**BACKGROUND**

During the Fall 2011 semester, 63 professors participated in a review of a forthcoming chapter from Voet, Voet, and Pratt’s *Fundamentals of Biochemistry, 4th Edition* (FoB,4e) and provided feedback on that chapter through a web-based survey.

- Of these instructors, 32% teach a one-semester course, 48% teach a two-semester course, and 21% teach both.

- 84% of the instructors who participated use a book that favors a chemical approach, while 40% use a book that favors a biological approach.

When asked what concepts students find most difficult to learn, many instructors cited various topics including kinetics, enzyme mechanics, thermodynamics, protein structure, and synthesis. Many instructors also added that their students often have the most difficulty with concepts that draw heavily upon their math skills, while others noted gaps in their students’ chemistry backgrounds and/or difficulty in drawing upon knowledge learned in other courses as a source of struggle:

> The students struggle with linking previous material in other courses to the content at hand. The ideas, for example, of thermodynamics, equilibria and kinetics seen in General Chemistry and the mechanistic chemistry of Organic Chemistry along with the biology provided within a Cell Biology course. There is too much “dividing into compartments” in the students’ mind. Having sections in a book that are designed to refresh and reinforce this information is therefore very desirable.

—Robert Warburton, Shepherd University

Regardless of where their students struggle most, instructors overwhelmingly agree that a strong foundation in chemistry is important for students—not only to help them develop a conceptual understanding of biochemistry but also to help them understand the cellular interactions at the root of biochemistry applications.

**Instructors agree: a solid foundation in chemistry is essential for student understanding**

![Graph showing percentage of instructors who agree strongly/agree that a solid foundation in chemistry is essential for student understanding]

- 90% agree/strongly agree
- 85% agree/strongly agree

- Given the volume of information in this rapidly changing field, a solid foundation in chemistry will help students develop conceptual understanding of biochemistry rather than rely on memorization.

- Students need to see the relevance and application of biochemistry, but they can understand cellular interactions only if they understand the chemistry behind the biological structures and reactions occurring in living systems.
Biochemistry instructors were very enthusiastic about the FoB,4e chapters that they reviewed, with 100% describing their reaction to the chapter as “positive” or “very positive.” They were also highly positive about the authors’ organization and writing style:

Instructors are highly positive about the FoB,4e chapters

Additionally, 90% of instructors agreed that the chapter presented a level of difficulty that was “about right” with respect to where they would want the level of the material to be targeted to their students. An overwhelming majority also found the FoB,4e chapters to be highly accurate and up to date, with 94% and 97%, respectively, giving the FoB,4e chapters the top two marks in each of those categories.

When asked about the greatest strengths of the FoB,4e chapters, the instructors who participated in the reviews frequently cited the text’s writing style, organization, accuracy, and currency as integral parts of the authors’ ability to present the material with the clarity and depth needed to provide students with a strong foundation for future learning:

> The writing was strong and the presentation of ideas was very fluid. The chapter was extremely easy to read and most of the material was important to a one-semester biochemistry course. The examples used to show a concept were quite good and the historical background was just about right — not too much to bore the student but just enough to set the stage.

    —Roger Sandwick, Middlebury College

> The chapter is organized and written well, it provides the students with the vital knowledge that he/she needs to understand future chapters. In covering the concept, the chapter uses many strategies to help students understand the concepts. It connects well to the previously learned subjects and builds well for what is coming next.

    —Jahangir Emrani, North Carolina A&T State University
The authors’ ability to provide depth and context for the concepts that are covered is another frequently cited strength:

“This is just a tremendous summary of many aspects of enzymology, distilled down somewhat for an undergraduate audience. I think there are many very strong aspects to note, particularly the focus on pharmaceutical development and the utility of [having] a knowledge of enzyme chemistry in the study of disease.”

—Andy Koppisch, Northern Arizona University

“Nice emphasis on diseases associated with protein folding. I find students like material that helps explain issues they can relate to. It also lays down a very nice foundation for understanding the behaviors of enzymes, so that they become more than just little Pac Man figures eating up pie wedges. There is a nice amount of material that shows how some of the data is generated.”

—Daniel Moriarty, Siena College

KEY PEDAGOGICAL FEATURES MEET WITH HIGH APPROVAL

Each chapter in FoB,4e contains pedagogy that is also recognized by many instructors as being among the text’s greatest strengths:

- 91% of instructors “agreed” or “strongly agreed” that the Key Concepts feature at the beginning of each section helps students identify the learning goals of a chapter.
- 97% of instructors “agreed” or “strongly agreed” that the Checkpoint Questions at the end of each section help students master the key concepts in the chapter.
- 98% of instructors said that the Sample Calculations promote student understanding of the more quantitative aspects of biochemistry, with 69% saying that they would promote student understanding to a “great extent.”
- Over half of the instructors said that the inclusion of Figure Questions within figure captions were valuable or very valuable in facilitating further reflection and analysis of the figure.

FoB,4e contains several features that provide context and additional information to students throughout the text and these too were well received:

- 100% of instructors found the Biochemistry in Health and Disease feature to be highly useful in providing students with the opportunity to explore biochemical clinical correlations. Of that 100%, 96% rated this feature as “very useful”—the maximum rating!
- 82% of instructors found the Perspectives in Biochemistry feature to be highly useful in providing students with the opportunity to explore more in-depth, technical information.
- 68% of instructors rated the Pathways of Discovery feature as either “useful” or “very useful” in providing students with an opportunity to get a better sense of history while emphasizing that the study of biochemistry is a human endeavor.

COMPARISONS TO TEXT IN USE

Instructors showed a much stronger preference for FoB,4e over their current text. In fact, when considering only the responses of instructors who are NOT current FoB,4e users:

- 52% of instructors stated that they considered the reviewed chapter to be either “better” or “much better” than their current text. Only 5% explicitly preferred the chapter in their current text—the rest were neutral.
- 43% “preferred” or “strongly preferred” the end of chapter exercises in Fob,4e, while only 5% preferred the end of chapter exercises offered by their current text – the remaining 43% were neutral.

Current FoB,4e users are even more highly satisfied with the chapters from the new edition: 72% considered the review chapter to be “better” or “much better” than the previous edition, while 68% prefer the end of chapter exercises in the new edition.
Likelihood to Adopt

Based on what they saw in the review chapter, 78% of all instructors said that they would consider using FoB,4e in their course. Among current FoB,4e users, 96% are highly likely to strongly consider using Voet again and among non-users, 67% are highly likely to strongly consider it.

Instructors are highly likely to consider FoB,4e for adoption regardless of the length of their course

While FoB,4e takes a chemical approach, instructors were likely to consider adopting FoB,4e in their own course regardless of the approach employed in the text that they currently use:

"The presentation and the figures are great. The material is very clear and would be appropriate for my more biologically oriented student."
—Ruth Birch, St. Louis University

"[Voet] went into more depth than my current text and therefore laid a better foundation for understanding the vital role of water in the study of biochemistry and of life itself. I like the worked examples that 'brought home' the theory to show how it is used/applied."
—Verne Biddle, Bob Jones University

"I like the in depth. It covers the biological system with chemistry rigor."
—JiongDong Pang, Southern CT State University

Instructors are likely to consider FoB,4e for adoption regardless of their current approach

For additional information please contact Kristy Ruff: kruff@wiley.com