

# Development of an Ergonomic PLC Trainer Kit with Support for Video E-Modules Using Smartphones in Vocational High Schools

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## ABSTRACT

This research aims: (1) to produce an ergonomic PLC trainer kit; (2) find out the performance of the PLC trainer kit produced; (3) determine the feasibility level of the PLC trainer kit produced for use in learning PLC practices at SMK; (4) produce interactive e-modules loaded with video using smartphones to support the use of PLC trainer kits; and (5) knowing the level of feasibility of developing interactive video-loaded e-modules using smartphones to support the use of PLC trainer kits in learning PLC practices in SMK.

This type of research used in this research is research and development with ADDIE model according to Robert Maribe Branch. The research steps undertaken include: (1) needs analysis, evaluation of the results of needs analysis, revision 1; (2) ergonomic design of PLC trainer kits and video e-modules using smartphones, evaluation of design, revision 2; and (3) making ergonomic PLC trainer kits and e-module video using smartphones, validation of material experts, media experts, and teachers, as well as student assessments and revisions 3. Data collection is done by observation, interviews, and questionnaires, using observation sheet instruments, interview guides and questionnaires. Data were analyzed descriptively.

The results of the study show: (1) An ergonomic PLC trainer kit has been produced for use in PLC practice learning at SMK, which is composed of PLC units and other supporting components; (2) PLC trainer kits have a very good performance as a programmable controller, which is marked by all parts of the trainer kit having 100% functional value; (3) PLC trainer kits are assessed by material experts, media experts, teachers, and students with an average value of 88.63% which is included in the category of very feasible to be used in learning PLC practices in vocational high schools; (4) an interactive e-module containing video has been produced using a smartphone to support the use of PLC trainer kits in learning PLC practice at SMK, which is installed on a smartphone with the name of the Basic PLC Module application; (5) interactive e-module products containing video using smartphones are assessed by material experts, media experts, teachers, and students with an average rating of 81.17% which is included in the feasible category for use in PLC practice learning at SMK.

Kata Kunci: *trainer kit, PLC, ergonomic, e-module, smartphone.*