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Weaving Ubuntu into Design and Technology: An Afrocentric, Competency-Based Basket-Making Lesson from Cameroon in the COMSTEDA 23 One Million Lesson Initiative

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Abstract

This paper reports a Design and Technology lesson taught live from Cameroon during the One Million Lesson initiative of the 23rd Conference on Mathematics, Science and Technology Education in Africa (COMSTEDA 23), held at the Adwa Victory Memorial Museum, Addis Ababa, Ethiopia, on 10 November 2026. Junior secondary learners (Forms 1 and 2) designed and wove a collective classroom storage basket from locally available natural cane and fibres. The lesson was built on two African philosophical foundations: Ubuntu ("I am because we are"), which framed the basket as a common good produced through shared roles and inter-group help, and Afrocentricity, which placed Cameroonian materials, mother tongues, elders' techniques and traditional motifs at the centre of learning. The paper uses a qualitative, practice-based case design that combines analysis of the lesson plan, the conference programme and 18 classroom photographs, grouped into seven multi-panel figures. Mapping the photographic evidence to the lesson's evaluation grid shows learners engaged in seven main competences: collaboration and shared leadership, mathematical measurement, design and planning, manual and technical skill, scientific reasoning about materials, cultural identity and Afrocentric creativity, and environmental responsibility with safety. The case suggests that Ubuntu and Afrocentricity can serve as working classroom structures, not only as values statements, within a competency-based design lesson. Because no learner achievement data were collected, the findings are descriptive. The paper recommends a scoring study using the lesson's rubric and teacher development in culturally grounded STEAM pedagogy.

Keywords: Afrocentricity, Ubuntu, Design and Technology, Competency-Based Education, Indigenous Knowledge, Basket Weaving

1. Introduction

1.1 Context of the study

COMSTEDA 23 was organised by SMASE-Africa with the Federal Ministry of Education of Ethiopia from 9 to 13 November 2026 under the theme "Empowering Africa through STEAM Education and Innovation for Sustainable Development and Global Competitiveness" [1]. Its programme was structured around five sub-themes, including relevance, quality and innovation in STEAM education, and STEAM for innovation and socio-economic transformation [1].

On Day 2 (10 November 2026), the One Million Lesson initiative connected classrooms in participating African countries to delegates in Addis Ababa. The programme describes competence-based lessons in which local facilitators support learners in familiar languages, using materials available in their communities [1]. The lesson reported here was listed as **Secondary Design and Technology – Cameroon**, Room 3, 12:50–13:50 East Africa Time (10:50–11:50 local time) [1].

1.2 Problem and rationale

Many African classrooms teach design and science through imported examples, while learners' own material culture is treated as outside "real" knowledge. Scholars of African education describe this as a mismatch between schooling and the cultural worlds learners bring to it [4]. Science education research shows that learners must cross a cultural border between their life-

world and school science, and that this crossing is easier when teachers deliberately connect the two [5, 6].

Cameroon's secondary syllabuses, introduced in 2014/2015, adopted the Competence-Based Approach through Real-Life Situations [7]. That reform asks teachers to build lessons around situations learners actually face. A scattered classroom with no storage is one such situation, and the basket-weaving traditions of Cameroonian communities offer a ready, low-cost response.

1.3 Purpose and questions

This paper documents and analyses the Cameroonian lesson as a case of Afrocentric, Ubuntu-based Design and Technology teaching. It addresses three questions:

1. How were Ubuntu and Afrocentricity built into the structure of the lesson?
2. Which competences were learners engaged in, as shown by the lesson design and the photographic record?
3. What does the case suggest for teacher development in culturally grounded STEAM education across Africa?

2. Theoretical Framework and Literature Review

2.1 Ubuntu as a pedagogical principle

Ubuntu is the Southern and Central African understanding that a person becomes a person through other people. Mbiti expressed this relational view of personhood in the formulation "I am, because we are; and since we are, therefore I am" [2]. Ramose treats Ubuntu as a foundation of African philosophy rather than a slogan [8]. Letseka defends it as a normative moral theory with direct implications for education and citizenship [9], and Metz develops it as a moral theory centred on harmonious, caring relationships [10].

In a classroom, Ubuntu implies four practical commitments: shared responsibility for outcomes, help across groups rather than competition, respect for the knowledge of elders, and products that serve the community. The lesson studied here turns each commitment into a concrete rule, for example "if one group of three fails, the class of 18 fails".

2.2 Afrocentricity in education

Asante defines Afrocentric education as placing African learners at the centre of their own learning, as subjects rather than objects of other people's histories [3]. Mazama describes the Afrocentric paradigm as one that takes African cultural experience as the starting point of inquiry [11]. Nsamenang and Tchombe, writing from Cameroon, argue that education predates schooling and that its first purpose is the transmission of cultural heritage between generations [4].

Afrocentricity is not a rejection of global science. Le Grange argues that Western science and indigenous knowledge can work together in science education when neither is treated as the only valid way of knowing [6]. This lesson takes that position: learners use measuring tapes and calculate perimeters, while also naming fibres in their mother tongues and recalling elders' weaving techniques.

2.3 Indigenous knowledge, culturally relevant pedagogy and ethnomathematics

Aikenhead and Jegede explain learners' difficulties in school science as a form of cultural border crossing and collateral learning [5]. Ladson-Billings' culturally relevant pedagogy adds that teaching should build academic success, cultural competence and critical consciousness together [12]. Ethnomathematics, introduced by D'Ambrosio, recognises mathematical ideas embedded in cultural practices [13]. Gerdes showed that African basket and mat weaving carries geometric and symmetry ideas that can be used directly in the mathematics classroom [14].

Basket weaving is therefore a strong STEAM context. It joins botany (fibre source), materials science (strength and flexibility), mathematics (measurement, circles, perimeter), art (pattern) and history (ancestral technique) in one authentic task.

2.4 Learning as social participation

Vygotsky's sociocultural theory holds that learning first happens between people before it is internalised [15]. Lave and Wenger describe learning as legitimate peripheral participation in a community of practice, where newcomers move toward full participation alongside more skilled members [16]. The lesson's "elder of the day" role, in which a learner who masters a step teaches another group, enacts this directly.

2.5 Competency-based and SMASE approaches

Cameroon's 2014 syllabuses define competence as the mobilisation of knowledge, know-how and attitudes in real-life situations [7]. SMASE-Africa's ASEI-PDSI approach (Activity, Student-centred, Experiment, Improvisation; Plan, Do, See, Improve) promotes learner activity and the use of improvised local materials [17]. The basket lesson aligns with both: learners act, use local materials, test their product and propose improvements.

3. Methodology

3.1 Research design

The study uses a qualitative, practice-based single-case design. The case is one lesson, planned and taught by practitioners and reflected on by them. The aim is rich description and analytic interpretation, not statistical generalisation.

3.2 Setting and participants

The lesson took place in a secondary school classroom in Cameroon and was broadcast to COMSTEDA 23 Room 3 [1]. The lesson plan targets Form 1 and Form 2 (6e and 5e) Design and Technology learners, organised as a class of 18 in six groups of three. The plan sets 80 minutes, with a two-period option for 40-minute timetables; the conference slot was 60 minutes [1].

3.3 Data sources

- **Lesson plan:** The competency- and activity-based plan *Design and production of a collective classroom storage system using Cameroonian natural fibers* (JSS 1 Design and Technology), including outcomes, procedure, evaluation grid, differentiation, safety notes and learner activity sheet.
- **Conference programme:** The amended final COMSTEDA 23 programme (7 November 2026), used to confirm the event, date, room and timing [1].
- **Photographs:** 18 photographs taken during the lesson, grouped by activity into seven multi-panel figures (Figures 1-7).

3.4 Data analysis

Photographs were first grouped by the lesson phase and

activity they show. Each figure panel was then coded against two frames: the competences named in the lesson's evaluation grid and procedure, and the Ubuntu and Afrocentric principles in Section 2. A competence was recorded as "engaged" only where both the plan required it and at least one photograph showed learners doing it. Descriptions report only what is visible; where a material or purpose cannot be confirmed from the image, this is stated.

3.5 Limitations

No rubric scores, learner work samples, interviews or video transcripts were available to the authors. The study therefore describes engagement, not achievement. Photographs capture moments, not whole processes, and the selection of images may favour successful moments.

4. Lesson Design and Implementation

4.1 The design challenge

The lesson posed a real classroom problem: "Our notebooks, chalk and rags are scattered. How can we create together, with the riches of the earth, a storage system for 18 that is strong, beautiful, useful to everyone and 100% local?" The expected product was a basket showing precision, sound assembly and eye–hand coordination. Prior knowledge drew on the sources and uses of bamboo, raffia and banana stems. Core concepts were the design process, strength and balance, load-bearing structure, interlacing and tightening, edge finishing and safety, and "form follows function".

4.2 Building Ubuntu and Afrocentricity into the lesson structure

The plan does not add culture as decoration. It writes Ubuntu and Afrocentricity into the classroom rules, roles, materials and assessment:

- **Ubuntu circle:** Learners sit in a circle on a mat, "just like in the village", so everyone can see each other.
- **Palaver with rotating roles:** Each group of three rotates Circle Chief, Materials Guardian, Memory Guardian (records proverbs), Mathematician (measures) and Spokesperson.
- **Shared fate and mutual aid:** A group that finishes helps another; the finished basket is offered to the class as a common good for the year.
- **Elder of the day:** A learner who masters a step teaches another group.
- **Intergenerational preparation:** A week before, each learner visits an elder, observes the banana or raffia plant, and brings back its local name and technique.
- **Afrocentric materials and language:** Community-donated fibres, natural dyes (hibiscus, charcoal, mango tree), Ndop/Toghu fabric scraps, and labels and presentations in French plus a mother tongue.
- **Proverbs:** "Alone you go fast, together we go far" and "A single hand cannot pick up flour" anchor collaboration.

4.3 Lesson phases

Table 1 summarises the five phases of the 80-minute plan, the Ubuntu or Afrocentric element in each, and the figures that document them.

Table 1: Phases of the lesson, their Ubuntu/Afrocentric elements and photographic evidence

Phase (time)	Main learner activity	Ubuntu / Afrocentric element	Evidence
A. Engage – Ubuntu circle (10 min)	Compare a natural-fibre basket with an imported plastic one; share elders' knowledge and local fibre names	Circle seating; mother-tongue names; elders' techniques	Fig 1
B. Define – Ubuntu palaver (10 min)	Frame the class storage problem as "we"; set five criteria; estimate dimensions	Rotating roles; collective problem statement	Fig 1, Fig 2
C. Explain and plan (15 min)	Co-create one sketch with measurements, perimeter, plant names, motif and compartments	Ndop/Toghu motifs; ancestral three-strand technique	Fig 2, Fig 3
D. Construct – community work (25 min)	Measure, cut, twist, stake, weave, border, dye, label	Elder of the day; inter-group help; proverbs and song	Figs 3–7
E. Test and celebrate – village market (20 min)	Load test with notebooks and chalk; present in French and a mother tongue; offer the basket to the class	Common good; no losers; elder's wisdom for improvement	Fig 6c

4.4 Photographic record of the lesson

The 18 photographs are grouped below into seven figures by activity. Each panel is labelled (a), (b), (c) or (d).

Engaging in the Ubuntu circle: Learners sat on mats in small circles on the classroom floor, with the teacher standing to facilitate rather than lecture. In the circles, learners handled and sorted the cane strands together before any construction began.



Fig 1: The Ubuntu circle. (a) Learners seated in circles on floor mats during the opening discussion, with the facilitator standing at the edge. (b) A group of six learners in a closed circle on a mat, each handling and sorting cane strands from a shared bundle

Drawing on African motifs: A large African-print cloth with repeated geometric and seed-like motifs served as the class's pattern reference. Learners first studied it on the floor, then held it up as a backdrop for the working area. The plan names Ndop and Toghu as the target motifs; Ndop is the indigo resist-dyed royal display cloth of the Cameroon Grassfields, used to mark the setting for royal ceremonies [18]. The cloth in the photographs is a printed fabric, not an Ndop cloth, and was used as a stand-in motif source.

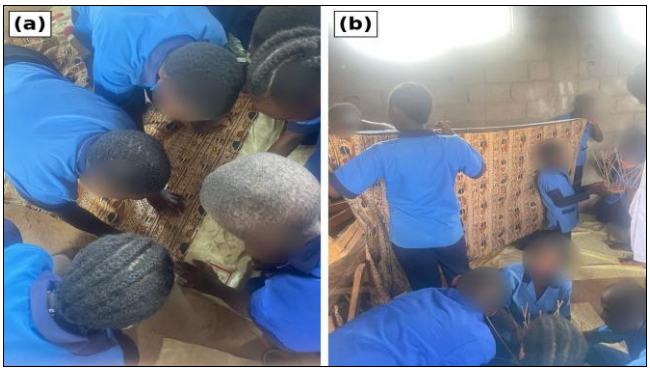


Fig 2: Afrocentric design reference. (a) Learners kneel around the African-print cloth to examine its motifs; a paper sheet with a red border, likely the group sketch, lies at its edge. (b) Learners hold the cloth up as a display backdrop while other groups continue preparing stakes

Measuring before cutting: Groups used flexible measuring tapes to measure strand lengths and the distances they would need, then marked and cut. This is the lesson's explicit mathematics link: length, circumference of the base and perimeter of the rim.

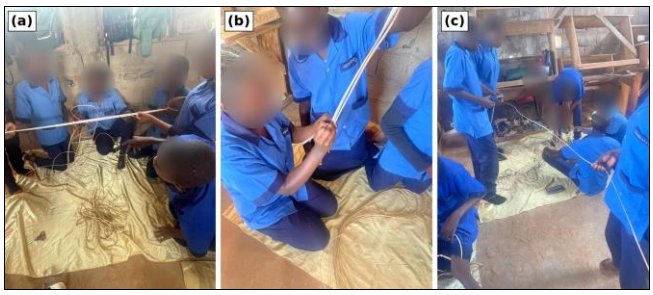


Fig 3: Measurement as applied mathematics. (a) Two learners stretch a measuring tape across the mat while their group watches, beside coils of cane and a pair of scissors. (b) A learner reads the tape against a cane strand held by a partner to mark the cutting point. (c) Learners standing and seated around the mat measure and cut long cane strands with scissors

Twisting fibre cord: Some learners twisted thinner fibres into cord, practising the strand-twisting technique the plan attributes to a named mother in the community. The teacher demonstrated alongside the learners rather than taking over.



Fig 4: Preparing fibre cord. (a) A learner twists fibre strands into cord while group members guide the strands. (b) The teacher (right, white shirt) works beside learners as they twist cords on the mat

Building together: Construction began with cane stakes inserted around a round wooden base. Several pairs of hands held the stakes upright while others wove the first rows. Strips of African-print cloth were woven into the walls as decorative bands. The teacher guided from inside the circle.



Fig 5: Collective construction. (a) Learners and the teacher insert cane stakes into the round base, several hands holding the structure steady. (b) Learners hold a base with stakes splayed upward and the first woven rows in place. (c) Many hands weave the basket wall around the stakes, with strips of African-print cloth woven into the pattern. (d) The teacher observes learners working on a partly built basket; a learner holds scissors and a mobile phone lies on the mat

Finishing the border and testing the form: Learners bent the stake ends into a looped border, trimmed protruding ends with round-tip scissors, and added a handle. The final basket has a rounded body, a scalloped looped rim and a single arched handle.



Fig 6: Border, trimming and the finished product. (a) Learners bend stake ends into the looped rim. (b) A learner trims a protruding end with scissors while steadying the woven wall; cloth strips are visible in the weave. (c) A group examines the finished basket with its looped border and arched handle

Natural finishes: In the final stage, learners brushed finishes onto the basket. Dried hibiscus calyces were used as a natural dye; the photograph shows a pink-red colour on the lower woven band. Hibiscus sabdariffa calyces contain water-soluble anthocyanin pigments that are studied as natural textile dyes [19]. A yellow liquid finish, carried in a cut plastic bottle, was also brushed onto the rim. This liquid was palm kernel oil, applied as a gloss and varnish and to protect the basket against insects.

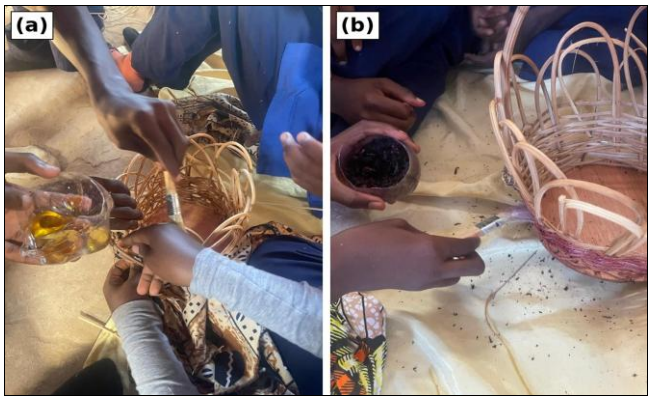


Fig 7: Natural finishing. (a) A learner brushes palm kernel oil (the yellow liquid) onto the rim of the completed basket as a gloss, varnish and insect-protective finish, while another holds the container. (b) A learner applies hibiscus dye from a cup of dried calyces; the dye has coloured the lower woven band pink-red

Table 2: Main competences engaged during the lesson

S. No	Competence	What learners did	Evidence	Ubuntu / Afrocentric link
1	**Collaboration and shared leadership**	Worked in circles; rotated roles; many hands held and wove one structure; groups helped one another	Fig 1a–b, Fig 5a–c	Ubuntu: shared fate, mutual aid, common good
2	**Mathematical measurement and calculation**	Measured strand lengths with tapes; marked and cut to size; linked base circumference to rim perimeter	Fig 3a–c	Ethnomathematics: measurement inside a cultural craft
3	**Design thinking and planning**	Framed a "we" problem; set criteria; produced a collective sketch with motif and compartments	Fig 2a, Table 1 phases B–C	Collective design rather than individual ownership
4	**Manual and technical skill**	Twisted cord; inserted stakes; wove walls; bent borders; trimmed ends; fitted a handle	Fig 4a–b, Fig 5, Fig 6a–c	Ancestral techniques passed between learners
5	**Scientific reasoning about materials**	Handled flexible cane and fibre; experienced how interlacing and twisting add strength; used plant-based dye and palm kernel oil finish	Fig 1b, Fig 4, Fig 7b	Indigenous materials knowledge joined to school science
6	**Cultural identity and Afrocentric creativity**	Studied African motifs; wove cloth strips into the walls; dyed with hibiscus; finished with palm kernel oil; presented in French and a mother tongue (per plan)	Fig 2a–b, Fig 5c, Fig 7	Afrocentricity: learners' heritage at the centre
7	**Environmental responsibility and safety**	Used biodegradable, local materials; round-tip scissors; worked on mats to collect offcuts	Fig 3c, Fig 6b	Ubuntu: "Mother Earth is a community member"

5. Results and Discussion

5.1 Main competences learners engaged in

The analysis identified seven main competences that the plan required and the photographs show learners practising. Table 2 lists each competence, what learners did, the evidence, and its link to Ubuntu or Afrocentricity.

5.2 Ubuntu as a working classroom structure

The clearest finding is that Ubuntu was visible in how bodies and materials were arranged. Learners sat in closed circles on shared mats (Fig 1). In Figures 5a–5c, between four and seven hands hold or weave the same basket at once, which would be impossible as individual work. The teacher sits inside the circle and works alongside learners (Fig 4b, Fig 5a), matching the plan's instruction to facilitate rather than direct.

This matches Lave and Wenger's view of learning as growing participation in a shared practice [16] and Vygotsky's claim that learning happens first between people [15]. It also gives practical form to Metz's reading of Ubuntu as harmonious, caring relationship [10]: the task cannot succeed unless learners coordinate.

5.3 Afrocentricity as content, not decoration

Afrocentricity shaped what learners worked with. Materials were local cane and fibre rather than imported plastic. The motif reference was an African-print cloth (Fig 2), and strips of similar cloth were woven into the finished walls (Fig 5c, Fig 6b). Finishing used a plant dye familiar in Cameroonian households (Fig 7b) and palm kernel oil, a locally produced oil, as a gloss, varnish and protection against insects (Fig 7a). These choices place learners' own material culture at the centre of a STEAM task, as Asante recommends [3].

At the same time, learners used measuring tapes and calculation (Fig 3). The lesson thus models Le Grange's argument that indigenous and Western knowledge can be used together [6], and reduces the cultural border learners must cross into school science [5].

5.4 Integrated STEAM learning

One artefact carried several disciplines. Weaving a round basket requires reasoning about circles and perimeter, which Gerdes identified as a rich source of school geometry [14]. Choosing and twisting fibres involves material properties. Natural dyeing introduces plant chemistry, since hibiscus anthocyanins are water-soluble pigments [19]. Oiling the finished basket with palm kernel oil adds a further link to science, as learners see a natural oil used to give a glossy, varnish-like surface and to protect plant fibres against insects. The plan's environmental message contrasts biodegradable fibre with plastic. The plan's figure of "500 years" for plastic should be taught as an approximation: a

review of the literature found plastic degradation rates vary widely by polymer and environment and are poorly measured [20].

5.5 Gaps between plan and photo evidence

Some elements of the plan are not visible in the photographs. These include the three labelled compartments, the raised moisture-proof base, mother-tongue labels, the load test with notebooks and chalk, and the elders' visits. The finished basket in Fig 6c is a single open container with a handle.

6. Conclusion and Recommendations

6.1 Conclusion

The Cameroonian basket-weaving lesson shows that Ubuntu and Afrocentricity can be written into the rules, roles, materials and assessment of a competency-based Design and Technology lesson. The photographic record shows learners working in circles, building one shared product with many hands, measuring before cutting, and finishing their basket with local fibres, African motifs, a plant dye and a palm kernel oil finish. Across the lesson, learners engaged seven competences: collaboration and shared leadership, mathematical measurement, design and planning, manual and technical skill, scientific reasoning about materials, cultural identity and Afrocentric creativity, and environmental responsibility with safety.

The lesson fits the COMSTEDA 23 theme and the One Million Lesson aim of learning with locally available materials [1]. Its main contribution is practical: it shows teachers one way to move culturally grounded STEAM teaching from principle into routine classroom structure.

6.2 Recommendations

1. **Train teachers:** Include Ubuntu-based group structures, ethnomathematics and indigenous materials in in-service STEAM training, building on SMASE ASEI-PDSI practice [17].
2. **Adapt across countries:** Replicate the lesson with fibres and motifs from other African communities and compare outcomes.

7. Acknowledgements

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8. Ethical considerations

The study involved school learners and photographic documentation. Learners' faces have been blurred in the photo evidence used in this study.

9. Conflict of interest

The authors declare no conflict of interest.

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