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Web-based Homework: the Good, the Bad, and the Possibilities[1]

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Web homework has become widely used in teaching physics, but is that a good thing? Research shows that requiring students to work on homework does improve student performance in introductory physics. However, a closer look shows a mixed picture, as greater student effort on the homework frequently does not translate into greater learning. Not all types of student effort and engagement in the course are the same, and that which is rewarded by the web homework is not quite the same as that which leads to greatest learning of physics. It turns out that the technology itself does not affect student performance, so to increase the value of homework we must focus on the exercises themselves. Several themes have emerged from research in physics education that are relevant in this context for improving the value of homework, including the importance of conceptual as well as quantitative reasoning, using multiple representations, and explicitly helping students develop expert-like problem solving skills. Different strategies for addressing these through web-based homework will be discussed, including the Physics Applets for Drawing (PADs). These Java applets are embedding in web-based homework and provide a way for to have students to make and interpret graphs and diagrams as part of their homework. They can be used on a variety of platforms, are graded automatically and provide feedback to the student (http://www.wku.edu/pads).

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