Evaluating Technology for Early Learners

A Best Practice Guide to Giving Children the Tools They Need to be Super-Skilled

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Lilla Dale McManis is the Research Director for Hatch, where she works to both inform and carry out research on technology products for early childhood. Joining Hatch in 2008, Dr. McManis now works in tandem with Hatch Product Development in the design and evaluation of educational technology for early learners.

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Early Childhood Content Specialist, Hatch

Jenne Parks started her career as a kindergarten teacher in a federally funded full-day Title-1 class and continued her career with at-risk pre-kindergarten students. In 2000, Jenne accepted a position as a Curriculum Specialist with La Petite Academy managing the Education Department that served over 600 schools and 13,000 teachers. She is an accomplished national presenter and author on early childhood teaching and training.

Technology's Impact on Education

Many educators, researchers and policy-makers agree that technology can significantly contribute to the effectiveness of a high-quality early learning program. Well-designed educational technology has opened up opportunities for learning experiences for young children that are unprecedented and provide positive results in cognitive and social-emotional development.

Careful attention to the role technology plays in education is vital to ensuring that young learners have optimal experiences when interacting with technology as part of the high-quality education that we all strive to provide.

Did you know?

An estimated 1 in 3 children currently enters kindergarten unprepared to learn the core skills of math and reading. And it has been shown time and again that a child who is behind early in the educational system is likely to stay behind, and to leave school early.

The United States is falling behind in education, and the difficulties begin as early as preschool. **Educational technology can be key to solving this problem!**

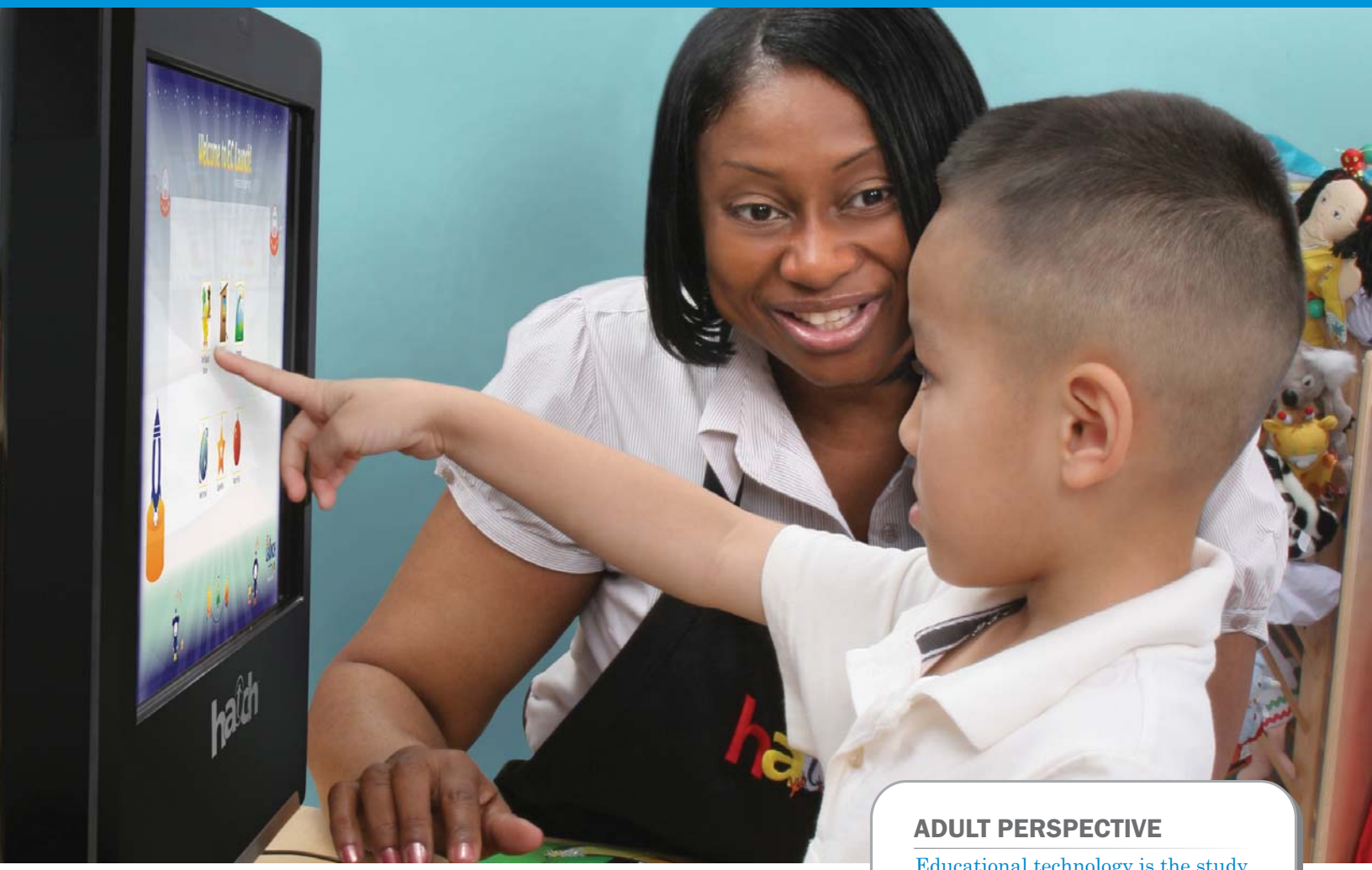
- Cunningham & Stanovich 1998

CONSIDER THIS:

While some products may promise success, it is not likely that they can do so at the level of excellence you want to provide for your learners. Are you absolutely sure that they follow best practices in early education, are tied to the standards your state requires and are backed by solid scientific research?

Interactive whiteboards are the technology that most teachers report they want for their classrooms.

- Grunwald 2011



What is Educational Technology?

Educational technology covers the gamut—from development of hardware and content to its use by kids, to how it's implemented and ultimately how it's managed and put into practice each day in the classroom. It includes, but is not limited to, software, hardware, Internet and mobile applications and activities.

These tools have proven helpful in advancing early learning and can even be used to measure each child's progress, which can be connected back to their individual lesson plans ensuring critical skills are being developed appropriately.

ADULT PERSPECTIVE

Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources.

Association for Educational Communications and Technology, 2008

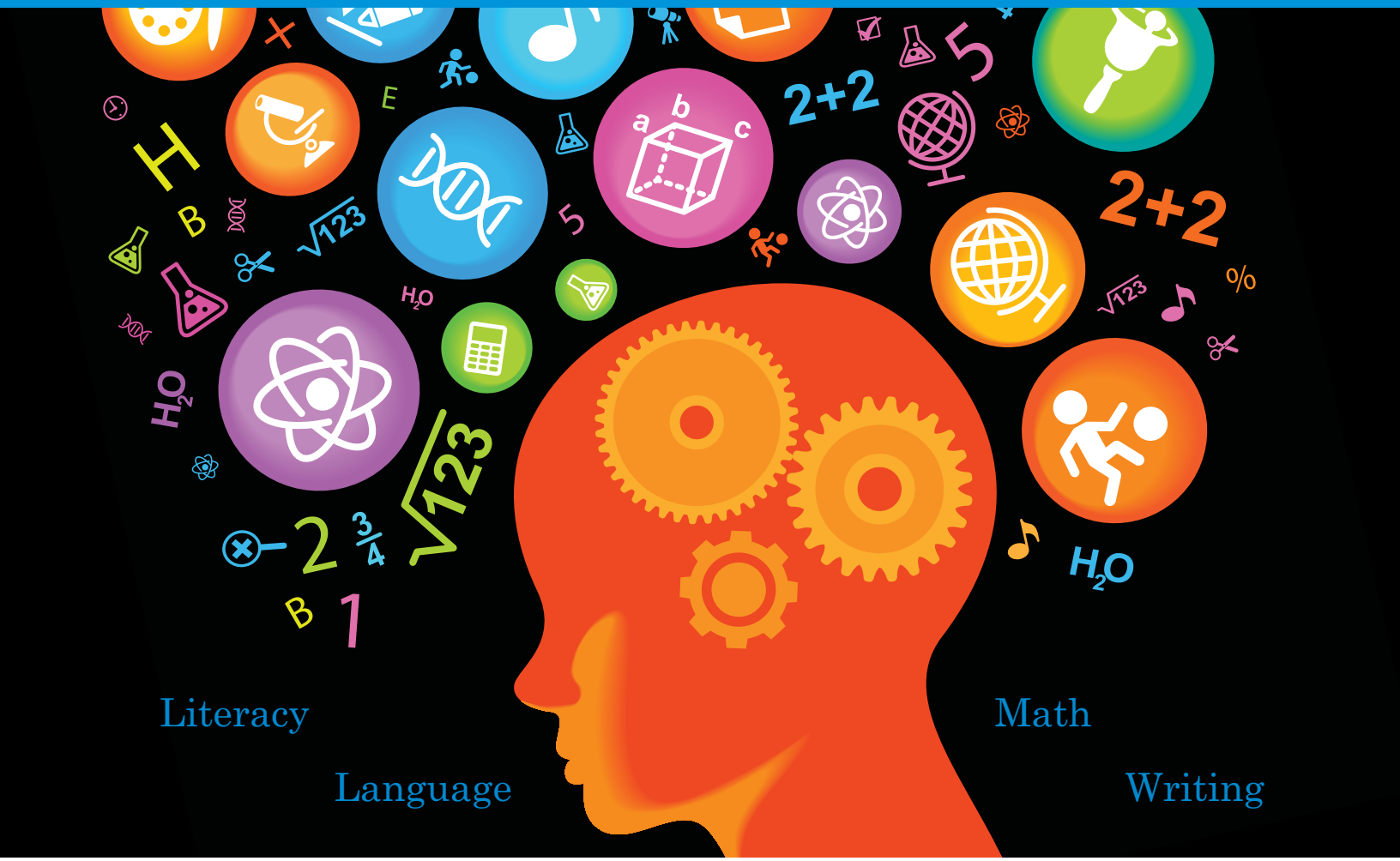
CHILD PERSPECTIVE

I like computers because they teach me so much and if I had a friend who didn't have a computer, I would tell him the cat and cow story is my favorite because it is so funny! They go to another country!

Sebastian, 5 years, Mudpies Child Development Center, Winston-Salem, NC

"The most effective use of technology in an early childhood setting involves the application of tools and materials to enhance children's learning and development, interactions, communication, and collaboration."

NAEYC's revision of position statement, 2011



Cognitive Development

Thirty years of research supports that young children are developmentally ready and able to engage with educational technology in ways that promote positive outcomes in school readiness and success in early schooling.

In fact, young children tell longer and more structured stories following a computer graphics presentation versus a static presentation or no stimulus[1]. And, computer-assisted instruction drills and tutorials help students develop pre-reading and reading skills, including word recognition and recall[2].

Studies also show that in addition to literacy, language and writing skills, computer software similarly helps young children develop competence in math skills such as counting, sorting, symmetry, patterns and spatial order[3]. The largest gains in the use of computer-assisted instruction have been in mathematics for preschoolers[4].

[1]Riding & Tite 1985; [2]Shapira 1995; [3]Clements & Nastasi 1993; Wright 1994; [4]Fletcher-Flinn & Gravatt 1995

Did you know?

Preschoolers' language activity, measured as words spoken per minute, is almost twice as high at the computer as at any of the other activities, including play dough, blocks, art or games.

-Muhlstein & Croft, 1986

More than 70 percent of teachers say interactive whiteboards stimulate discussions & creativity AND are directly related to student achievement.

- Grunwald 2011

CONSIDER THIS:

The addition of a computer center does not disrupt ongoing play, but rather facilitates extensive positive social interaction, cooperation and helping behaviors.
(Binder & Ledger, 1985; King & Alloway, 1992; Rhee & Chavnagri, 1991; Rosengren et al.., 1985)

Social-Emotional Development

Technology is often overlooked when considering ways to improve social-emotional development in the classroom. Yet, as early as the preschool years, a computer center fosters a positive climate characterized by praise and encouragement of peers.[1] In fact, children spent nine times as much time talking to peers while on the computer than while doing puzzles.[2]

Social-emotional skills facilitate:

- Stronger engagement in learning which is important for cognitive growth and academic achievement
- Positive peer relationships—a key developmental milestone
- Easier adjustment in early childhood

Creating an environment that promotes child engagement, teaches expectations and positive behavior, and gives teachers the tools they need to monitor this development with technology is one piece of the puzzle to improving child development and future success in life.

Children who struggle with self-control as preschoolers were three times as likely to have problems as young adults.

- "A Gradient of Childhood Self-Control Predicts Health, Wealth and Public Safety," Moffitt et al, Proceedings of the National Academy of Sciences 2010

[1]Klinzing & Hall 1985; [2]Muller & Perlmutter 1985

Focused Instruction: Advanced Skills & Special Needs

Studies show that when children are in control, they create fantasy in computer programs beyond the producers' imaginations.[1] Additionally, such characteristics as motivation, higher-order thinking and meta-cognition have been found when young learners use computers.[2]

With programs that scaffold (supports children as level of difficulty increases and reduces support as the child progresses in ability) teachers can use computers to help advanced and special needs students develop at their own pace.

Special needs preschool children have also shown progress in all developmental areas, including social-emotional, fine motor, gross motor, communication, cognition and self-help. Across 11 common classroom activities, including play, books, computer, art and snack time, results showed that computer use was most often followed by desirable behaviors such as sharing, communicating, taking turns and focusing—and also the least likely activity to be followed by aggression.[3]

[1]Escobedo 1992; Wright & Samaras 1986; [2]Nastasi & Clements 1994; Fletcher-Flinn & Suddendorf 1996; [3]Hutinger & Johanson 2000

Did you know?

Children who use technology with supporting activities for key learning goals showed more gains than children without such experiences in the following skills:

- Verbal and Non-verbal Skills
- Problem Solving
- Abstractions
- Conceptual Skills
- Pre-literacy & Mathematics
- Social-Emotional Development

- Haugland 1992

CONSIDER THIS:

Children show higher positive affect and interest when they use the computer together. This creates a great opportunity for peer tutoring, where children at differing developmental levels working collaboratively may help one another advance.
(Shade, 1994)

83% of teachers say technology increases student motivation.

- Grunwald 2011

The question is not if technology has a place in education—but

What is child appropriate?

CONSIDER THIS:

Much technology out of the box is not appropriate. But when best practices in implementation, teacher training and software development intersect, children have the greatest potential for learning and reaching their maximum potential.

Three decades of research shows positive outcomes when young children use developmentally appropriate educational technology.

Using Best Practice

Years of research illustrates that educational technology has a positive impact on helping preschool and school-age children build critical cognitive and social-emotional skills. From traditional technology to breakthrough touchscreen systems—all can have a place in the classroom if you consider what learning situations they are best suited for and how they will be used. What is important is how they support learning.

Properly leveraging instructional technology in the early learning classroom hinges on the developmental appropriateness of the software content and the equipment itself. Make sure it matches children's developmental level, is adapted for their age, and will hold up to the daily use of natural curiosity and motor limitations. In other words, make sure it is appropriate for children!

The Relationship Between Technology & Teaching

Bringing knowledge about teaching, technology and content together is key and is where children have the greatest potential for learning.

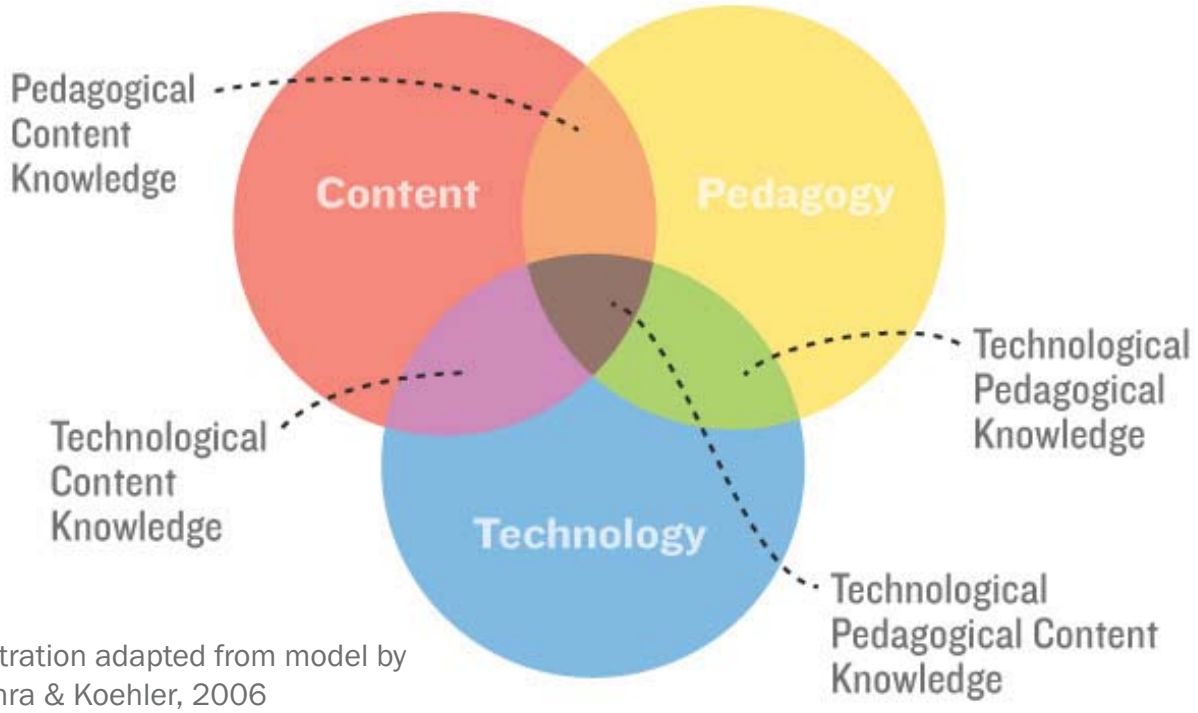
TPACK (illustrated below) is a conceptually based theoretical framework developed by Mishra & Koehler about the relationship between technology and teaching that can transform the conceptualization and the practice of **teacher education**, teacher **training** and teacher **professional development**. The framework's basis is that teaching is a highly complex activity that draws on many kinds of knowledge.

Pedagogical knowledge, or deep knowledge about the processes and practices of teaching and learning, is combined with knowledge about how technology and content are related. The result is using technologies in constructive ways to teach content.

Did you know?

Content knowledge: understanding the subject matter.
Pedagogical knowledge: deep knowledge about the methods of teaching & what teaching approaches best fit the content.
Technology knowledge: understanding standard & new technologies.
Pedagogical content knowledge: understanding how to present instruction based on learners' interests & abilities.
Technological content knowledge: the relationship between technology & content.
Technological pedagogical knowledge: how various technologies are used in learning settings & how teaching might change as the result of technology.
Technological pedagogical content knowledge: an emergent form of knowledge that goes beyond all three components—content, pedagogy & technology.

-Mishra & Koehler, 2006



-Illustration adapted from model by Mishra & Koehler, 2006

Set up for Success

Installing new technology in the classroom is not enough. Teachers must be supported with initial training, plus ongoing professional development and technical support to make sure the technology is being used in best practice and incorporated into daily curriculum.

The classroom teacher is the critical factor in the full development and use of technology[1,2] and while teachers want to learn to use educational technology effectively, the lack of time, access and support are barriers.[3] In particular, lack of professional development for technology use is one of the most serious obstacles to fully integrating technology into the curriculum [1,4,5].

Teacher training should give teachers an understanding of goals and outcomes of using educational technology, including how to balance many different types of technology to fit in with traditional components of the curriculum. Teachers must understand how all these elements can be woven into strong, comprehensive, high-quality early learning experiences.

CONSIDER THIS:

Teachers must have substantial time, ranging from 30-plus hours to several years, to fully support higher-order thinking skills, decision making and collaboration in students.[6] This is why incorporating professional development into your program regularly has the most positive results.

> The classroom teacher is the critical factor in the full development & use of educational technology.[1,2]
>
> *–U.S. Congress, Office of Technology Assessment*

[1]U.S. Congress, Office of Technology Assessment. 1995; [2]Trotter, A. 1999; [3]Guhlin, M. 1996; [4]Fatemi, E. 1999; [5]Panel on Educational Technology, President's Committee of Advisors on Science and Technology. 1997, March; [6]Sheingold & Hadley; 1990

CONSIDER THIS:

It is rare to find one product that fits all of your educational goals. So, when evaluating content it's important to keep your priorities in focus. Rank your goals to help you determine what you'd most like to achieve with your technology investment.

Possible Educational Goals

Enhance Approaches to Learning
- Curiosity
- Flexible thinking
- Creativity
- Persistence

Enhance Cognitive Development
- Mathematics
- Language
- Literacy
- Science
- Social Studies

Enhance Social-Emotional Skills
- Cooperation
- Collaboration
- Identifying Emotions

The Best Technology Solution for Your Goals

A 21st century, data-driven early learning classroom could have all of the solutions below, providing an optimal mix of experiences and uses. It is important to also pair the technology tool itself with the right content that should be delivered through that technology and in the proper setting.

Hardware	Best suited for
Desktop computer	Individuals & pairs
Laptop computer	Individuals & pairs
Interactive whiteboard	Large & small groups or individuals
Tablets	Individuals
Multi-touch table	Small groups & pairs

Weighing the Importance of Key Design Principles

Having the right tools makes it easier to drive positive academic results. Technology best supports early learners when it follows these **key design principles:**

- ✓ Easy to use
- ✓ Meaningful context
- ✓ Informative feedback
- ✓ Multiple opportunities for success
- ✓ Allows for independent choice, control & access
- ✓ Intentional focus on academic & cognitive development
- ✓ Frequent monitoring & assessment of progress
- ✓ A means for expanding and creating new activities are provided to the teacher

Did you know?

Positive results of educational technology are much more likely when they are integrated into the classroom by the teacher with learning activities that reinforce fundamental skills in a way that promotes active engagement, group participation, interactivity, feedback and connections to the real world. The tools you select during your evaluation process must ultimately be so easy to use that integration into the classroom is greatly facilitated.

Questions to Ask:

1) Is the content worthwhile in the educational value it provides?
2) Is the content & technology appropriate for young children, pre-readers & non-readers?
3) Is it relevant to curriculum goals & each child's needs & interests?
4) Is it feature-rich with key tools for teachers such as assessments, progress monitoring & customizable activities?

> Combining child-directed discovery with direct teacher instruction to help scaffold & support children as they learn skills represents a highly effective educational environment for young children.

- Landry, 2005; NAEYC, 2009

The research and product development experts at Hatch have identified **6 evaluation areas** to help measure quality and better ensure the educational value will lead to positive outcomes.

1 Educational Value

- Focuses on learning rather than winning a game.
- Specific learning goals are identified—not just free-play time.
- Is research and standards-based.
- Includes informative feedback for teachers and children.
- Teaching concepts happens before a child is asked to give responses. For example, a program shows children the names of letters before asking them to identify them.

2 Age Appropriate

- Meets the correct development needs of the children using it.
- Concepts are introduced in an appropriate order. For example, counting activities are mastered before addition.
- Pre/non-readers, English Language Learners (ELL) and children with visual and motor disabilities are able to navigate the content easily.
- Includes positive social cues and is free of gender, race/ethnicity, family structure and physical capability bias.

3 Questions to Ask

when analyzing whether content is age appropriate

1) Are the cognitive skills and subject matter age-appropriate? The content should meet the developmental needs of the children using it. For example, if you're working with non-readers, pre-readers or ELL students, the program should include clear visuals, audio and speech to ensure success at the appropriate skill and subject level.

2) Is the content set in an interesting/appealing context for children? The learning experiences should be set in a theme or context that children can relate to and that will maintain their interest.

3) Is the content free from bias? Obviously, the program should not contain or use violence. But also consider whether the content is delivered with fair and equal representation of diversity including gender, race/ethnicity, physical capabilities, family structure, varying roles, etc.

CONSIDER THIS:

If designed for independent use, content must be easy for young children to navigate without requiring a teacher to work with them for extended periods. Good content helps children gain independence as they use the system, requiring less direct prompting from the teacher as the child's competence grows.

3 Child Friendly

- Provides simple and clear choices that don't cause undue frustration, confusion or allow the child to get stuck.
- Integrates logical instructions with verbal support demonstrating appropriate language and vocabulary.
- Supplies visual prompts for the child to access and see a tutorial of what to do.
- Includes multiple opportunities for success as children explore with trial and error.
- Helps the child move on to another activity when current skill level is too difficult without constant teacher intervention.

4 Engaging

- Contains enough activities to last a school year.
- Incorporates positive encouragement, external rewards (a star) and internal rewards ("great job!")
- Holds the child's attention span without being distracted by too many graphics or overpowering music.
- Uses realistic and concrete graphics and photos that reflect the real world from a child's perspective.

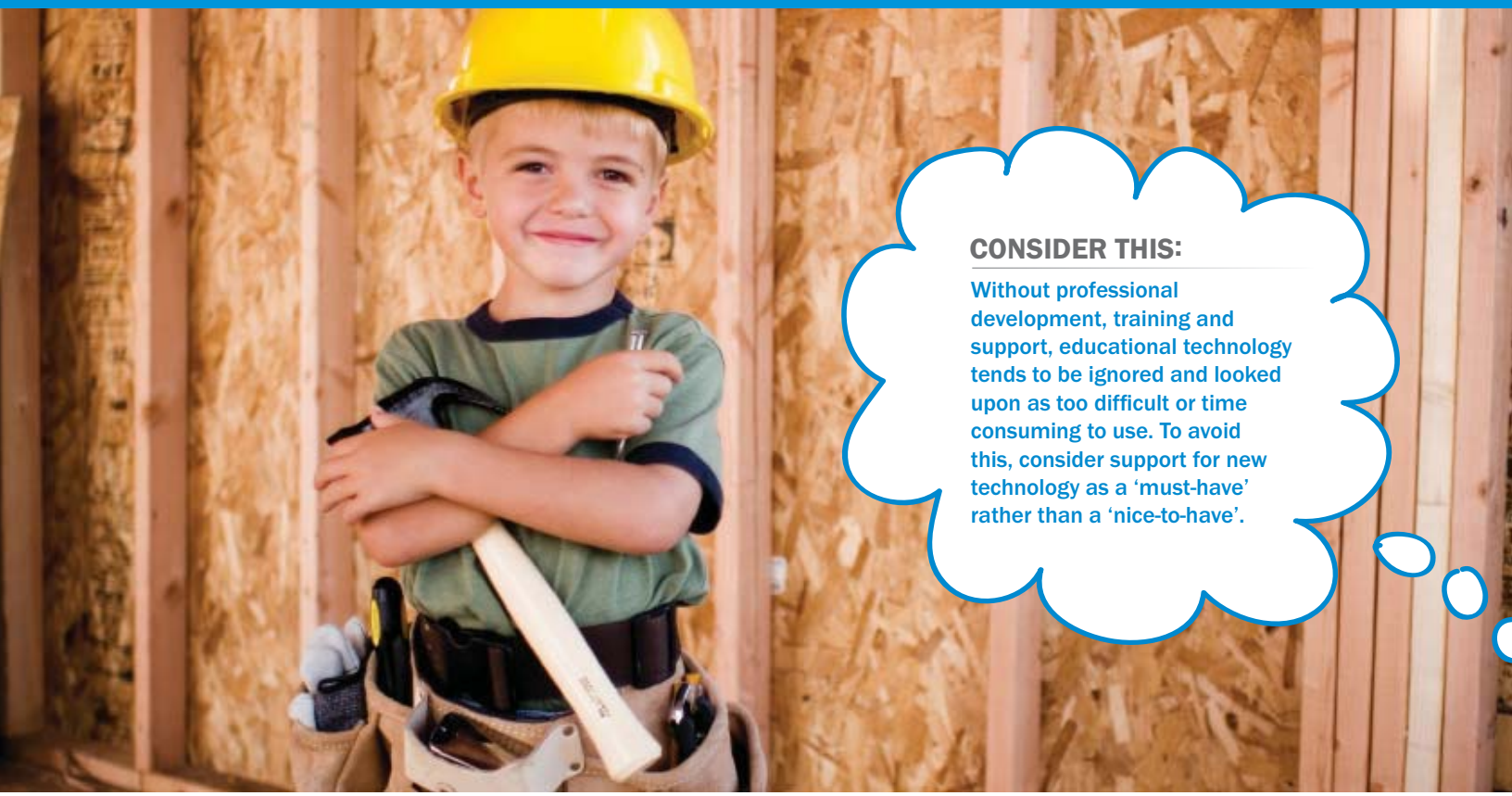
Did you know?

The National Education Technology Plan states: Technology is at the core of virtually every aspect of our daily lives and work, and we must leverage it to provide engaging and powerful learning experiences. Technology-based learning and assessment systems will be pivotal in improving student learning and generating data that can be used to continuously improve the education system at all levels.

- 2010 U.S. Department of Education Office of Educational Technology

93% of teachers say technology helps them be more effective.

- Grunwald, 2011



CONSIDER THIS:

Without professional development, training and support, educational technology tends to be ignored and looked upon as too difficult or time consuming to use. To avoid this, consider support for new technology as a 'must-have' rather than a 'nice-to-have'.

5 Assessment & Progress Monitoring

- Tools facilitate the easy measurement and monitoring of each child's progress.
- Easy to use, interpret and share with colleagues and parents.
- Might include automatic reporting, checklists, digital portfolios and observation tools.
- Digital recordings support alternative means of assessment.

6 Customizable Features

- Teacher can adapt activities to meet each child's learning needs and interests.
- Allows new activities to be created that meet more or additional curriculum goals past those provided in the base package.
- Supports the teacher in scaffolding activities at varying levels of complexity.

3 Questions to Ask

about assessment and progress monitoring

1) Is the progress monitoring tool easy to use? If it's not easy to use, it's not likely to be integrated into the curriculum.

2) Is the information easily shared with families and other educators who work with the children using the program? Using authentic work samples and progress data in parent-teacher conferences is a powerful way to illustrate how children are developing. Additionally, data that can be shared with other educators and administrators helps present a program-wide view.

3) Is the information easy to interpret for teachers, administrators and parents? Data should be presented in a simple way so that educators and parents can easily determine how a child is performing and areas that need additional instruction.

The Picture-Perfect Classroom Solution

Driving change and enthusiastic teacher adoption is key! The total solution is only as good as the equipment, software content and professional development training behind it. Look at the entire curriculum and goals and think about how educational technology both fits in and improves outcomes for children.

- Professional development for teachers is essential for classroom integration.
- Some technology products provide initial training as well as ongoing support over time and throughout each school year.
- Utilizing the talent you have on staff is an excellent beginning point.
- If training is not included and if it is not possible to put an ongoing plan into place, examine the ease and usability of the software, in addition to written directions and/or help videos, graphics or another form of presentation.

6 Questions to Ask

when reviewing technology and content for your program

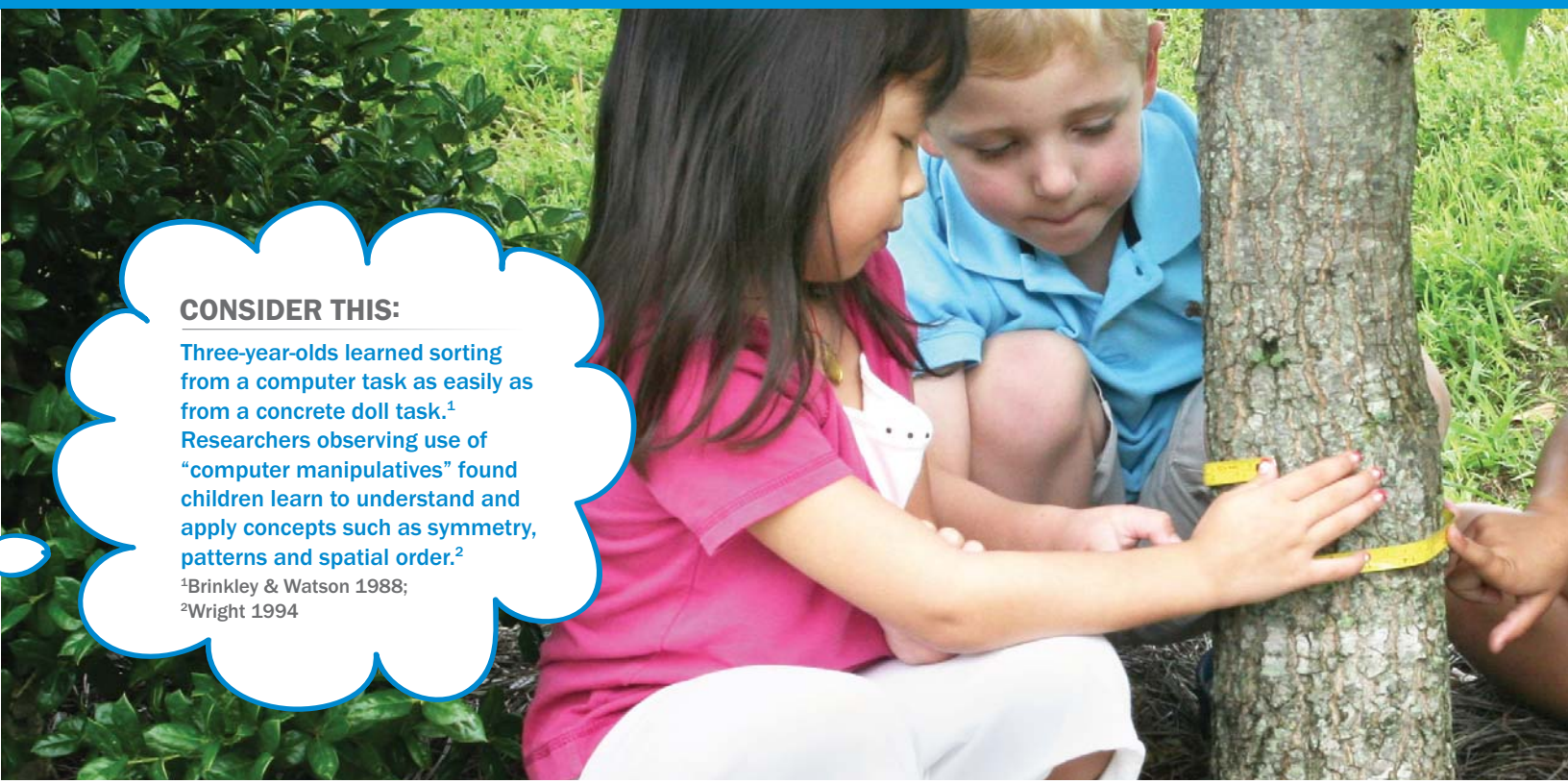
1) Is there training? Are initial training sessions backed by ongoing support throughout each school year?

2) Does the system provide a solution for the whole year or does it require combining together activities and software across many learning philosophies and vendors?

4) Is the quality consistent across solutions and classrooms?

5) Does the system differentiate instruction and scaffold difficulty up or down depending on the child's skill level?

6) Can teachers share activities across classrooms, providing a unique opportunity to maximize teaching effectiveness and efficiencies across the board?



CONSIDER THIS:

Three-year-olds learned sorting from a computer task as easily as from a concrete doll task.[1] Researchers observing use of "computer manipulatives" found children learn to understand and apply concepts such as symmetry, patterns and spatial order.[2]

[1]Brinkley & Watson 1988;
[2]Wright 1994

But How is it Measured?

How do you measure 'quality', 'ease of use' and 'appropriateness for all children'? The experts at Hatch have developed this tool to make it easier to identify the not so good, the good, the better and the best when it comes to easy to use, developmentally appropriate, and high-quality educational technology.

Helpful Tip!

We recommend ranking the following goals in order of importance. Whether you are looking for one solution or a set of solutions, it's important to define and consider your goals up front.

1) What goals, skills and curricular areas are you looking to enhance with the addition of the educational technology?
2) What approaches to learning do you want to focus on—curiosity, attention, flexible thinking/creativity, and persistence?
3) Are you introducing kids to games or truly interactive learning experiences that build critical skills in:
   a. Language/Literacy (phonological awareness, print and other building blocks required to read)
   b. Mathematics (problem solving, addition, subtraction and math language)
   c. Social Studies (studying neighborhood and community, home state, citizens and society)
   d. Science (experimentation and following the scientific method)
   e. Social-Emotional (cooperation, collaboration, identifying emotions)

Did you know?

While to date most of the research on mobile technology such as tablets is usability based, initial work is promising. For instance, a recent formative evaluation with iPads found that young children learned to use touchscreen technology and apps quickly, and the technology appears to encourage a sense of independence and mastery as well as a format that allows exploration of more complex and abstract concepts.

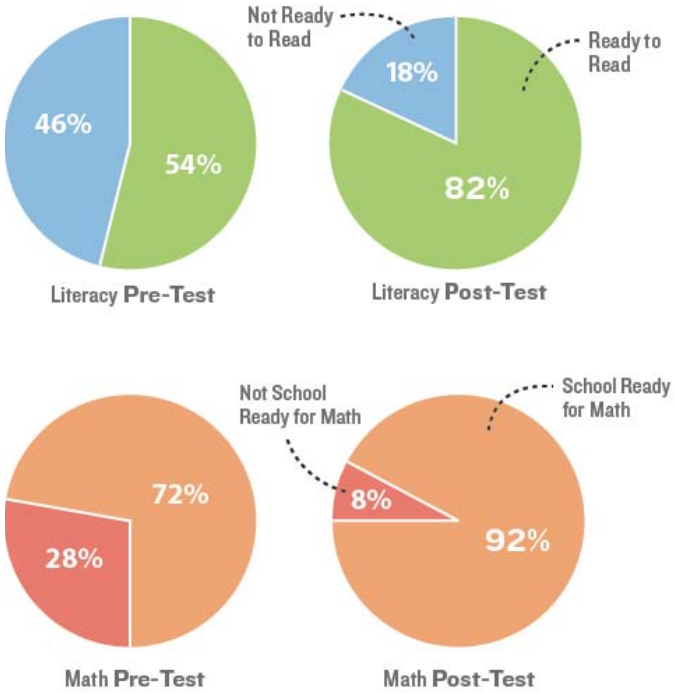
– Cohen, 2011

Technology Combined with Quality Content is Shown to Work

A recent study demonstrates that the Hatch interactive whiteboard with content, the TeachSmart Learning System, can greatly increase a child's readiness to learn reading and math[1]. The importance of that finding cannot be understated, as an estimated one in three children currently enters kindergarten unprepared to learn these core skills.

The children in the study made significant gains in the areas of early literacy, print knowledge, phonological awareness, emergent writing and mathematics skills such as counting, operations and shapes. At the beginning of the study, only 46% of the children were ready to learn to read. Six months later, 82% exhibited the literacy skills required for reading readiness. Just 72% of children scored high enough during initial math testing to be considered ready for math in school. At the end of the study, that number had increased to 92%.

82% Ready to Read &
92% School Ready in Math



Did you know?

In many cases interactive whiteboards are being used merely as a high-tech chalkboards and computer games serve as entertainment, offering little or no instructional value. Hatch interactive whiteboard content, informed by research and tied to national standards, brings technology to life, featuring thousands of activities that differentiate learning, engage students and support teachers.

[1]McManis et al., 2010

“Hatch Technology Ensures Positive Outcomes for Early Learners”

–**Cynthia Johnson**, *PreK Early Start (PKES) Program Manager, Houston, TX*

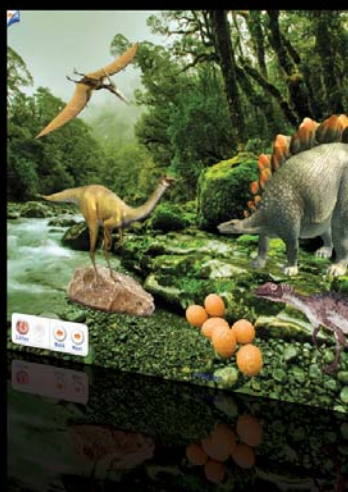
Interactive Whiteboards & Content Packages with Lesson Planning Tools

Revolutionary **Computer Learning Center** that Monitors Child Progress

Multi-touch Tables & Content Packages that Promote Cooperative Play

How can Hatch learning activities & tools work for you?

1. **Save Time**
2. **Differentiate Instruction**
3. **Ensure Quality**
4. **Show Results**



Thousands of **research-based activities** for preK to 1st grade that align with Common Core, NAEYC & Head Start **standards** and vary from easy to advanced levels.

Includes easy-to-use tools that **monitor each child's progress** allow educators to base decisions on actual data and capture **authentic work samples**.

Plus, Hatch Technology is **proven to work!** A recent study of preschoolers showed gains that resulted in **82% "ready to read"** and **92% "school ready" in math.**

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EARLY CHILDHOOD EDUCATIONAL TECHNOLOGY EVALUATION TOOLKIT

Complete the following worksheet for each major educational technology purchase consideration. Please see accompanying directions for further explanation and examples.

Date: _____ Evaluator(s): _____

Organization: _____

Age group: ____ Older Toddlers ____ Preschoolers ____ School Age (Grades _____)

Type: ____ Regular Education ____ Special Needs (Disability: _____) ____ ELL ____ Title 1

GOALS

____ a. Approaches to learning (curiosity, attention, flexible thinking/creativity, persistence)

____ b. Language/Literacy ____ c. Mathematics ____ d. Science

____ e. Social Studies ____ f. Social-Emotional (cooperation, collaboration, identifying emotions)

HARDWARE

____ a. Desktop or laptop computer (mouse and keyboard) ____ b. Desktop or laptop computer (touch screen)

____ c. Interactive whiteboard ____ d. Tablet ____ e. Multi-touch table or surface

SOFTWARE

Software Title: _____ (1 = No 2 = Unsure 3 = Somewhat 4 = Yes)

1. Educational	a. Learning versus focus on winning?	1	2	3	4
	b. Content research and/or learning standards based?	1	2	3	4
	c. Feedback informative/teaches?	1	2	3	4
2. Appropriate	a. Appropriate cognitive skill(s)/subject matter?	1	2	3	4
	b. Set in interesting/appealing context?	1	2	3	4
	c. Pre/non-readers can navigate?	1	2	3	4
	d. Free from bias?	1	2	3	4
3. Child-Friendly	a. Simple/clear choices?	1	2	3	4
	b. Multiple, positive opportunities for success?	1	2	3	4
	c. After adult support, children can use independently?	1	2	3	4
4. Enjoyable/Engaging	a. Enough activities with variety?	1	2	3	4
	b. Appropriate use of rewards?	1	2	3	4
	c. Realistic graphics and appealing to intended age?	1	2	3	4
	d. Activities match well to attention span?	1	2	3	4
5. Progress Monitoring/Assessment					
	a. Covers all the key areas the software teaches?	1	2	3	4
	b. Easy to use and interpret?	1	2	3	4
6. Individualizing Features	a. Can be customized for child's needs?	1	2	3	4
	b. Allows creation of new activities?	1	2	3	4

INTEGRATION

a. Initial training/professional development on integration included?	1	2	3	4
b. Ongoing training/professional development opportunities?	1	2	3	4

SCORE

(Total Score ÷ 80) × 100 = 0

(90-100 = A, 80-89 = B, 70-79 = C, 60-69 = D, <59 = F)

____ Purchase ____ Continue to Consider this Option

____ Do Not Purchase ____ Consider other Options

COMMENTS

EARLY CHILDHOOD EDUCATIONAL TECHNOLOGY EVALUATION TOOLKIT:

In order to ensure that young learners have optimal opportunities and experiences while using educational technology, we have created a tool to more efficiently and effectively identify unique technology needs as well as evaluate the most important components of educational software. We hope that you will find the Toolkit to be both user-friendly and valuable.

GOALS:

What goals, skills and/or curricular areas are you looking to enhance with the addition of the educational technology you are considering?

- Several areas to consider: Approaches to Learning (curiosity, attention, flexible thinking/creativity, persistence), Language/Literacy, Mathematics, Social Studies, Science, Social-Emotional (cooperation, collaboration, identifying emotions).
- It may be that you wish to provide all of the above-mentioned areas, and while some products may promise success in doing so, it is not likely that they can do so at the level of excellence you want to provide for your learners.
- We recommend ranking the above goals in order by importance if you are looking for one solution or that you consider a set.

HARDWARE:

For a very long time, keyboard and mouse driven desktop computers were the main type available and that being said, hardware has changed dramatically in the last few years. There are many options now and it is important to consider that they vary in their strengths concerning young learners. These include:

- Desktop or Laptop Computer (may be best suited to individuals or pairs)
- Interactive Whiteboard (may be best suited to large or small groups, but can be used with individual children)
- Tablet (may be best suited to individuals)
- Multi-touch table (may be best suited to groups or pairs)

SOFTWARE:

This is one of the most important areas of consideration as it represents the intersection where children have the greatest potential for learning as they use technology, whether using traditional software or apps. We have identified 6 areas to evaluate.

1. The software has educational value.

a. Is the focus learning versus winning?

You will want to ensure valuable instructional time is not used for "gaming". This is not to say that concepts are never presented in a game-like fashion, which is appropriate for young learners, but this is as opposed to playing games on a computer for entertainment, with no specific appropriate learning goals.

b. Is the content research and/or standards based?

Ensure that the skills the software is designed to teach or enhance are deemed necessary by research (and/or the curriculum, framework and/or standards of your program).

c. Does the software have feedback that is informative and that teaches its users?

The software should follow an effective teaching path while providing a learning sequence that is obvious, process-oriented, and correct. A teaching component should be provided before asking children to make responses. For example, the names of the letters are taught before asking children to identify them.

2. The software is age and child appropriate.

a. Are the cognitive skills and subject matter age-child appropriate?

You will want to ensure it meets the developmental needs of the children using it. For example, the software should introduce counting before addition. Important too is to consider if the software will be used by children older or younger than the intended range and how they may react-from frustration to boredom.

b. Is the software set in an interesting/appealing context for children?

Having the learning experience set in a theme or context that children can relate to will help ensure it is appropriate and maintains their interest (school, park, farm, etc.).

c. Can pre/non-readers navigate the software?

For early learners, clear visuals that represent ideas and audio/speech need to be in place. This is also very useful and important when the software is being used by ELL children.

d. Is the software free from bias?

The software should not use violence but rather positive social values to convey information. Fair and equal representation of diversity should be present among its characters and settings; including gender, race/ethnicity, physical capabilities, family structure, and roles.

3. The software is child-friendly.

a. Does the software have simple and clear choices?

Children must be able to use software effectively and without undue frustration. Therefore, while it is expected that children need time to determine how the software works, continually getting stuck or confused within a program is not conducive to learning or to encouraging a positive feeling about using technology to learn. Understandable and logical instructions integrated with verbal support, visual prompts, and/or by the children being able to access a help function or a tutorial are necessary with any software.

b. Does the software offer multiple opportunities for success?

You will want to ensure that the software is designed to allow children to re-process the information around the concepts and skills and have another opportunity should this be needed. The software should be open to trial and error to allow children to explore freely and learn how the program works as well as the concepts being presented. However, equally important is that the software be intuitive enough to determine when a child is repeatedly not experiencing success and help the child move to another activity.

c. After adult support, can children use the software independently?

Once teachers have modeled use of the software, children should be able to use it with minimal assistance. Independence should not be taken to mean individual at all times. Children working in teacher-led activities or in pairs can also be a powerful time of learning, particularly for additional language and social skills development. Keep in mind the younger children may need a few more learning sessions than older children.

4. The software is enjoyable and engaging.

a. Does the software have enough activities and variety of activities?

The number and/or increasing complexity of the activities should be substantial enough that the software has staying power and can be utilized throughout a school year.

b. Does the software incorporate appropriate use of rewards?

Use of rewards is appropriate if used to make learning goals clear and concrete while supporting the development of skills, as well as positive approaches to learning (e.g., curiosity, sustained attention and self-regulation, flexible thinking and creativity, and persistence). You will want to ensure the software makes the association for the children between the external reward, such as a star or the chance to view a video clip, and the internal reward such as "you did a great job…you worked hard and figured that out… you helped your friend" so that the child wants to engage with the activities because they seek the positive feelings associated with earning an external reward.

c. Do the activities match the attention span of the users?

Attention span is the length of time an individual can concentrate on a task without becoming distracted. For a typical preschooler this is generally from 5 to 15 minutes, and depends on the individual child and how interesting the task is to that child. Too many graphics, overpowering music, and/or a great deal of movement can decrease a young child's attention span.

d. Are the graphics realistic and appropriate for the intended age group?

Ensure that the software uses representation of objects and situations that are realistic, concrete, and reflect the real world from a child's perspective. For example, pictures of real children, animals set in their accurate environment. Visuals should be whimsical and playful when designed for early learners. Color, scale, music, and animation can help to accomplish this goal.

5. The software has progress monitoring and/or a relevant and useful form of assessment.

a. Does the progress monitoring-assessment cover the software's key areas?

The most valuable role for progress monitoring of any sort is to inform a teacher's instruction at the individual child level. The progress monitoring/assessment feature might include automatic reporting, checklists and observation tools and/or digital portfolios. It should tell the teacher both what the child has done and their level of success. A useful additional feature is an option to see small groups and/or at the classroom/program level.

b. Is the progress monitoring-/assessment tool easy to use, interpret, and share?

To become a part of the instructional cycle means the progress monitoring-assessment feature must be easy to use and then to interpret. You will want to consider how automatic you need these to be. The ability to share with parents can motivate and support them in increasing engagement with their children at home.

6. The software has additional support features.

a. Can the software be customized to individual children's learning needs?

A feature such as this can increase the usability of the software greatly. Teachers can set a predetermined level, or the software only makes the appropriate level or type of activities available. Another possibility is that teachers can move the children through levels manually as they are ready. This can be particularly important for meeting the needs of special learners.

b. Does the software allow for creation of new activities?

This feature can increase usability, interest, and higher order thinking. It also allows children to understand technology is truly a tool that can be used for their own learning goals.

INTEGRATION:

The final area we visit in the Toolkit is integration of use.

- It is recommended that programs look at the entire curriculum and goals and think about how educational technology both fits in and improves outcomes for children.
- One essential area to consider is solid professional development for teachers, for without this educational technology tends to be ignored and looked upon by teachers as too difficult or time consuming to use.
- Some technology provides initial training as well as ongoing support over time and throughout each school year.
- Utilizing the talent you have on staff is an excellent beginning point.
- If training is not included and if it is not possible to put an ongoing plan into place, examine the ease and usability of the software, in addition to written directions and/or help videos, graphics or another form of presentation.