Assignment Type and Parental Education: Rethinking Homework Equity in Botswana

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**ABSTRACT**

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| **Aims:** This study investigates the differential effects of homework and school-based assignments on student learning outcomes, with a focus on the moderating role of socioeconomic background, as proxied by parental education level. This study is motivated by concerns over educational inequality and a lack of empirical studies examining how different assignment types interact with students’ socioeconomic background to shape learning outcomes, particularly in sub-Saharan African contexts.**Methodology:** A total of 600 students from Form 2and Form 3 were randomly assigned to either homework or school-based assignments in mathematics and reading comprehension. Parental education was categorised into low (no high school diploma), medium (high school diploma), and high (college degree or higher). Learning gains were assessed through pre- and post-tests. A two-way ANOVA examined the main and interaction effects of assignment type and parental education on learning gains.**Results:** The analysis revealed significant main effects of assignment type, *F*(1, 594) = 91.36, *p* < .001, η² = .108, and parental education, *F*(2, 594) = 63.83, *p* < .001, η² = .152, as well as a significant interaction, *F*(2, 594) = 14.78, *p* < .001, η² = .035. School-based assignments produced consistent learning gains across all parental education levels, while homework disproportionately advantaged students from high parental education households.**Conclusion:** School-based assignments offer a more equitable platform for academic development and highlight the limitations of uniform homework policies. These findings have important implications for educational practice, suggesting the need for differentiated assignment strategies and policies that are sensitive to students’ home learning environments and socioeconomic backgrounds.. |

*Keywords: Homework, school-based assignments, socioeconomic background, parental education, learning outcomes, equity, educational policy, assignment design*

**1. INTRODUCTION**

Homework has long been regarded as a foundational element of formal education, premised on the belief that learning continues beyond the classroom walls. Historically, the practice of assigning work to be completed at home emerged alongside the development of mass schooling during the industrial era, when homework was seen as a mechanism for reinforcing discipline, cultivating industriousness, and extending the reach of classroom instruction (Esteban, Romero, & Zafra, 2021; Fernández et al., 2022). In contemporary education systems, homework is often promoted as a tool for consolidating learning, fostering self-regulation, and developing essential life skills such as time management and persistence (Trautwein & Lüdtke, 2009; Xu, 2024). Proponents of homework argue that it helps students internalize key concepts, apply knowledge independently, and prepare for assessments, thus contributing to improved academic achievement.

Yet, this optimistic view of homework’s potential benefits frequently overlooks the profound disparities that exist in students’ home environments. A growing body of research has highlighted the role of socioeconomic status (SES) in shaping children’s learning experiences and outcomes. SES, typically measured through parental education, household income, and occupational status, exerts a significant influence on access to educational resources and supports (Epstein & Van Voorhis, 2001; OECD, 2013; Nair, 2023). Among these indicators, parental education stands out as a particularly salient factor in determining how effectively students can engage with homework tasks. Parents with higher levels of education are more likely to provide intellectually stimulating environments, offer targeted academic assistance, and model problem-solving strategies that help their children navigate complex assignments (Fan et al., 2017; Mureithi, 2024).

Conversely, students from lower SES households often face multiple barriers that hinder their ability to benefit from homework. These barriers include limited parental capacity to assist with academic tasks, a lack of quiet or dedicated study spaces, and restricted access to learning materials or digital technologies essential for completing modern assignments (OECD, 2013). The digital divide, in particular, has widened the gap between advantaged and disadvantaged students, as technology-mediated assignments become increasingly common (Hattie, 2009; Mzidabi et al. (2024). These structural inequalities create conditions in which homework may unintentionally reinforce or exacerbate pre-existing educational disparities.

While several studies have explored the general benefits of homework, limited attention has been given to how assignment type interacts with socioeconomic background in sub-Saharan African contexts. This study addresses that gap by examining whether school-based assignments can serve as a compensatory mechanism for students from disadvantaged home environments in Botswana.

Vygotsky’s (1978) sociocultural theory provides a compelling lens for understanding how these disparities unfold in practice. Central to this theory is the concept of the Zone of Proximal Development (ZPD), defined as the distance between what a learner can achieve independently and what they can accomplish with the support of a more knowledgeable other. According to Vygotsky, learning occurs most effectively within this zone, as guidance from others enables students to engage with tasks that lie just beyond their current capabilities. The concept of scaffolding, the structured support that helps learners bridge this gap, is integral to facilitating development within the ZPD.

In higher SES households, parents often fulfill the role of the more knowledgeable other, providing the scaffolding necessary for their children to engage productively with homework. Such support may take the form of clarifying instructions, demonstrating strategies, or offering feedback that helps the child internalize new skills. By contrast, students from lower SES homes may lack access to this type of support, leaving them to attempt tasks that fall outside their ZPD. Without appropriate scaffolding, these students may experience frustration, disengagement, and ultimately diminished learning gains (Dolean & Lervag, 2022).

Within the classroom, however, teachers are ideally positioned to provide the scaffolding and mediated learning opportunities that Vygotsky identified as essential for cognitive development. School-based assignments, in particular, can be designed to ensure that all students, regardless of their home circumstances, have access to guided participation, peer collaboration, and timely feedback. These assignments align more closely with students’ ZPD because they are delivered in contexts where support is available and where tasks can be adjusted to meet learners’ evolving needs (Bas et al., 2017). School-based assignments, therefore, offer a promising avenue for promoting educational equity by ensuring that learning tasks are accessible and productive for all students.

The potential of school-based assignments to mitigate educational disparities is especially relevant in light of the limited and often inconclusive empirical literature comparing the effectiveness of homework and school-based tasks across socioeconomic groups. Meta-analyses have generally found that homework produces small to moderate benefits for academic achievement, particularly in secondary education (Cooper et al., 2006; Hattie, 2009; Li & Hamlin, 2019). However, these analyses typically report aggregated effect sizes and pay insufficient attention to subgroup differences based on SES or parental education. As a result, the specific mechanisms through which assignment type interacts with students’ backgrounds to shape learning outcomes remain poorly understood.

Moreover, much of the existing research on homework focuses on the quantity rather than the quality or context of assignments. Studies tend to examine the number of minutes spent on homework or the frequency of completion, with limited exploration of how the nature of the assignment or the environment in which it is completed influences its effectiveness (Xu, 2024). Where researchers have considered the role of context, findings suggest that homework tends to benefit students from advantaged backgrounds disproportionately, likely due to their greater access to scaffolding and support (Chophel & Choeda, 202; Hoover-Dempsey et al., 2001; Fan et al., 2017). Nevertheless, these insights have not translated into widespread policy or practice reforms aimed at designing assignments that promote equity.

In contrast to homework, school-based assignments may provide a more equitable alternative precisely because they situate learning within environments where scaffolding is available. Such assignments can be structured to provide the social interaction, guided participation, and mediating tools that Vygotsky identified as critical for effective learning. They offer opportunities for teachers to model strategies, monitor progress, and provide feedback in real time, ensuring that students remain within their ZPD and are not left to flounder on tasks that exceed their independent capabilities. In doing so, school-based assignments operationalize Vygotsky’s principles in ways that homework, by its very nature, often cannot.

This study aims to address these gaps by systematically examining the interaction between assignment type (homework versus school-based assignments) and parental education level in shaping learning outcomes. By focusing on this interaction, the study seeks to determine whether school-based assignments can serve as a compensatory mechanism that mitigates the educational disadvantages associated with lower parental education. In doing so, it contributes to a more nuanced understanding of how assignment practices can be designed to promote equitable learning opportunities for all students, consistent with Vygotsky’s sociocultural theory.

**2. methodology**

**2.1 Participants**

The study sample comprised 600 students enrolled in Form 1 and Form 2 (equivalent to Grades 8 and 9) across twelve public junior secondary schools in the South East Educational Region. These schools were purposefully selected to represent a broad spectrum of socioeconomic contexts, including urban, peri-urban, and rural communities. This sampling strategy aimed to capture variation in home environments and access to educational resources, factors relevant to the study’s focus on assignment type and parental education.

 Although a formal a priori power analysis was not conducted, the final sample of 600 students exceeds the threshold typically required to detect medium effect sizes (Cohen’s f = 0.25) in a two-way ANOVA with 80% power at an alpha level of .05. This suggests that the study was adequately powered to detect the observed effects.

The sample included students from diverse linguistic and cultural backgrounds reflective of the region’s demographic composition. To ensure ethical integrity, approval for the study was obtained from the Ministry of Education’s Research Ethics Committee. Informed consent was secured from both the participating students and their guardians. Consent procedures included clear communication of the study’s purpose, procedures, potential risks, and assurances of confidentiality and voluntary participation.

**2.2 Procedure**

Participants were randomly assigned at the class level to one of two conditions: homework or school-based assignments. This approach minimized selection bias and enhanced comparability between groups. The six-week intervention focused on mathematics and reading comprehension, both aligned with the national curriculum.

In the **homework condition**, students completed assignments independently at home, with no support beyond written instructions. These tasks aimed to reinforce classroom learning and promote self-directed engagement.

In the **school-based condition**, students completed equivalent tasks during structured in-school periods under teacher supervision. Teachers provided guidance, clarification, and feedback to support students’ engagement. These sessions were designed to reflect the scaffolding principles of Vygotsky’s sociocultural theory, helping students work within their zone of proximal development (ZPD).

To ensure consistency, all participating teachers were briefed on the study’s objectives and instructed to deliver materials uniformly across conditions.

To minimize confounding, random assignment was conducted at the class level. Both conditions received assignments of equivalent content and difficulty, and teachers were briefed to maintain consistent instruction and administration protocols across groups. While some unmeasured individual factors (e.g., motivation) may exist, these procedural controls enhanced internal validity.

**2.3 Measures**

Student learning was assessed using standardized pre- and post-tests in both mathematics and reading comprehension. These assessments were designed by subject specialists to align with national curriculum objectives and to ensure content validity. Each test was scored on a scale from 0 to 20, with separate sub-scores for mathematics and reading comprehension. The primary outcome variable, learning gain, was calculated as the difference between post-test and pre-test scores, providing an index of academic progress over the intervention period.

Parental education level was included as a key independent variable. Data were obtained through school records, supplemented by parental surveys to improve completeness and accuracy. Parental education was categorized as low (no high school diploma), medium (high school diploma or equivalent), or high (college degree or higher).

This measure served as a proxy for socioeconomic status, given its established association with access to educational resources, home learning environments, and parental capacity to provide academic support.

This study aimed to examine the comparative effects of homework and school-based assignments on student learning outcomes across different levels of parental education, used here as a proxy for socioeconomic status. The objective was to determine whether school-based assignments can mitigate the academic disparities often associated with lower parental education backgrounds.

The following research questions guided the study:

1. What is the effect of assignment type (homework vs. school-based) on students’ learning gain?
2. What is the effect of parental education level on students’ learning gain?
3. Does the effect of assignment type on learning gain vary by parental education level?

To ensure instrument reliability, internal consistency was assessed using Cronbach’s alpha. The pre- and post-tests demonstrated acceptable reliability: α = .81 for mathematics and α = .78 for reading comprehension. Content validity was supported by alignment with national curriculum standards and expert review by subject specialists.

**3. results and discussion**

**Result:**

Descriptive statistics indicated meaningful patterns of learning gain across assignment types and parental education levels (see Table 1). Students from high parental education households demonstrated substantial learning gains under both homework (M = 7.02, SD = 2.34, 95% CI [6.56, 7.49]) and school-based assignment conditions (M = 7.46, SD = 2.23, 95% CI [7.02, 7.90]), though average improvement was slightly higher in the school-based context. These students consistently achieved higher mean learning gains than their medium parental education peers (homework: M = 4.92, SD = 1.94, 95% CI [4.53, 5.30]; school-based: M = 6.67, SD = 2.05, 95% CI [6.26, 7.08]) and low parental education peers.

In contrast, students from low parental education households exhibited pronounced differences in learning gains between assignment types. Under the homework condition, these students recorded the lowest mean learning gain (M = 3.55, SD = 2.05, 95% CI [3.14, 3.95]), substantially lower than that of their medium and high parental education counterparts. However, when assigned school-based tasks, their learning gain improved markedly (M = 6.25, SD = 1.90, 95% CI [5.87, 6.63]), approaching the levels observed among students from medium and high parental education backgrounds. This descriptive pattern suggests that the school-based assignment context served to mitigate disadvantages associated with lower parental education.

**Table 1. Mean Learning Gains by Assignment Type and Parental Education Level**

|  |  |  |  |
| --- | --- | --- | --- |
| **Assignment Type** | **Parental Education** | **M (SD)** | **95% CI** |
| Homework | Low | 3.55 (1.25) | [3.10, 4.00] |
| Homework | Medium | 5.85 (1.45) | [5.30, 6.40] |
| Homework | High | 7.02 (2.34) | [6.56, 7.49] |
| School-based | Low | 6.10 (1.80) | [5.65, 6.55] |
| School-based | Medium | 6.95 (1.70) | [6.50, 7.40] |
| School-based | High | 7.25 (2.00) | [6.80, 7.70] |

**\****Values represent mean learning gains (post-test minus pre-test) and standard deviations (in parentheses) by assignment type and parental education level.*

The ANOVA results supported these observations (see **Table 2**). There was a significant main effect of assignment type on learning gain, *F*(1, 594) = 91.36, *p* < .001, η² = .108. This result indicates that assignment type accounted for approximately 10.8% of the variance in learning outcomes, a medium-sized effect in educational research. The main effect of parental education was also significant, *F*(2, 594) = 63.83, *p* < .001, η² = .152, suggesting that parental education level explained 15.2% of the variance in learning gain. Importantly, the interaction between assignment type and parental education was significant, *F*(2, 594) = 14.78, *p* < .001, η² = .035, revealing that the effect of assignment type on learning gain varied according to parental education level.

***Table 2:* Two-way ANOVA Summary Table for Learning Gain by Assignment Type and Parental Education**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Source** | **SS** | **df** | **F** | **p** | **η²** |
| Assignment type | 400.00 | 1 | 91.36 | < .001 | .11 |
| Parental education | 558.98 | 2 | 63.83 | < .001 | .15 |
| Assignment × Parental education | 129.39 | 2 | 14.78 | < .001 | .04 |
| Residual | 2600.86 | 594 | — | — | — |

\**η² = partial eta squared.*

Tukey HSD tests revealed that students from low parental education households assigned homework scored significantly lower in learning gains compared to their high parental education peers assigned homework (mean difference = –3.48, P < .001) and medium parental education peers (mean difference = –2.11, P < .001). However, no significant differences were found between students assigned school-based tasks, regardless of parental education level. These results support the interpretation that school-based assignments mitigate disparities related to socioeconomic background, while homework amplifies them.

These findings raise important questions about the equity of uniform homework policies. Rather than levelling the playing field, homework may exacerbate existing inequalities. In contrast, school-based assignments provide an environment that promotes consistent learning gains across diverse student populations.

**DISCUSSION**

The findings of this study provide robust evidence that assignment type and parental education level interact meaningfully in shaping student learning outcomes. The significant main effects of assignment type and parental education highlight their independent contributions to learning gain. The medium effect size for assignment type underscores the importance of context in supporting learning, while the large effect size for parental education reflects the continuing influence of family background on educational attainment.

The significant interaction effect is particularly noteworthy. The data suggest that school-based assignments help to reduce disparities between students of differing parental education levels. This finding aligns strongly with Vygotsky’s (1978) sociocultural theory, which emphasizes the role of social interaction, scaffolding, and the learning environment in cognitive development. According to Vygotsky, learning occurs most effectively within the zone of proximal development, where learners engage in tasks that they can accomplish with appropriate guidance. In this study, school-based assignments may have provided the scaffolding, guidance, and mediated support necessary for students from low parental education households to succeed. These assignments likely ensured that students had access to teacher assistance, peer collaboration, and school resources that facilitated learning within their ZPD.

Conversely, homework placed greater demands on students’ independent learning capacities and access to out-of-school support (Lanuza, 2017). For students from low parental education households, such support may have been limited or absent, making it more difficult for them to engage effectively in learning tasks beyond their current capabilities. This would explain the significantly lower learning gains observed for these students under the homework condition.

The findings resonate with prior research indicating that homework tends to benefit students from advantaged backgrounds disproportionately (Li & Hamlin,2019; Mzidadi et al., 2024) The current results extend this work by demonstrating that school-based assignments can serve as a tool for promoting educational equity. School-based tasks ensure that all students, regardless of home background, have access to the social and instructional supports identified by Vygotsky as critical for development.

The fact that students from high parental education backgrounds achieved strong learning gains under both conditions further illustrates Vygotsky’s point that access to tools, signs, and mediating structures enhances development. These students may benefit from enriched home environments that provide academic scaffolding and support similar to that available in school, enabling them to succeed across diverse learning contexts.

From a practical perspective, these findings suggest that assignment design should prioritize the creation of supportive learning environments that provide scaffolding for all learners. Schools might reduce reliance on homework, particularly in contexts where disparities in parental education and support are pronounced. Instead, structured school-based assignments, collaborative learning opportunities, and after-school programs could help ensure that all students benefit from the guided participation and mediated learning emphasized in sociocultural theory (Chophel & Choeda, 2021; Suárez-Fernández et al., 2022).

At the policy level, these results support calls for reforms aimed at promoting equity in education. Educational policies could encourage or mandate the use of school-based assignments in core subjects, provide funding for after-school learning programs, and offer professional development to help teachers design assignments that effectively scaffold learning. Such measures would align educational practice more closely with Vygotskian principles, ensuring that all students are provided with the tools and supports needed to reach their full potential.

The limitations of this study must also be considered. The research was conducted within a single educational region, which may limit the generalizability of the findings. Future studies should replicate this work across different regions and educational systems to determine whether similar patterns emerge. Additionally, while parental education served as a proxy for socioeconomic background, it does not capture the full range of factors that may influence students’ learning environments. Future research could incorporate additional measures such as household income, parental involvement, and access to learning resources to provide a more comprehensive picture of how home background interacts with assignment type.

Moreover, this study focused on quantitative measures of learning gain and did not explore the processes through which school-based assignments support learning. Qualitative studies examining students’ and teachers’ perspectives could shed light on how social interaction, scaffolding, and other Vygotskian mechanisms operate in practice. Longitudinal research could also investigate the lasting effects of assignment type on educational trajectories and outcomes.

**Conclusion:**

In conclusion, this study contributes important evidence that assignment type interacts with parental education level in shaping learning outcomes. School-based assignments, in particular, emerged as a promising strategy for mitigating educational disparities linked to socioeconomic background. By ensuring that all students have access to supportive learning environments that align with Vygotskian principles of scaffolding and guided participation, educators and policymakers can help promote equitable educational opportunities. These findings highlight the need for a critical re-evaluation of homework practices and support the development of assignment designs that foster inclusive and effective learning for all students.

**CONSENT**

Written informed consent was obtained from all parent of the participants prior to their completion of the survey. Participants were provided with clear information about the purpose of the study, the voluntary nature of their participation, and their right to confidentiality. All names and identifying details were kept strictly confidential, and participants were assured that they could withdraw from the survey at any point without any consequences.

**ETHICAL APPROVAL**

The study was conducted with the approval and in accordance with the standards of the University. The research followed all applicable ethical guidelines, ensuring respect for the respondents’ consent, privacy and confidentiality.

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