ISSN: 2473-4901
v12 n6726

AI Reshapes Information Systems Analysis and Design Curriculum: A Case Study of Pedagogical Practice

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Abstract

Artificial intelligence (AI) is changing how information systems are analyzed, designed, documented, prototyped, and implemented. These changes are especially consequential for Information Systems Analysis and Design (ISAD) courses, which have traditionally emphasized requirement discovery, process analysis, data modeling, interface design, and client communication, but often face practical constraints when students attempt to convert analysis artifacts into working prototypes. This paper reports a case study of an AI-integrated ISAD course redesign implemented at a Midwestern public university in Fall 2025. The redesign combined project-based learning, a flipped classroom structure, scaffolded AI workshops, and human-in-the-loop verification across the system development life cycle (SDLC). Results indicate that AI was perceived as most useful in feasibility analysis, project goal and scope definition, requirements engineering, user interface design, use case development, and prototyping. Survey data suggest strong student satisfaction, frequent AI use, and moderate-to-strong agreement that AI improved understanding, efficiency, and design quality. At the same time, students reported challenges related to hallucinations, prompt formulation, responsible use, and overreliance. Drawing selectively on evidence from a companion prototyping study, this paper argues that AI can enrich ISAD pedagogy when it is embedded in a guided instructional design that emphasizes verification, reflection, and collaboration rather than automation alone. The paper concludes with practical recommendations for integrating AI into IS curricula without weakening analytical rigor, creativity, or ethical judgment.

Keywords: artificial intelligence, Information Systems Analysis and Design, ISAD, systems development life cycle, project-based learning, prototyping

ISSN: 2473-4901
v12 n6726

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1. INTRODUCTION

Artificial intelligence (AI) is no longer an external topic that information systems (IS) programs can treat as optional enrichment (Van Slyke et al., 2023). It is now directly affecting professional practice. As organizations adopt AI-enabled tools in everyday work, faculty in IS education face a dual challenge. They must prepare students to use AI effectively while also ensuring that AI use does not weaken the core modes of thinking central to systems analysis and design, including requirements reasoning, critical evaluation, stakeholder communication, and design judgment (Becker et al., 2023). This tension is especially visible in Information Systems Analysis and Design (ISAD), a core course of the IS program that often emphasizes modeling and communication rather than full-scale programming. However, students and clients often benefit from seeing ideas translated into a working artifact, even when the artifact is only a prototype (Zhao & Tu, 2026). Working prototypes help students experience iterative design, reveal hidden assumptions in requirements, and provide clients with something concrete to evaluate. Many ISAD students do not have sufficient programming experience to build prototypes efficiently, particularly within the time constraints of a single semester. Generative AI changes this instructional equation (Messina & Panciroli, 2025; North & Riskas, 2025). When used appropriately, AI tools may lower technical barriers and allow students to focus more directly on analysis, design logic, and client communication. When used poorly, however, the same tools may encourage shallow thinking. They may also lead students to accept inaccurate outputs uncritically or place too much confidence in polished but flawed artifacts. Thus, the key educational question is not whether students should encounter AI in ISAD, but how the course should be designed so that AI supports disciplined systems thinking rather than replacing it.

This paper presents a case study of an AI integrated redesign of an ISAD course at a Midwestern public university. The redesign was motivated by a practical and curricular need: to show how AI can be used across multiple phases of the system development life cycle (SDLC), not only for coding, while preserving the analytical orientation of the course. The course combined three instructional approaches. First, it used project-based learning centered on a real client-sponsored information system problem. Second, it adopted a flipped classroom structure in which core concepts were introduced by the instructor and extended through guided in-class application. Third, it embedded AI-assisted activities throughout the semester, supported by verification, peer review, instructor feedback, and client evaluation. The pedagogical aim was to help students learn not merely to prompt AI, but to evaluate, refine, and justify AI-assisted analysis and design outputs.

Three contributions are expected from this work. First, it documents a course level pedagogical design for integrating AI across the ISAD curriculum rather than treating AI as an isolated module or a coding assistant. Second, it provides empirical evidence from student use patterns, client evaluation, and course-end perceptions that help clarify where AI added value and where it introduced risk. Third, it develops implications for IS educators who wish to modernize the curriculum while preserving critical thinking and ethical responsibility. Although the paper centers on one course and one institutional context, the case is useful because ISAD is a common curricular component across IS programs, and the pressures it now faces from AI are widely shared.

2. RELATED WORK

Project-based learning has long been recognized as a productive approach in IS education because it places students in realistic problem contexts that require communication, ambiguity management, and iterative problem solving (Schwering, 2015; Smith III et al., 2008). In ISAD, this method is particularly valuable because the discipline itself is inherently applied. Prior work on IS capstone and project-centered courses has shown that authentic external clients can increase student engagement and improve the perceived relevance of analysis and design tasks (Zhao et al., 2026; Zhao & Tu, 2025).

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Flipped classroom pedagogy complements project-based learning by redistributing course time. Instead of using most class meetings for content delivery, instructors shift some foundational learning to pre-class preparation and reserve class time for discussion, coaching, collaborative work, and applied practice (Lavoie & Proulx, 2020). In a complex course such as ISAD, this approach can support deeper learning because students need repeated opportunities to test and refine analytical techniques rather than simply hear about them. A flipped structure is especially useful when students are expected to use emerging tools whose outputs require interpretation, comparison, and critique. Under such conditions, the classroom becomes a space for guided sense-making rather than passive note-taking (Liao & Wu, 2023).

The arrival of GenAI has intensified debate within computing and information systems education. On one side, researchers argue that AI-based tools can widen participation, reduce low-level barriers, and make room for higher-order design thinking, especially for novice learners and students whose primary strengths lie in analysis rather than programming. Many researchers and teachers now encourage students to use GenAI tools as support and an opportunity to demonstrate good scientific practice (Gimpel et al., 2025). On the other side, scholars warn that AI-generated outputs may create illusions of competence and undermine foundational understanding when students rely on them uncritically (Becker et al., 2023; Macnamara et al., 2024; Prather et al., 2023). For novices, the principal risk is inhibited skill formation or shallow understanding. For students who have already developed relevant competencies, sustained overreliance may additionally contribute to skill atrophy or reduced confidence in independent analysis (Xing & Cao, 2025). These concerns raise broader pedagogical questions about what students should know, what they should be able to do themselves, and how educational environments should respond when professional tools automate parts of the work.

Several strands of literature are particularly relevant to this study. The first concerns experiential learning. Kolb (1984) argued that effective learning involves a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. That framework is well aligned with AI-assisted project work. Students can use AI to produce an artifact, test it in a concrete setting, reflect on inaccuracies or gaps, revise their conceptual understanding, and try again. The important pedagogical point is that AI does not eliminate the cycle; rather, it can accelerate movement through the cycle if instructional scaffolding is present. A second strand concerns design-based and iterative pedagogical research. Design-based research treats educational interventions as evolving designs to be tested and refined in real instructional settings (Barab & Squire, 2004). This lens is useful when courses incorporate fast-changing technologies, because the goal is not only to measure outcomes but to understand how pedagogical structures and tool affordances interact. AI integration in ISAD is an example of such a context. A third strand concerns AI code generation and prototyping support. Research on AI-assisted programming suggests that AI can help novice learners get unstuck, generate initial solution structures, and engage in more ambitious projects than would otherwise be feasible (Kazemitabaar et al., 2023). At the same time, code generators can obscure logic, limit deeper debugging practice, and encourage a trial-and-error prompting style disconnected from systematic reasoning (Becker et al., 2023). In ISAD, these tensions are amplified because the pedagogical objective is not simply to produce code but to preserve the traceability between business requirements, design rationale, and implemented features. Prototyping tools therefore have educational value only if they remain connected to analysis artifacts rather than bypassing them.

Recent work on vibe coding adds a useful perspective. Vibe coding describes a natural-language-based programming workflow in which users specify intended functionality in plain language and AI systems generate corresponding code (Sapkota et al., 2025). A companion study conducted in the same course context suggests that prototyping support can be pedagogically valuable, but only as one component of a broader AI integrated curriculum. The literature also points to risks that extend beyond skill acquisition. AI outputs may encode hidden bias, produce fabricated content, or reproduce inappropriate assumptions from training data. In educational settings, these issues intersect with academic integrity, authorship, and responsible use (North & Riskas, 2025). Students may not always know when to trust, verify, or reject machine-generated suggestions. Consequently, AI integration in IS curricula must include explicit attention to policy, ethics, transparency, and verification rather than assuming that technical fluency is enough (Van Slyke et al., 2023).

In summary, prior work suggests: 1) authentic projects matter because they force students to connect representations to real stakeholder needs; 2) scaffolded reflection matters because AI generated

ISSN: 2473-4901
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outputs are only educationally useful when students interrogate them; 3) prototyping matters because it strengthens feedback cycles and links abstract models to concrete system behavior; 4) human oversight remains central, not as a conservative resistance to technology, but as the mechanism by which students develop judgment. The present study builds on these ideas by examining how a semester-long ISAD redesign operationalized them across multiple SDLC phases.

3. METHODS

This study employed a qualitative case study design focused on one semester long implementation of AI integrated pedagogy in an undergraduate/graduate ISAD course. The goal was not to test a narrow causal hypothesis, but to understand how a coordinated set of pedagogical interventions functioned in practice, how students used AI across different SDLC activities, and what kinds of benefits and challenges emerged. The design was informed by experiential learning (Kolb, 1984) and design-based research (Barab & Squire, 2004), since the course redesign was intentionally iterative and centered on real classroom implementation.

Participants were 43 students enrolled in Fall 2025 sections of an ISAD course at a Midwestern public university. Of these, 35 were graduate students and 8 were undergraduate students. Students were assigned to 11 project teams. The course worked with a real university client from the Facilities Department. The client sought a system to support recycling material management and related role based workflows. This real world setting was important to the course design because it created authentic pressure for clear communication, justified design choices, and iterative refinement. The course met three times per week. A flipped classroom structure was used. Monday sessions emphasized the instructor's explanation of core concepts, frameworks, and modeling techniques. Students were expected to review readings and supporting materials outside class. Wednesday and Friday meetings were used more extensively for applied work, discussion, AI supported activities, team collaboration, and review of intermediate artifacts. This structure allowed direct observation of how students interacted with AI tools and how they revised outputs after peer, instructor, and client feedback.

Because the project involved a real university client and students used several external GenAI platforms, privacy and information-leakage controls were incorporated into the course guidelines. Students were instructed not to enter personally identifiable information, authentication credentials, confidential operational records, internal documents, or other sensitive client data into public AI systems. AI prompts were limited to generalized requirements, de-identified notes, and non-sensitive descriptions of workflows and system functions. When the sensitivity of information was uncertain, students were required to consult the instructor before using it with an AI tool. Students were also reminded that AI platforms differ in data-retention, logging, and model-training practices and were encouraged to review applicable privacy policies. These controls reduced, but could not fully eliminate, the risk of unintended disclosure.

As shown in Figure 1, the instructional redesign treated AI as a support layer across the SDLC rather than as a stand-alone topic. Four phases were emphasized: system planning, system analysis, system design, and prototype implementation. Across all phases, students were expected to follow a human-in-the-loop process that included generation, verification, revision, and reflection. This process can be described as a scaffolded and accountable AI integrated pedagogy in which AI accelerates initial output generation, but judgment remains distributed across the team, peers, instructor, and client. During the system planning phase, students used AI to explore organizational context, consider SWOT elements, align project aims with client goals, identify assumptions, and draft feasibility analyses. In the system analysis phase, AI was used to organize notes from interviews and client meetings, identify candidate functional and nonfunctional requirements, draft user stories and use cases, and support data-flow analysis. In the system design phase, AI assisted with entity identification, data dictionary drafting, user-interface ideation, and discussion of component relationships. In the implementation phase, students used Vibe coding tools to translate design ideas into working interfaces and logic suitable for client demonstration.

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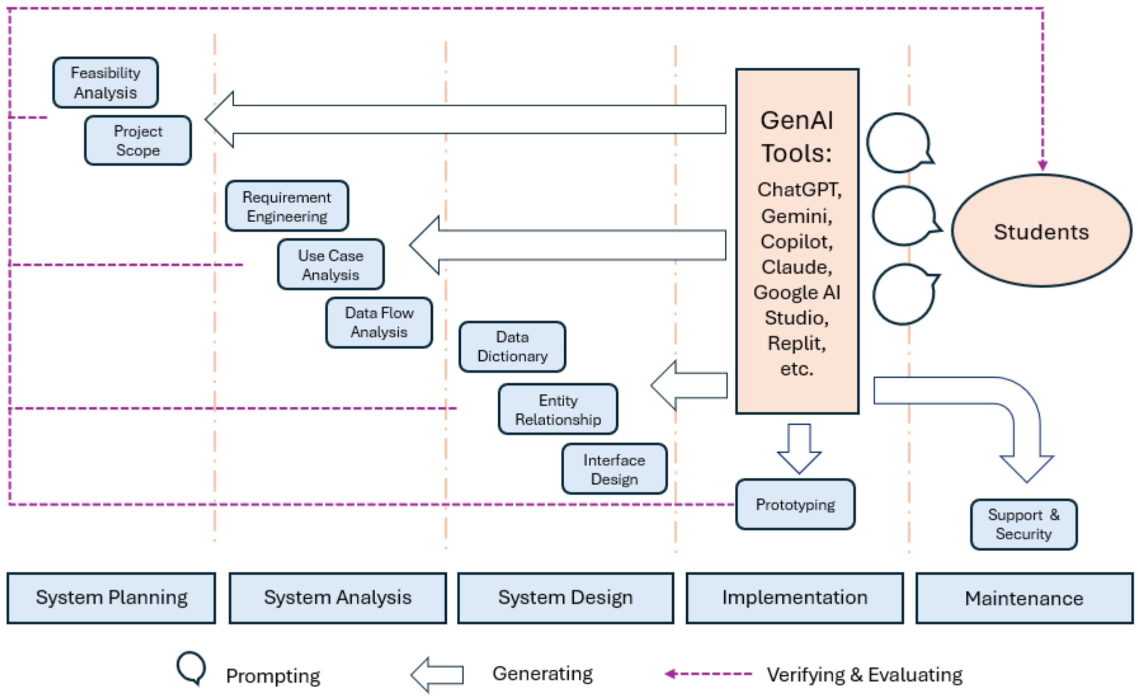

Figure 1. The Instructional Design of Using GenAI in SDLC Phases

The semester began with workshops intended to establish shared baseline familiarity with AI tools and prompting practices. In the first two weeks, students explored major GenAI tools such as ChatGPT, Gemini, Copilot, and Claude. These activities focused on prompt construction, comparison of outputs across tools, and early discussion of strengths and limitations. Students also encountered Figma AI as a support tool for interface design ideation. The first client meeting occurred early in the semester. The client presented the problem context, described expectations, and established communication norms. Students then proceeded through the course sequence, which can be summarized in seven two-week blocks. As shown in Table 1, Weeks 1–2 focused on introduction, project management, and system planning concepts alongside tool exploration and team formation. Weeks 3–4 addressed requirements engineering and client interaction. Weeks 5–6 emphasized use case analysis and object-oriented or process modeling activities. Weeks 7–8 emphasized data flow analysis, data dictionaries, and entity-relationship modeling. Weeks 9–10 focused on user-interface design and iterative client-facing refinement. Weeks 11–12 introduced system architecture and pre-prototyping workshops. Weeks 13–14 emphasized implementation-oriented prototyping, demonstration, peer review, and client evaluation, and a course-end survey (shown in Appendix A).

Weeks	Primary AI-assisted activities
Weeks 1–2	Introduction, project management, and system planning; GenAI tool exploration; team formation; first client meeting; feasibility analysis.
Weeks 3–4	Requirements engineering; requirement extraction; functional and nonfunctional requirements; continued client interaction.
Weeks 5–6	Use cases, user stories, and object/process modeling.
Weeks 7–8	Data flow analysis, data dictionaries, and entity-relationship modeling.
Weeks 9–10	User-interface design and iterative client-facing refinement.
Weeks 11–12	System architecture concepts and pre-prototyping workshops.
Weeks 13–14	Prototype development, demo presentation, peer review, client evaluation, and course-end survey.

Table 1. Condensed Course Schedule

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The course also included two dedicated pre-prototyping workshops. In one workshop, students used AI-assisted coding tools to build a simple number-guessing game. In another, they created a dynamic website with an interactive administrative dashboard. These workshops were not the central focus of the present paper, but they served as structured preparation for later prototype development. Because the present study examines the full ISAD curriculum, evidence from these workshops is used selectively as contextual support for understanding how students approached AI-assisted implementation.

Multiple sources of evidence were used to understand the pedagogical effects of AI integration: instructor observations collected during class activities, reviews, and discussions; student artifacts created across the semester, including feasibility analyses, requirement documents, use cases, data-flow representations, data dictionaries, interface designs, and prototypes; peer-review activities in which teams evaluated each other's work and discussed revisions; client feedback on project deliverables and final prototype demonstrations; a course-end survey capturing AI tool usage, satisfaction, perceived benefits, and perceived challenges; and selected quantitative results from the companion prototyping study, particularly where those results clarified how students approached AI-assisted prototype creation. The course-end survey produced several descriptive data points that are central to the results section. Students reported which AI tools they used most frequently, how often they used AI during the project, which tasks benefited most from AI support, and how strongly they agreed with statements about AI benefits and challenges. Overall satisfaction with AI-assisted analysis and design was also recorded. The analysis was primarily interpretive and thematic. The goal of the analysis was to identify where AI appeared to strengthen learning, where it introduced friction, and what design implications followed for future offerings of the course.

4. RESULTS AND DISCUSSION

Student adoption of AI tools in the course was both broad and frequent. As shown in Figure 2, the counts reported at the end of the course were 42 for ChatGPT, 36 for Gemini, and 15 each for Copilot and other tools. These patterns suggest that students did not rely on a single platform exclusively. Instead, many appeared to compare tools or select tools based on task type, convenience, and perceived output quality (Van Slyke et al., 2023). From a pedagogical perspective, this is a useful finding: it indicates that students experienced AI as an ecosystem of support rather than as one canonical assistant, which makes it even more important to teach transferable evaluation habits rather than tool-specific routines. Frequency-of-use data further illustrate how deeply AI has become embedded in project work. Fourteen students reported daily use, 19 reported use a few times per week, 6 reported occasional use, and 4 reported rare use. In other words, the majority of students used AI regularly throughout the semester. This degree of integration likely reflects the course design, which repeatedly invited students to apply AI to authentic artifacts instead of limiting AI exposure to a one-time demonstration.

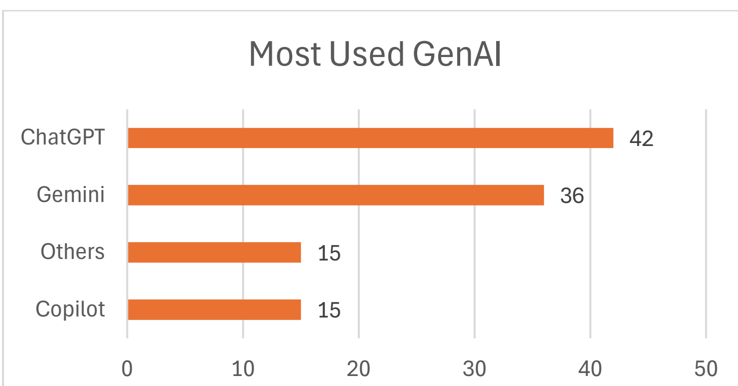

Figure 2. Most Used GenAI Models

Students reported that AI was most helpful in tasks that required synthesis, structuring, and translation across representations. As shown in Figure 3, the top areas were feasibility analysis (36 responses), project goal and scope clarification (28), requirements engineering (25), user-interface design (22), use-case analysis (19), prototyping (12), data dictionary creation (11), and data-flow diagramming and entity-relationship design (10 each). Debugging was also mentioned, though less frequently, with 5

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responses. This distribution is revealing. The strongest support appeared in the early and middle stages of the SDLC rather than only in prototype implementation. Students found AI especially useful where they had to transform messy, incomplete, or verbal information into structured documentation. Feasibility analysis and scope definition, for example, require students to identify assumptions, consider tradeoffs, organize stakeholder goals, and articulate boundaries. AI appears to have helped students generate first-pass structures that made discussion easier. Similarly, in requirements engineering, students likely benefited from AI's capacity to summarize client conversations, propose candidate requirements, and provide templates or examples for writing formalized statements.

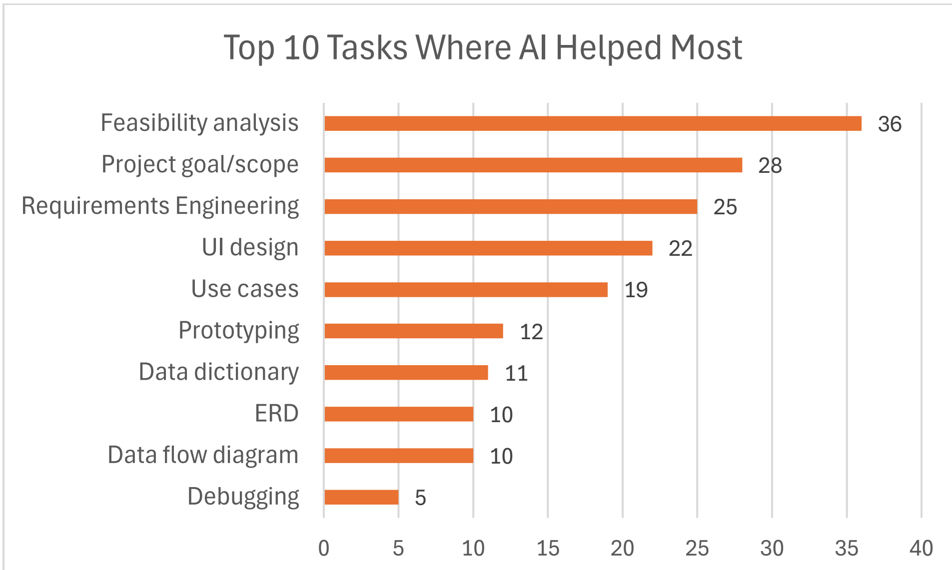

Figure 3. Top 10 Tasks Where AI Helped Most

The prominence of user-interface design and use-case development also deserves attention. These tasks sit at the boundary between analysis and communication. They require students to imagine how a system will be experienced and to express interactions clearly enough that others can criticize them. AI tools can support this work by generating alternatives, turning textual descriptions into visual ideas, and helping students rephrase vague intentions into clearer scenarios. Such support does not replace design reasoning, but it can accelerate exploration, which is pedagogically useful in a course with limited time. Interestingly, prototyping did not dominate the ranking despite the visibility of AI-assisted coding tools. This suggests that students did not view AI primarily as a code generator. Instead, they experienced it as a broader analytical and representational support system. That finding strengthens the argument that AI integration in ISAD should be designed across the entire process, not just around implementation.

Survey statement	Mean
AI feedback improved design quality and deliverables	3.91
AI clarified system requirements	3.88
AI improved understanding of cases and process models	3.81
AI increased efficiency in project documentation	3.79
AI encouraged experimentation with new ideas	3.79

Table 2. Highest-Rated Perceived Benefits (5-point scale)

Student agreement data suggest that the perceived educational benefits of AI were substantial but not unqualified (Table 2). The highest mean agreement scores were associated with statements that AI feedback improved the quality of system design and deliverables (3.91 on a 5-point scale), that AI tools helped clarify system requirements more effectively (3.88), and that AI-assisted analysis improved understanding of use cases and process models (3.81). Students also reported that AI increased

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efficiency in completing project documentation (3.79), encouraged experimentation and exploration of new system ideas (3.79), and supported future willingness to use AI again in courses or projects (3.79).

These findings align with instructor observations during the semester. Teams often moved more quickly from uncertainty to discussable artifacts when AI was used to produce an initial draft. For example, a team that struggled to define scope boundaries after a client meeting could use AI to generate alternative formulations, then compare them against the client's intent. Similarly, students who were unsure how to formalize user stories or organize data definitions could use AI-generated structures as a starting point. In many cases, the educational gain did not come from the quality of the first output itself, but from the speed with which the class could move to critique and revision. AI effectively reduced the blank-page problem.

Students also reported that AI helped connect theory from lectures to project practice (mean 3.49) and enhanced their understanding of the IS development life cycle (3.63). These values, though slightly lower than the strongest ratings, are still meaningful because they address a core curricular goal. In a traditional ISAD course, students may understand individual artifacts in isolation but struggle to see how they relate across the lifecycle. By helping students generate, revise, and test artifacts more quickly, AI may have made lifecycle connections more visible. A requirement statement can be traced to a use case, which informs interface design, which then supports a prototype that the client can evaluate. When those links are experienced iteratively rather than hypothetically, the course's conceptual coherence becomes more tangible. Another notable benefit concerned creativity and experimentation. Students moderately agreed that AI tools helped generate creative design ideas or system prototypes (3.77). This matters because ISAD pedagogy often risks becoming procedural, with students focusing on correct diagram formats rather than imaginative problem framing. AI may help counteract this tendency by surfacing alternative formulations or design options. However, creativity in this context should be interpreted carefully. The value lies less in AI originating novel ideas independently and more in its ability to provide prompts, contrasts, and examples that stimulate student thinking.

	Functional Coverage (Admin) 40 pts	**Functional Coverage (Technician) 20 pts**	**Data & Reporting Accuracy 10 pts**	**Usability & Accessibility 10 pts**	**Authentication & Authorization 10pts**	**Performance & Reliability 10pts**	**Total 100 pts**
Team 1	32	12	8	10	5	10	77
Team 2	30	20	8	8	5	10	81
Team 3	20	12	6	10	5	10	63
Team 4	36	20	10	10	10	10	96
Team 5	25	15	10	8	8	10	76
Team 6	38	20	10	10	8	10	96
Team 7	30	20	10	10	8	10	88

Table 3. Recycling Management System Project Client Evaluation Results

Although this paper is centered on the broader curriculum rather than prototyping alone, a selective use of findings from the companion vibe-coding study (Zhao & Tu, 2026) helps clarify one important aspect of the redesign: how later-stage implementation support affected the course as a whole. In the preparatory prototyping workshops, students experimented with both agile-style prompting and waterfall-style prompting. Agile-style prompting involved iterative refinement through multiple shorter prompts, whereas waterfall-style prompting emphasized a more comprehensive initial specification. Students using agile prompting required more prompts overall, while students using waterfall prompting produced more complete first-pass outputs. Yet student preferences leaned toward agile prompting, and later project work often used hybrid strategies. This pattern is significant for ISAD pedagogy because it mirrors the broader process of systems analysis and design. Students rarely possess a perfect understanding at the outset. Requirements evolve, interface ideas change, and stakeholder reactions shift priorities. A hybrid prompting approach therefore resembles authentic design work: teams begin with some structured intent, test a partial implementation, and then revise. As shown in Table 3, in the final client evaluation of recycling management prototypes reported, all teams delivered functioning

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prototypes, and the average client evaluation was strong, with two teams reaching near-complete fulfillment of the specified criteria (score 96). These results suggest that AI-assisted prototyping can make it feasible for ISAD students to close the loop between analysis documents and demonstrable system behavior. For the present study, the key implication is not that prototyping scores were high, but that prototype production changed the nature of earlier phases. Students became more attentive to requirement clarity because vague requirements produced poor downstream outputs. They became more aware of interface logic because clients could react to visible workflows rather than abstract descriptions alone. In other words, AI-assisted prototyping increased the pedagogical stakes of analysis and design. This is one of the most important ways in which AI reshaped the curriculum.

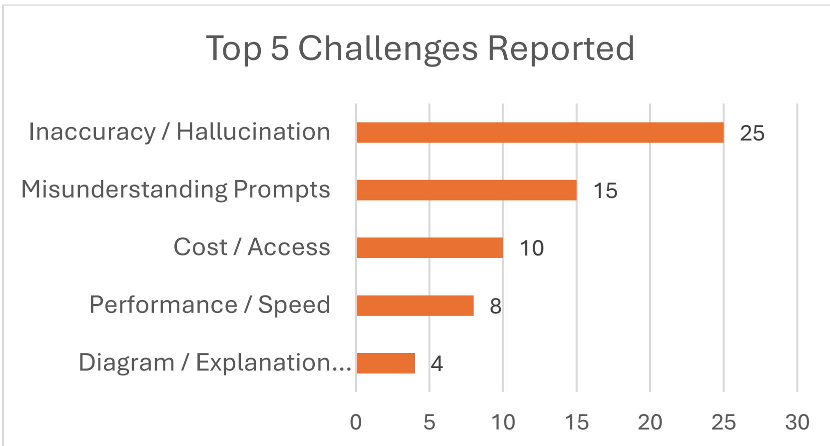

Figure 4. Top 5 Challenges Reported

The benefits of AI integration were balanced by several recurring challenges. As shown in Figure 4, students reported that the most significant difficulties were inaccuracy or hallucination (25 mentions), misunderstanding how to phrase prompts (15), cost or access issues (10), performance or speed limitations (8), and diagram or explanation limitations (4). These findings are consistent with broader research on GenAI in education (Macnamara et al., 2024; Prather et al., 2023). They also reflect a crucial reality for ISAD instruction: a tool that produces fluent output is not necessarily producing valid analysis. Survey means on challenge-related items reinforce this point. Students moderately agreed that AI suggestions were sometimes inaccurate or misleading (3.26). They also reported needing more guidance on when and how to use AI responsibly (3.00), and some indicated difficulty integrating AI-generated content with teamwork (3.00). Lower but still nontrivial scores appeared on concerns that overreliance on AI reduced confidence in one's own analytical skills (2.77) and uncertainty about ethical or academic honesty issues (2.72). These values do not indicate widespread rejection of AI, but they do show that support structures matter.

Instructor observations suggest that the most productive teams were not those that simply used AI most often, but those that treated AI output as provisional. Such teams compared outputs across tools, checked them against client conversations, and discussed inconsistencies openly. Less successful teams sometimes accepted AI-generated requirements or models with minimal scrutiny, only to encounter downstream problems when prototypes failed to align with actual needs. This pattern reinforces the pedagogical principle that AI should be framed as a collaborator whose work must be reviewed, not as an authority whose answers are final.

A second challenge involved motivation and skill development. Some students worried that easy generation of diagrams, requirements, or code might reduce the incentive to learn the underlying logic (North & Riskas, 2025). This concern is legitimate. If students merely assemble polished outputs without understanding why they are structured as they are, then AI use may create the appearance of competence without its substance. The course attempted to address this risk through peer review, instructor questioning, and client-facing justification. However, the tension remains and should be treated as a design constraint for future curriculum development.

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Theme	count
AI Tool Tutorials	17
Policy Clarify	13
Ethical Guidelines	8
Hands-on Workshops	6
Case Studies	4
Prompt Engineering	5
Verification of Accuracy	5
More Examples/Practice	3
Collaboration	3

Table 4. Suggestions to Improve Course Integration with AI

A third challenge concerned ethics and policy. Because the project involved a real campus client, students had to think carefully about what information was shared with AI systems and how outputs were represented. The course-end survey revealed clear student demand for more AI tool tutorials, policy clarification, ethical guidelines, hands-on workshops, prompt engineering instruction, accuracy verification strategies, collaboration guidance, and more examples or practice (Table 4). The strongest counts were for tutorials (17) and policy clarification (13), followed by ethical guidelines (8). This distribution suggests that students did not want fewer AI opportunities; they wanted clearer institutional and instructional support for using AI responsibly.

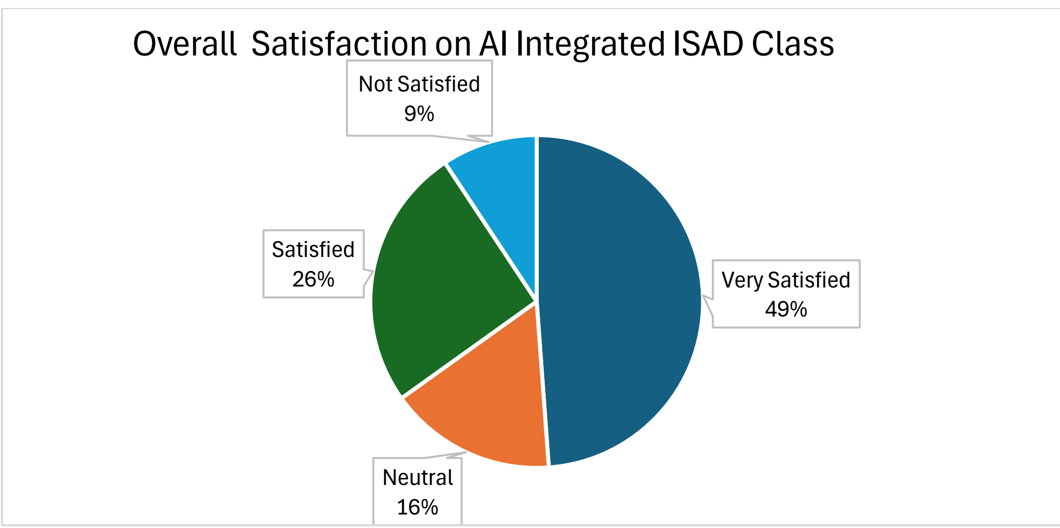

Figure 5. Overall Satisfaction with AI Integrated ISAD Class

Overall satisfaction with AI integrated ISAD class was positive (Figure 5). Approximately 48.8% of students reported being very satisfied, 25.6% satisfied, 16.3% neutral, and 9.3% not satisfied. These distributions should not be interpreted as proof that the redesign was universally successful. Rather, they indicate that most students perceived the approach as educationally worthwhile despite the challenges described above. For a course introducing rapidly changing tools into an already demanding subject, that level of acceptance is notable.

AI works best in ISAD when it is used throughout the full SDLC rather than only for coding or final editing. Its educational value increases in flipped, project-based courses with real clients, because students can compare outputs, justify revisions, and test AI work against real requirements. The study also shows that human oversight remains essential through self-verification, peer review, instructor feedback, and client evaluation. Overall, AI should be integrated as part of a curriculum that includes ethics, policy, and verification, with instructors guiding students to critically evaluate AI outputs instead of simply accepting them.

5. CONCLUSION

This study examined how generative AI was integrated into an Information Systems Analysis and Design course across project planning, analysis, design, and prototype implementation. The findings suggest that students generally perceived AI as a useful support tool, particularly for feasibility analysis, scope definition, requirements engineering, interface design, documentation, and prototyping. Survey responses indicate that many students believed AI improved efficiency, clarified requirements, encouraged experimentation, and strengthened project deliverables. However, the results also suggest that AI's educational value depended on the instructional structure surrounding its use. Students reported concerns about inaccurate outputs, hallucinations, prompt formulation, overreliance, ethical issues, and responsible use. Classroom observations indicate that AI-supported activities were more productive when students treated generated content as provisional and evaluated it through self-verification, peer review, instructor feedback, and client evaluation. Because the study involved 43 students at one institution, the findings should not be interpreted as broadly generalizable evidence of AI effectiveness in all ISAD courses. Instead, the case provides a practical model for integrating AI across the SDLC in a project-based, flipped-classroom environment. The results suggest that effective integration requires clear policies, ethical guidance, verification procedures, and opportunities for students to explain and defend their decisions. Future studies should use larger, more diverse, multi-institutional samples and comparative or longitudinal designs.

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APPENDIX A

Student Survey on AI Tools Used in ISAD Class

Student Survey on AI Tools

* Indicates required question

Section 1: Background Verification

(Nominal — for descriptive analysis only; optional for anonymity.)

1. You name and student number *

   ____

2. 1. What is your current academic level? *

   Check all that apply.

   ☐ Undergraduate
   ☐ Graduate (MSIS)
   ☐ Other: ______________________________

3. 2. Have you previously used any AI tools before this course? *

   Check all that apply.

   ☐ Yes
   ☐ No

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4. 3. If yes, which tools did you use most often for this project? *(Select all that apply)* *

Check all that apply.

- [ ] ChatGpt
- [ ] Copilot
- [ ] Gemini
- [ ] Claude
- [ ] Perplexity
- [ ] Other: ____________________

5. 4. How frequently did you use AI tools during your project work? *

Check all that apply.

- [ ] Daily
- [ ] A few times per week
- [ ] Occassionally
- [ ] Rarely
- [ ] Never

Section 2: Perceived Usefulness and Learning Support

(5-point Likert scale: 1 = Strongly Disagree → 5 = Strongly Agree)

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6. *

Mark only one oval per row.

	1	2	3	4	5
AI tools helped me clarify system requirements more effectively.	◯	◯	◯	◯	◯
AI-assisted analysis improved my understanding of use cases and process models.	◯	◯	◯	◯	◯
AI tools helped me generate creative design ideas or system prototypes.	◯	◯	◯	◯	◯
Using AI increased my efficiency in completing project documentation.	◯	◯	◯	◯	◯
AI feedback improved the quality of my system design and deliverables.	◯	◯	◯	◯	◯

Section 3: Perceived Challenges and Concerns

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7. *

Mark only one oval per row.

	1	2	3	4	5
I sometimes found AI suggestions inaccurate or misleading.	⬭	⬭	⬭	⬭	⬭
It was difficult to integrate AI-generated content with team work.	⬭	⬭	⬭	⬭	⬭
I was uncertain about the ethical or academic honesty of using AI tools.	⬭	⬭	⬭	⬭	⬭
Overreliance on AI made me less confident in my own analytical skills.	⬭	⬭	⬭	⬭	⬭
I needed more guidance on when and how to use AI responsibly.	⬭	⬭	⬭	⬭	⬭

Section 4: Impact on Learning and Collaboration

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8. *

Mark only one oval per row.

	1	2	3	4	5
AI tools enhanced my understanding of the IS development life cycle.	⬭	⬭	⬭	⬭	⬭
Collaboration within my team improved through shared AI-assisted work.	⬭	⬭	⬭	⬭	⬭
AI helped me connect theory (lectures) to practice (project work).	⬭	⬭	⬭	⬭	⬭
AI encouraged me to experiment and explore new system ideas.	⬭	⬭	⬭	⬭	⬭
I would like to use AI tools again in future courses or projects.	⬭	⬭	⬭	⬭	⬭

Section 5: Open-Ended Reflection Questions

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9. 1. In what specific tasks did AI tools help you the most (e.g., use case creation, DFD, ERD, UI design, documentation, etc.)? *

10. 2. What challenges or frustrations did you encounter while using AI tools? *

11. 3. How did AI tools affect teamwork and communication within your group? *

12. 4. What ethical or academic integrity considerations did you think about when using AI? *

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13. 5. What suggestions would you offer to improve AI integration in future ISAD courses? *

Summary Question

14. Overall, how satisfied are you with your experience using AI tools for your ISAD project *

Check all that apply.

- [ ] Very Dissatisfied
- [ ] Dissatisfied
- [ ] Neutral
- [ ] Satisfied
- [ ] Very Satisfied

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