Fostering Innovations and Nurturing Diversity in STEM Education - FIND STEM –

2024-1-EL01-KA210-SCH-000249907

Continuous Professional Development Curriculum and Teacher Training

Module 6;
Assessment Strategies

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Module 6: Assessment Strategies

Description

Effective assessment is key to measuring pupil progress and engagement in STEM. This module covers interactive and real-life-oriented assessment methods, providing teachers with tools for evaluating learning outcomes and refining their teaching strategies through reflective practices.

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Key Topics

- Planning and executing interactive, real-life-oriented STEM lessons
- Assessing pupil learning and engagement in STEM subjects
- Reflective practices for teachers to evaluate and improve teaching strategies

General Learning Outcomes

Upon the completion of the module educators will:

- Design and implement interactive, real-life-oriented STEM assessments to measure pupil learning effectively.
- Develop formative and summative assessment techniques that promote continuous learning and improvement.
- Utilize alternative assessment methods, such as portfolios, presentations, and peer evaluations, to capture diverse pupil strengths.
- Apply reflective teaching practices to assess and improve STEM teaching strategies for better pupil outcomes.

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Activities

Activity 1: Integrating Alternative Methods into Formative and Summative STEM/STEAM Assessment	
This activity aims to deepen the understanding of formative and summative assessments, emphasizing alternative methods such as portfolios, presentations, and peer evaluations. The goal is to equip teachers with strategies that promote continuous learning and cater to diverse pupil strengths.	
Specific Learning Outcomes	Differentiate between formative and summative assessment techniques Design an integrated assessment strategy using alternative methods Explain how these techniques promote continuous learning
Teaching Methods and Approaches	Brief Interactive Lecture: Overview of formative vs. summative assessments Rapid Jigsaw Activity: Shortened expert group and home group phases
Duration	25 minutes
Delivery format	Face to face

Activity description

1. **Introduction to Formative and Summative Assessment**
   - Define formative and summative assessment.
   - Use a table to highlight the differences:

Feature	Formative Assessment	Summative Assessment
Purpose	Improve learning	Evaluate learning
Timing	During instruction	End of unit/term
Feedback	Immediate, guides improvement	Delayed, summarizes achievement
Impact on Grade	Low or no impact	High impact

   - Introduce alternative assessment methods: portfolios, presentations, peer evaluations.
     - ✓ **Portfolios:** Collections of pupil work showing progress over time.
     - ✓ **Presentations:** Pupils present their understanding of a topic.
     - ✓ **Peer Evaluations:** Pupils assess each other's work based on criteria.
2. **Jigsaw Activity Instructions**
   - ✓ Divide participants into three "expert" groups: Portfolios, Presentations, Peer Evaluations.
   - ✓ Each group discusses best practices and challenges of their assigned method.
   - ✓ Re-form groups with one member from each expert group.
   - ✓ Each group designs an integrated assessment strategy for a specific unit, incorporating at least one alternative method.
3. **Wrap-Up and Sharing**
   - ✓ Each group briefly shares their assessment strategy.

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✓ Highlight how alternative methods capture diverse pupil abilities.	
Assessment Methods	• Observation of participation. • Use of an assessment rubric for the designs. • Brief reflective journal entry.
Resources	Design templates
	Assessment rubric
	PowerPoint presentation

Activity 2: Integrating Technology in STEM/STEAM Assessments	
This activity emphasizes reflection to refine teaching and assessment methodologies. The goal is to encourage teachers to critically analyze their teaching practices and develop actionable plans for improvement.	
Specific Learning Outcomes	Brainstorm and redesign a traditional STEM/STEAM assessment using technology
	Consider how technology can provide more immediate and personalized feedback
	Explore ways technology can make assessments more engaging and interactive by thinking of educational games and tools that encourage collaboration
	Identify how technology can make assessments more accessible and inclusive, such as through audio responses or anonymous participation
	Determine how technology can assist in data collection and analysis to inform future instruction. Google Forms can be useful for collecting data in assessments
Teaching Methods and Approaches	Brief Interactive Lecture
	"Tech-Enhanced Assessment Makeover" interactive activity
Duration	35 minutes
Delivery format	Face to face
Activity description	
Participants will explore how technology can transform the way assessments are designed and delivered in STEM/STEAM education. Moving beyond traditional paper-based evaluations, this lesson introduces innovative, engaging, and data-driven approaches to gauge student understanding. The focus will be on leveraging technology not just as a content delivery tool, but as a strategic partner in identifying learning progress, misconceptions, and potential areas for growth. Educators will discover how digital platforms enable real-time feedback, foster inclusive participation, and personalize the assessment experience. Through hands-on examples and demonstrations, participants will examine tools such as Google Forms for efficient formative assessments, Plickers for immediate student feedback, and Nearpod for building interactive and participatory learning environments. The session will also address how digital assessment strategies can reduce bias, support collaborative learning, and enhance equity in the classroom. By the end of the lesson, educators will be equipped with practical tools and strategies to seamlessly integrate assessment into their STEM/STEAM instruction, making it a meaningful and constructive component of student learning.	

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<table>
<tr><td colspan="2">Interactive Activity: "Tech-Enhanced Assessment Makeover"
• Objective: Participants will brainstorm and redesign a traditional STEM/STEAM assessment using technology.
• Materials: Chart paper or whiteboard, markers, laptops/tablets (optional).
• Procedure:
1. Small Group Formation: Divide participants into small groups (3-4 teachers).
2. Traditional Assessment Identification: Each group identifies a traditional STEM/STEAM assessment they currently use (e.g., a worksheet, a lab report, a presentation).
3. Tech-Enhanced Redesign: Groups brainstorm ways to enhance this assessment using technology. Encourage them to consider:
▪ Formative Feedback: How can technology provide more immediate and personalized feedback?
▪ Engagement: How can technology make the assessment more engaging and interactive? Consider educational games and tools to encourage collaboration.
▪ Accessibility: How can technology make the assessment more accessible and inclusive (e.g., audio responses, anonymous participation)?
▪ Data Collection: How can technology help collect and analyze data to inform future instruction? Google Forms can be useful for collecting data in assessments1.
4. Sharing: Each group briefly shares their "Tech-Enhanced Assessment Makeover" with the larger group.</td></tr>
<tr><td>Assessment Methods</td><td>• Observation of Group Discussions
• Review of Redesigned Assessments (Creativity and Innovation – Practicality - Alignment to Learning Objectives – Inclusivity)
• Sharing and Feedback</td></tr>
<tr><td rowspan="4">Resources</td><td>Chart Paper or Whiteboard and Markers</td></tr>
<tr><td>Laptops/Tablets with Internet Access (Optional)</td></tr>
<tr><td>Google Forms Template (Optional)</td></tr>
<tr><td>Digital Education Tools Guide for Teachers and Students: https://www.nwea.org/blog/2024/75-digital-tools-apps-teachers-use-to-support-classroom-formative-assessment/</td></tr>
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Summary of key takeaways

- **Importance of Varied Assessment Types**: A key takeaway is the need to understand and implement different assessment types, including baseline, formative, and summative assessments.
- **Collaborative and Student-Created Assessments**: The module emphasizes the value of collaborative and student-created assessments to foster motivation and deeper understanding.
- **Blended Assessment Formats**: Utilizing both physical and online formats for exhibitions and presentations of learning is encouraged to cater to different learning styles and technological capabilities.
- **Assessment for Reflection**: Classroom assessment strategies should incorporate reflection to enhance teaching effectiveness.
- **Hands-on activities** Encouraging the use of hands-on activities to promote active learning and deeper content understanding is seen as vital for engaging students in STEM.

Opportunities for Further Professional Development:

- **Deeper Dive into Technology Integration**: Further professional development could focus on specific technology tools and platforms for assessment, such as Plickers, Google Forms, Nearpod, Flipgrid, Quizizz, and EdPuzzle 1. Training should emphasize practical applications and best practices for using these tools effectively.
- **Collaborative Assessment Design**: Workshops could be designed to guide teachers through the process of creating collaborative assessments that align with specific STEM/STEAM learning objectives.
- **Reflection Techniques:** Training on effective reflection techniques for both teachers and students would be beneficial, helping to improve teaching practices and promote self-assessment skills.
- **Explore STEM Outreach Center Resources:** Participating in professional developments by STEM Outreach Center to gain new knowledge and skills in the context of conceptual tools and roles as facilitators could prove beneficial. These opportunities often incorporate new and innovative ideas into the curricula.
- **Hands-on Learning**: Taking part in hands-on activities during professional development encourages teachers to implement similar activities in their classrooms1.

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- **Continuous Learning**: Professional development should be an ongoing activity to help teachers cope with technological changes and improve teaching practices

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