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Supplementary Material. Questionnaire Items

The questionnaire was administered in English and Arabic; the items used in the analysis are given here in English, with the corresponding Arabic version alongside. All items were rated on a five-point frequency scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always). The inquiry-based facilitation items and item DRPA1 are written as classroom scenarios, each followed by the teacher's typical response.

مقياس الاستجابة (تكرار الممارسة): 1 = أبدًا، 2 = نادرًا، 3 = أحيانًا، 4 = غالبًا، 5 = دائمًا.

Table S1. Reflective intelligence (RI) items.

Code	Item (English)	النسخة العربية
RI1	After each STEM activity, I think about the extent to which it has achieved the learning objectives.	بعد كل نشاط STEM، أفكر في مدى تحقيقه لأهداف التعلم.
RI2	I reconsider my teaching methods when I notice a weak response from the children.	أُعيد النظر في طرقي التدريسية عندما ألاحظ ضعف استجابة الأطفال.
RI3	I keep notes about my activities so that I can learn from them later.	أحتفظ بملاحظات حول أنشطتي لأتعلم منها لاحقًا.
RI4	I discuss with my colleagues what worked and what did not work in my lessons.	أشارك زميلاتي في مناقشة ما نجح وما لم ينجح في دروسي.
RI5	I notice how my questions affect the children's level of thinking.	ألاحظ كيف تؤثر أسئلتي على مستوى تفكير الأطفال.
RI6	I am able to identify my mistakes in managing the activity and learn from them.	أستطيع اكتشاف أخطائي في إدارة النشاط وأتعلم منها.
RI7	I deliberately vary my methods of teaching the same concept based on my previous experience.	أتعمد تنويع طرقي لتعليم المفهوم الواحد بناءً على خبرتي السابقة.
RI8	Reflecting on my lessons helps me better understand the children's needs.	التأمل في دروسي يجعلني أكثر فهمًا لاحتياجات الأطفال.
RI9	I set aside time after the activity to evaluate my teaching performance.	أخصص وقتًا بعد النشاط لتقييم أدائي التربوي.

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Table S2. Inquiry-based pedagogical facilitation (IBPF) items.

Code	Item (English; situation followed by the teacher's response)	النسخة العربية
IBPF1	The children noticed that the colors of the tree leaves changed in autumn and asked about the reason. I encourage them to observe different leaves, compare them, and experiment with exposing them to light to see its effect.	لاحظ الأطفال أن ألوان أوراق الشجر تغيّرت في الخريف، وسألوا عن السبب. أشجعهم على ملاحظة أوراق مختلفة، ومقارنتها، وتجريب تعريضها للضوء لمعرفة أثره.
IBPF2	While the children are using tablets to draw shapes, the application suddenly stops. I ask, "What can we do to solve the problem?" and give them the opportunity to suggest solutions.	أثناء استخدام الأطفال للأجهزة اللوحية لرسم الأشكال، توقف التطبيق فجأة. أطرح سؤالًا: «ما الذي يمكننا فعله لحل المشكلة؟» وأتيح لهم اقتراح الحلول.
IBPF3	The children wanted to build a small tunnel for toy cars using cardboard pieces. I guide them to try more than one design to find out which one allows the cars to pass through most easily.	أراد الأطفال بناء نفق صغير لسيارات اللعب باستخدام قطع الكرتون. أوجّههم لتجريب أكثر من تصميم لمعرفة أيها يسمح بمرور السيارات بسهولة.

Table S3. Diagnostic reasoning and pedagogical adaptation (DRPA) items.

Code	Item (English)	النسخة العربية

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DRPA1	While counting, some children mix up the order of the numbers. I use counting with toys or songs and ask them to arrange the numbers themselves so they can correct their understanding of the concept.	أثناء العدّ، يخلط بعض الأطفال بين ترتيب الأعداد. أستخدم العدّ بالألعاب أو الأغاني وأطلب منهم ترتيب الأعداد بأنفسهم حتى يصحّحوا المفهوم.
DRPA2	I notice the children's cues that indicate a misunderstanding of the scientific concept.	ألاحظ إشارات الأطفال التي تدل على سوء فهم المفهوم العلمي.
DRPA3	I ask questions that help me discover how children think.	أطرح أسئلة تساعدني على اكتشاف كيف يفكر الأطفال.
DRPA4	I change my way of explaining when I notice a misunderstanding.	أغيّر أسلوبي في الشرح عند ملاحظتي سوء الفهم.
DRPA5	I use children's mistakes as opportunities for learning, not for punishment.	أستخدم أخطاء الأطفال كفرص للتعلم وليس للعقاب.
DRPA6	I record examples of children's explanations in order to analyze them later.	أدوّن أمثلة من تفسيرات الأطفال لتحليلها لاحقًا.
DRPA7	I anticipate misconceptions before presenting the new concept.	أتوقع المفاهيم الخاطئة قبل تقديم المفهوم الجديد.
DRPA8	I prepare additional activities to correct misunderstandings.	أُعِدّ أنشطة إضافية لتصحيح الفهم الخاطئ.

Table S4. Relationship between the initial draft items and the final diagnostic reasoning and pedagogical adaptation (DRPA) items.

Draft position → final code	**Item (initial draft, English)**	**Status**
1 → DRPA1	While counting, some children mix up the order of the numbers. I use counting with toys or songs and ask them to arrange the numbers themselves so they can correct their understanding of the concept.	Retained unchanged (see Table A3).
2 → DRPA2	I notice the children's cues that indicate a misunderstanding of the scientific concept.	Retained unchanged (see Table A3).
3 → DRPA3	I ask questions that help me discover how children think.	Retained unchanged (see Table A3).
4 → DRPA4	I change my way of explaining when I notice a misunderstanding.	Retained unchanged (see Table A3).
5 → DRPA5	I use children's mistakes as opportunities for learning, not for punishment.	Retained unchanged (see Table A3).
6 → DRPA6	I record examples of children's explanations in order to analyze them later.	Retained unchanged (see Table A3).
7 → DRPA7	I anticipate misconceptions before presenting the new concept.	Retained unchanged (see Table A3).
8 → DRPA8	I prepare additional activities to correct misunderstandings.	Retained unchanged (see Table A3).
9 → –	I compare children's thinking with scientific concepts in order to adjust my teaching.	Removed before expert review: overlapped in content with other items such as item 4 (adjusting explanations after noticing a misunderstanding) and item 2 (noticing cues of misunderstanding). Not administered.
10 → –	I consider diagnostic thinking an essential part of my daily work.	Removed before expert review: stated an attitude, not a frequency of practice. Not administered.

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