



FRAMEWORK of Essential Skills of the K-12 CTO

The Framework of Essential Skills of the K-12 CTO is comprised of three **primary professional categories** in the education technology field. Each of these categories includes **10 essential skill areas**, outlining the **responsibilities and knowledge** needed to be a viable **educational technology leader**. Each of these skills and the related knowledge needed to demonstrate them are included in CoSN's Certified Education Technology Leader (CETL) certification exam.

- Leadership & Vision
- Strategic Planning
- Ethics & Policies
- Instructional Focus & Professional Development
- Team Building & Staffing
- Information Technology Management
- Communication Systems Management
- Business Management
- Data Management
- Data Privacy and Security

The **Core Values & Skills** of the *Framework* extend through all 10 skill areas and are practiced by effective CTOs. They represent the critical personal skills and behaviors necessary for accomplishing all of the other competencies identified in the *Framework*. These core values and skills include being an effective **Communicator** and **Innovator**, **Exhibiting Courage**, and being **Flexible & Adaptable** and **Results-Oriented**.

Primary Professional Categories

I: Leadership & Vision

II: Understanding the Educational Environment

III: Managing Technology & Support Resources

I. Leadership & Vision (36%)

A. Leadership and Vision (15%)

Provide leadership while working with the executive team to develop a strategic plan that will support the organization's mission, vision, and goals with technology.

IA – Actively participate with members of the organization's leadership team to create a vision for how technology will support the organization's strategic and operational goals

Knowledge of: strategic planning techniques; effective collaboration skills; existing and emerging technologies; interpersonal communication skills (e.g., asking questions to solicit best ideas from the group and consensus-building strategies)

IB – Establish and lead advisory committees that inform and support meaningful and effective uses of technology in support of the organization's strategic goals

Knowledge of: definitions of roles, responsibilities, and expectations; time management skills; organizational skills; constructive conflict management

IC – Facilitate the process of priority setting and decision making for meaningful and effective uses of technology in support of the organization's strategic goals

Knowledge of: use of decision-making rules; time-management skills; organizational skills; big picture awareness; systemic planning skills

ID – Lead infusion of innovative technologies into all aspects of education

Knowledge of: scope of promising technologies; forecast of return on investment; benchmark measurements for key innovations

IE – Leverage appropriate relationships (opportunities) between emerging technology resources and the education process

Knowledge of: focus on effective, challenging, and engaging learning for all; value of new technologies

IF – Develop and maintain a systemic understanding of the core business and culture of the school organization

Knowledge of: listening skills; relationship-building skills; organizational structure (formal and informal); stakeholders (community and employee demographics); organization history

IG – Employ technology within the interdependent environment of assessment, curriculum, and instruction

Knowledge of: sources and nature of educational content and processes; technologies that can be used for the greatest impact on teaching and learning; assessment best practices (e.g., how to assess key instructional activities, learning diagnostics, assessing learning styles, educational terminology, and accommodations for all learning styles)

IH – Facilitate change in an organization and deal with ambiguity effectively

Knowledge of: techniques to manage the change process; cultural context of change; role of professional development in change process; techniques for communicating need for change, direction, and destination (successful accomplishment of vision); facilitating change

II – Promote effective use of communication and marketing resources

Knowledge of: building support for change through a variety of mechanisms (leading by example, and personal and mass communication); relationship building; marketing collateral (online, hardcopy); public speaking; use of data to help people to draw conclusions; storytelling (e.g., tangible examples of what effective change looks like)

IJ – Collaborate with business and instructional units to develop ownership of their work processes

Knowledge of: effective power-sharing techniques; building supportive relationships; importance of focus on shared goals; value of using processes (methods) that recognize contributions of individual stakeholders; sense of common mission; camaraderie to ensure success

IK – Communicate the effectiveness of technology in professional activities (e.g., model, inform, and demonstrate how technology assists with productivity)

Knowledge of: role of technology to enhance efficiency and effectiveness of current practices; cost reduction opportunities (e.g., online attendance, accounting, operations, and professional development records for certification documentation)

B. Strategic Planning (15%)

Possess a high-level view across the organization and work with teams to identify steps needed to transform the educational and operational technology vision into a strategic plan in alignment with the organization's mission, vision and goals.

2A – Work with key system leaders, people networks and/or learning communities (e.g., math teachers) and departments to identify steps needed to meet strategic goals

Knowledge of: identifying system leaders; best practice of strategic planning; technology framework; alignment of technology to the strategic goals

2B – Work with key system leaders, people networks (e.g., math teachers), and departments to identify budget and funding mechanisms needed to meet strategic goals

Knowledge of: sources of funds, including federal, state, local, and public and private grants; donations; budget development (chart of accounts)

2C – Align technology team activities with the school organization goals

Knowledge of: aligning resources such as people, capital, and expenses; goals and performance evaluations aligned to organization goals; relative priorities of competing demands

2D – Promote and lead the implementation of industry best practice methodologies, tools, and programs (e.g., TCO, ITIL, SDLC, Baldrige) in support of technology

Knowledge of: TCO concepts; modeling the implementation of methodologies, tools, and programs in support of organization goals; use of financial information, financial, and non-financial metrics; conducting a needs assessment

2E – Articulate and fully leverage the value of investment (VOI) in technology to ensure effective delivery of services aligned to the organization vision and goals

Knowledge of: communicating the alignment of research to support best practices to illustrate VOI; application of project management; prioritization concepts to implementation

2F – Provide leadership in strategic alignment of technology with all organization systems (e.g., instruction, assessment, finance, facilities, transportation, security, food service)

Knowledge of: how to find evidence and examples of successful solutions for each organization system and department; methods of identifying “all organization systems;” methods of communicating results (e.g., case study); organization system components

2G – Integrate technology with curriculum and instruction to provide an appropriate teaching and learning environment

Knowledge of: evidence and examples of successful solutions for each organization system and department; measurements for how technology supports each system or department; integration and relationships between various departments

2H – Develop sound practices that guide, articulate, and inform the organization of risk management strategies and risk mitigation in support of business and instructional initiatives

Knowledge of: developing a security plan; periodic and ongoing tests for backup and recovery; redundancy systems; means of assessing risk and potential impact

2I – Monitor, evaluate, and report on organization’s educational technology plan

Knowledge of: metrics; data on goals, strategies, and budget to support the technology plan; reports that are meaningful to stakeholders (applicable to education)

2J – Advocate for organization-wide disaster recovery and business continuity planning

Knowledge of: best practice examples of successes and failures; a phased-in plan to include multiple solutions; involving stakeholders in refining plan; implementing drills

2K – Plan and implement the organization’s goals and objectives by leading innovation and strategy

Knowledge of: conveying complex technology concepts in familiar terms to non-technology staff; translating data and statistics into easily understood graphical representations of goals and objectives; engineering solutions based on existing goals and objectives; developing solutions for creating a process of continuous improvement

C. Ethics and Policies (6%)

Manage the creation and implementation of policies and procedures relating to the social, legal, and ethical issues involving technology use throughout the organization and modeling responsible decision-making.

3A – Model and ensure adherence to state and federal laws

Knowledge of: applicable state and federal laws; monitoring for compliance; collaborating with other impacted departments and areas of the organization; system goals and practices; process for demonstrating personal and system compliance

3B – Demonstrate high standards of integrity and professional conduct with consideration for fairness and honesty

Knowledge of: policies and procedures at all levels (e.g., organization, federal, E-Rate); maintaining records

3C – Communicate to stakeholders the appropriate ethical and professional behavior for technology use in the organization

Knowledge of: examples of best practices; expert examples in the field and/or experts who can share their examples

3D – Model and ensure awareness about pertinent laws and legal issues related to implementation and use of technology in a organization (e.g., copyright, privacy, and compliance)

Knowledge of: resources for maintaining current information about laws and legal issues and how particular organization departments, policies, and practices are impacted; multiple methods of communicating information

3E – Maintain safety of students and staff

Knowledge of: potential vulnerabilities and issues; best preventive practices; cyber-security and physical security; policies impacting vulnerabilities

3F – Demonstrate commitment to responsible environmental protection and energy-saving practices

Knowledge of: how to align technology planning and implementation to support goals for environmental protection and energy-saving practices; best practices for appropriate equipment disposal

3G – Collaborate with others in the policy development process by ensuring that policies support a high-performing learning environment

Knowledge of: existing policies with impact on high-performing learning environments, policy development guidelines and process; policy writing and development; communicating and collaborating with individuals; the definition of a high-performing learning environment

3H – Facilitate equitable access to technology resources for all stakeholders

Knowledge of: definition of equitable access; structuring technology expenditure formulas to accommodate equity; identifying stakeholders in the equitable process, as determined by organization practice and/or policies; access needs of diverse students and staff (e.g., UDL information, IDEA, ESL, special needs)

II. Understanding the Educational Environment (33%)

A. Instructional Focus and Professional Development (18%)

Budget, plan, and coordinate ongoing, relevant professional learning for all staff using technologies; ensure or recommend a sufficient budget through the implementation and assessment process of emerging technologies.

4A – Plan for and coordinate ongoing, purposeful professional development

Knowledge of: needs assessments; resources (funding, technologies, and policies); stakeholder feedback; communications

4B – Identify and promote how technology can support educational best practices through communication and collaboration with the organization instructional leadership

Knowledge of: needs assessment with instructional leaders; best practices (from research and collaboration with field); alignment of technology resources to support best practices; alignment of technology and curriculum standards

4C – Empower staff to reach a proficient level to meet the ongoing demands of their jobs

Knowledge of: staff proficiency assessment; alignment of job roles to technology resources; resource availability or need

4D – Promote standards for innovative teaching and learning that develop student proficiency in 21st century skills

Knowledge of: communicating 21st century skills; plan to share or communicate examples of standards and innovative teaching; collaboration with local education institutions to establish programs of interest for existing teachers; how to serve in an advisory capacity to develop new teachers

4E – Stay abreast of state and national standards, benchmarks, and frameworks for technology literacy

Knowledge of: organizations responsible for developing and modifying standards; collaborating with staff to share updates regarding standards; professional development associated with the standards

4F – Promote the application of technology to address the diverse needs of students and maximize student learning

Knowledge of: stakeholder needs; identification of resources; plan to share and/or facilitate professional development opportunities; examples of effective uses of technology to maximize learning for diverse students

B. Team Building and Staffing (15%)

Create and support collaborative teams for decision-making, technology support and professional learning in support of the organization's mission, vision, and goals.

5A – Create cross-functional teams for appropriate aspects of the organization's technology program

Knowledge of: system organization; when to pull people together, who to pull together, and how to pull them together; roles and responsibilities within the organization; who should be around the table; protocols; determining when a team is necessary; when and how to come to consensus

5B – Support cross-functional teams for appropriate aspects of the organization's technology program

Knowledge of: the team's function; ensuring the resources to deliver on the functions (e.g., knowledge, funding, time, tools)

5C – Manage diverse, cross-functional teams that work and perform well

Knowledge of: distributed leadership; leadership skills

5D – Mentor and empower others to assume leadership roles; set clear objectives and measures; monitor process, progress, and results

Knowledge of: defining and setting expectations; establishment of agendas and targets; planning and coordinating meetings; meeting protocols; feedback; assigning defined responsibilities to others (e.g., delegation)

5E – Build an environment of trust through communication and transparency about decisions and how they are made

Knowledge of: purpose of any team; ensuring everyone is clear on the expectations of the team and their roles on the team; standards for team communications (who, what, when, where, how); proper follow-through on team commitments

5F – Use tools (e.g., quality improvement) for decision making to support effective teamwork

Knowledge of: team milestones; how and who to meet the milestones; framework for decision making that includes current state and desired state assessment information; scorecards, dashboards, and/or progress summary

5G – Build an environment that encourages team member communication

Knowledge of: engaging team members; communication protocols (reply to all or send to lead person, shared tool set); limiting positional power; ensuring everyone has the opportunity for input; issues associated with favorites; appropriate use of meetings; post-meeting follow-up that includes everyone

5H – Analyze and identify on an ongoing basis individual and team strengths, required areas of growth, and how teams and their members are being deployed and redeployed

Knowledge of: building teams based on the needs of the team and not the job; descriptions of individual strengths and weaknesses of the staff; separating fact from opinion; reconciliation of mixed messages; techniques for dealing with personalities and professional interactions

5I – Make effective hiring decisions using quantitative and qualitative data

Knowledge of: representative job descriptions; screening and interviewing processes that match the knowledge, skills, and dispositions necessary for success in the job; valid measures; measures that are appropriate for the position and the environment; validation of information sources

5J – Provide feedback to individuals and teams on a regular basis regarding areas of strength and required growth, using quantitative and qualitative data

Knowledge of: establishing team benchmarks; providing on-going feedback to the team; when to address the individual one on one and when to escalate to a supervisor; characteristics of feedback (e.g., timely, specific, corrective)

5K – Analyze the structure and system organizational chart of the team relative to its ability to address the organization strategic plan

Knowledge of: team function and responsibilities; clear job descriptions; accuracy and publication of organizational chart; involving board and leadership as needed; assessing strategic plan for staffing requirements; needs analysis; alignment of staffing resources to needs; skills development

5L – Deploy staff to best address the organization strategic plan and meet its goals

Knowledge of: realigning positions and reassigning staff based on data obtained from organization structure; working through HR and the budget process as necessary

III. Managing Technology and Support Resources (31%)

A. Information Technology (7%)

Lead the integration of technology into all appropriate areas of the organization.

6A – Plan all tasks related to technical systems, network infrastructure, and technology device management

Knowledge of: system design; standards concepts (e.g., networking standards and interoperability); resources available (e.g., funding and people); rationale for technology choices made; need for training, readiness, and concept of scalability

6B – Implement all tasks related to technical systems, network infrastructure, and technology device management

Knowledge of: techniques for overseeing the implementation; alignment of roles and responsibilities to tasks and project management techniques

6C – Sustain all tasks related to technical systems, network infrastructure, and technology device management

Knowledge of: impact of choices made (e.g., if outsourced, still have to sustain); keeping up with availability and trends of emerging technology

6D – Evaluate all tasks related to technical systems, network infrastructure, and technology device management

Knowledge of: total cost of ownership; return on investment; pilot projects (e.g., meet goals, support education, comparison of plans to actual outcomes); communication with stakeholders; development of evaluation instruments

6E – Assess all tasks related to technical systems, network infrastructure, and technology device management

Knowledge of: application of results of evaluation and making the appropriate changes

6F – Direct, coordinate, and ensure implementation of all tasks related to the integration of technology into every facet of operations

Knowledge of: the meaning of integration in the education environment; which systems support which types of operations (e.g., purchasing systems related to cafeteria); how filtering has an impact on operations

6G – Develop, collect, interpret, and report metrics for all aspects of the IT system

Knowledge of: utilization, uptime statistics, and equity (e.g., number of devices); staff efficiency; ratios of technicians to students or devices; mean-time-to-repair (MTTR); who the users are and how the system was being used (students versus staff); how metrics are used by stakeholders

6H – Develop and implement disaster recovery and business continuity plans that are an integral part of the organization’s technology program

Knowledge of: difference between disaster recovery and business continuity as well as best practices of both; resources that are “mission critical;” levels of risk; managing expectations

B. Communication Systems (2%)

Use technology to improve communication and collaboration with stakeholders.

7A – Direct and coordinate use of e-mail, organization websites, web tools, voice systems, and other forms of communication

Knowledge of: which systems are in use and if they are interoperable with each other as well as how scalable they are; which stakeholders are accessing systems; how stakeholders are accessing systems; which emerging access options and devices are available; how to collaborate with stakeholders in the field about what is effective; how to maintain connections and/or collaboration with stakeholders in the field

7B – Use various communication tools and techniques

Knowledge of: emerging communication tools and their potential use within the education environment; building relationships with experts for recommendations and information on interoperability; information on what other organizations are doing

7C – Accommodate technical issues related to implementation of various communication tools

Knowledge of: feedback from stakeholders on issues and needs; communicating with experts; currently installed systems; determination of interoperability issues or needs

7D – Resolve design, accessibility, and compliance issues related to keeping organization, school, and teacher websites and other communication tools updated and operational

Knowledge of: organizational policies (e.g., acceptable use policy for students and employees, student information, copyrights, ethical use of organization resources and internet); collaborating with experts and stakeholders to establish standard framework for content and security

7E – Enhance communication by keeping up to date on emerging technologies

Knowledge of: emerging communication tools and their potential use within the education environment; organizations responsible for sharing emerging technologies that enhance communications; conferring with experts in the communications field on standards and interoperability

7F – Maintain communication systems by ensuring that they are updated, compliant, and operational

Knowledge of: internal support capabilities; research on other support options; uptime requirements and the relationship to support; available resources; necessary compliancy requirements (e.g., archiving, use and abuse, security, and records retention)

C. Business Management (10%)

Manage the budget and serve as strong business leader who guides purchasing decisions, and fosters mutually beneficial relationships with vendors, potential funders, and other key groups.

8A – Identify funding sources available to the organization and leverage them to meet organization and programmatic goals

Knowledge of: differences between recurring sources and one-time funding; differences between capital and operational expenses and funding; matching funding; federal guidelines (e.g., Title I), E-Rate certifications and guidelines, grants, state funds

8B – Develop and manage budgets, both annually and long-range

Knowledge of: differences between leasing and purchasing; differences between fixed expenses and variable expenses; salary administration; differences between unit costs and extended costs; differences between budgeted costs and actual costs; budget cycle; fiscal year

8C – Develop accurate pricing estimates for technology initiatives by using TCO and VOI

Knowledge of: differences between TCO and VOI (soft and hard benefits); principles of TCO and VOI; tradeoffs

8D – Make effective purchasing decisions following relevant laws, policies, and guidelines

Knowledge of: bid and RFP processes; bulk purchasing, warehousing, just-in-time purchasing; aligning purchases to goals and needs; laws and monetary limits; quotes; contracts and contract negotiations; impact of inventory and insurance practices on purchasing decisions; asset management life cycle

8E – Manage organization funds by following basic financial and accounting principles and processes and all regulatory guidelines

Knowledge of: differences between line item budgeting and categorical budgeting; financial reporting and forecasting; budget rollover or carryover; role of governing bodies in (re)appropriations of funds

8F – Direct, manage, and negotiate with vendors and business partners

Knowledge of: organization and state policies and guidelines (e.g., monetary limits, lunch and other benefits, legal requirements, purchasing guidelines); volume purchasing; discounts; differences between leasing and purchasing and/or multi-year purchasing; ethical purchasing; task forces to bring in business partners; collaborating with business partners; in-kind contributions and donations; contacts with vendors that are appropriate; rules for negotiation; vendor performance management; process for a non-performing vendor

8G – Direct, coordinate, and ensure implementation of all tasks related to selection and purchasing (e.g., RFPs, purchasing guidelines)

Knowledge of: preparation of RFPs; milestones for contract payments based on implementation

8H – Budget for ongoing, purposeful professional development for all staff using new technologies

Knowledge of: budgeting and implementing of professional development; analyzing in-house services against contracted services; analyzing the scope of necessary training

D. Data Management (5%)

Implement and maintain systems and tools for gathering, mining, integrating, and reporting data.

9A – Establish systems and tools for gathering, warehousing, mining, integrating, and reporting data in usable and meaningful ways

Knowledge of: basic understanding of database structures and concepts (enter once/use many); effects of invalid data; authorizations and security standards; data streams and systems; platforms and interoperability; data frameworks and multi-dimensional data cubes as well as scalability; evaluating and managing user needs; requirements gathering

9B – Maintain systems and tools for gathering, warehousing, mining, integrating, and reporting data in usable and meaningful ways

Knowledge of: data migrations; data loss management; monitoring health of data systems through reporting; understanding differences between web-based computing and cloud computing as well as differences between hosted and self-hosting

9C – Make decisions based on data and related processes in support of stakeholders

Knowledge of: availability of on-demand data; needs assessment and/or gap analysis; automation of data capture; access to the right data for the right people

9D – Administer data and databases following industry standards, (e.g., SIF and SCORM)

Knowledge of: definition, description, and differentiation between SIF and SCORM

9E – Assess and respond to information reporting requirements related to government mandates

Knowledge of: alignment of input to output; collection of data needed to produce necessary reports; data validation processes; data needs of end-users

D. Data Privacy and Security (7%)

Implement practices and systems to ensure the privacy and security of organizational data.

10A – Ensure compliance with federal and state laws, board policy, and contracts relating to organization data privacy and security

Knowledge of: user vulnerabilities, network security, cloud and data security, student data privacy

10B – Prevent and/or mitigate harm to the security of the organization resulting from breach

Knowledge of: Methods for network security risk mitigation and access controls, vulnerability and threat types, assessment, and auditing

10C – Make decisions and implement strategies that will protect, inform, and educate stakeholders

Knowledge of: data privacy agreements, cyber security insurance, security awareness programs, professional development

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