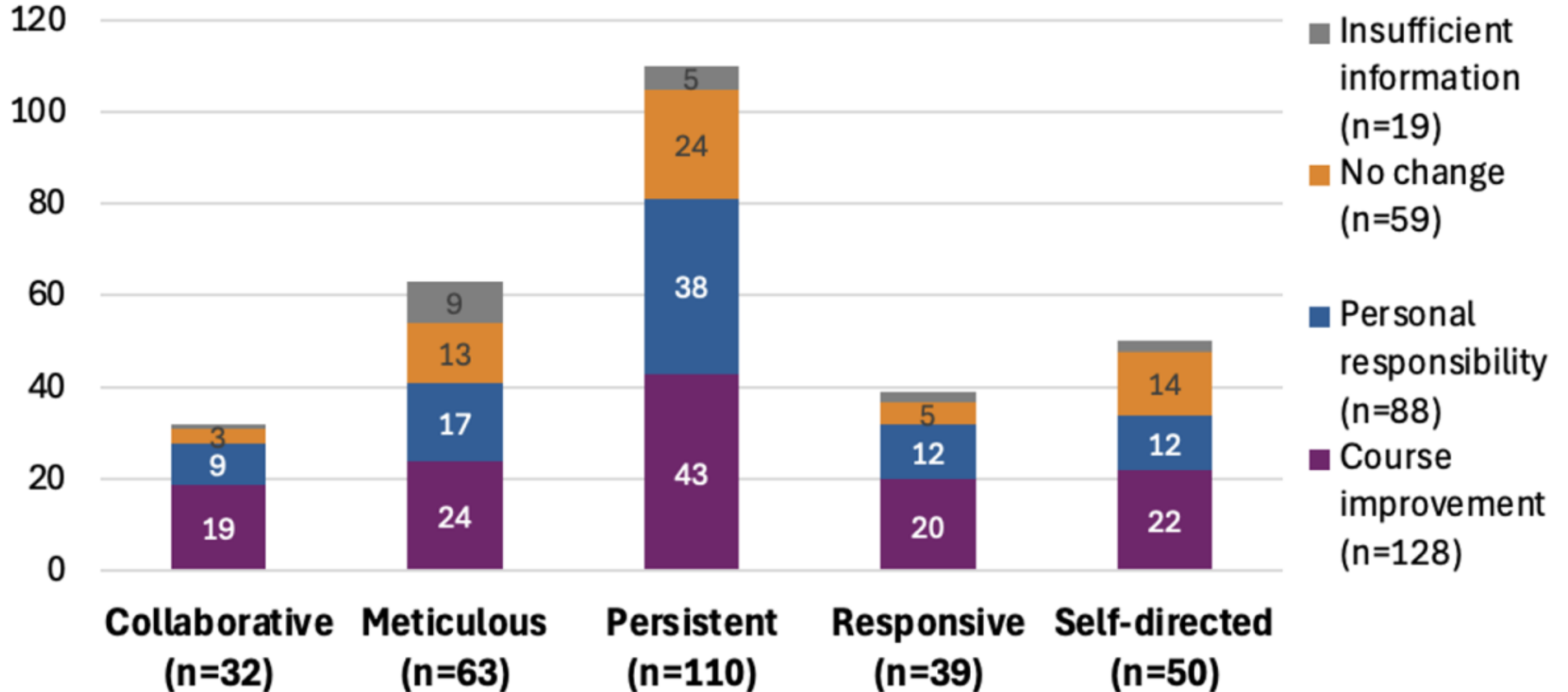
| Course →       | CS1  | Database<br>Mgmt (DB) | Software<br>Des. (SD) | Prog.<br>Lang (PL) |
|----------------|------|-----------------------|-----------------------|--------------------|
| Universities → | A, B | C                     | C                     | B                  |
| Disposition    |      |                       |                       |                    |
| Collaborative  | -    | 2                     | -                     | -                  |
| Meticulous     | 3    | 2                     | -                     | 2                  |
| Persistent     | 3    | 2                     | 1                     | 2                  |
| Responsive     | 1    | 2                     | -                     | -                  |
| Self-Directed  | 3    | -                     | 1                     | 2                  |

# Findings - Major surprise

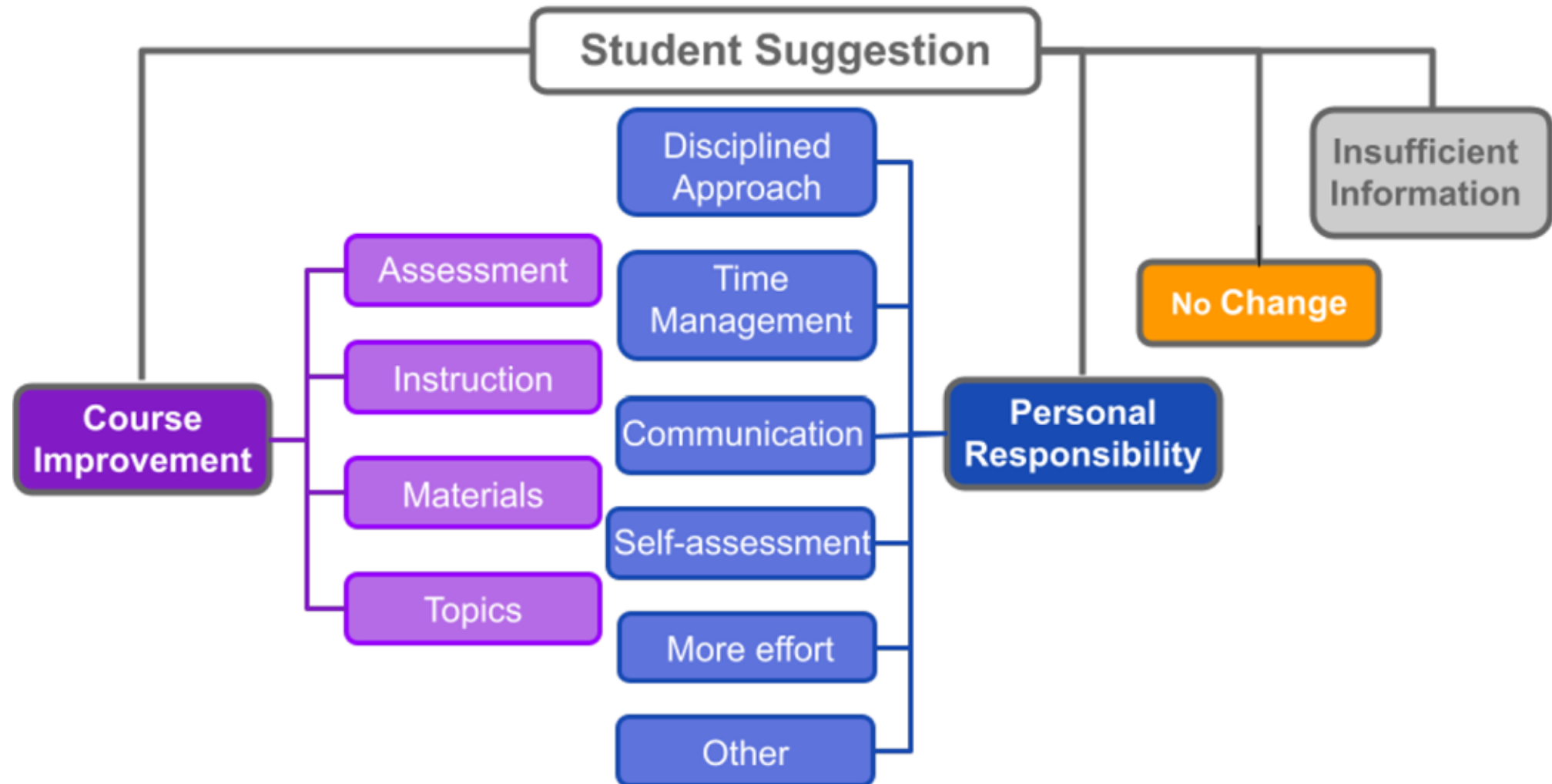
## One-third in the *Personal Responsibility* type



# Types of Suggestions by Disposition



# Analyzed Data for Course Improvement and Personal Responsibility: Found Themes



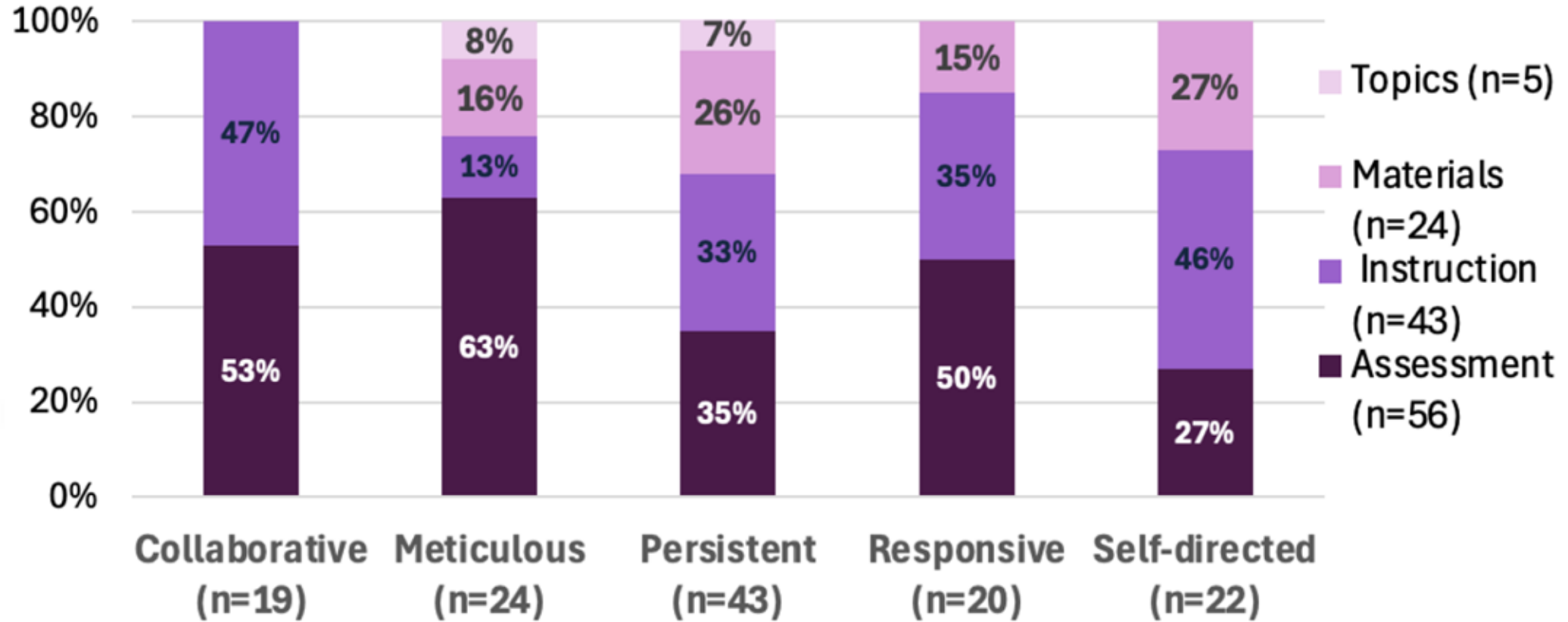
# Example Responses: Course Improvements

| Theme       | Statement                                                                                                                                                                                                                                                                                                 |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Assessment  | “Breaking larger assignments into <b>smaller, manageable tasks</b> or <b>checkpoints</b> could help maintain motivation and momentum.” ( <i>persistent</i> )                                                                                                                                              |
| Instruction | “If we were allowed some <b>time to work on the project in class</b> (maybe about 10-15 mins toward the end), that would be a great help to us for being more collaborative.” ( <i>collaborative</i> )                                                                                                    |
| Materials   | “Providing <b>clear, well-defined learning outcomes and accessible resources</b> (such as online tutorials, articles, or videos) would help me understand what to focus on. This clarity would enable me to take control of my learning and direct my efforts more efficiently.” ( <i>self-directed</i> ) |
| Topics      | “We've done some test driven development, maybe <b>explore some other development paradigms</b> in addition to TDD?” ( <i>meticulous</i> )                                                                                                                                                                |

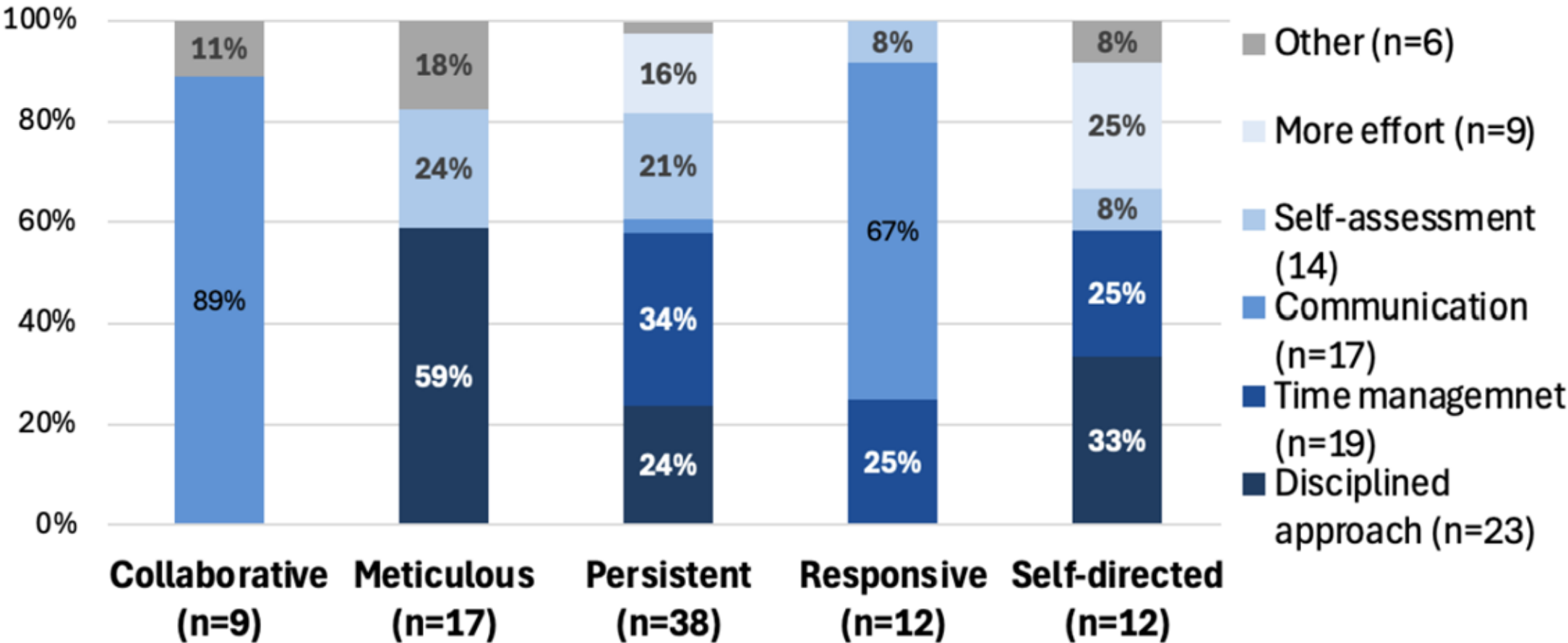
# Example Responses: Personal Responsibility

| Theme                | Statement                                                                                                                                                                                                     |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Disciplined Approach | “Well when I think of meticulous I think of being thorough, so I believe we could have been even more thorough by <b>checking over the submission an extra time</b> before submitting.” ( <i>meticulous</i> ) |
| Time Management      | “The biggest thing I can do is <b>start assignments earlier</b> than I do. It gives me more time to work out the kinks and make things more optimized.” ( <i>self-directed</i> )                              |
| Communication        | “I should've tried to <b>connect more with them continuously</b> to see if we were having any problems and not fully collaborate on the last few days.” ( <i>collaborative</i> )                              |
| Self-Assessment      | “Try and <b>be more open minded</b> . Address things that need to be addressed and go from there.” ( <i>responsive</i> )                                                                                      |
| More Effort          | “I could probably <b>set aside 20 minutes a night</b> to work on the small assignments done through Java just to make sure my skills are sharp.” ( <i>persistent</i> )                                        |

# Course Improvement Themes by Disposition



# Personal Responsibility Themes by Disposition



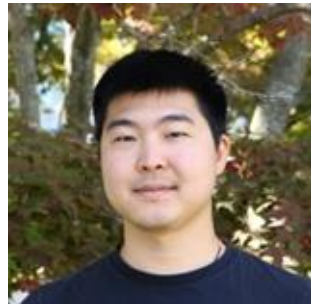
# Takeaways for Educators

- Students took responsibility for dispositions when asked about improvements to the course
- Low-cost approach via a simple prompt can give valuable insights to educators
- Students provided feedback about class time
  - Educators may want to consider what activities are most valuable in the classroom community vs. outside class
- Specific resources included
  - guides to help students get unstuck (debugging resources),
  - self-reflection tools, and
  - guides for handling open-ended projects

# Suggestions for Adoption

1. Identify **course**
2. Identify one to four **dispositions** that you want students to practice
3. Choose subset of **assignments**, one assignment per disposition
4. Include a **prompt** in the assignment submission
  - comprised of **disposition definition** and **feedback questions**
5. Read and categorize **student feedback**
  - May use the flowchart from the paper for **themes** in course improvements and personal responsibility types
6. Consider making **course changes** based on the feedback
7. **Talk to colleagues** about developing dispositions in courses across the curriculum

# Thank you



Do you have thoughts, ideas, questions?

Interested in learning more or joining this team of educators?

<https://dispositions-project.org>

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