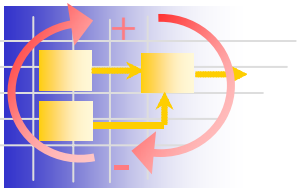


ESD.36J System & Project Management



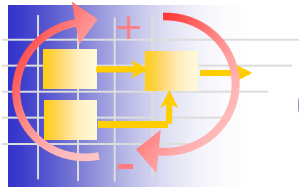
L23: Course Summary

Instructor(s)

Prof. Olivier de Weck

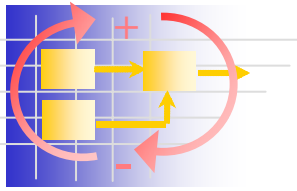
Prof. James Lyneis

December 9, 2003



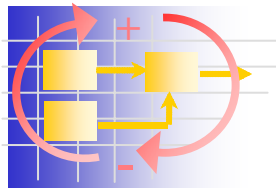
Outline

- Course Summary
 - Course Objectives
 - SPM Viewpoints
 - Framework: Preparation, Planning, Monitoring
Adaptation
- ESD.36 Internal Survey Results
- Open Discussion
- Last 15 minutes reserved for survey form
 - Faculty will leave room - done at 4:15p.m.
 - Need class volunteer



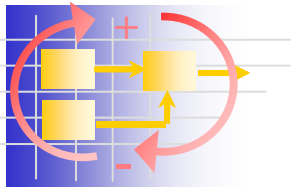
Course Objectives

- Introduce advanced methods and tools of Project Management in a product /system development context
 - Probabilistic CPM/PERT
 - Design Structure Matrix
 - System Dynamics
 - Risk Management
 - Earned Value Tracking
- Understand how methods work (strengths, limitations)
 - Industry Examples
 - Case Studies, Strategic Issues
- Learn from each other
 - Class Discussions
 - Project Assignments
- → Improve development projects at your workplace



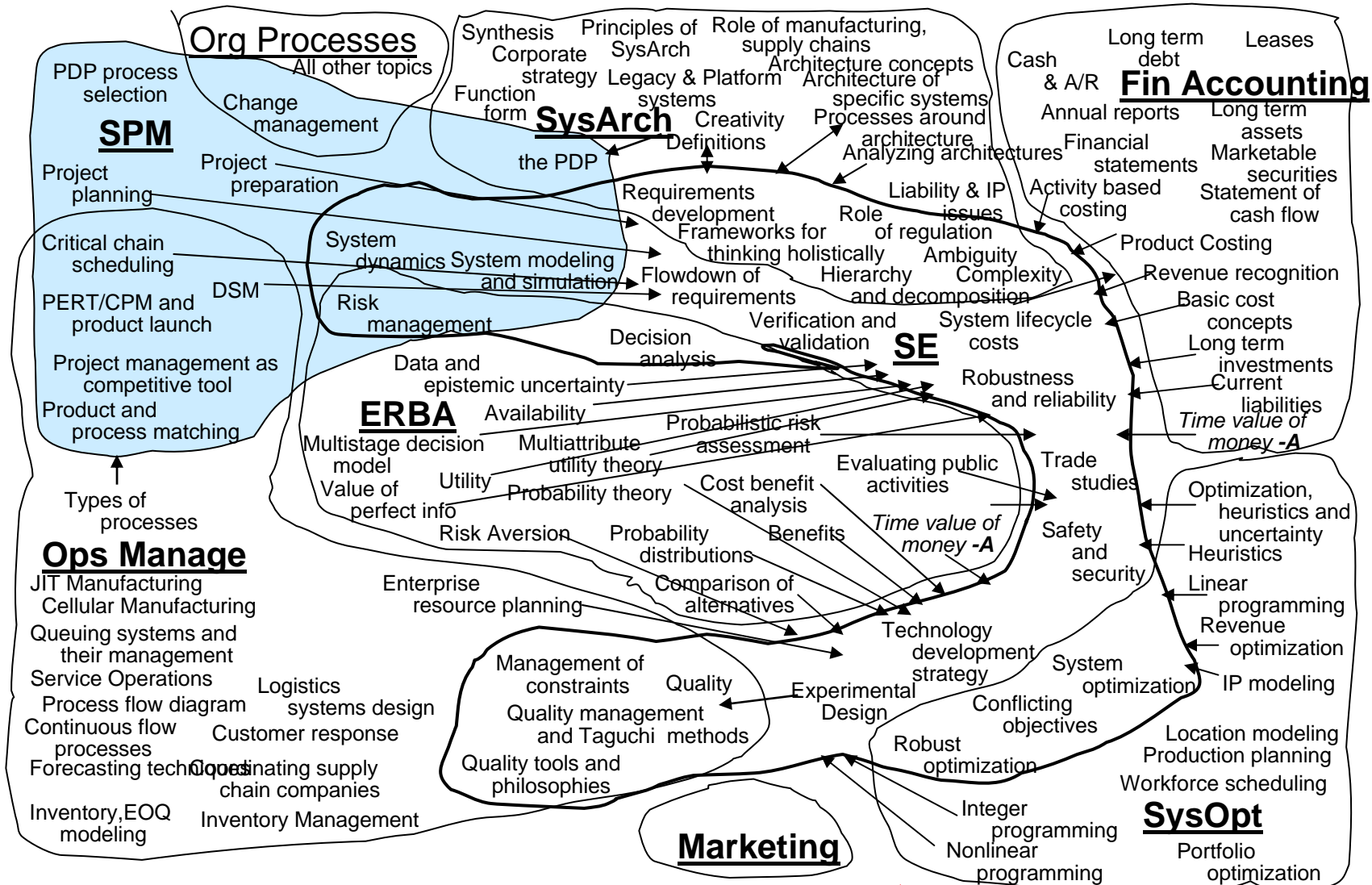
Relationship with other SDM core courses (simple view)

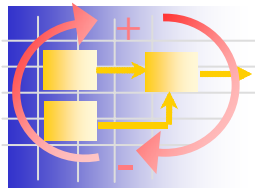
- System Architecture (ESD.34) is about the “DNA” of the ARTIFACTS themselves – atomic unit: object
 - Concept, form, function, decomposition ...
- Systems Engineering (ESD.33) is about the PROCESSES to understand and design systems – atomic unit: process
 - QFD, Requirements Analysis and Verification, ...
- Integrating the Lean Enterprise (ESD.61J) is about the PEOPLE and ORGANIZATIONS – atomic unit: person
 - Principles of lean manufacturing, organizational models
- System Project Management (ESD.36) is about how to best utilize resources to implement a set of objectives – atomic unit: task
 - CPM, DSM, System Dynamics



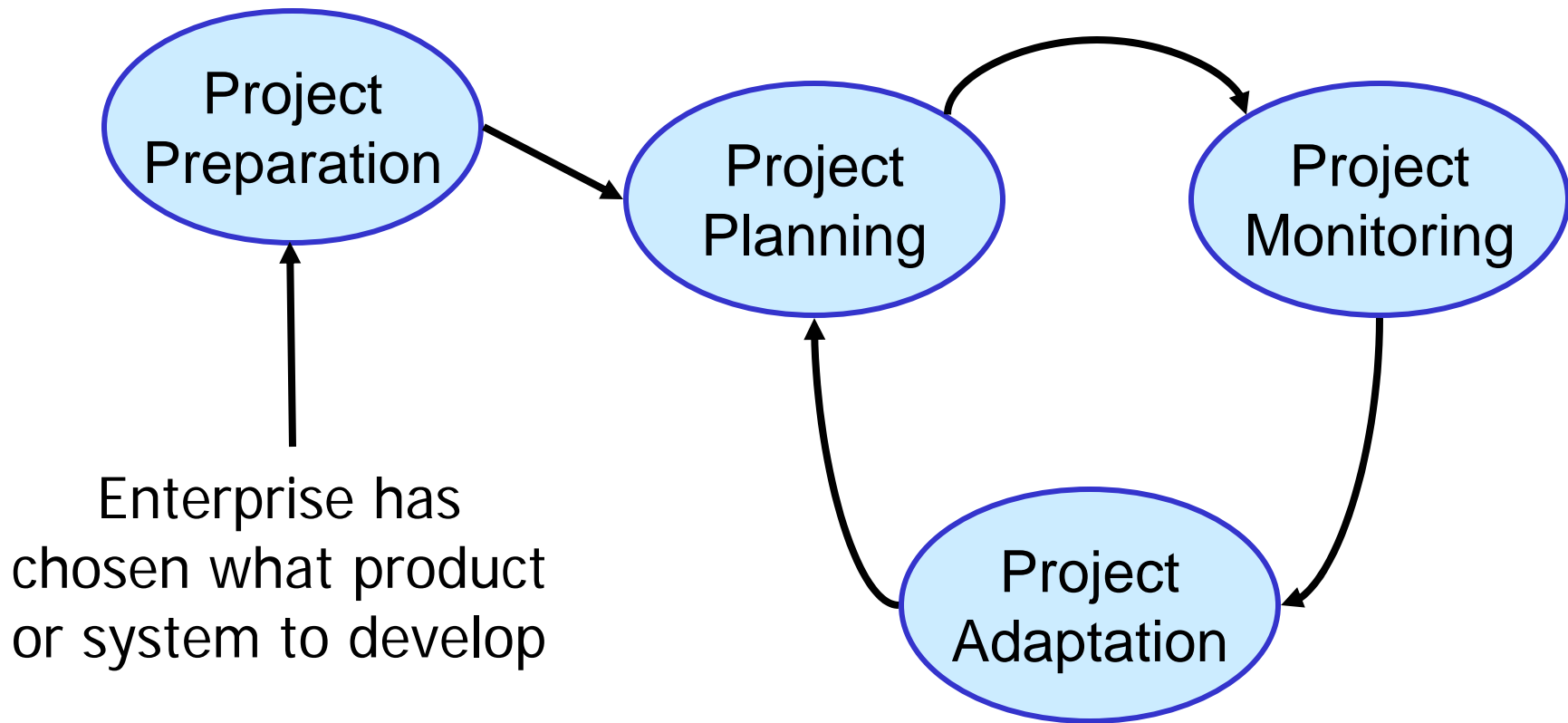
Relationship with other SDM core courses (complex view)

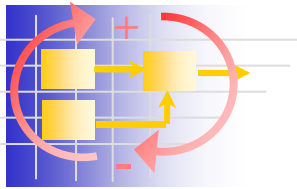
Source: Lagace



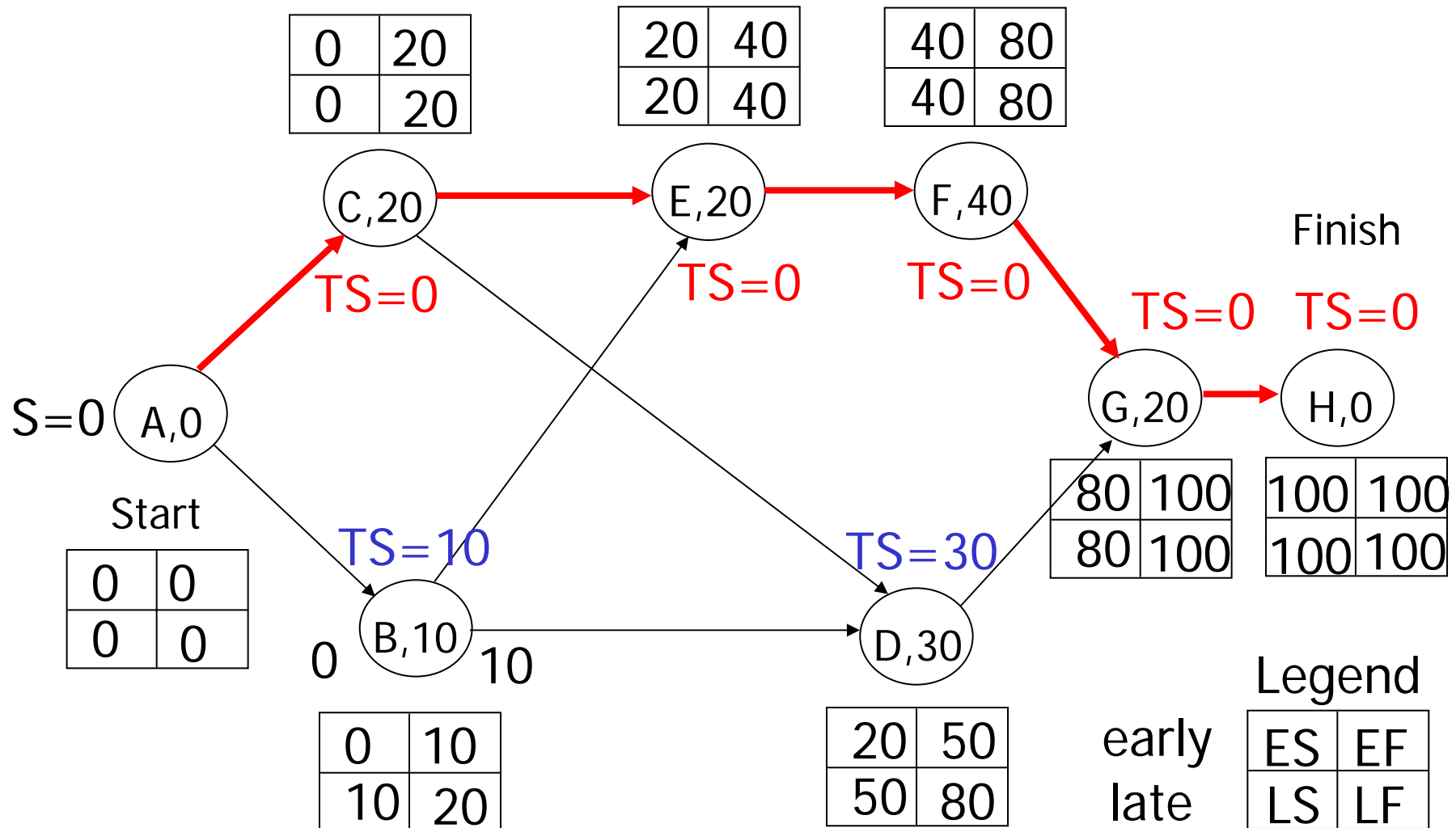


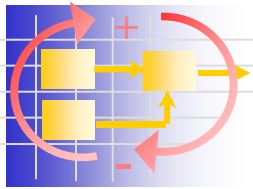
System Project Management ESD.36 Framework





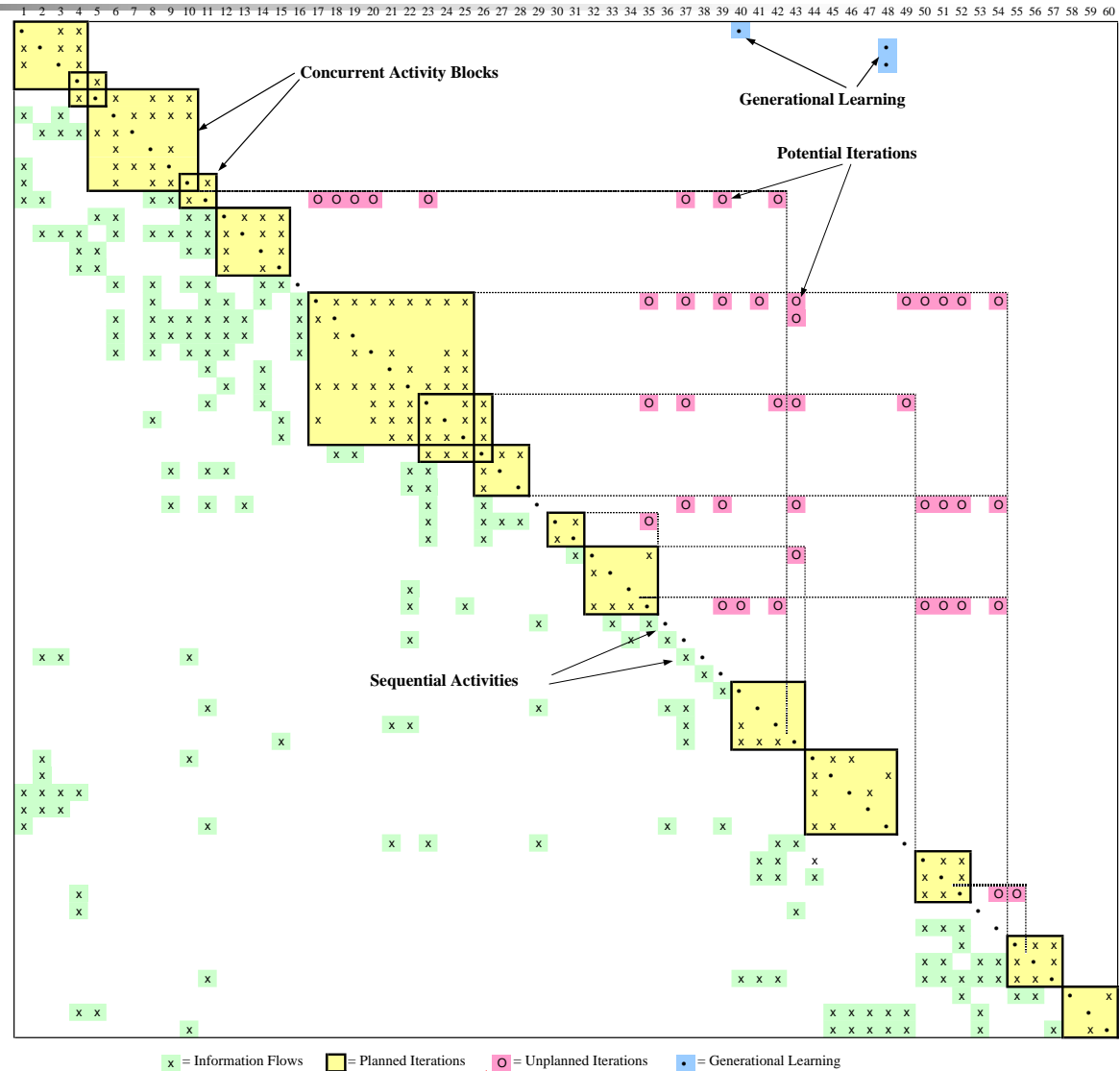
Network Viewpoint

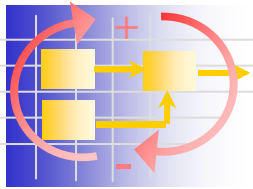




DSM Viewpoint

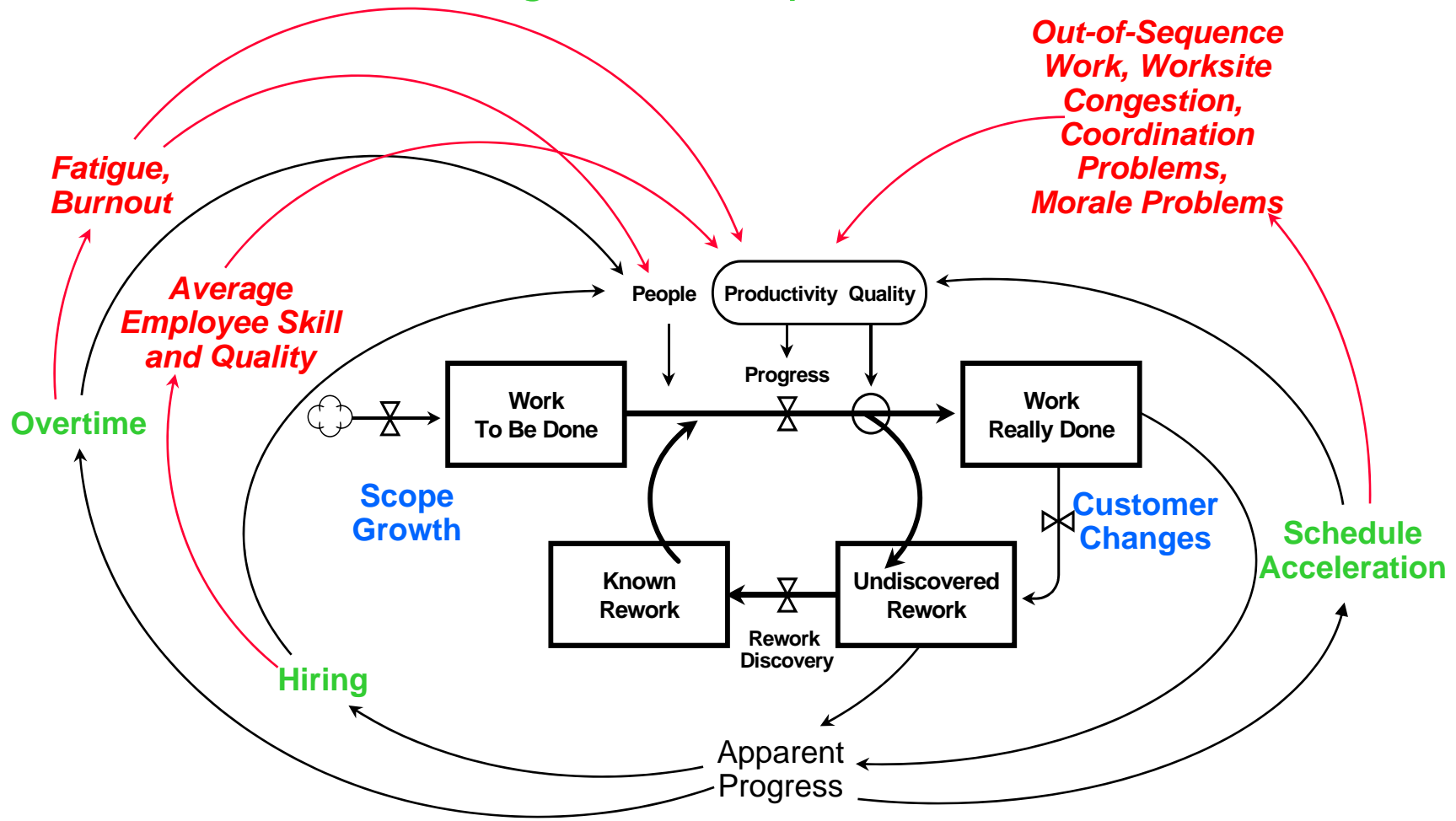
- 1 Set customer target
- 2 Estimate sales volumes
- 3 Establish pricing direction
- 4 Schedule project timeline
- 5 Development methods
- 6 Macro targets/constraints
- 7 Financial analysis
- 8 Develop program map
- 9 Create initial QFD matrix
- 10 Set technical requirements
- 11 Write customer specification
- 12 High-level modeling
- 13 Write target specification
- 14 Develop test plan
- 15 Develop validation plan
- 16 Build base prototype
- 17 Functional modeling
- 18 Develop product modules
- 19 Lay out integration
- 20 Integration modeling
- 21 Random testing
- 22 Develop test parameters
- 23 Finalize schematics
- 24 Validation simulation
- 25 Reliability modeling
- 26 Complete product layout
- 27 Continuity verification
- 28 Design rule check
- 29 Design package
- 30 Generate masks
- 31 Verify masks in fab
- 32 Run wafers
- 33 Sort wafers
- 34 Create test programs
- 35 Debug products
- 36 Package products
- 37 Functionality testing
- 38 Send samples to customers
- 39 Feedback from customers
- 40 Verify sample functionality
- 41 Approve packaged products
- 42 Environmental validation
- 43 Complete product validation
- 44 Develop tech. publications
- 45 Develop service courses
- 46 Determine marketing name
- 47 Licensing strategy
- 48 Create demonstration
- 49 Confirm quality goals
- 50 Life testing
- 51 Infant mortality testing
- 52 Mfg. process stabilization
- 53 Develop field support plan
- 54 Thermal testing
- 55 Confirm process standards
- 56 Confirm package standards
- 57 Final certification
- 58 Volume production
- 59 Prepare distribution network
- 60 Deliver product to customers

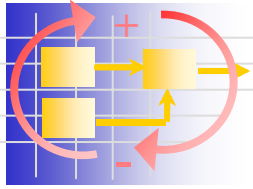




System Dynamics Viewpoint

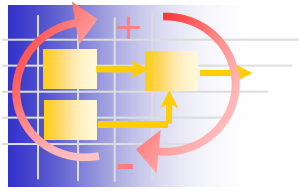
External factors; management responses; side effects





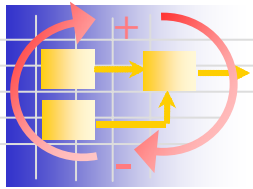
Why project fail ...

- Selected the wrong product (system) concept
 - Market Risk, Technological Risk
- Human Dimension
 - Wrong person as project manager
 - Reward and Incentive systems not aligned
 - Dysfunctional Team Structures
- Upper management is non-supportive
- Inadequately defined tasks, goals ... (ambiguity is never removed)
 - Risks are not understood: cost, schedule, performance
- “Impossible” mission
 - Over-scoped, under-funded, not enough time
- Wrong corrective measures
 - kicks off vicious circles (SD)... burnout, fatigue...
- Project “end game” is not planned



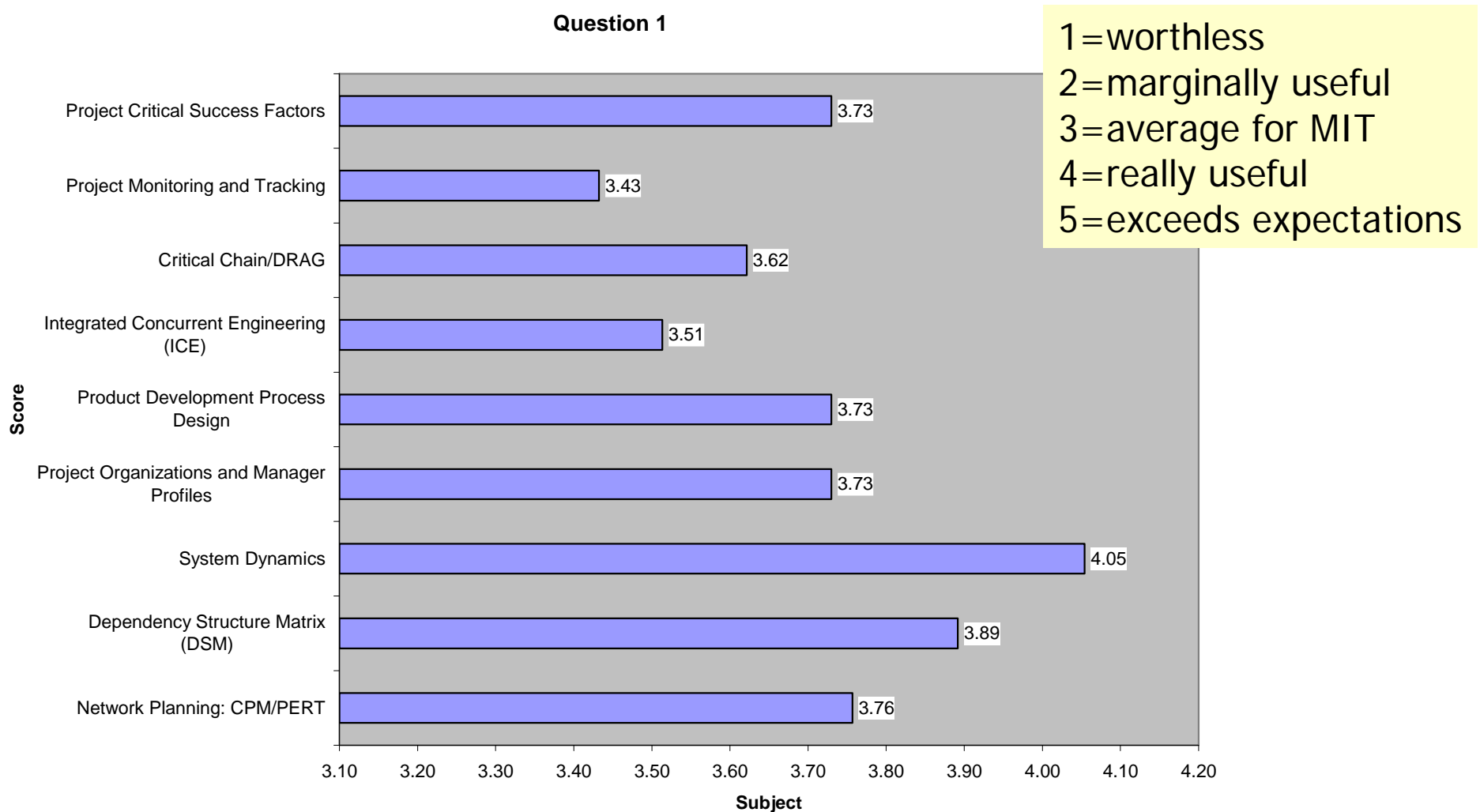
Internal Survey

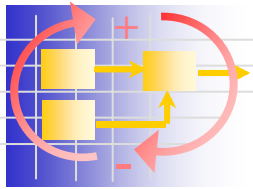
- Purpose
 - get feedback from the students on the content of the lectures, the cases treated in class, the homework as well as the expectations for the future of the course.
- Total 37 respondents
 - as of Sunday night 12/7
- 10 Questions
 - Results will be transmitted to SDM leadership
 - used for next year's edition



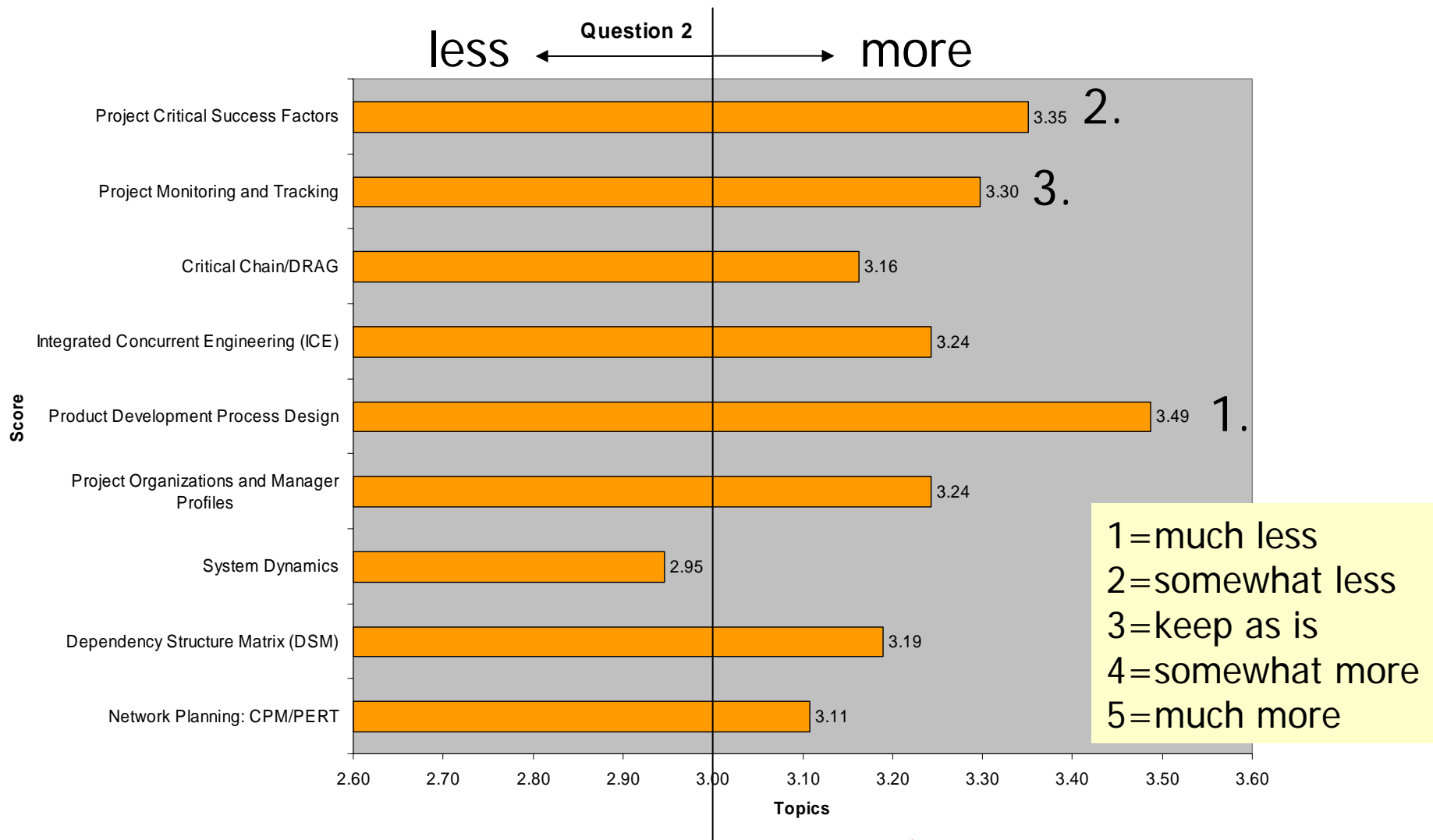
Q1: Rate the **relevance and quality** of the following lectures and associated topics presented in class:

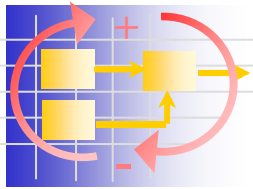
Question 1





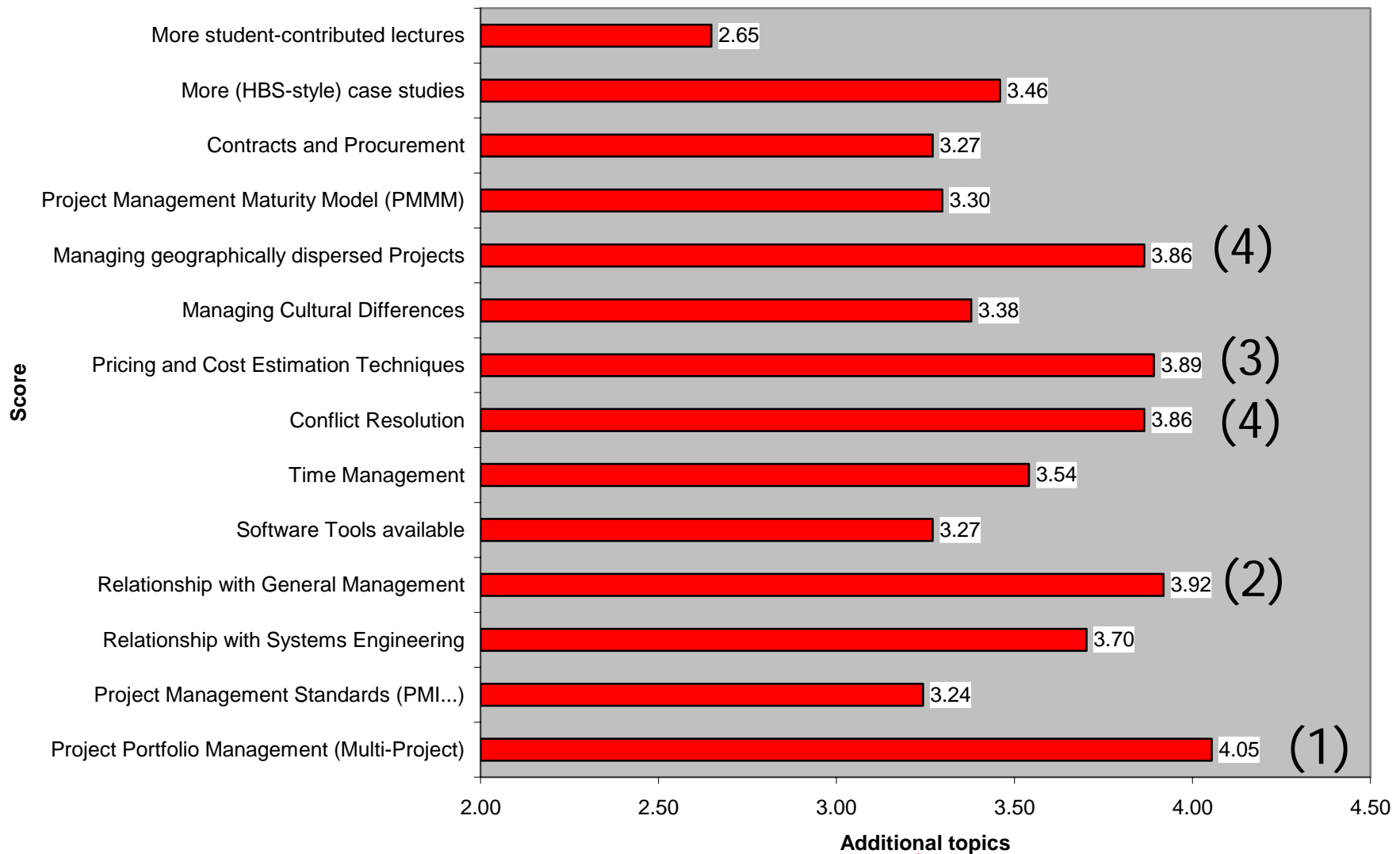
Q2: For each topic say whether you would like **more, less or the same amount** of material.

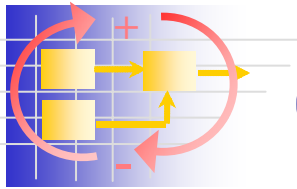




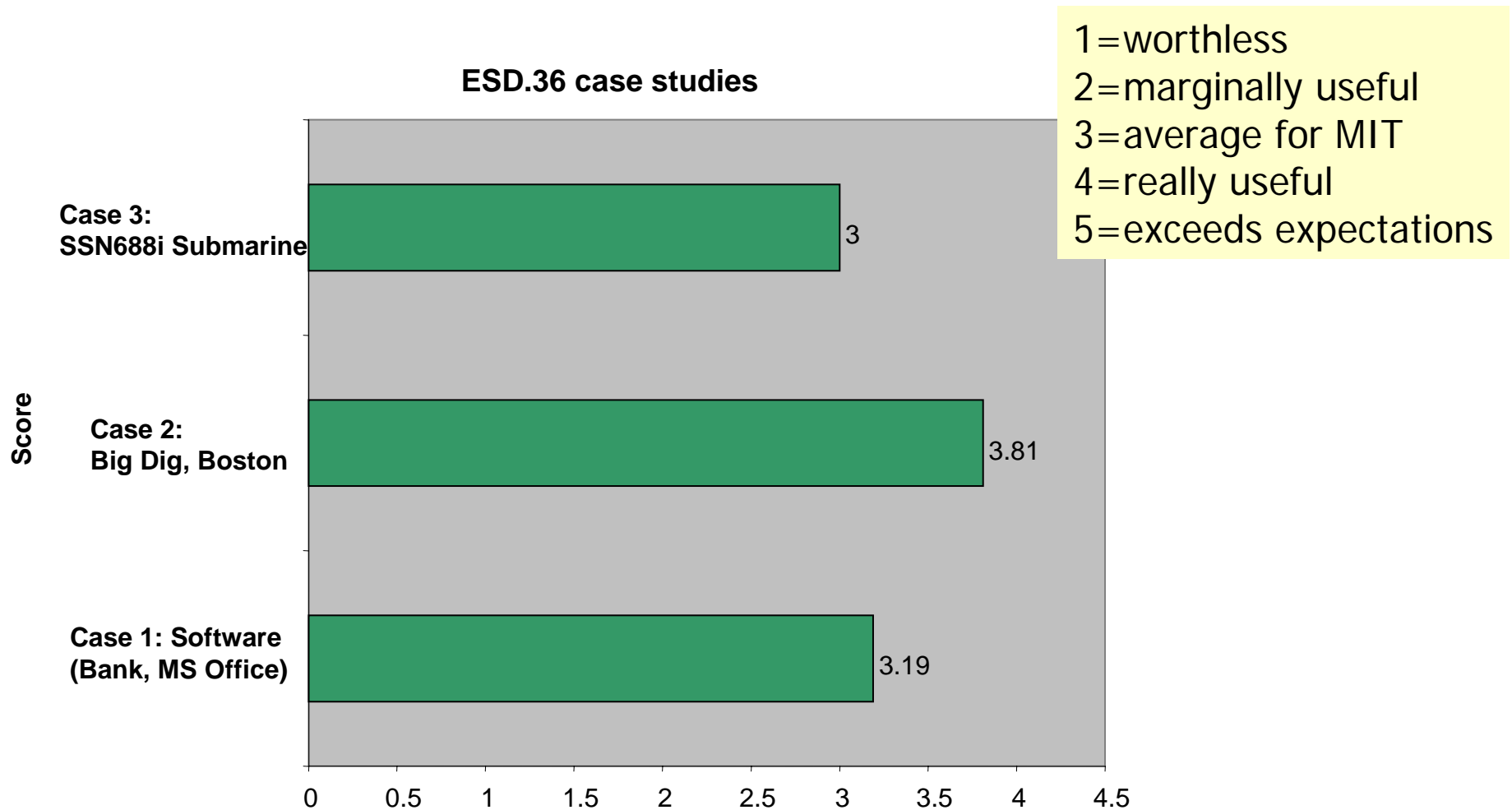
Q3: Rate potential value of topics that **are not currently covered in the syllabus of ESD.36 to SDM.**

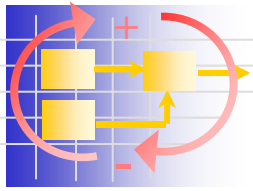
Question 3





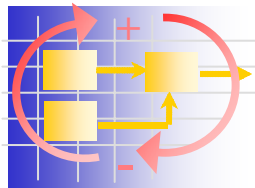
Q4: Rate the three cases



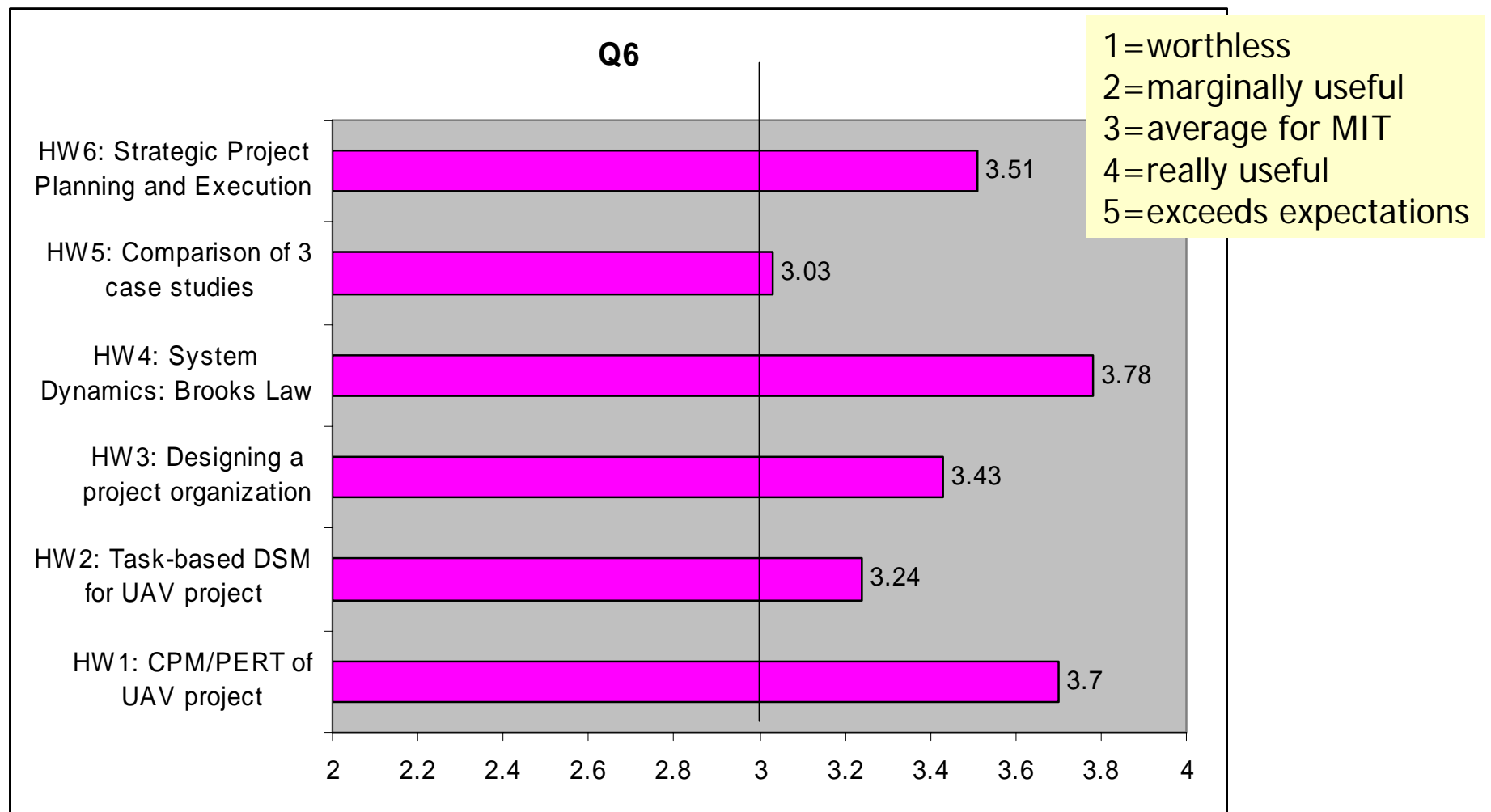


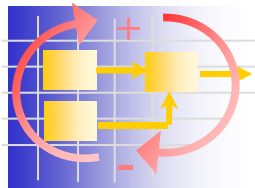
Q5: Suggestions for **new project cases** and speakers

- Dean Kamen, the Segway project
- Consulting company project management case (McKinsey...), brings in an added "external" view of SPM.
- Future Combat System, COL Bill Johnson (DARPA)
- Conflict resolution, actual exercise during class time
- Multi-project management case, speaker?
- Microsoft speakers
- Student contributed cases - maybe make that a project
- Homeland Security or Iraq - Paul Bremmer - whoever is in charge
- Product development , Lean Engineering - Chris Theodore, Al Haggerty
- Update SSN688i case with more recent study of a similar nature like NSSN (Virginia Class) or the like
- an FPDS vehicle case study
- Wireless Product (High Clockspeed,High Technology)
- HBS case with real class preparation/participation/debate instead of slide and lecture format
- The Denver Airport (DEN) - various stakeholder with conflicting objectives
- Automobile development; compare NA with Toyota, Ford FPDS case
- Development of an ASIC at Intel or Motorola. A VP of Engineering or Technical Lead could be a good speaker.

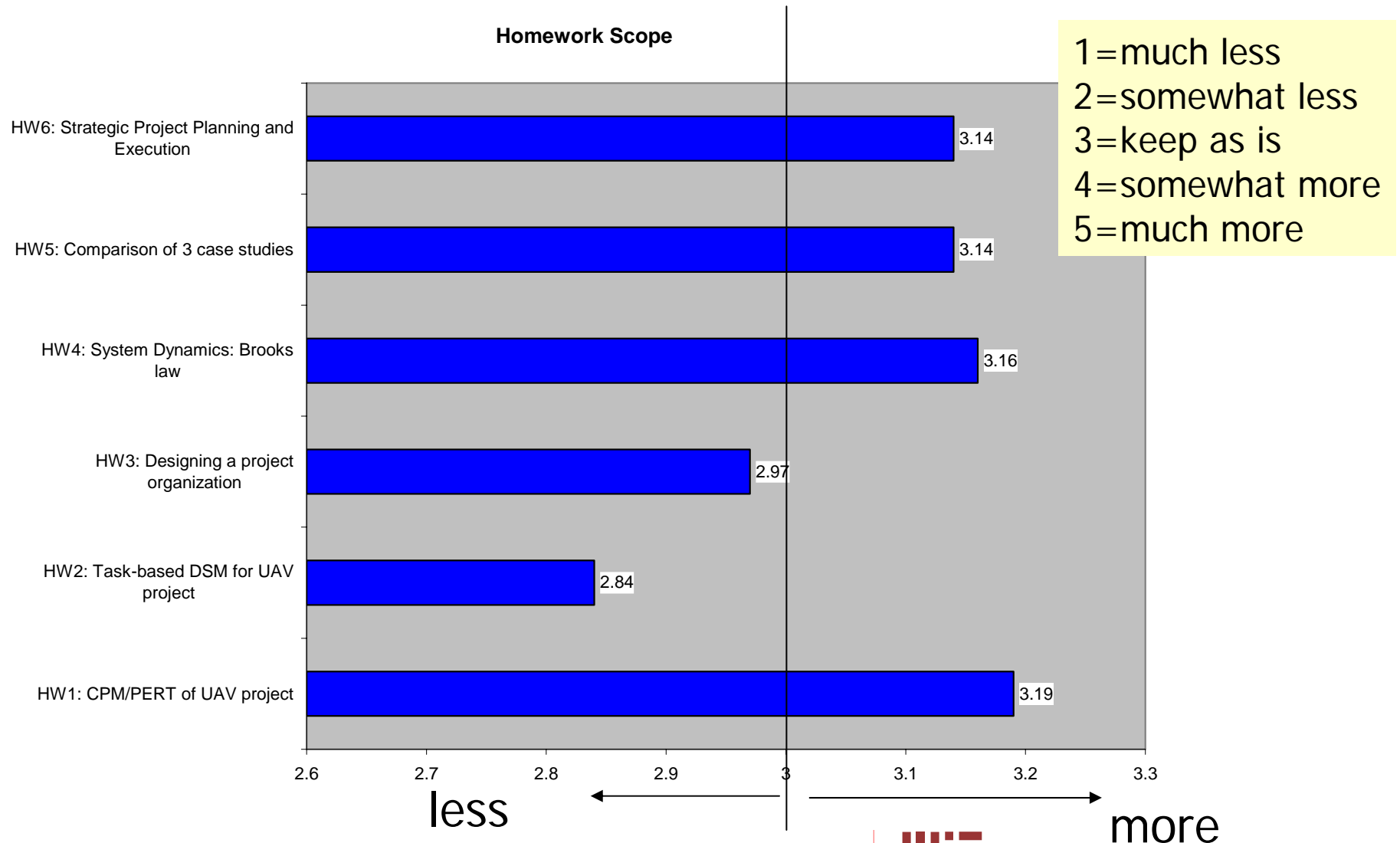


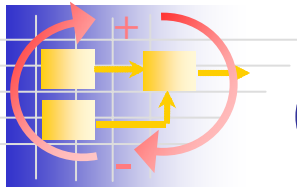
Q6: Rate homework assignments in terms of scope and relevance to SPM



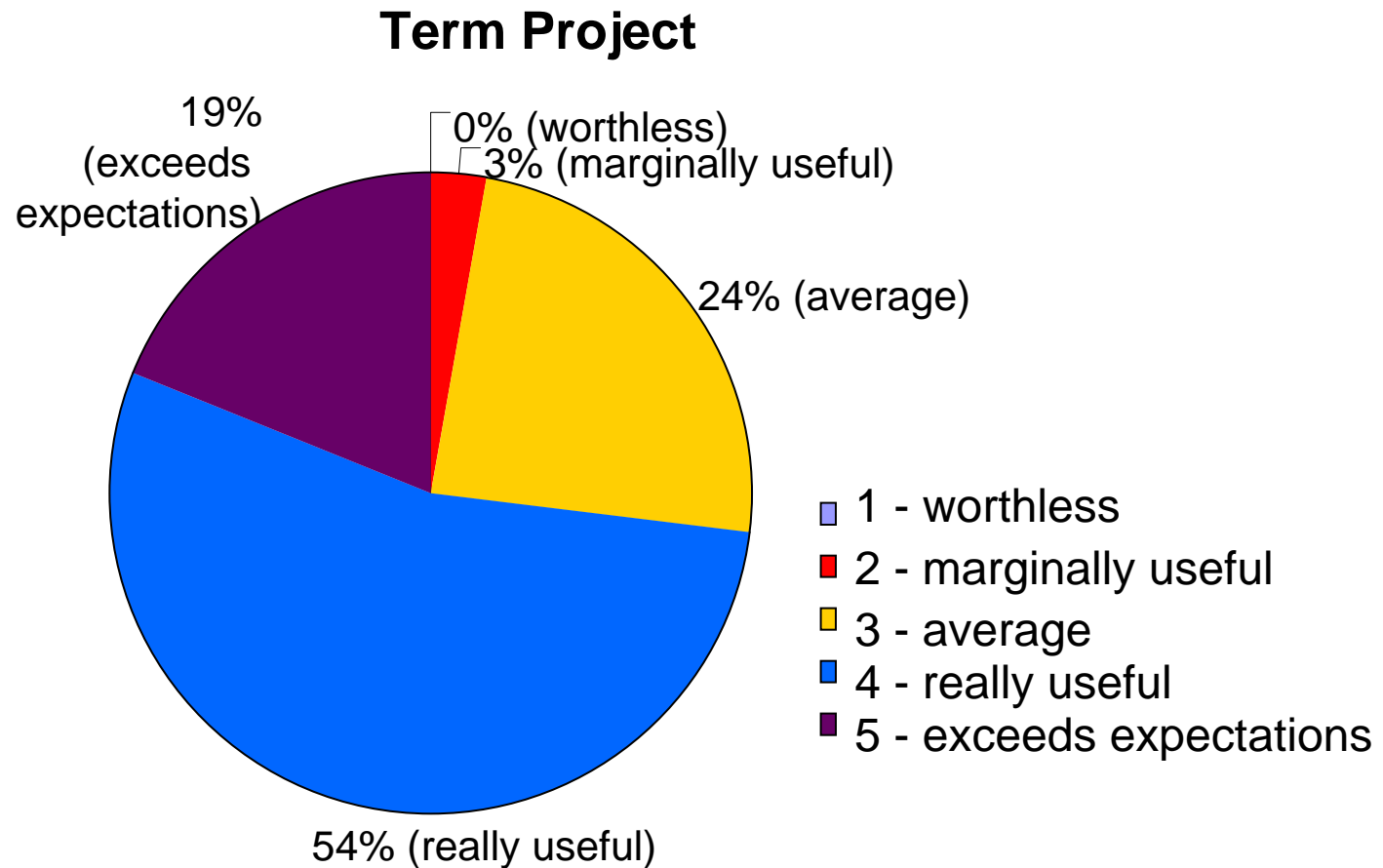


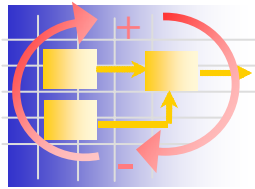
Q7: Rate homework assignments in terms of workload (augment, descope)





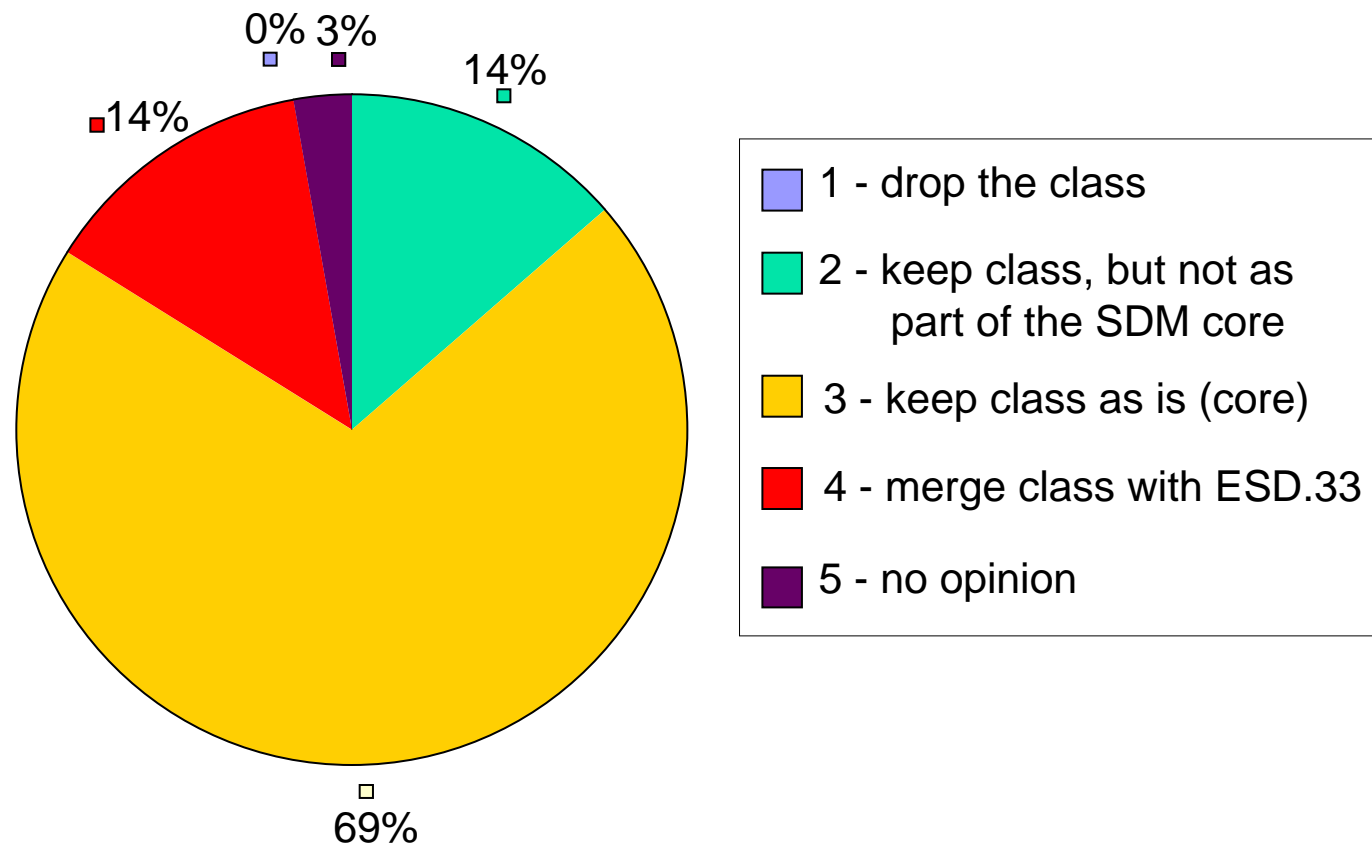
Q8: Rate usefulness of Term Project

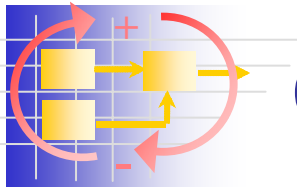




Q9: What should be the **future of this class** in the context of the SDM program?

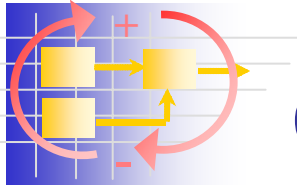
Future of ESD.36 class





Q10: Suggestions for **improvement (I)**

- General sense that improvements are “tweaks” rather than quantum changes
- Lectures:
 - More about PERT and the newer methods using Monte Carlo simulations to forecast project outcomes
 - Address the challenges of PM from a more challenging and senior perspective - e.g. multi-project constraints
 - Reduce the System Dynamics piece (relative to other parts) or make SD mandatory as a separate class and use as pre-requisite
 - Make sure the class ends on time! (Practice what is taught)
 - Draw connection to system engineering better. How can the class teach more of a system view of project management?
- Term Projects:
 - Descope term project in light of learning one or two more “cutting edge” methods (like DSM and system dynamics).
 - Better to have three 2hr sessions than two 3hr sessions



Q10: Suggestions for **improvement (II)**

■ Case Studies

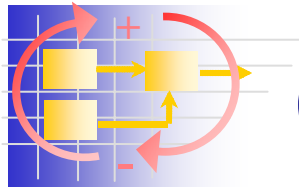
- Case Studies that explore the decisions, options and managerial levers pulled by the PMs in directing the projects.
- Invite more senior industry speakers.
- Increase and spread participation more evenly on the class by adding 2 HBS project cases (emphasize “rich” class discussion)
- Program management execution. (e.g. FedEx)

■ Homeworks:

- comments throughout the document that help understand what has been done really well and what needs to be improved.
- Focus on problems that mirror real world conundrums in addition to just practice with new tools.- augment decision processes

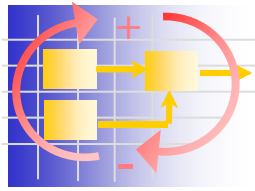
■ General

- Most all SDM students are familiar with the traditional tools. Strengthen “soft skills” in dealing with employees and superiors.
- systems perspective? > no simple answer - remember RISK MGT!



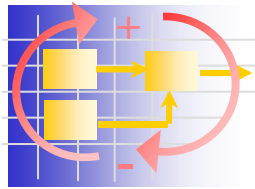
Class Discussion

What do you think ?



Final Touches

- Please fill in paper survey
 - hand to class volunteer when done
- Project Evaluations will be mailed out to teams 1-16 on Friday 12/12
- Final class grade on WEBSIS after 12/16
- Pickup class CD-ROM from SDM office (Bill Foley)



Thank you!

TA's: Christos Sermpetis, Darren Chang

Co-instructor and Helpers: Jim Lyneis, Pat Hale, Donna Rhodes

Happy Holidays !