When GenAI Arrived, Forum Participation Fell: Reshaping Help-Seeking in Introductory Computing Courses

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Matthew is a Ph.D. candidate in Computer Science at North Carolina State University. His research focuses on computer science education, with a strong emphasis on student help-seeking behaviors in introductory computer science courses. His work explores how students engage with help-seeking resources, their perceptions of those resources, and how teaching assistants can provide more effective support through structured guidance. His research is driven by a strong passion for teaching and a commitment to improving student learning experiences in computing education. Matthew was the recipient of the Outstanding TA Award (2024) in recognition of his instructional contributions. He is actively looking for teaching faculty opportunities.

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Abstract

The rapid growth of openly-available generative artificial intelligence (GenAI) tools has impacted higher education. These tools are readily available sources of academic assistance, raising important questions about how students' engagement with existing help-seeking resources may change. In computing education, where help-seeking has traditionally relied on peer interaction and instructional support through online discussion forums, the presence of GenAI may alter both the frequency and purpose of forum participation. Understanding these shifts is critical for interpreting student engagement and designing effective support structures.

Introductory computer science (CS) courses present a particularly important context for examining the impact of GenAI on academic help-seeking. These courses are typically characterized by large enrollments, diverse student backgrounds, and a heavy reliance on asynchronous help-seeking mechanisms such as online discussion forums. Additionally, many GenAI tools are advertised as supporting coding tasks similar to those in introductory programming courses. As a result, participation metrics drawn from these forums have historically been used as indicators of engagement and learning. However, the emergence of GenAI as an alternative help-seeking resource may reshape how students interact with forums, especially in introductory programming courses where students are still developing their problem-solving and help-seeking strategies.

This paper investigates how student participation in online discussion forums has changed before and after the widespread availability of GenAI tools starting in Fall 2023, and how the relationship between forum participation and academic performance differs across these periods. Using longitudinal forum log and course performance data from multiple semesters of introductory programming courses (CS1 and CS2), we conduct a quantitative analysis of participation frequency, usage of anonymous posting features, and contribution types across pre-GenAI and post-GenAI eras. For the purposes of this study, we consider semesters prior to Fall 2023 as pre-GenAI, and those from Fall 2023 onward as post-GenAI. We further examine correlations between forum participation metrics and final course grades to assess whether previously observed relationships persist in the current GenAI context.

Our results reveal notable shifts in forum participation with the introduction of GenAI tools, including changes in participation levels, anonymity use, and the interpretability of participation metrics as indicators of academic performance. While discussion forums remain an active component of the help-seeking landscape, their role and signaling value appear to have evolved alongside new AI-driven alternatives. These findings provide an updated empirical baseline for interpreting discussion forum engagement in introductory computing courses and highlight the need to reconsider how help-seeking behaviors are measured and understood in the presence of GenAI.

Introduction

Help-seeking is a fundamental component of student learning, particularly in large, conceptually dense undergraduate courses. Prior work characterizes academic help-seeking as a process in which students recognize a knowledge gap, evaluate available resources, and decide whether, when, and how to seek assistance [1]. Within self-regulated learning (SRL) frameworks, help-seeking is understood not as dependency but as a strategic behavior that supports persistence, problem-solving, and conceptual understanding [2]. In computing education, where students must integrate abstract concepts with procedural skills, effective help-seeking is critical for navigating early coursework and sustaining progress [1, 3].

Introductory computer science (CS) courses frequently operate at scale, enrolling students with widely varying prior experience. Over the past two decades, undergraduate computing enrollments have grown substantially, intensifying instructional demands and constraining access to individualized support [4, 5]. Students must navigate a distributed help landscape that includes office hours, peers, online resources, and course-managed technologies. Understanding how students engage with scalable, asynchronous resources is therefore central to characterizing contemporary learning experiences in CS1 and CS2.

Online discussion forums have become a core component of this help-seeking landscape, offering persistent, searchable, and asynchronous spaces for asking questions and accessing course-related information [6, 7, 8]. Prior research shows that forum engagement takes multiple forms, ranging from visible participation (e.g., posting questions or answers) to less visible behaviors such as reading without posting, often referred to as "lurking" [8]. In computing contexts, both active and observational forum participation have been positively associated with course performance and learning outcomes, suggesting that forum usage metrics capture meaningful dimensions of student engagement beyond simple post counts [6, 9].

A recurring theme in the literature is the role of anonymity in shaping forum participation. Studies in computing education indicate that anonymity can reduce perceived social risk, particularly for students who feel uncertain about their understanding or who belong to groups underrepresented in computing [10, 11]. At the same time, many students engage with forums in limited or indirect ways, citing discomfort with public visibility or fear of appearing unprepared [7]. More broadly, previous work has documented systematic patterns in how computing students select and sequence help-seeking resources, often beginning with low-cost, immediately accessible options before escalating to more direct forms of support [12]. These preferences vary with prior programming experience and influence both the type and visibility of help-seeking behaviors [13, 14].

The rapid and widespread growth of generative AI (GenAI) tools since November 2023 represents a substantial shift in the educational context [15] in which these help-seeking patterns were established [16]. Evidence suggests that GenAI technologies have spread at an unprecedented rate among post-secondary students [17], functioning as on-demand help-seeking resources that alter perceptions of availability, immediacy, and utility relative to existing supports [15, 18]. Educators have consequently emphasized the need to re-examine assumptions about student learning behaviors in technology-mediated environments [19]. However, little empirical work has examined how student engagement with online discussion forums—and its relationship to academic performance—has shifted longitudinally following the widespread adoption of GenAI tools.

In this study, we examine how student engagement with online discussion forums in introductory computing courses differs before and after the widespread availability of GenAI tools, and how these changes relate to course performance. Using eight semesters of forum activity data from CS1 and CS2 courses at a large public R1 institution in the United States (Fall 2021–Spring 2025), we analyze changes in participation frequency, engagement patterns, and relationships with academic performance across pre- and post-GenAI periods.

We investigate the following research questions:

1. **RQ1:** How do students' frequency and patterns of participation in online discussion forums in introductory programming courses differ before and after the widespread availability of generative AI tools?
2. **RQ2:** How does the relationship between students' online discussion forum participation and academic performance in introductory programming courses differ before and after the widespread availability of generative AI tools?

By focusing on discussion forums as a central help-seeking resource, this work provides a descriptive account of how student help-seeking behaviors may be evolving within contemporary computing education contexts.

Related Work

Help-seeking is a critical academic behavior, particularly in large undergraduate courses, and involves recognizing gaps in understanding, evaluating available resources, and deciding whether and how to seek assistance [1]. These decisions are influenced by not only cognitive need but also by motivational factors, perceptions of competence, and concerns about social evaluation [1]. Prior work further frames help-seeking as an important self-regulated learning (SRL) strategy for managing cognitive, motivational, and behavioral challenges, particularly in complex or ill-defined tasks [2], making it especially important in introductory computer science courses where students must diagnose errors, interpret feedback, and manage frustration.

Empirical work in programming contexts highlights the importance of SRL for academic success, with motivational factors such as self-efficacy and task value consistently related to performance and anxiety differentiating student outcomes [14]. These findings suggest that help-seeking is closely tied to students' confidence, motivation, and regulation of learning processes. At the same time, the widespread rapid adoption of GenAI has altered the help-seeking landscape, particularly in introductory programming courses [20], motivating an examination of how GenAI is shaping students' help-seeking in introductory computer science courses and their engagement with online discussion forums.

Help-Seeking and Online Discussion Forums in Computer Science

As enrollments in computer science have grown substantially over the past two decades [4], instructional support in CS courses has increasingly relied on scalable, asynchronous resources such as online discussion forums. These forums provide spaces where students can ask questions, read others' questions, and receive assistance from peers and instructional staff outside of class time.

Prior work has demonstrated relationships between forum participation and academic performance. Romero et al. showed that students' activity in asynchronous discussion forums can be used to predict final course performance, suggesting that forum engagement reflects meaningful learning behaviors rather than incidental interaction [9]. Similarly, Vellukunnel et al. analyzed student questions in CS discussion forums and highlighted how forums support learning by allowing students to articulate confusion and engage with course concepts [6]. Together, these studies position discussion forums as central help-seeking environments in computing courses.

However, participation in forums is uneven. Research on asynchronous forums in higher education has consistently found that many students engage through "lurking" or reading without posting [8]. In computing contexts, this pattern complicates assumptions that visible participation accurately reflects help-seeking behavior or learning engagement. Doebling and Kazerouni identified distinct patterns of academic help-seeking among undergraduate computing students, reinforcing that students vary widely in how they access and use available support resources [12] .

Anonymity, Visibility, and Participation

A defining feature of many CS discussion forums is the option for students to post anonymously or under a pseudonym. Early work on online learning environments found that students' choice of anonymity is shaped by identity concerns, perceived risk, and social context [21].

Recent computing education research has documented systematic differences in the use of anonymity and participation. Thinnyun et al. found gender differences in engagement on Piazza, with anonymity playing a role in shaping participation patterns [10]. Extending this work, Sharma et al. demonstrated that anonymity usage varies across intersections of gender and race/ethnicity, and that these patterns depend on course context, platform, and type of contribution [11]. These findings suggest that anonymity functions as a consequential affordance that can both enable and obscure student participation.

At the same time, anonymity and limited visibility are associated with discomfort and hesitation. Sibia et al. found that many students experience discomfort when using Q&A forums, with fears of appearing unknowledgeable or being judged, contributing to reduced visible participation [7]. Further work by Sibia et al. showed that grouping students by programming experience can influence participation patterns, underscoring how forum structure and perceived expertise shape help-seeking behaviors [13]. These studies collectively highlight that while discussion forums intend to support all students, social and contextual factors strongly influence who participates and how.

Forum Structure and Student Engagement

Beyond anonymity, the design of discussion forums also shapes students' willingness to engage. Moanes H. Tibi found that computer science students hold different attitudes toward structured and unstructured discussion forums in fully online courses, with implications for engagement and perceived usefulness [22]. These findings suggest that forum design decisions influence not only participation rates but also students' perceptions of forums as practical help-seeking tools. These prior works show that discussion forums are complex social spaces. Students may seek help by posting questions, reading others' posts, or disengaging altogether, with these behaviors shaped by confidence, identity, perceived expertise, and course design.

Re-examining Help-Seeking in the Era of Generative AI

Recent technological changes further motivate a re-examination of help-seeking in computing education. Generative AI tools have been rapidly adopted and are increasingly accessible to students as on-demand sources of assistance [17]. Educators report that these tools are beginning to influence how students approach learning and support, raising questions about how traditional help-seeking resources fit within this evolving landscape [19]. Hou et al. mentioned how novice students increasingly favor GenAI after being *redirected to ChatGPT* by senior students [16]. This finding shows a shift away from the discussion forums.

Empirical evidence suggests that GenAI has not replaced existing help-seeking resources, but rather added new complexity to students' choices. Hou et al. found that computing students' help-seeking preferences vary by task and context, and that students continue to rely on a mix of resources, including peers, instructors, and forums, alongside GenAI tools [18]. Their findings also suggest that effective help-seeking with GenAI requires skill development, further emphasizing that help-seeking remains a regulated and situated behavior.

Research Gap

Prior work establishes online discussion forums as central components of the help-seeking landscape in introductory computer science courses and has documented how participation, anonymity, and forum structure relate to student engagement and academic performance. This work has also shaped prevailing assumptions about how forum participation metrics can be interpreted as stable indicators of engagement, help-seeking, or learning across contexts.

However, much of this literature is based on observations collected prior to the widespread availability of GenAI tools. As GenAI has rapidly emerged as an on-demand help-seeking resource, there is limited empirical evidence examining how students' engagement with existing forum-based help-seeking resources has changed over time. In particular, little work has quantitatively examined longitudinal shifts in forum participation patterns across pre- and post-GenAI periods. This study addresses this gap by providing a longitudinal, course-level analysis of discussion forum engagement and its relationship to academic performance before and after the widespread availability of GenAI tools.

Methods

This IRB-approved study examines student help-seeking behaviors in introductory computer science courses by analyzing online discussion forum activity and course-level student performance data. Data were collected from two large introductory CS courses at a public R1 university in the United States, encompassing 1,731 consenting students across eight semesters from Fall 2021 to Spring 2025. The *pre-GenAI* period spans Fall 2021 - Spring 2023, with the *post-GenAI* period including Fall 2023 and beyond.

Course Context

The study was conducted in two introductory programming courses that serve distinct student populations and instructional goals: **CS1-Eng** and **CS2-OOP**.

CS1-Eng is an introductory programming course for engineering students who are not majoring in computer science. The course focuses on MATLAB programming and emphasizes clear documentation, adherence to coding standards, and mastery of foundational control structures. Students engage with practical engineering-oriented programming tasks, including arrays, conditional logic, loops, functions, debugging, and testing. Assessment consists of three programming projects, three exams, and supplemental assignments in the form of labs and quizzes. In CS1-Eng, students were not permitted to use GenAI until Fall 2024, when an internal AI tool was introduced for students' use.

CS2-OOP is the second course in a three-course programming sequence for computer science majors and minors. It introduces object-oriented programming and software development concepts aligned with the software development life cycle, including encapsulation, polymorphism, composition, and inheritance. Using Java, students complete three guided projects that reinforce CS1 concepts and introduce development tools such as IDEs, followed by two individual programming projects. The course also includes three exams assessing both conceptual understanding and applied skills. In CS2-OOP, students were not permitted to use GenAI until Spring 2025, when Gemini was allowed for basic tasks and limited code generation with proper citation.

The two courses differ substantially in instructional format. CS1-Eng follows a flipped-classroom model, with a 2-hour and 45-minute lab session each week, during which students receive direct support from teaching assistants (TAs). In contrast, CS2-OOP follows a more traditional lecture model with shorter lab sessions, and students are expected to complete most of their work independently outside scheduled class time. These structural differences create distinct help-seeking environments across the two courses.

Online Discussion Forums

In both courses, students can seek asynchronous help through an online discussion forum. From Fall 2021 through Spring 2024, both courses utilized the Piazza discussion forum [23], an online question-and-answer platform. Piazza allows students to post questions in three ways: (1) non-anonymously, where the post is visible to all; (2) anonymously, where the post is visible to all but the student's identity is hidden from peers and visible only to instructors and TAs; and (3) privately, where both the post and the student's identity are visible only to the teaching staff. Piazza also provides a search feature that allows students to view existing discussions and supports threaded follow-up discussions.

Beginning in Fall 2024, both courses transitioned to the Ed-Stem discussion forum [24]. Ed-Stem provides functionality similar to Piazza, including anonymous and non-anonymous posting options and threaded discussions. While the interface differs, both platforms support asynchronous help-seeking and peer or instructional responses.

Participants

The final dataset includes 1,731 consenting student participants across eight semesters. 1,029 students were enrolled in CS1-Eng (241 women, 788 men), and 702 students were enrolled in CS2-OOP (200 women, 502 men).

Participant information is summarized by semester in Table 1, including consent rates, the number

and percentage of women and men participants, and total participant counts. The initial forum dataset included all individuals associated with the courses, including instructors, teaching assistants, and students. To comply with IRB requirements and ethical research practices, only students aged 18 or older who provided consent for the use of their anonymized course data were included in the analysis.

Table 1: Participant demographics across courses. Gray-scaled columns denote the pre-GenAI era.

Semester	Fa 2021	Sp 2022	Fa 2022	Sp 2023	Fa 2023	Sp 2024	Fa 2024	Sp 2025
CS1-ENG								
Consent Rate	60%	56.85%	26.23%	42.90%	51.98%	52.04%	56.89%	46.96%
Women	28 (22.8%)	45 (24.7%)	13 (21.0%)	24 (20.7%)	22 (19.8%)	42 (30.7%)	30 (18.8%)	37 (26.8%)
Men	93 (75.6%)	132 (72.5%)	49 (79.0%)	92 (79.3%)	85 (76.6%)	94 (68.6%)	129 (80.6%)	98 (71.0%)
Total	123	182	62	116	111	137	160	138
CS2-OOP								
Consent Rate	39.32%	41.56%	24.24%	37.37%	32.14%	9.57%	33.47%	20.53%
Women	45 (27.8%)	25 (20.8%)	27 (33.3%)	29 (28.4%)	19 (22.9%)	9 (34.6%)	28 (35.9%)	18 (36.0%)
Men	114 (70.4%)	87 (72.5%)	53 (65.4%)	71 (69.6%)	60 (72.3%)	16 (61.5%)	49 (62.8%)	30 (60.0%)
Total	162	120	81	102	83	26	78	50

Metrics and Data Collection

Data for this study were collected from multiple sources, including online discussion forums, a course background survey, and course grade records. Student engagement with help-seeking resources was characterized using online forum participation metrics recorded by the sources.

Forum participation metrics captured students' posting behavior, including the number of questions asked, responses provided, and post visibility. Students were required to submit code-containing questions as private posts; if code appeared in a public post, the post was converted to private and therefore categorized as anonymous. In both courses, whenever a student posts privately, it is visible only to the instructor. Since both course contexts enforced the usage of private posting for specific coding questions with screenshots, and still had the option to turn on or off an anonymity flag, we chose to treat these posts the same as public posts and took the value of the anonymity flag to decide whether the student intended to remain anonymous or not. The teaching staff in both courses were always able to see a student's identity. Student-level metrics included demographic information collected through course surveys and academic performance derived from course grades. All data was de-identified before analysis in accordance with IRB approval.

Analytic Approach

The analysis addressed the two proposed research questions by characterizing longitudinal forum participation data and their relationship to academic performance before and after the widespread availability of GenAI tools. To address RQ1, longitudinal forum log data from Fall 2021 through Spring 2025 were analyzed to examine changes in students' participation frequency and patterns in online discussion forums over time. We examined average forum contributions at the semester level and further categorized them by visibility and contribution type. In addition, forum contributions were categorized into questions, answers, and follow-up posts. For each category, we once again examined semester-level averages and used these metrics to explore how students' forum engagement evolved across semesters. The full set of metrics are in Table 2.

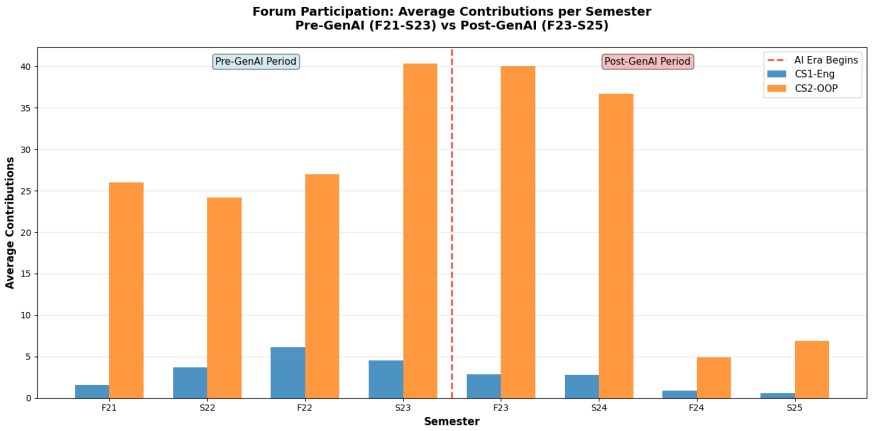


Figure 1: Average student contributions per semester

The *pre-GenAI* period spans Fall 2021 through Spring 2023, while the *post-GenAI* period spans Fall 2023 through Spring 2025. Although ChatGPT-3.5 was released in November 2022, the inflection point in computing education is widely associated with the release of GPT-4 in March 2023 [16, 17, 19]. Since adoption remained limited at that time, Spring 2023 is treated as the final pre-GenAI semester.

Table 2: Online Forum Participation Metrics.

Metric	**Description**
Questions Asked	The number of original queries posted by students seeking help
Unique Posts Viewed	The number of posts that were opened by students
Questions Answered	The number of responses provided by students to peers or TAs/ instructors
Follow-ups	Additional clarifications or discussions posted related to a thread
Anonymity	Contributions were tagged as either Anonymous or Non-Anonymous

To address RQ2, forum participation metrics were analyzed in relation to students' academic performance within each semester. Forum participation was defined as the total number of contributions per student per semester, and academic performance was measured using final course grades. Students were grouped into letter-grade bins, and average forum participation, both overall and anonymous/non-anonymous, was computed within each bin. These comparisons were conducted separately for pre- and post- GenAI semesters to examine differences in the relationship between forum participation and academic performance across the two periods.

Results

RQ1: Forum participation before vs. after GenAI

This section reports differences in students' participation frequency and patterns in online discussion forums before and after the widespread availability of generative AI tools.

Forum Participation

Across both courses, average forum participation per student declined in the post-GenAI era relative to the pre-GenAI era. This can be seen in Figure 1.

In CS1-Eng, average contributions per student (mean of individual student contributions) decreased from 3.98 in the pre-GenAI era to 1.78 in the post-GenAI era, representing a 55.3% reduction. As shown in Figure 1, all post-GenAI semesters exhibited lower average participation than any pre-GenAI semester. Participation levels in the post-GenAI era also clustered within a narrower range, indicating reduced variability across semesters compared to the pre-GenAI period.

In CS2-OOP, average contributions per student decreased from 26.65 to 22.14, corresponding to a 16.9% reduction. Fall 2024 and Spring 2025 represented the lowest contributing semesters, with 4.90 and 6.89 average contributions, respectively. This decrease aligns temporally with the transition to the post-GenAI era, after which average participation remained below pre-GenAI levels across subsequent semesters. Although participation levels fluctuated across eras, no post-GenAI era reached the levels observed before Fall 2023. We observe a potential lagging effect of GenAI adoption on the help-seeking landscape, with no observable decrease in forum participation until Spring 2024. These results indicate a clear and sustained reduction in forum participation frequency within each course following the transition to the post-GenAI era.

Anonymity of Contributions

Patterns of anonymous participation differed across each era within each course, as shown in Figure 2, which presents both absolute counts and percentage breakdowns of anonymous and non-anonymous contributions by semester.

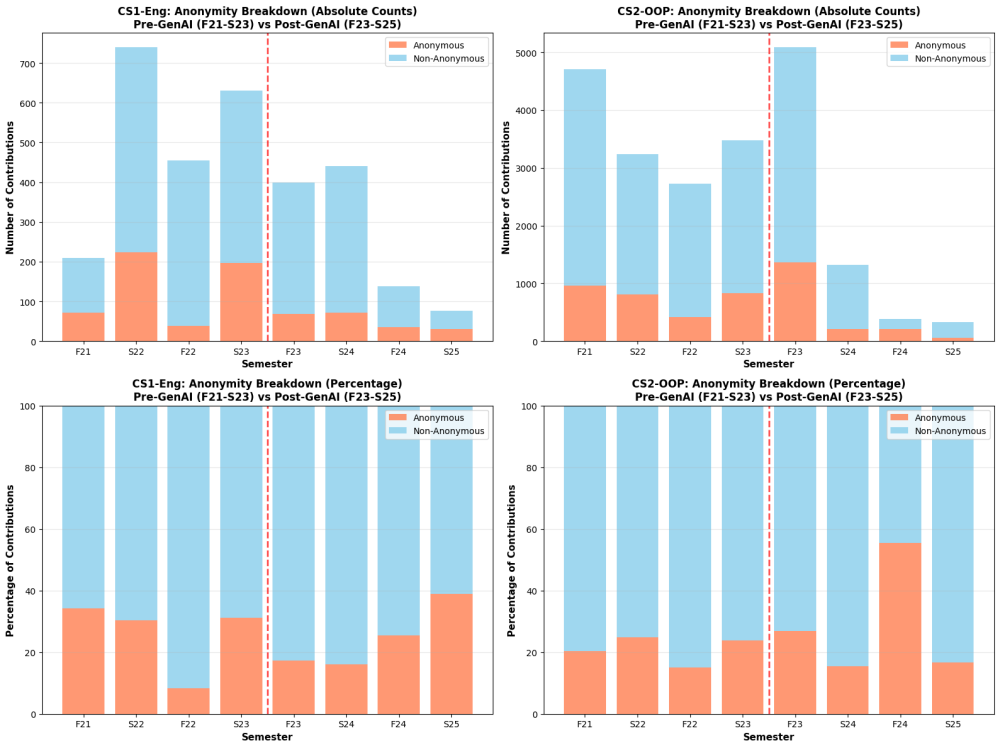


Figure 2: Breakdown of forum anonymity by course and semester. Including absolute counts (top row) and percentage distribution (bottom row).

In CS1-Eng, anonymous contributions represented 26.0% of all forum posts in the pre-GenAI era and 24.4% in the post-GenAI era, representing a decrease of 1.6 percentage points. As illustrated

in Figure 2, this change reflects a modest shift rather than a sharp discontinuity at the era boundary. Across post-GenAI semesters, anonymous posting remained a minority of contributions, and the overall proportion of anonymous posts varied only slightly from semester to semester.

In CS2-OOP, anonymity usage increased in the post-GenAI era. Anonymous contributions comprised 21.0% of posts in the pre-GenAI era and 28.6% in the post-GenAI era, an increase of 7.6 percentage points. As shown in Figure 2, this increase is evident both in the relative proportion of anonymous posts and in their absolute counts during post-GenAI semesters. Following the transition of the post-GenAI era, anonymous contributions consistently represented a larger share of overall forum activity than in any pre-GenAI semester.

Contribution Type Patterns

Figure 3 presents the distribution of forum contribution types by semester using absolute counts and percentage breakdowns, respectively. Interpretation of contribution type patterns must account for the platform transition from Piazza to Ed-Stem between Spring 2024 and Fall 2024, which introduced structural differences in how interactions were categorized.

During the Piazza period, forum activity in both CS1-Eng and CS2-OOP consisted of a diverse set of interaction types. Across pre-GenAI and early post-GenAI semesters within this period, questions and answers consistently comprised the majority of contributions, with follow-ups and update actions representing smaller but persistent portions of engagement.

As shown in Figure 3, the relative distribution of contribution types within the Piazza period remained broadly similar across semesters. No abrupt changes in the proportional makeup of the contribution types are evident from the pre-GenAI to the post-GenAI boundary. In Fall 2024, discussion forums transitioned to Ed-Stem, which employs a simplified interaction structure consisting primarily of questions, posts, comments, and announcements. As shown in Figure 3, contributions during this period were dominated by questions, which accounted for the majority of recorded activity in both courses.

Viewed at the level of platform-aligned contribution categories, the primary cross-era change is a reduction in participation volume rather than a redistribution of interaction types. As shown in Figures 1 and 3, participation frequency has declined in the post-GenAI era, while question-oriented contributions remain dominant across platforms. Despite how Piazza and Ed-Stem structure interactions, contribution-type patterns indicate a continuity in the functional use of online discussion forums even alongside reduced engagement frequency.

RQ2: Forum participation–performance relationship before vs. after GenAI

This section addresses how the relationship between students' discussion forum participation and their academic performance differed between the pre- and post-GenAI eras. Figure 4 shows the mean contributions and anonymity percentages for CS1-Eng and CS2-OOP in both eras.

CS1-Eng: The relationship between forum participation frequency and academic performance was weak in both eras, with no clear strengthening with the adoption of GenAI. During the pre-GenAI era, average forum participation was similar across letter grades, with no statistically significant differences. In the post-GenAI era, average participation declined across all letter grades, and

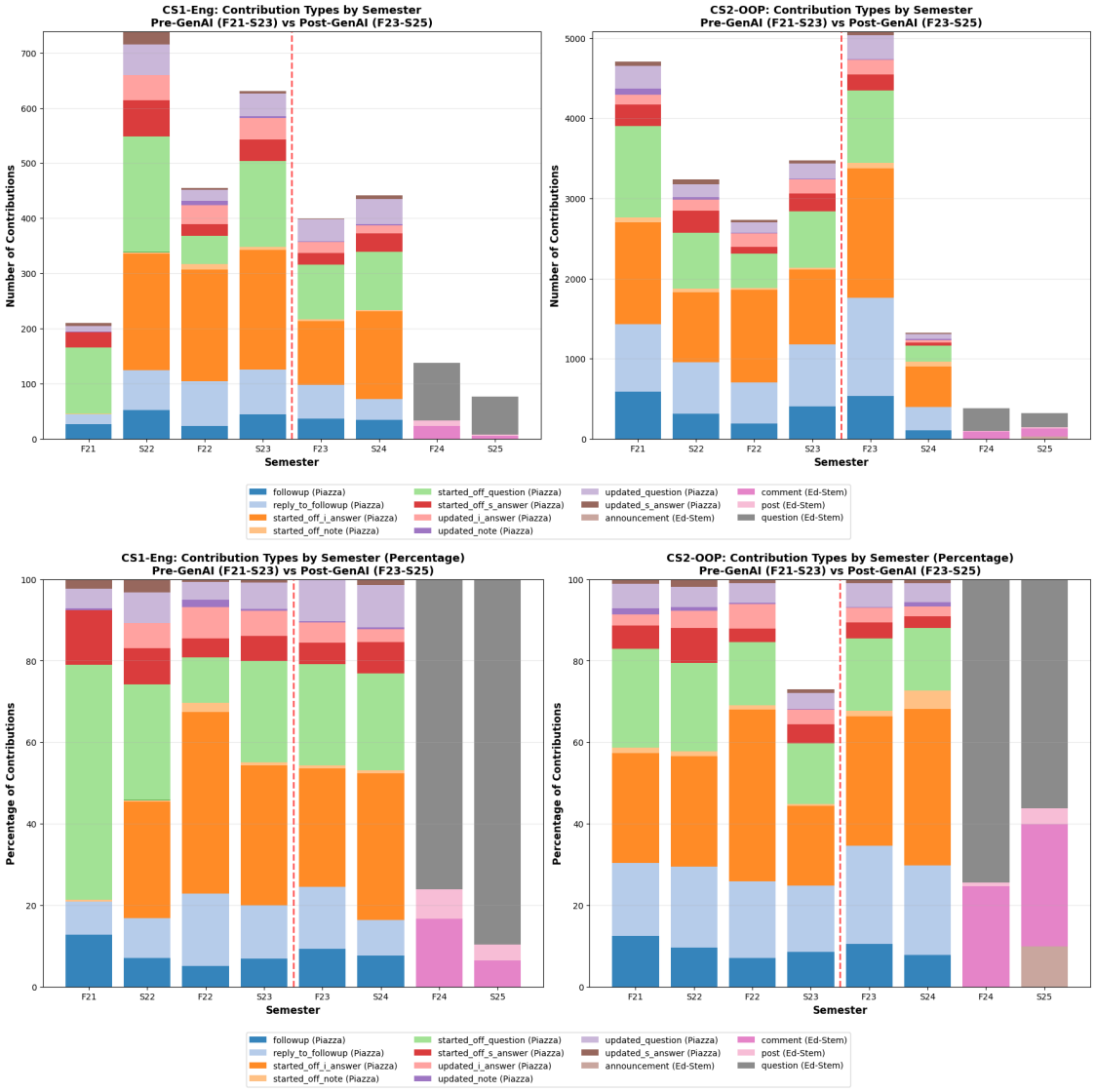
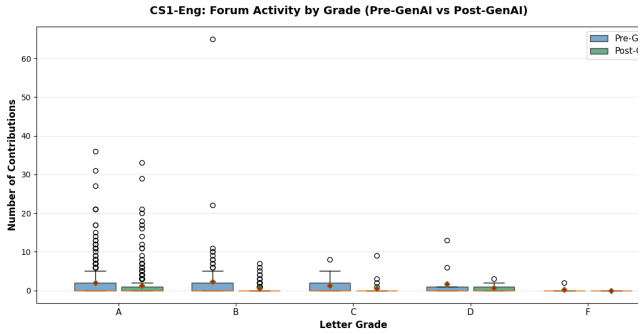


Figure 3: Breakdown of types of contributions by course and semester. Includes absolute counts (top row) and percentage distribution (bottom row).

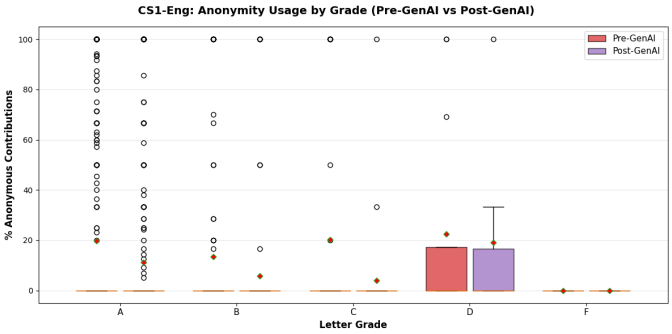
a Kruskal-Wallis test indicated a significant overall difference (p = 0.037). However, post hoc pairwise comparisons with the Bonferroni correction revealed no significant differences.

The relationship between anonymity usage and academic performance weakened from the pre-GenAI to the post-GenAI era. During the pre-GenAI era, anonymity use differed significantly across letter grades ($p < 0.001$), with higher-performing students (grades A and B) and lower-performing students (grades D and F) exhibiting higher anonymity rates than middle-performing students. In the post-GenAI era, this pattern did not persist. A chi-square test revealed no significant association between letter grade and anonymity usage (p = 0.303), and anonymity rates converged across grade categories.

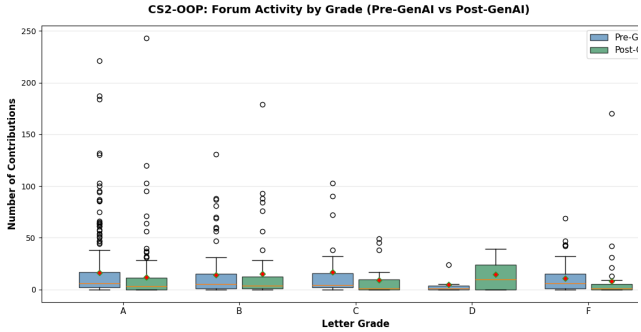
CS2-OOP: The relationship between forum participation frequency and academic performance



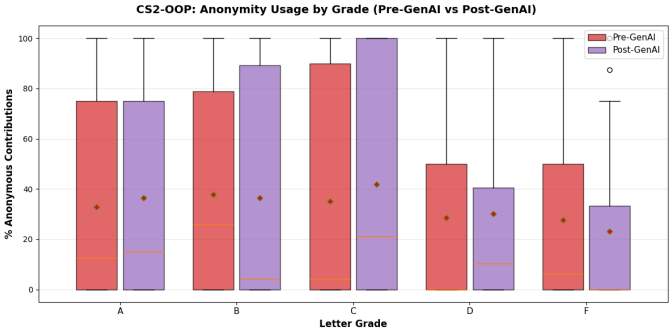
(a) CS1-Eng Forum Activity in Pre- and Post- GenAI era



(b) CS1-Eng Forum Anonymity in Pre- and Post-GenAI era



(c) CS2-OOP Forum Activity in Pre- and Post-GenAI era



(d) CS2-OOP Forum Anonymity in Pre- and Post-GenAI era

Figure 4: Forum participation and anonymity by academic performance before and after the widespread availability of GenAI tools. Boxplots show per-student distributions of count and percent of contributions posted anonymously, stratified by final letter grade and era (pre-GenAI vs. post-GenAI). Boxes indicate inter-quartile range with median lines; whiskers and points denote spread and outliers, and diamonds mark group means.

changed clearly between eras. During the pre-GenAI era, participation levels varied across grades but did not differ significantly ($p = 0.302$), indicating no strong association between forum activity and academic performance. In the post-GenAI era, a Kruskal-Wallis test revealed statistically significant differences in forum activity and letter grade ($p = 0.039$). Post-hoc pairwise comparisons showed that lower-performing students participated significantly less than higher-performers.

Anonymity use remained strongly associated with academic performance in both eras, though the nature of the relationship changed across them. During the pre-GenAI era, differences in anonymity use were statistically significant across letter grades ($p < 0.001$), exhibiting a complex pattern, with particularly high anonymity among lower-performing students. In the post-AI era, anonymity usage again differed significantly by grade ($p < 0.001$), but the distribution reorganized. Higher-performing students, particularly those earning A's, accounted for a larger share of anonymous contributions to the forum in the post-GenAI era.

Discussion

RQ1: Changes in Forum Participation After the Widespread Availability of GenAI

Across both courses, we witnessed a decrease in forum participation in the post-GenAI era, while the distribution of contribution types remained stable. Question-oriented contributions dominated forum activity across platforms and eras, indicating continuity in the core role that discussion forums play as spaces to articulate questions and obtain context-sensitive feedback [6, 22]. These findings suggest that GenAI tools did not displace discussion forums, but contributed with a reduced usage of them.

This pattern aligns with prior work framing help-seeking as a strategic and self-regulated process [1, 2]. As GenAI provides a private, low friction alternative for some forms of assistance, students may reallocate their help-seeking activity away from online discussion forums without disengaging from them entirely. Consistent with research on selective participation, lower posting frequency should not be inferred as diminished learning engagement [8].

RQ2: Reconfiguration of Participation and Anonymity With Respect to Performance

While participation declined in both courses, the relationship between forum engagement and academic performance evolved differently across instructional contexts. In CS1-Eng, forum participation remained weakly associated with academic performance in both eras. In contrast, CS2-OOP exhibited a clear change between eras. In the post-GenAI era, lower-performing students participated significantly less than higher-performing students, and anonymity usage was more prominently seen in these higher-performing students. Rather than acting as a uniform indicator of engagement, participation in the online discussion forum appeared increasingly selective and aligned with academic performance. Together, these findings caution against the assumption that forum participation metrics carry stable meanings across instructional contexts or GenAI eras.

Changes in anonymity usage in the post-GenAI era further illustrate how forum participation has been re-contextualized. Prior research has emphasized anonymity as a mechanism for reducing social anxiety and lowering barriers to participation [10, 11, 21]. While this functionality remains prevalent, the CS2-OOP post-GenAI patterns suggest that anonymity increasingly serves as a tool for managing the visibility of help-seeking.

Limitations

This study has several limitations that should be considered when interpreting the results. First, although the analysis is framed around a pre- and post-GenAI comparison, it cannot establish causal relationships between the availability of generative AI tools and observed changes in forum participation or its relationship to academic performance. While the temporal boundary is supported by external evidence documenting rapid adoption of generative AI in higher education [17, 25], other unobserved factors—such as cohort differences, instructional changes, or broader shifts in educational technology—may also have contributed to the observed patterns.

Second, the quantitative design of this study limits insight into students' motivations, perceptions, and decision-making processes. While shifts in participation frequency, anonymity usage, and performance-linked patterns are evident, the analysis cannot directly capture how students reason about using forums versus generative AI tools or how they interpret the social norms surrounding

forum participation. Qualitative follow-up work is needed to better understand the mechanisms underlying these changes, and this is one potential direction for future work.

Third, academic performance was characterized using final course letter grades, which are an imperfect proxy for learning. Grades reflect multiple factors beyond conceptual understanding, and the use of categorical grade groupings may obscure more fine-grained relationships between participation and performance.

Finally, this study focuses exclusively on online discussion forums as a single help-seeking channel. Other forms of support, such as office hours, peer collaboration, and direct use of generative AI tools, were not measured. As a result, the findings should be interpreted as reflecting changes in forum participation within a broader and increasingly complex help-seeking landscape, rather than comprehensive changes in student help-seeking behavior.

Conclusion

This study examined how students' engagement with online discussion forums changed before and after the widespread availability of GenAI tools, focusing on participation frequency, anonymity usage, and relationships with academic performance. Rather than indicating the decline of discussion forums, the findings suggest that the post-GenAI era is characterized by a reconfiguration of how forums are situated within students' broader help-seeking ecosystems.

Across eras, the dominant forms of forum engagement, particularly question-oriented contributions, remained stable, even though participation frequency declined. This suggests online discussion forums' continuity to serve important functions related to contextualized and human-mediated support. The reduced participation frequency points to a redistribution of help-seeking across an expanding set of resources, including GenAI tools, rather than disengagement from online forums.

The relationship between forum participation, anonymity, and academic performance shifted in the post-GenAI era. Forum activity no longer functioned as a uniform signal of course engagement, and anonymity emerged as a more important function of how participation aligned with academic outcomes. These patterns suggest that online forum engagement has become increasingly selective and strategic, shaped by considerations of visibility, effort, and perceived appropriateness of public help-seeking in AI-enabled learning environments.

Together, these findings underscore the need to reconsider how online forum participation metrics are interpreted in introductory computer science courses. As GenAI tools continue to reshape students' access to support, forum engagement should be understood as adaptive behavior within a changing help-seeking landscape, rather than as a simple indicator of effort or learning.

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