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Skills, Not Just Will: Experimental Evidence From Uganda on Transparency in Public Procurement

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ABSTRACT

Governments are usually the largest purchasers of goods and services, creating significant opportunities for corruption. We study whether offering training and technical assistance to procurement officials in 50 Ugandan districts prompted them to publish procurement actions on an online public portal, as legally required. Among districts that received the training and technical assistance program, we randomized whether procurement officials received information in advance about their eligibility to earn a public award for adherence to these transparency standards. We use national administrative data across multiple financial years and 134 district governments to evaluate impacts. The training and technical assistance program increased the number and value of procurement actions uploaded several-fold, while award eligibility did not have similarly large effects. These results suggest that motivation problems may be overemphasized in the fight against corruption. Building capacity in accounting and transparency could provide effective guardrails against corruption.

1 | Introduction

Public procurement represents a significant share of government spending worldwide, yet it is often vulnerable to inefficiencies and corruption. Procurement is typically managed by bureaucrats who earn modest salaries relative to the financial resources they control, creating incentives for corruption, kickbacks, and other forms of financial mismanagement. Beyond corruption, weak procurement processes contribute to cost overruns, poor-quality service delivery, and delays (Lewis-Faupel et al. 2016). Corruption may even distort public spending away from social services and toward areas like infrastructure where it is easier for officials to capture illicit funds (Liu and Mikesell 2014). Improving procurement practices, therefore, has the potential to generate substantial public benefits.

Diagnoses of financial mismanagement in public procurement often focus on bureaucratic incentives. Classic theories suggest

that underpaid bureaucrats will try to maximize their total compensation through both legal and illicit means, especially when detection and enforcement are weak (Becker and Stigler 1974). Many reforms have aimed to curb corruption through stronger monitoring or harsher penalties. However, these approaches are often ineffective in settings where there are no “principled principals” who prioritize clean governance (Persson et al. 2013).

Transparency in public procurement can serve as a safeguard against corruption by making government spending more visible to multiple parties and establishing routine accounting practices. When procurement processes are open, private sector bidders can see how contracts are awarded, reducing opportunities for favoritism and cost overruns (Baránek and Titl 2024). Empirical evidence supports this logic: mandatory publicity requirements for procurement auctions increase competition and reduce costs (Coviello and Mariniello 2014), and greater transparency in procurement is associated with lower

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Evidence for Practice

- A targeted capacity building program improved the performance of local government officials at meeting transparency standards in procurement.
- Offering public awards to bureaucrats is complementary to training and technical assistance, with marginal evidence that it increases willingness to meet transparency standards.
- Anti-corruption advocates should focus on boosting the performance of accounting officers and improving routine accounting practices, rather than just prosecuting corrupt acts.
- Addressing capacity constraints in public procurement is likely a key way to improve the performance of the public sector at meeting its obligations.

levels of corruption and better value for money (Ohashi 2009; Bauhr et al. 2020). Public disclosure also enables civil society, media, and oversight bodies to scrutinize procurement decisions, increasing the likelihood that irregularities will be detected and challenged. However, transparency practices require skills, resources, and motivation, providing an opportunity to test whether a training program and a motivational intervention can help build these guardrails.

This study tests whether a training program and public awards strengthen the capacity and motivation of bureaucrats to improve transparency in procurement. It contributes to long-standing debates about whether poor bureaucratic performance stems primarily from weak motivation or limited capacity. Transparency and public access to information policies are heralded as key practices in reducing corruption, but these practices are frequently not implemented in settings where corruption is widespread.

Bureaucrats may fail to comply with transparency requirements because they lack knowledge or technical resources, rather than the willingness. If so, training and technical assistance should improve compliance. Another possibility is that bureaucrats have little personal incentive to comply with procurement standards since they receive no direct benefit for doing so and face minimal consequences for noncompliance. In this case, awards and public recognition could provide non-financial incentives to adopt transparency practices by creating career and social benefits.

To test these ideas, we conducted a nationwide study and nested randomized controlled trial in Uganda. The main outcome of interest is the use of the Government Procurement Portal (GPP) by district governments. District governments ($n = 134$) handle approximately 10% of total public spending in Uganda and are primarily responsible for frontline services like local roads, schools, local health facilities, water, and sanitation, though they face significant administrative and financial challenges in delivering these services (Kyohairwe et al. 2024).

The GPP is an online platform on which government entities publish procurement plans, tender notices, contract awards, and

supplier information, with the aim of reducing corruption, improving competition among bidders, and promoting the efficient use of public funds. Despite being central to efforts to improve financial management, use by district governments has been low. Only 22 of 134 districts uploaded procurement plans in the financial year prior to our study, and only 12 of 134 districts uploaded any notices of awarded contracts.

Working with Transparency International Uganda and the Public Procurement and Disposal of Assets Authority (PPDA), we recruited procurement officials in 50 district governments and provided a half-day, in-person training and remote technical support on using the portal. Within this group of districts, we randomly assigned procurement officials from 25 districts to be informed in advance about the possibility of earning an award at a national ceremony if they were among the best-performing or most improved districts in using the portal. Procurement officials in the treated districts were repeatedly reminded about the award over several months, but otherwise received the same training and support as control districts.

We find that training and supporting bureaucrats on procurement standards significantly improves the use of the procurement portal, while we can rule out that offering awards had a similarly large effect. This suggests that capacity constraints may play a larger role than motivation in limiting transparency in public procurement. When comparing the 50 districts enrolled in the training and technical assistance program to all other districts in Uganda, we observe a very large relative increase in use of the procurement portal, roughly 16-fold in the number of items uploaded and more than 20-fold in uploaded value. By controlling for baseline use of the procurement portal and other aspects of district budgets, we address possible selection effects associated with a non-random sampling procedure for this aspect of the study.

Within the 50 districts that formed the experimental sample, providing information about the prospects for an award did not lead to similarly large effects, with positive and significant results appearing only in a small number of specifications and always at magnitudes below what the design can reliably detect.

This study advances research on bureaucratic performance by providing empirical evidence that capacity constraints, rather than just motivation, play a key role in shaping governance outcomes. While traditional theories of corruption emphasize bureaucrats' incentives to seek personal gain (Becker and Stigler 1974), recent work highlights how limited resources, overwhelming workloads, and weak institutional support can lead to poor governance outcomes, even when bureaucrats have good intentions (Dasgupta and Kapur 2020). In many low-accountability settings, bureaucrats are expected to manage complex procurement processes with minimal training and support. Local politicians may benefit from opacity, further reinforcing structural underinvestment in professional skills among bureaucrats.

Capacity-building programs are widely used in development, but rarely evaluated. While some research suggests they can improve governance outcomes (Alpizar et al. 2019), other work argues that knowledge alone is not enough (Zhang

et al. 2019). This study is among the first to show that training and supporting bureaucrats can significantly improve public sector governance. More broadly, it supports the idea that many bureaucrats enter public service not to benefit personally, but to produce public goods (Honig 2024). Creating supportive management practices like targeted and regular trainings may offer a way to boost the performance of public sector governance (Honig 2021), even when dealing with the thorny problem of corruption.

Finally, this study provides new evidence on the effectiveness of non-financial incentives in the public sector. While social status and prestige influence behavior in many domains, their role in bureaucratic performance has received less attention (Buntaine et al. 2024). Our results suggest that awards may complement training programs but are unlikely to drive large changes in public sector behavior. Their low cost still makes them an attractive complementary tool in resource-limited settings.

Improving transparency in procurement has broad policy implications for the efficient use of public funds. A growing body of empirical research demonstrates the value of transparency for governance outcomes. Public disclosure of government audits increases electoral accountability for corruption (Ferraz and Finan 2008), monitoring by government auditors reduces missing expenditures in public works (Olken 2007), publishing information about fund flows to local governments increases the share of funds reaching intended beneficiaries (Reinikka and Svensson 2011), and citizen access to information about government performance improves environmental governance (Liu et al. 2025). Direct evidence on transparency in procurement specifically is thinner, though existing work shows that publicity requirements increase competition and reduce procurement costs (Coviello and Mariniello 2014; Ohashi 2009). This study demonstrates that training and offering ongoing technical assistance to bureaucrats significantly increases compliance with transparency rules, leading to billions of shillings in additional disclosures.

2 | Motivation, Resources, and Skills for Controlling Corruption

Capacity building programs are pursued around the world with the idea that public agencies and their employees lack the skills and resources to perform their functions well. Capacity building programs increase the *potential* to act in accordance with official mandates (Williams 2021). They take many forms, including training, equipment and software upgrades, ongoing technical support, and networking opportunities, which are often bundled together to address the barriers public sector workers face.

Capacity constraints are hardly viewed as the dominant source of bureaucratic dysfunction; however, particularly when it comes to corruption. One line of research highlights how bureaucrats can have incentives to enrich themselves rather than provide public service, and so the challenge is to design institutions that improve oversight (Raffler 2022). Another line of work highlights how the structure of remuneration gives rise

to incentives for bureaucrats to engage in corruption (Van Rijckeghem and Weder 2001).

Understanding corruption as an incentive problem helps explain why it happens, but it does not provide all the answers about how to stop it. Many anti-corruption safeguards—such as properly accounting for public budgets and ensuring transparency in procurement—depend on bureaucrats who are not themselves engaging in corruption, but who are responsible for carrying out practices that deter it. The challenge, then, is not just to prosecute corruption more effectively, but to ensure that bureaucrats have both the skills and the motivation to build the safeguards that prevent it.

Indeed, a growing body of research questions whether incentive problems are at the heart of bureaucratic performance issues. Dasgupta and Kapur (2020), for instance, challenge the notion that incentive problems are responsible for bureaucratic underperformance in India, instead highlighting how most local officials are significantly under-resourced relative to their formal responsibilities. In this perspective, building state capacity means ensuring that bureaucrats have the skills, resources, and finances to meet those responsibilities, including for work related to anti-corruption.

Capacity building that provides information, skills, or new resources might overcome key constraints in many circumstances. Such programs are common in public financial management (Fritz et al. 2011), environmental management (Robins 2008), and public health (DeCorby-Watson et al. 2018). They are routinely applied to non-profit organizations (Despard 2016), communities (Alpizar et al. 2019), and firms (Cusolito et al. 2023). In most cases, they focus on the potential for actions rather than the motivation to act (Williams 2021). Because they do not directly address institutional design, they can be implemented without contentious reforms.

Despite the prevalence of capacity building, the evidence surrounding this approach is surprisingly thin. A recent meta-analysis of capacity building efforts in public health noted the limited number of outcomes measured and a variety of methodological problems in existing evaluations (DeCorby-Watson et al. 2018). While there have been recent experimental evaluations for non-profits, communities, and firms (Despard 2016; Alpizar et al. 2019; Cusolito et al. 2023), there is very little evidence about such efforts in the public sector.

Yet, just because a government official has the capacity and resources to act does not mean that they will. Both capacity and motivation are necessary ingredients for performance. A large literature in public administration examines the role of public service motivation—an individual's predisposition to act in line with public goals (Perry and Wise 1990; Perry 1996). Research shows that selecting and fostering public service motivation and other moral attitudes can have positive impacts on the performance of the public sector (Ntayi et al. 2013; Gans-Morse et al. 2022), and that mission-driven motivation is associated with higher effort even absent external rewards (Bellé 2013). Alongside intrinsic motivations, both financial and non-financial extrinsic incentives shape

bureaucratic behavior. A central concern in this literature is that financial incentives can crowd out intrinsic motivation (Bénabou and Tirole 2006), particularly in prosocial work environments. Meta-analytic evidence suggests that pay-for-performance in the public sector often carries hidden costs through this crowding-out mechanism (Weibel et al. 2010), and experimental work has shown that monetary performance pay can undermine the image motivation of public service workers, whereas symbolic recognition does not produce the same crowding-out effect (Bellé 2015).

The evidence on how financial and non-financial incentives affect bureaucratic behavior in developing countries is growing but remains concentrated in health and tax administration. Financial incentives have been shown to increase tax revenue among collectors in Pakistan (Khan et al. 2016), but can backfire among community health workers (Wagner et al. 2020) and deter pro-socially motivated candidates from applying to public service (Deserranno 2019). Non-financial incentives, including social recognition, have been shown to be more cost-effective than financial incentives among health workers in Zambia (Ashraf, Bandiera, and Jack 2014). However, evidence on how these incentive structures apply to bureaucrats working in procurement in low-income countries is essentially nonexistent.

Awards represent a specific class of non-financial incentive that may help to build and reinforce the motivation to excel in public service. Theoretically, awards can operate through several distinct channels (Frey and Gallus 2017). First, awards can provide status incentives that serve as valuable signals of quality to external audiences, including employers and professional networks (Besley and Ghatak 2008). Credentials are often crucial to advancement in the civil service, since returns to effort are not easily observable and advancement is more regimented (DiPrete 2013). Second, awards activate social image concerns by publicly marking high-quality behavior, which can increase effort even when the award itself carries no material value (Kosfeld and Neckermann 2011). Experimental evidence confirms that public recognition can substantially increase subsequent performance (Bradler et al. 2016), and that purely symbolic awards can sustain voluntary contributions to public goods (Gallus 2017). Third, awards may focus efforts in task environments that are complex and where attention is limited by making specific performance dimensions more salient.

Awards also carry risks: recognition directed at top performers can demotivate non-recipients (Robinson et al. 2021). For these reasons, there has been growing interest in the careful use of awards to improve the performance of the public sector (Hartley and Downe 2007; Federman 2020; Buntaine et al. 2024).

For actions that require concerted effort, capacity and motivation should be complementary: a bureaucrat who can discharge their responsibilities but lacks the motivation will perform poorly, and one who is motivated but lacks the skills and resources will not fare any better. These considerations motivate our research design, which combines a capacity

building intervention and a prospective awards scheme to encourage officials to apply newly acquired skills toward transparency in public procurement.

3 | Research Design

3.1 | Setting

Uganda is a dominant party regime characterized by some political competition at the local level. It is also perceived as one of the most corrupt governments in the world by independent observers and investors (Transparency International 2022). The Inspector General of Uganda, which is in principle an independent watchdog over government expenditures, regularly finds significant irregularities in public spending at the district government level (Buntaine et al. 2018).

Since 1995, when administration of public funds was decentralized, district governments became responsible for many front-line public services, funded mainly through unconditional, conditional, and equalization grants from the central government (Green 2018). Most districts have limited ability to raise revenue directly; what little they collect must be sent to a consolidated national account and transferred back through the Ministry of Local Governments. In total, district governments handle approximately 10% of public spending in the country, including services that directly affect public welfare, such as schools, local roads, frontline health clinics, and water provision (Ggoobi and Lukwago 2019).

Much of the spending by district governments is done through procurement of external vendors. Each financial year, districts create a procurement plan that lists items they expect to put out for tender, though delayed fund transfers sometimes create deviations from the planned timeline.

Specialist procurement officers are assigned to each district government to manage the procurement process. These officers are charged with ensuring that public procurement follows national standards, which include several transparency requirements. With the launch of the Government Procurement Portal in 2015—part of a broader national effort to digitalize public financial management that was later codified in Uganda's Third National Development Plan and reinforced by \$200 million in World Bank financing for digital government infrastructure—procurement officers are required to post their annual procurement plans along with updates as specific procurements proceed. In particular, there are four stages in the procurement process that have disclosure requirements. First, all items that are planned for public procurement must be uploaded along with an estimate of the planned amount. Second, when a procurement is approved to collect bids, a notice of tendering should be posted to alert firms about the bidding competition. Third, once bids are received and evaluated, the procuring entity should post a notice of the best evaluated bidder, including the bid value and evaluation criteria. Finally, once a contract for providing the goods or services is signed, the procurement officer is supposed to post notice of the award amount and terms.

These steps are formally required for every procuring entity, including district governments, based on guidelines issued by the PPDA in 2020. The PPDA Amendment Act of 2021 further formalized the shift by authorizing electronic records and communication in procurement and introducing electronic procurement methods. But as noted above, compliance with these requirements has remained low. In principle, posting procurement actions to the GPP should make tracking spending more efficient, streamline required reporting, and make it easier to resist pressures from politicians to steer procurements away from strict quality criteria.

There are several reasons why procurement officers may not comply with requirements to post procurement actions. First, transparency in procurement reduces the ability to extract rents, as posting notices of best-evaluated bidders or award contracts opens governments to informed scrutiny. This is a serious consideration since corruption is a major problem in district governments (Buntaine et al. 2018). Indeed, publicizing the funds sent to local governments in Uganda resulted in more of the funds actually being used for public services (Reinikka and Svensson 2011). In our baseline survey, procurement officials did not, on average, disagree that it is hard to resist pressures from politicians in procurement (see Table S5).

Second, there may be capacity issues that involve both training and computing resources, since interacting with online systems requires specific skills. Training may boost these skills. There is related evidence that the meritocratic selection of bureaucrats based on their education and training is associated with performance in delivering public services (Fernandez and Cheema 2025); however, there is little direct evidence on the causal impacts of specific training interventions on bureaucratic performance. In the study's setting, procurement officials tend to disagree that they have enough technology, resources, and understanding about how to adhere to disclosure requirements using the GPP (see Table S5).

Finally, time and motivation may also be limited. If transparency does not match the normative values of individual procurement officials or offer a pathway to career advancement, then it may simply not be a priority in a multi-task setting given many competing demands. In addition to responsibility for uploading the results of procurement actions, officers have to actually manage the procurement process, file paper-based procurement reports, and track expenditures, often on different governmental systems. These other activities could be crowding out compliance with guidelines about using the online procurement portal, given limited resources (Dasgupta and Kapur 2020). In the setting of this study, procurement officials tend to be neutral or disagree that uploading items to the GPP is a priority, though they report high motivation to adhere to procurement standards (see Table S5).

Despite low rates of compliance, there is evidence that the GPP serves a broader set of stakeholders in the procurement process. The PPDA uses the portal to monitor compliance across procuring entities, and the private sector uses it to identify bidding opportunities, register as suppliers, and download bid documents. Civil society organizations—including Transparency

International Uganda, the Uganda Debt Network, the Africa Freedom of Information Centre, and the Uganda Contracts Monitoring Coalition—have extracted data from the GPP to track procurement across sectors such as health, education, and infrastructure, publishing analyses and convening policy events based on the data.¹ Reports from the Open Contracting Partnership have documented increases in competitive bidding following the launch of the GPP and highlighted how procurement data have been used to improve value for money in health spending.² Journalists have used GPP data to report on government spending, and CoST Uganda has published independent review reports drawing on GPP data to assess transparency and value for money in public infrastructure.³ While rigorous impact evaluations of the portal are not available, it is used by a variety of actors beyond procuring entities.

3.2 | Capacity Building and Recognition Treatments

This study involves both non-randomized and randomized treatments. For the non-randomized training and technical support treatment, we selected 50 districts for inclusion in a capacity building program on the use of the GPP, implemented in partnership with Transparency International Uganda (TIU). Districts were selected based on TIU's existing network of contacts with district officials and outreach to districts prioritized for future engagement. In approximately 40 districts, TIU had prior programming, including monitoring service delivery, building capacity on anti-corruption, identifying community monitors, conducting community awareness initiatives, carrying out corruption risk assessments, and holding advocacy meetings with district officials. Because much of the interaction with officials occurred remotely during COVID-19 lockdowns, working through existing relationships was the most feasible way to implement the study.

This selection approach creates potential differences between districts selected for the capacity building program and other districts, including possible differences in willingness to engage in transparency or responsiveness to training and technical support. To address this concern, our analysis controls for baseline levels of uploads to the GPP and carefully defines the population to which the estimates apply. We return to these issues when discussing results below.

The training and technical support program included several components. Each district that enrolled in the training program was invited to send one procurement officer to a half-day training in-person or online, with a small per diem payment provided to participants to cover expenses. The training covered how to use all parts of the government procurement portal (GPP) and upload the procurement information required by law. The training was conducted with the Public Procurement and Disposal of Assets Authority, which oversees use of the government procurement portal. The training was divided into five sessions: an overview of the GPP's goals and sign-on procedures, followed by step-by-step instructions for uploading procurement plans, notices of tendering opportunities, best evaluated bidder notices, and notices of awarded contracts. These modules were presented with detailed slides and provided hands-on opportunities to practice.

After completion of the initial trainings, TIU staff sent weekly messages that encouraged regular uploading to the GPP and invited officers to contact TIU with technical difficulties. Although TIU did not systematically track each interaction, all districts in the program expressed interest in group and individual support. The most common types involved resetting passwords, troubleshooting upload failures, and step-by-step guidance on uploading files. In some districts, heads of procurement departments also requested additional support for procurement assistants who had not attended the initial trainings.

All districts selected into the program received the same curriculum, encouragement, and technical assistance, while districts not enrolled received no contact as part of the study, though they remained legally obligated to upload procurement actions. The non-randomized treatment was therefore a bundled intervention combining technical training, repeated encouragement, and ongoing technical support. Our research design does not allow us to isolate the relative contribution of these components. Beyond the mechanical skills conveyed, the training program may also have increased the perceived salience of GPP compliance by signaling that higher-level authorities prioritize its use, which could operate as a motivational channel. Moreover, monitoring cannot be fully separated from the training program: engaging with officers through training signals that outside actors are paying attention to their use of the GPP. We return to this issue when interpreting the qualitative evidence below.

For the randomized treatment, we assigned staff from 25 of the trained districts (out of 50 selected into the non-randomized capacity building intervention) to be informed about the potential to win a national prize for uploading information to the Government Procurement Portal consistent with the training program. Treatment assignment occurred only after completion of the baseline training, which was delivered to procurement officers from all 50 districts prior to randomization. Following randomization, assignment status and award eligibility were communicated directly to officers through WhatsApp, and officers were placed into separate ongoing support groups based on treatment status. This sequencing ensured that baseline exposure to training content was identical across study participants and reduced the likelihood that treatment-specific information was shared during training activities. While procurement officers may interact professionally across districts, communicating assignment individually and maintaining separate support channels limits, though does not eliminate, the potential for spillovers. We did not detect knowledge of the award among the control group interviewees at the endline interviews.

We provided award eligibility information in an initial outreach message following the common district training and in ongoing support messages to officers in the treatment group, who were regularly reminded via text messages and phone calls that they would be eligible to receive an award in a national ceremony if they uploaded information to the GPP. Our TIU partners did not monitor real-time uploading behaviors or provide feedback about upload rates or standing in the awards competition.

Staff at TIU informed districts in the treatment group that awards would be given for both the best performers and for the most improved performers from among all districts (the precise

number of awards was not decided or disclosed in advance). The purpose of communicating two types of awards was to ensure that the awards could potentially motivate all districts and avoid a commonly observed backfire effect among non-top performers (Ashraf, Bandiera, and Lee 2014). Staff from the districts not assigned to treatment received no information at any point about the potential to earn a national award, though in reality they were eligible for the awards.

Our communication to the treatment group described a symbolic national award, consisting of a plaque presented at a national ceremony, jointly given by TIU and the PPDA. The award had no monetary prize or promise of a direct material benefit. Individual officers may nonetheless have viewed the award as a credential for career advancement, though we do not have direct evidence of this from interviews, and our design cannot parse the relative importance of social and professional motivations.

The treatment and control districts enrolled in the training program did not receive any feedback about their real-time use of the procurement portal, and care was taken to avoid any indications that their actions were being monitored in real-time. Instead, regular follow-up messages were sent to both the treatment and control group with reminders to upload materials, where the only variation was mention of the potential to earn an award as part of visual aids, rather than a message of general appreciation for a commitment to transparency (see Section S1.2 for examples of outreach materials).

3.3 | Outcomes

The primary outcome of this study is the use of the Uganda Government Procurement Portal by district governments. Each district government is required to upload information to the portal in four areas, all of which are publicly visible (see <https://gpp.ppda.go.ug/>). As described in the previous section, the four areas are procurement plans, tenders, best evaluated bidder notices, and award contracts. We examine the number and value of uploads in each of these areas and the combined total across all areas.

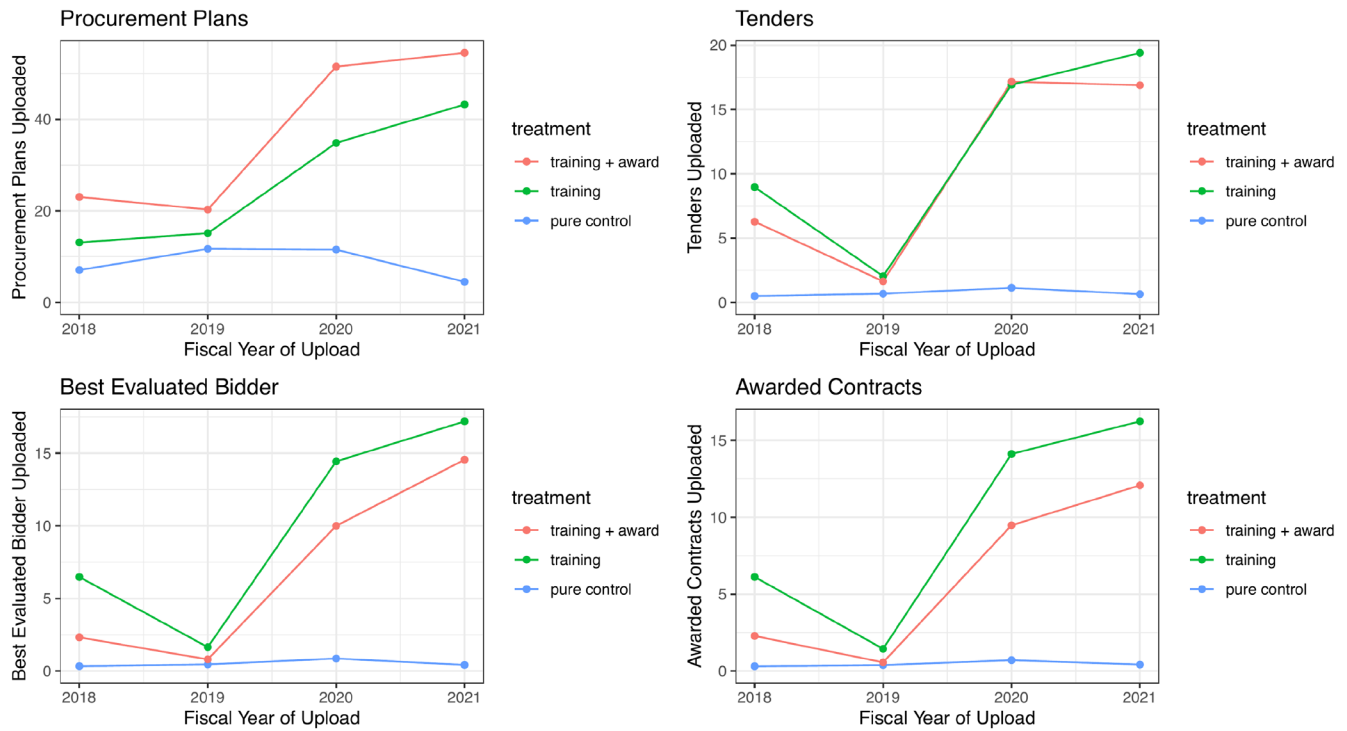
For the primary analysis, we look at outcomes in the 2019–2020, 2020–2021, and 2021–2022 financial years. This time period includes one pre-treatment year, 1 year during implementation of the training program and recognition treatments, and 1 year after completion of the training for the district procurement officers. For the experimental analysis, we compare the number and value of items uploaded by districts whose staff were trained and offered recognition to districts that received only training and ongoing technical assistance. The resulting estimate is informative about the effect of offering an award among trained districts.

We cooperated with the Public Procurement and Disposal of Assets Authority to access the full set of uploaded items, which includes time stamps of each uploaded action by the district governments.⁴ Because procurement officers can upload items for actions that started in previous financial years, we use these timestamps to count the total number and value of items uploaded during each financial year, regardless of when the procurement was initiated, as our primary outcome. We did not anticipate access to these timestamps when launching the

experiment, so this choice enhances precision as compared to using only the financial year at the start of each procurement action, as outlined in our pre-analysis plan.

The descriptive data show that use of the GPP has generally increased since the 2018 financial year on average, with some variation across different years and outcomes (Figure 1). We can see

A



B

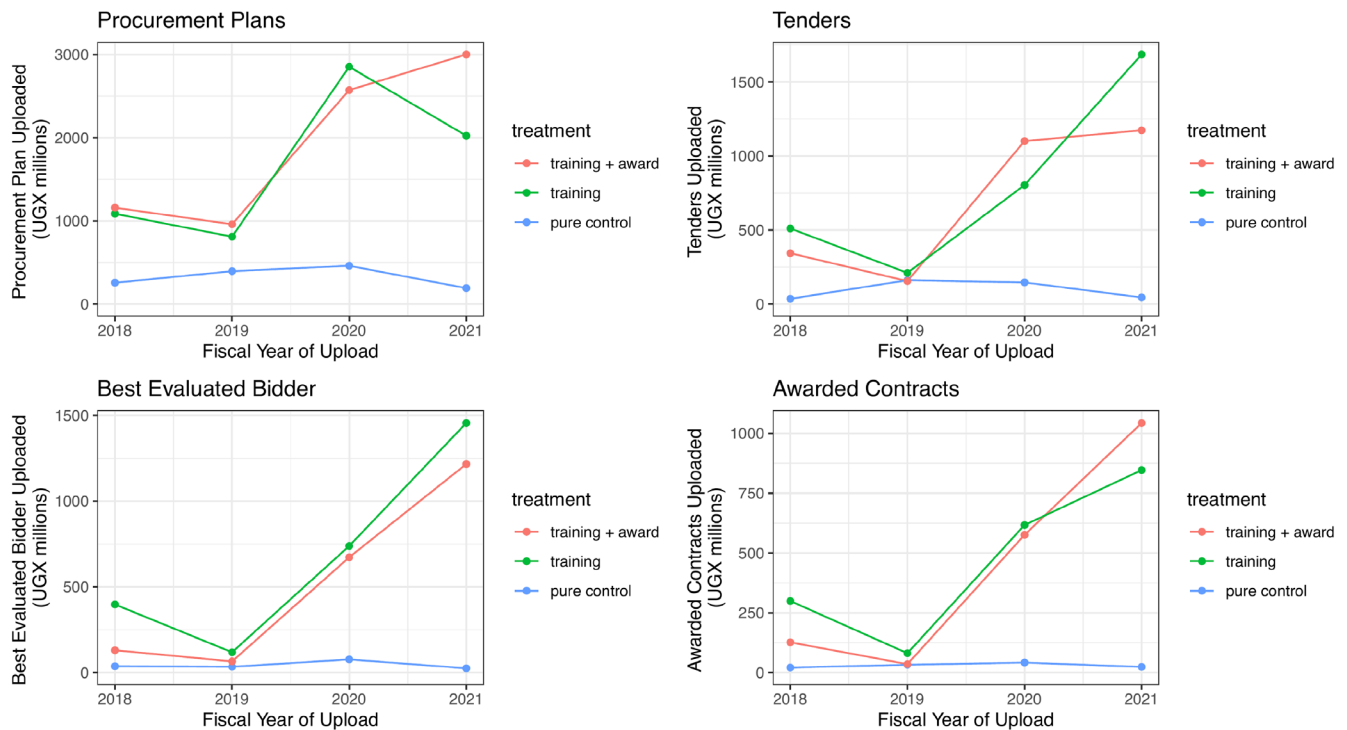


FIGURE 1 | Uploads to the GPP by district procurement officers in each treatment arm by financial year of upload: (A) average number of each type of item; (B) average value of each type of item.

that both of the experimental groups that had access to the non-randomized training program have had higher use of the GPP throughout both the pre-treatment and post-treatment periods. To address these differences, we control for the pre-training level of uploads in 2019 in all specifications (Bruhn and McKenzie 2009).

A balance table of baseline survey responses collected from district procurement officials is presented in Table S5. Because survey response rates at baseline were incomplete (37 of 50 districts), several items show numerical differences between groups that are difficult to interpret given the reduced sample and resulting imprecision. Importantly, our primary outcome—uploads to the GPP—is measured from administrative records for all 134 districts and does not depend on survey response. By controlling for the pre-treatment level of uploads in all specifications, we directly account for any differences between treatment arms in the baseline propensity to comply with transparency requirements.

A concern for analyzing the training program is whether districts that received training differ from uncontacted districts in their budgets. As displayed in Figure S6, we observe no obvious patterns of changes in the non-contacted or “pure control” districts relative to all districts. However, pure control districts have lower total, staff, and information and communication technology budgets on average. Thus, as a further check on the analysis, we control for pre-training budget amounts in each of these categories and changes in the budgets over time (see Figure S7).

3.4 | Quantitative Analysis

For the experimental results on the impact of offering awards on upload behaviors, we adapt the pre-specified empirical strategy and estimate the following for counts and value of items uploaded to the procurement portal:

$$Y_{j,t=1} = \alpha_j + \tau D_j + \beta_1 Y_{j,t=-1} + \beta_2 X_j + \varepsilon_j$$

where Y_j is the outcome of interest (number or value of uploads), τ is the sample average treatment effect, D_j is an indicator of the treatment assigned at the district level, β is a vector of parameter estimates for district-level covariates, which include the outcome lagged by 2 years and the total approved procurement budget in the post-treatment year, and ε_j is the error term. We lag the outcome by 2 years instead of a single year as specified in our pre-analysis plan to avoid any possibility of post-treatment bias caused by the announcement of the program. The resulting estimate is the effect of offering awards within the sample of enrolled districts.

For analysis of the non-randomized training program, which we did not pre-specify, we adopt the same empirical strategy. However, in this case D_j can take on the value of the experimental conditions separately. We always control for differences in baseline uploads, which accounts for any differences between the districts in their propensity to act according to transparency rules. The resulting estimate is the average effect of the training program among the trained districts, rather than the average effect of the training program among all districts, conditional on an assumption of no other confounders. In extended analyses,

we also control for pre-treatment district budgets and the change in district budgets. These controls are intended to rule out the most likely time-varying confounders.

Districts typically run dozens of procurements per year, each of which is required to generate four uploads. The average approved procurement budget was approximately 5.8 billion shillings per district in the post-treatment outcome year of 2021, which corresponds to a maximum of approximately 23.3 billion shillings of uploaded value across categories. Our unit of treatment and measurement is the district-year, which limits statistical power to detecting large shifts in uploads. An ex ante power analysis before the study using 2019 data was not informative because uploads were at zero in all categories across a large majority of districts. Accordingly, any policy-relevant impacts necessarily imply large proportional increases. We therefore report minimum detectable effects at 80% power based on randomization inference or model-based sampling variation from the realized outcome data to calibrate interpretation below.

For the randomized awards treatment, the minimum detectable effect reflects the difference between treatment arms. This difference corresponds to approximately 75 additional uploaded items in the treated arm with an offer of an award relative to the control arm, which is equivalent to about a 3.5-fold increase over baseline uploads in the experimental sample. In value terms, the minimum detectable effect is approximately 4.2 billion shillings more uploaded value in the treated arm relative to the control arm, which is roughly 3.5 times baseline uploaded value. Given substantial post-treatment variation in upload behavior and the limited number of treated districts, the design is capable of detecting transitions from minimal compliance in the control arm to regular uploading of a minority share of procurements in the treated arm, but not smaller changes.

For the non-randomized analysis of the training and technical assistance intervention, which estimates the effect of each training arm relative to no training using all 134 districts, minimum detectable effects are smaller. Aggregating across upload categories, the minimum detectable effect reflects the estimated difference between trained and untrained districts and ranges from 48 to 73 additional items per treated district relative to control districts, representing roughly a four- to five-fold increase relative to the pure control baseline. In value terms, the minimum detectable effect ranges from approximately 2.5 to 3.5 billion shillings more uploaded value in treated districts relative to control districts, or roughly four to six times baseline uploaded value. These magnitudes correspond to moving from near-zero uploads to uploading roughly 15% of eligible items and procurement value that should have been uploaded. Our study accordingly focuses on detecting policy-relevant shifts of this scale.

3.5 | Summary of Experimental Design

A timeline of the treatments and data collection phases of the study is displayed in Figure 2A. Figure 2B summarizes the experimental research design and sample sizes for each outcome.

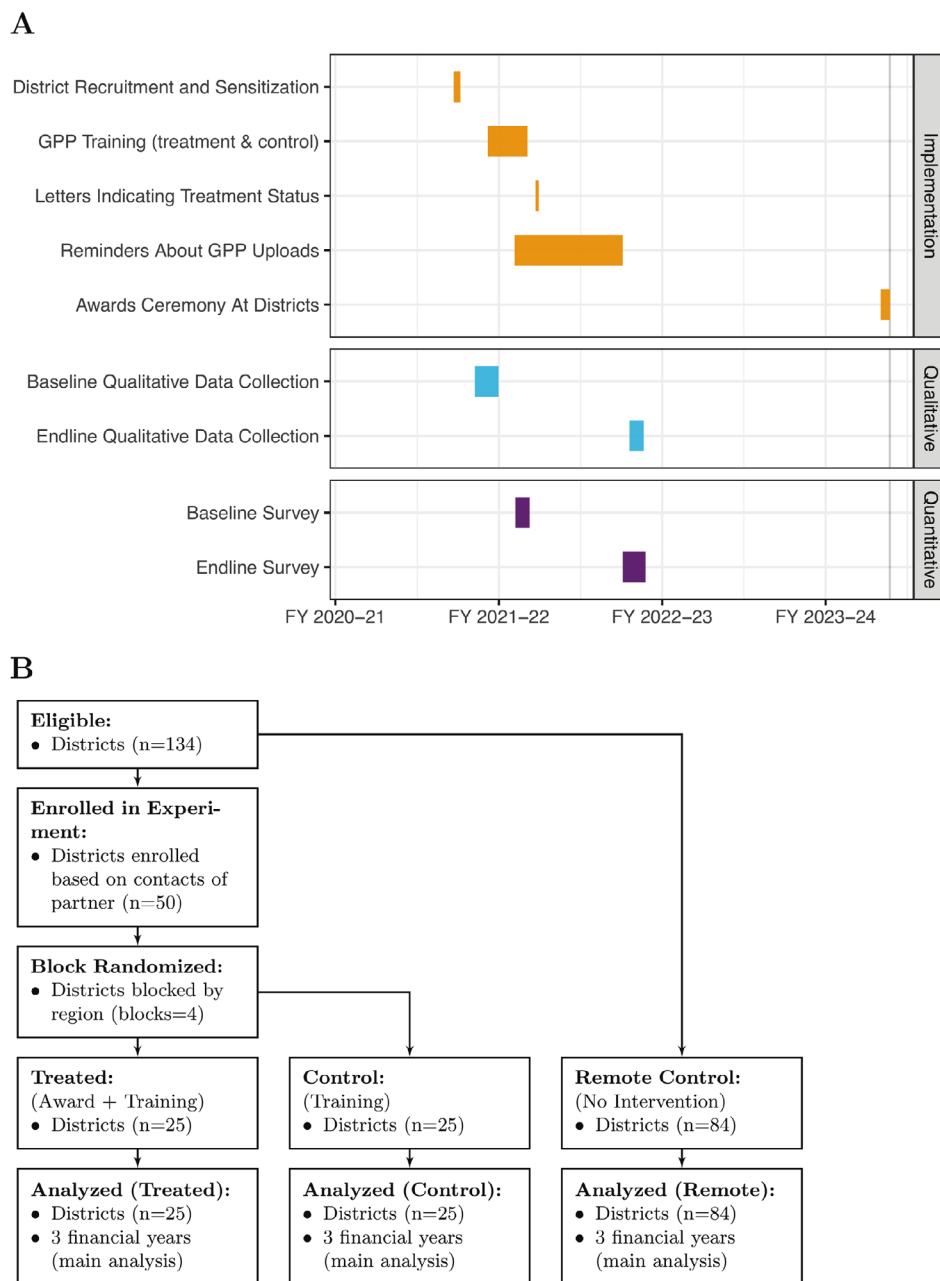


FIGURE 2 | Design of the study: (A) timeline of the study, where financial years begin on July 1; (B) CONSORT diagram tracking the study design.

3.6 | Qualitative Research Design

We used structured qualitative interviews within the broader experimental evaluation to generate information on how officials responded to the treatment and on their main motivations and constraints within the procurement process. While experimental methods are able to identify whether an intervention has an impact, qualitative data collection is often well-suited to uncover the mechanisms behind any observed changes by exploring the lived experiences, motivations, and institutional contexts of the procurement officers at the center of our study.

The qualitative research design had two phases: (1) baseline interviews with procurement officials to establish prevailing procurement practices and officer motivations prior to the

intervention; and (2) endline interviews to assess changes in practices, perceptions, and constraints brought about by the training program or the offer of an award. Due to COVID-19 restrictions at the time of the study, we conducted some of the interviews remotely.

Prior to the launch of the interventions, the team conducted 12 qualitative interviews with procurement officers across treatment and control districts, evenly split between treatment and control districts. At the end of the study period, we conducted 10 qualitative interviews (6 treatment, 4 control districts). Within that stratified sample, we purposefully selected interviewees who had significant experience with the procurement process: (i) direct involvement in procurement and financial management processes, (ii) seniority and decision-making responsibilities, and (iii) ability to reflect on changes in procurement practices over

time. As a result, the respondents included Senior Procurement Officers, Procurement Officers, Assistant Procurement Officers, and, when relevant, Chief Finance Officers.

Each interview was guided by a template designed to elicit participants' perspectives on procurement norms and compliance, GPP use, institutional and infrastructural barriers, political pressures, officer motivation, and experiences with the interventions. These tools were iteratively refined in collaboration with PPDA and local research partners to ensure relevance (see Section S4 for copies). All interviews were conducted in English, with informed consent, and were audio-recorded and transcribed.

We analyzed qualitative data using a hybrid approach, combining grounded theory (Corbin and Strauss 1990) and content analysis (Hsieh and Shannon 2005). We used grounded theory techniques to inductively develop insights about how officers understand procurement rules, how motivation and compliance evolve, and how political and institutional constraints influence behavior. We reviewed transcripts iteratively to generate codes, identify patterns, and develop themes through constant comparison—comparing concepts across time (baseline vs. endline), treatment arms (treatment vs. control), and context (district-level characteristics). Codes were grouped into higher-level categories such as: GPP adoption and e-procurement usage; procurement compliance; motivation and recognition; political interference; and institutional constraints and resources.

We also used content analysis to limit the analytical focus to themes most relevant to the intervention logic model—such as increased compliance, transparency, and performance motivation. We applied a holistic reading approach during early analysis stages to preserve narrative flow and contextual detail, followed by a categorical-content approach to support cross-case comparisons (Beal 2013). We coded the data using Dedoose, an online qualitative analysis platform. To support analysis, we drew on illustrative quotes that were selected for their representativeness, clarity, and ability to capture key differences across treatment status and over time.

4 | Results

4.1 | Treatment Effect of Offering Awards Among the Trained Districts

The main pre-registered analysis investigates whether informing district procurement officers in advance about the chance to win an award for uploading items to the GPP increases the number and value of items uploaded among trained districts. The main theory is that offering an award has the potential to set norms about appropriate practice and might serve as a valuable credential that would increase motivation to comply. As displayed in Figure 3, Panel A, we cannot reject a null effect of the treatment on the number of items uploaded to the portal. Likewise, when examining the treatment effect of eligibility for awards on the total value of items uploaded in Figure 3, Panel B, there is no evidence that the treatment increased the value of procurement plans and awarded contracts uploaded. Recalling that the minimum detectable effect of the design allows us to detect a significant

shift in uploaded behavior across treatment arms equivalent to roughly 15%–20% of the items and value that should be uploaded by regulation, our analysis allows us to rule out these larger, policy-relevant effects of offering an award, but not smaller effects. Additionally, if knowledge of the award reached control districts through professional interactions among procurement officers, this would generally attenuate treatment effects toward zero, meaning the true effect of offering an award could be larger than estimated.

To address the fact that both the number and value of items uploaded are highly skewed with high variance, we add an exploratory analysis that takes a logarithmic transformation of both outcomes. As displayed in Figure 3 Panels C and D, the results are more consistent with a marginal effect of the award offering on performance. There is marginal evidence that treatment increased the number of best evaluated bidder notices and contract award uploads, and the value of most items uploaded to the procurement portal. Several of these estimates are statistically significant in the one-sided randomization-inference tests specified in our pre-analysis plan ($p = 0.016$ – 0.046), though Benjamini–Hochberg q -values within outcome families are approximately 0.06 (see Section S2.1). However, the magnitude of the estimated effects is smaller than the minimum detectable effects at 80% power, and so must be interpreted with caution. The results indicate that offering awards to bureaucrats might marginally boost effort after they have received training, but not at effect sizes that can regularly be detected by the design.

Qualitative examination of the awards treatment shows that at baseline, procurement officers exhibited low motivation, expressing feelings of being undervalued and unrecognized; in certain districts, this led to a passive approach toward procurement performance:

For the 7 years I have been here, I have not seen any recognition for procurement work. [R1.KII9]

There is none [recognition], anyway, once in a while. Last year, I was given a certificate of recognition as one of the performing officers in the district. I was appreciated, so once in a while, they do that. As far as procurement is concerned, this was the first certificate I received while I served. The district appreciates me, but we are always looked at as people who are like what? [R1.KII11]

Procurement is a thankless job. No one notices when you follow procedures, but people complain when there are delays. [R1.KII10]

We just do what is required. There is no competition or incentive to perform beyond the basics. [R1.KII7]

Actually, when you look at public standing order, when you excel in something, probably they may say thank you, and that's enough, nothing more. [R1.KII8]

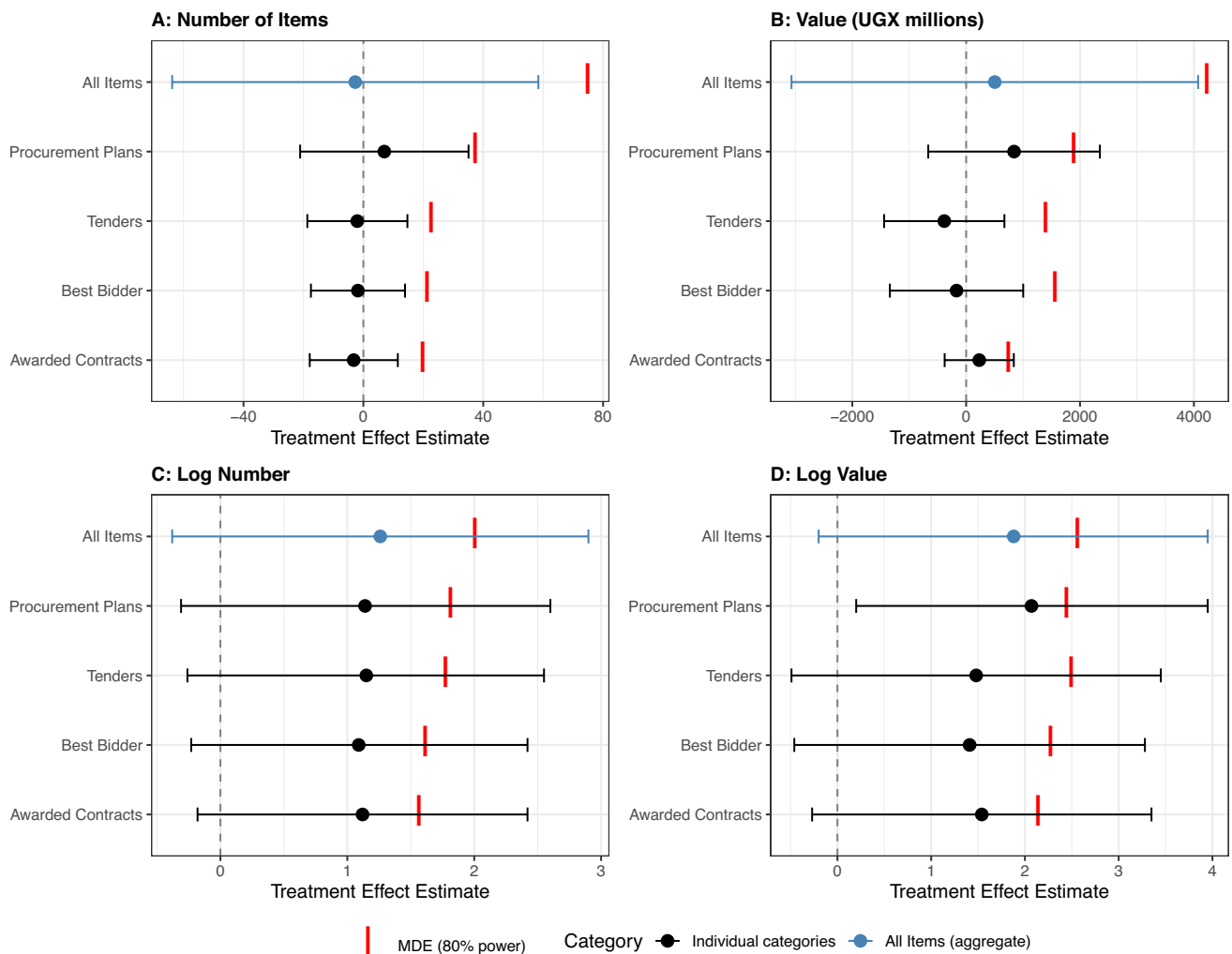


FIGURE 3 | Treatment effects of offering eligibility for an award on uploads to the GPP. Heteroskedasticity-robust (HC2) 95% confidence intervals displayed. Minimum detectable effects (MDEs) for 80% power using one-sided randomization inference at $\alpha = 0.05$ are reported.

At baseline, however, treatment districts reported heightened engagement, enthusiasm, and a strengthened commitment to procurement best practices, including meticulous record-keeping:

at the end to know that when I perform better at the end of the process, I am going to be selected among the best districts and be given a reward. I uploaded all that I had done into the system... It triggered high performance. [R2.KII1]

We now ensure that procurement data is complete and uploaded on GPP regularly. Everyone wants to be among the best-performing districts. [R2.KII4]

I now pay more attention to details in procurement because I know our work is being monitored. The awards push us to follow standards more closely. [R2.KII3]

I was excited to hear about the award... definitely it changed the way we work because it also made us

work so harder. You never know what might come out. Maybe I may be among those selected. [R2.KII6]

The interviews suggest that offering awards fostered a competitive and performance-driven environment, particularly in the treatment districts, with officers feeling recognized and empowered to improve procurement processes. However, the impact varied across districts, with some officers expressing skepticism about the long-term benefits of non-financial recognition. These findings suggest that combining recognition with tangible support—such as professional development opportunities, financial rewards, and improvements in working conditions—may enhance the effectiveness of awards (see Section S6 for additional illustrative quotes).

You can reward me, but you can't create an enabling environment to help me score what you want me to score. Without that working environment, it restricts me... I would suggest infrastructure including offices and storage facilities to store the documents. I would be very appreciative. Then, there are also vehicles to collect the project managers and for monitoring

purposes, such as which contractor is performing or not performing, because we are centralized somehow. [R2.KII3]

...the same thing happens at the district level because if there are some short courses. Let me say there is money here and also capacity building, let me say go for this course maybe for 9 months. Yeah, it increases one's capacity and performance. [R2.KII6]

...promotion by putting someone on media, and it is recognized worldwide that this one is a performer who would sell you. You can be like someone seated, and they call you for a job or promote you. It will also be good information on recognition with the prize, and even a scholarship for further studies would be a great motivator. [R2.KII4]

4.2 | Treatment Effect of the Training Program

Next, we investigate the effects of capacity building on the number and value of items uploaded, comparing them to the group of districts that did not receive any contact as part of the study. As described in the design section, the treated districts were selected based on the preexisting contacts of our partner organization, which had prior engagements in approximately 40 of the 50 districts; none of those activities focused specifically on capacity building for procurement.

The main challenge this poses for our analysis is that the districts undergoing the capacity building program may be particularly

receptive to using the GPP because of these prior efforts. Indeed, the 50 districts that were invited to take part in the training and technical assistance program used the GPP more at baseline (Figure 1). While these districts have less room to improve their upload efforts, which may limit treatment effects, they also may be primed to participate in transparency initiatives. As in the analysis of the awards treatment, we control for the baseline amount of upload activity in the financial year starting in 2019 to adjust for different baseline propensities to comply with the transparency requirements. The assumption required for our analysis is that the direct effect of prior engagement with TIU is reflected in the baseline uploads. Even with that assumption, our estimates represent the effect of the training program on the trained districts (average treatment effect on the treated), which is less informative about the potential effect of offering training and ongoing technical assistance to districts without these prior programs.

As displayed in Table 1, the effects of training and ongoing technical support are both substantively large and allow us to rule out a zero effect both for the number of items and the value of items uploaded. In substantive terms, both of the treatment arms that included training increased the amount of disclosure of procurement actions by the district governments by over an order of magnitude, a policy-relevant effect given extremely low baseline uploads. On average, this resulted in 5.2–5.6 billion shillings of additional disclosures across the upload categories in the GPP, which is roughly one quarter of the total eligible to be uploaded. Consistent with the results on the effect of awards displayed above, the difference between the trained district officials that were and were not informed about awards is much smaller than the difference between the trained and the untrained districts. This result indicates that offering training and ongoing technical support to district governments on how to meet disclosure guidelines

TABLE 1 | Effect of training treatments on uploaded items and values.

Dependent variables	# Items	# Items (log)	Total value	Total value (log)
Model	(1)	(2)	(3)	(4)
Variables				
(Intercept)	−0.48 (3.87)	−1.06*** (0.30)	−273.1* (154.6)	0.15* (0.09)
Training	86.66*** (29.22)	3.34*** (0.66)	5193.7*** (1409.5)	4.46*** (0.86)
MDE (80% power)	72.67	1.64	3504.7	2.14
Training + Award	87.13*** (19.23)	4.50*** (0.56)	5621.4*** (999.2)	6.18*** (0.73)
MDE (80% power)	47.82	1.39	2484.4	1.82
Fit statistics				
Observations	134	134	134	134
Controls	Yes	Yes	Yes	Yes
Adjusted R ²	0.30007	0.64545	0.47068	0.65578

Note: Clustered (district) standard errors in parentheses. MDE: minimum detectable difference given estimator SE (one-sided $\alpha = 0.05$, 80% power). Signif. codes: ***: 0.01, **: 0.05, *: 0.1.

had a policy-relevant effect much larger than the minimum detectable effect, with no evidence that the effect of training was contingent on also being offered an award.

Because the districts were purposefully chosen for training, another concern for inference then is whether these districts had different background characteristics or other changes in budgeting or personnel that could account for their large increase in the use of the procurement portal after receiving training. The baseline models in Table 1 already control for use of the procurement portal in the year prior to the training program. This should address any differences in the background propensity to use the procurement portal. As an added check, we also examine whether controlling for different aspects of district budgets changes the results. As displayed in Figure S7, the results are highly robust to controlling for different district budget types and the change in the budget from the pre-treatment year to the post-treatment year. Here, the budget categories, compiled from the Ministry of Finance, Planning and Economic Development, are the total district budget, staff budget, information and communication technology budget, staff training budget, and office supplies budget. In all specifications, we control both for the baseline budget in the category and the change in the budget in that category between pre- and post-treatment periods. These controls do not alter the findings, which provides confidence that time-varying confounds in district budgets do not account for the observed effects.

Qualitative results on the treatment effect of training and technical support show increased GPP adoption, compliance with procurement regulations, and reduced political interference among treatment districts. At baseline, interviews revealed a lack of awareness and limited use of the GPP, with key challenges including low system awareness, inadequate training opportunities, and poor internet connectivity.

To be honest, I got to know GPP the day I received a link to attend the training. The status right now is at zero. [R1.KII3]

We are not using GPP. As a PDU [procurement and disposal unit], we have the senior PDU who is the head, so he forgot the password, and so we are not using the GPP. Honestly, we have not been employing GPP for the last two years. Although we asked for help from PPDA to help us correct the password or unblock us so that we can again start using GPP, they haven't yet done so. [R1.KII9]

Sometimes, documents are uploaded late, and we do not always advertise widely. [R1.KII11]

We still do everything manually. Even when we hear about GPP, no one has trained us to use it. [R1.KII12]

Sometimes we don't follow the full bidding process because we don't know all the procedures. Training would help, but we have not had any. [R1.KII8]

These insights reveal a widespread set of issues in treatment and control districts before the training program began. Indeed, 16 of 25 treatment districts and 17 of 25 control districts did not upload any items to the GPP in the year before the study. Even in instances where the GPP was partially operational, its implementation was inconsistent and limited in scope. At the end of the intervention, participants in trained districts reported greater awareness, confidence, and active use of the GPP, with improvements in regular updates, procurement tracking, and the transition to digital documentation.

We are at 80% compliance with the GPP now. We ensure that procurement information is uploaded as required, and this helps us better track procurement progress. We are left with a few files that have not been handled. The invitation ones. But they are few. [R2.KII4]

GPP has made the procurement work a bit easier. When you enter that information, it can be captured. So long as you have access to it, you can see how a particular element is performing. [R2.KII6]

Before the training, we had abandoned GPP. Now we use it more, though network issues sometimes slow us down. [R2.KII3]

GPP has helped us a lot. It has enabled us to know many things. Sometimes, you know you cannot say that you know all things. But since the training, it has enabled us to learn certain things and improve. It has helped to improve. Yeah, in terms of transparency and reminding you of all those small things there. [R2.KII5]

Despite the promising advancements in transparency fostered by the GPP, many challenges persist, primarily stemming from inadequate internet connectivity and insufficient infrastructure. These issues hinder the GPP's effectiveness:

The GPP is an invaluable resource for enhancing transparency in procurement processes. However, a considerable barrier remains in fully integrating and ensuring connectivity within the system. The ongoing connectivity struggles impede their adherence to the protocols outlined during training sessions. For instance, officials often experience interruptions while inputting data into the system, only to have the connection drop unexpectedly, leaving them unable to retrieve their only saved information. However, the system is not bad if facilitated in that direction. I see us performing much better. [R2.KII1]

...Currently, there are two servers designated for coordination with the Chairperson of the Local

Council and one allocated for educational purposes, both of which are accessible. However, the server associated with procurement is still in the stages of completion. As a result, staff members navigate various departments, occasionally switching between the procurement and finance sections to fulfill their needs. [R2.KII6]

Officers in treatment districts also noted improved adherence to procurement timelines, increased bidder engagement, and confidence in their ability to enforce procurement laws.

We now follow procurement timelines strictly, advertise widely, and ensure that the best bidder is awarded fairly. [R2.KII6]

The moment the procurement plan is approved, I display it on the notice board and on the district website. Even on GPP, it has been there. [R2.KII4]

Before the intervention, political interference presented a significant obstacle to ensuring competitive procurement practices. Officers often felt intimidated, with many admitting to fears of external pressure to award contracts to politically favored suppliers and sometimes threatening delays in approval processes.

Most of us switch off our phones during the evaluation stage because of fear of intimidation. [R1.KII6]

Sometimes we get direct instructions from politicians on which suppliers to pick. It makes our work difficult. [R1.KII3]

Politicians normally interfere, asking for favors and linking up with some companies. They want to intimidate the technical staff to be able to get tenders for these companies. [R1.KII10]

However, following the training program, some officers reported a newfound confidence in their ability to counteract political pressure as they were better equipped with knowledge of procurement laws and accountability mechanisms.

Politicians approve budgets, but they do not influence supplier selection anymore. We now enforce procurement laws more strictly. [R2.KII5]

Overall, following the training, officers demonstrated a marked increase in their understanding of procurement laws, improved skills in using the GPP, and a strengthened ability to resist political interference. Several challenges persist, however: resource constraints continue to limit adherence to standards, political interference still poses risks, and officers' motivation declined noticeably over time beyond the initial training. Sustaining the benefits of capacity building would likely require regular refresher sessions (see Section S6 for additional illustrative quotes).

As noted in the design section, any effects by the training or the offer of an award cannot be fully separated from the signal that outside actors are paying attention to GPP use. However, the qualitative interviews did not reveal fear of sanctioning for non-performance as a motivation for increased uploads. Instead, officers emphasized the organizational benefits of using the GPP for tracking procurement progress, the ease it brought to their work, insulation from political pressure, and the prospect of recognition. Taken together, the qualitative evidence suggests that the interventions drew attention to GPP requirements and built the skills to meet them, rather than generating compliance primarily through a perceived threat of punishment.

5 | Discussion and Conclusions

Training and ongoing technical assistance to bureaucrats increased compliance with transparency requirements, while offering awards for doing so did not cause similarly large changes in behavior. This result is consistent with capacity being a binding constraint on bureaucratic achievement of disclosure mandates, though the training program may also have increased motivation by raising the perceived salience of GPP compliance among officers. The limited additional effect of offering awards is also consistent with the training having already boosted motivation through higher-level prioritization, reducing the marginal impact of a further motivational intervention.

Little robust evidence exists about the benefits of capacity building in the public sector, despite such programs being common worldwide. By comparing districts that received training to those that did not, we show that targeted capacity building is critically important for the performance of officials, corroborating emerging work that finds under-performance is shaped by a lack of skills and resources (Dasgupta and Kapur 2020).

The most important policy implication is that government leaders need to map the capacity constraints of key actors within the administrative state and provide the resources and training needed to overcome them. We saw major increases in compliance with transparency standards simply by providing half-day trainings and ongoing support, delivered in partnership with the Public Procurement and Disposal of Assets Authority. Our partnership-based approach confirms that this type of support is practical and feasible.

These results thus relate to broader work on professionalization of public management and the control of corruption. Research in the US finds that adoption of a council-manager form of local government is associated with declines in corruption incidents (Nelson and Afonso 2019). Greater professionalization of public management prevents politicians from using public resources for their own gain. As we find in the qualitative interviews, one of the benefits of training bureaucrats is that it helped them stand up to political pressures to choose certain providers or steer procurement processes in certain directions.

There are limits to our research design. First, the study was only powered to detect relatively large, policy-relevant effects.

It may be that offering an award has a robust but significantly smaller effect on disclosures. Second, the training intervention was not randomized. While we control for baseline uploads and district budgets, districts selected into the training program may differ from other districts in ways we cannot fully observe. Our estimates therefore represent the effect of training on the trained districts rather than a generalizable average treatment effect. Third, the training and ongoing technical support program was a bundled treatment, so we cannot parse the relative contributions of its components. Relatedly, both treatments inherently signal that outside actors are paying attention to GPP use, and we cannot fully separate this monitoring channel from the direct effects of training and awards. As reported in the qualitative results, however, officers did not cite fear of sanctioning as a motivation; instead, they emphasized professional benefits and recognition, suggesting the interventions operated primarily by building capacity and drawing attention to GPP requirements.

Fourth, we were unable to study the longer-term effects of the training and awards beyond the first post-treatment year. The government began piloting a broader Electronic Government Procurement (eGP) system in July 2021 alongside the GPP, and the ongoing transition between these systems diverted reporting effort and complicated measurement of sustained impacts beyond the study period. Fifth, we do not have definitive evidence that procurement quality improved as a result of the training program, as measured by cost overruns, service quality, or lost public resources. It is possible that compliance with GPP disclosures does not tightly correlate with these outcomes. We view the strongest evidence on this dimension as coming from interviews that suggested transparency buffered procurement officers from pressure from politicians to steer procurements according to their interests. While research has linked transparency in procurement to quality (Ohashi 2009; Bauhr et al. 2020), more evidence is needed on how transparency changes the efforts of bureaucrats across multiple tasks and the outcomes of procurement in high-corruption settings. We do not observe how procurement officers reallocated their time as they increased their use of the GPP, and it is possible that some of this reallocation came at the expense of other valuable activities. While the qualitative evidence suggests that the GPP substituted for less efficient manual tracking and reporting practices, more detailed data on officer time use would help assess the net value of increased compliance.

These results have lessons for controlling corruption. Public servants provide important guardrails against the mismanagement of public funds. Building a public sector that operates with integrity depends on officials properly accounting for public budgets, operating open procurement practices, and ensuring the public has the means to scrutinize government decisions, rather than just prosecuting violations. All of these guardrails take effort, resources, skills, and time. Our study suggests that more effort needs to go into ensuring that the parts of government that provide guardrails against corruption can carry out their mandates. More evidence is needed about the effects of both capacity building programs and non-financial interventions on bureaucratic performance, particularly in high-corruption environments.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data and code needed to reproduce the analyses reported in this manuscript and the pre-analysis plan registered in advance are available in an Open Science Framework project repository: <https://doi.org/10.17605/OSF.IO/Z32VR>.

Endnotes

- ¹ See AFIC, "What Next After Disclosure: Initiative to Develop Use Cases for Public Procurement Data in Uganda," 2018, <https://www.africafoicentre.org/what-next-after-disclosure-initiative-to-develop-use-cases-for-public-procurement-data-in-uganda/>.
- ² Open Contracting Partnership, "Improving Disclosure and Value for Money in Health Procurement in Uganda," November 2020, <https://www.open-contracting.org/2020/11/02/improving-disclosure-and-value-for-money-in-public-procurement-in-uganda/>.
- ³ CoST/Basel Institute on Governance, "CoST Uganda: A Collective Action Approach to Integrity in Infrastructure Procurement," 2021, <https://baselgovernance.org/blog/cost-uganda-collective-action-approach-integrity-infrastructure-procurement>.
- ⁴ The same data are available on a public portal at <https://gpp.pdda.go.ug/>. However, the publicly available data do not include time stamps and must be gained from an export from the internal PPDA system.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Figure S1:** Short visual aid sent by WhatsApp to control districts. **Figure S2:** Long visual aid sent by WhatsApp to control districts. **Figure S3:** Short visual aid sent by WhatsApp to treated districts. **Figure S4:** Long visual aid sent by WhatsApp to treated districts. **Figure S5:** Example of award presented to most compliant district in experiment. **Table S1:** Treatment effect of eligibility for an award on number of items uploaded. **Table S2:** Treatment effect of eligibility for an award on value of items uploaded. **Table S3:** Treatment effect of eligibility for an award on logarithm of the number of items uploaded. **Table S4:** Treatment effect of eligibility for an award on logarithm of the value of items uploaded. **Table S5:** Balance table of baseline survey responses. **Figure S6:** Average value of approved budgets for districts with different treatment conditions across several categories. **Figure S7:** Effects of training treatment arms on uploads to the GPP controlling for different aspects of district budgets. **Figure S8:** Estimated treatment effects on families of survey items. The components of each index are listed

in Section S7 and are the same at baseline and endline. The covariates used in the specification are imputed to higher level clusters as described in the pre-analysis plan and amended as described in Section S3. $N = 29$.

Appendix S1: Baseline survey with district officials.