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ADMINISTRATIVE INFORMATION

Support - No support.

Review Stage at time of this submission - Piloting of the study selection process.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202690041

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 9 September 2026 and was last updated on 9 September 2026.

INTRODUCTION

Review question / Objective (1) What are the components of existing empirically supported digital competency frameworks for university teachers in higher education? (2) What are the longitudinal changes among these frameworks? (3) What are the overall effects of training based on these frameworks? (4) What are the most effective components of these frameworks?

Condition being studied There is no health condition involved in this systematic review and meta-analysis.

METHODS

Participant or population The participants must be university teacher (e.g., professors, lecturers, instructors).

Intervention The interventions that aimed to enhance university teachers' digital/AI competency will be reviewed.

Comparator Not applicable. Currently, the authors do not aim to take comparative interventions into account. Meanwhile, comparison or control groups who did not receive intervention will be included.

Study designs to be included (1) Quantitative observational studies, such as questionnaire-based survey; (2) Intervention studies to promote university teachers' digital/AI competency.

Eligibility criteria (1) Studies that involved competency framework (not individual competencies). (2) The study's participants include university teachers only. (3) Peer-reviewed (4) Journal article (5) Full-text is available. (6) Written in English.

Information sources (1) Electronic databases: Web of Science, Scopus, EBSCOhost, and ProQuest (it might be expanded to other databases during the review process)

(2) Contact with authors: for studies that we have questions with, we will contact with authors

(3) Grey literature: preprint draft before official publication will be searched online, e.g., through Google Scholar.

Main outcome(s) (1) The major digital/AI competency frameworks for university teachers, and their components; (2) The longitudinal changes of these frameworks; (3) The effects of the training based on these frameworks on university teachers; (4) The most effective components of these frameworks.

Quality assessment / Risk of bias analysis Two independent reviewers will assess the quality of primary studies. Any disagreements will be resolved through discussion, or by consulting a third reviewer. Studies with high risk of bias will be explored via sensitivity analysis and excluded from the meta-analysis when needed.

Strategy of data synthesis (1) Systematic review: We will systematically analyses empirical studies regarding digital/AI competency frameworks for university teachers, in terms of the components, structures, and levels.

(2) Meta-analysis: For continuous outcomes, mean differences (MD) or standardized mean differences (SMD) with 95% confidence intervals (CIs) will be calculated. For dichotomous outcomes, odds ratios (OR) will be used. Statistical heterogeneity will be assessed using the Chi-squared test. A random-effects model will be applied if significant heterogeneity is observed ($I^2 > 50\%$); otherwise, a fixed-effects model will be used. R will be used for quantitative data analysis. If meta-analysis is not feasible due to high heterogeneity or insufficient quantitative data, findings will be structured and presented in a narrative format complemented by summary tables.

Subgroup analysis The data will be analyzed for the following subgroups:

(1) Cultural sub-groups, such as universities in European, America, Asia, Africa;

(2) Intervention duration sub-groups, such as one-time intervention (e.g., one single workshop) and weeks-long courses.

Sensitivity analysis Sensitivity analyses will be conducted to assess the robustness of the primary meta-analysis results. Specifically, we will re-run the meta-analysis by (1) excluding studies with a

high risk of bias or low methodological quality, and (2) comparing the pooled effect sizes obtained from the random-effects model versus the fixed-effects model.

Country(ies) involved China.

Keywords Digital competency; AI competency; Framework; University; Teachers.

Contributions of each author

Author 1 - Xiaohua Zhou.

Author 2 - Jieping Shi.