



# Comparative Study of Content Delivery Effectiveness among Retooled and Non-Retooled Junior School Teachers in Kakamega North Sub-County, Kenya

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**Abstract:** Globally, teacher retooling is recognized as an important strategy for improving classroom instructional effectiveness through continuous professional development. The Teachers Service Commission (TSC) introduced the Teacher Professional Development (TPD) framework to enhance teachers' instructional competencies. However, concerns remain regarding differences in the extent to which retooled and non-retooled teachers effectively deliver curriculum content in junior schools. In Kakamega North Sub-County, reported inconsistencies in classroom instruction have raised questions about whether teacher retooling translates into improved content delivery. This study therefore sought to compare the content delivery effectiveness of retooled and non-retooled junior school teachers in Kakamega North Sub-County, Kenya. The study was anchored on Constructivist Learning Theory. An ex post facto research design was adopted. The target population comprised 864 junior school teachers in public schools in Kakamega North Sub-County, from whom a sample of 273 teachers was selected using simple random sampling. Data were collected using a structured questionnaire to establish teachers' retooling status and a standardized classroom observation schedule adapted from the Teacher Performance Appraisal and Development (TPAD) tool to assess content delivery effectiveness. The findings indicated that retooled junior school teachers demonstrated significantly higher content delivery effectiveness than their non-retooled counterparts ( $F = 21.67, p < .001$ ). The findings suggest that teacher retooling contributes to improved delivery of curriculum content under the CBC. The study recommends strengthening teacher professional development, follow-up support, and continuous monitoring to enhance the translation of retooling into effective classroom practice.

**Keywords:** Teacher retooling; Teacher Professional Development (TPD); Competency-Based Curriculum (CBC); content delivery effectiveness; Teacher Performance Appraisal and Development (TPAD); curriculum content delivery, professional development

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## 1. Introduction

In the 21st century, quality education remains a cornerstone of global development, with effective teacher content delivery being a critical determinant of meaningful learning

outcomes. Content delivery refers to the ways in which teachers organize, explain, present, and facilitate curriculum content to enable learners to understand and apply knowledge and skills. Effective content delivery requires teachers to possess adequate subject knowledge, pedagogical competence, appropriate instructional

strategies, and the ability to adapt content to learners' diverse needs. Consequently, continuous professional development and teacher retooling have increasingly been recognized as important approaches for strengthening teachers' instructional competencies and improving the quality of classroom teaching (Darling-Hammond et al., 2017; OECD, 2021; UNESCO, 2023).

Globally, education systems have adopted different approaches to teacher retooling to enhance teachers' capacity to deliver curriculum content effectively. In Finland, teacher education and professional development emphasize research-based pedagogy, subject knowledge, and the continuous improvement of teaching practices (Sahlberg, 2018). The strong preparation of teachers enables them to select appropriate instructional approaches, relate curriculum content to learners' experiences, and facilitate meaningful learning. Similarly, Singapore has established structured professional development through the Teacher Growth Model, which promotes continuous improvement of teachers' pedagogical knowledge, instructional practices, and professional competencies (Ng, 2020). Such approaches demonstrate the importance of continuous teacher development in strengthening the capacity of teachers to translate curriculum content into effective classroom learning experiences (OECD, 2021).

In Japan, teacher professional development is strongly associated with collaborative lesson study, commonly referred to as *Jugyō Kenkyū*. Through this approach, teachers collaboratively plan, observe, evaluate, and refine lessons with the aim of improving instructional practices and learners' understanding (Takahashi & McDougal, 2016). Lesson study provides teachers with opportunities to reflect on how content is presented, the appropriateness of instructional strategies, and learners' responses to classroom instruction. Similarly, teacher professional learning in the United States has increasingly emphasized evidence-based instructional practices and professional learning communities, through which teachers collaboratively examine and improve classroom instruction (Darling-Hammond et al., 2017). These international experiences suggest that sustained professional development can strengthen teachers' capacity to deliver curriculum content effectively.

In Africa, teacher retooling has also become an important component of efforts to improve instructional quality. South Africa has implemented teacher education and development initiatives aimed at strengthening teachers' professional and instructional competencies, including their ability to deliver curriculum content (Department of Basic Education, 2019). Rwanda has similarly invested in teacher development and learner-centred pedagogy to improve teaching practices and classroom learning experiences (World Bank, 2020; UNESCO, 2022). In Ethiopia and Uganda, teacher development programmes have focused on improving

teaching practices through professional learning, mentoring, and coaching (World Bank, 2021; UNESCO, 2023). Despite these initiatives, challenges such as inadequate resources, variations in training opportunities, and limited follow-up continue to affect the extent to which teachers translate professional development into effective classroom instruction.

In Kenya, the implementation of the Competency-Based Curriculum (CBC) has increased the demand for teachers who can effectively interpret curriculum requirements and deliver content through learner-centred and competency-based approaches. The Teachers Service Commission (TSC), in collaboration with relevant education agencies, has introduced teacher training and professional development initiatives to strengthen teachers' pedagogical and curriculum competencies (TSC, 2022). Teacher retooling is therefore expected to enhance teachers' ability to organize curriculum content, employ appropriate teaching strategies, explain concepts clearly, use relevant instructional resources, and facilitate learners' active engagement in the learning process. However, studies have indicated that the transfer of skills acquired through teacher training into classroom practice remains inconsistent, partly because of inadequate follow-up and variations in the implementation of professional development programmes (Wanjohi & Muraya, 2023; MoE Kenya, 2023).

In Kakamega North Sub-County, the implementation of CBC has created an increased need for teachers to demonstrate effective content delivery in junior schools. Although teachers have been exposed to CBC-related training and professional development initiatives, concerns regarding variations in instructional practices raise questions about whether teacher retooling has translated into improved delivery of curriculum content. This creates a need to establish whether retooled junior school teachers differ from their non-retooled counterparts in their effectiveness in delivering curriculum content. It is against this background that the present study focuses on comparing the content delivery effectiveness of retooled and non-retooled junior school teachers in Kakamega North Sub-County, Kenya.

## 2. Literature Review

Teacher retooling is increasingly viewed as a mechanism for improving content delivery in competency-based curricula. In South Africa, Moodley and Aronstam (2020) investigated the effect of in-service teacher training on instructional delivery under curriculum reform using a mixed-methods design involving lesson observations and interviews. Their findings indicated that retooled teachers demonstrated improved clarity in content explanation and better use of real-life examples during instruction. Despite these insights, the study did not explicitly compare trained and untrained

teachers, nor did it disaggregate instructional effectiveness into lesson organization and content delivery as separate constructs. This study has filled this gap by explicitly comparing retooled and non-retooled teachers on these specific instructional dimensions.

The organization of lesson content plays a critical role in supporting knowledge construction, particularly within constructivist learning environments. A study by Choy, Wong, and Gao (2019) in Singapore explored how pedagogical training influenced lesson planning and content sequencing among secondary school teachers using document analysis and classroom observations. The study revealed that trained teachers were more consistent in aligning lesson objectives, instructional activities, and assessment tasks. However, the study focused on lesson planning documents rather than enacted classroom instruction. The present study extends this work by examining actual classroom instructional practices, thereby providing stronger evidence of instructional effectiveness.

Content delivery effectiveness is also influenced by teachers' pedagogical content knowledge acquired through retooling. In a Kenyan study, Mutisya and Gathumbi (2017) examined the relationship between teacher professional development and instructional delivery in public secondary schools using a correlational design. The study found that teachers who had undergone in-service training demonstrated improved clarity, pacing, and coherence in content delivery. Nonetheless, the study focused on secondary schools and examination-oriented instruction, limiting its relevance to junior schools operating under CBC. The current study fills this gap by focusing on junior school teachers and competency-based instructional delivery.

Teacher retooling has been shown to influence the coherence of lesson organization during curriculum transitions. In Rwanda, Ndayambaje and Mugisha (2021) investigated teachers' instructional practices following competence-based curriculum training using classroom observations. Their findings showed that trained teachers demonstrated stronger lesson introductions, clearer activity sequencing, and better lesson closure. However, the study did not include a comparison group of non-trained teachers, making it difficult to attribute differences directly to retooling. The present study addresses this limitation by employing a comparative design involving retooled and non-retooled teachers.

Instructional content delivery under CBC requires teachers to contextualize subject matter to learners' experiences. Hashim and Abdullah (2022) conducted a study in Malaysia to examine the influence of constructivist-oriented teacher training on classroom content delivery using observation checklists and interviews. The study found that trained

teachers were more effective in contextualizing content and scaffolding learning. Despite its relevance, the study was conducted in a higher education context, limiting its applicability to junior school classrooms. The current study fills this gap by focusing on basic education under CBC.

The effectiveness of lesson organization is also shaped by teachers' ability to integrate training into classroom routines. In a longitudinal study, Opfer and Pedder (2019) researched how professional development influenced lesson organization over time among primary school teachers in England. The findings indicated that teachers who received sustained training demonstrated progressively improved lesson coherence and instructional flow. However, the study did not examine content delivery practices explicitly. The present study integrates both lesson organization and content delivery to provide a more comprehensive assessment of instructional effectiveness.

Teacher retooling has been linked to improved instructional clarity, yet evidence from developing country contexts remains limited. In Uganda, Ssempala and Kibuuka (2020) conducted a peer-reviewed study examining the effect of in-service training on instructional delivery using classroom observations. The study found that trained teachers demonstrated clearer explanations and better pacing of lesson content. However, the study did not examine lesson organization as a complementary instructional dimension. The current study fills this gap by jointly examining lesson organization and content delivery.

Lesson organization and content delivery are particularly critical during early stages of curriculum reform. In Kenya, Waweru and Orodho (2021) examined teachers' instructional practices during CBC transition using descriptive survey and observation methods. The study reported that teachers who had attended retooling workshops demonstrated improved lesson flow and content sequencing. However, the study relied heavily on self-reported data and did not adopt a comparative analytical framework. The present study strengthens this evidence by employing a comparative design and multiple data sources.

### 3. Methodology

The study adopted an ex post facto research design and was conducted in Kakamega North Sub-County, Kakamega County, Kenya. The target population comprised 864 junior schoolteachers from 116 public junior secondary schools during the 2024–2025 academic year. A sample of 273 teachers was selected using Yamane's formula. Stratified and proportional random sampling techniques were used to select retooled and non-retooled teachers. Of the 273 teachers targeted, 257 participated, yielding a response rate of 94%. Data were collected using a structured teacher

questionnaire and a classroom observation schedule adapted from the Teachers Service Commission’s Teacher Performance Appraisal and Development (TPAD) tool. The questionnaire established teachers’ retooling status, while the observation schedule assessed content delivery through clarity of explanation, linkage of new content to prior knowledge, use of appropriate examples, learner-centred strategies, differentiated instruction, and formative assessment.

A pilot study involving 30 teachers from two schools excluded from the main study was conducted. Content delivery demonstrated acceptable reliability with a Cronbach’s alpha coefficient of 0. 7762.Data were analysed using SPSS version 28. Descriptive statistics, including means and standard deviations, were used to summarize content delivery scores, while an independent-samples *t*-test was used to compare content delivery effectiveness between retooled and non-retooled teachers. Multiple linear regression was used to assess the influence of teacher retooling on content delivery while controlling gender, teaching experience, qualification, and class size.

## 4. Results and Discussion

This section presents the retooling status of the 257 respondents. Teacher retooling status served as the main

**Table 1: Descriptive Statistics for Lesson Organization**

| <b>Retooling Status</b> | <b>N</b> | <b>Mean</b> | <b>Std. Deviation</b> | <b>Std. Error Mean</b> |
|-------------------------|----------|-------------|-----------------------|------------------------|
| Retooled                | 178      | 0.82        | 0.11                  | 0.008                  |
| Non-Retooled            | 79       | 0.67        | 0.14                  | 0.016                  |
| <b>Overall</b>          | 257      | 0.77        | 0.13                  | 0.008                  |

Retooled teachers recorded a higher mean score in lesson organization (*M* = 0.82, *SD* = 0.11) compared to non-retooled teachers (*M* = 0.67, *SD* = 0.14). The overall mean score for lesson organization across all respondents was 0.77. This indicates that, on average, teachers demonstrated moderately good lesson organization practices, with retooled teachers showing both higher performance and greater consistency.

### 4.2 Bivariate Analysis

An independent samples *t*-test was performed in order to test the mean differences between the retooled and non-retooled teachers in the mean scores on lesson organization.

independent variable in the study. The majority of the respondents (69.3%) had undergone formal teacher retooling through CBC and/or Teacher Professional Development (TPD) programmes. However, a significant proportion (30.7%) had not yet received any formal retooling. This distribution provides a balanced and adequate basis for conducting a comparative analysis of classroom instructional effectiveness between retooled and non-retooled junior school teachers as per the objectives of the study. The presence of both groups enables the researcher to determine whether retooling has a measurable effect on instructional practices in Kakamega North Sub-County.

### 4.1 Descriptive Statistics for Lesson Organization

The outcome variable for objective one was Lesson Organization. The results were obtained from the standardized TPAD tools, which were filled by the Deputy Principal for every teacher sampled. The minimum score is 0, and the maximum score is 1. This generated ratio data.

An independent samples *t*-test revealed a statistically significant difference in the lesson organization of retooled and non-retooled teachers (*t*(255) = 8.76, *p* < 0.001). The obtained *t*-value is equal to 8.76, which means that there is a large difference between group means compared with variability within the groups. Moreover, the mean difference is quite significant and equals 0.15 (on a 0 – 1 scale), which means that retooled teachers scored 15 percentage points higher in lesson organization than non-retooled teachers. It means that retooled teachers were better at reviewing prior material, setting objectives, connecting lesson topics, and providing a fascinating introduction.

Pearson correlation between the covariates and the dependent variable was performed in order to find out which

ones will be entered into the multiple linear regression. The results are shown below.

**Table 2: A Correlation Matrix for Covariates**

| Variable                        | Classroom Effectiveness | Instructional Teacher Retooling | Teaching Experience | Subject Specialization | Class Size |
|---------------------------------|-------------------------|---------------------------------|---------------------|------------------------|------------|
| Classroom Effectiveness         | 1.0000                  |                                 |                     |                        |            |
| Instructional Teacher Retooling | 0.4825*                 | 1.0000                          |                     |                        |            |
| Teaching Experience             | 0.3157***               | 0.2468*                         | 1.0000              |                        |            |
| Subject Specialization          | 0.2843***               | 0.1934*                         | 0.3521*             | 1.0000                 |            |
| Class Size                      | -0.2679***              | -0.1045*                        | -0.1186***          | -0.0914                | 1.0000     |

\*\*\* $p < 0.001$ , \* $p < 0.01$ ,  $p < 0.05$

Correlation analysis was carried out to determine the strength and direction of the relationships between the effectiveness of classroom instruction (dependent variable) and explanatory variables before estimating multiple linear regression model. It is evident from the findings that teacher retooling had a moderate positive relationship with the effectiveness of classroom instruction ( $r = 0.4825$ ). It means that teachers who had gone through CBC and TPD retooling showed higher instructional effectiveness than those teachers who did not go through retooling. Thus, this explanatory variable was considered fit for inclusion in the MLR model as the most important explanatory variable. The teacher retooling variable can be defined as a variable representing teachers' participation in CBC related professional development.

Teaching experience also had a positive relationship with instructional effectiveness ( $r = 0.3157$ ). It means that the more experienced teachers are likely to show improved classroom organization and delivery of content as well as improved learner engagement. Teaching experience as an independent variable affecting instructional practices may not be affected by the retooling variable. Hence, teaching experience was included in the regression model as a control variable. The study recognizes teacher-related factors such as experience as contextual variables influencing instructional effectiveness. Subject specialization showed a positive association with classroom instructional

effectiveness ( $r = 0.2843$ ). This means that teachers' specialization in terms of their education and profession could influence their capability to present the content of the subject. Hence, subject specialization was one of the covariates used in the MLR model.

The size of the class showed negative association with classroom instructional effectiveness ( $r = -0.2679$ ). This means that large classes could affect lesson planning, learner participation, and classroom communication due to high level of management. Thus, class size was also entered into the regression model since it might affect instructional effectiveness. The conceptual framework identifies class size among school-related factors that may influence the outcome.

### 4.3 Multivariate Analysis (Multiple Linear Regression)

A multiple linear regression analysis was carried out to explore the influence of teacher retooling on lesson planning after controlling for some selected demographic and contextual variables (gender, teaching experience, highest level of qualification, and class size). The first model consisted of only teacher retooling, while the second model comprised all the control variables.

**Table 3: Multiple Linear Regression Results for Lesson Organization**

| Variable                       | Model 1 |            | Model 2 |         |
|--------------------------------|---------|------------|---------|---------|
|                                | $\beta$ | p-value    | $\beta$ | p-value |
| Teacher Retooling (1=Retooled) | 0.412   | <0.001     | 0.378   | <0.001  |
| Gender                         |         |            | 0.042   | 0.412   |
| Teaching Experience            |         |            | 0.118   | 0.029   |
| Highest Qualification          |         |            | 0.095   | 0.087   |
| Class Size                     |         |            | -0.156  | 0.003   |
| <b>Model Statistics</b>        |         |            |         |         |
| <b>R<sup>2</sup></b>           | 0.169   |            | 0.248   |         |
| <b>Adjusted R<sup>2</sup></b>  | 0.166   |            | 0.228   |         |
| <b>F-statistic</b>             | 51.92   | P<0.001*** | 12.45   | P<0.000 |

\*\*\* $p < 0.001$ , \* $p < 0.01$ ,  $p < 0.05$

In Model 1, teacher retooling emerged as a significant predictor of lesson organization ( $\beta = 0.412$ ,  $p < 0.001$ ) that accounted for 16.9% of the variance ( $R^2 = 0.169$ ). An F-statistic of 51.92 ( $p < 0.001$ ) attests to the model's statistical significance.

In Model 2, with controls for demographic and contextual factors, teacher retooling proved to be a significant and strong predictor of lesson organization ( $\beta = 0.378$ ,  $p < 0.001$ ). With these controls, the total variance explained by the model in lesson organization scores was 24.8% ( $R^2 = 0.248$ ), constituting a substantive increase of 7.9 percentage points. The model is significant at a statistical level ( $F = 12.45$ ,  $p < 0.001$ ). Teaching experience and class size are the only two control variables with a statistically significant effect on lesson organization.

These results indicate that involvement in teacher retooling programs is a highly significant positive determinant of lesson organization despite other teacher and classroom-related variables. This supports the value of retooling initiatives in strengthening structured and coherent classroom instruction under the Competency-Based Curriculum.

The regression model proved statistically significant;  $F(5, 251) = 12.45$ ,  $p < 0.001$ . Most importantly, the coefficient for teacher retooling remained statistically significant  $\beta =$

0.378,  $t = 6.87$ ,  $p < 0.001$  after controlling for the effects of gender, teaching experience, highest qualifications, and class size, leading to rejection of the null hypothesis ( $H_0$ ). This shows that teacher retooling is statistically significant in influencing lesson organization.

## 4.4 Discussion of Results

The results show that teacher retooling has a statistically significant and practically meaningful positive effect on lesson organization of the junior school teachers in Kakamega North Sub-County. Even after accounting for teaching experience, class size, and other contextual factors, the effect of retooling was found to be stable and consistent ( $\beta = 0.378$ ,  $p < 0.001$ ), with the retooled teachers performing better than the non-retooled teachers (mean score of 0.82 versus 0.67). This is not the result of statistical changes only, but pedagogical changes facilitated by retooling programmes developed for CBC.

Given this context of CBC implementation in Kakamega North, these outcomes are dependent on the competencies which were central to TSC's TPD and MoE/KICD retooling modules. The Retooling course provides teachers with a framework for sequential lessons, setting objectives, and connecting prior learning to the new material, which are skills essential to a competency-based curriculum but quite different from the content-coverage approach that was the

focus of the old 8-4-4 curriculum. Non-retooled teachers, who are mostly relatively inexperienced (more than 62% with less than 10 years of service) and teach in large classes (almost 47% with 40+ learners) seem to follow familiar, but less structured, teacher-centered routines. The continued negative effects of class size in the regression model also highlight the importance of the impacts of poor preparation in the resource-constrained environment of rural schools, such as Kakamega North, where teachers often have to manage time-on-task, transitions, and coherent lesson closure with overcrowded classrooms and insufficient instructional materials to retool.

Importantly, the moderate amount of explanatory power of the full model (the Adjusted  $R^2 = 0.228$ ) indicates that retooling does not act by itself. These systemic implementation gaps encompass follow-up after initial training, where teachers' work was not equally supported in the classroom, limited access to ongoing mentoring, and lack of alignment between the retooling content and classroom reality in under-resourced sub-counties, which may be why even retooled teachers did not obtain near-perfect organization scores. This finding has significant implications for the need for one-off or short-term retooling programmes for achieving big pedagogical change in contexts like Kakamega North where infrastructural and policy-support gaps are still significant.

The findings are consistent with international findings (Kallio & Halinen, 2018 in Finland; Choy et al., 2019 in Singapore) that found that sustained professional development enhances lesson coherence. They build on these studies by showing that, under similar conditions, such benefits can be observed in a resource limited environment in Kenya in the midst of rapid curriculum shift. The results are in line with previous observations in Kenya (Waweru & Orodho, 2021; Ouma & Simatwa, 2022) and extend beyond these earlier observations by providing empirical evidence comparing different countries with standardized TPAD observations and strict controls. This reinforces causal inference about the effect of retooling and underscores that the poor performance of those non-retooled teachers is probably due to the lack of exposure to the constructivist planning models that lie at the heart of CBC.

## 5. Conclusion and Recommendations

### 5.1 Conclusion

The consistently higher organization scores among retooled teachers indicate that training has shifted practice toward purposeful sequencing, explicit lesson objectives, and time-bounded phases that support competency development. In CBC, progression through scaffolded tasks is essential for competency acquisition. The significant regression effect of retooling (controlling for experience, class size, and

leadership) implies that policy investment in TPD yields classroom-level structure that generic experience alone does not reliably produce. School leaders can expect fewer fragmented lessons and more reliable pacing when retooling coverage is complete, which should reduce off-task time and improve curriculum coverage in crowded timetables.

### 5.2 Recommendations

Based on the findings of the study, the following recommendations are made:

1. The Teachers Service Commission and the Ministry of Education should ensure that all junior school teachers undergo comprehensive CBC and TPD retooling programmes to strengthen instructional effectiveness across schools.
2. Continuous professional development opportunities should be provided regularly to enable teachers to update their pedagogical knowledge and sustain the gains achieved through retooling programmes.
3. School administrators should create supportive environments that facilitate the application of competencies acquired during retooling, including provision of instructional resources, mentorship, and professional collaboration opportunities.
4. Curriculum support officers should strengthen monitoring and instructional support mechanisms to ensure that competencies acquired during retooling are effectively translated into classroom practice.

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