Course of Mind

Product Evaluation Guide

DIGITAL CURRICULUM

COURSE OF MIND

ISTE

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Introduction

How do you distinguish between edtech products that are built well vs. those that are not? Which products are built in a way that naturally aligns with how people learn best?

These questions are foundational in the edtech selection and buying process, and the need for valid, reliable methods of product assessment are universal across educational organizations at all levels.

Through Course of Mind, ISTE continues to help educators and leaders across the country find well-built digital products and see the best learning impacts. This evaluation tool is one resource to aid teachers and edtech decision makers in finding those "best" products.

About Course of Mind

Course of Mind is an evidence-based initiative that is transforming the educational landscape by leveraging learning sciences and educational technology hand-in-hand. Through the translation of proven learning science findings into practical strategies for both the classroom and edtech selection, Course of Mind continues to help educators optimize instructional time, and decision-makers approve the very best digital products for teachers and students.

About ISTE

ISTE inspires educators worldwide to use technology to innovate teaching and learning, accelerate good practice and solve tough problems in education by providing community, knowledge and the ISTE Standards, a framework for rethinking education and empowering learners.

Who is this guide for, and what does it do?

This product evaluation guide is designed to help school district leaders, administrators, and instructional technology specialists make decisions about edtech purchasing by providing a framework you can use to evaluate educational technology products against product design benchmarks that are based on current learning sciences research. In other words, this guide helps educational practitioners determine the degree to which an edtech product aligns with how we know humans learn best. Note that there are separate guides for each of three product types: digital curriculum products, formative assessment products, and learning management system (LMS) products. Make sure to review the guide that is designed for the type of product you're interested in reviewing because the evaluation criteria will differ by product type.

This evaluation guide includes four parts:

1. **Introduction** = Describes what's in the guide.
2. **Scoring instructions** = How to use the guide to score a product.
3. **Indicators** = A set of criteria that describe the essential features of a product based on the learning sciences. These indicators are what you'll evaluate a product against.
4. **Scoring sheet** = A sheet you can use to evaluate a product. You'll probably want to print several copies of just that sheet, and look at the completed example to get an idea of how to use the scoring sheet.

As you explore a trial version or sandbox account for a new product, score it against each indicator. When you're done scoring, you'll have a clear picture of how well the product's build and features align to rigorous, research-based practices about how people learn most effectively. You can then compare your ratings with those of colleagues to see where you agreed or disagreed, and use your ratings to guide conversations with product providers in ways that help you ensure that you get down to the most essential questions about a product's build and fit for the teachers and students in your schools.

What are the learning sciences?

The learning sciences make up an interdisciplinary field of research with the common goal of studying and understanding how people learn, and how to apply this understanding to the design and evaluation of learning experiences. Key fields that contribute to the learning sciences include cognitive psychology, educational psychology, human development, linguistics and social psychology. Knowledge from multiple fields helps us understand learning as an interaction between learners and their environment including peers, teachers, learning materials, and instructional products.

Other terminology that will be helpful in using this guide includes:

- **Product:** An educational technology (edtech) application that can be purchased by an educational organization or individual. Digital curriculum products provide content as well as other functionality (such as interactive activities). Digital curriculum products are distinguished from "platforms" that provide functionality but entirely lack content.
- **Content:** The information the product provides. Content can be any format or media type such as text, images, audio, simulation, or video. Digital curriculum products present informational content to learners while platforms do not.
- **Activities:** The assessments and/or interactive elements requiring student response and interaction. Distinguished from "content" here, although edtech curriculum products often quickly switch between or intertwine content and activities.
- **Digital curriculum products:** Products that provide content (usually academic instruction) as well as other functionality (such as activities). These curriculum products are distinguished from "platforms" that provide functionality but entirely lack content. If students are exploring a new topic with technology, they are probably using a digital curriculum product.
- **Platform products:** A type of educational technology product that does not include content. Instead, platforms only include functionality features. Examples of "platforms" include learning management systems, student information systems, and assessment applications that entirely rely on teachers (or other instructional support people) to input content.
- **Formative assessment product:** A formative assessment product is an edtech product that helps teachers create, distribute, and review interactive experiences to understand what learners know and don't yet know; commonly thought of as a "quiz."
- **Learning Management System:** Also known as an LMS, a learning management system is a product used to manage the creation, administration, delivery, and reporting of educational courses.

Scoring Instructions

This evaluation guide includes a scoring sheet that can be used as a worksheet to evaluate or "rate" an edtech product as you explore a trial version, sandbox account, or even watch a demo video. **Here's how to use it:**

1. **Print the scoring sheet.** Print the scoring sheet included in this guide and keep it in front of you while you review the product. You may also want to print this entire guide, as it contains important details about each indicator for the product - it may be helpful to have those in front of you "on paper" as you explore a product.

2. **Select a product sample.** Decide WHAT in the product you're going to look at in order to evaluate it. If you're working with colleagues who will all score the product, make sure that everyone is looking at the SAME PRODUCT PAGES so that you're all scoring the same product sample. If different people are looking at different pages, you won't know if your product evaluations (i.e. scores) should be lining up with each other or not because you will have looked at different parts of the product.

3. **Score the product.** On your scoring sheet, write in the name of the product and your name, then use the scoring sheet to evaluate the product sample based on your best understanding of the criteria. To what degree does the product meet each indicator? Place an "X" on the "Rating" line to indicate the degree to which the product sample meets expectations set forth by the criteria.

   a. The central vertical line represents "meets minimal expectations" for the indicator, so mark an "X" on that line if the product generally meets your expectations based on the indicator description. Marking anywhere to the left of the central line indicates that the product does not meet the expectations articulated by the criteria. Marking anywhere to the right of the central line indicates that the product exceeds the minimally "adequate" expectations you see for any indicator.

   b. The "absence" and "exemplar" descriptions in this guide describe what to look for when you're scoring the product. If the product meets most of the "look fors" described in the exemplar, then assign it a score of meets expectations. If the product does an exceptional job with most or all of the look fors listed in an exemplar, assign the product a score of exceeds expectations, marking to the right of the central line.

   c. Don't be shy about assigning a rating of "does not meet" if you don't see evidence that the product is meeting expectations for that indicator. There might be a tendency for you to think, "Oh, I guess this is good enough." But if you don't see evidence that the product is meeting the expectations set forth in the indicator, mark to the left of the vertical line, assigning a rating of does not meet expectations.

d. Scoring is necessarily subjective. Your goal is not to "score it perfectly" but rather, take a close look at the product, evaluate the product, and compare your ratings with those of your colleagues so that, as a team, you come to a rigorous conclusion about the product's quality. So, your scoring doesn't have to be "perfect" but, instead, informative.

4. **Summarize your assessment.** Once you're done assigning ratings for each indicator, assign a score of -1 for each row (indicator) where the product does not meet expectations, 0 for meets expectations, and +1 for exceeds expectations. Enter those scores in the boxes on the far right, and sum them. A total score of less than 0 may indicate that the product isn't built very well. In addition to the numerical scores, you may want to get a better sense of the product's profile by connecting your rating X's with lines and shading the area to the left of the connected line. This "jagged profile" can be a nice way to visualize where the product is strong, and where it's weaker. See the (fictional) scoring sample provided at the end of this guide to get a sense of what that should look like.

5. **Talk about it!** Once your product assessment is done, use your results to inform conversations with colleagues and companies! Talk with other educators and leaders at your school or district about how they scored the product. You may even want to try sitting down and scoring a product at the same time in the same room. Scoring the product may raise questions for you that are worth asking a product provider - and this way you can be confident that your questions are grounded in proven research about how people learn. This can really take conversations with providers up to the next level!

Focused Delivery

DEFINITION: The content is formatted in a way that keeps students focused on the lesson's objectives, including limiting extraneous or redundant information.

DESCRIPTION: Primary objectives are clearly previewed and referenced during the lesson. Content is scaffolded in a way that provides all learners with an entry point, even if the material is complex. Lessons should not contain excessive detail that distracts from primary objectives, such as intricate examples or seductive detail.

PURPOSE: Humans can only focus on one stimulus at a time. Extra information (presented visually or through text) that is not directly aligned with the learning objectives can be distracting and impair learning, as such distracting information increases cognitive load (as if the student were task-switching). While humor or storytelling can be effective to guide students' attention, it must not distract from the primary learning objectives. The more complex the material, the more focused, sequential, and scaffolded the information should be revealed. (Weinstein et al, 2019)

Absence: Lessons lack clear learning objectives, have multiple competing objectives, or include sections that are misaligned with the objectives. Complex material is overwhelming and not presented in ways that scaffolds learning. Images, stories, or formatting features distract from the primary learning objectives and content.

Exemplar: Lessons are almost always focused on one or two learning objectives. Complex material is scaffolded in a way that helps students understand what is most important to know at first, and how to learn more. Lessons use humor and storytelling minimally to enhance or guide learning. No distracting information is presented.

Content Alignment

DEFINITION: Curriculum clearly demonstrates alignment of learning objectives with standards, content, activities, and assessments.

DESCRIPTION: Good digital curriculum should clearly outline alignment of lesson learning objectives with state educational standards and lesson content including key vocabulary, activities, and assessments.

PURPOSE: Delivering learning experiences with tools that are well-aligned (logical, consistent, united towards a whole) is critical for reducing unnecessary cognitive burdens. With multiple digital and print curriculum programs in a school, school leaders and teachers own this alignment for students. When this burden is placed solely on the teacher, it can be overwhelming and impossible without the right set of tools. Good digital curriculum should outline this alignment for teachers and students.

Absence: Curriculum does not cite national or state standards, or finding such alignment between standards and the lessons is difficult or clunky. Reporting on student progress or use is not presented in terms of standards or skills. Key terminology used in the curriculum is different from terminology used in approved standards or across the discipline.

Exemplar: Curriculum uses the specific skill standards required by teachers to organize lesson searching, planning, and student reporting. Most terminology is similar to what is used in other curricula in the discipline or in related standards. Content and assessments clearly align to learning objectives.

Chunking

DEFINITION: The content is previewed and organized into age-appropriate, attainable chunks with milestones.

DESCRIPTION: The main ideas of the lesson are previewed so that students know what to expect and where to focus their attention. Lessons are delivered in reasonably sized segments (i.e. "chunks"), so students are not overwhelmed by too much content at once and, thus, can more efficiently direct their attention and efforts.

PURPOSE: Attention is a limited resource and students have different capacities for processing information as they age and gain knowledge. When material is broken into attainable chunks, students have the opportunity to build their self-regulation skills and focus their attention to learn (Weinstein et al, 2019). The main ideas of the lesson should be previewed before the student engages with the content so they are primed and know what to attend to (Clark & Mayer, 2016). Multimedia lessons should be user-paced and delivered in reasonably-sized segments, so a student is not overwhelmed by too much content at once and can efficiently direct their attention while engaging with the material (Clark & Mayer, 2016). Finally, when students and teachers achieve meaningful milestones, it fuels their sense of competency and increases intrinsic motivation for learning (Ryan & Deci, 2000).

Absence: Multimedia content is fixed and can only be accessed in long chunks (all at once). There is no preview of the lesson for students before they start. It is unclear how long a lesson will take. The work lacks milestones.

Exemplar: Multimedia content is broken up into relatively short "chunks" that include clear milestones that show students how far they have come through a lesson. There is a succinct, clear preview of the material, including an introduction to key words and concepts in the lesson, as well as an estimate of how long the lesson will take.

Effortful practice

DEFINITION: Curriculum design supports students' effortful practice to improve learning, including spaced practice, interleaving, and active retrieval activities.

DESCRIPTION: Learning new things requires effort, and good curriculum design directs students' effort in ways that helps them remember information better. Students learn best when learning activities about a topic are plentiful, spaced out, interleaved (i.e. mixed in with other topics), and require regular recall of what they already know. Spiraling - wherein learners return back to topics over time - accomplishes a similar effect.

PURPOSE: Learning new things requires effort, and oftentimes that extra effort can help us remember information better. That effort is maximized when it is distributed (spaced out), interleaved (features a mixed up, variety of related tasks), and requires active retrieval efforts (bringing to conscious mind what is known). Together, these practices optimize cognitive effort to enhance learning (Agarwal & Bain, 2019).

Absence: Lessons present new content with minimal opportunity for students to explore it and test their knowledge. Opportunities to practice with the content are not spaced out (so there is just one learning episode for a topic). Content from other lessons is never mixed in (interleaved) with new content. Students are not asked to recall what they know or remember about a topic.

Exemplar: Material is organized so students must apply effort to solve problems before answers are provided to them. Learning activities related to a topic are spaced out - over days, weeks, or even months - and interleaved with content from other lessons. Students are regularly asked to recall what they know or remember about a topic.

Pace and Place

DEFINITION: Curriculum design helps students and educators understand where they are in the curriculum/lesson and allows them to control how they move through it.

DESCRIPTION: The curriculum should offer students and teachers a clear sense of where they are within and across lessons (place). This may also be known as "signposting." Curriculum design also enables students to move more quickly or slowly, or even skip around, in order to control their engagement with content (pace), and easily return to a place where they left off previously.

PURPOSE: Within or outside of a single lesson, students and teachers can get overwhelmed when they do not know what they have completed, what they have left to do, or what is next. A digital platform with poor navigational features can deplete students' limited cognitive resources and leave less attention and time for skill building. Features that make the pace and place of learning clear build student and teacher agency, increase engagement, save time, and boost the opportunity for effective learning (Deci & Ryan, 2002).

Absence: It is difficult for students and teachers to understand what they have completed, what they have left to do, and where they are on their learning journey. Navigation through the digital material is clunky, confusing, or changes across the platform. Students cannot easily determine what they should do next or how the given options would help them meet their goals. They cannot control how quickly they move through the material, revisit old material as needed, or return to material they were working on recently.

Exemplar: Students can quickly and easily figure out what they have completed, what they have left to do, and where they are on their learning journey. Navigation through the digital material is smooth and clear, and students can get where they want to go (as is appropriate) with little or no help, including moving through content quickly or revisiting old content. Features help students know what to do next, and it's usually clear how those activities will help them meet their goals. Students can easily return to material they were working on recently.

Accurate Graphics

DEFINITION: Graphics are relevant, informative, accurate, and do not promote cultural stereotypes.

DESCRIPTION: People learn better from words and pictures than from words alone when the graphics used are accurate, relevant, informative, and culturally appropriate.

PURPOSE: Presenting information using relevant and accurate graphics as well as verbal elements (speech or text) can help reduce the overall extraneous cognitive load, increase the number of retrieval paths, and support deeper processing and encoding (Paivio, 1971, 1991). In short, people learn better from words and pictures than from words alone (Clark & Mayer, 2016).

Absence: There are no graphics, only written text or audible narrative throughout the lesson. If graphics are present, they are confusing, irrelevant, or promote stereotypes. Graphics fail to highlight key learning objectives, and/or provide distracting details.

Exemplar: The lesson includes graphics that directly relate to the lesson, add information to what is being learned, and are accurate in their depictions. Graphics effectively highlight (and never distract from) key learning objectives. Graphics feature equitable and inclusive examples by race, gender, and other demographic and cultural characteristics.

Verbal-visual Alignment

DEFINITION: Graphics are accompanied by written text or, better yet, audible narration. Where written text is displayed on screen, it appears close to corresponding images in both space and time.

DESCRIPTION: People learn better from words and pictures than from words alone when the graphics and verbal/text information appear close together spatially and at the same time.

PURPOSE: Graphics are more effectively explained by audible, rather than written, descriptions (Clark & Mayer, 2016). Corresponding words and pictures should be presented near to each other in space and time so verbal and visual processing loops are not competing (Clark & Mayer, 2016).

Absence: Narration and graphics do not refer to the same concepts. Narration does not occur at a time when a student is engaging with the highlighted graphic. Written text is distracting from the narration and graphics, or its placement makes it hard to understand its relevance to the content.

Exemplar: Graphics and narration are closely conceptually aligned and build on, rather than distract from, each other such that it is easy for a student to follow both at once. If presented, written text reinforces narration and/or graphic elements. Narration/text is spaced (in time and place) with any graphics in such a way that it is clear what information the text is referring to.

Labeled Graphics

DEFINITION: Graphics are labeled in a way that makes it clear what they are describing and how they relate to the text.

DESCRIPTION: Graphics include arrows, headings and other cues tell students what they should pay attention to, and to help them connect new knowledge to prior knowledge.

PURPOSE: Graphics with minimal information can be distracting and confusing. Informative graphics include labels such as arrows, headings, and other cues that tell students what they should pay attention to and what the relationship among visual elements is (Clark & Mayer, 2016).

Absence: Graphics do not have labels or any signals about what information is most important, so it is unclear how graphics relate to the information being presented through narrations or text. Graphics fail to connect new knowledge to concepts covered in existing lessons. Graphics are never interactive.

Exemplar: Graphics include clear labels that align with the information being presented through narrations or text, as well as arrows, bolding, or other cues that direct the student's attention to the important information. Additionally, graphics and illustrations are scaffolded based on the student's learning journey, so that they become more complex over time. Students interact with graphics to help complete them as they expand their knowledge.

Cultural Relevance and Interest

DEFINITION: Content is culturally relevant and appropriate for the audience and presented in a friendly, accessible manner.

DESCRIPTION: Digital curriculum should authentically reflect the experiences and lives of the students and teachers using it. Additionally, content should be presented in a conversational (rather than formal) way that is accessible to a wide variety of students and teachers.

PURPOSE: Students' engagement is positively impacted when they are learning about topics that they are interested in or are relevant to their culture. Students learn better when they are excited about the information, and their attention can more successfully be sustained (Schwartz, Tsang, & Blair, 2016).

Absence: Storytelling within the work is not diverse or representative of the cultural backgrounds or interests of students or teachers. The flow and format of the experience is formal (like an encyclopedia or academic handbook) rather than friendly.

Exemplar: Storytelling and the format of the lessons includes many moments to hook students' interest and maintain their attention. Content is generally relevant to teachers and students because it reflects their lives and cultures and/or represents a diverse range of cultures and backgrounds. The flow and format of the learning experience is more friendly than formal.

Worked Examples

DEFINITION: Worked examples of concepts are present, concrete, and contrasting as appropriate.

DESCRIPTION: Examples should show how a solution is worked out for a particular type of case or problem. Examples can take on different forms for different subjects, and help make a concept concrete for students. Contrasting cases (A vs. B) are also often informative by showing a "non-example" that distinguishes a new concept from others already covered.

PURPOSE: New concepts need to be related to existing knowledge in order for us to learn (i.e. incorporate new knowledge). Examples are a great way of tying new concepts to known ones, and concrete/worked examples and contrasting cases/non-examples facilitate the connections between relevant prior knowledge and new concepts. (Rawson, Thomas, & Jacoby, 2015; Schwartz, Tsang, & Blair, 2016)

Absence: There are no concrete or worked examples in the lesson. The lesson focuses on abstract content.

Exemplar: Concrete examples of the content are included throughout the lesson, and worked examples and/or contrasting cases (including examples that are culturally familiar to students) are included for each new concept.

Retrieval Practice

DEFINITION: Retrieval activities, including opportunities for student "free recall" of knowledge, are present. When possible, retrieval activities provide immediate, meaningful feedback.

DESCRIPTION: Learning is as much about students recalling knowledge as it is getting new information into their brains. Curriculum should offer regular opportunities for students to recall (or "retrieve") knowledge, including right after the content is presented. If possible, those opportunities include immediate, meaningful feedback based on what they recall.

PURPOSE: Recalling information, or moving knowledge from long-term memory back into working memory (even briefly) strengthens and extends the connections between memories in the brain - thus enabling deeper, longer-lasting learning (Agarwal & Bain, 2019).

Absence: Retrieval opportunities are rare. Any questions that ask students to freely recall what they have learned appear in a formal (summative/graded) assessment context. If present, the "feedback" provided amounts to a score or grade based on the number of correctly recalled items.

Exemplar: Students have frequent prompts throughout a lesson to recall what they have learned and how it connects to other knowledge. Many retrieval episodes are "low stakes" or "no stakes," and focus on ungraded recall. Students receive meaningful "low stakes" feedback on the accuracy of what they remember.

Elaborative Content

DEFINITION: Elaborative content is included in each lesson in the form of pre-training and within-lesson connections to familiar or previously covered concepts.

DESCRIPTION: Elaboration is the process whereby students make connections between new and prior knowledge to grow their understanding. To encourage elaboration, digital curriculum should preview the connections between new and previously covered information and regularly summarize those connections.

PURPOSE: Elaboration is the process whereby students make connections between new and prior knowledge to grow their understanding, and this building and deepening of connections between concepts in long term memory facilitates longer-lasting learning. (Craik & Lockhart, 1972; Craik & Tulving, 1975; McLeod, 2017). All new knowledge is connected to existing knowledge in the brain, and activating or building prior knowledge facilitates the formation of these new connections when information is passed from working memory into long term memory (Fisher, Frey, & Lapp, 2012; National Research Council, 2000).

Absence: There is no pre-training or connection of the lesson to other concepts that students may already know, including for concepts that have already been covered in a prior lesson.

Exemplar: Each lesson begins with a brief pre-training that shows the connection between concepts in the upcoming lesson and those from prior ones. Lessons regularly highlight such connections throughout learning activities.

Elaboration Practice

DEFINITION: Opportunities for elaboration exist throughout the curriculum through questions and/or prompts for self-explanation.

DESCRIPTION: Students are regularly asked to recall prior knowledge or beliefs related to the lesson, explain new concepts in their own words, and actively connect new information with prior knowledge, including concepts formerly covered in the curriculum.

PURPOSE: Elaboration practice - connecting new information to prior knowledge - is essential to deeper learning (Fisher, Frey, & Lapp, 2012, McLeod, 2017). When students explicitly see how much they know, and how it fits into their larger learning goals, they develop a sense of self-efficacy and autonomy over their learning.

Absence: Questions in the lesson only ask for repetition of content. There are no questions that ask students to explain the material in their own words, or connect new knowledge to prior knowledge, including concepts formerly covered.

Exemplar: Each lesson includes questions throughout that ask the student to reflect on and explain what they are learning in their own words, as well as connect new information to prior knowledge.

Meaningful Practice

DEFINITION: Elaboration and retrieval activities are relevant to students and reflect the culture and lived experiences of their communities.

DESCRIPTION: When students are asked to retrieve information or elaborate upon their understandings, the curriculum platform offers them the ability to see and describe examples that are familiar to their own cultures and interests.

PURPOSE: Seeing how their learning is relevant to their interests and experiences (both in and outside of the learning environment) fosters engagement in the learning process. Both self-efficacy and engagement contribute to better learning. (Bandura & Cervone, 2983; Ridley, 1992)

Absence: Elaboration and retrieval activities are completely standardized and do not allow any student choice. Such activities accommodate only dominant cultural features and lack diverse viewpoints.

Exemplar: Elaboration and retrieval activities use language, cultural assumptions, and circumstances that are relevant to different populations, including the students themselves. This could include adaptations or multiple illustrations of a concept, as well as use of inclusive language. Students are able to provide examples or elaborations grounded in their lived experience.

Assessment Formats

DEFINITION: The curriculum provides a variety of options for assessment types to support diverse assessment experiences for students. Assessment functionality is intuitive and easy to use for teachers and students.

DESCRIPTION: Digital curriculum should offer a variety of user-friendly formative assessment experiences that allow students to show what they know.

PURPOSE: Assessment tools provide students opportunities to show the teacher what they know by making their learning visible in a variety of ways such as multiple choice, free response, and submission of images, graphics, or other multimedia. There are so many different ways, formal and informal, that educators can incorporate assessment into the learning experience. Built-in feedback mechanisms support and model constructive feedback practices for teachers and students (William, 2013).

Absence: Lessons provide assessments in limited, fixed types (e.g., all multiple choice), and are difficult, rigid, or confusing to use for students and teachers.

Exemplar: Lessons offer students a variety of assessment experiences, including multiple choice, free response, graphic and multimedia, etc. The assessments are easy to use for students, and provide results that are easy to interpret for teachers.

Success Criteria

DEFINITION: The curriculum presents clear success criteria and offers opportunity for self-review and/or peer-review of work in addition to teacher review and feedback.

DESCRIPTION: Clear success criteria and/or rubrics are provided for scoring of assessments and other student work, including for teacher scoring as well as (student) peer evaluation of work.

PURPOSE: Clear success criteria are essential for informative learning experiences including feedback (Clarke, 2021). Additionally, self-awareness and self-management skills can be practiced through self-review, and social awareness and management skills can be practiced and developed through peer-review.

Absence: Success criteria are absent, unclear, or complex, making it difficult for students to understand what high quality work should look like or self-review their work before submission.

Exemplar: Success criteria are transparent to students, and they have the opportunity to review their own work and make revisions before submitting it for teacher or peer evaluation.

Actionable Feedback

DEFINITION: Curriculum provides real-time (or close to it) results that are detailed at the sub-skill level to inform the teacher of knowledge gaps. It also provides students real-time feedback about their work that is specific, actionable, and constructive.

DESCRIPTION: Teachers need feedback to diagnose student knowledge gaps, and students need specific, actionable feedback about their work. The closer in time the feedback is to the completion of the work, the better.

PURPOSE: Effective and meaningful feedback is "just-in-time, just-for-me information delivered when and where it can do the most good" (Brookhart, 2017, p.1). Digital curriculum should provide students with quick, real-time feedback and provide teachers what they need to enhance and enrich personalized feedback, including at the instructional level of a single lesson or lesson part.

Absence: Digital curriculum offers students little or no feedback as they are working, and feedback provided by an intelligent (AI) tutor is limited and repetitive. For teachers, helpful information about student progress is not provided or easily accessed, and lessons do not offer scripts, worked examples, or other guidance (e.g., common errors related to a concept) that models helpful feedback.

Exemplar: Digital curriculum frequently offers student helpful and relevant feedback while they are working, and feedback provided by an intelligent (AI) tutor is varied and specific. For teachers, information about student progress is translated into actionable strategies to integrate into instruction and feedback episodes, and lessons offer scripts, worked examples, and other guidance to help teachers provide feedback that is specific, actionable, and constructive.

Instructional Recommendations

DEFINITION: The curriculum provides instructional recommendations based on student performance on assessments

DESCRIPTION: Results from built-in formative assessments should point the direction towards instructional materials that can help students target knowledge gaps and deepen their learning.

PURPOSE: To truly personalize and accelerate learning, digital curriculum should either integrate student assessment performance into the algorithms that determine a student's learning path (or learning progressions) automatically, or provide diagnostic information to the teachers along with curated, high-quality content recommendations for varied instructional purposes (teach, reteach, remediate) and sizes (whole, small group, or individual). Such feedback is actionable (Brookhart, 2017; Wiggins, 2012).

Absence: The digital curriculum does not include algorithms to determine personalized learning paths, nor does it provide reporting to the teacher with diagnostic level information. It lacks curated, high-quality recommendations for teacher instruction or review with individuals or student groups.

Exemplar: The digital curriculum includes algorithms to inform personalized learning paths, and/or it provides curated, high-quality recommendations for teacher instruction or review with students (singularly or in groups). The quality and consistency of these automated suggestions is good, the results provided are actionable, recommendations are tailored and helpful, and the functionality generally helps students from all backgrounds succeed.

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COURSE OF MIND
AN ISTE INITIATIVE

Digital Curriculum Scoring

Product _____ Rater _____ Total Score _____

Label	Definition	Rating	Score
Chunking	The content is previewed and organized into age-appropriate, attainable chunks with milestones.		
Focused Delivery	The content is formatted in a way that keeps students focused on the lesson's objectives, including limiting extraneous or redundant information.		
Effortful Practice	Curriculum design supports students' effortful practice to improve learning, including spaced practice, interleaving, and active retrieval activities.		
Pace and Place	Curriculum design helps students and educators understand where they are in the curriculum/lesson and allows them to control how they move through it.		
Content Alignment	Curriculum clearly demonstrates alignment of learning objectives with standards, content, activities, and assessments.		
Accurate Graphics	Graphics are relevant, informative, accurate, and do not promote cultural stereotypes.		
Verbal-visual Alignment	Graphics are accompanied by written text or, better yet, audible narration. Where written text is displayed on screen, it appears close to corresponding images in both space and time.		
Labeled Graphics	Graphics are labeled in a way that makes it clear what they are describing and how they relate to the text.		
Cultural Relevance and Interest	Content is culturally relevant and appropriate for the audience and presented in a friendly, accessible manner.		
Worked Examples	Worked examples of concepts are present, concrete, and contrasting as appropriate.		
Retrieval Practice	Retrieval activities, including opportunities for student "free recall" of knowledge, are present. When possible, retrieval activities provide immediate, meaningful feedback.		
Elaborative Content	Elaborative content is included in each lesson in the form of pre-training and within-lesson connections to familiar or previously covered concepts.		
Elaboration Practice	Opportunities for elaboration exist throughout the curriculum through questions and/or prompts for self-explanation.		
Meaningful Practice	When students are asked to retrieve information or elaborate upon their understandings, the curriculum platform offers them the ability to see and describe examples that are familiar to their own cultures and interests.		
Assessment Formats	Digital curriculum should offer a variety of user-friendly formative assessment experiences that allow students to show what they know.		
Success Criteria	Clear success criteria and/or rubrics are provided for scoring of assessments and other student work, including for teacher scoring as well as (student) peer evaluation of work.		
Actionable Feedback	Teachers need feedback to diagnose student knowledge gaps, and students need specific, actionable feedback about their work. The closer in time the feedback is to the completion of the work, the better.		
Instructional Recommendations	Results from built-in formative assessments should point the direction towards instructional materials that can help students target knowledge gaps and deepen their learning.		

COURSE OF MIND
AN ISTE INITIATIVE

Digital Curriculum Scoring

Product _____ Rater _____ Total Score 2

Label	Definition	Rating	Score
Chunking	The content is previewed and organized into age-appropriate, attainable chunks with milestones.		-1
Focused Delivery	The content is formatted in a way that keeps students focused on the lesson's objectives, including limiting extraneous or redundant information.		0
Effortful Practice	Curriculum design supports students' effortful practice to improve learning, including spaced practice, interleaving, and active retrieval activities.		0
Pace and Place	Curriculum design helps students and educators understand where they are in the curriculum/lesson and allows them to control how they move through it.		-1
Content Alignment	Curriculum clearly demonstrates alignment of learning objectives with standards, content, activities, and assessments.		1
Accurate Graphics	Graphics are relevant, informative, accurate, and do not promote cultural stereotypes.		1
Verbal-visual Alignment	Graphics are accompanied by written text or, better yet, audible narration. Where written text is displayed on screen, it appears close to corresponding images in both space and time.		1
Labeled Graphics	Graphics are labeled in a way that makes it clear what they are describing and how they relate to the text.		1
Cultural Relevance and Interest	Content is culturally relevant and appropriate for the audience and presented in a friendly, accessible manner.		0
Worked Examples	Worked examples of concepts are present, concrete, and contrasting as appropriate.		1
Retrieval Practice	Retrieval activities, including opportunities for student "free recall" of knowledge, are present. When possible, retrieval activities provide immediate, meaningful feedback.		-1
Elaborative Content	Elaborative content is included in each lesson in the form of pre-training and within-lesson connections to familiar or previously covered concepts.		-1
Elaboration Practice	Opportunities for elaboration exist throughout the curriculum through questions and/or prompts for self-explanation.		0
Meaningful Practice	When students are asked to retrieve information or elaborate upon their understandings, the curriculum platform offers them the ability to see and describe examples that are familiar to their own cultures and interests.		1
Assessment Formats	Digital curriculum should offer a variety of user-friendly formative assessment experiences that allow students to show what they know.		-1
Success Criteria	Clear success criteria and/or rubrics are provided for scoring of assessments and other student work, including for teacher scoring as well as (student) peer evaluation of work.		0
Actionable Feedback	Teachers need feedback to diagnose student knowledge gaps, and students need specific, actionable feedback about their work. The closer in time the feedback is to the completion of the work, the better.		0
Instructional Recommendations	Results from built-in formative assessments should point the direction towards instructional materials that can help students target knowledge gaps and deepen their learning.		1