PHASE III REPORT

Classroom Observations of College Tutors for IDP Foundation, Inc. and Sesame Workshop's Techniques for Effective Teaching

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Executive Summary

Project Overview

NORC at the University of Chicago is evaluating the third phase of the Techniques for Effective Teaching (TFET) program. During prior Phases I and II, the TFET program partnered with 127 private, low-fee primary schools across eight regions in Ghana to strengthen the capacity of early grade teachers (KG1-P3) to use child-friendly and inclusive teaching approaches. Phase III is the newest piloting phase of the program supporting the use of pupil-centered techniques by college faculty and student teachers within 46 Colleges of Education in Ghana. Although TFET was originally designed for primary teachers, many of the program's techniques are relevant to teaching at any level.

From October to November 2020, TFET Phase III Master training was held online by Sesame Square with Professional Development Coordinators (PDCs) and Supported Teaching in Schools Coordinators (STSCs) from 46 colleges. The first level of Step-down training began in January 2021 when PDCs and STSCs held their weekly professional development meetings with college tutors. At the second level of Step-down, tutors were expected to embed TFET techniques into their courses and mentoring of student teachers. Findings from Phase III reporting thus far showed TFET was a timely, well-positioned program for supporting the on-going work of tutors in implementing the new 4-year Bachelor of Education (B.Ed.) curriculum. The new curriculum framework and teaching standards promote similar styles of pupil-centered pedagogy.

This report presents findings from the Phase III Classroom Observation study of college tutors. It forms part of an on-going study on the efficacy of TFET training in the 46 Colleges of Education. There has been very little research to date that directly observes the quality of college tutor pedagogy in Ghanaian colleges of education, especially after the reforms to teacher education in 2018. Insights from this study thus aim to inform future iterations of TFET as well as broader efforts to reform teacher education across colleges in Ghana. Through direct observation, this study examined the uptake of pupil-centered techniques by tutors teaching B.Ed. courses to students in eight case study colleges. Throughout this report we describe the teaching techniques of college tutors and integrate earlier findings from the Phase III training and curriculum reports. Overall, this study presents a qualitative snapshot of the pedagogy in college classrooms with a special focus on tutors as central agents of curriculum reform.

Research Methods and Objectives

In March 2022, trained fieldworkers conducted 16 classroom observations of TFET-trained tutors in eight case study Colleges of Education (two observations per college). The eight

colleges varied by region and mentoring university. Classroom observations focused on tutor characteristics, the classroom learning environment, and pedagogic techniques used during courses with student teachers.

Observation data was collected and analyzed using a mixed methods research design. The closed-ended quantitative part of the observation tool captured the presence and absence of pupil-centered teaching techniques as presented in the TFET training manual and videos. Open-ended qualitative lesson narratives captured the processes involved in the uptake of techniques. Findings were derived from an analysis of both the quantitative and qualitative data and presented throughout this report.

The research questions for this study focused on the integration of TFET-style pupil-centered methods into the classroom practice of tutors. Specifically, the research questions are:

- What TFET pupil-centered techniques were evident in the instructional practice of college tutors?
- Where evident, how were pupil-centered techniques implemented in classrooms?
- What did an analysis of instructional practice reveal about tutor approaches used for B.Ed. teaching of student teachers?

The design of this classroom observation study builds on findings from earlier Phase III reports to generate a comprehensive account of TFET Master and Step-down trainee pedagogy. This earlier work comprised interview and survey data on college tutor perceptions of training effectiveness and understandings of pupil-centered pedagogy. Earlier work also reviewed the new Bachelor of Education curriculum in Ghana and explored implementation challenges and successes shared by curriculum experts.

Findings and Conclusions

Throughout this report we present findings from the classroom observation study of tutor pedagogy in relation to Phase III training from 2020-2022. The following are key conclusions from this work organized by theme: 1) tutor characteristics, 2) classroom learning environment, and 3) classroom pedagogy.

Tutor Characteristics

- All 16 tutors in this study held a Master's degree and two were PhD candidates.
- Most tutors received TFET training on a wide variety of pupil-centered topics and reported teaching a wide variety of TFET techniques to students during B.Ed. courses. Differentiating teaching through pupil grouping was taught most frequently. Very few differences were observed in the coverage of TFET topics between Master and Step-down trainees.

- While most tutors reported using PowerPoint and imagery to step-down TFET techniques to student teachers, only 60% of tutors reported using TFET training materials. Partial use of TFET materials may be due to challenges with network connectivity, a broader challenge across colleges and basic schools found in the training report.
- The most frequently reported need of student teachers to succeed in the B.Ed. program was more knowledge and skills for teaching (including subject knowledge, pedagogic content knowledge, and classroom management). Student access to more teaching resources was reported second most.

Classroom Learning Environment

- The learning environments of observed classrooms were mostly similar in physical arrangement, display of materials, and behavior management routines. In most classes learners were grouped or paired for collaborative learning. Half of tutors arranged students in more than one way during lessons. In all but one classroom, students were easily able to enter and exit the room.
- The walls of classrooms were largely bare with 1-2 materials pasted onto the walls. In only one classroom were there no Teaching and Learning Materials (TLMs) on display at all. Forty-four percent of classrooms had a computer, which was the most frequently observed material on display. Least observed were class rules, calendars, and imagery.
- Of the classes directly observed in this study, most tutors taught a large class of more than 30 students. Three tutors taught between 1-30 learners, eight taught between 31-60, one taught 86 learners, and four taught between 91-120 learners.
- Across lessons, tutors used significantly more positive behavior techniques than negative. All tutors praised students for correct answers, and about half modeled calm behavior. Three tutors made reference to class rules, and one referred to consequences for breaking the rules. During lessons, two tutors shouted to show disapproval and pointed out negative behavior. One tutor shouted to get students' attention and another threatened to use corporal punishment.
- In 88% of classes, students raised their hand before speaking. In 56% of classes students entered and exited the room without instruction by the tutor. In very few classrooms were learners seen collecting, handing out, or packing away materials without instruction from tutors. Behavioral routines were more common in classes with fewer than 60 pupils.
- 13 out of 16 tutors appeared prepared for lessons, and 12 tutors told students how much time they had to complete a learning task. During observations, students carried out assigned leadership or helper duties in 38% of classes, usually taking attendance, leading discussions, and presenting group work (albeit, discussions and presentations were seen in more than half of observed lessons).

- Male and female learners were given equal opportunities to learn, and during five lessons, tutors encouraged or praised the efforts of females.
- Although the study did not gather data on whether students had special learning needs, no tutors were seen providing special assistance to students with emotional, physical, or other identifiable learning needs during observed lessons.

Classroom Pedagogy

- The structure and style of pedagogy were more similar than different across classrooms in this study. Most tutors spent all or most of the 45-minutes covering subject knowledge and skills that varied widely across level 100 and 200 lessons. Half of tutors covered at least one other topic, albeit less than half the time, especially techniques for basic school instruction.
- Five lessons were *mostly pupil-centered* where students mainly influenced the content, pacing, or structure of the lesson. Eight lessons were *hybrid*, exhibiting teacher-centered lecturing and/or chorusing alongside some pupil-centered techniques, such as group work or discussion. Two lessons were *mostly teacher-centered*, with a few pupil-centered techniques. One lesson was *teacher-centered,* where the tutor lectured most of the time and used call and response questioning; no pupil-centered techniques were seen.
- The chalkboard was the most frequently used TLM by 11 tutors and seven students. In very few lessons were other kinds of materials used for hands-on learning.
- Across lessons, 81% of tutors made connections between lesson content and student interests, and 75% connected lesson content to students' prior knowledge or experience.
- All tutors lectured to some extent, but during 63% of lessons students spent more time on collaborative learning activities, interacting and sharing ideas with each other (through grouping, presentations, and discussion). The combination of lecturing, grouping, and discussion indicates a prevalence of oral instruction.
- During 88% of lessons, students had opportunities to read or reference materials to some extent, usually from textbooks, cell phones, or the board.
- The use of at least some pupil-centered techniques was seen in 81% of lessons, especially in classes of fewer than 60 students.
- Thirty-eight percent of tutors assigned some kind of learning task to *individual* students.
- Whereas 56% of tutors gave all students the same learning task, 44% gave different tasks to different students, usually to different groups of students. Although grouping criteria were sometimes difficult to assess, more tutors grouped students of the same ability, interest, and language.
- Tutors in this study demonstrated similar assessment techniques. Tutors mainly used oral questioning during lectures and discussion to assess understanding.

Open-ended questions, where tutors sought more than one answer or different explanations, were seen in 94% of lessons. Closed-ended questions, where the tutor sought one correct answer, were seen in 69% of lessons. There was little evidence of individualized written assessments of learning.

- Sixty-nine percent of lessons showed chorusing, a commonly used teacher-centered technique where tutors prompted students to repeat words, answers, or definitions altogether.
- During lessons, 13 tutors indicated whether student responses were right or wrong. Of those 13 tutors, 11 took time to elaborate *why* an answer was right or wrong, and 10 tutors re-taught or re-explained an idea to students.
- Variation in the quality of learning assessment was mainly seen in the *clarity* of questions tutors asked students and extent to which tutors took time to explain to students *why* their ideas were or were not correct.
- One standout instance of play-based activity was seen, reflecting TFET-style techniques and modeling active, hands-on numeracy pedagogy.

In conclusion, this study found strong similarities across the learning environments of classrooms and in the pedagogic styles of college tutors. Most tutors used some combination of teacher-centered and pupil-centered methods. The study's conclusions are partly consistent with findings from earlier Phase III research. Some misalignment was found between tutors' espoused beliefs and tutors' enacted pedagogy, especially the prevalence of chorusing, lack of hands-on activities, and mixed use of differentiation techniques. This misalignment may be explained by common teaching challenges at colleges, especially large class sizes. Tutors in this study were more likely to use pupil-centered techniques in classes of fewer than 60 students. Thus, tutors may more easily adopt pupil-centered methods if professional development is designed to support their specific teaching needs and the reality of classroom contexts.

Research Methodology

The classroom observation study of college tutors collected evidence on the style of teaching techniques used during courses with student teachers at eight case study colleges of education. Data was gathered and analyzed using a mixed methods approach to examine how tutors used TFET-style techniques and materials, producing a more comprehensive measure of pedagogic quality. Trained fieldworkers worked together in pairs to observe Bachelor of Education lessons in 16 college classrooms from 1-8 March 2022.

Study Sample

The eight case study colleges of education selected for this study participated in an earlier Phase III study on Master and Step-down training. The training study gathered interview data in September and October 2021 from tutors, PDCs, and STSCs on TFET training effectiveness and understandings of pupil-centered teaching approaches. We selected colleges that carried out both Master and Step-down training on at least two modules, specialize in Early Childhood (ECE) or General Education, and are affiliated with each of the four mentoring universities. The eight case study colleges are spread across seven different administrative regions in Ghana. Three colleges are all female institutions, and one is an all-male college.

At each college we sought to observe two tutors that completed training on as many TFET modules as possible, or on at least two modules. The timing of the research further restricted our sample of tutors to those teaching level 100 and 200 courses in the new Bachelor of Education program (level 300 and 400 students were off campus at the time of observation). Taken together, the selection criteria for classroom observations produced a sample of nine Step-down trained tutors, six Master-trained tutors, and one tutor that had not received any TFET training. Of the 16 tutors, seven taught level 100 students, and nine taught level 200 students.

Table 1 summarizes the classroom observation sample of 16 college tutors, including which courses were observed.

Table 1. Summary of Classroom Observation Study Sample

Case Study College	Affiliated University	Tutor No.	TFET Training	Course Level	Course Title
COE 1	UDS Tamale	1.1	Step-down	100	Foundation of education in Ghana
		1.2	None	100	Mathematics
COE 2	UEW Winneba	2.1	Step-down	100	Learning, teaching, and applying numbers and Algebra
		2.2	Step-down	100	Foundation of education in Ghana
COE 3	U of Ghana	3.1	Step-down	200	Manipulative processes and skills in home economics
		3.2	Step-down	100	Social studies and TVET
COE 4	UDS Tamale	4.1	Step-down	200	Theories of learning mathematics for JHS
		4.2	Step-down	100	Social studies and TVET
COE 5	UE Winneba	5.1	Step-down	200	Science
		5.2	Master	200	Music composition
COE 6	UE Winneba	6.1	Step-down	200	Introduction to English
		6.2	Master	200	Ghanaian cultural identity and the arts
COE 7	U Cape Coast	7.1	Master	200	Phonology
		7.2	Master	200	Algebraic thinking

COE 8	UE Winneba (TVET)	8.1	Master	100	Foundation of education in Ghana
		8.2	Master	200	Information and Communications Technology

At each college, fieldworkers observed two tutors, each teaching a lesson from the beginning. Each observation lasted 45 minutes. This observation approach generated a systematic 'snapshot' of 45 minutes of teaching and learning across 16 B.Ed. classrooms.

Mixed Methods Design

We used a convergent mixed methods design to gather complementary forms of data concurrently in the classroom (Creswell, 2018). These data included 1) open-ended narratives of classroom activity and 2) closed-ended, low-inference judgments of technique uptake. Collecting both forms of data produced a more complete record of the techniques observed and the pedagogic processes involved. In the design of observation tools, we used Phase III TFET manuals and videos to generate a comprehensive list of program indicators to measure what pupil-centered teaching looks like in classrooms. Because the Phase III training manual excluded Modules 5 and 6 on early grade literacy and numeracy, we excluded both modules from the tool design and analyses that followed. While TFET techniques were originally designed for primary grade teachers, and some techniques may be less relevant to college pedagogy (e.g., smiley faces chart), we include them in this study, especially since tutors may model pedagogic techniques to students during courses.

A brief structured survey was also conducted to gather information on tutors' education background, TFET training experience, and perceptions of student teachers. The classroom observation tools are presented in Appendix B. The tutor survey can be found in Part 4 of tool 1.

While observing lessons in pairs, each fieldworker generated a detailed narrative of all teaching and learning activity for 45 minutes. Narratives gathered a combination of 1) verbatim talk focused on teacher-learner interactions (especially teacher questioning and feedback) and 2) detailed descriptions of behaviors, explanations, and materials used. The time was also recorded at five-minute intervals to gauge the length of different learning activities. Fieldworkers were then able to reference their lesson narratives while making judgments on closed-ended items. Pairs of fieldworkers completed the closed items together after the observation ended, allowing for an inter-rater reliability check at the point of data collection.

Fieldworkers participated in a five-day intensive training program that covered principles of classroom observation research, pupil-centered pedagogy, and TFET. Fieldworkers had various opportunities to apply observation methods through simulations using classroom video records and on-site piloting of tools in a local college of education. All fieldworkers are based in Ghana, fluent in local languages, hold a degree in higher education, have classroom

observation or survey experience, and several of them have teaching experience. Appendix C presents the five-day fieldwork training agenda.

Analytical Approach

A conceptual framework was designed to structure the data collection, analysis, and findings presented in this report. The framework includes three constructs that structure TFET training. These are tutor characteristics, classroom learning environment, and classroom pedagogy. Using a convergent mixed methods approach, qualitative and quantitative data were analyzed separately and then interpreted together during the evaluation stage. We referenced prior Phase III research reports during the analysis to seek broader explanations for study findings. Reference is made to this work throughout the report.

In the first instance, we quantified and analyzed closed-ended items in Excel. The analysis of quantitative data looked for patterns in technique uptake across the 16 college tutors. Next, each pair of open-ended lesson narratives was read together to produce one complete summary description per classroom. Using the conceptual framework, pedagogic patterns and processes were coded and extracted into tables. Interpretive analyses of lesson narratives focused on similarities and differences between lessons, exemplars of pupil-centered techniques, teacher questioning and feedback, and classroom management approaches.

Finally, we compared both forms of open and closed-ended data, offering a more complete understanding of the teaching and learning activities observed. Working between these data and pupil-centered theory produced descriptors of four lesson types. Lesson type was seen to vary on a scale from ‘teacher-centered’ (- -) to ‘mostly pupil-centered’ (++), measuring the extent to which a tutor used pupil-centered techniques during the 45-minute period. For example, lessons classified as ‘teacher-centered’ exhibited a largely oral call and response style of instruction and tutor lecturing. ‘Mostly pupil-centered’ lessons showed very little tutor lecturing where students mainly interacted with each other and controlled the selection, pacing, and/or sequencing of lesson content. Table 2 presents descriptors for the four types of lessons observed in this study.

Table 2. Measuring the Extent of Pupil-centered Techniques Per Classroom

When the teacher interacts with learners during the observation period, the teacher:	**Uses little to no P-C techniques** *(Teacher-centered lesson)*	**Uses a few P-C techniques** *(Mostly teacher-centered lesson)*	**Uses some P-C techniques** *(Hybrid lesson)*	**Uses many P-C techniques** *(Mostly pupil-centered lesson)*
	- -	-	+	++
	Uses very few or no pupil-centered techniques during the observation period. The lesson	Uses a few pupil-centered techniques during the observation period, such as student grouping or whole	Uses a combination of lecturing and some pupil-centered techniques during the observation period,	Uses many pupil-centered techniques during the observation period and lectures a little. Throughout the

	demonstrates a traditional, teacher-centered approach to instruction through a mainly lecturing style and/or oral call and response.	class discussion, but overall, the lesson demonstrates a mostly teacher-centered style through lecturing where the teacher mainly controls the selection and pacing of content.	such as student grouping, content relevancy, and/or opportunities for learners to share individual ideas with the teacher/class. Pupils make some choices about lesson content.	lesson, learners mainly influence the content, pacing, and/or structure of the lesson and share ideas, ask questions, and interact with each other.

Importantly, measures of pupil-centeredness presented in Table 2 do *not* necessarily reflect teaching effectiveness or the extent to which learning occurred. Rather, measures reflect the extent to which tutors *used* or attempted to use pupil-centered methods during the observed period. All tutors did lecture to some extent and most used chorusing, indicating the presence of teacher-centered methods across the 16 lessons in this study.

Limitations

Throughout this report we mostly discuss patterns in the quality of tutor characteristics, classroom environment, and pedagogy *across* all 16 tutors. While TFET training experiences do vary between tutors in this study, the sample of observed tutors was not constructed for analyses of training impact on the uptake of pupil-centered methods. Rather, the sample of tutors is viewed as a cross section of faculty teaching the new B.Ed. curriculum in Ghanaian colleges of education where TFET training occurred and where pupil-centered approaches are broadly supported through policy.

Phase III research thus far found that tutors at case study colleges reported using at least *some* pupil-centered methods *before* receiving TFET training. Tutors also reported receiving similar kinds of pupil-centered training from the Transforming Teacher Education and Learning project (T-TEL). Since 2014, T-TEL has been leading the overhaul of teacher education in Ghana through the development of new curricula policy and materials, including course manuals designed to support tutor pedagogy. Manuals are published online with outlines specifying content, pacing, and delivery methods per lesson per course. Many of the delivery methods outlined in course manuals reflect pupil-centered approaches, such as student grouping and class discussion. Moreover, several tutors observed in this study referenced the course manual during their lesson. TFET training should therefore be seen as one of several professional development programs aiming to shift tutor pedagogy toward a more pupil-centered style.

The sections that follow present the study's findings. Section 3 presents characteristics of college tutors. Section 4 describes the classroom environment, and Section 5 evaluates the pupil-centered nature of tutor pedagogy. The report concludes with summary comments and recommendations.

Characteristics of College Tutors

General Characteristics

Each of the 16 tutors reported holding a Master's degree, and two said they were PhD candidates. Half of the 16 tutors said they either taught or supported student teachers in one or two program areas. Another half said they taught students across a wide variety of programs, ranging between three and nine different areas. Table 3 presents how many tutors reported teaching courses within specific program areas. The table includes totals for Master trained tutors (n=6), Step-down trained tutors (n=9), and a tutor with no TFET training (n=1).

Table 3. Tutor Program Areas of Teaching and/or Support by TFET training status

	TFET Training Status			
Tutor Program Areas of Teaching/Support	**Master (N=6)**	**Step-down (N=9)**	**None (N=1)**	**Total (N=16)**
Early Childhood and/or Primary Education	4	5	0	**9**
Math and ICT	3	4	1	**8**
Social Sciences	3	1	0	**4**
Education and Professional Development	4	5	0	**9**
Vocational and/or Technical	3	4	0	**7**
Science Education	2	2	0	**4**
Languages	2	2	0	**4**
Other	0	2	1	**3**

Early Childhood and/or Primary Education and Education and Professional Development were the most frequently reported areas in which tutors taught. Least frequent were Social Sciences, Science Education, and Languages.

TFET Training

In order to assess exposure to the various TFET modules during Phase III Master and Step-down training, we identified 13 topics covered in the training. At least one topic was selected per module. Following each lesson observation, tutors were asked which of those topics were covered when they received TFET training. Table 4 summarizes tutor responses, comparing Master with Step-down trainees.

Table 4. Topics Covered during TFET Training Received by Tutors

Topics Covered in TFET Training	**Master (N=6)**	**Step-down (N=9)**	**Total (N=15)**
Basics of lesson planning	5	8	**13**
How "active learning" promotes "knowledge retention"	6	8	**14**
Setting up your classroom in a child-friendly way	6	9	**15**

Strategies that promote positive discipline	6	9	**15**
Developing low/no-cost teaching and learning materials	6	9	**15**
How to manage instructional time	6	9	**15**
Using pupils' ideas, experiences, and interests in lessons	6	9	**15**
Designing hands-on, interactive activities for pupils to explore	6	6	**15**
Differentiated teaching through pupil grouping	6	9	**15**
Using different assessment methods	6	9	**15**
Making accommodations for pupils with special learning needs	6	9	**15**
Ways to promote equal participation of boys and girls	6	9	**15**
Incorporating play or games into lessons	6	9	**15**

Overall, most respondents said they received training on all 13 topics. Very few differences were seen in the coverage of TFET topics between Master and Step-down trainees.

Tutors were also asked which TFET topics they had taught to students during *any* of their B.Ed. courses (that is, not necessarily during lessons observed in this study). Table 5 shows the most frequently taught topic by tutors was differentiated teaching through pupil grouping. Of the 15 tutors that received TFET training, 13 reported teaching most TFET topics while two reported teaching only 2 or 3 topics to students. None of the TFET-trained respondents said they had not taught any TFET techniques to students.

Table 5. Topics Taught by Tutors to Student Teachers During Courses

TFET Topics Taught to Students	Master (N=6)	Step-down (N=9)	Total (N=15)
Basics of lesson planning	5	6	**11**
How "active learning" promotes "knowledge retention"	6	7	**13**
Setting up your classroom in a child-friendly way	6	7	**13**
Strategies that promote positive discipline	6	7	**13**
Developing low/no-cost teaching and learning materials	6	6	**12**
How to manage instructional time	6	7	**13**
Using pupils' ideas, experiences, and interests in lessons	5	7	**12**
Designing hands-on, interactive activities for pupils to explore	6	5	**11**
Differentiated teaching through pupil grouping	6	8	**14**
Using different assessment methods	6	7	**13**
Making accommodations for pupils with special learning needs	4	8	**12**
Ways to promote equal participation of boys and girls	4	7	**11**
Incorporating play or games into lessons	5	6	**11**
None. I have not taught the TFET techniques to anyone else	0	0	**0**

During courses with students, tutors covered lesson planning, hands-on learning, gender equality, and play the least.

Finally, tutors reported which kinds of resources they used to teach TFET techniques to students, summarized in Table 6. Of the 16 tutors, 14 said they used PowerPoint presentations, and 12 used imagery. Only 60% of tutors said they used the TFET training manual and TFET YouTube videos. One explanation for partial use of TFET materials is poor network connections at colleges. This was one of the most commonly cited training challenges from the Training Report. Both the TFET training manual and YouTube videos

were distributed and accessed online. Four tutors said they used other materials, including cell phones, real objects, and big books for teaching literacy pedagogy. During lesson observations, cell phones, images, and objects (e.g. sewing machine) were directly seen.

Table 6. Resources for Teaching TFET Techniques to Student Teachers

Resources for Step-down	Master (N=6)	Step-down (N=9)	Total (N=15)
TFET training manual	5	4	**9**
TFET YouTube videos	5	4	**9**
Other YouTube videos	4	4	**8**
PowerPoint presentation	6	8	**14**
Images	5	7	**12**
Other	3	1	**4**

Tutor Perceptions of B.Ed. Student Teacher Needs

Since 2018, teacher education curriculum has shifted toward a more pupil-centered, integrated and competency-based framework that prioritizes practical experience, local languages, and pedagogic content knowledge. These emphases are stipulated in the new *National Teacher Education Curriculum Framework* and *National Teachers' Standards for Ghana* (MoE, 2015; 2017). Given such substantive reform to teacher education, all tutors were asked to name one important thing student teachers need to succeed in the new B.Ed. program. These findings are summarized in Table 7 below. In some cases, tutors identified more than one need.

Table 7. Tutor Perceptions of B.Ed. Student Needs

B.Ed. Student Needs	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
Access to a stable network connection	1	2	0	**3**
Access to ICT resources (e.g., laptop, projector, smartphone)	1	2	0	**3**
Teaching and learning materials to use during lessons	0	2	0	**2**
Motivation or discipline to learn	1	0	1	**2**
Pedagogic content knowledge (techniques for imparting specific subject knowledge)	0	1	0	**1**
Pedagogic knowledge (knowledge/skills for managing the classroom environment)	4	1	0	**5**
Subject knowledge (disciplinary knowledge)	1	2	0	**3**
Teaching philosophy (beliefs about how children learn)	1	0	0	**1**
Practical teaching experience	1	0	0	**1**
Mentoring support from college tutors	0	1	0	**1**

The most frequently reported need across all tutors pertained to students' knowledge and skills for teaching. Five tutors said students needed more pedagogic knowledge (methods for

organizing and managing classrooms). Three tutors said students needed more subject knowledge, especially stronger literacy, and numeracy skills. One tutor said students needed stronger pedagogic content knowledge (how to impart subject-specific knowledge), and another said students needed a teaching philosophy (beliefs about how children learn).

Access to more teaching resources was the second most frequently cited need. A stable Internet connection, ICT tools (e.g., laptops and projectors), and other kinds of hands-on teaching and learning materials were mentioned specifically. Students' motivation to learn, more practical teaching experience, and more mentoring from tutors were mentioned the least.

The Training Report found similar challenges to students undertaking the new B.Ed. Tutors emphasized students' need for more school-based resources (e.g., Internet access, desks, tables, chairs, and hands-on TLMs) for teaching lessons. While TFET does present innovative techniques for developing low/no-cost TLMs, other physical resources such as furniture and network equipment are relatively scarce. Across Phase III research, tutors agree students need a network connection to conduct research, plan lessons, and access teaching and learning materials.

Conclusions on Tutor Characteristics

All 16 tutors in this study held a Master's degree and most received TFET training on a wide variety of pupil-centered topics. Most tutors also reported teaching a wide variety of TFET techniques to students during B.Ed. courses. What varied amongst tutors was *how* TFET techniques were taught to students. While most tutors used PowerPoint and imagery to step-down TFET techniques, only 60% of tutors reported using TFET training materials. Partial use of TFET materials may be due to challenges with network connectivity, a broader challenge across colleges and basic schools found in the Training Report. There is consensus amongst tutors that students need more virtual, print, and physical resources to succeed in the new Bachelor of Education program.

The Learning Environment

Promoting a positive, student-friendly learning environment is presented in TFET as pupils exploring and discovering knowledge and experimenting and solving problems through cooperative group learning. A pupil-centered classroom promotes respect using positive discipline that encourages and models desired behaviors. This section examines the learning environments of the 16 classrooms and how tutors organized and managed classroom activities with student teachers.

Learner Arrangements

Student seating arrangements were examined as one component of the learning environment. Indicators of pupil-centered arrangements included students sitting together in groups or pairs and the whole class facing each other in some way. Seating variety, where learners are arranged in more than one way during the lesson, was also assessed. Findings showed that about half of tutors kept students in the same place throughout the lesson. The other half arranged students in more than one way. Table 8 summarizes the different learner arrangements across the 16 classrooms.

Table 8. Learner Arrangements during the Observed Period

Observed Learner Arrangements	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
Learners sitting at desks in a lecture hall	3	5	0	**8**
Learners sitting at individual desks in rows	3	2	1	**6**
Learners sitting together at desks or tables in groups or pairs	5	8	0	**13**
The whole class sitting and facing each other (such as U, O, or square shape)	2	0	0	**2**

In 15 of the 16 classrooms, learner arrangements enabled peer-to-peer or collaborative communication. In 13 classrooms, tutors arranged students into small groups or pairs for collaborative learning activities, and in two classes, students faced each other in a U, circle, or square shape. In half of the classes, students sat at desks in a large lecture hall. In two-thirds of classes, students were arranged in a traditional manner, seated at individual desks in rows.

Overall, two tutors only arranged students in a traditional manner (i.e., at desks in rows). In six classes, students were only organized into collaborative group arrangements. Eight of the 16 tutors used a mix of traditional and collaborative student arrangements, organizing students in more than one way during the observation period.

Display of Teaching and Learning Materials

The TFET program depicts a pupil-centered environment with teaching and learning materials displayed around the room, especially on walls and tables. Materials are used to manage classroom behavior (e.g., start charts) and to support teaching and learning (e.g., a world map). In this study we examined the display of materials in college classrooms as an indicator of pupil-centered teaching. How materials were *used* during lessons is explored below under the section on classroom pedagogy.

Ten materials on display were assessed in this study, listed in Table 9. Across classrooms, a total of 26 discrete materials were seen on display. Each material was observed at least once except for the happy/sad faces chart, star chart, and maps. Most classrooms had 1-2 materials on display. In only one classroom were there no materials seen at all (other than a chalkboard).

Table 9. Teaching and Learning Materials on Display in Observed Classrooms

TLMs on Display	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
Class rules	0	1	0	**1**
Calendar	1	0	0	**1**
Timetable	2	1	0	**3**
Star chart	0	0	0	**0**
Happy/sad faces chart	0	0	0	**0**
Other chart(s)	1	2	0	**3**
Map(s)	0	0	0	**0**
Images	1	2	0	**3**
Learners' own work (text or art based)	0	2	1	**3**
Computer(s)	4	3	0	**7**
Television	1	2	0	**3**
Other	1	1	0	**2**

Forty-four percent of classrooms had a computer, which was the most frequently observed material on display. Least observed were class rules, calendars, and imagery. Student work products and instructional charts were seen pasted on the walls of three classrooms. For example, Tutors 5.1 and 7.2 displayed a poster of the Cartesian plane. Other materials on display included flash cards of musical notation and measurement tools.

Classroom Management

Classroom management comprises techniques for organizing and regulating student activity. This study examined three ways in which tutors used pupil-centered classroom management strategies. These are positive discipline, classroom routines, and time management.

Positive Discipline

Positive discipline is a system of classroom management that promotes respect and encourages desired student behaviors. In a positive classroom, teachers refer to class rules and model calm behavior. Interview data from the training report showed that 86% of Master and Step-down trainees at case study colleges taught Module 3 on positive discipline to others at their college. The report also showed that trainees found positive behavior strategies challenging to put into practice but also useful and distinctive from other training programs. Large class sizes and traditional Ghanaian discipline were identified as obstacles to uptake.

In this study we assessed the presence of 10 positive behavior management strategies listed in Table 10. Given the dominance of traditional discipline in Ghana, we also assessed the presence of eight negative discipline strategies. By observing the presence of both positive and negative strategies, we assessed the dominant mode of tutor classroom management for each of the 16 lessons.

Table 10. Positive Behavior Management Strategies Used by Observed Tutors

Positive Behavior Strategies	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
The teacher refers students to the class rules	1	2	0	**3**
The teacher refers to consequences for breaking class rules	0	1	0	**1**
The teacher moves learner name(s) to a Smiley or Sad Faces chart	0	0	0	**0**
The teacher explicitly praises students for good behavior	4	2	1	**7**
The teacher explicitly praises students for correct answers	6	9	1	**16**
The teacher awards learner(s) a star on a Star chart	0	0	0	**0**
The teacher resolves conflict by discussing problem(s) and/or solutions with learners	0	0	0	**0**
The teacher models calm and positive behavior	4	5	0	**9**
The teacher changes student seating arrangements	0	0	0	**0**
The teacher reengages student by asking a content-related question	2	7	0	**9**

Across classrooms, all 16 tutors explicitly praised students for correct answers. Qualitative narrative data showed most tutors frequently praised students with the phrase: “Clap for him/her.” This form of praise was also seen across basic school classrooms during the Midline II classroom study of primary grade teachers. About half of tutors modeled calm or positive behavior, reengaged off-task students by asking them content-based questions, and praised students for good behavior. Three tutors referred students to class rules, and one referred to consequences for breaking rules.

We also assessed the use of negative behavior strategies during lesson observations. These are strategies used by tutors that are not necessarily encouraging of desired (positive) student behaviors and/or relationships with others. Table 11 summarizes the presence of these strategies across classes.

Table 11. Negative Behavior Management Strategies Used by Observed Tutors

Negative behavior strategies	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
The teacher shouts at learners to get their attention	0	1	0	**1**
The teacher shouts at learners to show disapproval of behavior	0	2	0	**2**

The teacher points out negative behavior or poor performance of learners	0	1	1	**2**
The teacher makes learner(s) stand during class	0	0	0	**0**
The teacher takes something away from the learner(s)	0	0	0	**0**
The teacher asks a learner to leave the classroom	0	0	0	**0**
The teacher threatens learners with corporal (physical) punishment	0	1	0	**1**
The teacher uses corporal (physical) punishment	0	0	0	**0**

In contrast to positive behavior strategies, tutors used significantly fewer negative strategies to manage classroom behavior. Only six negative strategies were seen across three classrooms. During lessons, two tutors shouted to show disapproval and pointed out negative behavior. One tutor shouted to get students' attention and another threatened to use corporal punishment. Narrative data revealed several tutors were displeased when students responded to questions in chorus by shaming or threatening. For example, Tutor 3.1 said, "Next time I come to this class, and I ask a question and you all try to answer at once, I will give you a knock." In contrast, at least three other tutors explicitly told students to respond to questions in chorus.

Classroom Routines

Routines are predictable classroom behaviors that create a sense of order and consistency before, during, and after lessons. According to TFET, routines allow pupils to act independently, manage their time, and predict what comes next during the day. This study assessed the presence of five behavioral routines that learners carry out *without* the teacher explaining how to do so. Table 12 presents findings on each of the five routines in comparison to class size. In this study, class size ranged from 9 - 117 students. Class size emerged throughout earlier Phase III research as a significant challenge for tutors in using pupil-centered methods during lessons.

Table 12. Behavioral Classroom Routines

Learners' Behavioral Routines in Classroom	**1-30 Learners (N=3)**	**31-60 Learners (N=8)**	**61-90 Learners (N=1)**	**91-120 Learners (N=4)**	**Total (N=16)**
Collecting or handing out materials or texts	0	1	0	0	**1**
Packing away materials or texts	0	2	0	0	**2**
Transitioning from one activity to the next	1	4	1	0	**6**
Entering and/or exiting the room	2	4	0	3	**9**
Raising a hand before speaking	3	8	0	3	**14**

In 88% of classes, students raised their hand before speaking. This was the most frequently observed routine across lessons. In nine classes, students entered and exited the room without explicit instructions from the tutor, suggesting the presence of pre-established procedures. In very few classrooms were students seen collecting, handing out, or packing away materials

without instruction from tutors. Overall, 32 discrete routines were observed, and three-quarters of observed routines were seen in classes with fewer than 60 students. We discuss class size in further detail under the section on tutor classroom pedagogy.

Time Management

Using time effectively enables tutors to maximize learning. TFET covers several time management techniques including setting a daily or weekly planner and giving pupils classroom responsibilities. In this study we examined the presence of five time management indicators, listed below in Table 13.

Table 13. Time Management Strategies Used by Tutors during the Observed Period

Time Management Strategies	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
Learners carry out classroom helper duties during observed period	2	4	0	**6**
The teacher refers learners to a timetable, calendar, or course schedule	0	0	0	**0**
The teacher claps his hands or her hands to get learners' attention	0	0	0	**0**
The teacher tells learners how much time they have to complete a task	5	7	0	**12**
The teacher appears prepared for the lesson with materials ready	6	7	0	**13**

Thirteen out of 16 tutors appeared prepared for the lesson with materials ready. Twelve tutors told pupils how much time they had to complete a learning task. In 38% of classes, pupils were seen fulfilling "helper duties" or responsibilities. The most common duties were class leaders taking attendance and small group leaders arranging students into groups, facilitating small group discussion, and presenting group work to the class.

Gender Equity and Inclusion

Finally, this study assessed whether classrooms accommodated students with special educational needs (e.g., physical, behavioral). In all but one classroom, students were easily able to enter and exit the room. However, in three classrooms, there was insufficient space for all students to easily move around the room, likely due to large class sizes. Although we did not examine whether students had special learning needs or disabilities, no tutors were seen providing special assistance to students with emotional, physical, or other identifiable learning needs during observed lessons.

Gender equity was examined in the ways tutors constructed learning opportunities and gave special attention to females. Of the four colleges that taught both male *and* female students, all tutors gave male and female learners equal opportunities to participate and respond to questions. While no tutors at any college shared examples of women in non-traditional roles

or occupations (e.g., women scientists) or assigned leadership roles to girls, five tutors did encourage girls to participate during lessons. One tutor explicitly praised the efforts of female students, and another covered gender stereotypes during a lesson on teacher's beliefs.

Conclusions on the Learning Environment

The learning environments of observed classrooms were mostly similar in physical arrangement, display of materials, and behavior management routines. In most classes learners were grouped or paired for collaborative learning. The walls of classrooms were largely bare with 1-2 materials pasted onto the walls. Across lessons, tutors used significantly more positive behavior techniques than negative. All tutors praised students for correct answers, and about half modeled calm behavior. Only three tutors made reference to class rules. In most classrooms, students raised their hand before speaking, and in about half of classes students entered and exited the room without instruction by the tutor. Behavioral routines were more common in classes with fewer than 60 pupils. Nearly all tutors appeared prepared for lessons and most made pacing of learning explicit. Students carried out leadership duties in about one-third of classes. Male and female learners were given equal opportunities to learn, and during five lessons, tutors encouraged or praised the efforts of females. Findings indicate a shared classroom culture across case study colleges that organizes and manages learning through mostly positive styles of behavior management and collaborative student arrangements.

Classroom Pedagogy

Pupil-centered pedagogy displayed in teacher education courses is the focus of this study. This section covers a range of pedagogic areas including general lesson characteristics, differentiation, assessment of learning, and use of teaching and learning materials.

The structure and style of pedagogy was more similar than different across classrooms in this study. Most tutors taught large classes of students that mainly covered subject knowledge at levels 100 and 200. Lessons were largely oral, and most tutors used some combination of lecturing and group discussion, reflecting a mix of both teacher and pupil-centered pedagogy. Narrative data revealed patterns in lesson sequencing across observations with common phases of teaching and learning activity. The most commonly observed phases across the 16 lessons are as follows:

- Introduction and statement of lesson topic
- Review of students' prior knowledge and/or experience
- Input of content by the teacher and/or students; largely oral

- Guided practice: application of knowledge/skills where students work together in groups as the teacher moves around the room to provide feedback
- Recap on main points of the lesson

These observed phases resemble trainee remarks on lesson sequencing found in the training report. Trainee remarks positioned the teacher as a *facilitator* of learning who moves around the room to support groups of students actively exploring content together.

What differs across the 16 classrooms in this study is the extent to which tutors incorporated pupil-centered methods into lessons. This pedagogic variation is discussed in the sub-sections that follow and is qualified with lesson narrative data.

Lesson Characteristics

Each classroom observation began from the start of the lesson and lasted 45 minutes. In this section, we examine general characteristics of the 16 lessons, including lesson type, content coverage, types of teacher-learner interactions, class size, and languages of instruction. For a summary of general characteristics per lesson see Appendix A.

Lesson Type

All tutors in this study used teacher-centered methods (especially lecturing and chorusing), and most used at least some pupil-centered methods too (especially grouping and discussion). Qualitative analyses of narrative data revealed four general lesson types based on the extent to which pupil-centered pedagogic techniques were used by tutors during the 45-minute period. These are 1) mostly pupil-centered lessons, 2) hybrid lessons, 3) mostly teacher-centered lessons, and 4) teacher-centered lessons. The table below compares lesson type to TFET training received by the observed tutor.

Table 14. Comparing Tutor Lesson Type with TFET Training Received

Lesson Type	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
Tutor uses *many* P-C techniques *(Mostly pupil-centered lesson)*	2	3	0	**5**
Tutor uses *some* P-C techniques *(Hybrid lesson)*	4	4	0	**8**
Tutor uses *a few* P-C techniques *(Mostly teacher-centered lesson)*	0	1	1	**2**
Tutor uses *little to no* P-C techniques *(Teacher-centered lesson)*	0	1	0	**1**

In this study five lessons were *mostly pupil-centered* where students mainly influenced the content, pacing, and/or structure of the lesson. Students shared ideas, asked questions, and interacted mostly with each other (e.g., during presentations). Of these five lessons, three

were taught by Step-down trainees, and two were taught by Masters. Eight lessons were coded as *hybrid*, exhibiting both tutor lecturing and some pupil-centered techniques, such as group work, hands-on activities, or group discussion. Of the eight hybrid lessons, four were taught by Master trained tutors and four were Step-down trained. Two lessons were *mostly teacher-centered*, taught by a Step-down trainee and a tutor with no TFET training at all. During both lessons, the tutor mostly lectured and used a few pupil-centered methods, such as student grouping. Finally, one lesson was *teacher-centered,* taught by a Step-down trainee. In this lesson the teacher lectured most of the time and used a call and response style of questioning; no pupil-centered techniques were seen. Throughout this report we illustrate the qualities of each lesson type with examples.

Lesson Coverage

All 16 tutors spent either all of the time or most of the 45 minutes covering subject knowledge. Subject knowledge is one of the four pillars of the new *National Teacher Education Curriculum Framework*. In this study subject knowledge is defined as subject-specific concepts and/or theory relating to a broader discipline of study. Subjects varied widely between lessons, including Ghanaian history, curriculum policy, pedagogic theory, mathematics, home economics, social studies, science, music, English language, and ICT. For example, Tutor 2.2 taught a level 100 course entitled, Foundation of Education in Ghana. During the lesson, students described characteristics, strengths, and weaknesses of traditional African education systems.

Across lessons, eight tutors covered at least one other topic in addition to subject knowledge, albeit less than half the time. The most frequent was teaching techniques, covered during six lessons, and addressed by tutors in different ways. For example, during an English language lesson, Tutor 7.1 facilitated a brief discussion on *why* teaching children phonological awareness is important. At the end of a social studies lesson, Tutor 3.2 asked students to name and describe his teaching methods. In this way the tutor attempted to engage students in analyzing pedagogy. In a similar way, Tutor 4.1 prompted students to identify sources of their beliefs, such as religion and family, and explain how those beliefs might impact on their teaching in classrooms.

In addition to subject knowledge, four tutors discussed the use of teaching and learning materials, and in three lessons, tutors covered classroom management strategies. Assessment and characteristics of children were covered during 1-2 lessons. No lessons covered lesson planning. The emphasis on subject knowledge across lessons is likely due to course level. Bachelor programs typically lay a foundation of subject knowledge in the first years on which to build pedagogic knowledge and skills for teaching a subject in years 3 and 4.

Learning Objectives

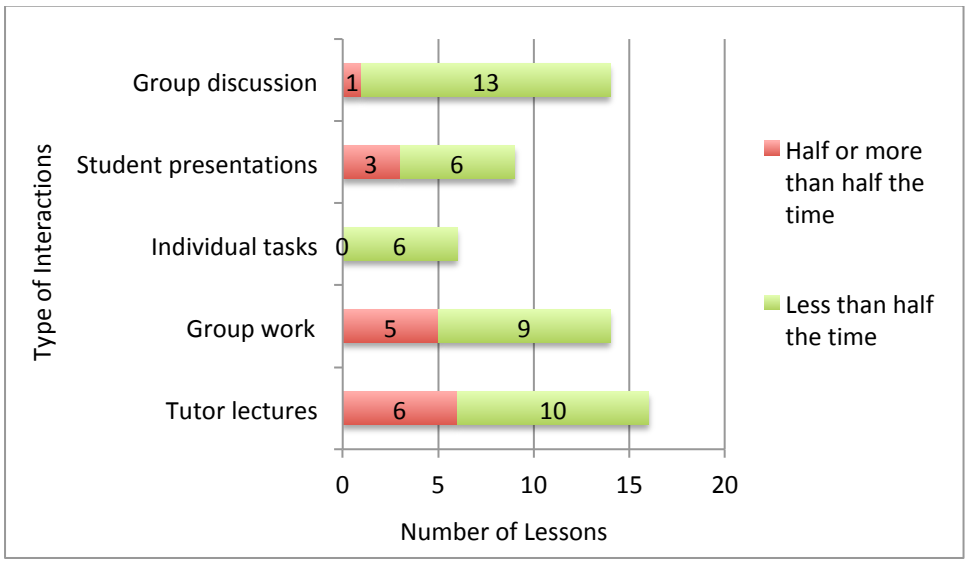
While most tutors stated the lesson topic, only a third told students the lesson objective, or what they should be able to know or do by the end of the lesson, a technique emphasized in TFET materials. For instance, during a lesson on Ghanaian culture, Tutor 6.2 projected a list of objectives onto a screen, such as: "Identify 10 vocations in Ghanaian communities." In lessons where objectives were not explicitly mentioned, learning objectives were inferred from narrative data based on what students were expected to do during the 45-minutes.

Several patterns emerged from an analysis of learning objectives across lessons. Most tutors covered 2-3 different objectives during the 45-minute period. Eight lessons focused on students defining concepts (e.g., define formal education contexts), seven focused on explaining and describing ideas (e.g., describe the five phases of basic schooling), and five required students to apply knowledge or skills in practice (e.g., apply values of music notation). Four tutors tasked students with an analytical activity (e.g., interpret Ghanaian art), and two expected students to identify and classify ideas (e.g., classify career opportunities in home economics). These findings imply a wide variety of intended disciplinary knowledge and skills of student teachers at levels 100 and 200.

Teacher-Student Interactions

This section examines how much time *tutors* spent lecturing and facilitating group discussion and how much time *students* spent on group work, independent tasks, and presentations. These patterns are displayed in Figure 1.

Figure 1. Summary of Teacher-Student Interactions



Each of the 16 tutors spent at least some time lecturing to students during the lesson, an indicator of teacher-centered instruction. However, 10 tutors (63%) spent less than half of the

45-minute period lecturing. The remaining time was spent on other activities, such as group work, student presentations, and whole class discussion. Fourteen lessons included some kind of small group activity at least part of the time. During eight lessons, tutors did very little lecturing. Instead, most of the time was spent on whole class discussions or presentations. For example, Tutor 8.2 taught an ICT lesson where groups of pupils presented on the use of instructional technology. Each group was assigned a different topic to research, discuss, and present to the class.

Across lessons, two-thirds of tutors interacted with students in 4-5 different ways (e.g., lecturing, discussion, presentations), and students spent more time interacting with each other and discussing ideas than listening to lectures. Taken together, findings indicate a relatively more pupil-centered pedagogic style across most classrooms in the study sample.

Pupil-centered Learning Opportunities

Six kinds of pupil-centered activities were assessed during each observation. Indicators were drawn from multiple TFET modules and selected based on their centrality to the model of instruction. These are listed in Table 14 below.

Table 15. Pupil-centered Learning Opportunities Observed Across Lessons

Pupil-centered Learning Opportunities	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
Students work independently on learning tasks	3	3	0	**6**
Students work together in small groups or partners on learning tasks	6	8	1	**15**
Students use their hands to manipulate materials to complete a learning task	1	1	1	**3**
Students ask the teacher questions on their own	4	9	0	**13**
Students share individual ideas with the teacher (one learner speaks at a time)	5	9	0	**14**
Students ask each other questions	3	5	0	**8**

Across lessons, most students worked together in small groups or partners on learning tasks, asked the teacher questions, and shared their own ideas with the tutor. For example, Tutor 3.1 used a think-pair-share activity to elicit student ideas during a home economics lesson. Students first brainstormed examples of 'cutting tools' in tailoring shops, discussed these with a partner or several peers, then shared examples with the class. Think-pair-share was a common technique seen during six lessons that supported active learning and class discussion.

Thirty-eight percent of tutors assigned some kind of learning task to individual students. During most lessons, students worked collaboratively with other students on learning activities. As a result, assessment seen across lessons was largely limited to oral questioning

or group presentations. There were very few instances of *written* assessment opportunities for individual students to apply knowledge and skills independently.

Finally, during eight lessons, students were seen asking each other questions, usually during or after group presentations. For instance, during a presentation on ICT tools, a student asked the class, "What is classroom learning?" In response, another student said, "It is a direct learning between learners where the teacher facilitates the learning and students can ask questions." This student's remarks signal a pupil-centered orientation to instruction, likely relayed by Tutor 8.2 in earlier lessons. Tutor 8.2 was a Master trainee who taught a mostly-pupil-centered lesson.

Pupil Prior Knowledge

Connecting lessons to pupils' prior knowledge or experience underpins both TFET and the new B.Ed. curriculum. Moreover, during Phase III interviews, 85% of TFET trainees explained that learning builds "from the known to the unknown." As one Master trainee explained:

> You should always build from known to unknown and so when you try to develop a lesson from their previous or current experiences, already the student has some ideas on which you are going to build your lesson, and so it becomes very easy for them to grasp whatever concepts you are going to give them.

Classroom observations showed three-quarters of tutors asked students to share their personal experience or prior knowledge of the lesson topic during the 45-minute period. In these classrooms tutors attempted to build new knowledge onto things students already knew or had experienced before. These findings indicate some alignment between tutor pedagogy and tutor beliefs, discussed above. For example, during a lesson on Ghanaian culture, Tutor 6.2 elicited students' prior knowledge of common vocations in Ghanaian communities. The tutor asked students questions such as, "What are some of the products associated with kente weaving?" and "Where can we find bead making?"

In 81% of lessons, tutors also connected concepts to things students were familiar with or interested in. During a level 200 science lesson, Tutor 5.1 introduced the concept of measurement through oral storytelling about a chief and his sons who measured the land in different ways. Later the tutor organized pupils into groups and tasked each with measuring familiar units or readily available objects, such as the length of a table in the classroom. In a similar way, Tutor 7.1 connected an English language lesson on phonology to the pronunciation of pupils' names and to familiar objects in the home, market, and classrooms.

Languages of Instruction

One of four pillars of the new teacher education curriculum framework is Literacy Studies. It is envisioned that B.Ed. courses support student teachers' language proficiency in both a Ghanaian language and in English. In this study, we explored which languages were used by tutors during the observed period. Thirteen of 16 tutors taught lessons in English during the entire 45-minutes. During two lessons, tutors spent most of the time teaching in English and part of the time teaching in Twi. In one lesson the tutor spent half the time instructing in English and half instructing in Twi. Across lessons, most observed instruction was done in English.

Class Size

Phase III reporting found that class size was a challenge to TFET Step-down training and tutor uptake of pupil-centered methods, such as positive discipline. According to one Step-down trainee cited in the Training Report, "Whatever technique you have used, when you go and the class is large, there is no way you can use it; no matter what you do, you have to use the lecture method." Most tutors in this study taught large classes of more than 30 students. Three tutors taught between 1-30 learners, eight taught between 31-60, one taught 86 learners, and four taught between 91-120 learners. We therefore explored the relationship between lesson type and class size across the 16 classrooms. Findings are presented in Table 16.

Table 16. Comparing Tutor Use of Pupil-centered Techniques with Class Size

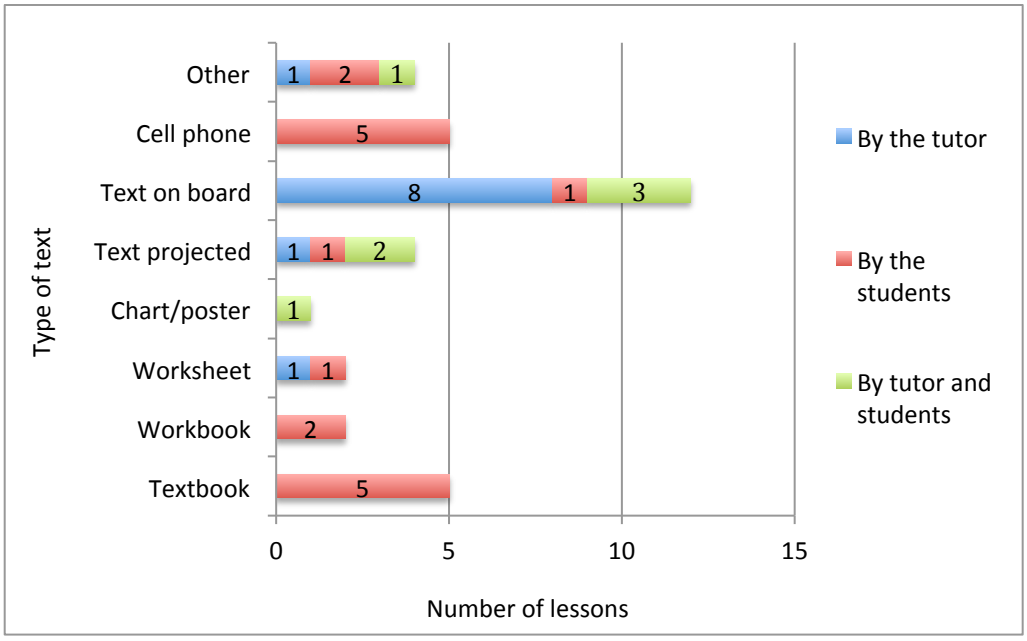
Lesson Type	1-30 Students (N=3)	31-60 Students (N=8)	61-90 Students (N=1)	91-120 Students (N=4)	Total (N=16)
Tutor uses *many* P-C techniques *(Mostly pupil-centered lesson)*	0	5	0	0	**5**
Tutor uses *some* P-C techniques *(Hybrid lesson)*	3	3	0	2	**8**
Tutor uses *a few* P-C techniques *(Mostly teacher-centered lesson)*	0	0	1	1	**2**
Tutor uses *little to no* P-C techniques *(Teacher-centered lesson)*	0	0	0	1	**1**

Of the 13 tutors that used some or many pupil-centered techniques, 11 taught classes of less than 60 students. Only two tutors taught very large classes and also used some pupil-centered methods. During the three lessons where few or no pupil-centered methods were used, tutors taught very large classes of 86, 92, and 117 students. These findings support many of the remarks of tutors from Phase III interviews and suggest class size may impact on the extent to which tutors use pupil-centered methods.

Use of Text

Student teacher access to print (and virtual tools, e.g., laptops) was found to be another significant challenge to learning throughout Phase III research. This study therefore explored the use of textual resources across classrooms by assessing what kinds of texts were *read* by the tutor and by students during lessons. Figure 2 presents findings from the 16 classrooms on a range of text types. During all 16 lessons, some kind of textual resource was read by the teacher and/or the students, and in two-thirds of lessons, more than one type of text was read. In several lessons, students were expected to read course material before attending class.

Figure 2. Types of Text Read by Tutor and/or Students During Observed Lessons



During 11 lessons (69%), text was read off the board by the tutor to relay content. The most common types of text read by students were passages from textbooks and text on their cell phones. In five lessons, the tutor instructed students to use their cell phones to search for definitions of concepts or reference their online course manual. Students then discussed what they read with a group of peers or shared their findings with the whole class. As an example, in a lesson on Ghanaian education, Tutor 1.1 directed students to look up 'vocation' on their cell phones when no student could explain its meaning.

Other types of text read during lessons were on flash cards and laptops. There was very little reading of posters, worksheets, workbooks, or text projected onto a screen. Overall, students had opportunities to read text *to some extent* during 88% of lessons.

Summary of Lesson Characteristics

Most tutors spent all or most of the 45-minutes covering subject knowledge and skills that varied widely across level 100 and 200 lessons, likely laying a foundation on which to build pedagogic knowledge for teaching a subject in years 3 and 4. Half of tutors covered at least one other topic albeit less than half the time, especially techniques for basic school instruction. Across lessons, 81% of tutors made connections between lesson content and student interests, and 75% connected lesson content to students' prior knowledge or experience. All tutors lectured to some extent, but during 63% of lessons students spent more time on collaborative learning activities, interacting and sharing ideas with each other (through grouping, presentations, and discussion).

The combination of lecturing, grouping, and discussion seen across most lessons indicates a prevalence of oral instruction in the relay of content with fewer opportunities for students to apply knowledge *on their own*. It also suggests the co-existence of teacher and pupil-centered methods. During 88% of lessons students had opportunities to read or reference materials to some extent, usually from textbooks, cell phones, or the board. Overall, the use of at least some pupil-centered techniques was seen in 81% of lessons, especially in classes of fewer than 60 students.

Differentiated Instruction

TFET defines differentiation as using various teaching strategies, activities, and assessments during a single lesson to ensure all pupils achieve the same learning objective. Emphases are placed on accommodating pupils' interests and learning abilities. Although about half of trainees reported covering differentiation during Step-down training at the case study colleges, the training report also found trainees *understood* how to use a wide variety of TFET-style differentiation techniques. Findings also showed trainees perceived differentiation strategies as especially useful for teaching adults.

In this study, we examined several indicators of differentiation during lessons. These were adapting lessons to accommodate students' diverse learning styles, modifying tasks for different students, and grouping students by ability or interest.

Learning Styles

Ten different learning styles as presented by TFET were examined by focusing on what students *did* during the observed period. The greater the variety of learning styles in lessons, the more differentiated the pedagogy. Table 17 summarizes these modes of learning.

Table 17. Learning Styles Observed During Lessons

Learning Styles: What the Students Do during the Lesson	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
See images, pictures, or maps to visualize the lesson topic	2	4	0	**6**
See words written on paper, the board, or a chart to read the lesson topic	5	9	1	**15**
Listen to songs, stories, or explanations of the lesson topic	6	9	1	**16**
Speak out loud about the lesson topic	6	9	1	**16**
Perform a song or skit about the lesson topic	1	1	0	**2**
Move their bodies to dramatize or act out ideas related to the lesson topic	2	1	0	**3**
Use their hands to build, sort, create, or manipulate objects or ideas	1	1	0	**2**
Write on paper, the board, or other materials to represent ideas	6	5	1	**12**
Write numbers on paper the board, or other materials to represent ideas	3	1	1	**5**
Draw images or symbols to represent ideas	1	1	1	**3**

Students *speaking* about the lesson topic and *listening* to stories or explanations of the topic were seen during all 16 lessons. This finding further substantiates a prevalence of oral instruction where a significant amount of talk occurs amongst the teacher and students (lecturing, discussion). Students *seeing* words was commonly observed in 15 classes, most of which was presented on the board by the teacher. During 75% of lessons, students had opportunities to *write* on paper or the board, but in most cases, writing was done as a group activity. What varies significantly between lessons is the extent to which students saw imagery or pictures, performed skits, moved their bodies to dramatize ideas, used their hands to manipulate objects, and drew images or symbols. These techniques were seen in less than half of observed lessons.

Two-thirds of lessons supported 4-6 different learning styles. This means students had various opportunities to learn in different ways in most classrooms (especially seeing, listening, and speaking). In contrast to the study sample, Tutor 5.2 used techniques during a music lesson that supported all ten learning styles listed in Table 17. In addition to reading from a textbook, poster, cell phone, and text on the board, students in this class described symbolic characteristics of musical notation out loud, manipulated and observed images of notation displayed on flash cards, used their bodies to represent music note duration (e.g. 4 beats), and performed songs to practice counting beats (“All other Gods”). Students also took notes during the lesson and drew notation symbols to compose their own music. Toward the end of the lesson students performed their compositions.

Differentiated Learning Tasks

This study examined whether tutors gave some students different tasks to the whole class during the lesson or gave all students the same task. Findings are summarized below in Table 18.

Table 18. Differentiation of Learning Tasks Across Lessons

Learning Tasks	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
Gives all students the *same* activities to complete during the entire period (no differentiation)	2	6	1	**9**
Gives some students or groups of learners a *different* task to the whole class (some differentiation)	4	3	0	**7**
Provides some student(s) with an *additional* learning task when they finish tasks quickly (some differentiation)	1	0	1	**2**

Nine tutors gave all students the same activity to complete during the lesson. This was seen in the questions asked or activities assigned to groups or individuals. In contrast, seven tutors gave some students or groups of students a *different* task to the class, indicating the presence of differentiation. In most cases this was seen through differentiated presentations, where the tutor gave groups of students different topics to discuss and then present to the class for feedback.

For example, Tutor 8.1 organized 60 students into five groups, one group for each phase of the basic schooling system (Kindergarten, Lower primary, Upper primary, Junior High, Senior High). Each group discussed the aims, features, and subjects offered in their assigned phase. After 15 minutes of discussion, where students referenced their textbook and cell phones, each group presented their findings to the class. This particular lesson showed a mostly pupil-centered style of differentiated instruction where students influenced the content of the lesson and mainly interacted with each other. Finally, during two lessons, when a few students finished their work early, the tutor gave them an additional learning task.

Differentiated Grouping

The final indicator of differentiation was grouping students by ability or interest to carry out a learning task. Classroom observers were given a list of potential grouping criteria, listed below in Table 19. During eight of 15 lessons where grouping occurred, grouping criteria were observable or made explicit (e.g. tutor instructions given to students). In contrast, during seven lessons where grouping occurred, observers were unable to discern how students were grouped. The table below summarizes the observed criteria tutors used to group students across lessons. In some classes, students were grouped by more than one criterion (e.g., groups of the same ability and same interest).

Table 19. Student Grouping Criteria Across Lessons

When the teacher uses grouping, students are put into groups:	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
With other students of the **same learning abilities**	3	1	0	**4**
With other students of different **(mixed) learning abilities**	1	1	0	**2**
With other students of **same interests**	4	1	0	**5**
With other students of **same language**	3	1	0	**4**
Not sure. Can't tell how students are grouped.	1	6	0	**7**

Observers were unable to discern grouping criteria in seven out of 15 lessons where grouping occurred. In several of these cases, student leaders organized students into groups (e.g. randomly). In the remaining eight lessons, four tutors grouped students with others of the same language or with students of the same learning ability. In five lessons tutors organized groups based on common interests, and two tutors mixed pupils by ability. Overall, grouping was a commonly observed pupil-centered method seen in most classrooms with some variation in observable grouping criteria.

Summary of Differentiated Instruction

Across all lessons, students primarily engaged with lesson content through *speaking about* and *listening to* stories or explanations of the topic, most often through discussions, lectures, and presentations. What varied most across lessons was the extent to which tutors gave different tasks to different students. Where 56% of tutors gave all students the same learning task, 44% gave different tasks to different students, usually to different groups of students. Although grouping criteria were sometimes difficult to assess, more tutors grouped students of the same ability, interest, and language. The extent to which tutors used differentiation techniques varied across lessons, primarily in the ways students accessed information and applied it in practice.

Assessment of Learning

Assessment is a process of gathering information about learning to measure if students achieved the objective(s) of a lesson. A distinguishing characteristic of the new B.Ed. curriculum is the 'continuous assessment' approach, where multiple forms of assessment are used, such as portfolios and practice-based activities. In this study we assessed how tutors gathered information about learning and used that knowledge to further support learning during the lesson. We assessed the kinds of questions teachers asked students to gauge understanding and the kinds of feedback tutors gave to students on their learning. In particular, the provision of feedback to students (along with encouraging students to expand on their responses through questioning) has been associated with more meaningful learning and positive outcomes for students in developing country contexts (Westbrook *et al,* 2013).

Forms of Assessment

During all lessons, tutors gave many different individual students opportunities to answer questions on their own. However, this form of assessment was largely oral, seen during whole class discussion or lectures. Few lessons showed individualized forms of written assessment, where students responded to questions on their own in writing. Unlike most tutors who used oral questioning, Tutor 6.1 instructed each student to write down the difference between 'stops' and 'fricatives' during an English lesson on articulatory phonetics. The tutor then moved around the room, observing students' work, and at times, stopped to correct answers.

Sixty-nine percent of lessons also showed chorusing, where tutors prompted students to repeat words, answers, or definitions altogether. Chorusing[1] is a communalizing technique associated with the archetype of teacher-centered instruction. For example, during a music lesson, Tutor 5.2 asked, "What are the elements of music?" Altogether, students chorused, "Pitch, harmony, tone, rhythm." In contrast, during two lessons, tutors discouraged students from chorusing. When students recited examples of surds during a mathematics lesson, Tutor 1.2 responded: "No, I don't like chorus answers. Raise your hands and I will call on you." Although Tutor 1.2 taught a mostly teacher-centered lesson, these remarks indicate a relatively more individualized orientation to assessment.

Types of Tutor Questioning

In the analysis of tutor questioning, we looked at narrative data to assess the types of questions tutors asked students and whether these were *open* (allowing for more than one possible answer) or *closed* (yes/no, one word, or short, restricted responses). We also assessed whether tutors asked student(s) to expand on a response to a question in more detail. Table 20 summarizes the types of questioning seen across lessons.

Table 20. Types of Tutor Questioning Across Lessons

Types of Tutor Questioning:	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
Closed ended, where the tutor asks questions that call for a yes/no, one word, or very short response (teacher is looking for one right answer from students)	5	5	1	**11 (69%)**
Open ended, where the tutor asks questions that allow for more than one possible answer (teacher is looking for different explanations from students)	6	8	1	**15 (94%)**
Probing, where the tutor asks learner(s) to expand on their response to a question in more detail	5	7	0	**12 (75%)**

[1] Pupil chorusing is especially prevalent in Ghanaian basic schools, seen during TFET Phase II classroom observations of primary teachers.

The most common question type was *open-ended*, seen in 94% of lessons where tutors sought more than one answer or different explanations from students. Open questions were most often used to facilitate class discussion, especially when asking students to:

- Analyze personal experience (e.g., "Where do your beliefs emanate from?")
- Reflect on prior learning at the start of lessons (e.g., "What types of education do we have?")
- Reflect on learning at the end of lessons (e.g., "What have you learnt today?")
- Give examples of concepts (e.g., "Give me an example of training where certificates are awarded")
- Explain reasoning (e.g., "Why do you think X is a misconception?" or "Please explain your solution to Y")
- Explain relationships between concepts (e.g., "How do the arts promote Ghanaian culture?")
- Evaluate teaching quality (e.g., "What would you do differently if we gave you an additional chance to present again?")
- Apply pedagogical knowledge (e.g., "How will you explain 'rhythm' to your pupils?")

Findings also showed in 75% of lessons, tutors asked students to expand on a response to a question in more detail (e.g., "What do you mean by formal education?"). Finally, 69% of tutors asked students *closed-ended* questions, where the tutor sought a single correct answer, especially when asking learners to:

- Define a concept (e.g., "What is a perfect square?")
- Classify ideas (e.g., "How would you classify that belief about teaching?")
- List or identify criteria (e.g., "What are the elements of music?")
- Recall facts (e.g., "How many letters do we have in Twi?")

Overall, most tutors used a combination of open and closed-ended questions to drive class discussion. What varied, however, was the *precision* of tutors' questions. In some cases, questions were unclear without any indication of the criteria being assessed (e.g., "What is another point on the topic?"). Further, the use of open-ended questioning drove some class discussions off topic for an extended period and generated confusion amongst students.

Quality of Feedback

In the assessment of tutor feedback, narrative data showed more similarities than differences across lessons, summarized below in Table 21.

Table 21. Tutor Feedback on Student Learning Across Lessons

Forms of Tutor Feedback on Student Learning	Master (N=6)	Step-down (N=9)	None (N=1)	Total (N=16)
The teacher stops and focuses on mistakes that learners make	6	6	1	**13**
The teacher *clearly indicates* whether a learner's response is right or wrong	5	7	1	**13**
The teacher takes time to explain *why* a learner's response is right or wrong	5	5	1	**11**
The teacher takes time to *re*-explain or re-teach an idea or concept when learners have difficulty understanding	3	6	1	**10**
The teacher provides support to small groups or individual learners while they complete learning tasks	5	6	1	**12**

In three-quarters of lessons, tutors moved around the room giving support to groups or individuals while they completed learning tasks. During lectures or class discussion, 13 tutors stopped to focus on mistakes learners made and indicated whether student responses were right or wrong (e.g., "I think your point is well made," "Clap for yourselves," or "That is fine"). Of those 13 tutors, 11 took time to elaborate or explain to students *why* an answer was right or wrong, and 10 tutors re-taught or re-explained an idea. During a social studies lesson, for example, Tutor 3.2 asked students to share misconceptions about agriculture. After a student stated chemicals on crops are misconceived as 'bad,' the tutor responded, "Good, this is an important point to make. We have something called a half life..." The tutor went on to explain the length of time chemicals remain effective, exemplifying some criteria for assessing the student's answer.

Summary of Assessment Techniques

Tutors in this study demonstrated similar assessment techniques. Tutors mainly used oral questioning to assess student understanding, and 69% used chorusing. There was little evidence of individualized written assessments of learning. A prevalence of open-ended questions seen in 94% of lessons indicates most tutors attempted to promote active student inquiry, thereby enabling students to shape the quality of lesson content. Variation was mainly seen in the *clarity* of questions and extent to which tutors took time to explain to students *why* their ideas were correct. Without explicit criteria for assessing student responses to questions, an open questioning style may drive discussions off topic, generate confusion, and inhibit students' acquisition of specialized knowledge for teaching and learning.

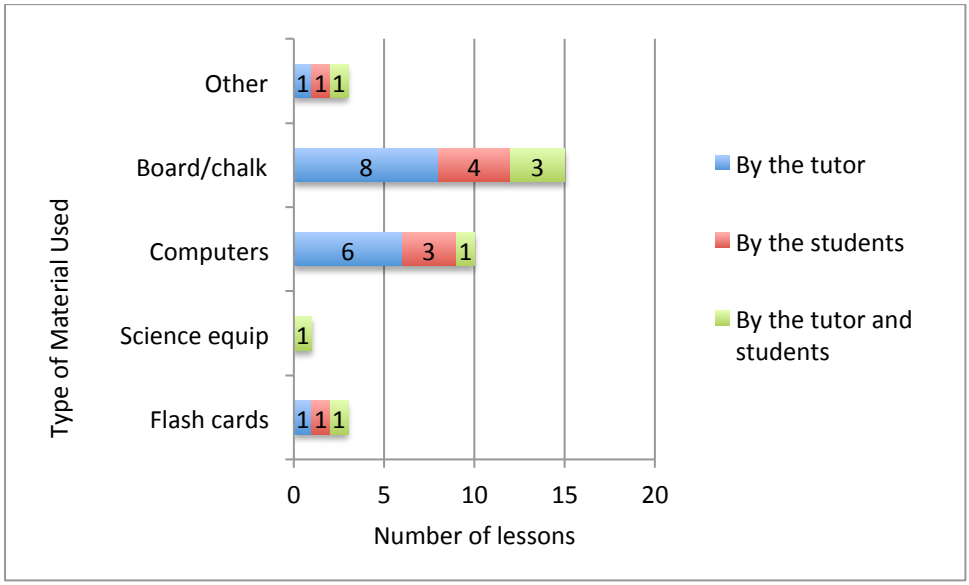
Use of Teaching and Learning Materials

A central indicator of pupil-centered lessons is active, hands-on learning, where students manipulate materials to explore ideas or concepts. Phase III research found that Module 4 on developing low-cost materials was especially useful and empowering for trainees. Many

tutors defined pupil-centered teaching as "hands-on," where students actively discover knowledge themselves. Eighty-two percent of survey respondents reported feeling very confident training other teachers to create hands-on activities.

Below we assess the kinds of teaching and learning materials *handled* or *used* during lessons and by whom. Figure 3 summarizes these findings. In no lessons did learners go outside to gather materials, have visitors share their expertise, or create their own teaching and learning materials during class.

Figure 3. Types of Teaching and Learning Materials Used During Lessons



Across the 16 lessons, the chalkboard was most frequently used by 11 tutors and in seven classrooms by students. During ten lessons, tutors and/or students also used computers, usually as a presentation aid. In very few lessons were other kinds of materials used for hands-on learning. During three lessons, flash cards were manipulated to support learning (e.g., musical notation cards). During a lesson on scientific measurement, the tutor, and students used equipment to practice measuring volume, length, mass, and temperature. Measurements were taken of familiar low-cost materials, such as the weight of a can of food. Lastly, during a home economics lesson, the tutor demonstrated how to use different kinds of sewing equipment. Findings suggest most tutors understand and use active learning techniques (e.g., think-pair-share), but these are largely oral in nature rather than hands-on activities where students manipulate materials to explore ideas.

Play-based Learning

One standout instance of play-based activity was seen in this study, reflecting TFET-style techniques for primary grade instruction. During a level 100 lesson with 44 learners, Tutor 2.2 covered techniques for teaching number concept and one-digit operations. The Step-down

trained tutor first reviewed classroom rules posted on the wall then gave instructions for a game called '7-up'. Students used their bodies to count and to demonstrate "real numbers." Afterward, the teacher presented examples of simple addition with everyday objects (e.g., oranges). Students then played a second rule-based game where two volunteers competed to select three numbers that equate to 15. Winners had to explain why they won. Finally, students played a third game in groups combining flash cards with operations and numbers that equate to 24. Each group shared results with the class as the tutor encouraged different solutions. This mostly pupil-centered lesson exemplified various creative and play-based activities that model active, hands-on numeracy pedagogy.

Conclusions on Classroom Pedagogy

Classroom observations revealed more similarities than differences in the quality of tutor pedagogy. All tutors covered subject knowledge and lectured to some extent during the 45-minute period. During lectures or discussions, most tutors made connections between lesson content and students' prior knowledge, experience, or interests. Chalkboards, textbooks, and cell phones were the most widely read texts across classrooms. Although the extent of student interactions varied, group work and class discussion were seen in 88% of lessons, both indicators of pupil-centered learning. Students primarily engaged with lesson content through oral forms of instruction and collaborative learning, but play-based and hands-on activities were scarce. There were relatively fewer opportunities for students to apply knowledge independently. While all tutors lectured, and most used chorusing, most tutors also used at least some pupil-centered techniques where students made choices about their learning. Thus, most tutors attempted to mix teacher-centered with pupil-centered methods.

The extent of differentiation and quality of tutor questioning varied significantly across lessons. Although student grouping was used in nearly all lessons, 44% of tutors assigned different tasks to different groups of students. Variation was therefore seen in the ways tutors differentiated content (or what students learn). Tutors used similar styles of assessment, especially chorusing alongside open-ended questioning to facilitate discussion. There was little evidence of individualized written assessments, where students responded to questions or prompts on their own in writing. Pupil understanding was mainly seen through discussions and oral presentations. Significant differences between tutors emerged in the clarity of questions and extent to which tutors explained *why* a student's response was or was not satisfactory. Vague, open-ended questioning without clear assessment criteria or an explicit learning objective steered some class discussions off topic and left students confused.

In summary, tutors' classroom pedagogy was mostly similar in the ways students engaged with content, interacted with others, and demonstrated understanding. Differences between lessons were largely seen in the use of differentiation and the quality of tutor questioning and feedback.

Conclusions

Findings from the classroom observation study revealed strong similarities across the learning environments of classrooms and in the pedagogic styles of college tutors. Classroom spaces were mostly similar in their physical arrangement, display of materials, and styles of management. In most lessons tutors used a combination of lecturing, chorusing, discussion, and grouping and connected lesson content to students' personal knowledge or experience. As a result, most tutors used some combination of teacher-centered and pupil-centered methods. Oral instruction was dominant throughout lessons, enabled by more open-ended questioning to facilitate discussion. Written forms of assessment were mostly communal (or collaborative). Overall, students had few opportunities to apply knowledge and skills on their own in writing or use hands-on learning materials. Although 81% of tutors used at least some pupil centered methods, lesson quality varied in the extent of content differentiation (groups of students discussed different content/concepts) and in the clarity of questions and feedback to students on learning.

The study's conclusions are partly consistent with findings from earlier Phase III research on TFET training and B.Ed. curriculum. Tutor beliefs do align with their pedagogy in several ways. Tutors generally believe that pupil-centered teaching is effective, involves building lessons on pupils' prior knowledge, and depends on active engagement with ideas while the teacher facilitates. Some tutors also believe lecturing is effective, especially when teaching large classes. In this study, most tutors displayed pedagogic methods reflecting these beliefs. Observations also revealed areas where tutor beliefs and pedagogy did not align. This was especially clear in the lack of hands-on activities, despite many tutors espousing the effectiveness of hands-on learning during interviews and surveys. Moreover, tutors understood how to use various differentiation methods, yet uptake in this study varied significantly across lessons. Some misalignment between belief and action may be explained by common teaching challenges at colleges. Phase III research found large class sizes, poor network connection, and lack of virtual and print materials especially challenging for tutors. In addition, this study found tutors were more likely to use pupil-centered methods in classes of less than 60 students. In conclusion, tutors may more easily adopt pupil-centered methods if professional development is designed to support their specific teaching needs and the reality of classroom contexts.

Recommendations

As colleges of education reform, the pedagogy of tutors and students through the new B.Ed. curriculum, Phase III research found TFET to be a timely, well-positioned program for supporting tutors' use of pupil-centered methods. Below are two program recommendations to align TFET more closely with tutors' teaching needs.

- **Offer a refresher training that aligns TFET content with tutors' teaching needs by covering the following areas:**

    - *Adapting pupil-centered methods for large class sizes:* In this study tutors used oral questioning and collaborative activities to assess student understanding, two techniques suited for large classes. However, tutors also need informal strategies to assess individual learners (other than exams) in writing. Examples include brief surveys with Likert scales or short answer questions and small group rotations, where tutors meet weekly with a different set of students. These kinds of strategies may also support positive relationships amongst teachers and students.

    - *Recruiting, creating, and using low-cost TLMs from the local environment to promote conceptual learning*: Phase III research showed tutors understood the centrality of hands-on learning and found Module 4 especially useful and empowering, but there was little evidence of tutors putting this into practice. Training student teachers to also recruit materials for lessons in basic schools would address a broader resource challenge to teaching.

- **Provide hard copies of TFET program materials to training participants,** including PDCs, STSCs, and college tutors at the 46 colleges. Poor network access impacted on the quality of the Master training and both levels of Step-Down training. Moreover, this study found only 60% of tutors reported using TFET materials to teach techniques to students. Hard copies of program materials may support on-going efforts to effectively step-down techniques within the colleges.

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Appendix

Appendix A: College Tutor Lesson Summary

Tutor	TFET training	Course level	Course title	No. of pupils	Lesson coverage	Pupil-centered rating (lesson type)
1.1	Step-down	100	Foundation of education in Ghana	107	Define formal and informal education contexts; explain the main purposes of schooling	+
1.2	None	100	Mathematics	117	Define 'surd'; simplify square root of one and two-digit numbers; convert a simplified surd to its original form	-
2.1	Step-down	100	Learning, teaching, and applying numbers and Algebra	44	Apply operations of real numbers; describe teaching techniques for teaching concept of real numbers and one-digit operations	++
2.2	Step-down	100	Foundation of education in Ghana	39	Describe the characteristics, scope, strengths, and weaknesses of traditional or indigenous African education systems	++
3.1	Step-down	200	Manipulative processes and skills in home economics	30	Describe five types of tools and equipment in the sewing industry (e.g., "cutting tools" "sewing tools")	+
3.2	Step-down	100	Social studies and TVET	108	Explain the importance of agriculture and common misconceptions; analyze the pedagogic structure of the lesson	+
4.1	Step-down	200	Theories of learning mathematics for JHS	55	Explain the importance of teacher beliefs and how they impact on teaching and learning; identify and classify sources of teachers' beliefs	+
4.2	Step-down	100	Social studies and TVET	34	Describe and classify career opportunities in home economics; explain the importance of home economics	++
5.1	Step-down	200	Science	86	Define forms of measurement; apply tools for measuring common objects (e.g., volume, length, mass, temperature)	-

5.2	Master	200	Music composition	9	Describe physical and symbolic characteristics of music notes; Apply values of notation in practice	+
6.1	Step-down	200	Introduction to English	92	Define concepts relating to articulatory phonetics, e.g., fricative; classify, pronounce, and explain variety of sounds and how they are produced by speech organs	- -
6.2	Master	200	Ghanaian cultural identity and the arts	42	Identify, describe, and analyze common vocations in Ghanaian communities; interpret meanings of Ghanaian arts (sculptures)	++
7.1	Master	200	Phonology	39	Define phonological concepts and their importance in teaching children; pronounce phonemes of words in English and Twi; identify words beginning with a given letter and formulate sentences using those words	+
7.2	Master	200	Algebraic thinking	26	Define algebraic concepts; explain, interpret representations of mathematical concepts, patterns, and equations	+
8.1	Master	100	Foundation of education in Ghana	60	Describe the five phases of basic schooling, including the aims, features, subjects, and assessment	+
8.2	Master	200	Information and Communications Technology	53	Define concepts pertaining to the use of instructional technology and modes online of learning; compare and contrast modes of learning	++

Appendix B: Classroom Observation Tools

Classroom Observation Tool #1 COLLEGE TUTOR	# TFET Techniques for Effective Teaching Sesame Workshop IDP Foundation, Inc. NORC @ the University of Chicago

College name:
Tutor name:
Master trained: ☐ **Step-down trained:** ☐
Date of observation:
Fieldworker name:

Instructions:

- Complete Part 1 of the tool
- Ask the teacher to observe a lesson
- Inform the teacher that you will only observe for **45 minutes**.
- Complete Part 2 while you wait for the lesson to begin
- Complete Part 3 while observing by writing a detailed narrative report of the full observation period
- Complete Part 4 in the classroom before you leave
- Make certain that you have taken the required photograph
- Complete Part 5 outside the classroom with the second fieldworker
- Read through your narrative carefully and make any necessary changes/translations
- Label photograph with the first 3 letters of the college, teacher's first name, and course level (e.g., STE_RIC _300_materials)

Part 1: Introduction

Complete this part before the lesson begins.

1.1	What is the course level being observed?	Tick one line
A	Level 100	
B	Level 200	
C	Level 300	
D	Level 400	

1.2	What is the title of the course being observed?
A	

Part 2: Classroom Environment

Complete this part while you wait for the lesson to begin

2.1	Which of the following teaching and learning materials are on display in the classroom?	Observed	Not observed
	Class rules		
	Calendar		
	Timetable		
	Star chart		
	Happy/sad faces chart		
	Other chart(s). Specify:		
	Map(s)		
	Images		
	Learners' own work (text or art-based)		
	Computer(s)		
	Other. Specify:		

2.2	Take <u>one</u> photo that captures as many teaching and learning materials as possible that are on display in the classroom.	Tick
A	Photo taken	

Part 3: Observation Narrative

3.1	**Complete a record of the full observation period in the table below. Record at *at least* 5 minute intervals**

Time	What the teacher and learners do

Part 4: Post Classroom Observation

Complete this part after the teaching observation is finished, ***before*** *leaving the classroom.*

4.1	**Learner presence** (if large class, 100+ students, ask tutor/student rep for support)	**Number**
A	How many **females** are present in the class during the observation?	
B	How many **males** are present in the class during the observation?	
C	How many **total** learners are present in the class during the observation?	

4.2	**Ask tutor:** *What is the highest educational qualification you have completed?*	**Tick one line**
A	SSS/WASSCE (SHS)	
B	Post-secondary Certificate	
C	Diploma/HND	
D	Bachelor's degree	
E	Master's degree	
F	Doctorate	
H	Other. Specify:	

4.3	**Ask tutor:** *Which TFET training(s) have you received?*	**Yes**	**No**
1.	Master training		
2.	Step-down training		

Fieldworker notes:

1. *Master training was conducted virtually by Sesame Square in November-December 2020*
2. *Step-down training was conducted by Professional Development Coordinator(s) throughout 2021 (frequency and coverage varies by college)*

4.4	**Ask tutor:** *The TFET training covers a range of techniques and topics. Which of the following topics were covered when you received TFET training?*	**Yes, definitely**	**Not sure**	**No, not covered**
1.	Basics of lesson planning			
2.	How 'active learning' promotes 'knowledge retention'			
3.	Setting up your classroom in a child-friendly way			
4.	Strategies that promote positive discipline			
5.	Developing low/no-cost teaching and learning materials			
6.	How to manage instructional time			
7.	Using pupils' ideas, experiences, and interests in lessons			
8.	Designing hands-on, interactive activities for pupils to explore			
9.	Differentiated teaching through pupil grouping			
10.	Using different assessment methods			
11.	Making accommodations for pupils with special learning needs			
12.	Ways to promote equal participation of boys and girls			
13.	Incorporating play or games into lessons			

4.5	**Ask tutor:** *Which of the following TFET topics have you **taught** to students in your college? (any student in any course taught by the tutor)*	**Yes, definitely**	**Not sure**	**No, not covered**
1.	Basics of lesson planning			
2.	How 'active learning' promotes 'knowledge retention'			
3.	Setting up your classroom in a child-friendly way			
4.	Strategies that promote positive discipline			
5.	Developing low/no-cost teaching and learning materials			
6.	How to manage instructional time			
7.	Using pupils' ideas, experiences, and interests in lessons			
8.	Designing hands-on, interactive activities for pupils to explore			
9.	Differentiated teaching through pupil grouping			
10.	Using different assessment methods			
11.	Making accommodations for pupils with special learning needs			
12.	Ways to promote equal participation of boys and girls			
13.	Incorporating play or games into lessons			
M	None. I have not taught the TFET technqiues to anyone else			

*If respondent answers **NO** to all parts of item 4.5, skip to item 4.7.*

4.6	**Ask tutor:** *Which resources did you use to teach TFET techniques to students?*	**Yes**	**No**
1.	TFET Training manual		
2.	TFET YouTube videos		
3.	Other YouTube vidoes		
4.	PowerPoint presentation		
5.	Images		
6.	Other. Specify:		

4.7	**Ask tutor:** *In which of the following areas do you teach and/or support student teachers?*	**Yes**	**No**
A	Early Childhood and/or Primary Education		
B	Math and ICT		
C	Social Sciences		
D	Education and Professional Development		
E	Vocational and/or Technical		
F	Science Education		
G	Languages		
H	Other. Specify:		

4.8	**Ask tutor:** *What is ONE important thing you think students need to succeed in the Bachelor of Education program?*

4.9	**Ask tutor for a copy of their 'scheme of learning' for the observed course.**	**Tick one**

		line
A	Scheme of learning received.	
B	N/A. The teacher is not able to produce a scheme of learning.	

Part 5: Sesame TFET Program Techniques

*Complete this section **after** the teaching observation. Consult Part 3 where necessary.*

General

5.1	**Classroom observation period:**	**Record hh:mm**
A	Start time	
B	End time	

5.2	**Which *topic(s)* were *explicitly* covered by the teacher during the observed period?** (Consult scheme of learning document if needed)	**All of the time**	**Half or more than half the time**	**Less than half the time**	**Never**
	Subject/disciplinary knowledge				
	Official school curriculum				
	Language(s) and/or literacy				
	Lesson planning				
	Techniques for instructing learners				
	Techniques for assessing learning				
	Learner characteristics				
	Classroom management				
	Use of teaching and learning materials				
	ICT				
	Other. Specify:				

5.3	**How was time spent during the observed peiod?**	**All of the time**	**Half or more than half the time**	**Less than half the time**	**Never**
1.	Teacher instructs the whole group (lecturing)				
2.	Learners complete tasks in small groups or pairs (group work)				
3.	Individual learners complete tasks independently (on their own)				
4.	Learner(s) instruct the whole group (presentations)				
5.	Whole group discussion where teacher and learners contribute ideas together				
6.	No teaching or learning occured				

5.4	**The teacher uses the following language(s) while teaching:**	**All of the time**	**Half or more than half the**	**Less than half the**	**Never**

			time	time	
1.	English				
2.	Twi				
3.	Fante				
4.	Ga				
5.	Ewe				
6.	French				
7.	Other: Specify langauge:				

5.5	Did the teacher or learners use any text(s) during the observed period?	Tick one line
	Yes	
	No (skip to Module 1)	

5.6	Which of the following types of texts were read?	By the teacher	By the learners	Not observed
1.	Textbook			
2.	Storybook (reader)			
3.	Workbook			
4.	Worksheet			
5.	Chart or poster			
6.	Text projected onto the board/screen			
7.	Text created on the board			
8.	Cell phone			
9.	Computer			
10.	Other. Specify:			

MODULE 1: Fundamentals of Teaching

5.1.1	During the observed period, the *learners:*	Observed	Not observed
	Work independently on learning tasks		
	Work together in small groups or partners on learning tasks		
	Use their hands to manipulate materials to complete a learning task		
	Ask the teacher questions on their own		
	Share individual ideas with the teacher (one learner speaks at a time)		

MODULE 2: Developing a Child-friendly Learning Space

5.2.1	How are learners organized throughout the observed period?	Observed	Not observed
1.	Sitting at desks in a lecture theatre		
2.	Sitting at individual desks in rows		
3.	Sitting together at desks or tables in groups or pairs		
4.	Whole class sitting facing each other (such as U, O, or □ shape)		

MODULE 3: Positive Discipline and Classroom Management

5.3.1	Which of the following POSITIVE behaviour management strategies were observed?	Observed	Not observed
	The teacher refers students to the class rules		
	The teacher refers to consequences for breaking class rules		
	The teacher moves learner name(s) to a Smiley or Sad Faces chart		
	The teacher explicitly praises learners for good behaviour		
	The teacher explicitly praises learners for correct answers		
	The teacher awards learner(s) a star on a Star chart		
	The teacher resolves conflict by discussing problem(s) and/or solutions with learners		
	The teacher models calm and positive behaviour		
	The teacher changes student seating arrangements		
	The teacher reengages student by asking a content-related question		
	Other. Specify:		

5.3.2	Which of the following NEGATIVE behaviour management strategies were observed?	Observed	Not observed
	The teacher shouts at learners to get their attention		
	The teacher shouts at learners to show disapproval of behaviour		
	The teacher points out negative behaviour or poor performance of learners		
	The teacher makes learner(s) stand during class		
	The teacher takes something away from the learner(s)		
	The teacher asks a learner to leave the classroom		
	The teacher threatens learners with corporal (physical) punishment		
	The teacher uses corporal (physical) punishment		
	Other. Specify:		

5.3.3	Throughout the observed period, the teacher:	All of the time	Half or more than half the time	Less than half the time	Never
A	Uses positive classroom management strategies				
B	Uses negative classroom management strategies				

MODULE 4: Developing and Teaching with Creative Low-Cost Materials

5.4.1	Teaching and learning materials *used (handled)* during the observed period:	By the teacher	By the learners	Not observed
	Flash cards			
	Workbooks			
	Storybooks			
	Textbooks			
	Science Lab equipment			

	Math manipulatives			
	Computer(s)			
	Board and chalk/markers			
	Materials created during class. Specify:			
	Other. Specify:			

5.4.2	**Did the learners leave the classroom to collect materials for a lesson?**	**Tick one line**
A	Yes. Specify material(s):	
B	No	

5.4.3	**Did an expert visit the class to teach the learners about a topic?**	**Tick one line**
A	Yes. Specify who and what topic:	
B	No	

MODULE 7: Time Management

5.7.1	**Time Management:**	**Observed**	**Not observed**
1.	Learners carry out classroom helper duties during the observed period		
2.	The teacher refers learners to a timetable, calendar, or course schedule		
3.	The teacher claps his or her hands to get learners' attention		
4.	The teacher tells learners how much time they have to complete a task		
5.	The teacher appears prepared for the lesson with materials ready		

MODULE 8: Practical Ways to Make the Classroom Creative and Fun

5.8.1	**Does the teacher ask learners to share their *personal experience* or knowledge of the topic during the lesson?**	**Tick one line**
A	The teacher asks ***most*** learners to share their own knowledge or experience	
B	The teacher asks ***some*** learners to share their own knowledge or experience	
C	The teacher asks a ***few*** learners to share their own knowledge or experience	
D	No	

5.8.2	**In the explanations of content, does the teacher make connections to things that learners are familiar with and/or interested in?**	**Tick one line**
A	Yes. Specify interest:	
B	No	

5.8.3	**Learning styles: During the observed period, *learners* have opportunities to:**	**Observed**	**Not observed**
1.	**See** images, pictures, or maps to visualize the lesson topic		
2.	**See** words written on paper, the board, or a chart to read the lesson topic		
3.	**Listen** to songs, stories, or explanations of the lesson topic		
4.	**Speak** out loud about the lesson topic		
5.	**Perform** a song or skit about the lesson topic		

6.	**Move** their bodies to dramatize or act out ideas related to the lesson topic		
7.	**Use** their hands to build, sort, create, or manipulate objects or ideas		
8.	**Write** on paper, the board, or other materials to represent ideas		
9.	**Write** numbers on paper, the board, or other materials to represent ideas		
10.	**Draw** images or symbols to represent ideas		

MODULE 9: Differentiated Instruction

5.9.1	**When the teacher interacts with learners, he, or she:**	**Tick one line**
A	Gives all learners the **same** activities to complete during the entire period (no differentiation)	
B	Gives some learners or groups of learners a **different** task to the whole class (some differentiation)	
C	Does not give learners any tasks or activities to complete during the period (not applicable)	

5.9.2	**When the teacher uses grouping, learners are put in groups:**	**Observed**	**Not observed**
1.	With other learners of the **same learning abilities**		
2.	With other learners of **different (mixed) learning abilities**		
3.	With other learners who share the **same interests**		
4.	With other learners who share the **same gender**		
5.	With other learners who share the **same language**		
6.	Not sure. Can't tell how learners are grouped.		
7.	Other: Specify:		

5.9.3	**When learners finish their work before the rest of the class, the *teacher*:**	**Observed**	**Not observed**
1.	Provides learner(s) with an additional learning task		
2.	Asks learner(s) to support others who are still working on a task		

MODULE 10: Assessment and Evaluation

5.10.1	**Lesson objectives: Does the teacher tell learners what they should be able to know or do *before* teaching the lesson?**	**Tick one line**
1.	Yes	
2.	No	

5.10.2	**Assessment: During the observed period, the *teacher:***	**Observed**	**Not observed**
1.	Asks *individual learners* to answer questions or do a task on their own		
2.	Gives *many different learners* opportunities to answer questions on their own		
3.	Prompts learners to repeat words, answers, or definitions all together		
4.	Moves around the room looking at what groups and/or individual learners are doing		

5.	Provides support to small groups or individual learners while they complete learning tasks		
6.	Gives learners a test or quiz on the course content		
7.	Assigns learners homework or tasks to complete after class		

5.10.3	**Questioning: During the observed period, the *teacher:***	**Observed**	**Not observed**
A	Asks questions that call for a yes/no, one word, or very short response (teacher is looking for one right answer from students)		
B	Asks questions that allow for more than one possible answer (teacher is looking for different explanations from students)		
C	Asks learner(s) to expand on their response to a question in more detail (probing)		
D	Directs learners to ask the teacher questions		
E	Directs learners to ask each other questions		

5.10.4	**Feedback: When *individual* learners respond to the teacher's questions or conduct a task:**	**Observed**	**Not observed**
1.	The teacher stops and focuses on mistakes that learners make		
2.	The teacher *clearly indicates* whether a learner's response is right or wrong		
3.	The teacher takes time to explain *why* a learner's response is right or wrong		
4.	The teacher takes time to *re*-explain or re-teach an idea or concept when learners have difficulty understanding		

MODULE 11: Girls Education and Inclusion in the Classroom

5.11.1	**Gender equality: When the teacher interacts with learners:**	**To a large extent**	**To some extent**	**Hardly ever**	**Never**
1.	Boys have opportunities to participate in learning activities				
2.	Girls have opportunities to participate in learning activities				
3.	Boys have opportunities to respond to questions				
4.	Girls have opportunities to respond to questions				

5.11.2	**Gender equity: During the observed period, the *teacher:***	**Observed**	**Not observed**
A	Gives learners examples of women in non-traditional roles or occupations (e.g., women scientists)		
B	Encourages girls to participate in a lesson activity		
C	Assigns a leadership role to girl(s)		
D	Explicitly praises the efforts or ideas of girls		

MODULE 12: Ensuring an Inclusive Learning Environment

5.12.1	Are all learners able to easily enter and exit the classroom space?	Tick one line
A	Yes	
B	No	

5.12.2	Is there enough space in the classroom for all learners to move around easily (including learners with physical disabilities)?	Tick one line
A	Yes	
B	No	

5.12.3	During the observed period, does the teacher provide special assistance to learners with emotional, physical, or other identifiable learning needs?	Tick one line
A	Yes. Specify assistance:	
B	No	

MODULE 13: Early Education and Childhood Development

5.13.1	Which behavioural routines do *learners* carry out without the teacher explaining how to do so?	Observed	Not observed
1.	Collecting or handing out materials or texts		
2.	Packing away materials or texts		
3.	Transitioning from one activity to the next		
4.	Entering and/or exiting the room		
5.	Raising a hand before speaking		
6.	Other. Specify:		

MODULE 14: Learning through Play with Early Learners

5.14.1	During the observed period, does the teacher incorporate a creative play-based activity or game to facilitate learning?	Tick one line
1.	Yes. Specify activity:	
2.	No	

GENERAL COMMENTS (e.g., other kinds of observations, events that stand out to you, things the teacher told you, etc.)

Classroom Observation Tool #2 COLLEGE TUTOR	TFET Techniques for Effective Teaching Sesame Workshop IDP Foundation, Inc. NORC @ the University of Chicago

College name:

Tutor name:

Master trained: ☐ **Step-down trained:** ☐

Date of observation:

Fieldworker name:

Instructions:

1. Complete Part 3 while observing by writing a detailed narrative report of the full observation period
2. Make certain that you have taken the required photograph
3. Complete Part 5 of Tool #1 outside the classroom with the second fieldworker
4. Read through your narrative carefully and make any necessary changes/translations
5. Label photograph with the first 3 letters of the college, teacher's first name, AND course level (e.g., STE_RIC 300_materials)

Part 3: Observation Narrative

3.1	**Complete a record of the full observation period in the table below. Record at *at least* 5 minute intervals**

Time	What the teacher and learners do

Appendix C: Fieldwork Training Agenda

Techniques for Effective Teaching Phase III
NORC – TNS/Kantar Accra, Ghana

DAY 1 TFET PROJECT OVERVIEW (Monday 21 February 2022)

- Introductions
- Techniques for Effective Teaching (TFET) program overview
- Phase III program evaluation methods
- TFET modules and materials
- Introduction to Classroom Observation tools 1 and 2

DAY 2 CLASSROOM OBSERVATION TOOLS (Tuesday 22 February 2022)

- Walk through Classroom Observation tools 1 and 2
- Video simulation #1
- Q&A discussion
- Video simulation #2
- Classroom observation procedures

DAY 3 FEEDBACK AND LOGISTICS (Wednesday 23 February 2022)

- Feedback on narratives
- Recap of protocol and procedures
- Video simulation #3 – practice in pairs
- Feedback on narratives
- Logistics for pilot observation

DAY 4 PILOT OBSERVATIONS (Thursday 24 February 2022)

- College visit and data collection (on-site completion of tools 1 and 2)
- Debrief college visit
- Feedback on narratives

DAY 5 PROTOCOL AND PROCEDURES (Friday 25 February 2022)

- Walk through student teacher interview tool
- Interviewing procedures
- Paired practice
- Review of key fieldwork protocols
- Data storage
- Possible matters arising (What to do if…)