Digital Age Best Practices

Digital Age Best Practices: Teaching and Learning Refocused

by Christopher Moersch, Ed.D.

Efforts to achieve pervasive digital age learning in our schools have often by thwarted by perceived competing initiatives ranging from conventional school reform efforts (e.g., Direct Instruction, Success for All) to popular curriculum models (e.g., Understanding by Design, Learning-Focused Solutions, Universal Design for Learning)—all with the hope of improving instruction and student achievement on high stakes tests. Fortunately, powerful exemplars prevail that demonstrate digital age learning's potential for rigorous and relevant learning experiences that target specific core content areas in math, language arts literacy, social studies, and science. One need look no further than popular educational websites including the George Lucas Educational Foundation (www.edutopia.org), ThinkQuest (www.thinkquest.org), and eCybermissions (www.ecybermission.com) for compelling proof of digital age learning's efficacy to promote high levels of student engagement, collaborative learning, and authentic problem-solving.

What makes these digital age exemplars so engaging to students? More importantly, what impact do digital age best practices have on student academic growth in the classroom? In the current era of high-stakes testing, building and district stakeholders are looking for proven, research-based methods that have demonstrably been shown to impact student achievement. In 2001, Marzano, Pickering, and Pollock identified nine research-based instructional strategies that—when implemented "correctly"—produced a reported statistically-significant effect size on student achievement based on standardized test measures. These strategies include (1) comparing, contrasting, and classifying, (2) summarizing and note-taking, (3) reinforcing effort and giving praise, (4) homework and practice, (5) nonlinguistic representation, (6) cooperative learning, (7) setting objectives and providing feedback, (8) generating and testing hypotheses, and (9) using cues, questions, and advanced organizers (Marzano et al., 2001). (Figure 1).

Though these instructional strategies have been employed at varying degrees by school systems nationwide to improve student academic achievement, their collective impact on transitioning traditional classroom pedagogy from subject-matter-based learning to digital age learning has been minimal. In addition, the research community has articulated additional variables impacting student achievement including direct teaching, advanced organizers, meta-cognition, mastery learning, and cooperative learning—yet none have directly altered conventional classroom roles and routines.

What is missing from the literature are specific instructional strategies that can serve as catalysts to promote digital age learning in the schools as well as offer empirical support for improving test scores. Provided below is a discussion of six instructional strategies referred to as the Digital Age Best Practices (DABP) that—when applied and used in conjunction with the aforementioned instructional strategies—have the potential to elevate student academic growth beyond those documented by conventional best practices alone.

In selecting these digital age best practices, the intent was to articulate a distinct set of instructional strategies that contain empirically-validated results relating to student academic achievement while promoting the tenets of digital age learning based on the following criteria:

- ✓ Aligns to the National Educational Technology Standards for Students (NETS-S) and digital age skills
- ✓ Demonstrates significant results on standardized tests
- ✓ Employs existing classroom digital tools and resources
- ✓ Fosters results that are generalizable to any K-12 classroom

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Figure 1

Best Practice	Supporting Research	Effect Size
Comparing, contrasting, classifying, analogies, and metaphors	These processes are connected as each requires students to analyze two or more elements in terms of their similarities and differences in one or more characteristics. This strategy has the greatest effect size on student learning. Techniques vary by age level.	1.61 or 45 percentile points
Summarizing and note-taking	To summarize is to fill in missing information and translate information into a synthesized, brief form. Note-taking is the process of students' using notes as a work in progress and/or teachers' preparing notes to guide instruction.	1.0 or 34 percentile points
Reinforcing effort and giving praise	Simply teaching many students that added effort will pay off in terms of achievement actually increases student achievement more than techniques for time management and comprehension of new material. Praise, when recognizing students for legitimate achievements, is also effective.	0.8 or 29 percentile points
Homework and practice	These provide students with opportunities to deepen their understanding and skills relative to presented content. Effectiveness depends on quality and frequency of teacher feedback, among other factors.	0.77 or 28 percentile points
Nonlinguistic representation	Knowledge is generally stored in two forms—linguistic form and imagery. Simple yet powerful non-linguistic instructional techniques such as graphic organizers, pictures and pictographs, concrete representations, and creating mental images improve learning.	0.75 or 27 percentile points
Cooperative learning	Effective when used right; ineffective when overused. Students still need time to practice skills and processes independently.	0.74 or 27 percentile points
Setting objectives and providing feedback	Goal setting is the process of establishing direction and purpose. Providing frequent and specific feedback related to learning objectives is one of the most effective strategies to increase student achievement.	0.61 or 23 percentile points
Generating and testing hypotheses	Involves students directly in applying knowledge to a specific situation. Deductive thinking (making a prediction about a future action or event) is more effective than inductive thinking (drawing conclusions based on information known or presented.) Both are valuable.	0.61 or 23 percentile points
Cues, questions, and advanced organizers	These strategies help students retrieve what they already know on a topic. Cues are straight-forward ways of activating prior knowledge; questions help students to identify missing information; advanced organizers are organizational frameworks presented in advance of learning.	0.59 or 22 percentile points

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Digital Age Best Practice #1:

Promoting Shared Expertise with Networked Collaboration

Critical Look-Fors:

- ✓ Students able to articulate a common group goal
- ✓ Evidence of student problem-solving and/or issues resolution
- ✓ Individual and group accountability structures in place
- ✓ Employment of digital tools and resources (e.g., blogs, wikis, discussion forums) to promote collaboration

Structured social networking, a cornerstone of digital-age learning, is not to be confused with students randomly accessing and updating their Twitter, Facebook, or MySpace accounts. As a digital age learning best practice, structured networked collaboration supports the concept of connectivism whereby learning is viewed as a process of creating connections among information sources and developing networks. A network, in this context, may be a community of learners (e.g., a classroom), a digital environment, or a social structure where ideas are shared with others, thereby "cross-pollinating" the learning environment (Siemens, 2005).

When defining networked collaboration, a distinction needs to be made between cooperative and collaborative learning. Though both cooperative and collaborative learning involve students working in groups toward the completion of a task as well as sharing and comparing procedures and conclusions, cooperative learning tends to be more teacher-centered than collaborative learning. Collaborative learning involves the empowerment of students for the purpose of finding solutions to problems and making inferences and drawing conclusions, even though they may be different from the teacher's perspective.

The positive impact of cooperative learning on student academic achievement is well documented in the research literature (Slavin, 1981; Johnson & Johnson, 1999; Dotson, 2001). According to Slavin (1995), "Cooperative learning has its greatest effects on student learning when groups are recognized or rewarded based on the individual learning of their members. Research has found greater achievement gains for cooperative methods using group goals and individual accountability than for those that do not."

As a digital age best practice, collaborative active learning involves student participation in a learning community for the purpose of clarifying, assimilating, or generating new concepts or ideas. Collaborative learning retains the benefits of the cooperative learning structure, but promotes higher order thinking processes, purposeful problem-solving/ decision-making, and issues resolution. The impact of structured collaborative networking on student academic achievement is less documented than cooperative learning given the relative infancy of this instructional approach. Baker, Gearhart, and Herman (1994) found that technology-enriched, collaborative learning environments seem to result in new experiences for students that require higher-level reasoning and problem solving, and they have a positive effect on student achievement.

Studies conducted by Wade (1994) and Teele (2006) reported similar findings involving groups of elementary and middle school students, respectively. Students exposed to a collaborative learning environment achieved higher post-test scores in literacy and mathematics when compared to their control group counterparts. Although the available research on networked collaboration is modest compared to cooperative learning, one should consider its potential in light of the empirical data that supports general group learning configurations.

Digital Age Best Practice #2:

Bolstering Purposeful Inquiry through Student Questions

Critical Look-Fors:

- ✓ Student-generated questions drive the inquiry
- ✓ Evidence of one or more teacher-generated Focus Activities
- ✓ Presence of complex thinking processes
- ✓ Presence of a student-centered learning environment

Student-directed inquiry represents the process of students guiding their own inquiry through self-generated questions driven by the cognitive dissonance between a student's physical, psychological, or digital environment and the student's exposure to/interaction with an event, a self-generated problem or challenge, or a critical observation. Teachers seeking to promote inquiry often capitalize on some type of "Focus" activity (e.g., staged scenarios, discrepant events, world events, word clouds, engaging video clips) that enables students to connect to the content in an authentic manner and generate purposeful questions about the topic.

Contemporary instructional models including the 5E Model (BSCS, 2006), the Experiential-based Action Model (Moersch,1994), the Problem-Based Learning model (PBL), and the Issues-based Science model capitalize on this approach—providing the classroom teacher with a set of guidelines to transform didactic learning environments into purposeful centers of student inquiry. According to the National Science Education Standards (1996), "When engaging in inquiry, students describe objects and events, ask questions, construct explanations, test those explanations against current scientific knowledge, and communicate their ideas to others. They identify their assumptions, use critical and logical thinking, and consider alternative explanations."

Current meta-analytical research findings confirm positive gains on student academic achievement when comparing student-centered inquiry to conventional instruction (Smith, 1996; Preston, 2007). Independent studies by Harmon (2006) and Kessner (2008) documented similar findings. Research studies that address the usefulness of problem-based learning—an instructional methodology grounded in student inquiry and authentic problem-solving—demonstrated that this approach was more effective than traditional instruction in increasing academic achievement on annual state-administered assessment tests as well as teaching specific content areas such as science and economics (Geier, Blumenfeld, Marx, Krajcik, Fishman, Soloway, & Clay-Chambers, 2008; Mergendoller, Maxwell, & Bellisimo, 2006).

The evidence suggests that the role of student inquiry using a student-centered learning model has strong merit as a digital age best practice. As with any best practice—whether digitally-based or conventional—the fidelity of implementation ultimately determines the magnitude of the effect on student achievement.

Digital Age Best Practice #3:

Personalizing and Globalizing Content by Making Authentic Connections

Critical Look-Fors:

- ✓ Learning connected to one or more 21st Century Themes
- ✓ Outcomes require sustained investigation
- ✓ Emphasis on multiple interpretations and outcomes
- ✓ Learning possesses an interdisciplinary perspective

Authentic contextual bridges provide the foundation for students to connect what they are learning in class to the real world. Reeves, Herrington, and Oliver (2003) identified ten characteristics of authentic learning that can be adapted to any subject area. These characteristics include (1) real-world relevance, (2) ill-defined problems, (3) sustained investigation, (4) multiple sources and perspectives, (5) collaboration, (6) reflection (e.g., metacognition), (7) interdisciplinary perspectives, (8) integrated assessments, (9) polished products, and (10) multiple interpretations and outcomes (Reeves et al., 2003). (Figure 2).

As a digital age learning best practice, creating authentic contextual bridges can be easily accomplished by integrating one or more 21st Century Themes as identified by the Framework for 21st Century Learning (Partnership for 21st Century Skills, 2004). These themes include: global awareness; financial, economic, business and entrepreneurial literacy; civic Literacy; health literacy; and environmental literacy. Encasing these themes within a well-conceived and standards-aligned performance task can elevate the rigor and relevance associated with any content area.

A clear delineation needs to be made between authentic performance tasks and authentic assessments. Authentic performance tasks become authentic assessments when scoring criteria is developed and shared with students.

Figure 2

Characteristic	Description
Real-world relevance	Authentic activities match the real-world tasks of professionals in practice as nearly as possible. Learning rises to the level of authenticity when it asks students to work actively with abstract concepts, facts, and formulae inside a realistic—and highly social—context mimicking "the ordinary practices of the [disciplinary] culture."
Ill-defined problems	Challenges cannot be solved easily by the application of an existing algorithm; instead, authentic activities are relatively undefined and open to multiple interpretations, requiring students to identify for themselves the tasks and subtasks needed to complete the major task.
Sustained investigations	Problems cannot be solved in a matter of minutes or even hours. Instead, authentic activities comprise complex tasks to be investigated by students over a sustained period of time, requiring significant investment of time and intellectual resources.
Multiple sources and perspectives	Learners are not given a list of resources. Authentic activities provide the opportunity for students to examine the task from a variety of theoretical and practical perspectives, using a variety of resources, and requires students to distinguish relevant from irrelevant information in the process.

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Figure 2

Characteristic	Description
Collaboration	Success is not achievable by an individual learner working alone. Authentic activities make collaboration integral to the task, both within the course and in the real world.
Reflection (metacognition)	Authentic activities enable learners to make choices and reflect on their learning, both individually and as a team or community.
Interdisciplinary perspective	Relevance is not confined to a single domain or subject matter specialization. Instead, authentic activities have consequences that extend beyond a particular discipline, encouraging students to adopt diverse roles and think in interdisciplinary terms.
Integrated assessment	Assessment is not merely summative in authentic activities but is woven seamlessly into the major task in a manner that reflects real-world evaluation processes.
Polished products	Conclusions are not merely exercises or substeps in preparation for something else. Authentic activities culminate in the creation of a whole product, valuable in its own right.
Multiple interpretations and outcomes	Rather than yielding a single correct answer obtained by the application of rules and procedures, authentic activities allow for diverse interpretations and competing solutions.

The goal is for students to internalize the criteria, establish milestones, and be able to monitor their own progress. According to Mueller (2005), “Authentic assessment is a form of assessment in which students are asked to perform real-world tasks that demonstrate a meaningful application of essential knowledge and skills.”

Research on various forms of authentic learning—ranging from students making authentic connections to integrated curriculum programs—lend support to its inclusion as a digital age learning best practice. In a meta-analysis conducted by Hartzlar (2000), students in integrated curricular programs consistently out-performed students in traditional classes on national standardized tests, on statewide testing programs, and on program-developed assessments. Dickerson (1999) investigated the impact of problem-posing instruction on mathematical problem-solving among 7th grade students and found a statistically significant difference between those students who received some type of problem-posing instruction and those who did not. Problem-posing instruction encourages students to use mathematics to make sense out of their world by building connections between previous and new knowledge through authentic, personally meaningful experiences.

Though research provides empirical support for both making authentic connections and student-directed inquiry as separate digital age best practices, their combined effect in the classroom can provide the foundation for even greater powerful learning.

Digital Age Best Practice #4:

Accelerate individual growth through vertical/horizontal differentiation

Critical Look-Fors:

- ✓ Adjustments to the content, process, and/or product based on learner readiness, profile, and interests are documented
- ✓ Presence of learning centers/stations
- ✓ Digital tools and resources adjusted to the needs of the learner
- ✓ Multiple LoTi levels simultaneously employed in the classroom

In a differentiated classroom, the content, process, and product of learning is adjusted based on the readiness levels, interests, and learning profiles of the students. In a differentiated learning environment, the teacher:

- ✓ Focuses on the essentials
- ✓ Attends to student differences
- ✓ Modifies the elements of the curriculum
- ✓ Participates in respectful work
- ✓ Collaborates with students in learning

An abundance of research findings (Slemmer, 2002; Luster, 2008; Kegerise, 2007) have found positive links between differentiated instruction and student achievement. Its inclusion as a digital age learning best practice has more to do with the complexity and diversity of students entering classrooms across America than with its alignment to the characteristics of the "defined" digital age learner (e.g., digital native). How do you promote the tenets of differentiation in school settings with multiple dominant languages, a large variance in socio-economic levels, and distinct cultural differences? Here lies the challenge.

The Levels of Teaching Innovation (LoTi) framework (Moersch, 1995) describes different levels of teaching practices with graduated levels of authenticity, complex thinking, student-centeredness, and technology use as one moves from a lower to a higher level of teaching innovation. In a digital age differentiated classroom, the existing digital resources are used strategically by the teacher to adjust instruction either horizontally (e.g., student interests, learning modality) or vertically (e.g., student reading level) to accommodate student needs. Instruction is delivered at multiple LoTi levels based on individual student or group learning profiles.

Accommodating the needs of today's digital natives requires multiple skill sets. The educator must be well versed in both specific strategies to differentiate instruction (e.g., tiered instruction, personal agendas, anchor activities, learning contracts, compacted curriculum, flexible grouping) and the available digital tools and resources that promote differentiation (e.g., wikis, blogs, interactive applets, simulations).

Digital Age Best Practice #5:

Anchor student learning with digital-age tools and resources

Critical Look-Fors:

- ✓ Emphasis on content and process skills; not on the digital tools
- ✓ Digital tools used at a LoTi 3 and higher
- ✓ Digital tools used in conjunction with clear, measureable achievement goals
- ✓ Use of digital tools is purposeful and intentional

For years, the term digital age tools and resources or its earlier alias, technology, has been the standard-bearer for digital age skills. Yet, used in isolation, its effect on student achievement has been criticized (Wenglinsky, 1998). As noted by Papanastasiou, Zemblyas, & Vrasidas (2003), it is not the computer use itself that has a positive or negative effect on achievement of students, but the way in which computers are used. According to Perez-Prado and Thirunarayanan (2002) and the National Business Education Alliance (2009), "higher student achievement gains were found in classrooms using technology in conjunction with inquiry-based teaching that emphasized collaborative learning methods, critical-thinking and problem-solving skills."

Roschelle, Pea, Hoadley, Gordin, & Means (2000) noted that, "Technology can enhance both what and how children learn when used in conjunction with: (1) active engagement, (2) participation in groups, (3) frequent interaction and feedback, and (4) connections to real-world contexts." One dramatic way digital tools and resources can affect learning is by introducing real-world contexts for inquiry. According to Quinn and Valentine (2001), the use of technology, "allows teachers and students to augment curriculum with timely, meaningful information and individualized instructional experiences. Students are more likely to discover and understand practical implications and produce knowledge with applications beyond the classroom."

Results of more than 700 empirical research studies, a statewide study, a national sample of fourth and eighth graders, and an analysis of newer educational technologies demonstrate that students show positive gains in achievement on researcher-constructed instruments, national tests, and standardized tests when they participate in:

- ✓ computer-assisted instruction,
- ✓ integrated learning systems technology,
- ✓ simulations that teach higher-order thinking,
- ✓ collaborative networked technologies, or
- ✓ design and programming technologies (Milken Exchange on Education Technology,1999).

These findings corroborate a meta-analysis conducted by Sandy-Hanson (2006), which indicated that students who are taught with technology outperform their peers who are taught with traditional methods of instruction. These findings also suggest digital age tool use is most telling when implemented in conjunction with the other digital age best practices. In the LoTi Framework, the occurrence of digital tool use with complex thinking strategies (e.g., investigation, decision-making) and collaborative problem-solving is first encountered at a LoTi 3 (Figure 3).

Digital-Age Best Practices #6:

Clarify student understanding with formative assessments

Critical Look-Fors:

- ✓ Follow-up interventions are timely, targeted, and based on student data
- ✓ Adequate wait time given for student responses
- ✓ Framed questions apply directly to content understanding
- ✓ Digital tools and resources (e.g., blogs, wikis, discussion forums) used for student feedback

Formative assessments refer to both informal and formal activities used by teachers and students to provide information about individual and group academic progress for the purpose of adjusting or modifying instruction. Research supports the use of formative assessments as a viable strategy to improve student achievement (Black & Wiliam, 1998; Fuch & Fuch, 1986; Wininger, 2005).

According to Black & Wiliam (1998), "such assessment becomes formative when the evidence is actually used to adapt the teaching to meet needs." Formal assessments provide more structure and greater reliability (e.g., common assessments, benchmark tests, performance tasks) while informal assessments require less structure, but are more frequent, transparent, and, in many cases, student-centered (e.g., teacher observations, minute papers, peer reviews, questions and answers, self-reflection, student journals, pair-shares).

Figure 3

LoTi Level	Description
LoTi 0: Non-use	At a Level 0 (Non-Use), the instructional focus can range anywhere from a traditional direct instruction approach to a collaborative student-centered learning environment. The use of research-based best practices may or may not be evident, but those practices do not involve the use of digital tools and resources. The use of digital tools and resources in the classroom is non-existent due to (1) competing priorities (e.g., high stakes testing, highly-structured and rigid curriculum programs), (2) lack of access, or (3) a perception that their use is inappropriate for the instructional setting or student readiness levels. The use of instructional materials is predominately text-based (e.g., student handouts, worksheets).
LoTi 1: Awareness	At a Level 1 (Awareness), the instructional focus emphasizes information dissemination to students (e.g., lectures, teacher-created multimedia presentations) and supports the lecture/discussion approach to teaching. Teacher questioning and/or student learning typically focuses on lower cognitive skill development (e.g., knowledge, comprehension). Digital tools and resources are either (1) used by the classroom teacher for classroom and/or curriculum management tasks (e.g., taking attendance, using grade book programs, accessing email, retrieving lesson plans from a curriculum management system or the Internet), (2) used by the classroom teacher to embellish or enhance teacher lectures or presentations (e.g., multimedia presentations), and/or (3) used by students (usually unrelated to classroom instructional priorities) as a reward for prior work completed in class.
LoTi 2: Exploration	At a Level 2 (Exploration) the instructional focus emphasizes content understanding and supports mastery learning and direct instruction. Teacher questioning and/or student learning focuses on lower levels of student cognitive processing (e.g., knowledge, comprehension) using the available digital assets. Digital tools and resources are used by students for extension activities, enrichment exercises, or information gathering assignments that generally reinforce lower cognitive skill development relating to the content under investigation. There is a pervasive use of student multimedia products, allowing students to present their content understanding in a digital format that may or may not reach beyond the classroom.

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Figure 3

LoTi Level	Description
LoTi 3: Infusion	At a Level 3 (Infusion), the instructional focus emphasizes student higher order thinking (i.e., application, analysis, synthesis, evaluation) and engaged learning. Though specific learning activities may or may not be perceived as authentic by the student, instructional emphasis is, nonetheless, placed on higher levels of cognitive processing and in-depth treatment of the content using a variety of thinking skill strategies (e.g., problem-solving, decision-making, reflective thinking, experimentation, scientific inquiry). Teacher-centered strategies including the concept attainment, inductive thinking, and scientific inquiry models of teaching are the norm and guide the types of products generated by students using the available digital assets. Digital tools and resources are used by students to carry out teacher-directed tasks that emphasize higher levels of student cognitive processing relating to the content under investigation.
LoTi 4a: Integration (Mechanical)	At a Level 4a (Integration: Mechanical) students are engaged in exploring real-world issues and solving authentic problems using digital tools and resources; however, the teacher may experience classroom management (e.g., disciplinary problems, internet delays) or school climate issues (lack of support from colleagues) that restrict full-scale integration. Heavy reliance is placed on prepackaged materials and/or outside resources (e.g., assistance from other colleagues), and/or interventions (e.g., professional development workshops) that aid the teacher in sustaining engaged student problem-solving. Emphasis is placed on applied learning and the constructivist, problem-based models of teaching that require higher levels of student cognitive processing and in-depth examination of the content. Students use of digital tools and resources is inherent and motivated by the drive to answer student-generated questions that dictate the content, process, and products embedded in the learning experience.
LoTi 4b: Integration (Routine)	At a Level 4b (Integration: Routine) students are fully engaged in exploring real-world issues and solving authentic problems using digital tools and resources. The teacher is within his/her comfort level with promoting an inquiry-based model of teaching that involves students applying their learning to the real world. Emphasis is placed on learner-centered strategies that promote personal goal setting and self-monitoring, student action, and issues resolution that require higher levels of student cognitive processing and in-depth examination of the content. Students use of digital tools and resources is inherent and motivated by the drive to answer student-generated questions that dictate the content, process, and products embedded in the learning experience.
LoTi 5: Exploration	At a Level 5 (Expansion), collaborations extending beyond the classroom are employed for authentic student problem-solving and issues resolution. Emphasis is placed on learner-centered strategies that promote personal goal setting and self-monitoring, student action, and collaborations with other diverse groups (e.g., another school, different cultures, business establishments, governmental agencies) using the available digital assets. Students use of digital tools and resources is inherent and motivated by the drive to answer student-generated questions that dictate the content, process, and products embedded in the learning experience. The complexity and sophistication of the digital resources and collaboration tools used in the learning environment are now commensurate with (1) the diversity, inventiveness, and spontaneity of the teacher's experiential-based approach to teaching and learning and (2) the students' level of complex thinking (e.g., analysis, synthesis, evaluation) and in-depth understanding of the content experienced in the classroom.
LoTi 6: Refinement	At a Level 6 (Refinement), collaborations extending beyond the classroom that promote authentic student problem-solving and issues resolution are the norm. The instructional curriculum is entirely learner-based. The content emerges based on the needs of the learner according to his/her interests, needs, and/or aspirations and is supported by unlimited access to the most current digital applications and infrastructure available. At this level, there is no longer a division between instruction and digital tools/resources in the learning environment. The pervasive use of and access to advanced digital tools and resources provides a seamless medium for information queries, creative problem-solving, student reflection, and/or product development. Students have ready access to and a complete understanding of a vast array of collaboration tools and related resources to accomplish any particular task.

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The inclusion of formative assessments as a digital age learning best practice is based on the reflective nature of the formative assessment process to promote personal progress. Shepard (2000) links formative or classroom assessment with the constructivist movement, which suggests that learning is an active process, building on previous knowledge, experience, skills, and interests.

The critical attributes of the formative assessment process are also linked to specific digital age skills that address the importance of being flexible, adapting to change, and becoming self-directed learners (e.g., incorporate feedback effectively; deal positively with praise, setbacks, and criticism; demonstrate commitment to learning as a lifelong process; reflect critically on past experiences in order to inform future progress). According to Stiggins and Chappuis (2008), "…it is the practice of assessment for learning that wields the proven power to help a whole new generation of students take responsibility for their own learning, become lifelong learners, and achieve at much higher levels."

Many, if not all, of the digital age best practices can be integrated seamlessly into any learning experience ranging from a single day lesson plan to a multi-day instructional unit. As with other "research-based best practices," their combined impact on student achievement consistently produces the greatest overall effect size. The deliberate use of these identified Digital age best practices in the instructional planning process in isolation, collectively, or in cooperation with other best practices can ensure that students are given the best opportunity to maximize their academic success as well as prepare for their eventual matriculation into a digitally-based global environment.

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Need More Information?

Fred Saunders
Phone: (760)522-8567
Email: fred@loticonnection.com
www.loticonnection.com