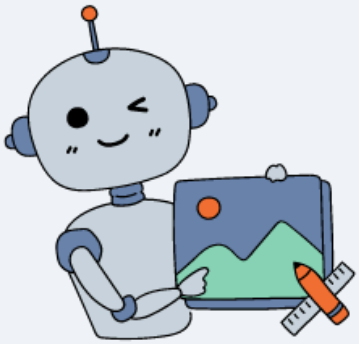
SmartStart Newsletter

Latest news from the SmartStart Teacher Academy



smart start

ERASMUS+

Teacher Academy

Project Event

SmartStart Midterm Conference

Our upcoming Midterm Conference marks an important milestone as we reach the halfway point of the project. It will be a great opportunity to meet in person, exchange experiences, and discuss our progress. The conference will focus on partner updates, the current status of all SmartStart work packages, key achievements, challenges, and the next steps as we continue working together towards our project goals.

October 7–9 | Eichstätt, Germany

Hosted by: Catholic University of Eichstätt-Ingolstadt

Venue: KU Eichstätt-Ingolstadt, Sommerresidenz / "Old Main," Ostenstraße 26, 85072 Eichstätt, Germany

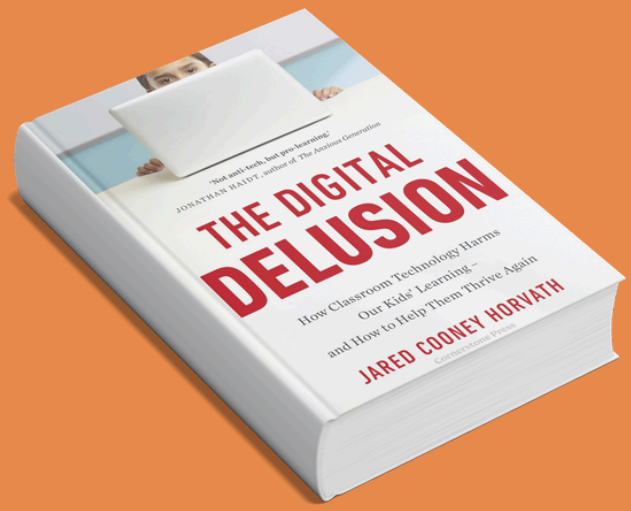
On our reading list

The Digital Delusion
by Jared Cooney Horvath

★★★★★

A thought-provoking take on digital technologies in education that sparks important discussions about the role of AI in the classroom. Worth reading — even if you don't agree with every conclusion.

The SmartStart Team



https://m.media-amazon.com/images/I/71o2CXX+NfL._SL1500_.jpg

Contact the Project Office
Katholische Universität Eichstätt-Ingolstadt
(Ostenstr. 26)
Temporary address: Hofgarten 1
85072 Eichstätt
Germany

We are social!

Literature Review

Designing Learning Objectives for Young Learners in the Age of AI: Five Frameworks Every Educator Should Know

Laila Khalil

Today, the research trend is about helping educators make sense of fast-moving technology. But recently, some questions kept coming up from teachers and parents alike: *How do we design learning objectives for young learners that go beyond just "using AI"? How do we prepare the young generations to have the skills they need to cope with the future AI integration that is already reshaping both education and the job market?*

I think most of us working in education can feel the gravity of these questions. SmartStart Academy is going to deliver a program that will equip teachers with the necessary skills to implement AI in education, taking into consideration all the questions that may arise. The good news is that we do not need to invent answers from scratch.

Generative AI, when paired with cognitive frameworks like Bloom's Taxonomy and Webb's Depth of Knowledge, emotional frameworks like CASEL, and technology-integration models like SAMR, can actually push learning deeper rather than shallower. Below are five frameworks that I believe every educator designing AI-integrated lessons should have in their back pocket.

1. Bloom's Taxonomy:

Developed by Benjamin Bloom and colleagues in 1956, this framework categorized educational objectives into six cognitive levels: knowledge, comprehension, application, analysis, synthesis, and evaluation (Chan & Wilson, 2020). In 2001, Anderson and Krathwohl revised the framework into the form most of us use today: remembering, understanding, applying, analyzing, evaluating, and creating.

Bloom's taxonomy provides an excellent mechanism that is verb-driven, meaning when instructors design an objective, they can immediately tell whether they are asking students to *remember* a fact or to *create* something from scratch (Anderson & Krathowohl, 2021). This makes it inherently actionable for lesson planning.

For example, here is how Bloom's taxonomy plays out in an AI-integrated classroom:

- Remembering: The instructor can present a list of the planets in the solar system, and students ask AI to generate a short description of each planet along with a picture. Teachers can divide a class in groups and ask each group to talk about a planet.
- Understanding: Students read an AI-generated summary of a fable or a story, and rephrase it in their own words.

Contact the Project Office
Katholische Universität Eichstätt-Ingolstadt
(Ostenstr. 26)
Temporary address: Hofgarten 1
85072 Eichstätt
Germany

- Applying: Students use an AI calculator or word-solver to complete a math or spelling problem (Masharipova, 2024).
- Analyzing: Students use AI to break down the components of an ecosystem and identify which parts the AI got wrong (Shen et al., 2024).
- Evaluating: Students prompt an AI for two solutions to a sustainability problem and judge which is more realistic (Alamäki et al., 2024).
- Creating: Primary students collaborate with AI to draft, illustrate, and publish an original digital storybook (Masharipova, 2024).

Recent research by Alamäki et al. (2024) used the revised Bloom's Taxonomy as the backbone of an AI literacy model for sustainable development, showing that the framework is still doing real work in AI-era education rather than being a dusty artifact from another time (Alamäki et al., 2024).

2. Webb's Depth of Knowledge: Beyond "Define and List"

Created by Norman Webb in 1997, the Depth of Knowledge framework focuses not on what verb a teacher uses in an objective, but on how deeply students must think to complete a task (Bechard et al., 2021). Bloom's taxonomy asks "what is the student doing?" while DOK asks "how cognitively demanding is the task itself?" This nuance is highlighted here.

DOK has four levels worth keeping in mind:

- Level 1 — Recall and Reproduction: Students define a word or list ideas (Bechard et al, 2021).
- Level 2 — Skills and Concepts: Students explain relationships or summarize information (Bechard et al, 2021, Masharipova, 2024).
- Level 3 — Strategic Thinking: Students critique, analyze, or solve non-routine problems (Hess et al., 2009).
- Level 4 — Extended Thinking: Students synthesize information across time and contexts to design original solutions (Hess et al., 2009; Masharipova, 2024).

The research by Hess, Jones, and colleagues in 2009 superposed Bloom's Taxonomy onto Webb's DOK, producing the Cognitive Rigor Matrix that has become a practical tool for lesson planning (Hess et al., 2009). More recently, Masharipova argued that integrating both taxonomies offers a strong strategy for designing lessons that fosters critical thinking and adaptability (Masharipova, 2024). I think this is exactly what we need when designing AI-integrated objectives for young learners: Bloom's tells you the verb, and DOK tells you the *struggle*.

3. CASEL: Keeping the Human at the Center

The Collaborative for Academic, Social, and Emotional Learning framework ensures that when AI enters the class-room, the human element does not get

Contact the Project Office
Katholische Universität Eichstätt-Ingolstadt
(Ostenstr. 26)
Temporary address: Hofgarten 1
85072 Eichstätt
Germany

pushed to the side (Mondi et al., 2021; Payton., 2000). CASEL identifies five interrelated core competencies:

- Self-Awareness: Helping young learners recognize their own frustration when an AI tool gives them an unexpected answer
- Self-Management: Setting time limits and managing impulses when using highly engaging, gamified AI platforms (Chen & Adams, 2022)
- Social Awareness: Understanding how AI's impact varies globally and practicing digital empathy
- Relationship Skills: Learning to collaborate with peers to solve a problem, rather than isolating themselves with an AI assistant
- Responsible Decision-Making: Developing digital citizenship by evaluating the safety and fairness of AI-generated content (Mondi et al., 2021)

CASEL school-based SEL programs work best when they are coordinated with larger systems, supported by educator preparation, and built into the curriculum rather than bolted on as an afterthought (Payton et al., 2000). With AI now embedded in everything from search engines to tutoring apps, weaving SEL into AI objectives is not optional; it is essential, and it is something I have explored in earlier work on emotional intelligence and resilience during crises.

4. SAMR: Asking How Deeply Technology Transforms Learning

The SAMR model, developed by Dr. Ruben Puentedura in 2006, evaluates how technology transforms a lesson and has become one of the most widely adopted frameworks in teacher education (Falloon, 2020). SAMR stands for:

- Substitution: AI acts as a direct tool substitute with no functional change (e.g., typing a spelling list into a chatbot instead of paper).
- Augmentation: AI adds functional improvement (e.g., using AI to read text aloud with real-time definitions for struggling readers).
- Modification: AI significantly redesigns the task (e.g., students use an AI image generator to visualize a scene, then rewrite their paragraph).
- Redefinition: AI allows for new tasks previously inconceivable (e.g., a class uses a safe AI simulator to "interview" a historical figure for research).

Contact the Project Office
Katholische Universität Eichstätt-Ingolstadt
(Ostenstr. 26)
Temporary address: Hofgarten 1
85072 Eichstätt
Germany

SAMR, in my opinion, pushes us past "Did we use the tech?" toward the far more interesting question "Did the tech change what students can actually do?" As Romrell and colleagues showed in 2014, true transformational use of technology creates learning activities that are personalized, situated, and connected (Romrell et al., 2014), and Falloon's 2020 review confirmed that SAMR has become a pragmatic guide for teachers worldwide (Fallon, 2020).

5. TPACK and the 4Cs: Two Frameworks Worth Pairing

TPACK or Technological Pedagogical Content Knowledge, developed by Mishra and Koehler in 2006, helps teachers design objectives at the precise intersection of what they teach, how they teach, and which AI tools they use (Prazeres & Pina, 2024; Yue et al. 2024). With the emergence of AI websites, researchers have proposed extended versions like Intelligent TPACK, which adds ethics as a core component to help teachers navigate AI-driven disputes (Park et al., 2023).

The 4Cs of 21st-Century Learning highlight exactly the human skills that AI cannot replicate: Critical thinking, Communication, Collaboration, and Creativity (Thornhill-Miller et al., 2023). Thornhill-Miller and colleagues argued in 2023 that these soft skills are becoming the defining currency of the future workforce and proposed systemic ways to assess them at the institutional level (Thornhill-Miller et al., 2023). When designing AI objectives, the 4Cs serve as a built-in safeguard against the risk of children becoming passive screen consumers.

A Quick Comparison Matrix

Framework	Primary Focus	AI Co-Creation Role
1. Bloom's Taxonomy	Cognitive verbs (Remember → Create)	Pair each verb with an AI-supported task to push students up the ladder.
2. DOK	Cognitive depth and problem-solving rigor	Move from AI-assisted recall to AI-partnered synthesis (Masharipova, 2024).
3. CASEL	Emotional intelligence and digital ethics	Keep the human—safety, self-regulation, empathy—at the center (Chen & Adams, 2022).
4. SAMR	Level of technology integration	Move past basic typing toward genuine tech transformation (Fallon, 2020).
5. TPACK + 4Cs	Teacher knowledge and 21st-century skills	Sit at the intersection of content, pedagogy, and technology while protecting the human skills AI cannot replicate (Prazeres & Pina, 2024).

The temptation to treat AI as a magical content-delivery device is real. However, as the research keeps telling us, the magic lies not in the tool itself, but in how we design the learning around it. Combining Bloom's, DOK, CASEL, SAMR, and the supporting scaffolds of TPACK and the 4Cs ensures that children leave our class-

Contact the Project Office
Katholische Universität Eichstätt-Ingolstadt
(Ostenstr. 26)
Temporary address: Hofgarten 1
85072 Eichstätt
Germany

room not just having "used AI," but also having thought more deeply, regulated their emotions more skillfully, collaborated more meaningfully, and created more originally than they could have done without it.

References

Alamäki, A., Nyberg, C., Kimberley, A., & Salonen, A. O. (2024). Artificial intelligence literacy in sustainable development: A learning experiment in higher education. *Frontiers in Education*, *9*, 1343406.

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives*. Addison Wesley Longman.

Bechard, S., Karvonen, M., & Erickson, K. A. (2021). Opportunities and Challenges of Applying Cognitive Process Dimensions to Map-Based Learning and Alternate Assessment. *Frontiers in Education, 6*, 653693.

Chan, C. C. B., & Wilson, O. (2020). Using Chakowa's Digitally Enhanced Learning Model to Adapt Face-to-face EAP Materials for Online Teaching and Learning. *International Journal of TESOL Studies, 2*(1), 93-98.

Chen, J. J., & Adams, C. B. (2022). Drawing from and Expanding their Toolboxes: Preschool Teachers' Traditional Strategies, Unconventional Opportunities, and Novel Challenges in Scaffolding Young Children's Social and Emotional Learning During Remote Instruction Amidst COVID-19. *Early Childhood Education Journal, 51*(5), 925–937.

Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Educational Technology Research and Development, 68*(5), 2449–2472.

Hess, K., Jones, B. S., Carlock, D., & Walkup, J. R. (2009). Cognitive Rigor: Blending the Strengths of Bloom's Taxonomy and Webb's Depth of Knowledge to Enhance Classroom-Level Processes. *SHAREOK (University of Oklahoma; Oklahoma State University; Central Oklahoma University).*

Masharipova, F. (2024). From Bloom's Taxonomy into Webb's Depth of Knowledge: Enhancing Lesson Planning Strategies. *Emergent Journal of Educational Discoveries and Lifelong Learning (EJEDL), 3*(4), 10–10.

Mondi, C. F., Giovanelli, A., & Reynolds, A. J. (2021). Fostering socio-emotional learning through early childhood intervention. *International Journal of Child Care and Education Policy/International Journal of Child Care and Education, 15*(1).

Payton, J., Wardlaw, D. M., Graczyk, P. A., Bloodworth, M., Tompsett, C. J., & Weissberg, R. P. (2000). Social and Emotional Learning: A Framework for Promoting Mental Health and Reducing Risk Behavior in Children and Youth. *Journal of School Health, 70*(5), 179–185.

Prazeres, F. G., & Pina, A. J. da S. (2024). AI integrated learning for higher education. Social Science Educators. *DergiPark (Istanbul University).*

Romrell, D., Kidder, L. C., & Wood, E. R. (2014). The SAMR Model as a framework for evaluating mLearning. *Online Learning, 18*(2).

Shen, C., He, P., Song, Z., & Zhang, Y. (2024). Cognitive disparity in online rumor perception: a group analysis during COVID-19. *BMC Public Health, 24*(1), 3049–3049.

Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J., Morisseau, T., Bourgeois-Bougrine, S., Vinchon, F., Hayek, S. E., Augereau-Landais, M., Mourey, F., Feybesse, C., Sundquist, D., & Lubart, T. (2023). Creativity, Critical thinking, Communication, and Collaboration: Assessment, certification, and promotion of 21st century skills for the future of work and education. *Journal of Intelligence, 11*(3), 54–54.

Yue, M., Jong, M. S., & Ng, D. T. K. (2024). Understanding K–12 teachers' technological pedagogical content knowledge readiness and attitudes toward artificial intelligence education. *Education and Information Technologies, 29*(15), 19505–19536.

Contact the Project Office
Katholische Universität Eichstätt-Ingolstadt
(Ostenstr. 26)
Temporary address: Hofgarten 1
85072 Eichstätt
Germany