# Learning and Work Tasks for Rural Kenya: Designing Digital Work-Based Learning with Teachers

Teachers in three rural Kenyan secondary schools designed their own digital Learning and Work Tasks (LWTs) after one structured training pathway. This article shows how the method and its learning environment work, and what others can reuse.

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| Platforms | European Digital Education Hub (Sharing is Caring / Reading Corner); EPALE (resource) |

**Abstract.** Kenya's Competency-Based Education (CBE) asks for practical, technology-integrated learning. Rural schools in Homa Bay County lack reliable power, devices and digitally trained teachers. DEVISE4KE combined solar power, low-energy devices and a teacher development pathway built on the Learning and Work Task (LWT) method. An LWT follows the phases of a real work process: acceptance, planning, implementation and conclusion. Teachers learned the method by working through LWTs themselves, then authored their own in a free, browser-based Task Manager. The result is four teacher-designed LWTs, in English and Kiswahili, on agriculture, community service, job applications and office work. Each is mapped to DigComp 2.2 competence areas. The article explains the design principles, the learning environment and the lessons for transfer to other low-resource settings.

**Keywords:** work-based learning; Learning and Work Tasks; digital competence; DigComp 2.2; teacher professional development; TVET; Kenya; open educational resources

## 1. Why work-based digital learning in rural Kenya

Kenya's Competency-Based Curriculum (CBC) asks schools to develop practical, transferable competences, including digital literacy. In rural Homa Bay County, three conditions stood in the way: unreliable electricity, too few devices, and teachers with little training in digital or competency-based teaching (Harberts, Ng & Kaune, 2024).

These gaps are documented beyond the project. In a study of public primary schools in Homa Bay that had received government Digital Literacy Programme devices, 55.4% of sampled schools had not yet

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started teaching with them (Omito, 2021). Earlier work in the same county found limited computer capacity among teachers (Omito, Kembo, Ayere & Ali, 2019). Globally, UNESCO's 2023 GEM Report concludes that technology adds value only where access, governance and teacher preparation are in place (UNESCO, 2023).

A second gap concerns work. Local employers interviewed by the project rated digital competences such as problem-solving and content creation as important or very important. Yet rural students have almost no access to internships or apprenticeships. The project needed a way to bring authentic work into the classroom, and to do it digitally on low-energy equipment.

DEVISE4KE answered with three linked investments: solar power for the schools, low-energy devices with an offline-capable server, and a teacher development pathway built on Learning and Work Tasks. This article focuses on the third: the method, the learning environment, and the tasks teachers produced.

## 2. The Learning and Work Task method

A Learning and Work Task turns one real work order into a learning project. The method comes from the Kompetenzwerkstatt tradition at the University of Bremen). Learners accept an order, plan it, carry it out and close it, and the result is a product or service whose usefulness to a client can be judged (Howe & Knutzen, 2021).

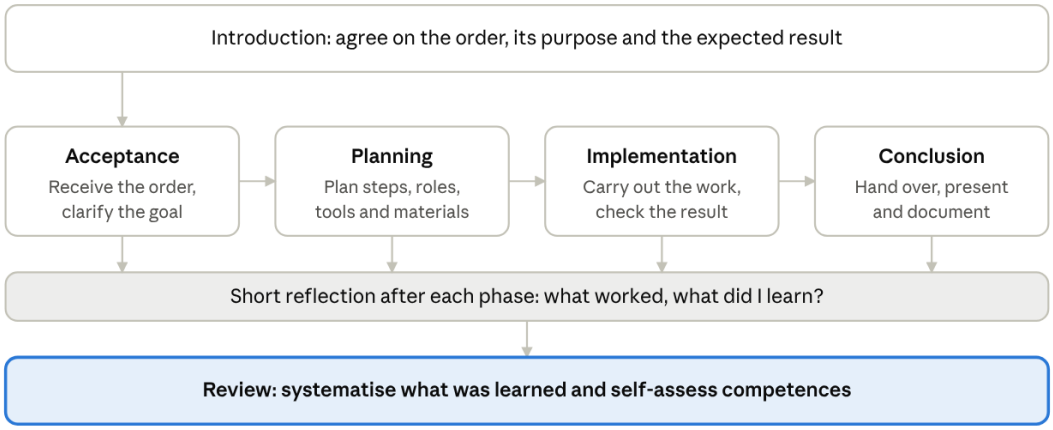



*Figure 1: LWT structure modified DEVISE4KE reflection rule (own visualization, based on Howe & Knutzen 2021)*

The task is framed by an introduction, where learners and teacher agree on the order and its purpose, and a review, where learners systematise what they experienced and assess which competences grew. Technical, methodological, social and personal competences are developed inside the phases, not in separate lessons (Howe & Knutze 2021).

For DEVISE4KE this mattered for two reasons. LWTs bring the logic of a workplace into schools where students cannot reach one. And they match the CBC's emphasis on active, inquiry-based learning, so teachers could use them without working against the national curriculum.

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### Five design rules used in DEVISE4KE

The consortium refined the method for rural secondary schools over several test cycles. Five rules emerged:

1. **Real topics.** Choose scenarios proposed by regional employers or drawn from community life, not from the textbook alone.
2. **Mixed activity.** Combine practical work, group work and planning in every task.
3. **Digital sub-tasks.** Build in sub-tasks that address named DigComp 2.2 competence areas (Vuorikari, Kluzer & Punie, 2022).
4. **Visible connections.** Make the goal of each sub-task and its link to the next phase explicit, so students see the work process as a whole.
5. **Reflection after each phase.** Short reflection points, not only a final review.

### Teachers learned the method by doing it

Teachers did not start by writing tasks. They first worked through LWTs designed by the European partners, as learners. These included installing a photovoltaic system for their own school, setting up digital equipment, and teaching with low-energy devices. Only then did they author their own, supported by a dedicated LWT on how to create an LWT. Each round was tested, evaluated and revised, following a design-based research approach (McKenney & Reeves, 2019).

## 3. The digital learning environment

The learning environment had to work for teachers new to digital content and for schools with weak power and connectivity. It was built in three layers, each solving one constraint.

| Layer | What was installed or used | Constraint it addresses |
|---|---|---|
| Energy | Photovoltaic systems with inverters at the schools | Erratic grid power |
| Devices and network | Tablets, projectors, Wi-Fi/LAN, and a Raspberry Pi server ("Digi.Cube") for offline teaching | Few devices, little internet |
| Authoring and delivery | The Task Manager (Aufgaben-Manager), a browser-based tool for building and running LWTs | Teachers new to digital content creation |

*Table 1: The Digital Learning Environment*

Rongo University also set up an equipment rental platform so other schools can borrow mobile devices.

### Why a purpose-built tool, not a generic LMS

The Task Manager was developed by the Kompetenzwerkstatt team at the University of Bremen for competency- and process-oriented vocational education. It builds the structure of an LWT into its interface, so teachers fill a ready frame instead of configuring a platform. Features that mattered in Homa Bay:

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- **Low entry barrier.** It runs in any browser on a PC, tablet or smartphone. Teachers reported being productive after a short familiarisation.
- **Three task types.** An exercise for short tasks, a course for sequential steps, and a project for a full four-phase LWT. Types can be converted, so teachers can start small.
- **Media by link.** The tool does not host videos or files. Teachers link to material stored elsewhere, which avoids large uploads on slow connections.
- **Result folders.** A cloud folder can be embedded so students hand in work digitally.
- **Didactic labels and colours.** Sub-tasks are marked by function (read, discuss, create, reflect), which orients students.
- **Teacher-controlled release.** Sub-tasks can be set active, inactive or hidden, so the teacher sets the pace.

The tool is free to use via the Kompetenzwerkstatt website and can be hosted on a school's own server. For DEVISE4KE, the University of Bremen runs a dedicated project instance, which keeps the content under institutional ownership.

### DigComp 2.2 as the shared reference

The project used DigComp 2.2, the framework for citizens, rather than DigCompEdu, the framework for educators (Vuorikari, Kluzer & Punie, 2022; Redecker, 2017). DigCompEdu assumes a baseline of digital competence that most participating teachers did not yet have. With DigComp, teachers and students could work on the same five competence areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem solving. Every teacher-designed LWT names the areas it addresses.

## 4. Four LWTs designed by Homa Bay teachers

The bilingual collection published in April 2026 holds four LWTs written by teachers at the three schools, in English and Kiswahili (DEVISE4KE, 2026). Together they run from the school garden to the office, the same path from school to work that Kenya's VET reform aims to support.

| LWT | School | Type and length | Scenario | DigComp 2.2 areas |
|---|---|---|---|---|
| Healthy Soils, Better Harvests (EN · SW) | Kiabuya | Project, four phases; 3 weeks × 3 hours | Youth Agriculture Club investigates "tired" soil and builds a compost heap with legumes | Information and data literacy; content creation; communication and collaboration |
| Supporting Local Food Banks (EN · SW) | Kiabuya | Project, four phases; several sessions | Students plan, recruit for and carry out volunteer work at a food bank | Communication and collaboration; content creation; safety |

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| LWT | School | Type and length | Scenario | DigComp 2.2 areas |
|---|---|---|---|---|
| Job Application Skills (EN · SW) | Miramba | Course, sequential; 3 lessons | Students write a real CV and cover letter and rehearse an interview | Content creation; communication and collaboration; information and data literacy |
| Preparing a Stakeholder Meeting (EN · SW) | St Joseph Olando | Project, three lessons | Junior clerks at a community centre handle email requests: letter, agenda, phone call, attendance sheet | Content creation; communication and collaboration; problem solving; safety |

*Table 2: Overview of Kenyan LWTs*

### What the tasks show

- **Local relevance.** Each scenario comes from the students' surroundings: soil fertility, food security, job seeking, community administration.
- **Digital work, not digital lessons.** Students photograph, document, write, calculate and present with digital tools because the work requires it, not as a separate ICT exercise.
- **Range of task types.** Teachers chose the format that fit: two full projects, one sequential course, one three-lesson project.
- **Language access.** Kiswahili versions lower the barrier for students and make the tasks reusable across Kenya.

The full collection, with learning goals and activities per task, is available on the project website.

## 5. Lessons for transfer

The main lesson is that designing an LWT is itself professional development. Teachers who wrote tasks had to analyse a work process, define competences, choose digital tools and plan reflection. That is the core of competency-based teaching.

This matches what research says about effective teacher development: it works best when it is active, collaborative, built on models of good practice, supported by coaching and feedback, and sustained over time (Darling-Hammond, Hyler & Gardner, 2017). The DEVISE4KE pathway had each of these elements: teachers experienced model LWTs, worked in school teams, received feedback from partners across several cycles, and produced something they then taught.

### What others can reuse

- **The tasks.** All LWTs are openly available and can be copied and adapted in the Task Manager for other year groups, subjects or regions.
- **The pathway.** Learn an LWT as a participant, then build one, then teach it, with reflection at each step.

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- **The design rules.** The five rules in section 2 apply to any setting where workplaces are out of reach.
- **The infrastructure logic.** Secure power first, then devices, then teacher capacity. Devices without power, or power without trained teachers, do not change teaching.

### Limits to keep in mind

- Evidence on student competence gains is still being collected from the school pilots.
- The tasks depend on teachers who stay. Staff turnover in rural schools is high, so training must reach more than one teacher per school.
- Equipment is limited against large classes; tasks need to be designed for group work on shared devices.
- Long-term maintenance of hardware and content after the project ends is not yet tested.

**Over to you.** Have you used work-process-based tasks in a setting without workplaces nearby? We would welcome your experiences and questions in the comments.

## References

APA 7. Each entry was checked against the publisher or repository record.

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute. https://learningpolicyinstitute.org/product/teacher-prof-dev

DEVISE4KE. (2026). *Learning and work tasks – Homa Bay, Kenya / Kazi za kujifunza na kufanya kazi – Homa Bay, Kenya*. University of Bremen, Warnborough College Ireland, Maristak Durango, Rongo University. https://devise4ke.com/about-devise4ke/publications-2/

Harberts, V., Ng, J., & Kaune, P. (2024). *Strategy report for digital transformation and work-based learning in VET schools in Homa Bay*. University of Bremen. https://devise4ke.com/wp-content/uploads/2024/08/1705_Strategy-Report-Homa-Bay.pdf

Howe, F., & Knutzen, S. (2021). *Lern- und Arbeitsaufgaben entwickeln* [Developing learning and work tasks] (Kompetenzwerkstatt – Handbücher für die Berufsbildungspraxis). tredition. https://media.suub.uni-bremen.de/handle/elib/5102

McKenney, S., & Reeves, T. C. (2019). *Conducting educational design research* (2nd ed.). Routledge. https://doi.org/10.4324/9781315105642

Omito, O. (2021). Status of Digital Literacy Programme in public primary schools in Homa Bay County, Kenya. *East African Journal of Education Studies, 4*(1), 37–47. https://doi.org/10.37284/eajes.4.1.443

Omito, O., Kembo, J., Ayere, M., & Ali, A. A. (2019). Teachers' computer capacity in public primary schools in Homa Bay County, Kenya: The case of the Digital Literacy Programme. *European Scientific Journal, 15*(19), 301. https://doi.org/10.19044/esj.2019.v15n19p301

Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu* (Y. Punie, Ed.; EUR 28775 EN). Publications Office of the European Union. https://doi.org/10.2760/159770

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UNESCO. (2023). *Global education monitoring report 2023: Technology in education – A tool on whose terms?* UNESCO. https://doi.org/10.54676/UZQV8501

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The digital competence framework for citizens – With new examples of knowledge, skills and attitudes* (EUR 31006 EN). Publications Office of the European Union. https://doi.org/10.2760/115376

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