Engineering Student Collaboration & Group Work

Dr. Eric M. Dickens
He/His/Him
Knox College
Meskwaki, Potawatomi, Miami, and Peoria Peoples' Land
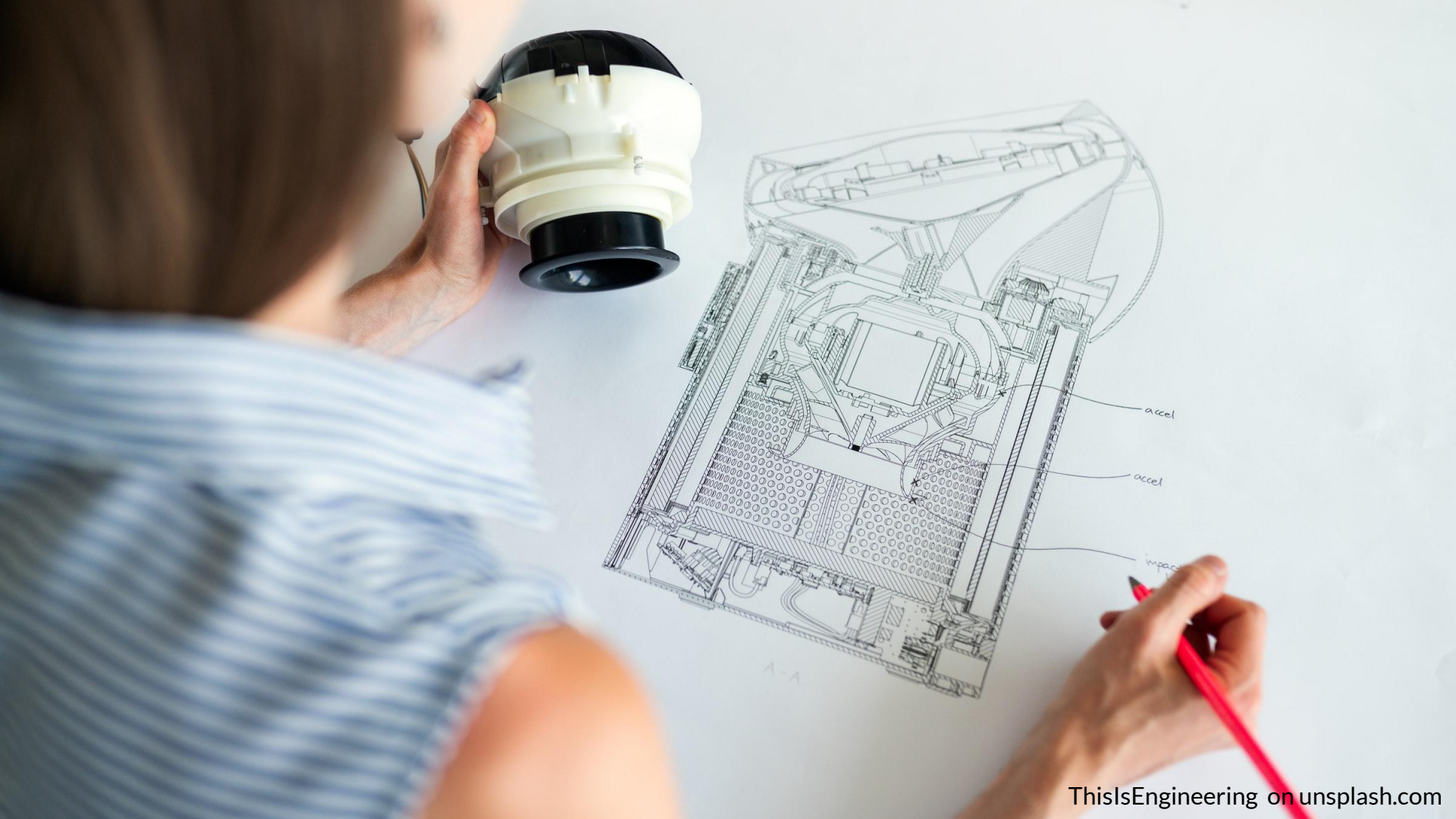
Overview

- Guiding principles
  - Engineering vs Encouraging
  - Backwards Design (Wiggins & McTighe, 2005)
- Example of student collaboration
  - Desired Results & Acceptable Evidence
- Planning process for student collaboration
  - Explain & share supports
- Bio Break
- Break out groups
- Debrief & Wrap up

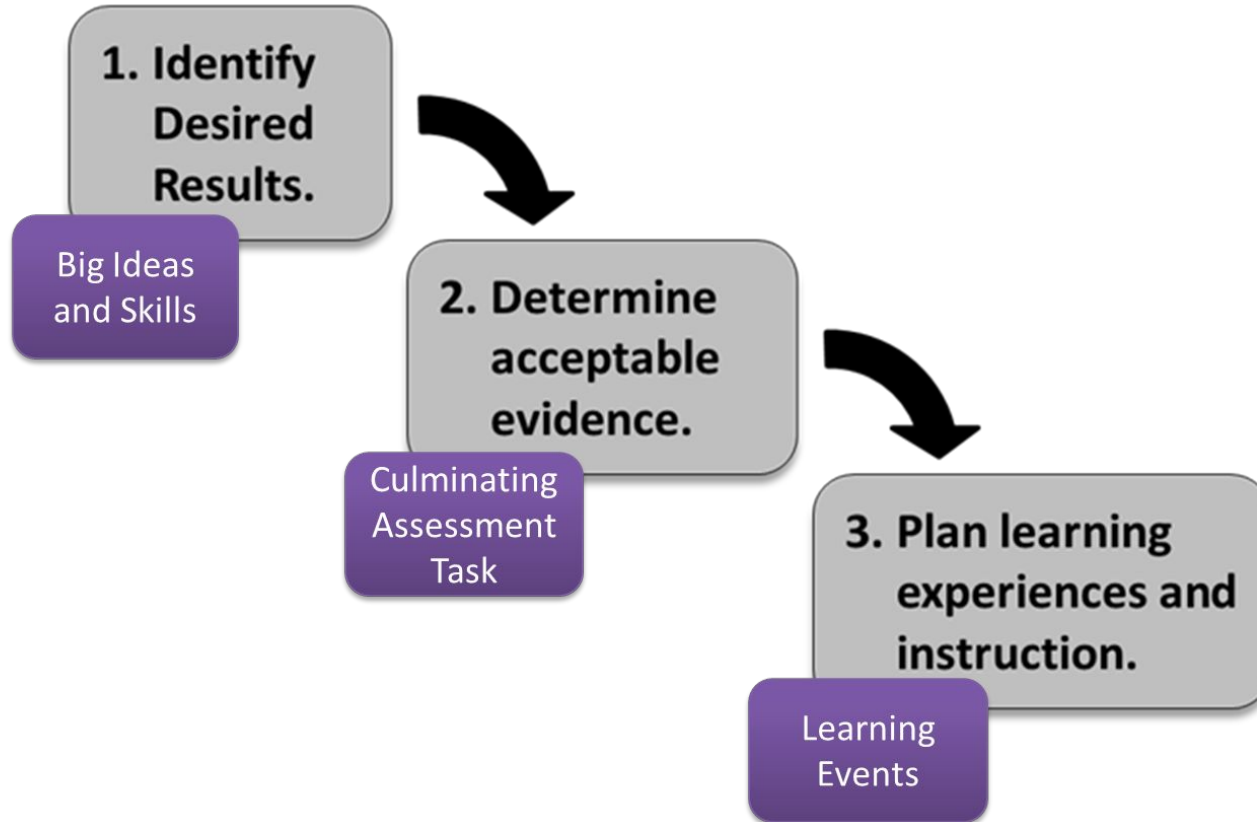# Encouraging vs. Engineering Student Learning

You got this

Backwards Design

Understanding by Design
Grant Wiggins & Jay McTighe

Backward Design

1. **Identify Desired Results.**

Big Ideas and Skills

2. **Determine acceptable evidence.**

Culminating Assessment Task

3. **Plan learning experiences and instruction.**

Learning Events

Wiggins, G. P., & McTighe, J. (2005). *Understanding by design*. Association for Supervision & Curriculum Development.

Backwards Design for a Group Discussion Assignment

- Desired Results
  - What is my big, ideal vision of the most awesome small group discussion ever?
- Acceptable Evidence
  - What specifically would I see that makes the discussion so awesome?
- Planning learning experiences
  - What do students need to do so that they can create the evidence I'm looking for? What scaffolds/supports do I need to create and provide along the way to get them there?

Desired Results

- Students are well prepared for, and in engage in, a deep, sustained discussion about the assigned readings that support each other's comprehension of the material, and expands each other's ideas beyond the comprehension level
- Students build respectful, productive communities of learners

Acceptable Evidence

- Before the discussion, students have thoroughly identified specific ideas from the readings they did not understand well
- During the discussion, students actively and consistently participate, building on other's ideas
- During the discussion, students' contributions are helpful, adding to and advancing the discussion
- During the discussion, all students ask their clarifying questions and share their ideas about the readings

Online Group Discussion Rubric

Rubric Categories	5: Exceeds Expectations	4: Meets Expectations	3: Approaches Expectations	2: Below Expectations	1: Not Acceptable
Planning: Thoroughness	**All prompts in preparation notes answered**; all are answered in depth	**All prompts are answered**; **most** are in **depth**, but **some** are **superficially** answered	**All prompts are answered**; **some** are in **depth**, but **most** are **superficially** answered	**Some** prompts are **unanswered**	**Most** prompts are **unanswered**
Planning: Specificity	**Citations** (page numbers, quiz question numbers, quotations and/or paraphrasing) **given in all responses**	**Citations** given in **most** responses, but **some** responses **lack** citations	**Citations** given in **some** responses	**Citations** given a **few** responses	**No citations** given in responses
Participation: Engagement	**Consistently** engaged **throughout** the discussion by leading the discussion, contributing ideas & actively listening*	Engaged for **most** of the discussion, **could engage more** by leading, contribute & actively listening	Engaged **some** of the time, but **some time disengaged** (not leading, contributing or actively listening)	Very **limited engagement** throughout the discussion	Student was **absent** from the discussion
Participation: Quality of Contributions	**Very good** discussion contributions; contributions are **very helpful** by clarifying, adding insight & moving the conversation forward by building on others' ideas	**Good** discussion contributions; contributions are **mostly helpful** by clarifying, adding insight & moving the conversation forward by building on others' ideas	Discussion contributions **need improvement**; contributions are **somewhat helpful** by not taking away from the discussion, but don't add clarity, insight or move the conversation forward by building on others' ideas	Discussion contributions are **superficial or vague**; they **don't** help/clarify or add insight, and don't move the conversation forward by building on others' ideas	Student was **absent** from the discussion
Participation: Shared Responsibility	**All** talking points from all group members' are **sufficiently discussed**	**Most** talking points from all members are sufficiently discussed. **Some** may be **mentioned** by **not discussed** with any depth	**Some** talking points from all members are sufficiently discussed, **but some** are not discussed at all	**Most** talking points from all group members are **not discussed**	Student was **absent** from the discussion

*Active listening includes: Asking specific questions, summarizing/restating what you understand somebody is saying, using brief affirmations ("I see"), demonstrating concern, and building trust by showing you are listening to what others are saying
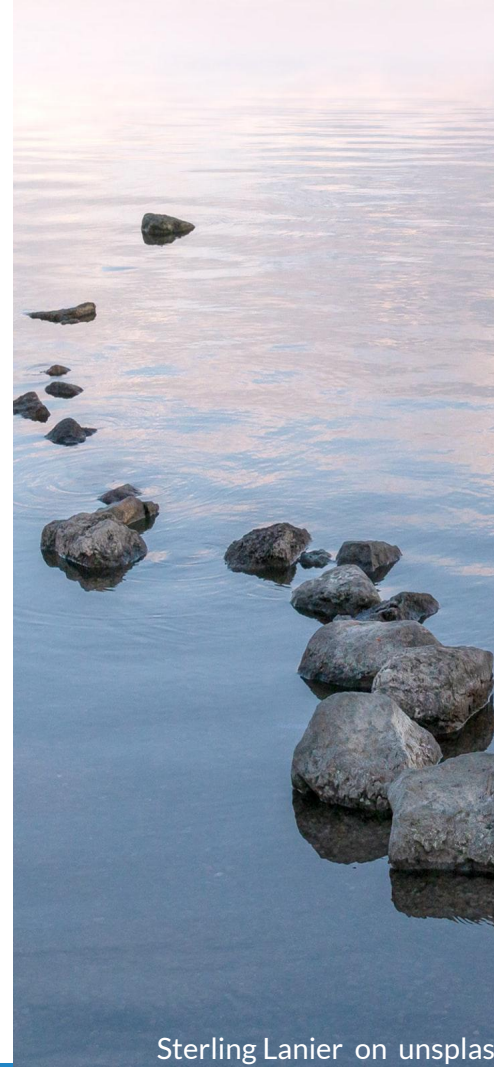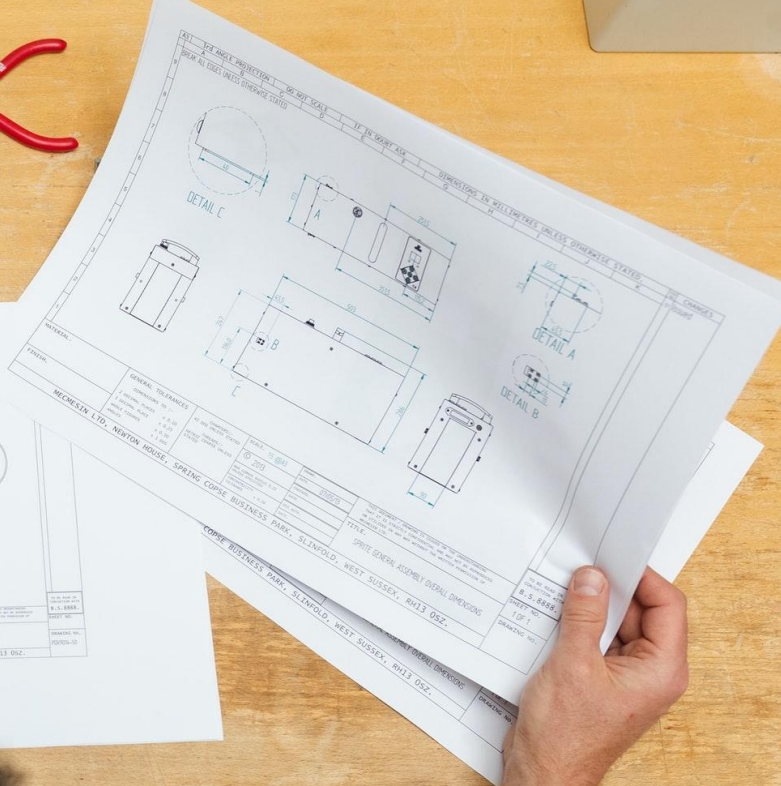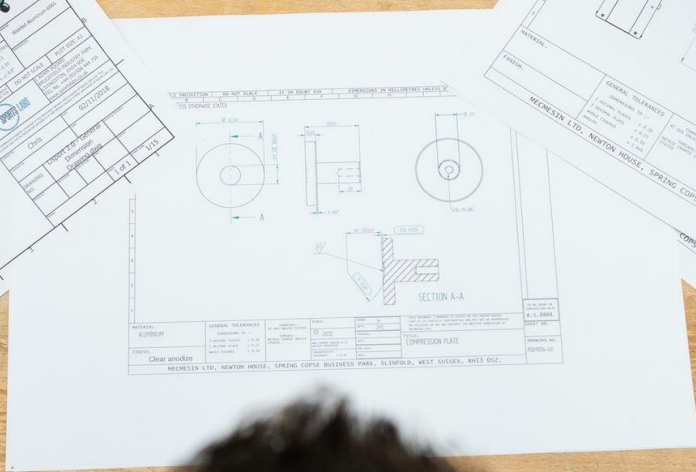
Video Example of Acceptable Evidence

Backwards Design for a Group Discussion Assignment

- Planning learning experiences (scaffolds)
  - At beginning of term
    - Rubric and Instruction Sheet with clear expectations
    - Semi-persistent groups with defined roles
    - Exemplar discussion videos
  - Prior to discussions
    - Accessible readings
    - Reading quizzes that email results
    - Preparation Notes template
  - During discussions
    - Students choose meeting time & budget flex time
    - Group accountability
    - "Talking Points" card

Sterling Lanier on unsplas

Lisport Machinery to BS EN 15306:2007
ITF Build, completion 1/2/18

Approximate Machinery Mass: 409 kg

SECTION A-A

COMPRESION PLATE

MECHESIN LTD, NEWTON HOUSE, SPRING COPSE BUSINESS PARK, SLINFOLD, WEST SUSSEX, RH13 0SZ.

DETAIL C

DETAIL A

DETAIL B

At the Beginning of the Term

- Persistent groups
  - Prioritized pre-existing connections based on surveys and student meetings
  - Students suggested group mates; I finalized
  - Students chose Leader and Facilitator role
- Rubric
- Instruction sheet
- Exemplar video
  - with notes connecting to rubric and highlighting why the video "Exceeds Expectations"

Discussion Preparation

- Accessible readings
  - Posted to LMS ASAP
  - Worked with Accessibility Office
- Google Forms Readings Quiz
  - Results sent back as email to copy & paste missed questions into preparation notes
- Discussion Preparation Notes
  - Google Doc template as a Classroom "assignment"
  - Sections for questions & ideas (with page numbers)
  - "Talking Points" section

TOPIC 1: Social Development

Clarifying Misconceptions

1) You receive an email with your answers after you submit each quiz. From that email, copy and paste the question number, question, and answer for any questions you missed on the quiz (or any question you got right, but are still unsure of).

> Women's self-concepts are consistently more strongly influenced by others' perceptions than men's self-concepts are
> People can influence others' perception of them over time
> People's self-concepts are formed by what they think others' think of them
> **People's self-concepts are more strongly influenced by higher status peers**

Going beyond

3) In the readings and/or presentations, what did you find significant, interesting or surprising?

> **I am interested in the timeline of identity forming. It feels really rigid to me and I feel like it's detrimental to people to say your identity is mostly settled by a certain age. I feel like identity is ever-changing in some respects, so I don't like the idea of there being a timeline for it.**

4) What connections did you make to the readings or presentations? (Or, what did they make you think of?)

> **I was thinking a lot about the importance of identity and feeling solid in your identity. I think it is important to feel you have an identity or things you identify with but I just think that we put too much emphasis on identity culturally speaking. I think in some ways it can be really beneficial to have an "identity" but I think it can be harmful to expect that to come at such a young age.**

Talking Points

Clarifying Misconceptions

Topic 1: Factors associated with puberty	While an exact cause of puberty is unknown, there are a number of complex factors which are associated with puberty. Which of the following is NOT one of these factors
	changes in the endocrine system
	changes in the nervous system
	changes in weight
	changes in body fat
	changes in leptin
Topic 2: Scientific processes	**Hormones involved in the pubertal process are regulated by a:**
	positive feedback system
	negative feedback system
	all of the above
	neither of the above, each gland individually controls secretion of a particular hormone

Going Beyond

Topic 1 *or* 2: Scientific processes	When I read the sleep readings, it made me think of how the growth spurt mostly occurs while we sleep, and that if students are regularly sleep deprived because of early school times, staying up late on phones, etc., it definitely does mess with important processes, but it seems that no one is wanting to make any concessions that they know they should.

Talking Points

Clarifying Misconceptions

Topic 1: Factors associated with puberty	**While an exact cause of puberty is unknown, there are a number of complex factors which are associated with puberty. Which of the following is NOT one of these factors** changes in the endocrine system changes in the nervous system changes in weight changes in body fat **changes in leptin**
Topic 2: Scientific processes	**Hormones involved in the pubertal process are regulated by a:** positive feedback system negative feedback system all of the above **neither of the above, each gland individually controls secretion of a particular hormone**

Going Beyond

Topic 1 _or_ 2: Scientific processes	**When I read the sleep readings, it made me think of how the growth spurt mostly occurs while we sleep, and that if students are regularly sleep deprived because of early school times, staying up late on phones, etc., it definitely does mess with important processes, but it seems that no one is wanting to make any concessions that they know they should.**

During Discussion

- Building flexibility & tone
  - They chose time, they handled connection issues
  - Personal time before the discussion
- Building accountability
  - Everybody has readings, quizzes & discussion notes out and ready (see Instruction Sheet)
  - Common grade for everybody contributing (see rubric)
    - Only because there were sufficient supports for success (clear expectations, facilitator role)

Video of Tone
Video of accountability

After Discussion

- Feedback
  - Comments on Discussion Preparation Notes
- Discussion Feedback Video
  - Common misconceptions from multiple groups
  - Individual group feedback

Search

0:00 / 1:45:58

Discussion 4 Feedback

Unlisted

25 views • Streamed live on May 14, 2020

1

0

SHARE

SAVE

Eric Dickens
1 subscriber

ANALYTICS

EDIT VIDEO

Timestamps for when I give feedback to specific groups:
32:27 Team 22 (██████████████████)
42:35 Group 4 (██████████████)
55:45 Quaranteam (███████████████████)
1:18:29 Psych/Ed Crossover (██████████████)

SHOW LESS

Break Out Groups

- Goals
  - Generate and discuss clarifying questions
  - Begin brainstorming how to incorporate one or more of these elements into your own courses
- Discussion Prompts
  - We've talked about Backwards Design and a specific application to planning supports for group discussions. What stood out to you? What is an idea that you want to come back to?
  - What is something you heard/saw today that you can apply to your own classes this Fall? How will you modify/adapt it?

Debriefing

- Groups report out summaries or interesting ideas
- What new questions emerged for you during discussions or this presentation?

Thank you!

Questions/Feedback/Suggestions
emdickens@knox.edu
Complaints:
comments@whitehouse.gov

Title 36 pt

- Level 1 30 pt
  - Level 2 24 pt
    - Level 3 18 pt

Title 36 pt

- Level 1 24 pt
  - Level 2 18 pt
    - Level 3 also 18 pt

Two level title Is 36 pt

- Level 1 24 pt
  - Level 2 18 pt
    - Level 3 also 18 pt

Two level title
Is 36 pt

- Level 1 30 pt
  - Level 2 24 pt
    - Level 3 18 pt