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# The Power of Five More Dollars: Exploring the Influence of Incentives and Reminders on the Response Rate for an Online Survey of STEM Majors

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## ABSTRACT

*Survey research is widely used in STEM education. Low response rates may risk validity and representativeness. This study investigates the impact of monetary incentives, reminder notifications, and student demographics on survey response rates among STEM majors at a rural public university. An online survey was distributed to 2,046 STEM students, with key majors randomly assigned to the $0, $5, or $10 incentive condition and exposed to multiple reminder types. The results indicate that response rates increased by approximately 9% with each additional $5 incentive and were enhanced by personalized reminder messages. The combined use of modest incentives and targeted reminders increased response rates within targeted subgroups to as high as 71%. These findings offer practical methodological recommendations for researchers seeking to improve survey response rates within STEM populations.*

**Keywords:** Incentives, Reminder Notifications, Response Rate, STEM, Survey Research



## INTRODUCTION

Online surveys are being increasingly used in educational research, as they allow large amounts of data to be collected in a relatively short time (Daikeler et al., 2022; Manfreda et al., 2008; Saleh & Bista, 2017). These surveys are often designed to capture individuals' understanding, experiences, and perceptions.

In education research, the STEM population represents a critical group of interest for reasons such as workforce development, technology innovation, and the preparation of future educators. Although the STEM population has been identified as an important group to study, its substantial academic and research demands may further limit STEM students' willingness to participate in voluntary survey research. For these reasons, it is important to better understand STEM population motivation for survey participation (Chen et al., 2025).

This challenge is especially relevant, as survey research is frequently used to examine persistence in STEM, student retention, and the ongoing shortage of K–12 STEM teachers. As a result, improving survey participation within STEM populations is not only a methodological concern but also necessary for informing education policy.

A continuous challenge in survey research is obtaining a high response rate; the percentage of surveys completed out of those that were sent. Low response rates raise concerns about validity, nonresponse bias, and the representativeness of findings (Wilson et al., 2024). Scholars in education have reported that typical response rates are approximately 44% (Stoffel et al., 2024), with studies indicating ideal rates of at least 60%- 67% (Manfreda et al., 2008; Wilson et al., 2024). Online surveys tend to produce response rates approximately 12% lower than those of other modes (Daikeler et al., 2020). Additionally, fraudulent participation may also be a concern with survey data (Mistry et al., 2026).

Despite the importance of response rates, relatively few studies in education have systematically examined the methodological factors that influence survey participation, such as incentives and reminder schedules (Neal et al., 2020; Wu et al., 2022), particularly among STEM populations. Although survey use in STEM

education research is well established, methodological research on optimizing survey participation among collegiate STEM majors remains limited. Much of the literature focuses on survey content rather than the processes that shape participation.

Given the high stakes associated with STEM education outcomes and the reliance on survey data to study this group, there is a clear need to understand how to effectively engage STEM students in survey research. This gap highlights the need for research on practical strategies to improve response rates in educational survey research and motivates the following research question: How do incentive amounts, reminder notifications, and student demographics influence the response rate of an online survey among STEM majors at a rural public university?

## LITERATURE REVIEW

Although relatively few studies focus specifically on survey methodology in STEM education, the broader literature identifies several factors that influence participation in online surveys. Two main themes emerged regarding the use of incentives and the timing/structure of reminder notifications, both of which can be tied to social exchange theory (SET; Homans, 1958).

### Social Exchange Theory

As a theoretical framework for this study, we consider SET. Homans (1958) suggested that human behavior is guided by an evaluation of costs and benefits, noting "that interaction is an exchange of goods, material and nonmaterial" (p. 597). Individuals are more likely to engage in an action when they perceive that the rewards of participation outweigh the associated costs. These rewards may be material items, such as financial gains, or nonmaterial, such as social approval or a sense of contribution. Costs may include time, effort, or mental burden.

SET also states that exchanges are shaped by social norms such as reciprocity, trust, and obligation, which highlights that participation decisions are not purely transactional but also relational. In an applied research context, SET can be used to explain participation behaviors in areas such as education and health research. Within the survey methodology, this framework suggests that participation can be increased by enhancing perceived rewards, reducing perceived costs, and strengthening social connection. Kosakow & Greenberg (2026) reported that, compared with other motivation-based survey questions, SET may elicit higher response rates. The following sections examine incentives and reminder notifications through this theoretical lens.

## Incentives

Research on incentives for online surveys presents mixed findings. Many studies report that monetary incentives increase response rates, although the type and amount of incentive matter. For example, in a meta-analysis of medical survey research, Abdelazeem et al. (2023) reported that money was the most effective incentive, followed by vouchers and lotteries, and recommended approximately $10. Similarly, Jia et al. (2021) confirmed that monetary incentives significantly improved both early and final response rates, suggesting an optimal range of $5–$15. For STEM majors, who often balance intensive coursework, laboratory requirements, and extracurricular research commitments, modest financial incentives may offset the perceived opportunity cost of survey participation and highlight the reward of participation.

The relationship between incentive amount and participation is not strictly linear. Fan and Yan (2010) reported that although incentives can increase response rates, increasing the amount does not always yield a directly proportional increase in responses. Several studies have also reported that prepaid incentives yield higher response rates than those distributed afterward do (Church, 1993; Smith et al., 2019; Wu et al., 2022), as participants may feel a greater obligation to complete the survey because of relational motivations. Other researchers have proposed alternative incentive formats, such as charitable donations, which may motivate participants who are less responsive to personal monetary rewards (Stoffel et al., 2024).

Despite these trends, not all studies find incentives to be effective. Wu et al. (2022) and Wilson et al. (2024) reported no statistically significant effect of incentives on response rates in some contexts. Cook et al. (2000) further cautioned that incentives may deter participation if participants infer that the survey will be time-consuming or difficult. Sobolewski et al. (2024) reported zero fraudulent responses in the no-incentive condition.

From a SET perspective, incentives increase personal rewards through direct monetary means, which shifts the cost–benefit balance in favor of participation. In their review of the effects of incentives, Singer & Ye (2013) utilized the SET framework to explain incentives and noted incentives' ability to increase response rates while also cautioning against the lack of evidence on "how large an incentive should be" (p. 134). Together, these findings suggest that although incentives can increase response rates, their effectiveness depends on the amount, timing, and population context, highlighting the importance of strategically testing incentive strategies within specific groups such as STEM majors.

**Reminder Notifications**

Another consistent theme in the literature is the important role of reminder notifications in increasing survey response rates. Wu et al. (2022) recommend pre-contacting participants before sending a survey to set expectations and promote engagement. Following the distribution of the initial invitation, multiple studies emphasize the effectiveness of sending several reminders (Cook et al., 2000; Neal et al., 2020).

Some research addresses the optimal number and timing of reminders as well. Jia et al. (2021) suggested that after initial contact, two reminders strike an ideal balance between prompting participation and avoiding excessive messaging. In fact, Neal et al. (2020) argued that a single follow-up phone call can double the likelihood of survey completion, making this technique more effective than an increase in incentives. Note that the modality of a phone call may also be relevant. This suggestion initiates the personalization process, which also emerged as a key factor.

Cook et al. (2000) highlight that personalized reminder messages, especially those referencing a past connection or familiarity with the researcher, lead to higher response rates. Heerwegh et al. (2005) suggested that a personalized approach can increase the response rate by 8.6% without decreasing data quality. This may be particularly relevant in STEM disciplines, in which faculty–student interactions often extend beyond the classroom through research groups, lab courses, advising relationships, and name recognition from peer discussions. Smith et al. (2019) reported that personalizing survey envelopes to include residents' names, rather than addressing these envelopes to "Current Resident", increased response rates. Collectively, the literature suggests that well-timed, personalized reminders may be as essential as incentive strategies in maximizing participation. Recent methodological research has further demonstrated that seemingly minor survey administration decisions can influence both the response rate and respondent representation, reinforcing the importance of survey design considerations beyond survey content itself (Dinh et al., 2026). However, it is important to note that while we may expect an increase in participation, the impact may be minimal in some cases (Porter & Whitcomb, 2003).

This direct tie to personalization in messaging can also be tied to the SET framework. Reminder notifications operate differently from incentives by shaping the relational aspects of the exchange. Personalized reminders may increase feelings of connection or obligation and increase the social reward associated with those conducting the research. Individuals may also be more compelled to respond when they perceive the interaction as relational instead of transactional.

## RESEARCH METHOD

This study falls within a larger research project focused on STEM majors' perspectives of realistic job previews offered through a public, regional comprehensive university. The purpose of this study was to compare perceptions of STEM teaching opportunities with industry and/or academic experience (e.g., internships and research experiences for undergraduates). A survey was developed to explore students' knowledge of, involvement with, and experience with these opportunities. The survey was expected to take students approximately 15 minutes and was composed of multiple-choice, Likert-type, and open-ended questions.

The university serves approximately 12,000 students, with few selective admissions. The institution has a strong focus on undergraduate students while still offering multiple master's degrees and a limited number of doctoral degrees. The university provides strong support for many first-generation students and, with its rural environment, fosters strong faculty–student interactions.

Given the survey's focus on STEM teaching, majors with the potential for STEM teacher certification (i.e., biology, physics, biochemistry, chemistry, and mathematics) were categorized as key majors and included in the incentive groups. The survey was first distributed via Qualtrics to all STEM majors, including these key majors. In total, 2,046 surveys were distributed across 14 majors, based on institutional records. This included 477 surveys that were sent to the five key majors.

**Table 1**
*Number of Surveys sent for Incentive level by Major*

| Major | $0 Incentive | $5 Incentives | $10 Incentives |
|---|---|---|---|
| Biology | 88 | 87 | 87 |
| Physics | 9 | 9 | 9 |
| Biochemistry | 22 | 22 | 22 |
| Chemistry | 19 | 18 | 18 |
| Mathematics | 23 | 22 | 22 |
| Non-Key Majors | 1569 | 0 | 0 |

*Note.* Key Majors' students were randomly and evenly assigned to the $0, $5, and $10 incentive categories. Incentives were awarded via an Amazon gift card upon completion of the survey. Students who were not in a key major did not receive any incentives for participation.

To understand the role of incentives, Key Majors' students were randomly and evenly assigned to the $0, $5, and $10 incentive categories, as shown in Table 1. Incentives were awarded via an Amazon gift card upon completion of the

survey. Incentive groups were asked to provide an email address for electronic gift card delivery. Batches of gift cards were sent on three occasions and were delivered within 20 days of completing the survey. Students who were not in a key major received no incentive to participate.

Students were initially sent survey information via a personalized Qualtrics invitation on the first day the survey was open. Three additional reminders, initiated via a Qualtrics email address, were sent three, seven, and nine days after the initial invitation. Finally, a reminder from the official university-based email address of a well-known professor was sent on day sixteen. The survey remained open for 70 days.

The analysis of the data included calculating response rates on the basis of incentive amounts and in reference to the reminder timeline. In addition, response rates were disaggregated by GPA (excluding students with no GPA) and class standing on the basis of institutional records. To ensure the validity of the results, both descriptive and inferential statistics were calculated, with the latter yielding a number of statistically significant findings.

## RESULTS

Among the 2046 surveys sent, 523 completed responses resulted in an overall response rate of 25.4%. Overall, the responses indicated a general trend that incentives and additional reminders increased the response rates.

### Incentive Impact

The key majors included the entirety of the incentive group and submitted 213 completed responses. This resulted in an overall response rate of 44.7% for this subgroup of key majors, which was much higher than the overall STEM-major population rate of 25.4%. Even unincentivized key majors responded 35.4%, which was a 10% increase from the overall response rate. When further identifying the response rate by incentive amount, there is a clear trend in response rates, as seen in Table 2. For each additional $5, there was an approximately 9.5% increase in the response rate. These results suggest a clear, positive relationship between incentive level and survey participation among key majors. A chi-square test for independence indicated that higher incentives corresponded to higher response rates, $\chi^2(2) = 11.75$, $p = 0.003$. Because the groups are ordered, a Cochran-Armitage test was run for trend, which indicated a significant increasing trend in response rates as incentives increased ($Z = 3.43$, $p < 0.001$).

**Table 2**
*Same Day Response Rates by Incentive Amount and Reminder*

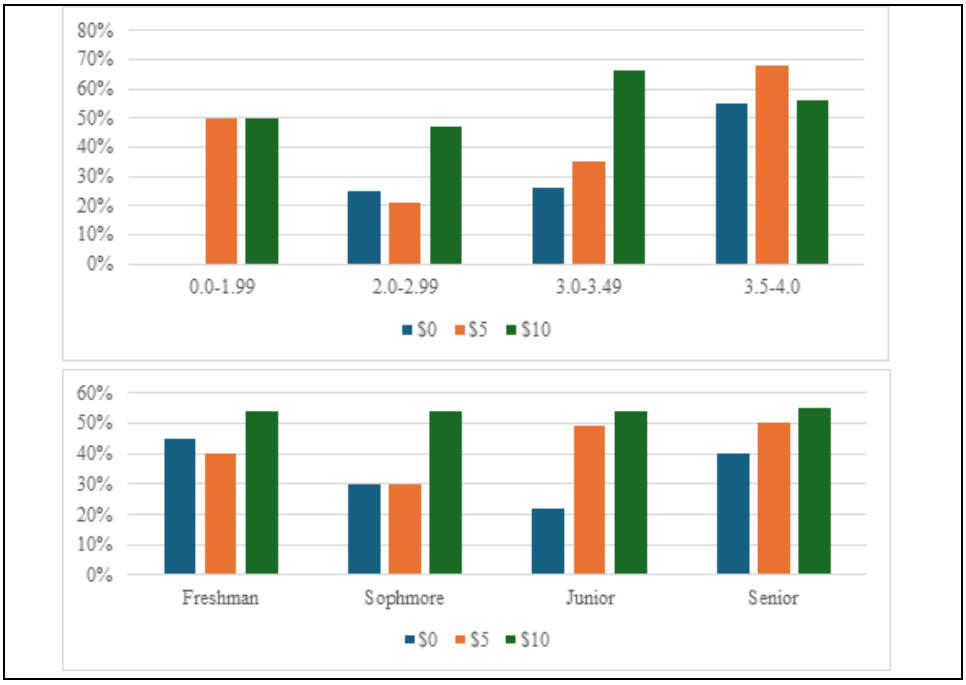
| | Initial Email | 1st Reminder (3 days later) | 2nd Reminder (7 days later) | 3rd Reminder (9 days later) | Personalized Reminder (16 days later) | Total Response Rate |
|---|---|---|---|---|---|---|
| $0 Overall | 3.1% | 5.6% | 4.6% | 2.5% | 5.1% | 21.0% |
| $0 Key Majors | 3.1% | 13.0% | 6.8% | 1.9% | 8.7% | 35.4% |
| $5 Incentive | 16.5% | 10.1% | 5.1% | 3.8% | 8.2% | 43.7% |
| $10 Incentive | 19.0% | 15.2% | 5.1% | 3.2% | 12.0% | 54.4% |
| All Response | 5.4% | 6.7% | 4.7% | 2.7% | 5.9% | 25.4% |

*Note.* When further identifying the response rate by incentive amount, there is a clear trend in response rate; for each additional $5, there was an approximately 9.5% increase in response rate.

When disaggregated by GPA, incentives appeared to have differing effects across academic performance levels (Figure 1). There is little impact for those in the 3.5–4.0 GPA range, $\chi^2(2) = 1.78$, $p = 0.41$, and drastically higher participation for those in the 3.0–3.49 range, $\chi^2(2) = 10.40$, $p = 0.006$. There is an overall greater impact for the $10 incentive on the 2.0–2.99 students, $\chi^2(2) = 6.94$, $p = 0.031$. Given the sample size ($n = 20$) in the 0.0–1.99 GPA range, the results from this group should be interpreted cautiously. This pattern suggests that modest incentives may particularly motivate students with mid-range academic performance.

**Figure 1**

*Response Rate by Incentive Amount, GPA, and Class Standing*




*Note.* Disaggregation of response rates by GPA does not include first-semester students who do not have a GPA at this time.

Progress through their course of study also appeared to moderate the impact of incentives, as shown in Figure 1. Disaggregation by academic year demonstrated the greatest effect of incentives on junior students, $\chi^2(2) = 8.69$, $p = 0.013$. Sophomores and seniors also saw an increased response rate as incentives increased, although the difference did not reach statistical significance (sophomores: $\chi^2(2) = 5.11$, $p = .078$; seniors: $\chi^2(2) = 1.96$, $p = 0.37$—larger p value because of the imbalanced sample). The freshman response rate improved overall as well, although there was a decrease in the response rate for the freshman $5 category. This did not approach statistical significance, $\chi^2(2) = 2.18$, $p = 0.34$. Consistently, the $10 incentive produced the highest response rate, and an incentive of any kind corresponded to higher response rates across all class standings.

When demographic information about key majors was considered, the response rate for female participants was greater (47%) than that for male participants (39%). This trend held true across all incentive rates, with the gap ranging from 5% to 13%. When race/ethnicity was considered and when groups

with at least 30 responses were limited, the overall response rates were similar (42% to 48%); however, the increase based on the incentive category was noticeably different. For white students (n = 254), there was a 10% increase from the $0 incentive to the $10 incentive, but for Hispanic (n = 130) and black (n = 50) students, the increase was approximately 30%.

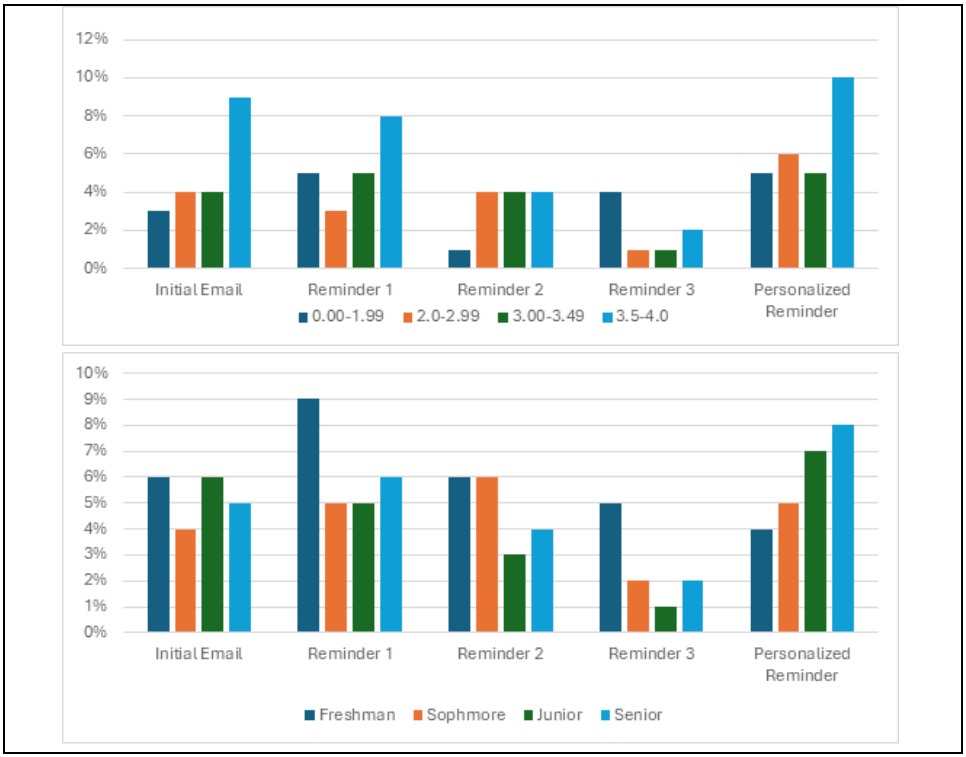
In summary, higher incentive levels were consistently associated with increased response rates among key majors, particularly among students with mid-range GPAs and among those with junior or senior standing or Hispanic and Black students. These findings highlight the potential for modest financial incentives to substantially improve survey participation rates in targeted student populations.

**Reminder Impact**

In the initial invitation, multiple reminders, and a final reminder from a well-known faculty member's university email account, several trends emerged in response behavior. With each reminder sent, additional responses were collected. After the initial survey invitation, 5% of the participants responded. With the first, second, and third reminders, the response rates increased by 7%, 5% and 3%, respectively. The final email reminder from a faculty member's university email elicited a 6% response rate. These results suggest that initial and personal reminders, especially from a recognizable professor, can dramatically increase survey participation.

Disaggregating by GPA, the response rates over time were quite similar for the lower three GPA categories, 0.00–1.99, 2.00–2.99, and 3.00–3.49, but significantly different for the 3.5–4.0 category (Figure 2). For instance, the initial email response rates for the three lower GPA categories were 3%, 4%, and 4%, respectively. However, for the 355 recipients in the 3.5–4.0 GPA category, there was a 9% response rate to the initial survey, $\chi^2(2) = 12.88$, $p < 0.001$. Similarly, there was a significant difference between the response rates for the lower three groups after the first reminder (4% response rate) and the 3.5–4.0 group (8% response rate), $\chi^2(2) = 6.54$, $p = 0.011$. Interestingly, there was no difference in response rates after the second and third reminders. However, the difference appeared again with the final reminder from a professor. The three lowest GPA groups responded at a 5-6% rate, whereas the 3.5-4.0 group responded at a 10% rate, $\chi^2(2) = 9.55$, $p = 0.002$.

**Figure 2**
*Response Rate by Reminder, GPA, and Class Standing*




*Note.* Disaggregation of response rates by GPA does not include first-semester students who do not have a GPA at this time.

We also examined changes in response rates across academic years. The response rates after the initial email, the second reminder, and the personal reminder via a professor's university email were not significantly different. However, freshmen responded at higher rates after the first and third reminders. The first reminder difference was a 9% response rate versus a 5–6% response rate, $\chi^2(2) = 11.36$, $p < 0.001$. The third reminder difference was a 5% response rate versus a 1–2% response rate, $\chi^2(2) = 13.16$, $p < 0.001$.

When the relationship of demographic information to the reminder schedule was considered, females responded at higher percentage rates than males did at all the notifications. However, there was no clear pattern of response rate for either sex. Similarly, for race/ethnicity data, there was no overall trend to report.

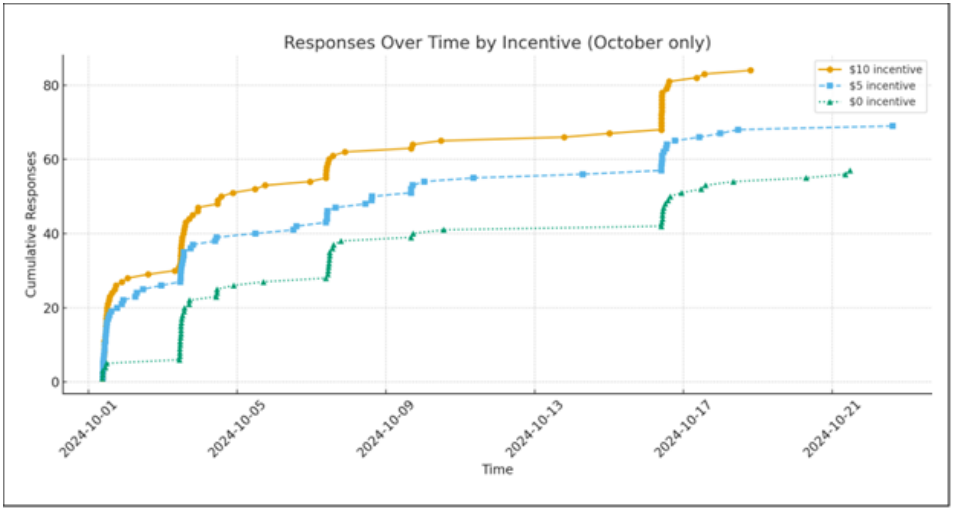
In summary, reminders clearly influenced participation, with the greatest effects occurring early in the distribution process, when a follow-up reminder came from a well-known professor's university-based email, for the 3.5-4.0 GPA group,

and for freshman students. These findings suggest that personalization can be as impactful as small monetary incentives and that the timing and source of reminder messages may be more critical than the sheer number of contacts.

**Incentive and Reminder Interactions**

We also examined the incentives and reminder–schedule interactions (Figure 3). Among incentivized students, the initial invitation produced the highest single-day response rate. For the participants offered the $10 incentive, the initial reminder generated the largest percentage of single-day responses (19%). In addition, the $5 incentive also produced a high response rate (17%). In contrast, the unincentivized group demonstrated relatively low initial participation (3.1%). However, the initial reminder (two days later) elicited the greatest number of responses from this group for a single day (6%). Reminder 2 (six days after initial) and Reminder 3 (eight days after initial) resulted in relatively low overall additional responses across all groups. With the exception of the freshman students, Reminder 3 generated the lowest level of engagement for all the other categories. A chi-square test across all incentive levels and reminders yielded significance, $\chi^2(2) = 37.6$, $p < 0.001$.

**Figure 3**
*Response Rates by Incentive*




*Note.* The highest response rate occurred in the incentivized group via the initial survey notification.

Looking further at the key major population, we see that the final personalized reminder, sent from a faculty email address seven days after Reminder 3 (and 15 days after initial), produced similar responses as Reminder 1, which was sent directly by Qualtrics using automation. Because all the reminders included this faculty member's name, we also chose to analyze data from the faculty members' current and former students independently. The subgroup of students who took a class with the faculty member who sent the personalized email produced an overall response rate of 59%. This represents a 14% increase in the response rate overall. Disaggregating by the incentive amounts of $0, $5, and $10, the response rates were 49%, 57% and 71%, respectively. In addition, eight students directly contacted the faculty member to state that they would complete the survey, including four who were in the $0 incentive category.

Finally, we examined a full logistic regression model of all participants with normalized GPA, academic year in school, and incentive amount as independent variables. The model included all interaction and quadratic terms. This model produced a likelihood ratio test with $p<.000001$ but a modest McFadden's pseudo R2 of 0.11. Four of the five least significant terms were all terms involving year in school; thus, this variable was removed from consideration. The fifth term with minimal significance was the quadratic incentives term. Since incentives had only three values and were normalized, this minimal significance was to be expected, and the term was eliminated. We ran the model again, employing only GPA, quadratic GPA, incentives, and an interaction term. McFadden's pseudo R2 remained at 0.11, and the likelihood ratio p<value decreased to below 10-8. The specific variable p values, in order of significance, were GPA ($p<0.001$), incentive ($p<0.001$), GPA2 ($p=0.004$), and GPA-by-incentive interaction ($p=0.066$). Overall, the more parsimonious model preserved explanatory power and demonstrated that the primary drivers in this study were the student's GPA and incentive level, with a limited contribution of interaction effects.

## DISCUSSION & CONCLUSIONS

This study indicates that survey participation among STEM students can clearly be understood as a social exchange process in which both material incentives and relational cues jointly shape participation decisions. The findings demonstrate that neither incentives nor reminders operate independently; rather, response behavior reflects how students evaluate the combined rewards, costs, and social context of participation. Incentives, clear monetary rewards, increased response rates across multiple groups, and personalized reminders appeared to strengthen participation through relational factors. Together, these findings suggest that participation in STEM populations is not driven by a single methodological strategy but rather by how participants evaluate the overall exchanges associated with completing a survey.

**Incentives, Reminders, Demographics, as Social Exchange**

The approximately 9.5% increase per $5 provides strong evidence that modest incentives meaningfully shift the cost–benefit calculation of participation, a clear connection to prior literature (Abdelazeem et al., 2023; Jia et al., 2021; Saleh & Bista, 2017). However, given the conflicting literature on this impact of incentives on a broader population (Wilson et al., 2024; Wu et al., 2022), this study also provides insight through SET on how incentives, for some groups, may not be enough to encourage participation. If the monetary reward is not perceived as enough to offset the burden of time/effort to complete the survey, potential participants may choose not to contribute. In such cases, this study highlights the additional importance of relational considerations.

Even with a total of four personalized Qualtrics invitations, many students did not complete the survey until a professor sent an invitation from their university-based email address. Through the lens of SET, this may reflect increased levels of trust, legitimacy, familiarity, or social obligation associated with the interaction. Rather than being a reminder, this message reframes participation as a relational exchange connected to an identifiable member of the university community. Although prior research has emphasized the importance of personalization (Cook et al., 2000; Heerwegh et al., 2005; Smith et al., 2019), these data support that the medium through which personalization is utilized is equally important. This can be highlighted by the student response affirming their intention to complete the survey from students of all incentive levels. (As a cautionary note, if university-based email is used, informing information technology services as institutional email limits may restrict distribution volume.)

The findings further suggest that participation strategies may not operate uniformly across all student populations. Students with higher GPAs participate at consistently higher rates (Porter & Umbach, 2026), suggesting that participation in this group may be driven more by intrinsic- or compliance-related motivations than by external incentives. Similarly, females also engaged at higher rates which is consistent with the findings of prior literature indicating that women are more likely to engage in cooperative and helping behaviors than men are (Eagly & Crowley, 1986). In contrast, the substantially larger gains observed among Black and Hispanic students indicate that incentives may play a more critical role in shaping participation for some groups. Importantly, the findings should not be simply viewed as participation tendencies but as indicators that students may evaluate survey participation differently depending on social, institutional, and motivational factors, which reinforces the usefulness of SET as a framework for understanding participation behavior.

Together, these findings contribute to the growing literature on survey methodology by extending SET into the context of STEM education research. Although prior studies have broadly examined incentives and reminders, relatively

little work has explored how these strategies operate specifically within STEM populations or how relational communication may interact with monetary incentives. The present study suggests that participation among STEM students may be particularly sensitive to both perceived effort and perceived relational connection. As a result, improving the response rate may require researchers to move beyond purely procedural survey administration practices toward more intentional strategies that consider both transaction and relational dimensions of participation.

**Implications for Future STEM Survey Research**

Several practical implications emerge from these findings. First, modest monetary incentives may substantially improve response rates among STEM populations. At just $5, this study experienced an increase in responses. Additionally, reminder schedules appear most effective when strategically timed. Finally, personalization may be as influential as incentives in promoting participation. Researchers conducting STEM survey methodologies may benefit from incorporating personalized communication strategies, potentially through other faculty members or institution representatives with whom the participants are familiar. Although these suggestions cannot guarantee an increase in response rates, there is evidence that following these suggestions aligns with best practices and is likely to increase response rates.

**Limitations/Suggestions for Future Research**

Notably, the results of this study were developed from a single survey with a specific topic focused on realistic job previews. Additionally, the study was conducted at a rural institution in the United States. Institutional characteristics such as size, student demographics, and campus culture may influence participation behaviors differently than other institutions do. Although the survey was sent to the entire STEM population at a single institution, only the subset of key majors was incentivized. With the use of this subpopulation, it may not be possible to fully separate the effects of incentive conditions from potential differences in motivation associated with these majors. Thus, it is possible that with a different survey topic and a different incentivized group, the results may differ. Although response rates increased substantially within several subgroups, the possibility of nonresponse bias remains. Students who elected to participate may differ systematically from nonresponses in ways not captured. Additionally, the study did not directly measure participants' perceptions of incentives or reminders, limiting the ability to confirm the proposed mechanisms of social exchange theory.

In future studies, the implementation of additional surveys across multiple institutions with various topics should be considered. Changing incentive amounts may also elicit different response rates. Finally, the use of a qualitative aspect to understand why students may or may not have taken the survey would help in understanding the nuances of this area. Future research should examine these dynamics in multiple contexts and populations to better understand the true impact incentives and reminders may have on the response rate.

## Conclusion

This study contributes to the limited body of methodological research focused specifically on the STEM population. The findings clearly suggest that modest monetary incentives, strategically timed reminders, and personal communication improve online survey response rates among STEM majors by increasing the benefits for participants.

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## AI STATEMENT

The authors used AI tools (ChatGPT) to improve the article's readability. AI was also utilized to find relevant literature for review. All the work, findings, and analyses are original works of the authors.

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