

A Google Classroom-Based Critical Thinking Program for School Administrators in Chaiyaphum Primary Educational Service Area Office 1

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Abstract

This research and development study designed and evaluated a Google Classroom-based program intended to strengthen critical-thinking-oriented learning activity management among doctoral students in educational administration who were also practicing school administrators. The study comprised needs analysis, program design and expert review, pilot testing, and field implementation. The field group consisted of 36 doctoral students. The intervention contained nine sequential modules: prior-experience inquiry, collaborative planning, conceptual understanding, application of critical-thinking principles, workplace practice, supervision and evaluation, feedback and reinforcement, an After Action Review seminar, and reflective professional learning. Instruments included the program and manual, a 60-item achievement test (reliability = .81), performance assessments, an expert evaluation form, and a satisfaction questionnaire. Descriptive statistics, the E1/E2 efficiency indices, an effectiveness index, and paired-samples *t* tests were used. The program achieved E1/E2 efficiency of 97.10/91.76. Mean achievement increased from 35.08 (SD = 4.38) before the program to 55.06 (SD = 1.79) after it, $t(35) = 24.19$, $p < .001$, Cohen's $d_z = 4.03$. The effectiveness index was .8016. The two-week retention mean was 55.75 (SD = 2.38) and did not differ significantly from the posttest, $t(35) = 1.41$, $p = .169$. The findings indicate that a structured blend of online study, guided workplace practice, supervision, feedback, and reflection can support advanced professional learning in educational administration. Because the study used one intact cohort without a control group, causal claims should be interpreted with caution.

Keywords: critical thinking; doctoral education; educational administration; Google Classroom; professional development; learning retention

1. Introduction

Doctoral education in educational administration must connect advanced conceptual learning with the professional judgments required of school leaders. Critical thinking is central to this connection because administrators routinely interpret policy, evaluate evidence, compare alternatives, and justify decisions under conditions of uncertainty. A course that only transmits content is therefore insufficient; doctoral learners need repeated opportunities to inquire, plan, apply ideas in authentic settings, receive feedback, and reflect on consequences.

Blended learning can extend these opportunities beyond scheduled class meetings. In higher education, online platforms support access to resources, asynchronous dialogue, formative feedback, and documentation of learning, while face-to-face and workplace activities provide social interaction and situated practice. The educational value of blended learning depends on instructional design rather than technology alone (Garrison & Kanuka, 2004). For adult and professional learners, relevance, prior experience, self-direction, and immediate application are also important design considerations (Knowles, 1980).

Previous Thai studies have reported promising outcomes from modular learning and Google Classroom in graduate educational-administration programs (Chantarasombat & Rooyuenyong, 2020; Chantarasombat & Sombatsakulkit, 2021). Nevertheless, the available work has often reported program efficiency without clearly integrating the full

learning cycle from prior-experience analysis through workplace practice, supervision, feedback, After Action Review (AAR), and retention assessment. The present study addresses that gap by developing and testing a nine-module program within a doctoral higher-education context.

The study focuses on critical thinking as disciplined analysis, evaluation, inference, explanation, and reflective self-regulation applied to learning-activity management. Creative thinking is treated as a complementary outcome that may occur during design activities, but it is not used interchangeably with the primary construct. Participants were doctoral students in educational administration who concurrently served as school administrators; thus, the unit of learning was higher education and the workplace was the setting for professional application.

1.1 Research Objectives

1. Identify the needs and design requirements for a critical-thinking-oriented learning activity management program.
2. Develop and validate a nine-module Google Classroom-based program and accompanying manual.
3. Evaluate program efficiency, learning achievement, and the effectiveness index after implementation with doctoral students in educational administration.
4. Examine two-week learning retention and participants' reflective professional-learning outcomes.

2. Conceptual Framework and Program Design

The program combined four design principles: adult learning, blended learning, critical-thinking practice, and reflective professional learning. Google Classroom provided the digital environment for resources, assignments, discussion, and feedback. Authentic administrative tasks provided the practice setting. Supervision and peer dialogue supported feedback, while AAR and reflection helped participants examine the reasoning behind their decisions and identify improvements.

Table 1. Structure of the nine-module program

Module	Title	Primary function
1	Prior-experience inquiry	Elicit professional experience, prior conceptions, and learning needs
2	Collaborative planning	Define goals, evidence, responsibilities, and action plans
3	Conceptual understanding	Study critical thinking and learning activity management
4	Application of principles	Analyze cases and adapt concepts to administrative problems
5	Workplace practice	Implement planned learning-management activities in authentic settings
6	Supervision and evaluation	Observe practice and examine evidence of implementation
7	Feedback and reinforcement	Use instructor, peer, and workplace feedback for improvement
8	AAR seminar	Review intended actions, actual results, causes, and lessons learned
9	Reflection and professional learning	Consolidate learning and plan transfer to continuing practice

3. Methodology

3.1 Research Design

A research and development design was implemented in four stages: (1) analysis of the professional-learning context and program requirements; (2) development of the program, manual, instruments, and module sequence; (3) expert review and pilot testing; and (4) implementation and evaluation with the field group. This staged design was used to refine both content and delivery before the full implementation.

3.2 Participants and Setting

The field group comprised 36 doctoral students in educational administration who were practicing school administrators associated with Chaiyaphum Primary Educational Service Area Office 1. They participated during Semester 1 of 2025. This description is used consistently throughout the manuscript: the participants were higher-education doctoral learners, while their school-administrator roles provided the workplace context for application. Separate convenience groups of 3 and 9 administrators who were not members of the field group participated in initial usability trials in Semester 2 of 2024.

3.3 Instruments and Quality Checks

The intervention consisted of the nine-module program, a facilitator manual, Google Classroom learning materials, workplace tasks, feedback activities, and AAR prompts. Five experts reviewed the program for relevance, feasibility, appropriateness, and utility. The pilot produced an efficiency estimate of 83.54/82.65, exceeding the predetermined 80/80 criterion.

Learning achievement was measured with a 60-item, four-option test selected from an initial pool of 70 items. Content alignment was examined by the expert panel. Item difficulty ranged from .40 to .80 and discrimination indices ranged from .20 to .60. Reliability was .81. A separate cohort of 20 doctoral students was used for test tryout; these students were not included in the field group.

Performance during the program was assessed across structured learning and practice tasks with a combined maximum score of 160. A questionnaire and AAR records were used to obtain participants' perceptions and reflective accounts. The satisfaction results were treated descriptively because the original responses showed a ceiling pattern and did not support variability-based inference.

3.4 Procedure

Participants completed the pretest, worked through nine modules in Google Classroom and workplace settings, received supervision and feedback, and completed the posttest. A parallel administration of the achievement test was conducted two weeks later to examine retention. Participation records, performance scores, and AAR reflections were collected throughout the program.

3.5 Data Analysis

Descriptive statistics were calculated for all measures. Program efficiency was expressed as E1 (percentage of the maximum performance score obtained during the program) and E2 (percentage of the maximum posttest score). The effectiveness index was calculated as $(\text{sum of posttest scores} - \text{sum of pretest scores}) / [(\text{N} \times \text{full score}) - \text{sum of pretest scores}]$. Paired-samples *t* tests compared pretest with posttest and posttest with the two-week retention test. Cohen's *d_z* and 95% confidence intervals were reported to improve interpretability. Statistical significance was evaluated at $\alpha = .05$.

4. Results

4.1 Program Efficiency and Effectiveness

Participants obtained 5,593 of 5,760 possible performance points during the program and 1,982 of 2,160 possible posttest points. Accordingly, E1 was 97.10 and E2 was 91.76. Both exceeded the predetermined 80/80 criterion. With a pretest total of 1,263, the effectiveness index was $(1,982 - 1,263) / [(36 \times 60) - 1,263] = .8016$, indicating that participants achieved 80.16% of the maximum possible improvement beyond their baseline scores.

Table 2. Descriptive statistics and program indices

Measure	N	Mean	SD	%	Index
Pretest (60)	36	35.08	4.38	58.47	-
Posttest (60)	36	55.06	1.79	91.76	E2 = 91.76
Two-week retention (60)	36	55.75	2.38	92.92	-
Program performance (160)	36	155.36	1.25	97.10	E1 = 97.10

4.2 Achievement and Retention

The mean posttest score was 19.97 points higher than the pretest score. This difference was statistically significant, $t(35) = 24.19$, $p < .001$, Cohen's $d_z = 4.03$, 95% CI for the mean difference [18.30, 21.65]. The two-week retention mean was 0.69 points higher than the immediate posttest; the difference was not statistically significant, $t(35) = 1.41$, $p = .169$, Cohen's $d_z = 0.23$, 95% CI [-0.31, 1.70]. The absence of a significant decline supports short-term retention, although it should not be interpreted as evidence of long-term transfer.

Table 3. Paired-samples comparisons

Comparison	Mean diff.	t	df	p	d _z	Result
Posttest - pretest	19.97	24.19	35	< .001	4.03	Significant increase
Retention posttest	- 0.69	1.41	35	.169	0.23	No significant change

4.3 Reflective Professional Learning Outcomes

AAR records indicated recurring development in four areas: using Google Classroom for self-directed learning, communicating analyses through presentations, engaging in critique and knowledge exchange, and seeking and synthesizing evidence for administrative decisions. These records were used as descriptive evidence of participants' experience; no frequency-based generalization was made because the reflections were not collected as a standardized outcome scale.

5. Discussion

The substantial pretest-posttest increase, high efficiency indices, and stable two-week scores provide convergent evidence that participants learned the intended content and retained it over the short follow-up period. The nine-module sequence may have supported this outcome by linking conceptual study to planning, authentic practice, supervision, feedback, and reflection rather than treating online learning as content delivery alone.

The higher-education relevance of the study lies in its participants and learning environment. The intervention was embedded in doctoral professional education, and the participants' school leadership roles functioned as sites for application. This relationship between university learning and professional practice responds directly to the need for doctoral programs to develop evidence-informed judgment and transferable leadership capabilities.

The results are consistent with the view that blended learning can create an integrated environment for interaction, reflection, and application (Garrison & Kanuka, 2004). They also extend previous modular-learning studies in Thai graduate educational administration by making the feedback and AAR cycle explicit and by including a delayed retention measure (Chantarasombat & Rooyuenyong, 2020; Chantarasombat & Sombatsakulkit, 2021).

The effect size was very large, but it should be interpreted in light of the one-group design, the participants' professional motivation, and possible alignment between instruction and the achievement test. The high E1 score and narrow dispersion may also reflect structured performance criteria. These results establish feasibility and preliminary effectiveness, not comparative superiority over another approach.

6. Conclusion and Recommendations

The study developed a coherent nine-module Google Classroom-based program for doctoral students in educational administration who were practicing school administrators. The revised evidence shows high program efficiency, a statistically significant improvement in achievement, an effectiveness index of .8016, and no significant decrease at the two-week follow-up. The program offers a practical model for connecting higher-education coursework with professional application through supervision, feedback, AAR, and reflection.

Future research should use comparison groups, multi-site samples, longer follow-up periods, and independent measures of workplace transfer. Researchers should also refine the satisfaction scale to reduce ceiling effects and separately measure critical thinking, creative production, and leadership practice rather than combining these constructs.

Limitations

The study used one intact cohort and did not randomly assign participants or include a control group. Participants were doctoral students from one professional context. The retention period was limited to two weeks, and some outcomes were self-reported or assessed with program-aligned tasks. The satisfaction distribution displayed a ceiling pattern. These limitations constrain causal inference and generalizability.

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Declarations

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