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Development of a flexible and scalable software tool for use by students in University Physics Laboratories[1] DOUG HARPER, SCOTT BONHAM, Western Kentucky University (WKU) — We report on a new software tool developed to support a revised curriculum in the WKU University Physics I Laboratory. A set of learning objectives, negotiated by departmental faculty, were used to guide the curriculum revision. Two of these objectives required that students be able to measure physical quantities using sophisticated data acquisition and be able to develop their own experimental procedures. The software, written in LabVIEW, was designed to support these objectives. The new curriculum avoided providing the student with step-by-step recipe for how to carry out the experiment in favor of allowing the student to develop the experimental procedure. The software is flexible enough to be used for any of our experiments and scalable to work with simple to complex experiments. It allows the student to design their experiment by building a series of waveforms (data evenly spaced in time) from sensor measurements and post-acquisition calculations. Students define acquired waveforms that are measured directly from sensors (such as position, force, temperature), derived waveforms that are derived from these by relationships such as derivatives, integrals, or Fourier transforms (such as velocity, acceleration, impulse), and calculated waveforms that are built from any of the previous using simple algebra (such as momentum, kinetic energy, potential energy, total energy). We will show examples of how this software has been used in our laboratory and discuss its effectiveness.

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