

Book Review

How Learning Works: 7 Research-Based Principles for Smart Teaching

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Publisher Description: Distilling the research literature and translating the scientific approach into language relevant to a college or university teacher, this book introduces seven general principles of how students learn. The authors have drawn on research from a breadth of perspectives (cognitive, developmental, and social psychology; educational research; anthropology; demographics; organizational behavior) to identify a set of key principles underlying learning, from how effective organization enhances retrieval and use of information to what impacts motivation. Integrating theory with real-classroom examples in practice, this book helps faculty to apply cognitive science advances to improve their own teaching.

How Learning Works: 7 Research-Based Principles for Smart Teaching meshes the art of effective teaching with the process of student learning. The authors' aim is to explore how students learn best and how instructors can appropriately foster their learning. Ambrose, Bridges, Lovett, DiPietro, and Norman argue that many faculty, as experts in their fields of study, underestimate certain aspects of students' learning such as how much structure students need in order to organize new content, and students' understanding of the learning goals that instructors may have for them as part of a course. On the other hand, faculty also overestimate students' abilities in the classroom, or their level of desire for performing certain tasks. *How Learning Works* is a comprehensive guide for instructors to help them explore how learning is happening in their classrooms. The authors designed the seven research-based principles for teaching to introduce faculty to approaches that support more integrated and engaged student learning.

Ambrose, Bridges, Lovett, DiPietro, and Norman bring a wealth of practical knowledge about teaching and research expertise to the subject of supporting faculty teaching. The authors write with a diverse teaching audience in mind—including college faculty, graduate students, and K-12 educators—who may be interested in knowing more about how students learn and how to apply this knowledge to instructional practices. With this book, the authors successfully bridge the gaps between research and practice and also amongst teaching and learning. In this volume they take the reader through a series of seven learning principles, distilled from a colossal collection of empirical research, which can be applied to instructor teaching practices in a variety of classrooms.

Ambrose, Bridges, Lovett, DiPietro, and Norman introduce *How Learning Works* by sharing their developmental and holistic perspective on learning. According to the authors,

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learning is a process that involves change (in knowledge, beliefs, behaviours, or attitudes), and it is something students *do* rather than something that is transmitted to them (p.3). They continue with outlining the central tenets of the seven learning principles that comprise the seven core chapters of this book. They close with a short, but useful, concluding chapter that suggests instructors apply the principles to themselves in order to continue to learn about themselves as teachers. Eight detailed appendices filled with instructional strategies that the authors refer to throughout the body of the book round out the end of the book. Each chapter opens with an appropriate narrative of a concrete teaching and learning scenario in a college classroom in order to exemplify the principle covered in the chapter. The majority of each chapter elaborates on the underlying research evidence that supports the principle, discusses examples of practical instructional strategies for classroom practice, and culminates in a brief, but helpful, chapter summary. The seven principles cover the role of students' prior knowledge, motivation, and developmental level, as well as opportunities for the student to practice and receive feedback, and learn to become self-directed learners.

Principle 1: Students' prior knowledge can help or hinder learning. This first principle speaks to the necessity of professors working with students to leverage accurate knowledge in order to promote learning. The author's main premise in this chapter is that if student have gaps and insufficiencies in their prior knowledge it may not adequately support new knowledge. Furthermore, if prior knowledge is applied in the wrong context it may lead to students making faulty assumptions or inappropriate comparisons to other situations.

Principle 2: How students organize knowledge influences how they learn and apply what they know. The authors focus on instructors helping students to gain a depth and breadth of knowledge through building effective knowledge organizations. Here, they acknowledge the difference between sparse and superficial novice knowledge structures and expert knowledge structures which tend to be more richly connected and meaningful. The main take-away points for instructors are helpful suggestions as to how to uncover their own methods for making conceptual connections. The authors suggest that when faculty understand how they organize knowledge, they are better prepared to model strategies for developing deeper, more meaningful knowledge structures for students.

Principle 3: Students' motivation generates, directs, and sustains what they do to learn. With this principle, the authors discuss the concepts of value and expectancy for success as competing factors that can increase or decrease student motivation. Chapter three is comprehensive in its discussion of how instructors influence student motivation. The authors define motivation; describe connections between student motivation, and three types of learning goals, three key levers of value, efficacy expectancies, and supportive classroom environments. The key point for instructors is to use the strategies suggested in the chapter to help students to establish value in the goals and activities they encounter in their learning and to build positive outcome expectancies to pursue learning goals. Instructors can also enhance student motivation by creating a positive and supportive environment for learning.

Principle 4: To develop mastery, students must acquire component skills, practice integrating them, and know when to apply what they have learned. The premise of this fourth principle is for instructors to consider the tasks they expect students to accomplish. Instructors need to consider three elements of mastery that the authors claim are required for student learning: acquisition of component skills, practice in integrating these skills, and knowledge of when to apply the skills. The authors suggest that instructors break down complex tasks into their

component parts and offer students opportunities for targeted practice either through isolated practice, whole task practice, or a combination of the two.

Principle 5: Goal-directed practice coupled with targeted feedback are critical to learning. Here instructors are reminded of a fundamental purpose of feedback: to keep learners' practice moving forward and toward improvement. Furthermore, feedback should be targeted to learning goals, timely, and frequent. The authors make a salient point about assisting students' efforts in focusing on what they need to learn rather than what they already know. When instructors help students to set performance goals at a reasonable and productive level of challenge, they also make their own instruction more efficient and focused. This is an important result when considering most faculty face time constraints in the courses they teach.

Principle 6: Students' current level of development interacts with the social, emotional, and intellectual climate of the course to impact learning. Ambrose, Bridges, Lovett, DiPietro, and Norman bring an important point to the forefront of their discussion of this principle: students are holistic beings and classrooms are encapsulated by intellectual, social and emotional dynamics that influence their learning experiences. To understand individual student development better, the authors discuss the various stages of a research-based model of identity development. They use this model to give examples of different stages of identity development and in relation to student learning. The key feature for instructors is to encourage individual student development through shaping classroom contexts with consideration for the various sociocultural factors, stereotypes, and tone influence learning.

Principle 7: To become self-directed learners, students must learn to assess the demands of the task, evaluate their own knowledge and skills, plan their approach, monitor their progress, and adjust their strategies as needed. The authors include this principle based on their assertion that one of the main intellectual challenges that students face upon entering college is managing their own learning. As such, this seventh principle is centered on the key metacognitive processes that are critical to being an effective self-directed learner. These skills are highlighted in a useful diagram called "The Cycle of Self-directed Learning" (p. 193). The processes in the cycle for students to follow include: assessing the task at hand; evaluating their strengths and weaknesses; planning appropriate approaches to accomplish tasks; and applying strategies for learning and monitoring performance. A take away for instructors is that students do not always apply metacognitive skills well. The authors suggest that instructors need to make development of metacognitive skills a focal point of the course goals.

At many points throughout the text the authors highlight various cognitive and developmental learning processes. However, the book lacks any adequate attention to social learning that, invariably, shapes student academic development and personal development (including identity and sense of agency) alongside of cognitive processes. One example is in chapter 6 where the authors stress the social and emotional dynamics that impact the classroom and can complicate learning. The authors engage in a broad discussion on various social forces that effect learning and highlight sociocultural factors, stereotypes, classroom climate, and faculty-student interactions. The authors maintain a strong focus on the influence of such social forces on cognitive aspects of learning; however, this focus seems to be somewhat contradictory of their professed holistic view of students. At any point in the text the authors could have entered into a brief conversation about social learning theory to explain the interplay of social interactions that are present in the classroom and how the individual learns with others, through others, and from others.

Finally, the arrangement of information in certain chapters in this volume needs consideration. For example, chapters four and six contain foundational information that frames the authors' position on education and learning. Readers would benefit from having this information much sooner in order to get a sense of the tone of the book and of the author's undergirding perspectives on education and student learning. For example, in chapter four, the authors point to the concept of transfer or "the application of skills (or knowledge, strategies, approaches, or habits) learned in one context to novel contexts" (p.108). They distinguish between near transfer (when learning context and transfer context are similar) and far transfer (when contexts are dissimilar). The authors then state that far transfer is the chief goal of education. With this statement they clearly accentuate their perspective on the purpose of education; however, it comes far too late in the book. In addition, chapter six covers students' level of development, which is, arguably, a crucial starting point for teaching and creating supportive contexts for learning in the classroom. However, if the authors are starting from the notion of the learner in order to better understand how learning works, then examining how learners develop is key information for instructors to have order to plan more effective classroom instruction.

Overall, *How Learning Works* is well written, extensively researched, and an informative read. The numerous empirical studies related to learning that are described in the book are relatively jargon-free, and complemented by familiar everyday examples thus enhancing their accessibility to numerous teaching audiences. Chapter sections entitled *Implications for this Research* are essential pieces that help to contextualize the theoretical portions of the authors' argument into practical applications of the classroom. The authors also weave regular reminders into the body of the text of the practical instructional strategies that are contained into the appendices of the book. Moreover, in terms of a tool for faculty development, this volume is a sound conceptual and practical launch pad for critical reflection on practice for instructors. Finally *How Learning Works* would lend itself well to a workshop series based on each individual learning principle that the authors present.