







| GENERAL INFORMATION | |
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| Module | ***Module 3: THINKER Framework – a gender inclusive approach to informatics teaching and assessment*** |
| Unit | 3.1: *Characteristics and examples of gender inclusive practices in informatics education* |
| Target Group | Upper primary/lower secondary education teachers/trainers |
| Duration | 150 minutes |
| Prerequisites | / |
| ECTS | 0,1 |

| LEARNING OUTCOMES | |
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| 1 | **Identify and implement characteristics of gender-inclusive tasks** that support gender inclusion, specifically in upper primary and lower secondary informatics education, and explain how these characteristics can reduce gender biases and encourage equal participation. |
| 2 | **Apply strategies for fostering gender inclusivity** in Informatics teaching practices, considering best practices from research and classroom case studies. |

| TEACHING METHODS (select all that apply) | | | | |
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| √ | Learning by doing | √ | Peer learning |
|  | Project-based learning | √ | Hands-on learning |
| √ | Active learning strategies | √ | Collaborative learning |
| √ | Blended learning |  |  |

| LEARNING MATERIAL | |
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| Required material | * Computer * Projector * Presentation software (e.g. ppt) * Internet/Wi-Fi access * Whiteboard & markers (optional) * Sticky notes & Pens (optional) * Digital Polling Tool (e.g. Mentimeter, Kahoot, Google Forms etc) (optional) |
| Additional resources | * Dagienė, V., Stupurienė, G., & Vinikienė, L. (2016). Promoting Inclusive Informatics Education Through the Bebras Challenge to All K-12 Students. *Proceedings of the 17th International Conference on Computer Systems and Technologies 2016*, 407–414. <https://doi.org/10.1145/2983468.2983517> * Evagorou, M., Puig, B., Bayram, D., & Janeckova, H. (2024). *Addressing the gender gap in STEM education across educational levels*. NESET report. Luxembourg: Publications Office of the European Union. <https://doi.org/10.2766/260477> * Koppi, T., Sheard, J., Naghdy, F., Edwards, S. L., & Brookes, W. (2010). Towards a gender inclusive information and communications technology curriculum: A perspective from graduates in the workforce. *Computer Science Education*, *20*(4), 265–282. <https://doi.org/10.1080/08993408.2010.527686> * Stonewall. (n.d.). *List of LGBTQ+ terms*.<https://www.stonewall.org.uk/resources/list-lgbtq-terms> * UNESCO (2017) *A guide for ensuring inclusion and equity in education*. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000248254> (Accessed: 30 April 2025). * UNESCO. (2017). *Cracking the code: Girls’ and women’s education in science, technology, engineering and mathematics (STEM)*. United Nations Educational, Scientific and Cultural Organization. <https://unesdoc.unesco.org/ark:/48223/pf0000253479> |

| UNIT CONTENT | |
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| Introduction | Gender disparities in Informatics classrooms can discourage participation among students, especially those that feel non-represented like girls. The adoption of gender-inclusive practices allows educators to create a more equitable learning environment where all students feel valued and supported.  In this course, learners will:   * Recognise the importance of gender-inclusive teaching and assessment in Informatics education * Critically self-reflect on unconscious gender biases * Use inclusive language and relatable examples to create a welcoming and equitable learning environment * Modify assessment methods to ensure they are fair and supportive of all learners * Implement practical classroom strategies that actively promote inclusion and encourage participation among underrepresented students |
| Activities | Welcome and Introduction (10 min) Slides 3-6 Purpose: this first set of slides introduces the module.   * A warm welcome to the learners * Introduce the module * Explain how the module relates to the THINKER project * State the expected outcomes of this module and how they align with the THINKER project and educational framework * Collectively discuss and agree on some ground rules to facilitate respectful and open discussion |
| Sharing perspectives on gender and informatics and motivating the module (15 min)  **2.1. Activity 1: Exploring gender bias in informatics (Slide 7)**   1. Warm-up poll: Use a digital tool for conducting an interactive poll (Mentimeter, Kahoot etc) to ask about gender representation in informatics. 2. Discussion: Ask participants to share their experiences or perceptions regarding gender representation in their own classrooms.   **2.2. Gender disparity in informatics and STEM education (Slide 8)**  **Purpose**: Take the opportunity to motivate the module, highlighting gender disparities in informatics education and discussing why gender-inclusion is important.   * Women account for just 1 in 3 STEM graduates ([Eurostat, 2022](https://digital-strategy.ec.europa.eu/en/policies/women-digital)) and 1 in 5 IT specialists ([Digital Decade Progress Report, 2024](https://digital-strategy.ec.europa.eu/en/factpages/state-digital-decade-2024-report)) * At younger ages, girls tend to outperform boys in informatics. However girls tend to lose interest in STEM subjects as they get older ([SheFigures, 2021](https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/67d5a207-4da1-11ec-91ac-01aa75ed71a1)). * Interest in computer science and informatics seems to decrease rapidly in girls at the beginning of secondary school (around 11 - 12 years old) with minimal recovery in later education stages.   **Outcome:** Teachers will have a deeper understanding of the reality of gender disparities and challenges in education, in particular relating to informatics and STEM education. |
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| Understanding the reasons behind gender disparity in informatics (25 min) Slide 9-10 Purpose**:** Facilitate a class discussion on the factors contributing to gender disparity in informatics and STEM. Encourage participants to think critically and reflect on different layers of influence, from the broader society to the classroom environment.  You may choose to guide a group activity where learners collaboratively create a *mind map* of the issues, organised into four levels:   1. Societal level 2. Whole-school level 3. Student-teacher interactions 4. Classroom peer dynamics   Use the following talking points and explanations to guide the discussion:   1. **Societal factors**   Cultural norms and family expectations shape students' ideas about gender and subject choices. These societal messages often suggest that boys are more suited to subjects like informatics, while girls are not.  Key points:   * Girls and gender minorities are often exposed to stereotypes from a young age that present informatics as a “male” field. * These ideas can influence their confidence and interest before they even enter a computer science class. * When girls and gender minorities believe they’re less capable or less experienced than boys in informatics, they may be discouraged from participating. * A lack of awareness about the wide variety of careers in IT (and the skills involved) may limit their motivation. * These factors work together to lower girls’ and gender minorities’ confidence in informatics, weaken their career aspirations, and make it harder for them to imagine themselves in informatics roles.   *Discussion prompt:* Can you think of any messages—at home, in the media, or in society—that might discourage girls and gender minority students from choosing informatics?   1. **Whole-school level**   At the school level, talk about the influence of the *hidden curriculum*—the unspoken norms and values that are communicated in everyday school life.  Key points:   * Schools may unintentionally reinforce gender norms through materials, teacher expectations, or even which students are encouraged to take certain subjects. * These subtle messages can shape students’ ideas about their own abilities and potential careers. * Gender ideology in schools can affect students' self-beliefs and long-term motivation, especially in relation to informatics and STEM subjects. * Teacher attitudes also influence how peers and even parents view the potential of girls and gender minority students in informatics and STEM—this can create a ripple effect.   *Discussion prompt:* What are some examples of unspoken messages schools might send about who “belongs” in informatics or science?   1. **Student-teacher interactions**   Explain how teachers can influence student participation in informatics—even unintentionally.  Key points:   * Teachers may (often unconsciously) have biased expectations of students’ abilities and interact differently with boys and girls in informatics or STEM classrooms. * For example, boys might be asked more challenging questions, while girls are given more help or praised for trying rather than for their ability. * These patterns can reinforce the idea that boys are more “naturally talented” in technical subjects. * Girls and gender minorities who sense they’re being treated differently may start to feel they don’t belong in the field.   *Discussion prompt:* What kinds of classroom behaviours or teaching styles could either support or discourage girls and gender minorities in pursuing STEM?   1. **Peer dynamics in the classroom**   The social dynamics between students, which can be just as influential as teacher-student interactions. Peer dynamics are especially influential for students in early secondary education, which is a critical period for girls and gender minority students losing interest in informatics.  Key points:   * Boys may talk over girls and gender minorities or dominate class discussions * Peer groups may self-allocate gendered roles in group activities * Girls and gender minorities may face bullying, misgendering, or exclusion when participating in informatics. * Sexist behaviour can create an unsafe or unwelcoming environment. * These experiences can discourage girls and other marginalized students from continuing in Informatics and STEM subjects. * Teachers have an important role in responding to exclusionary behaviours and promoting inclusive attitudes   *Discussion prompt:* What role do classmates play in either supporting or pushing others away from informatics? |
| Addressing your own gender bias (15 min) Slide 11 Purpose: Introduce conscious and unconscious biases, in particular gender bias. Support participants to critically self-reflect.   * Introduce the topic of unconscious gender bias through [this](https://www.ted.com/talks/i_spy_my_unconscious_gender_bias) video * Facilitate a discussion about conscious and unconscious gender bias, asking for responses from participants to the video. Remind them that everyone has their own biases and that the goal is increased awareness and growth, not guilt or blame. * Some questions for self-reflection are provided in the slides. Give a few minutes for participants to note down privately a time when they think they might have acted in a biased way.  Optional homework activity: Ask students to revisit what they wrote after the session, and write down what they would do differently now. |
| Using gender-inclusive language, resources and assessments (20 mins) Slide 12-13 Purpose**:** Discuss the impact of gendered language and stereotypes in Informatics education, resources and assessments, including the promotion of diverse role models.  **Activity 2: Gender-inclusive language in informatics classrooms**   1. Scenario revision: provide participants with short classroom dialogues, lesson instructions or feedback examples that include gender-biased language. Educators rewrite them using inclusive terms and balanced representation. 2. Reflection: Groups share their revised texts and discuss how subtle language changes can make a difference in classroom inclusivity   **Outcome:** Participants develop a deeper understanding of gender-inclusive language, and critically review learning resources and assessments |
| Normalising failure, encouraging perseverance (5 mins) Slide 14 Purpose**:** Highlight the importance of normalising failure and encouraging perseverance. Although failure is a natural and necessary part of learning in informatics, girls often internalise mistakes as a lack of ability, which can discourage them from continuing. Encourage teachers to normalise trial and error, highlight debugging and problem-solving as essential skills, and praise perseverance. This helps build confidence and supports a more inclusive, growth-oriented classroom environment.  Key talking points:   * Girls and gender minorities often report lower confidence in informatics and STEM subjects. This can lead them to believe mistakes mean they "aren’t good at it"—a harmful, self-fulfilling mindset. In contrast, boys are more likely to attribute failure to effort or preparation, not ability. * However mistakes are not setbacks—they’re a natural and essential part of learning in informatics. Emphasise *trial and error* as a valid, valuable process in programming and system design. * Teachers can counter this by:   + Talking openly about failure as a step towards learning.   + Modelling a growth mindset: “We learn by doing, and sometimes by failing.”   + Encouraging persistence, not just correct answers.   + Highlighting that *debugging, revising, and problem-solving* are normal parts of the work.   + Helping all students, especially girls and gender minorities, to reframe mistakes as opportunities to grow. |
| Beyond the classroom: Encouraging engagement with informatics (5 min) Slide 15 Purpose**:** Discuss the importance of encouraging engagement with informatics outside the classroom.   * Extending learning beyond the classroom helps students see the real-world value of informatics. Encouraging participation in coding clubs, camps, or competitions—especially those aimed at girls and gender minorities —can build confidence and spark long-term interest. * Early exposure to coding or problem-solving games can lay the foundation for future engagement. Teachers can also boost interest by connecting informatics to real-world problems, like using AI in healthcare or environmental science. These examples help students, especially girls and gender minorities, see how tech can make a difference in areas they care about. * Bringing in diverse role models—guest speakers, alumni, or professionals—to share their experiences can help students visualise future paths in tech and feel a sense of belonging in the field.   Some positive examples include running programmes through [Girls who Code](https://girlswhocode.com/) or encouraging engagement with programmes such as the [Girls’ IT Bootcamp](https://www.ecb.europa.eu/ecb-and-you/youth-initiatives/girls_it_bootcamp/html/index.en.html). |
| Pedagogical Strategies: experiential learning, THINKERing and game-based approaches (30 min) Slide 16 Purpose**:** Introduce the three teaching strategies, highlighting how each of these strategies can help promote gender inclusion. Discuss how they relate to authentic learning.   1. **Experiential learning**  * Cyclical model of contact–interest–sustainability * Highlight the value of real-world, meaningful experiences * Example: A project where students build a weather app using local data  1. **THINKERing**    * Explain the open-ended, self-directed exploration approach    * Stress the importance of iteration and experimentation    * Example: Letting students explore a robotics kit without initial instructions 2. **Game-based learning**    * Describe how games promote high engagement, especially among girls and gender minorities    * Showcase both digital and analog examples    * Example: Students learning programming logic through a card-based puzzle game   **Activity 3: Gender-inclusive teaching strategies**   * Group work: divide the participants into groups, and assign each of the groups one of the three strategies. Provide the class with a traditional learning exercise. Each group will propose an alternative method for teaching this material using the allocated strategy. * Presentations: the groups will briefly present their lesson plans to the class. |
| Addressing gender discrimination in the classroom (25 min) Slide 17 Activity 4: Creating an inclusive classroom environment   1. Scenario analysis: Present some different classroom scenarios where gender bias or exclusion occurs. Eg. Scenario 1 (a boy dominates discussion in the classroom, while girls and gender minorities hesitate to participate), scenario 2 (a teacher unconsciously gives more technical feedback to a boy and more encouragement-based feedback to girls and gender minorities). Divide participants into different groups and assign them one scenario to review. Each group discusses what the issue is, how such a situation affects students and how they could change the situation to make it more inclusive. 2. Group discussion: Each group presents their analysis and proposed solutions. The facilitator highlights best practices for promoting gender-inclusive participation in informatics classrooms (e.g. structured turn-taking, balanced group roles, unbiased feedback strategies) 3. Action steps: Ask each educator to write down three concrete actions they will take to create a more inclusive classroom. Invite participants to share their commitments if they want to.   **Note**: depending on the preferences of the facilitator, this activity can be conducted as a role-play exercise instead. |
| Assessment | The assessment of this lesson may take place via discussions.  **Discussion**: Ask questions to assess participants’ understanding of gender-inclusive informatics   * Can you provide examples of gender bias you have observed in your classrooms? How do these biases impact students’ participation and performance? * What strategies can we use to ensure assessments are fair and inclusive? |

| KEY TAKEAWAYS | |
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| Reflection and Conclusion | Throughout this lesson, we explored the importance of gender-inclusive teaching and assessment in informatics education. We examined how gender biases can manifest in the classroom, learning materials, and assessments, and discussed strategies to create a more equitable and supportive learning environment. We learned to recognise common gender biases in Informatics education, such as underrepresentation in examples, unequal participation, and gendered assumptions in assessments. We explored how gender-inclusive language and diverse representations can foster a more equitable learning environment. Additionally, we examined strategies for designing fair and inclusive resources and assessments by eliminating biases and offering multiple problem-solving approaches. Practical classroom interventions, including structured turn-taking, balanced feedback, and scenario-based discussions, were also discussed to promote equal engagement among students. |
| Homework/ Additional Tasks | **Classroom observation & reflection**: Observe one of your own informatics lessons and take notes on student participation, feedback distribution and language use. After the lesson, reflect privately or with a partner on the gender dynamics in the classroom. Using what you learnt in this session, make a bullet point list with actions you could take to make your teaching more inclusive.  **Inclusive lesson plan development**: Design a mini lesson plan (15-20 min) on an informatics topic, ensuring gender-inclusive language, diverse examples, and fair assessment methods. Prepare a brief explanation of how the lesson promotes inclusivity. |