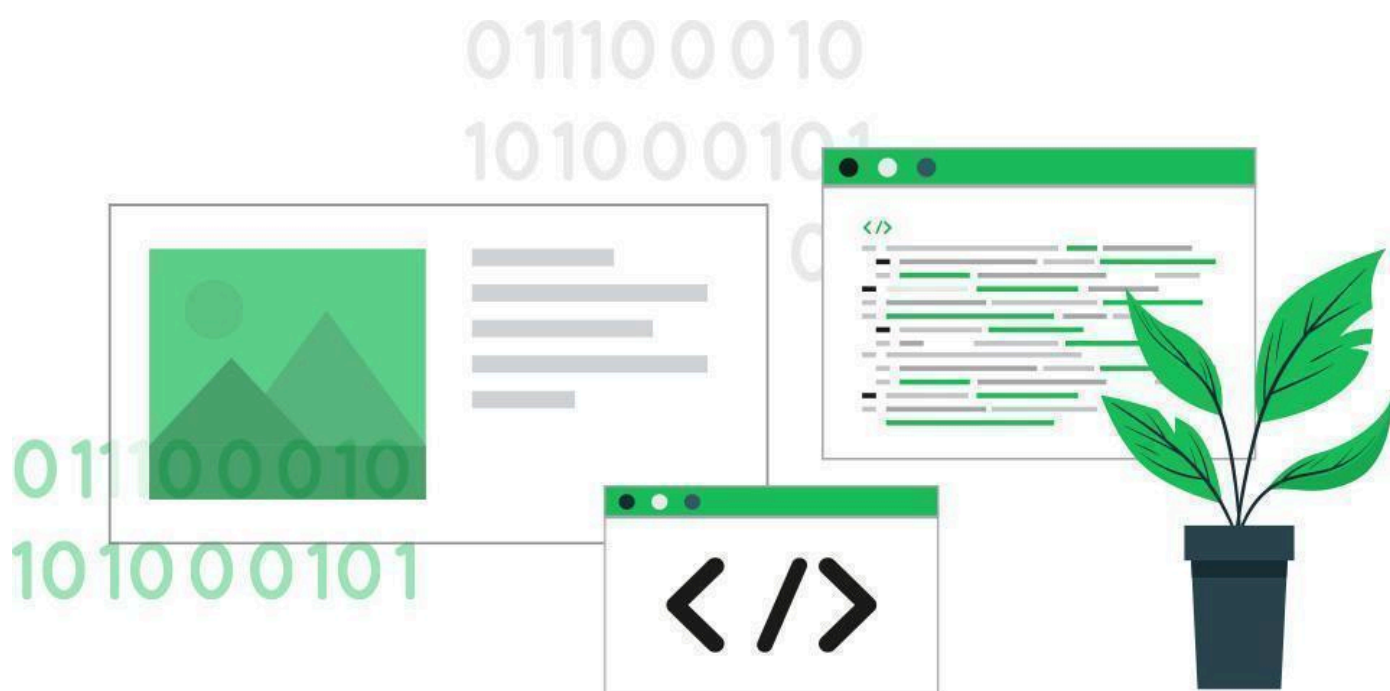


AN AUTHENTIC LEARNING
& GENDER INCLUSIVE
FRAMEWORK FOR TEACHING
INFORMATICS IN SCHOOLS
ACROSS EUROPE

TINKER trainers' handbook



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UNIVERSITY OF ZAGREB
Faculty of Electrical
Engineering and
Computing



university of
 groningen



c e s i e
the world is only one creature



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1. Introduction

This handbook is designed for you—TINKER trainers—who are guiding educators in delivering inclusive, future-oriented informatics education for learners aged 10–14. It supports the implementation of the **TINKER Pedagogical Framework**, equipping you with the tools and strategies to lead impactful teacher training aligned with real-world learning, gender inclusion, and evidence-based practice.

Whether you are facilitating an introductory session or a full course, this manual helps you translate TINKER principles into effective classroom practice.

Target group and what you'll find inside

Welcome, TINKER trainers—you are at the heart of it all. This manual was created to support you, passionate educators ready to lead the way in rethinking how we teach informatics. We've packed this manual with everything you need to spark real change in classrooms and deliver professional development aligned with the **TINKER pedagogical framework**. Inside, you'll find:

- A clear explanation of the TINKER Framework and its four core pillars
- Practical guidance for training design, including unit summaries and teaching strategies
- Tips for delivering engaging, inclusive sessions—both in person and online
- A self-assessment tool (Annex I)

2. An overview of the TINKER Framework

The [TINKER framework](#) pedagogical framework (Figure 1) is a flexible model for building meaningful, inclusive informatics lessons across diverse school systems. It is based on four interconnected pillars:

- **Informatics Competencies:** Develop learners' digital fluency in core areas such as coding, data, and cybersecurity.
- **Authentic Learning:** Create engaging, interdisciplinary experiences grounded in real-life contexts.
- **Gender Inclusion:** Foster equity through inclusive language, diverse representation, and balanced participation.
- **Teacher Professional Learning:** Equip educators with adaptable, relevant training that supports ongoing growth.

Your role is to help teachers activate these pillars in ways that reflect their learners' needs and educational environments.

2.1 TINKER Toolkit

The [TINKER Toolkit](#) makes the framework actionable with practical resources designed for training and classroom integration. It includes:

- **Design Guidelines:** Step-by-step support for aligning lessons with the framework and national standards
- **Scenario Template:** A customizable structure for building inclusive informatics learning activities
- **Self-Reflection Tool:** Based on the SELFIE model, helping teachers assess their own teaching practices
- **[108 Learning Scenarios](#):** Co-created with teachers, these are aligned with the TINKER pillars and tailored for upper primary and lower secondary education

This toolkit is not just for short-term use—it is built for sustained impact and curriculum innovation.

3. TINKER teachers' training course

This structured training course is made up of **eight modules**, each with clearly defined outcomes and practical activities. You will guide teachers through key pedagogical foundations and support them in applying the TINKER approach in real classrooms.

Training materials include:

- [The TINKER Framework and Toolkit](#)
- The [Transnational Report](#) and [Informatics4All Reference Framework](#)
- Self-assessment tools for trainers and teachers (Annex I)

In the pages that follow, you will find an overview of each module and guidance on how to deliver it effectively—whether you're running a single workshop or a full training programme.



Source: FreePik.com

Module 1: TINKER Project overview and first introduction to authentic learning and gender inclusive practice

Aim of the module: This module **empowers trainers to bring the TINKER Pedagogical Framework to life by combining big-picture thinking with everyday classroom strategies**. Across two dynamic units, trainees will unpack the core values of TINKER authenticity, inclusivity, and digital relevance, while exploring how to design real-world learning experiences and actively address gender bias in education.

From understanding the 'why' to practicing the 'how,' this module **turns reflection into action**.

Unit 1.1 Authentic Learning for a Gender-Inclusive Education

General overview: In this first unit, **you will introduce your trainees** to the TINKER project—its aims, structure, and significance in advancing inclusive and future-ready informatics education across Europe. Your role is to guide participants through the foundations of the TINKER Pedagogical Framework, with a specific focus on **authentic learning** and its connection to **gender inclusion**.

Duration: 1 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Understand the objectives and significance of the TINKER project in informatics education
- Identify and list the main informatics areas as outlined by the Informatics4All coalition
- Define what is authentic learning, and its main principles
- Recognise the importance of authentic learning in promoting a gender-inclusive environment
- Consider and apply practical methods to integrate authentic and gender-inclusive learning strategies in the classroom

Required material: To deliver this unit, you'll need:

- Tinker Resources:
 - [Tinker Framework and Toolkit](#)
 - [Tinker Transnational Report](#) on state-of-the-art and needs
 - [Informatics4All Reference Framework](#)

Implementation process:

Step 1 - Introduce the TINKER Project: Explain the goals of TINKER and the value of teaching informatics in authentic, inclusive ways. Use EU data to highlight current challenges like low engagement and gender gaps.

Step 2 - Reflect on Current Teaching Practices: Ask teachers to review a recent lesson, considering its objectives, delivery, real-world relevance, and whether all students—regardless of gender—were equally engaged.

Step 3 - Deepen Understanding of Authentic Learning: Facilitate small-group discussions where teachers share how they've applied authentic learning. Encourage them to document ideas collaboratively.

Step 4 - Connect Authentic Learning with Gender Inclusion: Discuss how authentic learning can support equity. Share data on gender disparity and invite teachers to brainstorm strategies that promote inclusion. Wrap up with group reflection and a discussion on applying these insights in practice.

Unit 1.2 Introduction to the authentic learning approach and gender inclusion in informatics education

General overview: This unit builds directly on the foundations laid in Unit 1.1. You'll guide teachers into a more applied understanding of how to implement authentic learning strategies that also advance gender-inclusive education. You'll **tackle gender bias head-on**. Through open conversation, trainees will spot common issues and walk away with a go-to list of steps to build fairer, more welcoming classrooms.

Duration: 1 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Define and explain the main authentic learning concepts required to design an authentic learning environment
- Provide examples of authentic learning practices in real classroom scenarios
- Understand how authentic learning concepts can enhance gender inclusivity
- Identify gender biases in informatics education and discuss their impact
- Develop an authentic learning activity with an emphasis on gender inclusion
- Reflect on their teaching practices and explore how to implement authentic learning concepts and reduce gender biases in informatics education

Required material: To deliver this unit, you'll need:

- Tinker Resources (all available online)
 - [Tinker Framework and Toolkit](#)
 - [Tinker Transnational Report](#) on state-of-the-art and needs
 - [Informatics4All Reference Framework](#).

Implementation process:

Step 1 - Exploring Authentic Learning and Gender Inclusion: Teachers are introduced to core concepts of authentic learning and how they support gender inclusion. They reflect on ways to apply these in their classrooms to make informatics more engaging and equitable.

Step 2 - Collaborative Group Activity on Authentic Learning: In groups, participants design authentic learning strategies for informatics. They then regroup to exchange ideas and share key takeaways on a collaborative platform.

Step 3: Unpacking Gender Bias in Education: Educators examine common gender biases in education, especially in informatics, and explore practical ways to recognize and address them in their teaching.

Step 4 - Self-Reflection and Group Dialogue: Teachers reflect on their own practices, identify barriers to inclusion, and brainstorm solutions. Insights are shared digitally, ending with a discussion on integrating inclusive, authentic approaches in daily teaching.

Module 2: TINKER Framework - authentic learning principles and practical guide

Aim of the module: This two-part module is all about making authentic learning in informatics come to life—practically, purposefully, and with impact. This module dives into what authentic learning really means, unpacking the pedagogical principles behind it and highlighting real examples from informatics education that show how powerful it can be.

We'll explore the nine core elements that give authentic learning its strength and relevance, especially for today's learners. After the first step, we'll roll up our sleeves and turn theory into action.

Unit 2.1 Understanding authentic learning - from theory to practice

General overview: You'll support teachers in exploring the 9 key elements of authentic learning, using real examples and group discussion to reflect on how these already appear—or could appear—in their classrooms. Through hands-on tasks and peer collaboration, participants will analyse lesson plans and begin drafting their own, integrating authentic learning into informatics in meaningful, real-world ways. From abstract ideas to authentic outcomes.

Duration: 1,5 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Define and articulate the philosophy behind the authentic learning model.
- Accurately list the 9 core elements of authentic learning and describe their role in lesson planning design, through a short verbal explanation.
- Develop a lesson plan or instructional activity for an informatics topic that integrates elements of authentic learning.

Required material: To deliver this unit you'll need:

- Handouts for Activity 4
- Pens, Paper

Implementation process:

Step 1 - Introduction to Authentic Learning: Participants explore the core principles of authentic learning through guided discussion, focusing on its role and relevance in education.

Step 2 - Case Study: A video case study illustrates authentic learning in action, followed by group reflection on how similar practices can be applied in their own classrooms.

Step 3 - Jigsaw Activity: Small groups analyze elements of the authentic learning model and create examples. They then share insights in new teams and conclude with a class discussion.

Step 4 - Designing Authentic Learning for Informatics: Participants collaboratively design informatics scenarios using authentic learning strategies and present their ideas to the group.

Step 5 - Reflection and Review: The session closes with individual and group reflection on applying authentic learning in teaching practice.

Unit 2.2 Overview: Authentic Learning in Informatics Education

General overview: In this unit, you'll explore real examples from primary and secondary informatics classrooms—projects where students code, create, and solve real-world problems. Through case studies, you'll identify what worked, what didn't, and why, using student feedback as evidence. Then, in collaborative activities, participants will apply the authentic learning framework to design or improve a lesson plan, integrating at least three core elements while aligning with curriculum goals.

Duration: 1,5 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Analyse, criticize and assess the effectiveness of authentic learning tasks by analysing outcomes and feedback from case studies in primary Informatics classrooms
- Develop and refine an authentic learning lesson plan using at least 3 elements of the authentic learning model

Required material: To deliver this unit you'll need:

- Handouts for Activity 2
- Large paper post its for each group working on activity 3
- Pens, markers, highlighters, paper
- For online sessions, groups can write in a whiteboard online - some options might be [Miro](#) or [Canva](#)

Implementation process:

Step 1 - Icebreaker – Memory Challenge: In small groups, participants recall the nine authentic learning elements, then create or remember informatics-related examples. A friendly competition reinforces prior learning and teamwork.

Step 2 - Identifying Authentic Learning in Case Studies: Groups examine sample lesson plans to identify authentic learning elements, rotating between cases. A group reflection wraps up the activity.

Step 3 - Designing an Authentic Informatics Lesson: Participants create an informatics lesson plan with an authentic context, task, and at least three additional learning elements. practice.

Module 3: TINKER Framework - gender inclusive approach to informatics teaching and assessment

Aim of the module: This module offers a practical look at what gender inclusion means in primary and secondary informatics classrooms. You'll explore real examples, task ideas, and case studies to understand how to create inclusive learning experiences. The focus is on how classroom setup, teaching strategies, and teacher actions can promote equal participation and ensure every student feels seen and supported. Combining reflection with hands-on guidance, this unit challenges assumptions and equips teachers with practical tools for more inclusive, engaging learning.

Unit 3.1 Characteristics and Examples of Gender-Inclusive Practices in Informatics Education

General overview: This unit highlights the importance of gender-inclusive teaching and how subtle biases can affect student participation. You'll learn to recognize and address these biases, use inclusive language, adapt examples to reflect diverse learners, and design fairer assessments. Teachers will explore inclusive task characteristics, apply research-based strategies, and practice integrating them into lesson planning and evaluation.

Duration: 2,5 hours

Educational outcomes: By the end of this module, teachers will be able to:

- Identify and implement characteristics of gender-inclusive tasks that support gender inclusion, specifically in upper primary informatics, and explain how these characteristics can reduce gender biases and encourage equal participation.
- Apply strategies for fostering gender inclusivity in Informatics teaching practices, considering best practices from research and classroom case studies.

Required material: To deliver this unit you'll need:

- Whiteboard, markers, sticky notes (optional)
- Digital Polling Tool (e.g. [Mentimeter](#), [Kahoot](#), Google Forms etc) (optional)

Implementation process:

Step 1 – Starting the conversation: begin with an interactive activity to explore perceptions of gender in informatics, followed by reflection on personal classroom experiences.

Step 2 – Exploring gender gaps: present key trends showing how girls' early interest in informatics often declines in secondary school, prompting discussion on why this happens.

Step 3 – Unpacking the influences: participants examine societal, school-wide, and classroom factors that contribute to gender imbalances, using tools like mind maps to guide discussion.

Step 4 – Classroom dynamics: review how teacher interactions and peer behavior can shape student confidence and participation. Discuss strategies to foster an inclusive climate.

Step 5 – Recognizing bias: introduce unconscious bias and guide participants in reflecting on their own assumptions and behaviors that may affect classroom equity.

Step 6 – Inclusive language and materials: educators practice revising classroom content to remove gender bias and ensure balanced representation.

Step 7 – Building resilience through a growth mindset: discuss how normalizing mistakes



and encouraging perseverance can help all students—especially girls and gender minorities—stay engaged in informatics.



Module 4: Learning progression: from early primary, to upper primary to lower secondary informatics education

Aim of the module: This module offers a European lens on informatics education, showing how digital skills and gender inclusion intersect. It introduces key EU frameworks—the **European Digital Competence Framework** and the **Digital Education Action Plan 2021–2027**—that guide informatics learning across school levels. Participants reflect on EU research about the gender gap in STEM and consider how these insights can shape more inclusive teaching.

Unit 4.1 Informatics Areas & Competencies, an EU perspective

General overview: This unit focuses on the **European Digital Competence Framework** as a shared guideline across EU countries. Teachers explore how to align digital skills development with real classroom needs, embed competencies into lesson planning, and support progression from primary to lower secondary education.

Duration: 2 hours

Educational outcomes: By the end of this module, teachers will be able to:

- Describe the main goals and priorities of the Digital Competences Framework and the Digital Education Action Plan 2021-2027 as outlined by the EU.
- Summarise the key findings from the EU report on addressing the gender gap in STEM education, and use the findings to inform the design of gender-inclusive Informatics lessons.

Required material: To deliver this unit you'll need:

- Pens, markers, highlighters, paper

Implementation process:

Step 1 – Understanding the Digital Education Action Plan: introduce the plan's goals and structure, highlighting how it supports modern, meaningful digital teaching across schools.

Step 2 – Exploring core competencies: present the five DigComp areas. In groups, teachers link them to classroom examples and brainstorm how to assess each skill.

Step 3 – Self-Assessment: explain the four proficiency levels. Teachers reflect on their own strengths and challenges, sharing insights with peers.

Step 4 – Applying DigComp 2.2: Introduce key updates. Teachers select a competence, design a practical classroom activity, and share takeaways in a final discussion.

Module 5: Evaluation of teaching and assessment practices in secondary informatics education

Aim of the module: This module focuses on self-assessment as a key tool for professional development. Educators reflect on their teaching to adapt to evolving technologies, diverse learners, and inclusive practices. Through hands-on activities, participants identify strengths and areas for improvement in lesson design and delivery. The emphasis is on personal reflection—not external evaluation—to support continuous, adaptive growth.

Unit 5.1: Self-Assessment for Continuous Improvement in Teaching

General overview: This unit is all about you taking the lead in your professional growth. You'll dive into self-reflection—not as a box-ticking exercise, but as a powerful tool to sharpen your teaching and stay aligned with the evolving world of informatics education. You'll explore how to use structured tools like the **TINKER self-assessment rubric**, reflective journals, and even video playback to take a closer, more intentional look at your teaching. No need for peer feedback or student surveys here—this is your space to pause, reflect, and make meaningful adjustments that serve your learners better.

Duration: 1 hour

Educational outcomes: By the end of this Unit, teachers will be able to:

- Conduct self-reflection on their teaching practices using rubrics, self-reflection journal, and video recording/playback
- Apply ready-to-use rubrics for evaluating teaching practices based on the TINKER Framework

Required material: To deliver this unit you'll need:

- A computer, a projection screen and access to the internet.
- TINKER self-assessment rubric handout

Implementation process:

Step 1 - Activity 1: Begin with a quick group activity to help teachers reconnect with the idea that there's always something to improve—and that's totally normal. It sets the tone for a growth mindset right from the start.

Step 2 - Explore what self-assessment really means: introduce why self-assessment matters and how it supports growth and better teaching. Walk through how using clear evaluation criteria or rubrics can make reflection more focused and purposeful.

Step 3 - Dive into the TINKER self-assessment rubric: presenting the TINKER rubric as a go-to tool for improving inclusive, authentic teaching. Get participants talking about how it fits into their own classroom experiences and what it can reveal about their teaching.

Step 4 - Get hands-on with rubric design: ask participants to create their own basic checklists or rubrics in small groups. They'll share ideas and see how peer insights can help shape clearer self-evaluation tools.

Step 5 - Broaden the toolkit: introduce other great self-reflection tools like the SELFIE platform, teaching journals, and video playback. Show how these can work alongside the rubric to give teachers different angles for reflection—on their own time, in their own style.

Unit 5.2: Other tools for evaluating teaching practices in informatics

General overview: Following the previous lesson where self-assessment of teaching practices was explored, this lesson introduces several techniques for assessment of teaching practices which rely on getting feedback or help from peer teachers or students, specifically: **student surveys / questionnaires, classroom observation protocols, student performance data, interviews / focus groups.**

Duration: ½ hour

Educational outcomes: By the end of this Unit, teachers will be able to:

- Describe, develop, and evaluate instruments for evaluation of teaching practices focused on general teaching effectiveness, equity and inclusion in Informatics, or other specific teaching aspects.

Required material: To deliver this unit you'll need:

- A computer, a projection screen and access to the internet.
- Smartphone for trying out an audience response system or creating a Google form
- optional but recommended tools to try for example [Kahoot](#).

Implementation process:

Step 1 - Activity 1: begin by greeting participants and recapping key points from the previous session. Briefly outline the focus and goals of the new unit.

Step 2 - Understanding student surveys and questionnaires: introduce student surveys and classroom observations as tools for gathering feedback. Demonstrate how to create a simple survey (e.g., Google Forms) and discuss structured observation methods, explaining that these involve structured observation using checklists or rubrics.

Step 3 - Using student performance data and technology: explain how performance data and real-time tools (e.g., AudIT) help assess teaching impact. Let participants explore or test these tools in small groups.

Step 4 - Introducing interviews and focus groups: present interviews and focus groups as qualitative methods for evaluating teaching practices. Explain how small-group discussions with students can offer in-depth insights into their experiences, and provide a practical example of how such a session might be structured.

Step 5: Group Activity – sharing tools and experiences: organize a group activity where Teachers share their own experiences using tools for collecting student feedback. Prompt discussion with guiding questions about methods they've used—such as surveys, audience response tools, or focus groups—and what they found effective.

Unit 5.3: Case study - Measuring the impact of authentic learning in the classroom

General overview: Building on prior self-assessment work (Modules 2 and 5), this session helps teachers apply their learning through two classroom case studies. As a trainer, you'll guide reflection and discussion on the impact of authentic informatics tasks—focusing on student engagement, equity, and measurable outcomes.

Duration: ½ hour

Educational outcomes: By the end of this Unit, teachers will be able to:

- Analyse case studies, based on the experience of reviewing two scenarios that highlight the impact of authentic learning on student outcomes
- Develop a reflective critique on the application of authentic learning tasks, sharing examples of effective and ineffective practices with peers

Required material: To deliver this unit you'll need:

- [Scenario A template](#)
- [Scenario B template](#)

Implementation process:

Step 1 - Activity 1: *distribute Scenario A* Divide participants into small groups (2–3 people) and give each group Scenario A. Ask them to read it together and identify at least **4 challenges or missed opportunities** that may have impacted student learning, inclusion, or engagement.

Step 2 - Reflect and connect to the framework: each group links the issues they spotted to specific **authentic learning principles** or **gender-inclusive practices** (e.g., lack of student voice, absence of real-world context, limited collaboration).

Step 3 - Brainstorm improvements: groups come up with at least **3 strategies** that could improve the scenario using the TINKER Framework—like designing a more meaningful task, adding structured feedback, or promoting more student choice and collaboration.

Step 4 - Activity 2: repeat for Scenario B Distribute Scenario B and follow the same process—or flip roles between groups for quick analysis.

Module 6: Learning and assessment design for classes based on the TINKER framework

Aim of the module: This module brings together lesson planning, assessment, and digital tools through the TINKER lens. Participants will design purposeful, inclusive activities, explore formative and summative assessment strategies, and discover how digital platforms—like quizzes, chatbots, and learning tools—can enhance teaching and streamline evaluation.

Unit 6.1 Designing learning activities aligned with the TINKER Framework

General overview: This hands-on unit guides teachers in adapting lesson plans using TINKER principles such as collaboration, creativity, and authentic learning. Participants review sample lessons, redesign them for their context, and create a 45-minute activity with at least two learning outcomes and one formative assessment.

Duration: 1 an ½ hour

Educational outcomes: By the end of this module, teachers will be able to:

- Evaluate and adapt a successful lesson design example: Analyze provided lesson examples and adapt them to their classrooms, adding at least one new task and formative assessment aligned with TINKER principles.
- Design a lesson aligned with the TINKER Framework: Develop a 45-minute lesson plan integrating collaboration, creativity, and inclusivity with at least two learning outcomes and one formative assessment.
- Align learning outcomes, tasks, and assessments with TINKER principles: Ensure each component follows the TINKER framework for authentic and inclusive learning.
- Incorporate gender-inclusive and collaborative learning practices: Implement learning activities that promote inclusivity and engagement

Required material: To deliver this unit you'll need:

- Handouts with lesson design [templates](#)
- Case study examples of informatics lesson plans
- [TINKER Framework](#)
- Online collaboration tools (e.g., Jamboard, or Padlet)

Implementation process:

Step 1 - Explore strong lesson examples: in groups, teachers examine two TINKER-aligned lessons, identifying elements that support collaboration, creativity, and inclusion. Each team shares a highlight and one improvement idea.

Step 2 - Adapt a lesson using the framework: teachers review the TINKER lesson template, then revise one of their own by adding a collaborative task, a TINKER-aligned goal, and an assessment. Updated lessons are shared for group feedback.

Step 3 - Create a brand-new lesson: teachers create a 45-minute lesson with two TINKER learning outcomes, a collaborative activity, and an assessment. Lessons are peer-reviewed, followed by a reflection on what worked, what challenged them, and take-home messages.

Unit 6.2 Designing assessment activities aligned with the TINKER Framework

General overview: This unit supports trainers in helping teachers design inclusive, effective informatics assessments using the TINKER Framework. It explores how strategies like coding tasks and reflections foster learning, and how aligning assessment with learning goals and inclusion leads to more authentic, student-centered education.

Duration: 1 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Identify formative and summative assessment strategies: Understand the role of formative and summative assessments in informatics education.
- Design a formative assessment tool for informatics competencies: Develop an assessment tool with at least two practical tasks and one reflective question aligned with the TINKER Framework.
- Implement practical tools for measuring informatics competencies: Use coding challenges or problem-solving activities to assess informatics skills such as algorithmic thinking.
- Provide immediate and constructive feedback: Develop strategies for offering real-time feedback to enhance learning outcomes.

Required material: To deliver this unit you'll need:

- Handouts with templates for formative assessment design - [link](#)
- [TINKER Framework](#)
- Online tools (e.g., [Kahoot](#), or [Scratch](#))

Implementation process:

Step 1 -Explore formative assessment in action: kick off with a group discussion around two sample formative assessments. In small groups, teachers identify which TINKER principles show up in the examples, then share one highlight and one possible improvement for each.

Step 2 - Create your own assessment: Introduce the template for designing a TINKER-aligned formative assessment. In teams, teachers create their own tool including two hands-on tasks and one reflective question. To close the activity, groups post their ideas on a shared board and browse each other's work for inspiration.

Unit 6.3 Online tools for teaching and assessment

General overview: This unit supports trainers in helping teachers design inclusive, effective assessments aligned with the TINKER Framework. It explores how tools like coding tasks and reflections can drive learning and growth, while connecting assessment to both learning goals and student inclusion. The focus is on making evaluation a meaningful part of authentic informatics teaching.

Duration: 1 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Identify and describe digital tools for teaching informatics: Explore tools such as audience response systems, H5P, and coding games.
- Explain how digital tools enhance student engagement and learning: Discuss the impact of interactive tools on learning outcomes.
- Compare different online tools for assessing informatics competencies: Analyze tools such as Moodle quizzes, Kahoot, and chatbots.
- Share best practices for using digital tools: Contribute examples from their own experience to the TINKER community

Required material: To deliver this unit, you'll need:

- Handouts with templates for formative assessment design - [link](#)
- [TINKER Framework](#)
- Online tools (e.g., [Kahoot](#), or [Scratch](#))

Implementation process:

Step 1 - Exploring online tools for informatics: introducing by discussing the value of digital tools in boosting engagement and learning in informatics. Demonstrate three tools—H5P, Kahoot, and a coding game like CodeCombat—and show how each can support interactive teaching. Wrap up with a group discussion on how these tools enhance creativity, assessment, and participation in the classroom.

Step 2 - Introducing two popular tools for quiz creation—H5P and Moodle: then, guide participants in designing a short, 5-question quiz based on a chosen informatics topic. Once complete, participants pair up, test each other's quizzes, and offer constructive feedback to refine them.

Module 7: Action Research: teachers as co-creators of solutions

Aim of the module: This module empowers teachers to become change agents in their classrooms by introducing them to the fundamentals of action research.

Through reflection and collaboration, they'll learn how to identify real challenges in their informatics teaching, frame them as research questions, and design practical interventions to address them. With a focus on inclusivity and impact, participants will build an action research plan tailored to improving student engagement, learning outcomes, and gender equity—transforming daily challenges into opportunities for growth.

Unit 7.1 Collaborative action research: designing interventions

General overview: This unit introduces teachers to the fundamentals of action research as a practical method for improving informatics teaching through systematic reflection and inquiry. As a master trainer, you will guide participants in identifying real classroom challenges and framing them as researchable questions to improve student outcomes.

Duration: 1 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Identify the steps involved in conducting action research, including problem identification, planning, and implementing changes in the classroom.
- Identify and document a classroom problem for Action Research to enhance teaching practices and improve informatics education outcomes.

Required material: To deliver this unit you'll need:

- sticky notes or digital equivalent ([Miro](#), [FigJam](#));
- Timer

Implementation process:

Step 1 - Sharing change stories teachers: teachers reflect on a past classroom challenge and share their “change stories” in pairs. The group then defines action research based on shared themes.

Step 2 - Understanding action research: introduce action research as a reflective, teacher-led method for solving classroom issues using a five-step cycle: Identify → Plan → Act → Observe → Reflect.

Step 3 - Teachers shift focus to identifying real classroom challenges: participants brainstorm 2–3 pressing teaching challenges (e.g. gender gaps, learning struggles), group similar themes, and begin forming shared inquiry topics.

Step 4 - Your challenges analysis: teachers dive deeper into one challenge, exploring its root causes, what's been tried, and how different student groups may be affected.

Step 5 - Drafting research questions: each teacher drafts a clear, actionable question based on their challenge, exchanges peer feedback, and refines it for use in a real-world inquiry cycle.

Unit 7.2 Collaborative action research: designing interventions

General overview: This unit empowers teachers to take a fresh, practical approach to improving their informatics teaching by exploring the essentials of action research. As a master trainer, you'll support them in turning everyday classroom challenges into meaningful opportunities for inquiry and growth. As a master trainer, your role is to help teachers build on the challenges identified in Unit 7.1 and move toward planning realistic, inclusive solutions tailored to informatics education.

Duration: 1 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Design and implement an action research plan with measurable outcomes.
- Collaborate with peers to develop and refine interventions.
- Create targeted solutions aligned with informatics goals and gender inclusion.
- Build a detailed plan using SMART questions, clear steps, and data collection methods

Required material: To deliver this unit you'll need:

- Sticky notes for Activity #1 ([Miro](#) or [Padlet](#) for online implementation)
- Action Research Plan template (for Activity #3)

Implementation process:

Step 1 - Recap the action research cycle: begin by revisiting the five phases of action research: Identify, Plan, Act, Observe, and Reflect. Encourage teachers to recall a challenge they previously identified and reshape it into a specific, measurable research question to guide future intervention.

Step 2 - Introduce collaborative action research: define collaborative action research and explore its benefits, emphasizing teamwork and shared inquiry. Prompt a group reflection on experiences of solving classroom challenges through collaboration, and optionally, spark discussion with an interactive poll.

Step 3 - Walk through a case study: to show how a challenge can be addressed using different intervention strategies. Highlight how each strategy aligns with inclusion goals and how its success can be tracked.

Step 4- Brainstorming and activity: in small groups, teachers share their challenges and brainstorm inclusive strategies. Each completes an Action Research Plan using their chosen question and approach. Partners exchange feedback on clarity and feasibility. The session ends with a brief recap and a look ahead.

Module 8: Workshop: co-design and evaluate learning scenarios for upper primary informatics teaching and assessment, based on the TINKER framework

Aim of the module: This module equips teachers with the tools and strategies to collaboratively design, refine, and evaluate engaging informatics learning scenarios grounded in the TINKER Framework. Through hands-on brainstorming, co-design, peer feedback, and guided reflection, teachers will prototype and adapt lesson ideas that foster authenticity, inclusion, and skill progression. The focus is on turning strong lesson design into lasting classroom impact—by aligning pedagogy, peer collaboration, and data-driven improvement.

Unit 8.1: Collaborative creation of effective learning scenarios

General overview: This unit provides participants with a hands-on opportunity to collaboratively design effective Informatics learning scenarios aligned with the TINKER framework. As a master trainer, your role is to guide teachers through structured collaboration techniques—such as silent brainstorming, affinity mapping, and dot voting—to ensure every voice is heard and ideas are refined collectively.

Duration: 1 and 1/2 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Apply structured collaborative techniques to design learning scenarios for Informatics.
- Employ brainstorming and consensus-building strategies to generate inclusive lesson ideas.
- Integrate Authentic Learning and Gender Inclusion principles into collaborative planning.

Required material: To deliver this unit you'll need:

- Sticky notes ([Miro](#) or [Padlet](#) for online implementation)

Implementation process:

Step 1 – The need for collaboration: the session begins with a discussion highlighting the importance of collaboration in designing learning scenarios. Theoretical foundations, such as Social Constructivism, are used to support the idea that learning is a social process.

Step 2 – Introducing the jigsaw method: participants are introduced to the Jigsaw method as a collaborative approach to co-designing scenarios. The method is explained through a video and visual aids. Its benefits are discussed, followed by a detailed breakdown of its implementation process. Participants then apply the method using a practical example.

Step 3 – Introducing round robin brainstorming: this step presents the RoundRobin Brainstorming method. A video introduces the concept, followed by a discussion on its theoretical background and benefits. The detailed process is then outlined, and participants implement the method through a hands-on example.

Step 4 – Addressing implementation challenges: participants explore potential challenges and obstacles related to applying Jigsaw and RoundRobin in practice. The group discusses possible solutions and shared experiences to foster problem-solving.

Step 5 – Reflection and conclusion: the session ends with a summary of key points and a reflection activity.

Unit 8.2: Evaluating the impact of informatics

General overview: This unit equips teachers with practical strategies to evaluate collaboratively designed learning scenarios using structured, evidence-based approaches. Participants will engage in peer feedback using protocols like “Critical Friends,” apply co-developed rubrics and checklists to assess alignment with Authentic Learning and inclusivity, and facilitate reflective discussions aimed at refining their instructional designs.

Duration: 1 and 1/2 hour

Educational outcomes: By the end of this module, teachers will be able to:

- Employ peer review protocols to evaluate learning scenarios.
- Exploit calibrated rubrics to assess alignment with Authentic Learning and inclusivity.
- Facilitate reflective discussions to improve team-based evaluations.

Required material: To deliver this unit you’ll need:

- Sticky notes ([Miro](#) or [Padlet](#) for online implementation)

Implementation process:

Step 1 - Introducing the role of peer feedback within evaluation strategies. Highlight the importance of structured peer-review protocols and explore the Rotating Feedback method as a collaborative tool for generating balanced input.

Step 2 - the Critical Friends Protocol (CFP) as a co-evaluation method: Show a brief demo of CFP, then guide participants through its process and benefits. Teachers use the protocol on a sample scenario, rotating roles as presenter and critical friend.

Step 3 - Discussion: Lead a discussion on real-world barriers to using CFP and CPR, and brainstorm solutions together.

Step 4 - Wrap - up: summarize key takeaways. Ask participants to reflect on which method they’ll use it and how it will support their lesson design.

Units 8.3 - 8.4 - 8.5: Groupwork phase - developing learning workshop

General overview: This workshop offers a hands-on, collaborative space for teachers to design and refine informatics scenarios using the TINKER Framework. As a trainer, you’ll guide them through the full process—from planning and feedback to final reflection—applying core principles of authentic learning, inclusion, and digital integration.

Duration: 4 and ½ hours

Educational outcomes: By the end of this module, teachers will be able to:

- Develop clear and meaningful learning scenarios that align with the project's and curriculum objectives.
- Incorporate differentiation and inclusion strategies to accommodate diverse learners within learning scenarios.
- Engage in peer review sessions to exchange ideas, provide constructive feedback, and refine teaching modules based on corresponding feedback.
- Reflect critically on their own teaching practices and the modules developed, identifying areas of strength and opportunities for improvement.

Required material: To deliver this unit you'll need:

- Sticky notes ([Miro](#) or [Padlet](#) for online implementation)
- Template for learning scenarios ([LINK](#))

Implementation process:

Unit 8.3: The session begins by introducing the five stages of group development to help participants form effective working groups. Participants are assigned different roles and asked to form balanced teams, fostering collaboration from the start. Each group then reflects on their roles, shares expectations, and creates an action plan to develop a learning scenario together.

Next, the focus shifts to understanding what makes a learning scenario effective. Through guided explanation and discussion, participants explore key elements like clear objectives, curriculum alignment, student engagement, and adaptability. Bloom's Taxonomy is introduced as a tool to define meaningful learning goals, and examples are used to connect theory to practice.

Unit 8.4: The session begins with an introduction to self-assessment, where the trainer explains its purpose and the personal and professional growth it supports. Participants then explore a self-reflective tool from the TINKER Framework in small groups, using it to evaluate their own teaching practices and identify areas of strength and growth.

Next, the concept of peer review is introduced as a collaborative evaluation method. Participants discuss its impact on feedback culture and student engagement through guided reflection questions.

Finally, in groups, participants apply a peer review protocol to assess one another's lesson plans. They provide constructive feedback and use it to refine their scenarios, gaining hands-on experience with collaborative evaluation.

Unit 8.5: In this activity, participants work collaboratively in groups to develop a learning scenario on a topic relevant to the project. After selecting their focus area, they follow guided steps provided by the trainer to structure their lesson plan. The trainer supports the process throughout, offering clarification and feedback. Once completed, each group's draft is reviewed, and final adjustments are made.

4. General Support Tools & Tips

This section provides practical tips, tools, and strategies to help you deliver each unit with confidence—from managing online platforms and engaging participants to adapting content and facilitating collaboration.

As you plan and lead sessions, consider Knowles' adult learning theory¹, which outlines five key assumptions about adult learners:

1. **Self-concept:** Adults are self-directed. Use a blended approach to offer flexibility and choice in learning.
2. **Learner experience:** Adults bring rich experience. Encourage them to share, validate their expertise, and build on what they already know.
3. **Readiness to learn:** Adults are goal-oriented. Make sure it's clear how each topic relates to real challenges in their teaching.
4. **Orientation to learning:** Adults are problem solvers. Focus on practical, task-based learning rather than just theory.
5. **Motivation to learn:** Adults are driven by internal motivation. Inspire through relevance, autonomy, and opportunities to apply learning.

Use what works best for your group and your teaching style—and feel free to adapt as needed!

4.1 Tips and Tricks for On-Site Lessons

To conduct a successful on-site training and in order to capture participants' interest and ensure their active involvement, it is important to:

- Optimize the Learning Environment:
 - Arrange the physical space to facilitate interaction and collaboration (e.g., arrange tables in a circle or U-shape).
 - Ensure that all participants have access to necessary materials and resources.
 - Use visual aids such as posters, flip charts, and multimedia presentations to enhance engagement.
 - Use non-verbal cues such as eye contact, body language, and active listening to create a positive and engaging atmosphere.
- Establish a Safe and Inclusive Environment:
 - Create a space where teachers feel comfortable sharing their thoughts and experiences without judgment and emphasize that there are no "right" or "wrong" answers, and that diverse perspectives are valuable.
 - Use icebreakers and welcome activities (as mentioned in the "Lesson Plan Overview") to set a positive tone and encourage interaction from the start.
 - Build a Sense of Community by creating opportunities for participants to connect with each other and build relationships.
- Facilitate and engage, Don't Lecture:

¹ Knowles, M., Knowles, M.S., Holton III, E.F., Holton III, E.F., Robinson, P.A., Swanson, R.A., SWANSON, R., & Robinson, P.A. (2020). The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development (9th ed.). Routledge. <https://doi.org/10.4324/9780429299612>

- Shift from a traditional lecture format to a more interactive approach and act as a guide and facilitator, providing support and clarification as needed.
- Throughout the session, **provide regular opportunities for feedback**. Setting up a **feedback wall**, where participants can post quick notes about their experience, allows for continuous adjustment and responsiveness. **Asking simple check-in questions** such as “Is this clear so far?” or “Would anyone like to add a different perspective?”.
- Adapt Activities for the On-Site Setting:
 - Modify activities to take advantage of the on-site environment and available resources.
 - Incorporate hands-on activities, group discussions, and practical exercises that are suitable for in-person interaction - some of them are described in the Lesson plan, but you can add other activities.
 - It’s also wise to **prepare for technical issues**, bring slides/videos on a USB, check equipment in advance, and have printed backups ready just in case.

4.2 Tips for teaching approaches in primary and secondary school

By incorporating these tips, you can create a dynamic and engaging learning experience that empowers teachers to effectively implement the TINKER Framework and Toolkit in their classrooms.

- **Learning by Doing & Hands-on Learning:**
 - You could involve practical exercises where teachers analyze existing lesson plans and identify areas for improvement in terms of authenticity and gender inclusion.
 - Provide concrete examples, some of them are in the speaker's notes or in the slides, and case studies to illustrate the concepts and include activities where teachers develop their own mini-lesson or activity, applying the principles discussed.
- **Peer Learning & Collaborative Learning:**
 - Structure group discussions to maximize interaction and knowledge sharing.
 - Discuss and decide roles within groups (e.g., facilitator, note-taker, timekeeper) to ensure that everyone participates.
 - Encourage teachers to share their own experiences and challenges related to informatics education.
 - Encourage trainers to use open-ended questions that promote critical thinking and reflection.
- **Individual and Collective Reflections:**
 - Use the "wrap-up" discussion at the end of each unit to summarize key takeaways and identify action steps.

5. After the training...

As your TINKER training journey wraps up, we hope it's been both inspiring and impactful. You've helped teachers grow in confidence and explore inclusive, authentic ways to teach informatics.

Take time with your group to reflect: what stood out, what they're eager to try, and what questions remain. These insights support their growth and show the training's impact. Here below is a short list of tips to guide you in supporting a good final reflection.

- **Use Structured Prompts** Guide participants with clear questions like:
 - What's one insight you gained today?
 - What will you apply moving forward?
 - What challenged your thinking?
- **Try some active approaches like the "One-Minute Paper"**: have everyone write a quick response to one or two focused questions—great for capturing fresh, honest insights with minimal effort.
- **Make it visual**, use **stickers**, **post-it notes**, or even **emoji reactions** on a shared board to express feelings, ideas, or takeaways—perfect for informal settings and keeping energy up.
- **Use online tools for collective reflection**, platforms like [Padlet](#), [Mentimeter](#), or [Jamboard](#) can make reflections interactive, fun, and anonymous if needed.
- **Invite a 'Next Steps' reflection**: encourage them to jot down one concrete action they'll take based on what they've learned—helps bridge reflection to real-life follow-through.
- **End with an open mic moment**: let a few people voluntarily share a short reflection out loud—builds connection and often sparks additional insights from peers.
- **Capture highlights for future reference**: summarize and save the most common themes or powerful thoughts. You can use them to shape your next training or follow-up communication.

As a trainer, you're more than a facilitator—you're a catalyst for change. Keep this handbook as a living resource to adapt and evolve with your practice. Whether online or in-person, your efforts are shaping a more inclusive, future-ready informatics education.

Thank you for your dedication.

**Warm wishes,
The TINKER Team**



Source: [FreePik.com](https://www.freepik.com)

Annex I - Assessment tools

1. This template is designed for you as a trainer to document and reflect on the implementation of the TINKER training programme. It captures key information about participation, session delivery, engagement, challenges, participant feedback, and recommendations for future improvement.

REPORTING TEMPLATE

Training Overview
The training structure and calendar:
Number of participants enrolled:
Number of participants completed the training:
Sessions Summary
Session 1 [Outline of activities, methods used and topics covered]
Session 2
[Insert as many rows as needed]
Participant Engagement
[Observations on involvement, discussions and feedback]
Challenges and Solutions
[Any obstacles encountered and how they were addressed]
Participants' Feedback
[Include a brief analysis of the participants' feedback questionnaire outcomes, and samples of participants' feedback]
Reflections and Recommendations
[Trainers' evaluation and suggestions for enhancing future training programmes]
Conclusion
[Summary of overall success and key takeaways]

- This questionnaire is for teachers who participated in the TINKER training. It gathers their feedback on the content, delivery, and usefulness of the training, as well as their understanding and readiness to apply authentic and inclusive informatics practices in their classrooms.

TEACHER TRAINING EVALUATION FORM

Instructions

Please take a few minutes to evaluate the training program you have just completed. Your responses will help us improve future programs.

Evaluation Scale: 1 = Very Low/Not at all, 5 = Very High/Absolutely

A. Content Evaluation

1. Please evaluate how interesting and useful the content of the training was for you.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

2. Please evaluate the structure and delivery of the training.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3. What aspects of the training do you believe were most effective?

4. What aspects of the training were more challenging?

5. What are 3 key takeaways you will take with you after the training?

B. Assessment of Understanding

6. Rate to what extent you agree with the following statements:

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
During the training I learned things relating to the project themes that were new to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The training enhanced my understanding about authentic learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am interested and motivated to apply authentic learning techniques in the classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Through the training I acquired the necessary skills to apply authentic learning techniques in the classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I understand why it is important to promote gender equality in informatics education and I am motivated to take action towards this goal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The training enhanced my understanding of the subject of gender inclusion in education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Through the training I acquired the necessary skills to implement inclusive practices in the classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

C. Overall Evaluation and Suggestions

7. To what extent do you intend to implement new practices or change something in your educational practice following the training? ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

8. What would you change/improve for future trainings?

D. Personal Information

Full Name: _____

E-mail: _____

Education Level: ☐ Primary ☐ Lower secondary (middle school) ☐ Upper secondary (high school)

Role/Position (e.g., teacher, principal): _____

School: _____

Specialty: ☐ Informatics ☐ Mathematics ☐ Science ☐ Other: _____

Thank you for your time!