THE COLLABORATIVE DISPOSITION: WHAT STUDENTS SAY

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WHAT STUDENTS SAID: BEING COLLABORATIVE

During problem 3 of the recent project, I reached out to a fellow classmate on how to incorporate a new function into the code

I often try to converse with friends about an assignment … if I get stuck to see if any conversation on the topic helps clear same stuff up

I have been collaborative with my classmates before and after class by talking to them and helping exchange knowledge on how to perform certain aspects of coding

An example of me being collaborative during this assignment would be me coming together with my partner and brainstorming our ideas. … there may have been a difference in ideas, but we came together to form one product. …

there was a classmate next to me that was working on [same assignment] at the same time that I was and we had shared ideas on how to complete this section of the project

WHAT STUDENTS SAID: FACTORS PREVENTING COLLABORATION

I didn't think to ask for help in discord when running into an issue, i (*sic*) brute forced my way into an answer by looking up the different methods … to see what tools i (*sic*) had to complete the assignment.

As this was a homework assignment and not a lab, I was not aware that collaboration was an aspect of this assignment. …

I needed to get this homework assignment done quickly so I could move on to other work. While it posed some interesting challenges that I would have liked to have seen some different perspectives on, I wasn't willing to wait around for Discord responses

I have social anxiety so collaborating is difficult.

I was ill and felt like I did not have the capacity to effectively communicate or reach out to other classmates

AGENDA

- What are dispositions?
- Why dispositions?
- Research Questions
- Context, Methods, and Analysis
- Results
- Discussion

WHAT ARE PROFESSIONAL DISPOSITIONS?

A mindset or value or belief that encourages positive behavior(s), that lead to successful practice.

- One component of competency.

[CC2020, page 47]

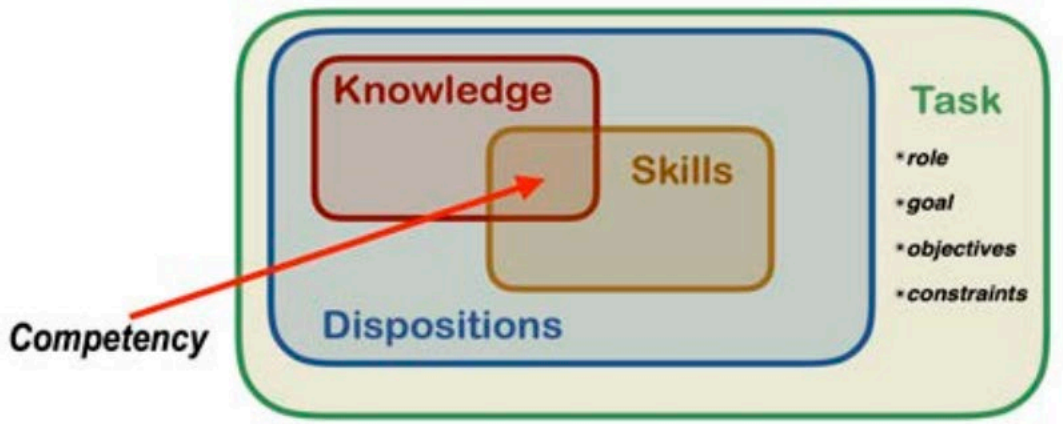


Figure 4.1. Conceptual Structure of the CC2020 Competency Model

Three components [Perkins, et al., 1993]:
(1) the **ability** to apply a behavior**,**
(2**) recognition of the opportunity** to apply a behavior**,** and
(3) the **inclination or** willingness to apply the behavior

WHY DISPOSITIONS?

Curricula :overlords say to: "*While it may be difficult to teach disposition,* ***faculty*** *members should* ***instill these concepts in their students***." [CC2020, page 51]

Employers say to (supported by research, for just two examples, see):
C. Dede et al., "Why dispositions matter for the workforce in turbulent, uncertain times." 2021.

D. Tagare, et al., "Dispositions that computing professionals value in the workplace: Systematic literature review and interviews with professionals," 2023.

STUDY FOCUS: COLLABORATIVE DISPOSITION

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

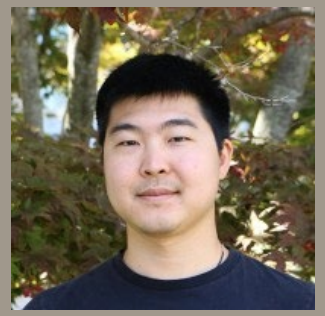
More from CC2020, page 51: **The workplace and society assume that dispositions (above) are expected of every competent computing graduate**.

We found that even though dispositions are included in the curriculum report, few studies exist about developing dispositions in computing students.

THE RESEARCH TEAM








This work is part of an ongoing multi-institutional study that started in 2021:

competencies → dispositions →

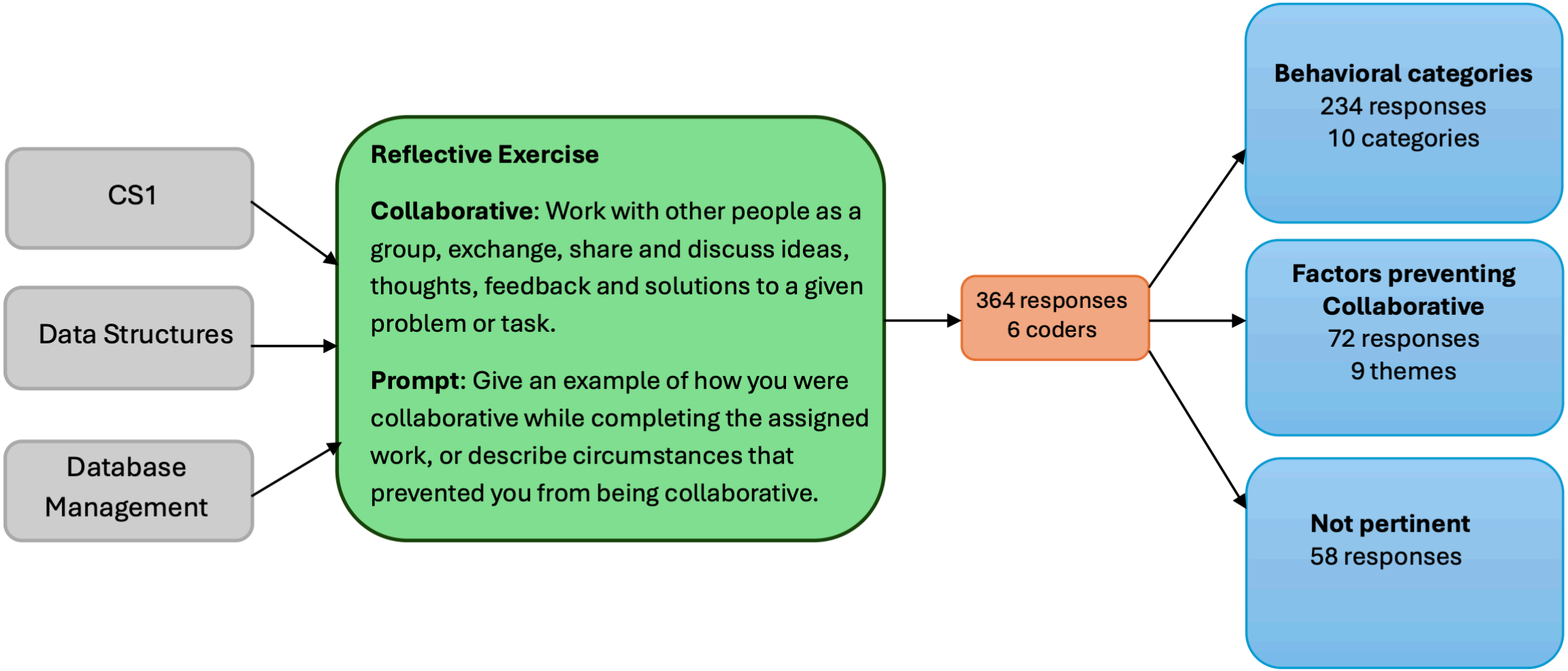
Behaviors (meticulous, adaptable, self-directed, collaborative, responsive, responsible)
Techniques for soliciting data (vignettes and reflection exercises)
Quantitative analysis
Qualitative self-directive intensive
Qualitative collaborative intensive (this paper)
Qualitative Persistent intensive (under analysis)
Investigating AI to assist in thematic analysis

RQ1: What do students **describe** as their collaborative practices in computing?

RQ2: What do students report are **factors that prevent** them from being collaborative?

TABLE I
COURSE SECTIONS, PARTICIPANTS, AND STUDENT RESPONSES IN THIS STUDY

Course	CS1	Data Structures	Database Management	Total
Sections	5	1	4	10
Participants	89	4	67	160
Responses	238	4	122	364



RESULTS: BEHAVIORAL CATEGORIES

TABLE II
BEHAVIORAL CATEGORIES FOR BEING COLLABORATIVE

Name	Definition
	Group collaboration categories
Interactive formal group collaboration (60)	Formal group of a team or partners working together and co-creating work products
Informal group interaction (46)	Working interactively with others without a formal group
Independent formal group collaboration (36)	Formal group working independently and building work products by merging individual contributions
	Help-related categories
Asking for help (35)	Reaching out to other individuals for guidance on problems/issues encountered with the assignment.
Assisting others (10)	Giving input and sharing insights with classmate(s) regarding coding errors, project solution, or concept understanding
Unsolicited help (7)	Having partner or classmate help without being asked
Helping each other (6)	Offering and getting help in a reciprocal manner
	Supportive categories
Communication (19)	Talking, sharing ideas, and keeping contact with peers, group members, friends, or others
Problem solving (11)	Identifying, discussing, and resolving problems or issues
Using tools (4)	Supporting collaboration through the use of resources, such as Discord or Google Docs

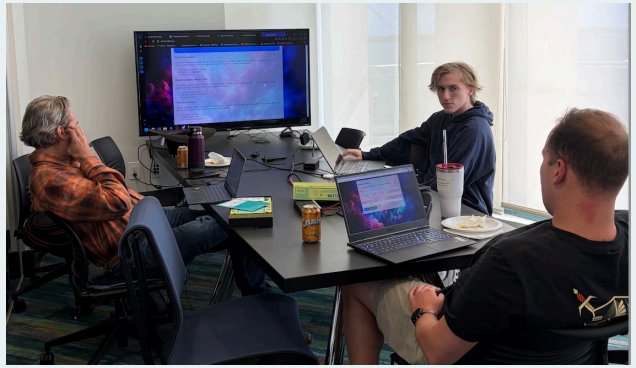
RESULTS: FACTORS PREVENTING

TABLE III
FACTORS PREVENTING STUDENTS FROM BEING COLLABORATIVE

Name	Definition
Assignment or course structure (33)	To the student, the structure of the assignment and/or course does not need the collaboration disposition to be applied or the assigned work is individual
Situational barriers (9)	Circumstances such as illness created a barrier to being collaborative
Self-sufficiency (9)	Given their own skills, student believes that they do not need to apply the collaboration disposition
Referred to reflection vs assignment (7)	Answered question about being collaborative when completing the reflection prompt vs the course assignment
Identity misalignment (5)	A component of the student's self-described identity is misaligned with applying collaboration disposition
No particular reason (4)	Simply stated they worked on the assignment alone
Competing commitments (3)	Other commitments (work, personal) prevent them from applying collaboration disposition
Insufficient motivation (1)	The student is not motivated to apply the collaboration disposition or to participate in the course.
Unsuccessful effort (1)	The student tried, but could not successfully apply collaboration disposition (e.g., due to lack of understanding or getting stuck on a problem)

DISCUSSION: IMPLICATIONS FOR EDUCATORS

Create and highlight opportunities for collaboration



Emphasize the value of collaboration

Teach and foster collaboration practices

CONCLUSIONS

Strengths:

- Multi-institutional
- Applicable to many contexts
- Employers value employees who are collaborative
- Educators value disposition + knowledge + skills

Limitations:

- Assignment information missing
- Most students surveyed were in introductory courses, fewer advanced students
- Challenging to study

THANK YOU

Do you have thoughts, ideas, questions?

https://dispositions-project.org

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EXTRA SLIDES

DATA AND ANALYSIS (PART 1)

Data unit: single response to prompt

Total units analyzed: 364 responses

How? Each response was identified as "exhibited collaborative behavior", "did not apply collaborative disposition", and "not pertinent"

Behaviors: Qualitative data analysis with seven deductive categories for behaviors of collaborative based on prior work [*Kiesler et al.*]

N = 234

Details: Three researchers individually analyzed 100 responses and categorized them based on original seven categories. They then met and discussed their findings as a group and tried to come to consensus on categories, finding that the original 7 did not fit well. All researchers met to discuss and agreed on adding some new and revising other categories.

New categories emerged, for a total of 10 categories

DATA AND ANALYSIS (PART 2)

Not applied: Qualitative data analysis with inductive categories for factors that prohibited students from being self-directed

[N=72]

Two researchers analyzed all responses as new categories emerged. The entire group worked together to come to consensus

Not pertinent: These responses were not studied further

[N=58]