Engaging Learners:
Exploring Student Perceptions of Pedagogy, Community, and Content

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CI Research Seminar Series
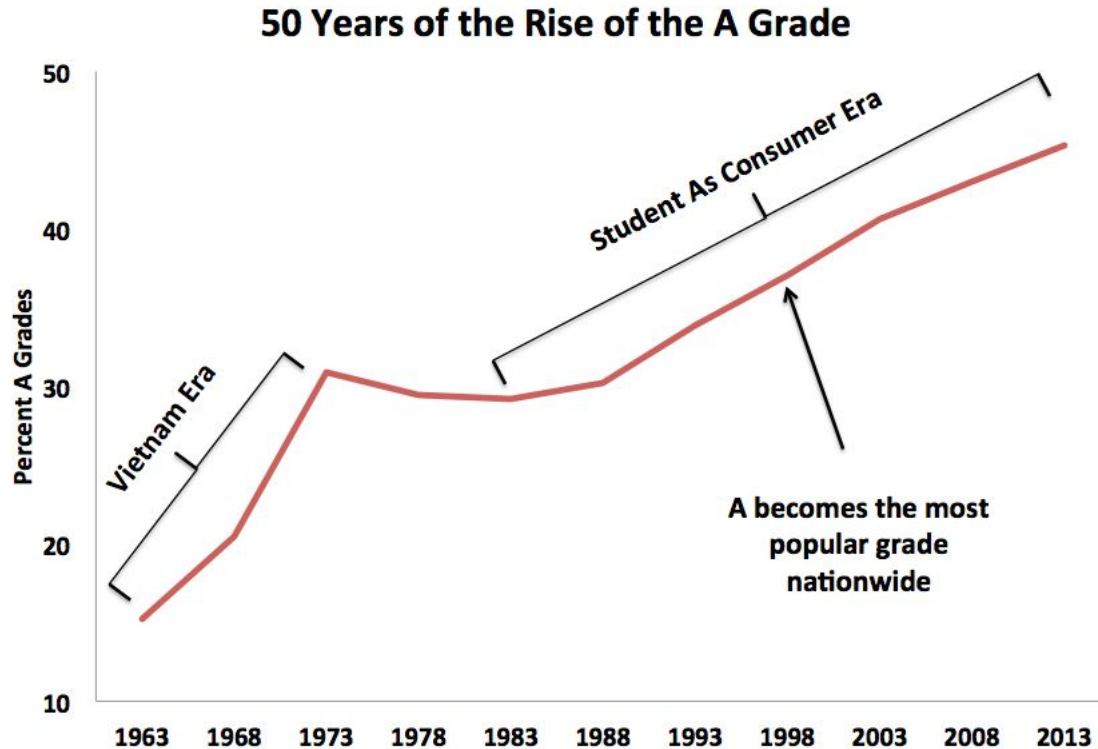March 12, 2025

Background Information

Goodhart's Law

Definition of a grade?

"When a measure becomes a target, it ceases to be a good measure. The more a 2.1 [*B+/A-*] examination becomes an expectation, the poorer it becomes a discriminator of individual performances" (Strathern, 1997, p. 308).

Do grades represent a **culture of learning** or **of auditing and accounting**?

"This paper outlines the path and describes how the time-honored practice of affixing ~~bibliographic references~~ **[grades]** to ~~scholarly articles~~ **[student assignments]** has paved the way for a culture of accounting **[rather than a culture of knowledge]** to establish itself in contemporary academia" (Cronin, 2013, Abstract).

GradeInflation.com (2016)

50 Years of the Rise of the A Grade

Vietnam Era

Student As Consumer Era

A becomes the most popular grade nationwide

Percent A Grades

50
40
30
20
10

1963 1968 1973 1978 1983 1988 1993 1998 2003 2008 2013

Motivation

To explore engagement in STEM and STEM-adjacent courses through Universal Design for Learning (UDL) and ungrading in order to enhance learning, foster inclusiveness, and minimize learning and course anxieties.

What is Ungrading?

Definition:

- Ungrading is a pedagogical approach that shifts focus away from grades and toward qualitative feedback and proficiency of content
- Some examples:
    a. Specification grading
    b. Self-assessment and reflection work
    c. Collaborative exams and peer feedback and review
    d. Portfolio-based assessment with reflection work
    e. Contract grading
    f. Process-focused feedback

Ungrading

Features:

- Reduces stress and anxiety (Palmer et al., 2025).
- Supports interest-driven learning (Gorichanaz, 2022).
- Emphasises formative, iterative feedback (Lipnevich & Smith, 2009).
- Promotes student responsibility, autonomy, intrinsic motivation (Spurlock, 2023).
- Ungrading is disruptive (Rapchak, Hands, & Hensley, 2023) and requires student buy-in (Sorenson-Unruh, 2020).
- Aligns with Universal Design for Learning (UDL)

Universal Design for Learning (UDL)

What is UDL?

- A framework for creating inclusive, engaging, flexible learning environments by:
  - Accommodating diverse learning modalities and needs
  - Ensuring equitable access to education for all students

Core Principles of UDL[1]

Multiple Means of Engagement

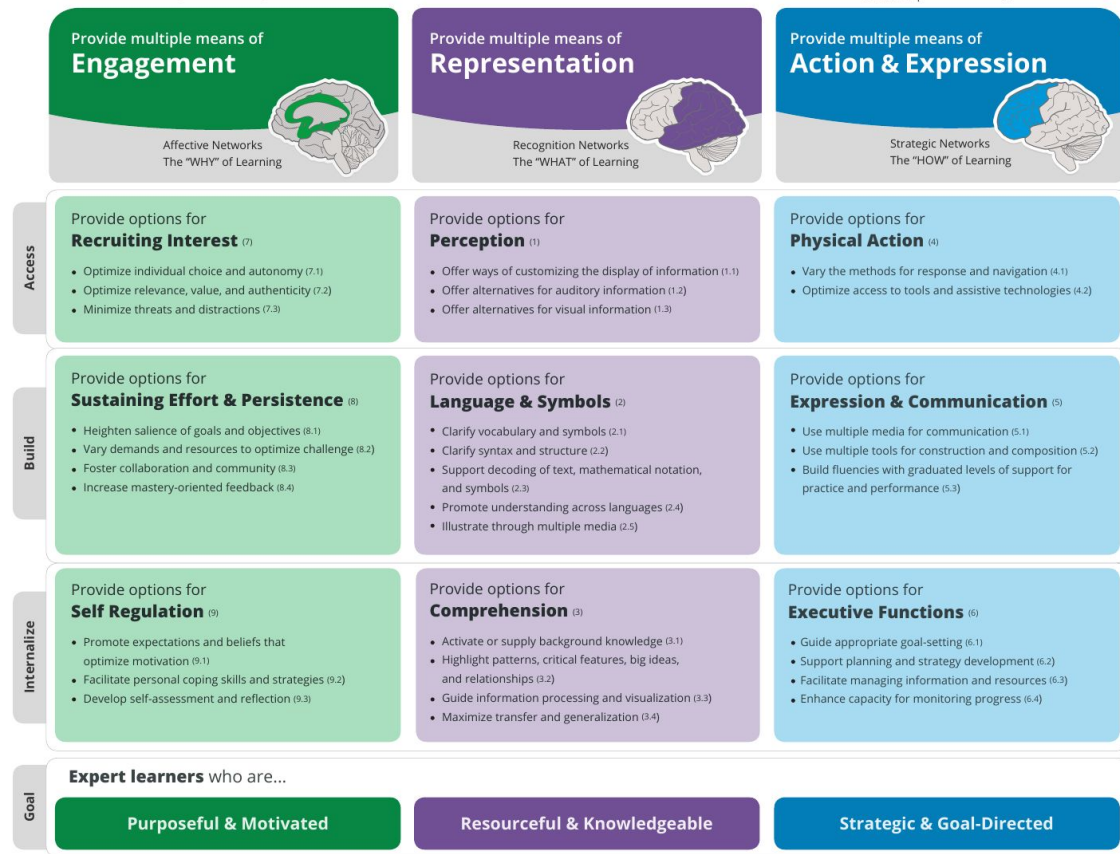- Example: minimize threats and distractions

Multiple Means of Representation

- Example: Illustrate through multiple media

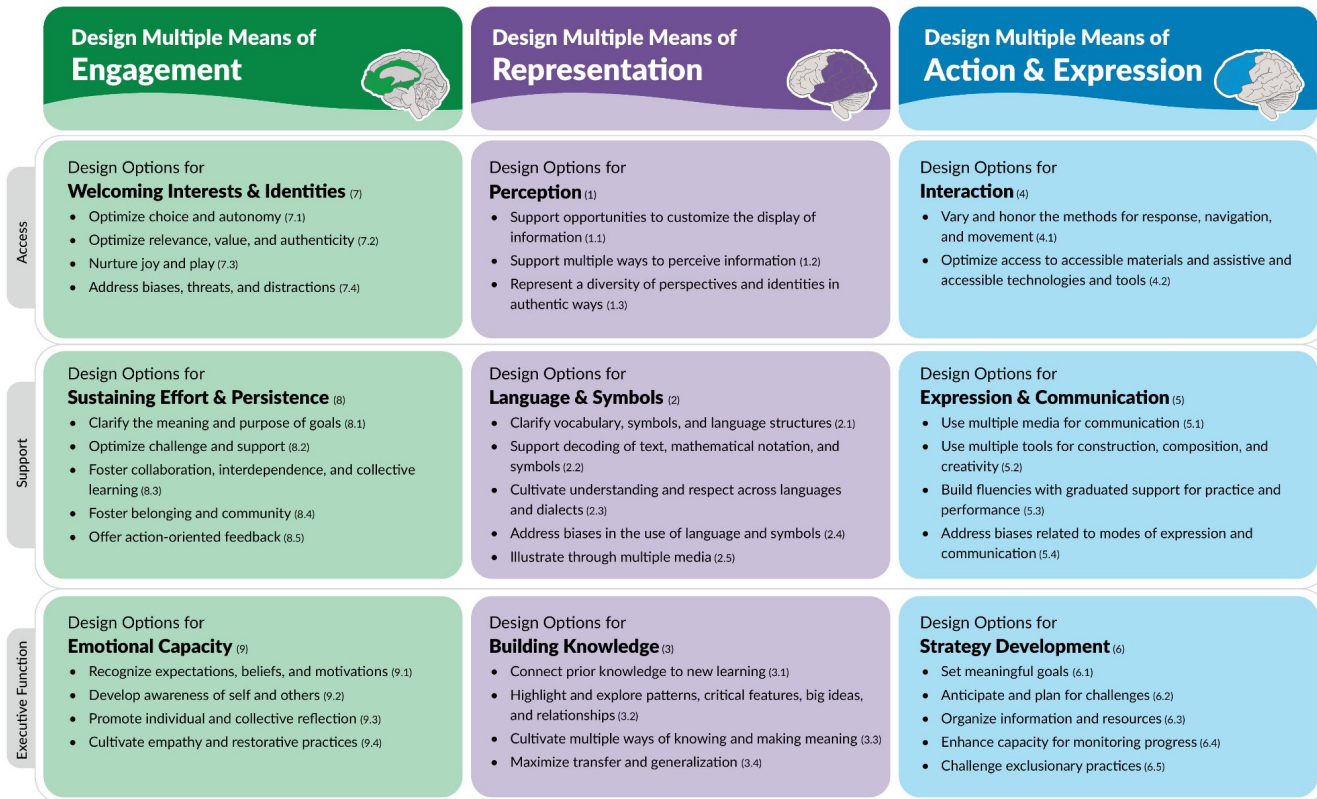**Multiple Means of Action & Expression**

- Example: Build fluencies with graduated levels of support for practice and performance

[1]We used UDL Guidelines version 2.2. Version 3.0 was released in the Summer of 2024.

The Universal Design for Learning Guidelines

Version 2.2

Provide multiple means of **Engagement**	Provide multiple means of **Representation**	Provide multiple means of **Action & Expression**
Affective Networks The "WHY" of Learning	Recognition Networks The "WHAT" of Learning	Strategic Networks The "HOW" of Learning

Access

Provide options for
Recruiting Interest (7)
- Optimize individual choice and autonomy (7.1)
- Optimize relevance, value, and authenticity (7.2)
- Minimize threats and distractions (7.3)

Provide options for
Perception (1)
- Offer ways of customizing the display of information (1.1)
- Offer alternatives for auditory information (1.2)
- Offer alternatives for visual information (1.3)

Provide options for
Physical Action (4)
- Vary the methods for response and navigation (4.1)
- Optimize access to tools and assistive technologies (4.2)

Build

Provide options for
Sustaining Effort & Persistence (8)
- Heighten salience of goals and objectives (8.1)
- Vary demands and resources to optimize challenge (8.2)
- Foster collaboration and community (8.3)
- Increase mastery-oriented feedback (8.4)

Provide options for
Language & Symbols (2)
- Clarify vocabulary and symbols (2.1)
- Clarify syntax and structure (2.2)
- Support decoding of text, mathematical notation, and symbols (2.3)
- Promote understanding across languages (2.4)
- Illustrate through multiple media (2.5)

Provide options for
Expression & Communication (5)
- Use multiple media for communication (5.1)
- Use multiple tools for construction and composition (5.2)
- Build fluencies with graduated levels of support for practice and performance (5.3)

Internalize

Provide options for
Self Regulation (9)
- Promote expectations and beliefs that optimize motivation (9.1)
- Facilitate personal coping skills and strategies (9.2)
- Develop self-assessment and reflection (9.3)

Provide options for
Comprehension (3)
- Activate or supply background knowledge (3.1)
- Highlight patterns, critical features, big ideas, and relationships (3.2)
- Guide information processing and visualization (3.3)
- Maximize transfer and generalization (3.4)

Provide options for
Executive Functions (6)
- Guide appropriate goal-setting (6.1)
- Support planning and strategy development (6.2)
- Facilitate managing information and resources (6.3)
- Enhance capacity for monitoring progress (6.4)

Goal

Expert learners who are...

Purposeful & Motivated	**Resourceful & Knowledgeable**	**Strategic & Goal-Directed**

The Universal Design for Learning Guidelines

The goal of UDL is **learner agency** that is purposeful & reflective, resourceful & authentic, strategic & action-oriented.

Version 3.0

	Design Multiple Means of **Engagement**	Design Multiple Means of **Representation**	Design Multiple Means of **Action & Expression**
Access	Design Options for **Welcoming Interests & Identities** (7) • Optimize choice and autonomy (7.1) • Optimize relevance, value, and authenticity (7.2) • Nurture joy and play (7.3) • Address biases, threats, and distractions (7.4)	Design Options for **Perception** (1) • Support opportunities to customize the display of information (1.1) • Support multiple ways to perceive information (1.2) • Represent a diversity of perspectives and identities in authentic ways (1.3)	Design Options for **Interaction** (4) • Vary and honor the methods for response, navigation, and movement (4.1) • Optimize access to accessible materials and assistive and accessible technologies and tools (4.2)
Support	Design Options for **Sustaining Effort & Persistence** (8) • Clarify the meaning and purpose of goals (8.1) • Optimize challenge and support (8.2) • Foster collaboration, interdependence, and collective learning (8.3) • Foster belonging and community (8.4) • Offer action-oriented feedback (8.5)	Design Options for **Language & Symbols** (2) • Clarify vocabulary, symbols, and language structures (2.1) • Support decoding of text, mathematical notation, and symbols (2.2) • Cultivate understanding and respect across languages and dialects (2.3) • Address biases in the use of language and symbols (2.4) • Illustrate through multiple media (2.5)	Design Options for **Expression & Communication** (5) • Use multiple media for communication (5.1) • Use multiple tools for construction, composition, and creativity (5.2) • Build fluencies with graduated support for practice and performance (5.3) • Address biases related to modes of expression and communication (5.4)
Executive Function	Design Options for **Emotional Capacity** (9) • Recognize expectations, beliefs, and motivations (9.1) • Develop awareness of self and others (9.2) • Promote individual and collective reflection (9.3) • Cultivate empathy and restorative practices (9.4)	Design Options for **Building Knowledge** (3) • Connect prior knowledge to new learning (3.1) • Highlight and explore patterns, critical features, big ideas, and relationships (3.2) • Cultivate multiple ways of knowing and making meaning (3.3) • Maximize transfer and generalization (3.4)	Design Options for **Strategy Development** (6) • Set meaningful goals (6.1) • Anticipate and plan for challenges (6.2) • Organize information and resources (6.3) • Enhance capacity for monitoring progress (6.4) • Challenge exclusionary practices (6.5)

Study 1 (Pilot)

Study 1: Context

- This study explored the adoption of ungrading/UDL in STEM-focused Library and Information Science (LIS) courses

- Goal:
  - Investigate how ungrading fosters more inclusive and effective learning environments based on Universal Design for Learning (UDL) course design

The LIS and STEM Connection

LIS as STEM:

- LIS integrates principles from computer science, cognitive science, humanities, and social sciences as well as its own content
- The intersection of these fields emphasizes the role of technology in addressing access to information

Why Ungrading in LIS/STEM?

- LIS courses often involve complex content and require innovative teaching methods to enhance engagement and content retention

Study 1
Research Methodology

Research Methodology

Design:

- Mixed-methods study involving 13 graduate students in two LIS online courses (Electronic Resource Management, Systems Librarianship)

Data Collection:

- Pre- and post-course surveys
- Mid-semester interviews
- Qualitative and quantitative analysis

Focus Areas:

- Learning outcomes
- Student perceptions of ungrading
- Shifts in focus from grades to expertise

Study 1
Course Design: Electronic Resource Management

Course Design: Electronic Resource Management

Overview:

- **Course Focus:** Management of electronic resources in libraries
- **Learning Approach:**
  - Readings, lectures, hands-on activities
  - Discussion board activities focused on both conceptual discussions and practical tasks
- **Skills Development:**
  - Exposure to the technologies used by electronic resource librarians
  - Practical experience in understanding workflows and technical tools

Course Design: Electronic Resource Management

Key Content Areas:

- **Technical Aspects:**
  - Integrated library systems (ILS)
  - Library service platforms (LSP)
  - Electronic resource management systems (ERMS)
  - Identity and access solutions (e.g., OpenURL)
- **Practical Engagement:**
  - Students explore and use demo sites of open-source ILS and ERM products
  - Encourages development of a mental model for managing electronic resources

Course Design: Electronic Resource Management

Course Design Goals:

- **Skills Development:**
    - Exposure to the technologies used by electronic resource librarians
    - Practical experience in understanding workflows and technical tools

Study 1
Course Design: Systems Librarianship

Course Design: Systems Librarianship

Overview:

- **Course Focus:** Learning-by-doing, project-based approach to systems librarianship
- **Practical Engagement:**
    - Use of cloud services (e.g., Google Cloud) and open-source software (Linux)
    - Introduction to command-line technologies through hands-on exercises
    - Installation and configuration of various systems

Course Design: Systems Librarianship

Key Technologies:

- **Linux Command Line**: Fundamental command-line skills using Ubuntu servers via the Google Cloud Platform
- **LAMP Stack**: Installation and configuration of a Linux, Apache, MySQL, PHP server
- **Library Systems**:
  - Create a barebones Integrated Library System (ILS)
  - Install and configure WordPress, Omeka, and Koha ILS from the Linux command line

Study 1
Key Findings

Key Findings – Focus on Proficiency

Student Perception:

- Students reported a shift in engagement with course—from achieving grades to knowing content
- Illustrative Quotes:
    a. "It's about making sure I learn everything I can and understand how it works."
    b. "I appreciate the shift in attention from a grade, and instead onto the topic and whether you learned it.

Relevance to UDL:

- Related to UDL checkpoint: Promoting beliefs that optimize motivation

Key Findings – Interest-Driven Learning

Student Autonomy:

- Ungrading allowed students to explore topics of personal interest, deepening engagement
- Illustrative Quote: "It gives me the flexibility to select what I want from the content."

Relevance to UDL:

- Optimize individual choice and autonomy
- Optimize relevance, value, and authenticity

Key Findings – Reduced Stress

Student Experience:

- Ungrading was reported to alleviate stress and anxiety by shifting focus away from grades and onto learning.
- Illustrative Quotes:
  a. "It takes a lot of pressure off... I can spend more time on the subject matter."
  b. "If I didn't get an A, I feel kind of stupid."
  c. "[In grade-centered courses], I become OCD on 'I will not miss a point'" rather than on learning.

Relevance to UDL:

- This aligns with UDL Checkpoint: Minimizing threats and distractions to promote engagement.

Key Findings – Responsibility for Learning

Self-Evaluation:

- Students felt more responsible for their own learning process
- Illustrative Quote: "Ungrading promotes a sense of personal responsibility."

Relevance to UDL:

- This promotes self-regulation and metacognition, per UDL Checkpoint: Develop self-assessment and reflection

Key Findings - Developing the Learner

Students as Learners:

- Students really care about our interactions with them
- Illustrative Quote: "I've got papers, I've saved papers for years because they still had some things written down on them [by their professors] that I thought were interesting and I wanted to keep, you know, and remember."

Relevance to UDL:

- Foster collaboration and community
- Promote expectations and beliefs that optimize motivation

Challenges and Considerations

Challenges:

- Student discomfort with non-traditional assessment methods
- Balancing ungrading with institutional grading requirements

Considerations:

- Gradual implementation and scaffolding of ungrading practices to support student adjustment

Outcome: UDL/Ungrading Framework

Pedagogical Tactics	Best Practices	Design Strategies
Content Solutions	Reduce technological anxiety	Introduce new, challenging technologies; scaffold complex tasks; be clear about technologies to be used
	Highlight relevance of course content	Help students understand how technologies can be used; highlight technological and personal development objectives; allow students to create or build content using the technologies they learn

Outcome: UDL/Ungrading Framework (cont.)

Pedagogical Tactics	Best Practices	Design Strategies
Climate Solutions	Build belonging & community	Encourage peer collaboration; supplement text with video demos; use less formal communication platforms
	Use ungrading assessment approaches	Allow students to revise and resubmit; provide extensive feedback and guidance; explain the purpose of the ungrading approach

Burns, C.S., Pusateri, J., DiGiacomo, D.K. (2024). Learning by doing: An online, open source course design approach to systems librarianship. *Journal of Education for Library and Information Science*. doi:10.3138/jelis-2023-0070

Study 1: Conclusion

Summary:

- Ungrading supports a more inclusive, proficiency-focused learning environment, especially in complex LIS/STEM courses

Future Directions:

- Continued research on ungrading's long-term impact on student performance and engagement. Next, collect data in a CS course on discrete mathematics and build collaborations with colleagues at other institutions
- Exploration of faculty and institutional perspectives on ungrading

Study 2
Research Methodology

Research Methodology

Design:

- Qualitative: survey and interview-based study involving 11 undergraduate students (primarily second-year) in a CS discrete math course

Data Collection:

- Pre-interview survey
- Multiple rounds of interviews
- Qualitative analysis

Focus Areas:

- Learning outcomes
- Student perceptions of ungrading
- Shifts in focus from grades to proficiency

Research Methodology, Note

Note: The surveys were conducted at the start of the interviews. Students were invited to be interviewed more than once. They received a $25 gift card for each interview.

Qualitative Analysis

Coding Framework	Codes
Climate Solutions (Deductive)	Community feel
	Pedagogical approaches that support ungrading
Content Solutions (Deductive)	Anxiety / stress, course related
	Perceived relevance of course content
Beliefs / Identities / Attitudes, Student Perceptions (Inductive)	General anxiety
	Grade-related identity
	Other student belief/identity/attitude

Study 2
Course Design: Discrete Mathematics

Course Design: Discrete Math

Overview

- **Course Focus**: Concepts/skills in discrete math not on programming
  - Set theory, induction proofs, relations, functions, Boolean algebra, permutations, combinations, algorithms
- **Learning Approach**:
  - Lectures, labs w/ TAs, zyBooks (interactive textbook), quizzes
- **Skills Development**:
  - Exposure and practice in the basic logic frameworks used in computer science and programming
- **Assessment**:
  - Specification grading

Course Design: Discrete Math

Assessment:

- **Specification grading**
  - Students have the opportunity to raise grades by redoing some work.
  - Students must successfully complete a predefined number of assignments to pass the course.
  - Students work in groups to solve problems. Their work is submitted individually but one assignment per group is randomly selected as the graded assignment.
- The key idea is that students may focus on *essential proficiency of the topics or go beyond to general competency*

Study 2
Key Findings (Tentative)

Survey Says, Student Characteristics

- Six Female / Eight Male
- One African / Two African-American / Two Latino / Nine White
- Three First-Generation
- Eight currently employed while pursuing studies

Survey Says, Student Motivation

Students are highly interested in the topic (most report "interest in technology" as the main reason to pursue a degree in CS) but report being motivated by grades and other extrinsic factors (including impact on financial support).

Would you describe your motivation for learning in this course as more intrinsic (e.g., interested in the topic, desire to learn more) or extrinsic (e.g., focused on grades, career outcomes, program requirements, credentials)?

Two reported **intrinsic**.

Twelve reported **extrinsic**.

Survey Says, Student Motivation

Students are highly interested in the topic (most report "interest in technology" as the main reason to pursue a degree in CS) but report being motivated by grades and other extrinsic factors (including impact on financial support).

How important is it for you to get an A in this course?

Moderately important: **one**
Very important: **five**
Extremely important: **eight**

Key Findings - Reduce Learning Barriers

Students as Learners:

- Illustrative Quote: "I feel so much better [telling] my friends […] that are taking the class, I can tell them with confidence, 'Look, you don't have to worry that much, like it's not the sort of doomsday class that a lot of people sort of made it out to be.'"

Relevance to UDL: Engagement / Access

- When students perceive a class as less intimidating, they are more likely to persist and take risks in their learning. Shifts focus from grades to understanding, and boasts confidence.

Key Findings - Focus on Applying Knowledge

Students as Learners:

- Illustrative Quote: "It's not as stressful as the traditional classes. Because I would know if I could do the homework on my own, then I have a good chance of doing well on the exam. So then, I could just review the types of problems on the homework instead of stressing to read every slide and read every page of the textbook."

Relevance to UDL: Representation / Comprehension

- Highlights how the class structure allows them to focus on applying knowledge rather than rote memorization. Encourages flexible ways of accessing and processing content and engage more deeply with problems rather than being overwhelmed by exhaustive review.

Key Findings - Group Work Fosters Confidence

Students as Learners:

- Illustrative Quote: "Like in my group, I get along mostly most of the time. And yeah, what I say matters."

Relevance to UDL: Engagement / Build

- Fosters a sense of belonging and agency in learning. When students recognize that their voice matters, it reflects how the course design promotes inclusive participation. Encourages students to feel valued and heard, and this enhances motivation and deeper engagement.

Key Findings - Group-Quiz work Fosters Engagement

Students as Learners:

- Illustrative Quote: "What's important about the collaborative experience like, maybe this has more to do with just the structure of the class, and not so much the grading scale. I mean, actually, well, let me take that back because the grading field does influence this, because we turn in a a like, we turn in all of our quizzes together, right? So like 5 of us. And then she grades one at random, and so that influences our desire to collaborate, whereas, like you normally have these students that you know, for each taking a quiz, I'm not going to talk to anybody, I'm going to sit there, I'm going to do my work, and then I'm going to turn in my quiz because I would receive an individual grade. But because I receive a group grade, I'm now looking over at, you know, Jimmy sitting next to me, and I'm like, Hey, do you get this right? Or or I'm more concerned about getting my work correct, because I don't want my paper to be graded. And then, you know, the whole group received a bad grade. So there's sort of like collective and individual responsibility."

Relevance to UDL: Action & Expression / Internalize

- Course design promotes collaboration and shared accountability. Grading structure promotes active engagement with peers, which makes learning a social and interactive process. UDL supports cooperative learning. This enables students to express understanding in varied ways and reinforces both individual and collective responsibility.

Key Findings - Students Identify as **A** Students

Students as Learners:

- Illustrative Quote: "For me, I'd say it's pretty important, because I've never gotten a B yet, and I don't wanna start now."
- "I feel like all of that makes me feel like if I get something other than an A, I got an F."

Relevance to UDL: Engagement / Internalize

- Highlights the limitations of traditional grading in fostering a growth mindset. In theory, the UDL framework should encourage assessment that supports learning rather than binary success/failure mindsets. Ungrading aligned with UDL should reduce performance-based anxiety and shift focus toward meaningful progress and self-reflection rather than rigid grade-based identities. UDL/ungrading together should create a learning environment that is more inclusive, reduces barriers, and fosters deeper engagement with course material. However, the pedagogical approach is in conflict with how students identify themselves.

Key Finding - Motivation Is Still Extrinsic

"Now, from this point on I have completed most of the things I need to complete in order to an A in the class. And so, like we had a homework that was due the other day, and it was a very difficult topic, and like I wasn't afraid of like spending the time to learn it. But I just didn't really want to, and I didn't need to, because I didn't need an excellent grade, or even a completed grade on that homework assignment. So I just didn't do it, which is definitely different, like, I would have been penalized significantly in a regular class for not doing this like this module, this section. So I think you know from here on out, I think my like overall application to this class will be definitely lower than you know the first three-fourths of the semester. But since the beginning of the semester to now, I think it's been a lot of learning for sure."

Study 2: Conclusion (Tentative)

- Ungrading/UDL is supportive of student's learning.
- Ungrading/UDL is not meant to increase the performance of "top students" under a regularly-used grading scheme and assessment process but to increase the success rate of those who might be more likely to drop the course or degree.
- Ungrading challenges some people's normative view of what counts as success.
  - This causes frustration but it doesn't seem to make them work less hard or be less engaged in the course.
  - Students need to be part of the ungrading conversation and buy-in to the process.
- We suspect that societal and institutional norms and pressures make ungrading difficult in practice.
- Recent political events make UDL implementation more difficult (if not illegal).

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