

# Promoting the Dispositional Dimension of Competency in Undergraduate Computing Programs

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## Project Goals

- Study how professional dispositions can be understood, promoted, and fostered across undergraduate computing programs
- Develop easy to integrate materials for a variety of courses without impacting existing learning objectives
- Focusing on two evidence-based approaches
  - Reflection exercises
  - Vignettes

## Deliverables

- A collection of revised reflection exercises and revised vignettes targeting dispositions along with guidelines for use
- Results from evaluating the efficacy of using reflections and vignettes among computing students at the participating institutions
- Dissemination of the surveys, exercises, guidelines, evaluation results to educators in computing programs

## Institutions Participating in the Study

- College of Charleston, Charleston, SC
- St. John's University, Queens, NY
- Ramapo College of New Jersey, Mahwah, NJ
- University of New Hampshire, Manchester, NH

## Research Questions

- To what extent do reflection exercises foster students' professional dispositions?
- To what extent do vignettes foster students' professional dispositions?

## Professional Dispositions

- **Definition:**
  - Cultivable behaviors desirable in the workplace
  - Components of Competency
    - Competency = Knowledge + Skills + Dispositions for a Task
  - Willingness and intent to use a skill
  - Habitual pattern, not a one-off behavior
- **Characteristics:**
  - Learnable, not necessarily teachable
  - Formatively assessable, not necessarily measurable
- **Dispositions studied in this project:**
  - Adaptable, Collaborative, Inventive, Meticulous, Persistent, Proactive, Responsive, Self-Directed [Computing Curricula 2020]

## Reflection Exercises

Students need to answer two questions:

- Rating question example (for the "meticulous" disposition):  
"I test my solutions exhaustively", "I re-read instructions to ensure I do not miss any detail of the assignment"
- Descriptive question example:  
"Describe an example of you being persistent when completing this assignment. Otherwise describe the circumstances that prevented you from being persistent"  
Example response "When completing the file reader I had spent a full day working on it until I finally got it to read all 3117 records"

## Vignettes

### Scenario based on real-life stories      Engagement questions

- 500-word full vignette
- 200-word mini-vignette
- Identify the disposition
- Describe an application

## Vignette example

**The Linux Operating System**

In 1991, while a computer science student in Finland, Linus Torvalds started working on a new free operating system, as a personal project. On August 25, 1991, he posted a message on Usenet, which was an early Internet newsgroup site similar to Reddit, announcing his project. He posted "I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)". So that people could access his project files, he uploaded them to a FTP server (an early Internet protocol for sharing files). One of the volunteer administrators of the server named the project "Linux", and the name stuck. He released the project under the GNU General Public License (GPL) which allows four freedoms: the freedom to run, copy, study/improve and distribute the work. The use of GPL, as well as the fact it was free and ran on affordable personal computers, are the reasons why Linux became one of the most popular operating systems of all time. As Linux became popular among PC hobbyists, users started writing and contributing their own code: bug fixes, utilities, and extensions. Over time, the Linux development community snowballed, with many programmers from all over the world working on the system. By 2005, the original system of passing changes around as patches and archived files became impossible to manage, so Torvalds and other community members worked together to develop Git, a version control system that can manage huge numbers of globally dispersed developers so they can work together. Today, Linux is an enormous open source project that is maintained and extended by over 600,000 programmers from around the world. Likewise, Git has become a very popular version control tool, helping developers work together. GitHub alone had 40 million registered developers in 2018

### Sample scenario

Please select the disposition best illustrated by the story. The dispositions have been defined above.

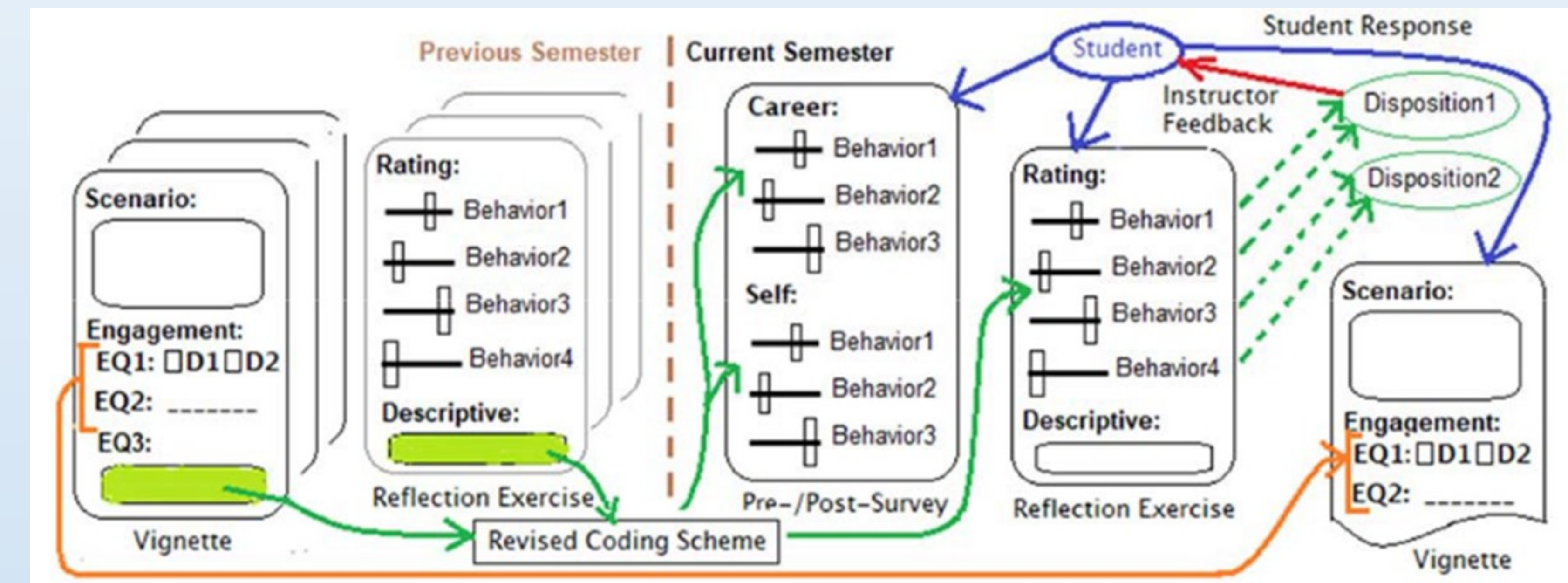
1. Adaptable
2. Collaborative
3. Inventive
4. Meticulous
5. Persistent
6. Proactive
7. Responsive
8. Self-directed
9. None of the above

Please explain why you think the story illustrates the disposition you selected.

Long answer text

### Sample engagement questions

## Study Protocol



Surveys, reflection exercises and vignettes: evolving from one semester to the next.

## Lessons learned

- Dispositions targeted to specific course content
- Focus groups to rate behavior statements
- *Professional* and *responsible* dropped
- Tailorable reflection exercises and vignettes

## Current status

- Pilot study 2021-2022 gathered initial set of data
  - Qualitative and quantitative analysis of this data informed the initial set of reflection exercises and vignettes used in 2023-2024
- Data collection scheduled for 2022-2023 and 2023-2024
  - Reflection exercises used in 10 courses at all institutions in fall 2022 and in three courses in spring 2023
  - Vignettes used in two courses in spring 2023
  - Analysis of data and modifications to exercises during summer 2023
- 2023-2024
  - Revised vignettes and reflections will be used

## Acknowledgements

- Partly supported by National Science Foundation under grants 2216121, 2215970, 2216031 and 2215166.
- We thank John Impagliazzo who contributed to all facets of this project.

## Please join us:

[bit.ly/dispositions-study/](https://bit.ly/dispositions-study/)