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Technical Communication

Analysis of Communications within a Discipline

Many forms of communication exist in technical fields due to the varying degrees of expertise among people. This is particularly true for physics, in which different levels of understanding can be obtained. The two works selected for comparison are both printed materials that deal with physics. One is the Princeton Review's "Cracking the AP Physics B & C" by Steve Leduc, an advanced placement preparatory book. The second is the textbook "An Introduction to Mechanics" by Kleppner and Kolenkow, used for the introductory physics course at MIT. I have chosen to discuss these two works because physics is one of the primary disciplines at MIT and provides the foundation for many careers in technology. Ultimately, the reason for writing any physics book would be to teach the reader about the subject. In these two works, however, the forms of communication and motivations for the reader differ significantly. This analysis will concentrate on the introductions of each work, which offer insight into the authors' purposes for writing the books. Occasionally, references will also be made to the actual physics material to demonstrate organization and the depth of topics covered. Whereas the exam preparatory book is mainly directed at high school students seeking to excel on the AP and assumes existing motivation, "An Introduction to Mechanics" targets college students studying physics for its intrinsic value and motivates them by explaining the uses of physics. The intended audience of each work is achieved through purpose, appeals, depth of material, organization, and visual layout.

The purpose of each work is conveyed in the introduction of the book and its overall presentation. The introduction of the Princeton Review is fairly brief, with mostly explanations of grading and the levels of testing offered by College Board. There are few references to the elements or importance of physics itself. For example, the first line of the introduction is "The AP (Advanced Placement) Examinations are given in May of each year and offer students the opportunity to earn advanced placement or

college credit for work they've done in high school or independently." The purpose presented is very practical and straightforward. It is direct, assuming that the reader, having purchased the book, already has motivation for studying it. On the other hand, the first line in the preface of Kleppner and Kolenkow states "There is good reason for the tradition that students of science and engineering start college physics with the study of mechanics: mechanics is the cornerstone of pure and applied science." This book is directed more at a long-term preparation, setting a foundation for careers in the science and technology fields. Although there is no immediate application of the material covered, it places more of an emphasis on creating a solid background. The purposes presented contribute to the establishment of the audience in each work. Princeton Review targets students preparing for the AP by concentrating on the exam in the introduction. On the other hand, Kleppner attempts to attract college students to physics by explaining its intrinsic worth.

Both works employ appeals in their introductions to urge the user to continue reading. Although the Princeton Review assumes existing motivation in the reader, logical appeal exists to orient the reader to the format of the exam. Kleppner and Kolenkow employ ethical appeal, attempting to establish common ground with the reader by presenting the importance of physics. They themselves acknowledge the real-life applications of physics, and try to pass that appreciation onto students in the physics course. Students obviously have prior motivation for enrolling in physics, and this introduction reaffirms them of their good decision. This common agreement on the uses of physics contributes to an ethical form of persuasion. The introduction of the first work contains mainly explanations of grading and guessing strategies. One predominant feature of this introduction is that it is full of percentages and statistics. These figures represent the level of performance required to obtain certain scores and the distribution of topics on the exam. Leduc offers logical appeal by presenting facts about the exam and promoting his own book as proper preparation: "Here's a listing of the major topics covered on the Physics B and C Exams, along with an approximate percentage of the questions in each topic...This book is designed to review all of the content areas covered on the Exam, illustrated by hundreds of examples." Leduc motivates the reader by offering success strategies for the exam. His introduction is more mechanical and goal-

oriented than the intentions laid out by Kleppner. Leduc states “Each right answer is worth 1 point, but $\frac{1}{4}$ of a point is subtracted for each wrong answer. Therefore, there’s little to be gained by randomly guessing on a question you know nothing about, but if you’re able to eliminate one or more choices, then it’s a good strategy to guess among the remaining choices.” His arguments are direct and to the point. On the other hand, Kleppner hopes to inspire an enduring interest in the reader. He employs ethical appeals to attract his readers, whose motivations may not be as substantial as those of Leduc’s readers. This is because there is no tangible, immediate gain to learning this material. This college textbook seeks not simply to prepare a student for an exam so that he or she may receive college credit. It instead emphasizes through ethical appeal that “[m]echanics is a mature science and a satisfying discussion” and attempts to “enrich” the student. Kleppner attempts to identify with the reader by stating that “Here is where students gain the sense of genuine understanding of the principles of physics.”

The level of technical diction in each work is also appropriate to its respective intentions. This is evident in the language used throughout the instructional portions of each book. Leduc is mainly concerned with preparation for the advanced placement exam, and therefore presents physics only at a superficial level. For example, when introducing the concept of position and velocity, Leduc merely states displacement/time = velocity. He presents physical concepts in a more direct, straightforward fashion. In Kleppner, however, the equation is presented as $\frac{dr}{dt} = \frac{dx}{dt} \mathbf{i} + \frac{dy}{dt} \mathbf{j} + \frac{dz}{dt} \mathbf{k}$. The author assumes that the college student has had extensive previous exposure to the terms displacement and velocity. Fundamental concepts in Kleppner are introduced as more complex and elegant expressions. It is obvious that he uses more specialized and technical language. He is directing his work at students seeking intellectually stimulating presentations of physics. In his preface, he actually defines his audience as “students who come to the course knowing some calculus.” Both works reveal different purposes, motivations, and audiences through their forms of presentation.

The organization and visual layout of the works also contribute to the effect they have on the audience. The brief introduction in the Princeton Review is immediately followed by practice tests and individual lessons highlighting the sections of the exam. The transition is very abrupt, because the author realizes the reader’s main motivation for

purchasing the book is to do practice problems and learn test-taking strategies. It would be inappropriate for him to elaborate on the merits and real-life applications of physics. Kolenkow's introduction, however, is organized into a preface and a note to the teacher. Each section contains a detailed explanation of the content of chapters 1 to 14, once from the student's perspective, once from the professor's. It tries to encourage the reader to enjoy physics by presenting its usefulness and its ability to "enrich."

The physical layouts throughout the two works are also indicative of their audiences. Leduc draws emphasis to the important formulas by enclosing them in gray boxes. He is very concise and direct, alerting the reader to crucial concepts on the exam. Important ideas will either be underlined or in bold font. In the Kleppner and Kolenkow textbook, however, the ideas are less simplified. It provides many explanations and derivations for each concept. Bold fonts are rarely used, which suggests that every idea in physics, no matter how minute, is important to the whole. This approach is appropriate since they hope to enlighten the college student in physics.

Both works implicitly define their intentions by their methods of presentation. This consists of elements such as purpose, motivation, organization, and visual layout. As a result, the relationship between the writer and the audience is determined. In the Princeton Review, Leduc is the instructor, speaking directly to the high school student. On the other hand, Kleppner and Kolenkow's work is a medium of instruction between the professor and the college student. Both works are successfully written and appropriate to their purpose.