



Introduction

A major focus in our department has been to develop a set of learning goals for each course that define what students should be able to do upon completion of a course. While the development of these learning goals has been well received by our faculty, many question the value of sharing such goals with their students. More specifically, faculty are uncertain if, and how, students would utilize the learning goals. To determine how students value and use learning goals, we administered an online, open-ended survey to physiology students in four upper-division courses at the University of Colorado at Boulder.

Course	Total # respondents	Total # students	Faculty use of learning goals
Course A - Cell Physiology	27	73	<ul style="list-style-type: none"> Goals posted online Goals incorporated into course materials Goals aligned with exams
Course B - Endocrinology	77	132	<ul style="list-style-type: none"> Goals posted online
Course C - Human Physiology II	153	170	<ul style="list-style-type: none"> Goals posted online Goals incorporated into course materials Discussion of goals in lecture
Course D - Neurophysiology	66	82	<ul style="list-style-type: none"> Goals posted online Goals incorporated into course materials Goals aligned with exams Discussion of goals in lecture

Methods

- All students were surveyed immediately after the first exam and prior to receiving their exams scores.
- Each student comment was coded and categorized by three independent scorers.
- Inter-rater agreement averaged 76-91% for each survey question.

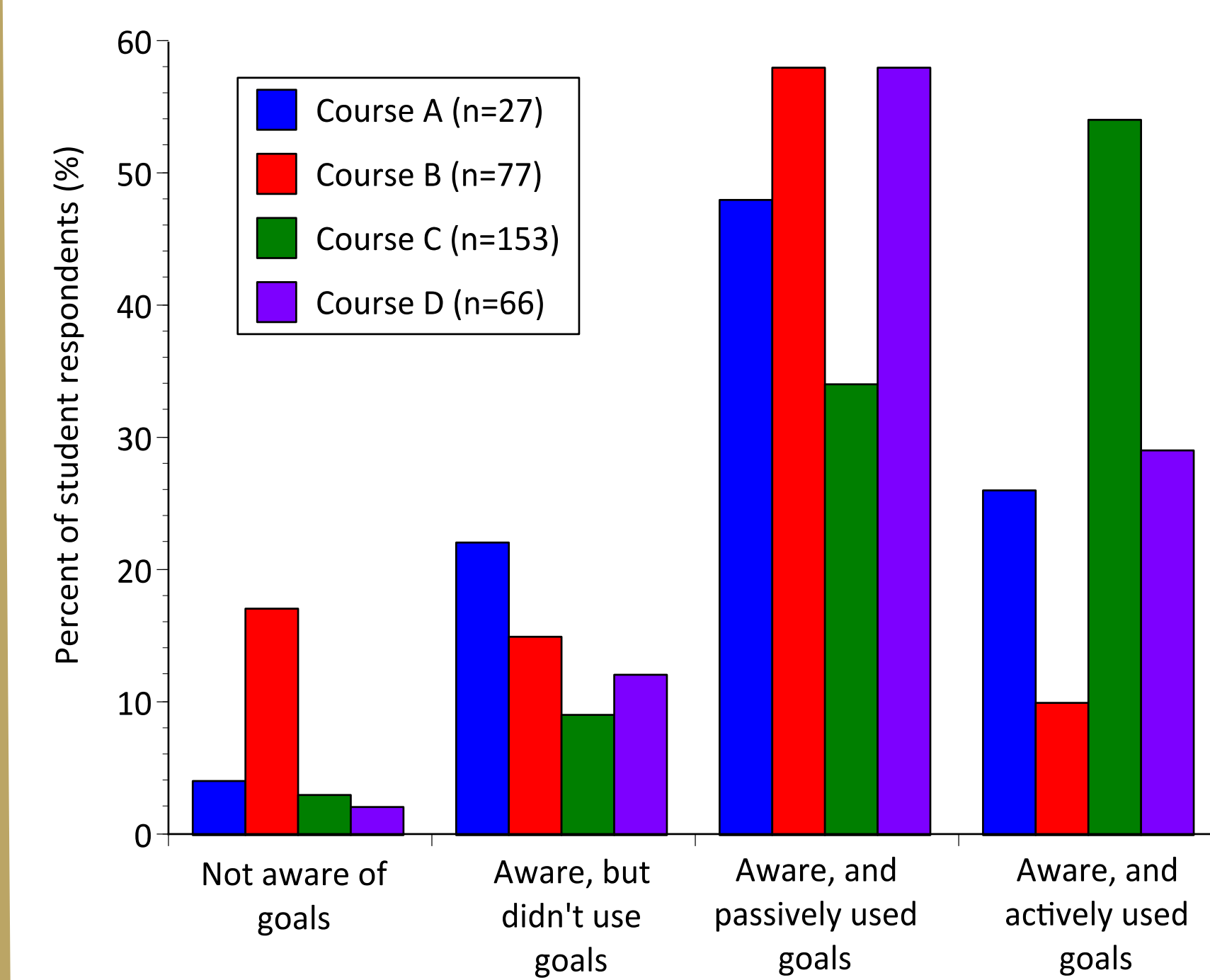
Example learning goals

Course A	Diagram the steps involved transcription beginning from binding of TBP to the TATA box and ending at creation of RNA by the polymerase.
Course B	Given clinical data, predict where the defect in the steroidogenesis pathway occurred and propose a viable treatment option.
Course C	Differentiate between the functions of the cephalic, gastric, and intestinal phases of digestion.
Course D	Given a change in a parameter that influences net driving force, equilibrium potential, or resting membrane potential, predict how this influences current across the membrane.

Electronic copies of these learning goals can be found at:
<http://www.colorado.edu/sei/departments/integrative-physiology.htm>

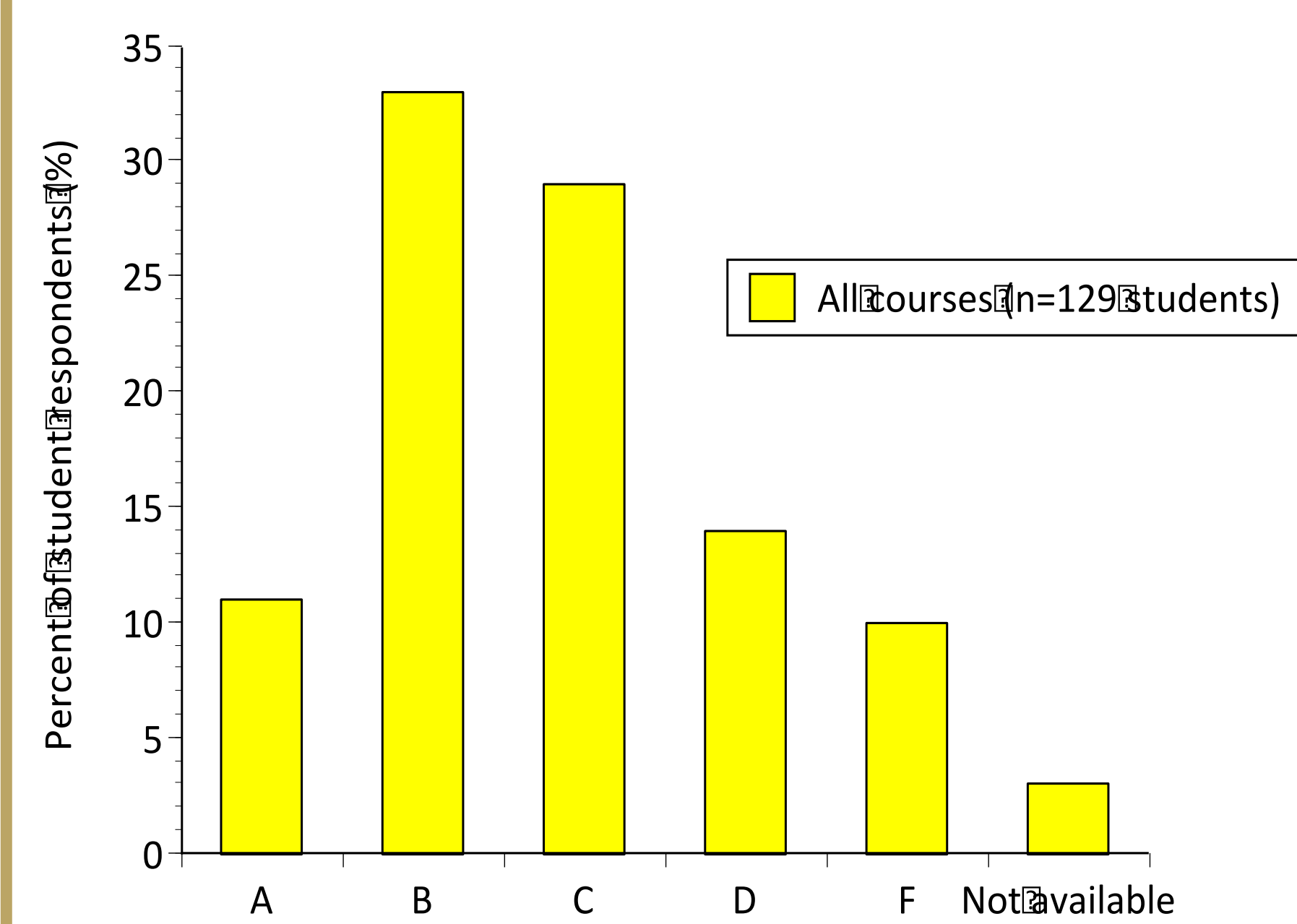
The Science Education Initiative at the University of Colorado provided funding for this project.

Were you aware that a set of learning goals was provided to you?



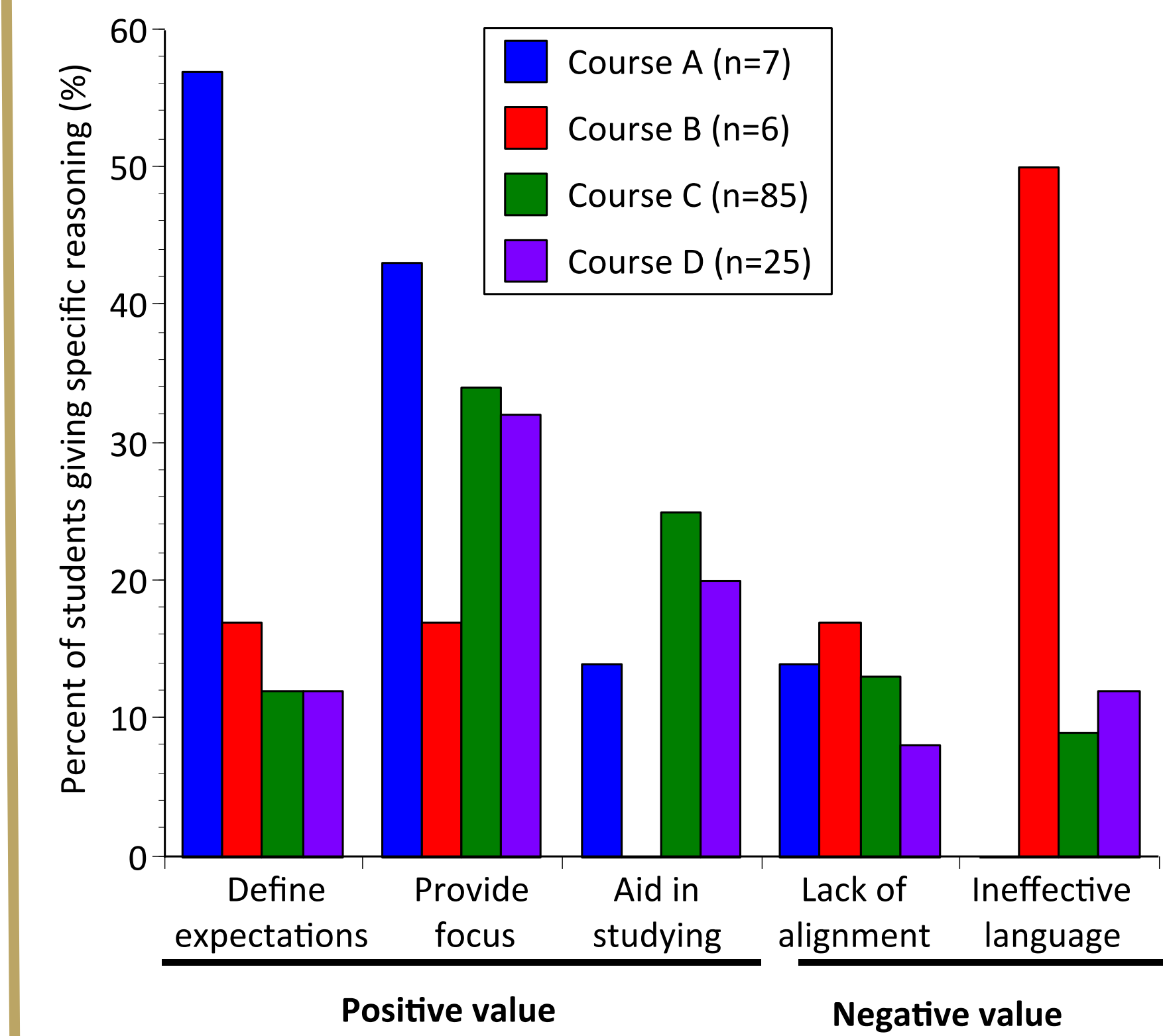
- Most students were aware of the learning goals.

Grade distribution of students actively using the learning goals



- The majority of students actively using the learning goals were B and C students.

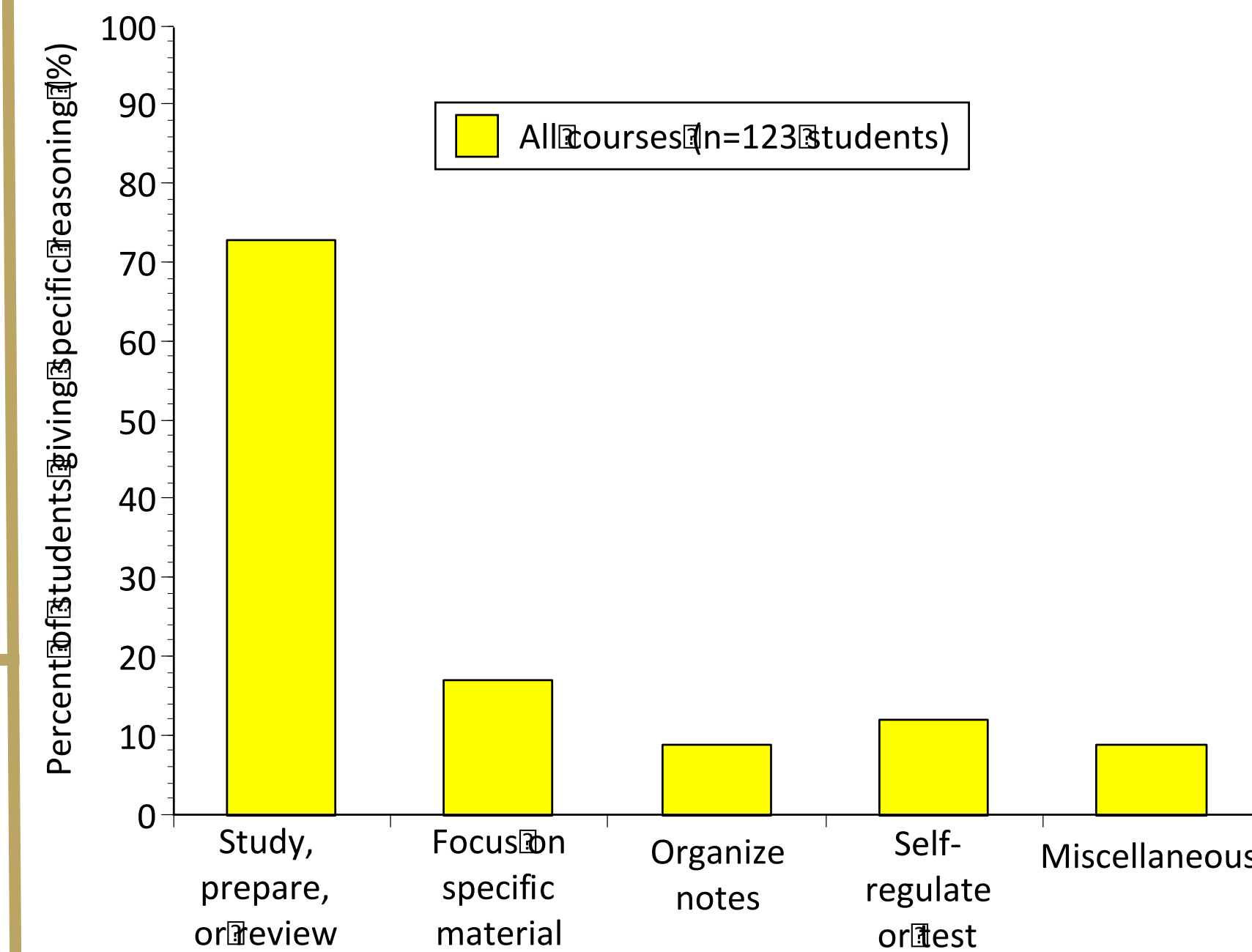
Did you find having the learning goals valuable? Why or why not?



- Among all courses, students find learning goals valuable because they define the faculty's expectations for the course and provide focus when studying.
- In Course B, students find little value in learning goals because they do not align with exams or are unclear in wording.

Specific reasoning category	Example student response
Define expectations	"Yes. It helped give me direction about what information we were expected to retain from each section."
Provide focus	"Yes. It allows you to focus on the points that the professor wants you to understand."
Aid in studying	"I found them very valuable because they helped me effectively study for the test and allowed me to see what concepts were most important."
Lack of alignment	"Somewhat, I thought there would have been more test questions that directly translated to the learning goals."
Ineffective language	"Some of the learning goals could be a little bit more clear and precise as to what they are asking students."

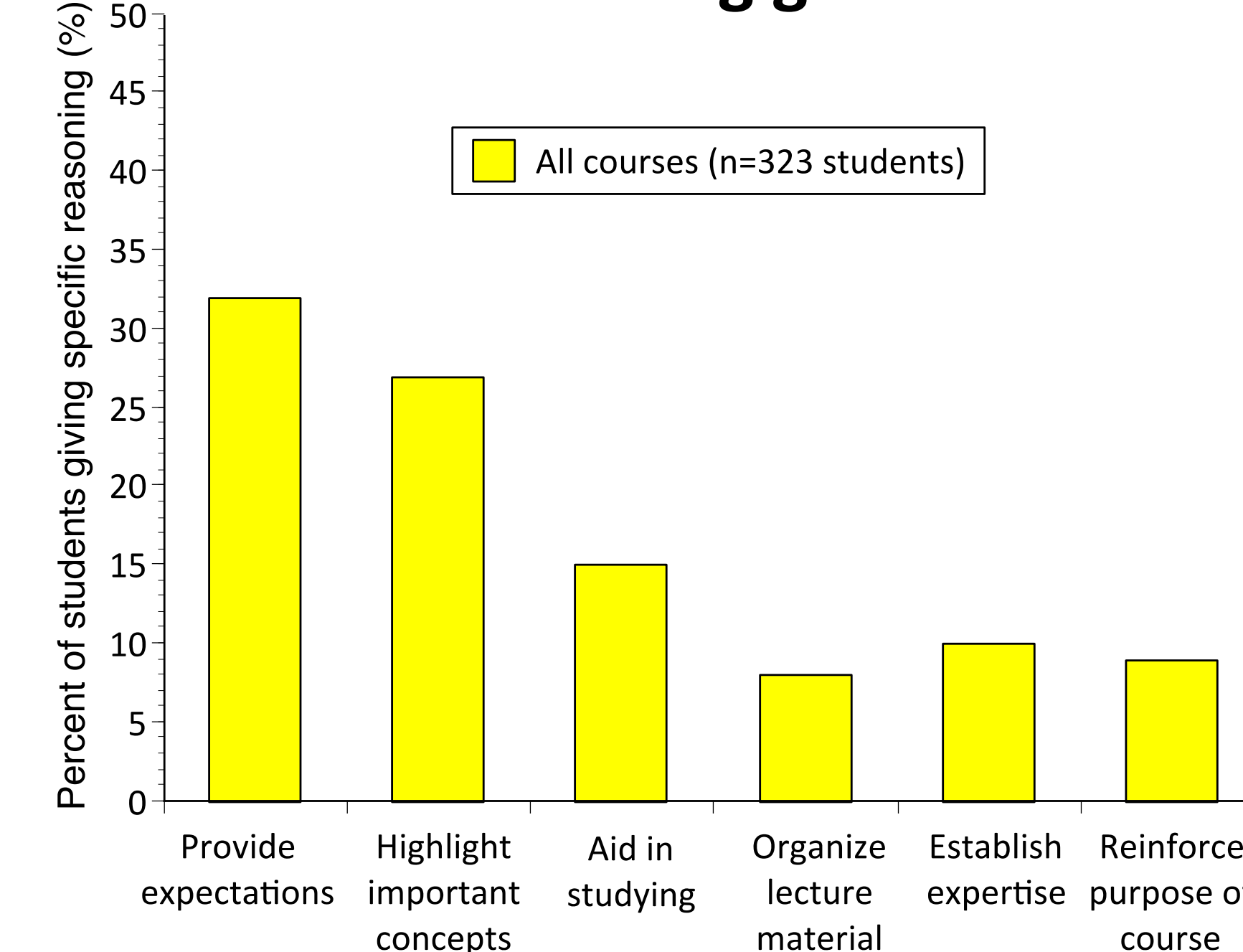
How did you use the learning goals?



- Students most commonly use learning goals to help sort through the vast amount of information in the course and help them focus on the most important material for studying.
- In addition, students use learning goals as tool to organize their notes or to quiz themselves on what information they do or do not understand.

Specific reasoning category	Example student response
Study, prepare, or review	"I used the learning goals as a framework for studying for the material."
Focus on specific material	"I used them to identify the important topics to focus on while studying for the exam." "I usually write out the learning goal in a notebook then try to write out what we are supposed to know under the learning goal."
Organize notes	"Basically reorganizing the information from the slides and book."
Self-regulate or self-test	"I briefly looked over them at first, then studied the material, and finally used them as a tool to test my knowledge."
Miscellaneous	"To preview the lecture materials beforehand." "To guide my reading of the textbook."

Why do you think your professor uses learning goals?



- In all courses, students believe that faculty use learning goals to reinforce what is expected of them. This includes defining what concepts are most important, as well as the skills necessary to achieve the learning goal.
- Students also believe faculty use learning goals as a means to organize or structure their lecture material.

Specific reasoning category	Example student response
Provide expectations for students	"To let the students know what they should expect to know and learn when taking the course."
Highlight important concepts	"The instructor uses it in order to make a contrast from other topics and show emphasis on a particular part." "They provide a good guideline for lecture and allow students to refer back to lecture and see how much they comprehended."
Aid in studying	"To add structure to the course and increase the level of organization."
Organize or structure lecture material	"To challenge us to think beyond the information presented to us and look deeper into the question."

Student suggestions for making the learning goals more helpful

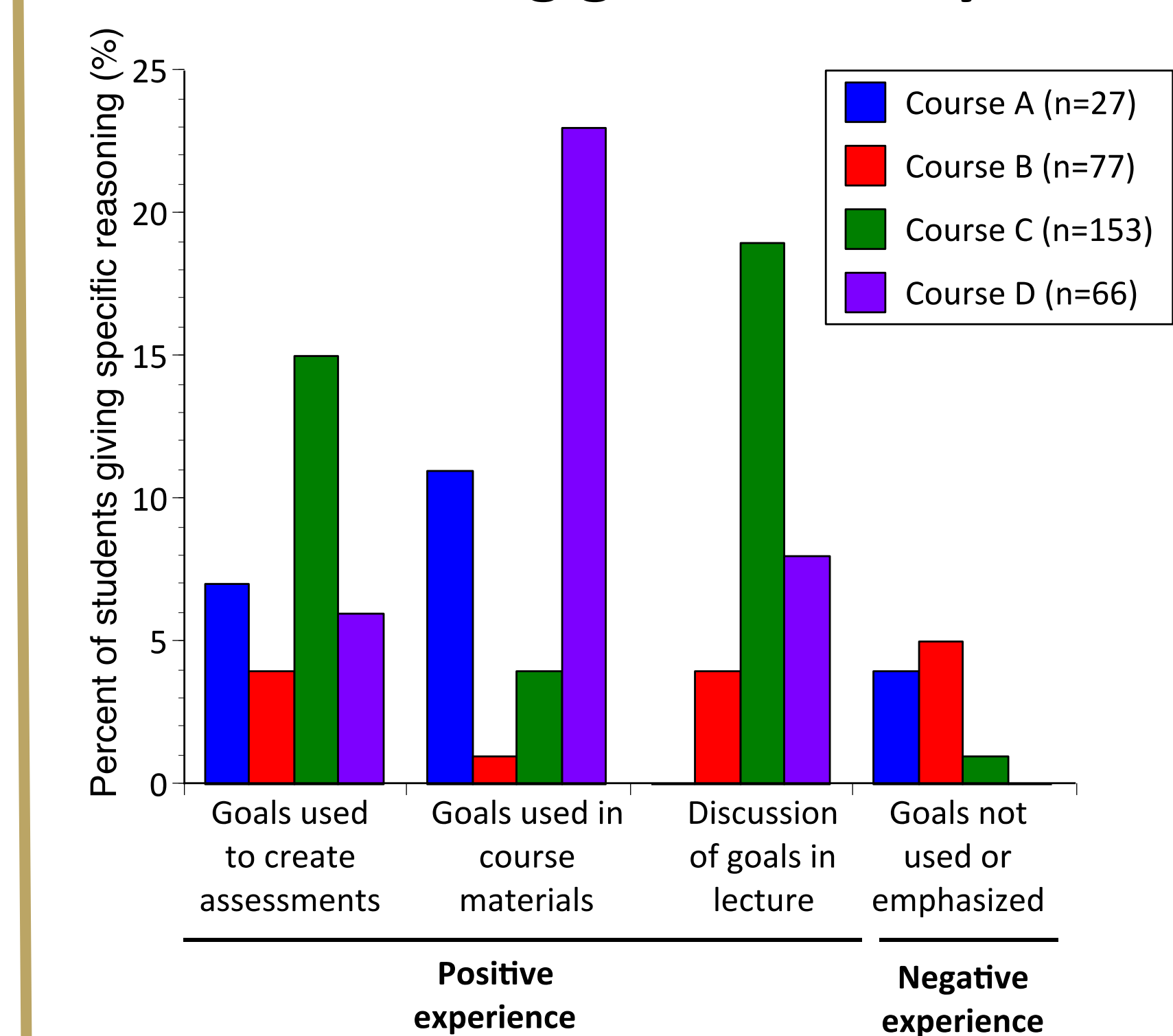
- Add more details to the learning goals, including adding sub-goals and/or page numbers
- Provide example or practice problems to supplement the goals
- Offer feedback on the goals (e.g., provide an "answer key" or review in class)
- Provide guidelines or directions on how to use the goals

Conclusions

- Physiology students find value in detailed, course-specific learning goals.
- Physiology students most commonly use learning goals to help focus on the most important material for studying, to organize their notes, and as a tool to test their knowledge.
- Our results are consistent with previous work by Simon & Taylor (2009) who demonstrated that students and faculty in Computer Science and Microbiology/Immunology at the University of British Columbia find value in learning goals.
- Results from this survey will be used to develop an "instruction manual" that will help faculty understand how students perceive and use learning goals.

Simon & Taylor (2009) What is the Value of Course-Specific Learning Goals? *Journal of College Science Teaching*. Volume 39 n2, pg. 52-59.

How are learning goals used by faculty?



- Students in Course C recognize that faculty use learning goals to create exams and are repeatedly reminded about the goals throughout the semester.
- Students in Courses A and D recognize that faculty use learning goals to structure their course materials.
- Students in Course B are conscious that faculty do not use the learning goals.

Specific reasoning category	Example student response
Goals used to create assessments	"His quizzes and exams reflect this material."
Goals used in course materials	"He includes the learning goals on the review sheets for exams."
Discussion of goals in lecture	"Her reiteration of using these goals as a tool has led me to this belief."
Goals not used or emphasized	"He doesn't really use the learning goals."