How Generative Artificial Intelligence Influences Teaching Performance through Digital Work Reshaping in Higher Education

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Abstract: *The study investigates how generative artificial intelligence (GAI) affects teaching performance in higher education through the mechanism of digital work reshaping. Using survey data from 112 faculty members, the analysis shows that AI usage improves teaching performance both directly and indirectly by restructuring teaching processes. The results highlight the importance of workflow redesign in maximizing the benefits of AI enabled teaching support and offer implications for institutional digital governance and work design in academic environments.*

Keywords: Generative Artificial Intelligence, Teaching Performance, Higher Education, Digital Work Reshaping, AI Integration

1. Introduction

Generative artificial intelligence has moved from the margins of academic experimentation to the center of everyday teaching practice (Akanzire et al., 2025). Systems such as ChatGPT, DeepSeek, and Gemini are increasingly integrated into university teaching practices. Faculty members use these tools to develop lecture outlines, design assessments, create instructional examples, and prepare formative feedback. Unlike earlier educational technologies that primarily facilitated communication or information storage, GAI tools are capable of producing structured text and content that approximate human drafts (Ortega-Ochoa et al., 2024). This capability alters not only the efficiency of work but also the organization of teaching labor.

Despite the speed of technological diffusion, scholarly discussion has predominantly addressed student learning, ethical concerns, and determinants of adoption. Far less attention has been paid to how GAI affects teachers' performance and to the mechanisms through which such effects occur. Teaching performance remains central to academic promotion systems, institutional evaluation frameworks, and professional identity formation. Understanding whether AI enhances or merely complicates teaching work is therefore essential.

This study argues that GAI does not automatically improve teaching performance. Rather, performance gains depend on whether AI integration reshapes teaching workflows. Drawing on work design theory and digital transformation perspectives, we introduce digital work reshaping as a mediating mechanism linking AI usage to teaching performance.

2. Theoretical Background and Hypothesis Development

2.1 GAI and Teaching Performance

GAI refers to Artificial Intelligence (AI) systems capable of producing original textual, visual, or multimodal content through large-scale deep learning architectures. In higher education contexts, GAI is widely applied in lesson preparation, assessment design, student feedback generation, research support, and administrative assistance. In this study, GAI usage is defined as the extent to which university teachers integrate AI tools into instructional preparation, classroom delivery, student feedback, and pedagogical innovation activities. GAI enhances teaching efficiency, reduces routine workload, and facilitates instructional creativity. Therefore, it is expected to improve teaching performance.

In educational psychology, teaching performance has traditionally been conceptualized in terms of teacher effectiveness, instructional quality, and student achievement (Aliazas et al., 2025). Organizational research conceptualizes performance as behavioral effectiveness in fulfilling role requirements. Within higher education, teaching performance encompasses instructional clarity, student engagement, responsiveness, innovation, and institutional evaluation outcomes. Teaching is cognitively demanding work. It requires planning, adapting explanations, constructing assessments aligned with learning objectives, and providing timely feedback. A significant portion of teaching labor is invisible to students: preparation and revision activities often exceed classroom time. If GAI reduces the time required for routine drafting and provides alternative instructional examples, teachers may reallocate effort toward higher-order tasks such as refining conceptual alignment, anticipating student misconceptions, and designing interactive activities. These changes could improve performance in terms of innovation, engagement, and responsiveness. Thus, GAI

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usage should show a positive association with teaching performance.

H1: GAI usage is positively associated with teaching performance.

2.2 Digital Work Reshaping: A Mediating Variable

Work design theory (Parker et al., 2017) argues that performance depends on task characteristics, autonomy, feedback, and skill utilization. More recent research on job crafting (Li et al., 2026) highlights that individuals proactively reshape tasks and boundaries to optimize work outcomes. Digital transformation literature extends this perspective by suggesting that technologies create value when they restructure processes rather than merely automate isolated tasks.

Digital work reshaping in this study refers to the structural reconfiguration of teaching tasks, workflows, and cognitive allocation resulting from AI integration. It includes several dimensions: First, task reorganization. Teachers may reorganize preparation routines into iterative cycles involving AI drafting and human refinement. Second, cognitive redistribution. Routine language production may be partially delegated to AI, freeing cognitive resources for analytical or pedagogical reasoning. Third, workflow digitization. Teaching preparation may become more modular, flexible, and adaptive. Fourth, interaction restructuring. AI-generated drafts may enable faster feedback loops with students. These elements reflect structural transformation rather than simple efficiency gains.

GAI usage is likely to promote digital work reshaping because repeated integration into tasks gradually alters routines. Behavioral repetition stabilizes into new workflow patterns. From a cognitive load perspective, delegating routine drafting to AI reduces extraneous cognitive burden. Teachers can focus on instructional coherence and student adaptation. From a resource allocation perspective, time saved in routine tasks may be reinvested in creative pedagogical design. From a motivation perspective, redesigned workflows may enhance perceived autonomy and mastery, which are associated with performance improvement. Furthermore, reshaped workflows may enhance responsiveness. AI-assisted drafting can reduce feedback turnaround time, which is closely linked to student engagement and satisfaction. If GAI improves teaching performance partly because it alters workflow structures and cognitive allocation, digital work reshaping functions as a mediating mechanism.

H2: Digital work reshaping mediates the relationship between GAI usage and teaching performance.

3. Methodology

3.1 Research Design

The purpose of this study is to examine the mechanism through which GAI usage influences teaching performance. Given the behavioral and perceptual nature of the focal constructs, a quantitative survey design was adopted. The analytical approach relied on SPSS-based statistical procedures, including reliability testing, exploratory factor analysis, hierarchical regression, and mediation testing using Hayes' PROCESS macro.

3.2 Sample and Data Collection

Data were collected via Wenjuan Xing, a widely used online survey platform in China. The questionnaire was distributed to university faculty members across multiple provinces. The target population consisted of full-time university teachers engaged in undergraduate or graduate instruction. The survey was disseminated via professional academic networks, institutional mailing lists, and peer referral channels.

A total of 128 responses were initially obtained. Data cleaning procedures were implemented to ensure quality. After cleaning, the final sample consisted of 112 valid responses. Among respondents, 44.7% were female and 55.3% male. Average teaching experience was 3.8 years. Academic rank distribution included lecturers (58%), associate professors (30%), and full professors (12%). Disciplines included Engineering (38%), science (34%), and liberal arts (28%).

3.3 Measurement

All constructs were measured using five-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). Scale items were adapted from validated instruments in prior research and adjusted to the higher education context.

1) GAI Usage
GAI usage was operationalized based on behavioral usage scales developed in information systems research (Granström & Oppi, 2025). The scale captures the extent to which teachers integrate AI into teaching-related tasks. Six items assessed integration into lesson preparation, content design, feedback drafting, assessment development, instructional innovation, and integration into workflow processes.

2) Digital Work Reshaping
Digital work reshaping was adapted from job crafting (F. Zhang et al., 2024). Items were modified to capture technology-enabled restructuring of teaching tasks, cognitive reallocation, and workflow transformation. Seven items measured task reorganization, workflow digitization, time reallocation, cognitive augmentation, flexibility, reduction of repetitive workload, and overall process change.

3) Teaching Performance
Teaching performance was adapted from teacher effectiveness and performance research (Granström & Oppi, 2025). Seven items captured perceived improvement in instructional effectiveness, student engagement, innovation, responsiveness, recognition, and meeting institutional standards.

4. Results

4.1 Descriptive Statistics and Correlations

1) Reliability and Construct Validity
Internal consistency reliability was assessed using

Cronbach's alpha. All constructs exceeded the recommended threshold of 0.70. Specifically, Cronbach's alpha values were 0.907 for GAI usage, 0.894 for digital work reshaping, 0.931 for teaching performance.

Construct validity was examined through exploratory factor analysis (EFA) using principal component extraction with varimax rotation. The Kaiser–Meyer–Olkin (KMO) measure was 0.911, indicating excellent sampling adequacy. Bartlett's test of sphericity was significant ($\chi^2 = 1413.65$, df = 190, p < 0.001), confirming that the correlation matrix was appropriate for factor analysis. Principal component analysis identified three factors with eigenvalues greater than 1. The rotated factor matrix demonstrated a clear three-factor structure aligned with the theoretical constructs of GAI usage, digital work reshaping, and teaching performance. All items exhibited strong loadings on their intended factors, with primary loadings above 0.60. Cross-loadings on non-target factors were generally below 0.40, supporting satisfactory discriminant validity. Overall, the factor structure was consistent with the proposed conceptual framework.

2) Common Method Bias Assessment

Harman's single-factor test was conducted. The first unrotated factor accounted for 39.26% of the variance, below the commonly cited threshold of 50%, suggesting CMV was unlikely to be a severe concern.

4.2 Hierarchical Regression Analysis

Hierarchical regression analysis was conducted to test direct effects. When predicting teaching performance, control variables (gender, teaching experience, academic rank, discipline type) were entered in Step 1. GAI usage was entered in Step 2. Digital work reshaping was entered in Step 3. Variance inflation factors (VIFs) were below 3.0, indicating no serious multicollinearity concerns. In predicting teaching performance, GAI usage was entered as the predictor variable. The regression model was statistically significant, explaining 9.4% of the variance in teaching performance ($R^2 = 0.094$, $F_{(1,110)} = 11.51$, p = 0.001). GAI usage had a significant positive effect on teaching performance ($\beta = 0.307$, t = 3.39, p = 0.001), providing support for H1.

4.3 Mediation Analysis

Bootstrapping with 5,000 resamples was conducted to generate bias-corrected confidence intervals for the indirect effect. Pearson correlation analysis showed that GAI usage was positively correlated with digital work reshaping (r = 0.483, p < 0.001) and teaching performance (r = 0.307, p = 0.001). Digital work reshaping was also positively correlated with teaching performance (r = 0.356, p < 0.001).

PROCESS Model 4 further indicated a significant indirect effect of GAI usage on teaching performance through digital work reshaping. The indirect effect was 0.137, and the bootstrapped 95% confidence interval was [0.047, 0.237]. Because the confidence interval did not include zero, H2 was supported.

5. Discussion

This study examined how generative artificial intelligence usage influences teaching performance and identified digital work reshaping as a key explanatory mechanism. The results indicate that GAI improves teaching performance not merely through efficiency gains but primarily through restructuring teaching workflows. When teachers embed GAI into preparation routines, feedback processes, and instructional design, they appear better able to focus on higher priority pedagogical activities, thereby enhancing effectiveness and innovation. Overall, the findings suggest that GAI's impact on teaching performance is structural and contextual rather than automatic, reinforcing the view that technology creates value when embedded in redesigned work processes under supportive conditions.

6. Conclusion

This study demonstrates that generative artificial intelligence enhances teaching performance primarily by reshaping digital workflows in higher education. The findings show that AI supported restructuring of teaching tasks enables faculty to concentrate on higher priority instructional activities. Institutions seeking to benefit from AI integration should therefore prioritize workflow redesign and provide support for sustainable digital transformation.

Disclosure Statement

The authors report no conflicts of interest.

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