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Active-learning in oscillations with high – speed video analysis

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An oscillation is a basic topic covered in either mechanics or vibration and wave course in undergraduate physics. Physics education research studies over five years indicated that most students have difficulties with visualization, so they are often capable of solving the equations without relating to real situations. Thus activities using high-speed videos have been constructed and designed based on active-learning approach. Numerous high-speed videos (such as oscillations with massive springs, damped oscillations in glycerin and self-oscillators etc.) were recorded and distributed to students. Students were taught to use Tracker and spread sheet software to analyse videos. Both quantitative and qualitative research studies were conducted to evaluate effectiveness of these activities over the past three years. Student understanding in several concepts were improved, but many students still had difficulties in concepts such as phase, quality factor and normal modes etc.

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