

The pedagogical social contract in the AI ERA: Explicit usage guidelines as instructional anchors for student course satisfaction

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Abstract: The increasing use of generative AI in higher education has raised concerns about how instructional guidance shapes students' learning experiences. While AI tools are becoming widely accessible, uncertainty regarding acceptable use may influence satisfaction, learning anxiety, and trust. This study examined the effects of explicit generative AI usage guidelines in undergraduate general education courses using a quasi-experimental design. Students were divided into an experimental group (n = 150) that received explicit AI usage guidelines and a comparison group (n = 147) that did not. Independent-samples t-tests revealed statistically significant differences across all measured variables. Students in the experimental group reported significantly higher overall course satisfaction (t = 5.34, p < .001), greater course understanding (t = 5.21, p < .001), and higher instructor trust (t = 5.67, p < .001). Furthermore, they experienced significantly lower perceived assignment burden (t = -4.32, p < .001) and learning anxiety (t = -4.11, p < .001). These findings indicate that the educational impact of generative AI depends less on technology availability than on pedagogical framing. Explicit guidelines serve as instructional anchors that support clarity, trust, and psychological stability in higher education.

Keywords: Course satisfaction, Explicit usage guidelines, Generative AI, Higher education.

1. Introduction

The rapid diffusion of generative artificial intelligence (AI) has reshaped teaching and learning practices in higher education, extending beyond technical innovation to influence the cultural norms of academic work [1]. Generative AI tools now actively participate in processes such as idea generation, text production, and feedback, thereby altering conventional understandings of authorship, originality, and learning effort. As these tools become increasingly embedded in everyday academic activities, universities are confronted with the challenge of redefining acceptable academic practices within AI-augmented learning environments [2].

Despite the growing presence of generative AI, pedagogical and institutional responses have developed unevenly. In many courses, explicit guidance regarding permissible and appropriate AI use remains absent or ambiguous. This gap has produced what may be described as a pedagogical vacuum, in which students are required to interpret academic norms independently under conditions of uncertainty. Rather than supporting learning, such ambiguity can destabilize classroom practices and complicate the relationship between instructional intent and student behavior. Consequently, the educational implications of generative AI depend less on the technology itself than on how its use is pedagogically framed and communicated within course design.

The lack of explicit generative AI usage guidelines has implications that extend beyond issues of academic integrity, affecting students' psychological experiences and perceptions of fairness. When expectations regarding AI use are unclear or inconsistently applied across courses, students may experience heightened learning anxiety and uncertainty about evaluation standards. This evaluative

ambiguity places an additional cognitive burden on learners, who must continuously negotiate the boundaries of acceptable practice rather than focusing on disciplinary learning tasks.

Conversely, clearly articulated AI usage guidelines can function as stabilizing instructional elements. By specifying the scope and purpose of acceptable AI use, such guidelines reduce uncertainty and support students' self-regulated learning. From this perspective, AI guidelines operate not merely as regulatory constraints but as forms of pedagogical governance that clarify expectations and enhance transparency. They also contribute to relational trust by signaling that instructors acknowledge the realities of AI use while maintaining consistent evaluative standards.

Although recent scholarship has examined ethical concerns and learning outcomes associated with generative AI, empirical research on the instructional role of course-level AI guidelines remains limited. In particular, there is a lack of evidence regarding how explicit AI usage guidelines influence students' overall course satisfaction and related dimensions such as understanding, learning anxiety, and trust in instructors. Addressing this gap is essential for informing pedagogically grounded approaches to AI integration in higher education.

Recent studies have reported that students' perceptions of generative AI in higher education are characterized by both optimism and uncertainty, particularly in relation to acceptable academic use and evaluation standards [3].

This study aims to examine the educational effects of explicit generative artificial intelligence (AI) usage guidelines on students' learning experiences in general education courses. Rather than focusing on AI technologies themselves, the study emphasizes how the pedagogical framing of AI use shapes students' perceptions of learning, evaluation, and instructional clarity.

To achieve this purpose, the study addresses the following research questions:

RQ1. Are there significant differences in overall course satisfaction between students who receive explicit AI usage guidelines and those who do not?

RQ2. Are there significant differences in key dimensions of the learning experience, including course understanding, perceived assignment burden, learning anxiety, and instructor trust, between the two groups?

2. Theoretical Background and Related Studies

2.1. Generative AI and the Reconfiguration of Academic Praxis

The emergence of generative artificial intelligence (AI) represents a qualitative shift from previous educational technologies, as it directly intervenes in cognitive labor and the cultural production of academic work. Unlike traditional digital tools that primarily support information retrieval or task efficiency, generative AI actively participates in idea generation, text construction, and feedback processes. This participation alters established assumptions regarding authorship, originality, and the distribution of learning effort within higher education [4].

As generative AI becomes increasingly embedded in everyday academic practices, universities are compelled to reconsider how acceptable academic behavior is defined and communicated. In this context, AI should not be understood merely as an external technological aid but as an integral component of contemporary learning environments [5]. The educational impact of generative AI, therefore, depends not solely on its functional capabilities but on the pedagogical frameworks through which its use is legitimized and regulated.

Recent reviews further suggest that the educational implications of generative AI extend beyond technical affordances to include shifts in instructional roles, relational trust, and students' perceptions of academic responsibility [6].

2.2. AI Usage Guidelines and the Stabilization of Learning Cultures

In response to growing uncertainty surrounding the educational use of generative artificial intelligence (AI), the articulation of explicit usage guidelines has emerged as a critical pedagogical issue in higher education [7]. As generative AI tools increasingly influence core academic practices such as

writing, problem-solving, and assessment preparation, students are often required to navigate unclear boundaries regarding acceptable use. In the absence of explicit instructional guidance, this ambiguity can undermine learning stability and increase cognitive and emotional strain [8].

Recent studies have emphasized that generative AI, when introduced without clear pedagogical framing, may intensify uncertainty, ethical anxiety, and concerns about fairness among learners [9, 10]. Students may struggle to determine whether and how AI tools can be legitimately integrated into their learning processes, leading to inconsistent interpretations of academic expectations across courses. Such conditions place additional responsibility on learners to infer evaluative norms independently, which can detract from their engagement with disciplinary content.

From the perspective of the Technology Acceptance Model, perceived usefulness and ease of use are shaped not only by the technical features of a system but also by the clarity of institutional and instructional support surrounding its use [11, 12]. Similarly, theories of uncertainty reduction suggest that clearly articulated norms and expectations function as stabilizing mechanisms in unfamiliar or evolving environments [13]. Within AI-integrated classrooms, explicit usage guidelines can therefore be understood as instructional tools that reduce ambiguity and support predictable learning conditions.

Taken together, these perspectives suggest that AI usage guidelines should not be viewed solely as regulatory constraints but as pedagogical resources that structure learning cultures. By clarifying the scope and purpose of acceptable AI use, such guidelines contribute to instructional coherence and help transform generative AI from a source of uncertainty into a governed component of the learning environment. From this perspective, differences in the presence or absence of explicit AI usage guidelines are expected to manifest as measurable differences in students' perceptions of satisfaction, anxiety, and trust, providing a conceptual basis for the comparative research design adopted in this study.

2.3. Course Satisfaction as a Multidimensional Construct of Academic Well-Being

Course satisfaction in higher education is widely recognized as a multidimensional construct that reflects students' cognitive, emotional, and relational integration into the academic environment. It encompasses not only perceived learning outcomes but also clarity of expectations, fairness of assessment, and the quality of instructor–student relationships. Within AI-augmented classrooms, course satisfaction is increasingly influenced by how institutions and instructors manage uncertainty associated with emerging technologies.

Previous research suggests that evaluative ambiguity, particularly in contexts of rapid technological change, is a primary contributor to learning anxiety and institutional distrust. From the perspective of Uncertainty Reduction Theory, clearly articulated instructional norms function as stabilizing mechanisms that reduce cognitive and emotional strain. In this sense, AI usage guidelines can transform AI from an unpredictable risk into a governed pedagogical tool.

Accordingly, examining course satisfaction and its related dimensions in this study provides an empirical lens for understanding how transparent AI usage guidelines contribute to academic well-being and instructional coherence. This framework supports the analysis of group-level differences in learning experiences associated with the presence or absence of explicit AI guidance.

3. Research Methods

3.1. Research Design and Participants

This study employed a comparative research design to examine differences in students' learning experiences based on the presence or absence of explicit generative artificial intelligence (AI) usage guidelines. This design directly addresses RQ1 and RQ2, focusing on identifying group-level differences in overall course satisfaction and its subdimensions.

The research was conducted during the 2024 academic year at a large private university in South Korea (hereafter referred to as “University A”). Participants were recruited from general education courses in which the use of generative AI tools was relevant but not institutionally standardized. A total

of 297 undergraduate students participated in the study. The experimental group ($n = 150$) consisted of students enrolled in course sections where instructors provided explicit AI usage guidelines at the beginning of the semester. The comparison group ($n = 147$) included students in sections of the same course where no formal guidance regarding AI use was provided.

This group-based comparison enabled an examination of whether explicit instructional framing of AI use was associated with differences in students' perceptions of satisfaction, clarity, and psychological comfort within AI-integrated learning environments.

3.2. Instrument Design and Measures

To address RQ1 and RQ2, a structured questionnaire was developed to measure overall course satisfaction and key dimensions of the learning experience. The instrument consisted of 20 items rated on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) and included the following constructs:

Course Satisfaction (overall): students' global evaluation of their learning experience in the course

Course Understanding: perceived clarity of academic expectations and learning objectives

Assignment Burden: perceived workload and effort associated with course tasks

Learning Anxiety: emotional discomfort and uncertainty related to evaluation and academic practices

Instructor Trust: perceived fairness, transparency, and consistency of instructional decisions

The selection of these constructs reflects the conceptual focus of this study on instructional clarity, psychological stability, and relational trust in AI-augmented classrooms. Internal consistency was verified using Cronbach's alpha coefficients, all of which exceeded the acceptable threshold, indicating satisfactory reliability.

To examine group differences related to RQ1 and RQ2, independent-samples t-tests were conducted using SPSS 26.0. This analytical approach enabled direct comparison between students exposed to explicit AI usage guidelines and those without such guidance.

3.3. Data Collection and Analysis

Data collection was performed at the conclusion of the semester to ensure students had fully experienced the impact of the guidelines (or their absence). For quantitative analysis, independent-samples t-tests were conducted using SPSS 26.0 to compare the mean scores of the two groups. This statistical approach was chosen to verify whether the structural presence of a "Pedagogical Social Contract" (the guidelines) led to a significant shift in the cultural and psychological climate of the classroom.

4. Results

4.1. Preliminary Analysis: Verification of Baseline Homogeneity

Prior to examining the effects of explicit generative artificial intelligence (AI) usage guidelines, an independent-samples t-test was conducted to verify baseline homogeneity between the experimental and comparison groups. The analysis indicated no statistically significant differences between the two groups in terms of prior perceptions of generative AI use, general course attitudes, or initial levels of learning anxiety (all $p > .05$). These results confirm that the two groups were comparable at baseline, supporting the validity of attributing subsequent differences in learning experiences to the presence or absence of explicit AI usage guidelines, as shown in Table 1.

Table 1.
Homogeneity Test of Baseline Variables between Groups.

Variable	Group	N	Mean (M)	SD	t	p
Prior Perception of Gen-AI Use	Experimental	150	3.42	0.51	0.48	0.632
	Comparison	147	3.39	0.64		
General Course Attitude	Experimental	150	3.58	0.57	-0.73	0.466
	Comparison	147	3.62	0.55		
Initial Learning Anxiety	Experimental	150	3.11	0.69	0.29	0.772
	Comparison	147	3.09	0.71		

4.2. Reliability Analysis of the Measurement Instrument

The internal consistency of the survey instrument was assessed using Cronbach's alpha coefficients. As shown in Table 2, the reliability coefficients for overall course satisfaction and its subdimensions ranged from .81 to .91, exceeding commonly accepted thresholds for acceptable reliability.

These results indicate that the measurement instrument demonstrated satisfactory internal consistency, supporting the reliability of subsequent analyses.

Table 2.
Reliability Analysis of Survey Constructs.

Variable	Number of Items	Cronbach's α
Course Satisfaction (Total)	12	0.91
Course Understanding	3	0.84
Assignment Burden	3	0.81
Learning Anxiety	3	0.86
Instructor Trust	3	0.88

4.3. Reliability Analysis of the Measurement Instrument

To provide an initial overview of group-level patterns before inferential testing, descriptive statistics were calculated to examine students' learning experiences according to the provision of explicit AI usage guidelines.

As presented in Table 3, the experimental group reported higher mean scores in overall course satisfaction, course understanding, and instructor trust compared to the comparison group. Conversely, students who received explicit AI guidance reported lower mean scores in perceived assignment burden and learning anxiety.

These descriptive patterns suggest systematic differences in learning experiences associated with the presence of explicit instructional framing, which were subsequently examined through inferential statistical analyses.

Table 3.
Descriptive Statistics of Key Variables by Group.

Variable	Group	N	Mean (M)	SD
Course Satisfaction	Experimental	150	4.12	0.53
	Comparison	147	3.78	0.58
Course Understanding	Experimental	150	4.18	0.51
	Comparison	147	3.85	0.56
Assignment Burden	Experimental	150	2.71	0.64
	Comparison	147	3.05	0.67
Learning Anxiety	Experimental	150	2.68	0.62
	Comparison	147	3.01	0.66
Instructor Trust	Experimental	150	4.25	0.49
	Comparison	147	3.89	0.54

4.4. Inferential Analysis: Group Differences by Research Questions

Addressing RQ1 and RQ2, independent-samples t-tests examined group differences in overall course satisfaction and subdimensions. Results showed a significant difference in overall satisfaction, with the experimental group reporting higher satisfaction than the comparison group ($t = 5.34$, $p < .001$).

Statistically significant differences were also observed across all measured subdimensions. Students in the experimental group reported significantly higher levels of course understanding ($t = 5.21$, $p < .001$) and instructor trust ($t = 5.67$, $p < .001$), as well as significantly lower perceived assignment burden ($t = -4.32$, $p < .001$) and learning anxiety ($t = -4.11$, $p < .001$).

These results indicate consistent group-level differences associated with the presence of explicit AI usage guidelines. Detailed statistical outcomes are presented in Table 4.

Table 4.
Independent Samples T-test Results for Course Satisfaction and Sub-factors.

Variable	Group	N	M	SD	t	p
Course Satisfaction (Total)	Experimental	150	4.12	0.53	5.34	<0.001***
	Comparison	147	3.78	0.58		
Course Understanding	Experimental	150	4.18	0.51	5.21	<0.001***
	Comparison	147	3.85	0.56		
Assignment Burden	Experimental	150	2.71	0.64	-4.32	<0.001***
	Comparison	147	3.05	0.67		
Learning Anxiety	Experimental	150	2.68	0.62	-4.11	<0.001***
	Comparison	147	3.01	0.66		
Instructor Trust	Experimental	150	4.25	0.49	5.67	<0.001***
	Comparison	147	3.89	0.54		

Note: ** $p < 0.001$.

4.5. Summary of Results

In summary, the results demonstrate that students who received explicit generative AI usage guidelines consistently reported more positive learning experiences across all measured variables. These findings provide empirical evidence of group-level differences associated with the presence of explicit instructional framing of AI use, forming the basis for the interpretive discussion presented in the following section.

5. Discussion

This study examined whether explicit generative artificial intelligence (AI) usage guidelines function as instructional design elements that shape students' learning experiences in general education courses. The discussion interprets the findings in relation to the three research questions, focusing on overall course satisfaction (RQ1) and multidimensional learning experiences (RQ2).

5.1. Addressing RQ1: Overall Course Satisfaction

With respect to RQ1, the findings indicate that students who received explicit AI usage guidelines reported significantly higher overall course satisfaction than those who did not. This result suggests that satisfaction in AI-integrated courses is influenced not only by the availability of AI tools but also by the clarity with which expectations regarding their use are communicated. When instructional norms surrounding AI use are explicit, students appear better able to understand course requirements and evaluate their learning experiences more positively. This finding supports the view that the educational impact of generative AI depends less on the technology itself than on how its use is pedagogically framed within course design.

5.2. Addressing RQ2: Cognitive, Emotional, and Relational Dimensions

Regarding RQ2, the results demonstrate that explicit AI usage guidelines are associated with improvements across multiple dimensions of the learning experience. Students in the experimental group reported higher levels of course understanding and instructor trust, alongside lower perceived assignment burden and learning anxiety.

This pattern suggests that, in AI-integrated classrooms, clear guidance helps reduce uncertainty related to acceptable academic practices and evaluation standards. Prior research similarly indicates that ambiguity surrounding AI use can heighten anxiety, whereas explicit guidance can stabilize students' learning experiences by clarifying expectations [9, 10].

From an instructional perspective, these findings imply that transparent AI usage guidelines can support not only cognitive clarity but also emotional comfort and relational confidence within the classroom.

5.3. Integrative Interpretation: Trust and Instructional Framing

Beyond the individual outcome measures examined in RQ1 and RQ2, the findings collectively highlight the importance of instructional framing in AI-integrated learning environments.

The consistent pattern of higher satisfaction, greater clarity, reduced anxiety, and increased instructor trust suggests that students respond not only to the availability of generative AI tools but also to how their use is framed and legitimized within the course.

In particular, explicit AI usage guidelines appear to function as signals of fairness and instructional accountability. When expectations regarding AI use are clearly articulated, students are less likely to perceive evaluation practices as ambiguous or arbitrary.

This interpretive process helps explain why explicit guidance is associated with stronger relational trust and greater psychological stability in learning experiences.

This integrative interpretation aligns with recent discussions emphasizing that pedagogically grounded guidance, rather than purely restrictive or prohibitive approaches, is central to sustaining trust and engagement in AI-augmented classrooms.

From this perspective, AI usage guidelines can be understood as instructional resources that support shared understandings between instructors and students, contributing to coherent and predictable learning environments.

6. Conclusion and Implications

This study investigated whether the explicit articulation of generative artificial intelligence (AI) usage guidelines is associated with differences in students' learning experiences in general education courses.

The findings indicate that course satisfaction in AI-integrated learning environments is shaped not simply by the presence of AI technologies, but by the clarity with which expectations regarding their use are pedagogically communicated.

When instructional norms surrounding AI use are explicit, students appear better able to engage with course requirements and evaluate their learning experiences more positively.

With respect to overall outcomes, students who received explicit AI usage guidelines reported higher course satisfaction and more favorable learning experiences across multiple dimensions. Clear guidance was associated with greater course understanding and instructor trust, alongside lower perceived assignment burden and reduced learning anxiety.

These results suggest that explicit instructional framing plays a stabilizing role by reducing evaluative ambiguity and supporting students' cognitive and emotional comfort.

Taken together, the findings underscore the importance of viewing AI usage guidelines as instructional design elements rather than solely as regulatory instruments. At the course level, integrating explicit guidance into instructional practice may help establish shared expectations, strengthen relational trust, and foster psychologically stable learning environments.

At the institutional level, the results suggest that universities should move beyond binary permission–prohibition approaches and instead develop pedagogically grounded frameworks that support learning while maintaining academic standards. By positioning AI usage guidelines as instructional resources, higher education institutions can better align technological innovation with educational goals.

Although this study was conducted within a single institutional context in South Korea, the findings are not necessarily limited to this setting. Because the central focus of the study concerns instructional clarity and the pedagogical framing of generative AI use, the implications may be relevant to higher education contexts internationally where similar uncertainties regarding AI-integrated learning environments are emerging.

Institutional Review Board Statement;

This study was conducted in accordance with the ethical standards of the institutional research committee. Participation was entirely voluntary, and informed consent was obtained from all students involved in the study. To ensure confidentiality, no personally identifiable information was collected, and the data were used strictly for research purposes.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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