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TEAL+ A Guide for Implementation

A worldwide challenge

Transforming learning to support 21st-century skills and concepts embodied in the 4th Industrial Revolution involve purposefully and deliberately embracing change. Communities that want to improve learners' potential for success in an increasingly technology-centric world need to change. This change requires programming to put educational technology in place that supports a shift toward student-centered instructional practices. TEAL+ encourages innovative teaching strategies and transformative use of educational technology.

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Introduction to Technology-Enabled Active Learning PLUS (TEAL+)

Educational technology has been incorporated into school programming for decades. Many learners can apply practical integrated technology in their everyday lives; however, there are communities with significant gaps in the quality of this experience. Depending on where learners are located, their access to resources and the traditional practices applied, learners may never experience the opportunity to use technology to develop themselves as individuals. TEAL+ programming targets moving from zero (or limited) use of instructional technology in the educational space to a high level of access and student engagement with an emphasis on discovery and promoting individual talents.

Many low-income or impoverished communities have not had the access, resources, or advantages available to provide their learners quality and innovative experiences. The designers of the TEAL+ model attempt to provide and promote higher-order thinking and application of technology for learners in these communities. To do so, they discovered the need to step back and build programming that nurtured students' desire for curiosity, creativity and risk-taking. TEAL+ programming provides a practical way to implement educational technology in a learner-centered environment and a gradual adoption of aligned teaching practices.

Barriers to promoting a shift to student-focused concepts can involve educational organizations' readiness, willingness and ability to empower teachers. The TEAL+ model focuses on shifting teachers, administrators and community members' commitment from improving specific technology skills toward supporting learners' potential.

Removing barriers and adopting TEAL+ programming is only the beginning of what is required for a learning community to help students reach their full potential.

Each education community should approach the primary components of TEAL+ with the awareness and commitment to add their own unique circumstances, culture and larger community involvement. This can establish the ownership required for long term success. No organization that chooses to implement TEAL+ will be identical to another. TEAL+ incorporates elements of many educational models and concepts. This is not a cookie-cutter program and each implementation should be viewed as a pilot program requiring gradual improvement, constant evaluation, adjustment and continued iteration.

TEAL+ definition

TEAL+ stands for Technology-Enabled Active Learning PLUS. The PLUS represents the components emphasizing personal learning through STEAM. STEAM represents the content areas of Science, Technology, Engineering, Art and Math. Technology-enabled concepts support students and teachers and promote an active and personalized environment. Some TEAL+ tools empower teachers with technology for managing their classroom. Others promote personalized programming for learners.

Rather than teach skills in isolation, TEAL+ promotes opportunities to build and combine skills in an authentic learning environment. Reengineering the classroom begins with a desire to shift from teacher-centered to learner-centered environments. When learners are at a station working collaboratively on real-world scenarios, the teacher becomes a coach, mentor, or guide.

In TEAL+ programing, the environment fosters increased engagement and participation by learners. An Active Learning Classroom (ALC) model uses flexible spaces and furniture supportive of student collaboration and a teacher's ability to move freely around the room. The transformational use of technology extends the potential of the ALC by providing tools to both the teacher and learner that foster engagement, understanding and scope of content.

TEAL uses technology tied to a classroom design and use of presentation displays and collaboration tools. While the concept of grouping student at tables and even using forms of displays is not a significantly unique concept, the introduction of the TEAL acronym as a concept was first promoted by instructional design experts at Massachusetts Institute of Technology (MIT). MIT professors John Belcher, Peter Dourmashkin and David Litste created this format for transforming their introductory physics courses (Breslow, 2010[1]).

MIT's TEAL project introduced a blend of pedagogy, technology and classroom design in a first course Fall of 2001. TEAL rooms were designed with group tables, connected displays and communication tools which are common in many universities, K12 schools and businesses. In many cases, the focus of a TEAL room is to bring together individuals from different programs, departments, or roles to a neutral space that allows for collaboration, fosters empathy and focuses on a of collective purpose.

[1]*Breslow, L. (2010). Wrestling with Pedagogical Change: The TEAL Initiative at MIT. Change, 42(5), 23–29. https://doi.org/10.1080/00091383.2010.503173*

TEAL+ incorporates these concepts and illustrates a deeper relationship between instructional design and the integration of technology: it empowers teachers in an active classroom and personalizes learning opportunities for students. TEAL+ programming emphasizes empowering teachers and learners with technology tools to meet their goals. Teachers are provided management tools to support their shift towards a learner-center environment. Technology tools are selected to help with the mass customization, adaptable pacing, and promoting learners' own agency to their own learning path.

The TEAL+ program promotes a student-focused learning environment where they are allowed to try new things, fail, and succeed at their own pace. The learner will have the support and encouragement of teachers dedicated to providing equitable, safe and challenging experiences. TEAL+ is grounded in the intent to provide an amazing experience regardless of gender, race, social-economic status or geography.

Goals

21st century skills increase incorporation of technology into career readiness. TEAL+ programming provides a path to implementing educational technology and innovative instructional practices in a practical way to achieve the following goals:

- Provide enriching learning opportunities to those experiencing opportunity gaps by teaching them skills that develop their individual and collective talents.
- Support the concepts of the 4th Industrial Revolution: People anywhere, with access to quality internet and transformational technology, can learn anything. And they can apply that knowledge to reach personal success and contribute to their communities.
- Addresses the systemic issues in educational organizations that limit all learners' success: particularly counteracting didactic instructional practices, passive engagement, substitutional level of technology use and the lack of personalization.
- Improve learners' readiness to advance towards challenge-based, project-based learning or other collaborative learning opportunities.

Fundamental principles supported

TEAL+ programming incorporates educational technology that creates an environment matched with pedagogical practices shown to foster student-centered learning and development of young leaders.

Two fundamental principles are:

An **environment** promoting critical thinking, creativity and leadership development. TEAL+ programing fosters personal growth for tomorrow's leaders.

Pedagogical practices that create safe, welcoming and learner-centered conditions for gender, race or ability are a key focus within TEAL+ programming. In a TEAL+ classroom, teacher-centered and learner-centered engagement can be improved by purposeful instructional practices designed to build trust across these relationships.

Primary skills promoted

Beyond targeting individual skills and concepts, TEAL+ supports progress towards combining skills applied at a high level. The combined skills include:

- Critical thinking
- Problem solving
- Creativity
- Leadership
- Personal agency

Criteria

Specific software applications (apps) and activities are selected based on their ability to support learners with these attributes:

1. **Physical-to-digital connection:** Digital pens, Sphero robotics, OSMO manipulatives and Specdrums music rings all connect physical interaction with digital challenges.

2. **Adaptive both in difficulty and accessibility:** Meeting learners where they are and allowing guided growth regardless of readiness is a must. Alternative language support and text-to-speech are among many assistive technologies common between selected apps..

3. **Learners progress at own pace:** Removing limits based on previous performance means that no learner is held back or pressed prematurely forward based on other learners.

4. **Prompts and hints to guide learners:** Teachers don’t have to be the guide. In-app support for learners as they progress or need assistance reduces the teachers need force whole-class, linear participation.

5. **Feedback to guide the learner:** Supports independent progress and self-reliance while also freeing up teacher time.

Active learning

Active learning is defined broadly by Talbert (2019[2]) to include any pedagogical method that involves students actively working on learning tasks and reflecting on their work apart from watching, listening and taking notes. To promote active learning, TEAL+ programming applies strategies to encourage a student-centered learning environment and conditions. Learner-centered environments and conditions promote:

- Increased participation and engagement
- A space for all to circulate by removing teachers' desks or podiums, eliminating the front- or back-of-the-room feel
- Active engagement of teachers
- Easy use of "proximity" - no tethered connections for teachers or learners
- Opportunities to discover talents - no preconceived limitations
- Spontaneous sharing of learning, discovery, and knowledge; airplay from anywhere to any display in the room without moving or being tethered.

Assessment

For decades, educational organizations have relied on some form of standardized assessment for evaluating students' knowledge, progress, and growth compared to other learners. Post-secondary education has relied heavily on these results for entrance qualification and scholarships. National exams have also been used to evaluate an educational organization's success. This emphasis on exam scores has shaped curriculum and instructional methods with a focus on group over individual success.

TEAL+ programming de-emphasizes the importance of national exams, aligning curriculum with exams, or instruction practices geared toward standardized exams. Rather than relying on summative assessment methods, TEAL+ programming involves alternative forms of formative assessment. These target students' increases in opportunities, their quality of experience, their engagement and their personal growth. This programming values potential and readiness for further learning over academic scores.

The assessments incorporated in TEAL+ programming shift attention to the individual learner's growth. Assessments geared toward providing feedback and material for learner reflection actively and specifically supports further growth. This is a purposeful change from the emphasis of reporting overall data. The focus on individual learners' growth is intended to increase student self-agency and influence in their own learning path.

[2]*Talbert, R., & Mor-Avi, A. (2019). A space for learning: An analysis of research on active learning spaces. Heliyon, 5(12). https://doi.org/10.1016/j.heliyon.2019.e02967*

Learner assessments include but are not limited to:

- Portfolio of learning
- Certificates of accomplishment
- Project outcomes
- Personal evaluations
- Demonstration of learned outcomes

Program assessments include:

- Walkthrough evaluation form that examines:
  - Teacher-to-student engagement
  - Student-to-student engagement
  - Use of technology for higher-order thinking
  - Use of technology for classroom management
- Equity
- Student feedback
- Data collection on learner progress

Agreement for organizations

TEAL+ programming is all about change. Not all organizations are ready for or desire to change. Being eager to accept donations for programming that includes technology resources is not a guarantee of a willingness to adopt change. There needs to be an agreement and commitment from the organizational leadership to adhere to the TEAL+ concepts and desired outcomes. The agreement should primarily be centered around adopting elements of change to the current state of learning and delivery within their current organization. The specific TEAL+ programming conditions are vital:

1. Teachers will accompany students and actively follow TEAL+ and the facilitators' instructions. This allows modeling and transfer of practices in a gradual and purposeful manner.
2. Class or group size is limited to no more than 25 learners (in centers with five stations), or five learners per TEAL table (station).
3. All learners will be allowed to participate regardless of gender and ability, and the program will not be used as discipline incentive. Programming is to support expanding exposure to the use of technology beyond those already included in computer science programs.

Agreements for adults (teachers)

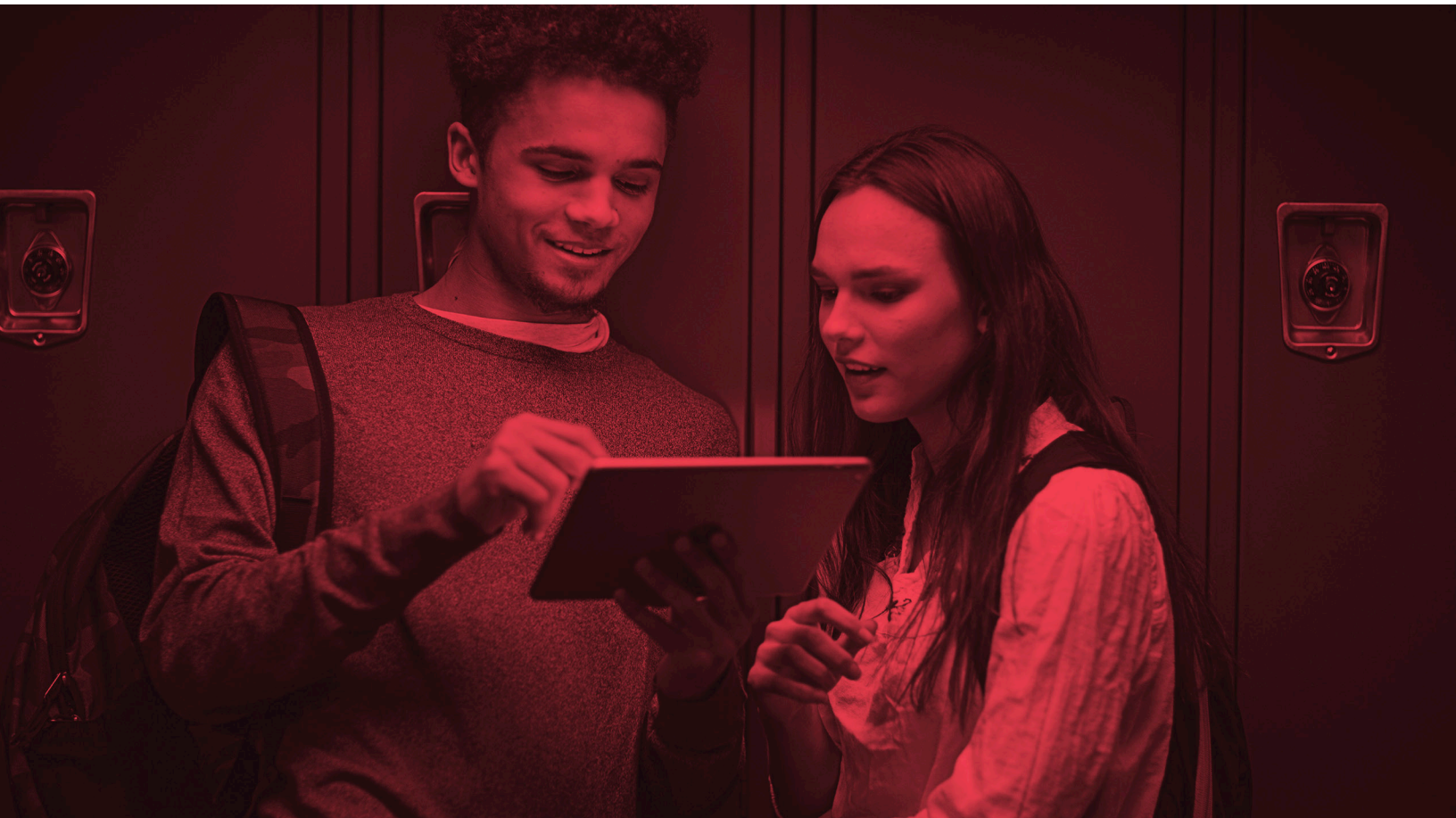
These should be explicit and explained to all adults at the beginning of all engagements. Teacher expectations should be reviewed before every engagement. A teacher who models reviewing expectations with learners is one way to establish a safe environment that fosters a learner-centered mindset.

Please do

- Move from table to table checking on how students are doing.
- Ask students questions starting with: why, how, show and explain.
- Ask the other students to help, and require them to follow these agreements (do's and don'ts).

Please do not

- Interrupt when the facilitator asks a question and do not press students to respond. We are using "wait time;" interruptions break a learner's ability to think beyond surface-level responses. To engage all learners takes time.
- Touch the students iPads or manipulatives being used — if you are trying to help - explain; do not do it for them. As a last resort - ask permission. Struggling is part of the process of learning.
- Answer questions directly. Prompt them, give hints, have other students answer.



Technology-enabled education is for both the learner and the teacher.

Barriers to a teachers' adoption of both educational technology and student-centered learning are often based on perceptions of this model as time-consuming and complicated. When asked about a perceived hesitancy to adopting learner-centered practices, teachers often say the same thing: "Save me time and make my life less complicated."

Device-based classroom management supports a teacher's shift toward student-centered learning by saving time and simplifying processes.

Saving time: Teachers can pause, focus on specific apps, smooth transitions, and prepare lessons or activities with in-class device management like Apple Classroom and Jamf Teacher. It is easy to count the number of transitions and the typical time it takes to get one, several, or the entire class's attention. Reducing the loss of learning time adds more opportunities for students to experience TEAL+ programming.

Simplifying: Device-based classroom management supports a calming environment while allowing for enthusiastic engagement. It smooths transitions, reduces distractions and connects with students without escalating chaos.

Reducing chaos is another value proposition for TE in the TEAL+ philosophy. When combined with device-based classroom management, TEAL+ programming supports a teacher's ability to gain learner's attention fast while still fostering an active learning environment.

How is TEAL+ different?

The education technology adage "it's not about the technology" is intended to guide the implementation of technology in education. Unfortunately, a focus exclusively on the technology and how to get it cheaply and quickly has remained the key focus of many adopted programs. Adoption decisions centered on cost and simplicity to meet basic expectation have overshadowed the ability to meet personalization and support teachers' pedagogical practices. A report by the the Office of Educational Technology of the United States Department of Education underscores this issue: "Many schools do not yet have access to or are not yet using technology in ways that can improve learning on a daily basis, which underscores the need—guided by new research—to accelerate and scale up adoption of effective approaches and technologies."[3]

[3] *Reimagining the Role of Technology in Education, U.S. DEPARTMENT OF EDUCATION (2017)*

The TEAL+ programming is not about the technology; however, specific transformational technology can be the lynchpin supporting change in the learner and teacher relationship.

The emphasis on specific technology is deliberate, purposeful, and measured. Measured in the sense of gradual implementation: a gradual increase of expectations, and a gradual focus of evaluation. Accepting changing instructional practices and supporting those changes are the primary differences that TEAL+ emphasizes. Technology is a key component in supporting adoption, personalization, and adaptability; however, the relationship between learners and teachers, and the shift to student-centered learning, remains the primary aspiration.

TEAL+ programming can support the gradual move toward student-centered learning and the adoption of transformational use of technology. The programming includes specific technology tools, applications and activities designed to support the adoption of TEAL+ practices; however, all of these are intended to accelerate a gradual shift—not necessarily to sustain it. Long-term success will require each organization to extend, develop and customize their specific programming to meet their own goals.

TEAL+ programming has the potential to build the prerequisite skills necessary for more advanced programs. Too often, programming is designed to skip the building of these fundamental skills and attempt to implement programs without a base of prepared learners. TEAL+ programming is designed to support building a group of learners with the readiness to enter and succeed in more advanced or specialized programs.

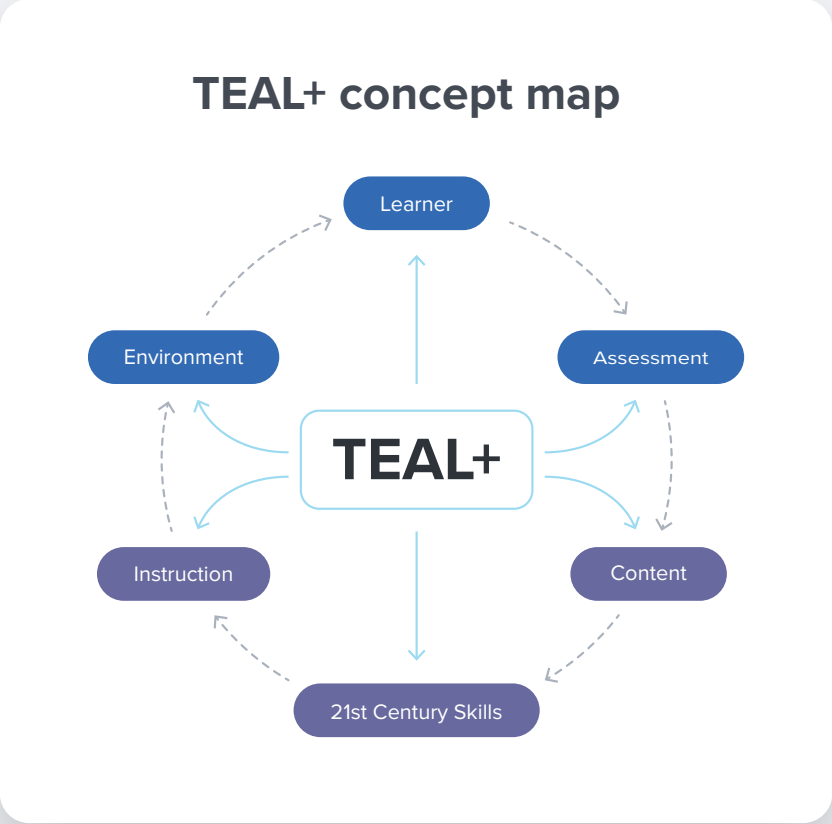
With time and a commitment towards the gradual adoption of TEAL+ practices, the key result will become an integrated approach to increase learners' readiness for broader programming. The readiness for teachers and learners to explore other collaborative and discovery-based learning models is an expected result. Teachers and learners should eventually have the aptitude to support the application of higher-level thinking or creative skills.

What TEAL+ is not

TEAL+ programming is not a complete curriculum or all-encompassing standalone program. TEAL+ is especially designed to help organizations experiencing zero or ineffective success of integrating technology to improve student learning. Rather than a fully all-encompassing package, TEAL+ is a program to kickstart or incubate the strategies and techniques that help transition an organization toward their own goals.

While there will be new discoveries along the way and adjustment made, there are specific technology and non-technology areas identified that present challenges. TEAL+ programming attempts to mitigate these with lessons learned— based on practical, hands-on experience.

- TEAL+ is not for an immediate implementation focused on promoting career readiness or high-level STEM programs without first cultivating curiosity, courage and interest in the learners.
- TEAL+ is not for organizing with leadership or for teachers lacking the readiness to change.
- TEAL+ programming is not for groups seeking to select technology on basis of cost and easy-to-set mass privileges.
- TEAL+ does not rely on heavily internet-dependent applications requiring reliable internet access and large bandwidth.
- TEAL+ programming cannot be implemented without technology tools and professional development and training for teachers to manage the digital classroom.



TEAL+ areas of focus

Learner

Learner-centered or student-centered environments emphasize individual leaners' success and engagement. The opposite would be teacher-centered, at its simplest form: teachers lecture to their classes without (or with very little student) engagement. With a student-centered approach toward instruction-student readiness, pace and expected progress is individualized. This approach also prioritized student agency, self-efficacy, voice and choice. In addition to academic readiness and growth, TEAL+ programming supports the individual leaner's development of:

- Emotional Intelligence
- Social/emotional wellbeing
- Empathy
- Equity

Environment

Creating the conditions for success begins with the physical environment designed to support student-centered learning and collaboration as well as teachers' ease with classroom management. Rather than single desks or even basic tables, TEAL+ stations are set up with displays and arranged to allow a free flow of students and teachers. While personalization is a major aspect of TEAL+, the model also provides for spontaneous collaboration and sharing of ideas between students. Rather than being tethered at the front of the room, the TEAL design supports engagement with all students and, if necessary, direct instruction.

Content

Beyond the physical arrangement, other elements that may not be as obvious significantly impact a student's potential success. Displays allow wireless connection that allow spontaneous sharing in small groups and to the whole class. Alternative input options support transformational use of technology and previously unimaginable interaction between learners and their devices. Even the functionality and affordances that can function offline are chosen purposefully to promote student engagement with minimal internet access.

Instruction

21st century skills require a grounding in the "6Cs:"

- Critical thinking
- Collaboration
- Creativity

- Communications
- Citizenship (including digital citizenship)
- Community

Rather than emphasizing skills in isolation, TEAL+ promotes opportunities to combine skills in an authentic learning environment. Reengineering the classroom begins with a desire to shift from teacher-centered to student-centered environments. When students are at the center, working collaboratively on real problems, the teacher becomes a coach, mentor or guide.

There are many instructional techniques that support a learner-centered teacher's strategies. The primary techniques emphasized within TEAL+ programming are the use of:

- Proximity
- Wait time
- Guided discovery
- Purposeful questioning

Emphasizing these techniques helps to create conditions for success.

Combining proximity and wait times, teachers can foster engagement without a loss of instructional time. A teacher able to move around the room allows them to eliminate a front or back of the room. Simply standing near a student can reduce distraction and avoid or deescalate any potential disruption. Asking a question and waiting several seconds before calling on students also results in greater participation and higher-quality responses.

Guided discovery and purposeful questioning promote active learner participation. The role of the teacher shifts to that of a facilitator. Allowing the teacher to not be the sole source of knowledge creates opportunities for students to be the "smartest person in the room." Doing so also removes the limits on what learners can discover and what provides them with motivation.

21st century skills

A 21st century skills approach offers opportunities to be successful regardless of where you live. Developing critical thinking, problem-solving and creativity equips a person to learn and work on anything, anywhere. The ability to gain knowledge can be done from anywhere with an internet connection. The ability to apply what students have learned is key to success in a knowledge-based economy.

Assessment

Assessment will require an education transformation from passing an exam to demonstrating a versatile set of skills. Unlike traditional assessments that target a learner's abilities compared to other students, a personalized approach to assessments stresses the learner's personal growth and readiness. The added element of technological influence and potential to assist learners can be assessed using a variety of evaluation models.

These models focus on the engagement of the learner, the level of engagement of the teacher and the potential to promote critical thinking and creativity. Integrated within the TEAL+ programming assessments are components of SAMR, TPaCK, and LoTi models of technology implementation (see below).

Each of these three models center on the use of technology to engage, include pedagogy and emphasize higher-level thinking skills. Assessments should examine the interaction between teacher and student as well as student to student from an active versus passive level of engagement.

SAMR was developed by Dr Rubin Puentedura (http://hippasus.com) and includes:

- Substitution: Basic use to replace analog methods
- Augmentation: Minor improvements to analog methods
- Modification: Beginning the transformation of technology use to achieve a high level of application
- Redefinition: Transforming learning to achieve abilities not previously possible

TPaCK (Technology, Pedagogy, and Content Knowledge)

TPaCK supports overlapping elements equally, valuing each component and potential within the intersection of the three. The TPaCK framework was developed by Punya Mishra and Matthew J. Koehler of Michigan State University in 2006 **http://www.tpack.org**.

LoTi - Level of Teacher Innovation

LoTi measures learner engagement, with a 0-7 measure examining content at a higher level that leads to transformational application of technology to solve problems. Christopher Moersch is the creator of the LoTi framework **https://www.loticonnection.com**.

Acknowledgments

Thank you to everyone who shared their thoughts, ideas, resources, and time to assist in the development of this resource. Your contributions are appreciated and will go a long way to helping others through practical application of TEAL+ programming.

This guide is a living document and will continue to change and grow as we learn from practice and each other.