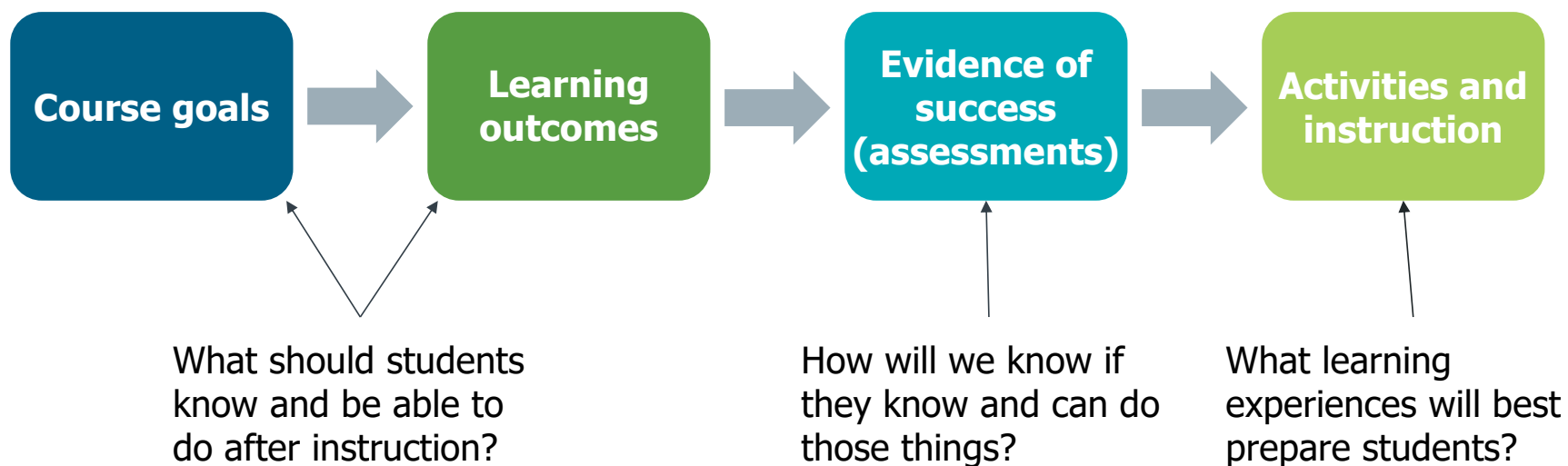# Big Ideas

CS 398T: Supervised Teaching in Computer Science

September 3, 2024
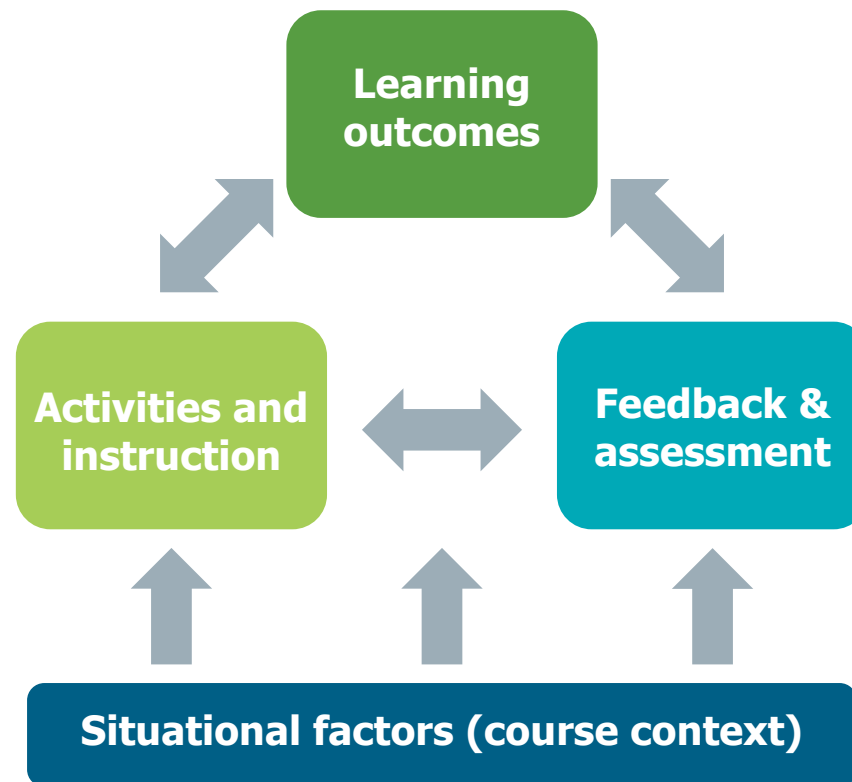
Backwards Design

Backward design to create an integrated course
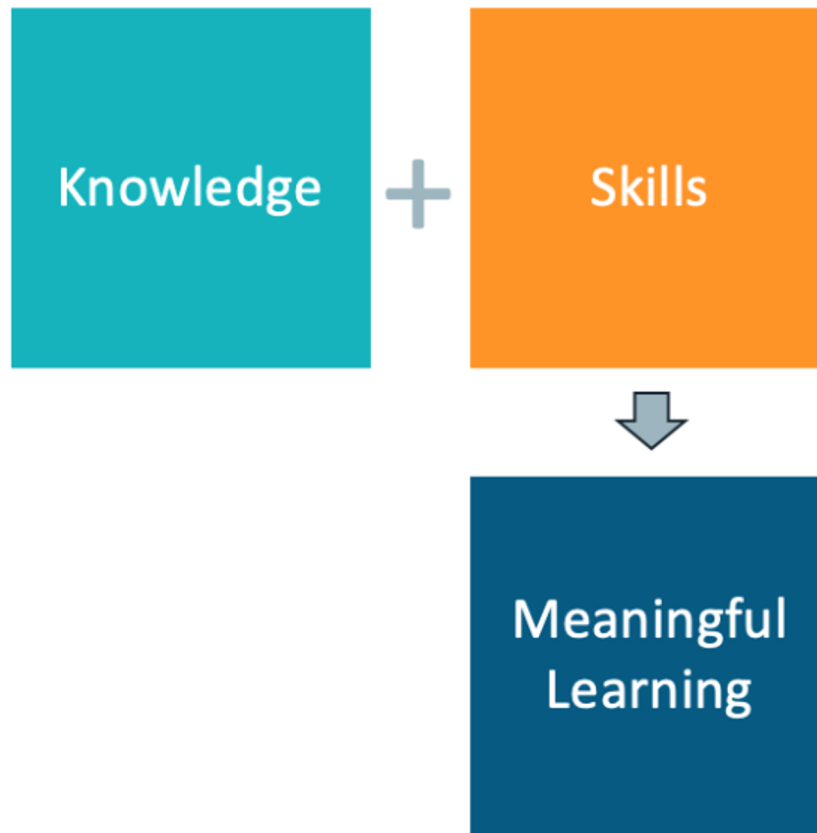
- Strategy for course design
- Helps structure a course in way that all students can be successful

Course goals	→	Learning outcomes	→	Evidence of success (assessments)	→	Activities and instruction

What should students know and be able to do after instruction?

How will we know if they know and can do those things?

What learning experiences will best prepare students?

Wiggins & McTighe 1998

Backward design aligns goals/assessments/instruction

Learning outcomes

Activities and instruction

Feedback & assessment

Situational factors (course context)

L. Dee Fink

Going beyond *foundational knowledge & skills*

L. Dee Fink Model For Significant Learning

- Self-directed learning
- Becoming a better student
- Inquiring about a subject

- Developing new interests, values and feelings

- Learning about oneself and others
- Reflection

- Understanding and remembering information and ideas

- Skills
- Creative & critical thinking
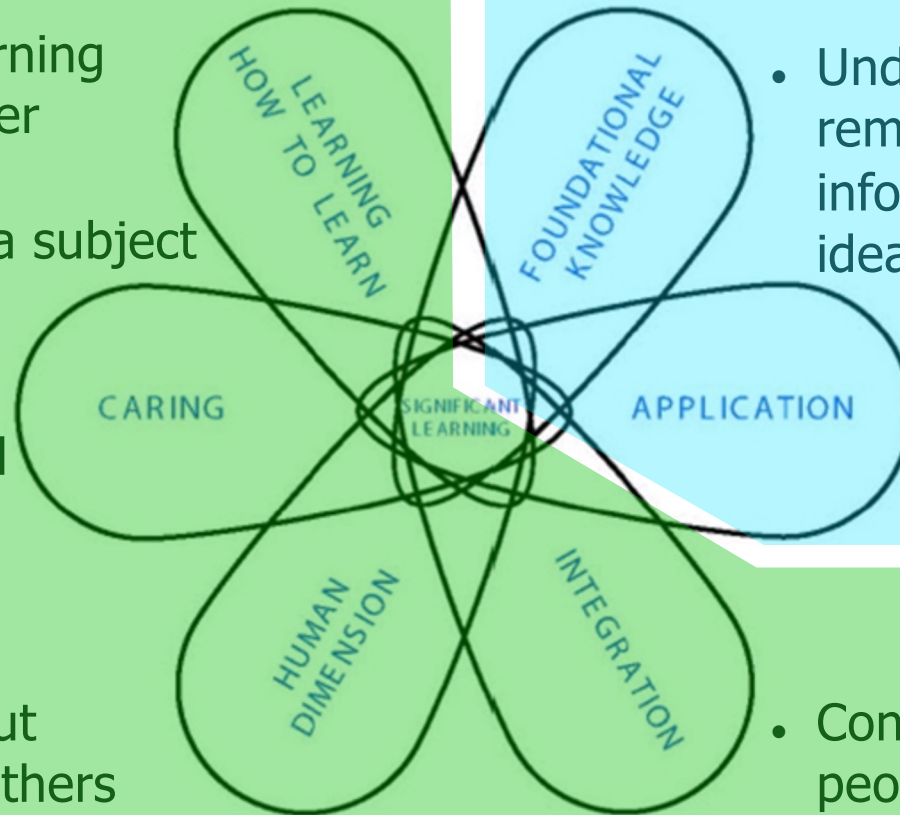- Managing projects

- Connecting ideas, people, ways of thinkings
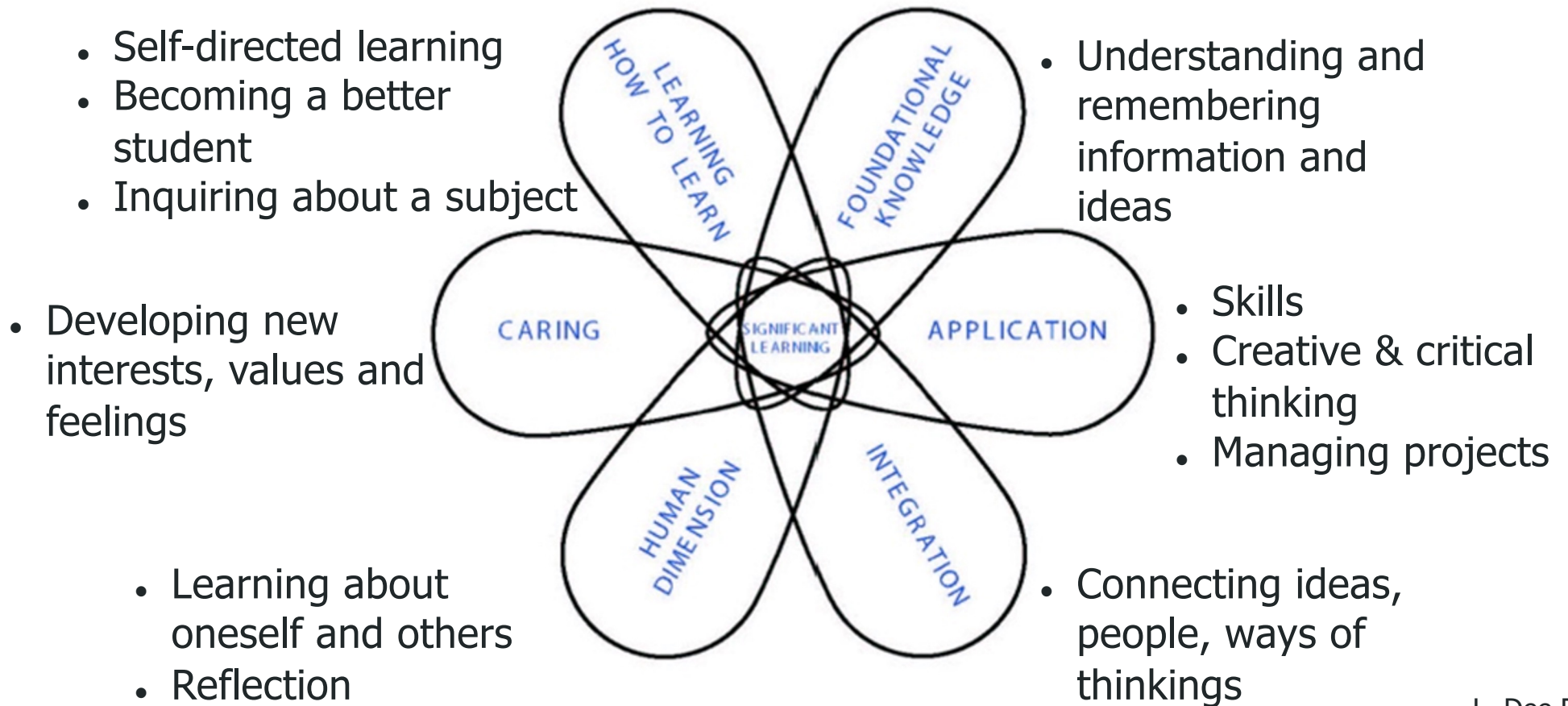
L. Dee Fink

L. Dee Fink Model For Significant Learning

Attitudes & Values

- Self-directed learning
- Becoming a better student
- Inquiring about a subject

- Developing new interests, values and feelings

- Learning about oneself and others
- Reflection

Knowledge & Skills

- Understanding and remembering information and ideas

- Skills
- Creative & critical thinking
- Managing projects

- Connecting ideas, people, ways of thinkings

LEARNING HOW TO LEARN

FOUNDATIONAL KNOWLEDGE

CARING

SIGNIFICANT LEARNING

APPLICATION

HUMAN DIMENSION

INTEGRATION

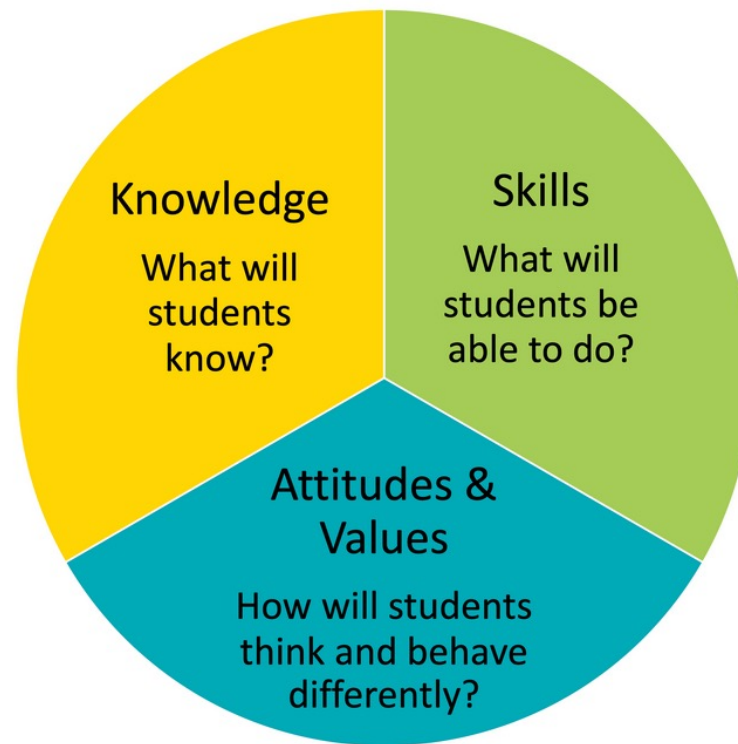L. Dee Fink

Big Ideas → Present → Engage → Assess → Assemble

What is the context of your lesson?

- Who is your audience?
- In what environment will you be teaching?
- What are your characteristics as an instructor?

What are the fundamental ideas?

Questions to Ask Yourself

- Knowledge: What idea would you be most embarrassed to find out they didn't know?

- Skills: What should students be able to do several years after you have taught them?
    - Consider: critical, creative, and practical thinking

- Attitudes and Values: In what ways of you want students to think and behave differently?
    - Consider: forming connections, adopting feelings and interests, independent learning

Next Steps

- Today:
  - Submit your topic form (linked from the schedule)
  - Submit your research reflection
- Next time:
  - Meet your teaching group
  - Choose smaller topic, get it approved
  - Create (and submit) learning objectives for your lesson

Special thanks to:

- the people at TIDES for the use of their workshop slides

- the TOTAL class creators for the use of their ideas and words

Big Ideas Part 2

CS 398T: Supervised Teaching in Computer Science

September 5, 2024

Get in your groups!

Get to Know Your Group: Step 1

For 3 minutes, take turns each answering one question in the list to the right. Each person can choose the question they wish to answer. (Try to keep responses to 1 minute each so everyone in your group gets a turn).

1. Given the choice of anyone in the world, whom would you want as a dinner guest?
2. Would you like to be famous? In what way?
3. Before making a telephone call, do you ever rehearse what you are going to say? Why?
4. What would constitute a "perfect" day for you?
5. When did you last sing to yourself? To someone else?

Get to Know Your Group: Step 2

Again, each person choose one question to answer in the list to the right, alternate who goes first this time. Spend 3 minutes on these questions, following the same system.

1. If a crystal ball could tell you the truth about yourself, your life, the future, or anything else, what would you want to know?
2. Is there something that you've dreamed of doing for a long time? Why haven't you done it?
3. What is the greatest accomplishment of your life?
4. What do you value most in a friendship?
5. What is your most treasured memory?

Get to Know Your Group: Step 3

Same plan, one last set of questions!

1. Make three true "we" statements each. For instance, "We are all in this room feeling..."
2. Complete this sentence: "I wish I had someone with whom I could share..."
3. Tell one of your team members what you like about them; be very honest, saying things that you might not say to someone you've just met.
4. Share an embarrassing moment in your life.
5. What, if anything, is too serious to be joked about?

Why are learning goals important?

- help students understand what is important in your course and in the field
- give students a target to aim for

- Next step is to write them in a format that tells students what knowledge, skills, and attitudes they should practice during your course

How should I write my goals for students?

- Goals presented to students should tell them, using an action verb, what they will have to do.

Action Verbs

Know

What are the foundational knowledge and skills students should remember and comprehend?

- Explain
- Demonstrate
- Identify
- Recite
- Reproduce
- Recognize
- Define
- Label
- Match
- Convert
- Translate

Analyze & Evaluate

What are the skills students need to "pull apart" existing knowledge to look at it critically and judge it?

- Assess
- Analyze
- Compare
- Contrast
- Prioritize
- Deconstruct
- Classify
- Justify
- Infer
- Distinguish
- Appraise
- Critique

Synthesize & Create

What skills do students need to combine existing knowledge to produce something new?

- Compose
- Design
- Solve
- Argue
- Generate
- Construct
- Develop
- Hypothesize
- Invent
- Formulate

Steps for Today

- Choose a learning topic

  Consider the websites of our courses:
  - Intro Programming: www.cs.utexas.edu/~scottm/cs312/
  - Data Structures: www.cs.utexas.edu/~scottm/cs314/
  - Discrete Math: www.cs.utexas.edu/~dnp/cs311/syllabus/

- Ask Alison, Sarah, or Devangi to approve your topic
  - Tell us your topic and your group number
  - We are going to check for appropriate topics and a lack of duplicates

- Create learning objectives on your worksheet

- Submit both your research reflection and your group's learning objectives before leaving

Questions to Consider

Broad topic (assigned):
Selected smaller topic (discuss, agree, talk to instructors):

What is a fundamental goal for learning during our lesson?

How could we express this goal to students?
Rewrite using an action verb that matches how you will assess student learning. Consult the Big Ideas page for ideas.

Discuss:
- Which of computer science's fundamental ideas are addressed in your class?
- Does your goal statement include an action verb?