SPECIAL ARTICLE

Technology Standards for Teachers and Professional Development Frameworks

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Introduction

Technology standards provide guidance for technology use while professional development frameworks provide a set of competencies and activities that teachers need to have in learning and teaching. Both play an instrumental role in understanding and linking theory and practice. This article explores technology standards for teachers and professional development frameworks in digital environments where digital devices (e.g., laptops, tablets, smartphones) are used for learning and teaching. It looks at several technology standards and frameworks and presents interrelated components of a specific language teacher development framework.

Technology Standards for Teachers

In line with the wide use of educational technology in language learning and teaching, language teachers need to develop and improve knowledge and skills for computer-assisted language learning (CALL) and competencies in technology-enhanced language teaching (TELT) (Son, 2018). Technology standards indicate expectations of technology integration and offer goals for what teachers should know and be able to do in practice. The International Society for Technology in Education (ISTE) (https://www.iste.org/) has produced the ISTE Standards for Students, Educators, Education Leaders, Coaches, and Computational Thinking Competencies. The ISTE Standards for Educators (https://www.iste.org/standards/iste-standards-for-teachers), in particular, are presented in the following seven roles:

2.1 Learner
Educators continually improve their practice by learning from and with others and exploring proven and promising practices that leverage technology to improve student learning. Educators:
2.1.a Set professional learning goals to explore and apply pedagogical approaches made possible by technology and reflect on their effectiveness.
2.1.b Pursue professional interests by creating and actively participating in local and global learning networks.
2.1.c Stay current with research that supports improved student learning outcomes, including findings from the learning sciences.

2.2 Leader
Educators seek out opportunities for leadership to support student empowerment and success and to improve teaching and learning. Educators:
2.2.a Shape, advance and accelerate a shared vision for empowered learning with technology by engaging with education stakeholders.
2.2.b Advocate for equitable access to educational technology, digital content and learning opportunities to meet the diverse needs of all students.

2.2.c Model for colleagues the identification, exploration, evaluation, curation and adoption of new digital resources and tools for learning.

2.3 Citizen

Educators inspire students to positively contribute to and responsibly participate in the digital world. Educators:

2.3.a Create experiences for learners to make positive, socially responsible contributions and exhibit empathetic behavior online that build relationships and community.

2.3.b Establish a learning culture that promotes curiosity and critical examination of online resources and fosters digital literacy and media fluency.

2.3.c Mentor students in safe, legal and ethical practices with digital tools and the protection of intellectual rights and property.

2.3.d Model and promote management of personal data and digital identity and protect student data privacy.

2.4 Collaborator

Educators dedicate time to collaborate with both colleagues and students to improve practice, discover and share resources and ideas, and solve problems. Educators:

2.4.a Dedicate planning time to collaborate with colleagues to create authentic learning experiences that leverage technology.

2.4.b Collaborate and co-learn with students to discover and use new digital resources and diagnose and troubleshoot technology issues.

2.4.c Use collaborative tools to expand students' authentic, real-world learning experiences by engaging virtually with experts, teams and students, locally and globally.

2.4.d Demonstrate cultural competency when communicating with students, parents and colleagues and interact with them as co-collaborators in student learning.

2.5 Designer

Educators design authentic, learner-driven activities and environments that recognize and accommodate learner variability. Educators:

2.5.a Use technology to create, adapt and personalize learning experiences that foster independent learning and accommodate learner differences and needs.

2.5.b Design authentic learning activities that align with content area standards and use digital tools and resources to maximize active, deep learning.

2.5.c Explore and apply instructional design principles to create innovative digital learning environments that engage and support learning.

2.6 Facilitator

Educators facilitate learning with technology to support student achievement of the ISTE Standards for Students. Educators:

2.6.a Foster a culture where students take ownership of their learning goals and outcomes in both independent and group settings.

2.6.b Manage the use of technology and student learning strategies in digital platforms, virtual environments, hands-on makerspaces or in the field.

2.6.c Create learning opportunities that challenge students to use a design process and computational thinking to innovate and solve problems.

2.6.d Model and nurture creativity and creative expression to communicate ideas, knowledge or connections.

2.7 Analyst

Educators understand and use data to drive their instruction and support students in achieving their learning goals. Educators:

2.7.a Provide alternative ways for students to demonstrate competency and reflect on their learning using technology.

2.7.b Use technology to design and implement a variety of formative and summative assessments that accommodate learner needs, provide timely feedback to students and inform instruction.

2.7.c Use assessment data to guide progress and communicate with students, parents and education stakeholders to build student self-direction.

(Source: https://www.iste.org/standards/iste-standards-for-teachers)

The Teachers of English to Speakers of Other Languages (TESOL) International Association (https://www.tesol.org/), on the other hand, has produced the TESOL Technology Standards Framework (https://www.tesol.org/docs/books/bk_technologystandards_framework_721.pdf) for language learners and teachers. The standards guide language teachers "to know what is expected of them in terms of knowledge, skills, and curriculum implementation" and "to challenge themselves to reach a higher level of proficiency in using technology in their teaching" (p. 6) with the following four goals:

Goal 1. Language teachers acquire and maintain foundational knowledge and skills in technology for professional purposes.

Standard 1: Language teachers demonstrate knowledge and skills in basic technological concepts and operational competence, meeting or exceeding TESOL Technology Standards for students in whatever situation they teach.

Standard 2: Language teachers demonstrate an understanding of a wide range of technology supports for language learning and options for using them in a given setting.

Standard 3: Language teachers actively strive to expand their skill and knowledge base to evaluate, adopt, and adapt emerging technologies throughout their careers.

Standard 4: Language teachers use technology in socially and culturally appropriate, legal, and ethical ways.

Goal 2. Language teachers integrate pedagogical knowledge and skills with technology to enhance language teaching and learning.

Standard 1: Language teachers identify and evaluate technological resources and environments for suitability to their teaching context.

Standard 2: Language teachers coherently integrate technology into their pedagogical approaches.

Standard 3: Language teachers design and manage language learning activities and tasks using technology appropriately to meet curricular goals and objectives.

Standard 4: Language teachers use relevant research findings to inform the planning of language learning activities and tasks that involve technology.

Goal 3. Language teachers apply technology in record-keeping, feedback, and assessment.

Standard 1: Language teachers evaluate and implement relevant technology to aid in effective learner assessment.

Standard 2: Language teachers use technological resources to collect and analyse information in order to enhance language instruction and learning.

Standard 3: Language teachers evaluate the effectiveness of specific student uses of technology to enhance teaching and learning.

Goal 4. Language teachers use technology to improve communication, collaboration, and efficiency.

Standard 1: Language teaches use communication technologies to maintain effective contact and collaboration with peers, students, administration, and other stakeholders.

Standard 2: Language teachers regularly reflect on the intersection of professional practice and technological developments so that they can make informed decisions regarding the use of technology to support language learning and communication.

Standard 3: Language teachers apply technology to improve efficiency in preparing for class, grading, and maintaining records.

(pp. 29-41)

Professional Development Frameworks

In digital environments, it is essential for language teachers to understand digital language teaching and explore ways of using digital technology. Son (2020) defines digital language teaching as "the application of digital pedagogies and technologies to the teaching of languages" (p. 3) and says that digital language teaching requires "digital literacy skills and digital teaching strategies together with content knowledge and pedagogical understanding" (p. 4). He also recommends language teachers to work with a variety of digital media and make the most of professional development frameworks in technology integration.

From professional development frameworks, teachers can see a set of competencies and activities that they need to have at each level of competence. Teachers can use competency frameworks to analyse "their strengths, weaknesses, and development needs" (Carrier & Nye, 2017, p. 220). The European Framework for the Digital Competence of Educators (Joint Research Centre, 2017), for example, presents the following six areas of professional activities:

Area 1: Professional engagement
Using digital technologies for communication, collaboration and professional development.

Area 2: Digital resources
Sourcing, creating and sharing digital resources.

Area 3: Teaching and learning
Managing and orchestrating the use of digital technologies in teaching and learning.

Area 4: Assessment
Using digital technologies and strategies to enhance assessment.

Area 5: Empowering learners

> Using digital technologies to enhance inclusion, personalisation and learners' active engagement.
>
> Area 6: Facilitating learners' digital competence.
>
> Enabling learners to creatively and responsibly use digital technologies for information, communication, content creation, wellbeing and problem-solving. (p. 16)

The Cambridge English Digital Framework for Language Teachers developed by Cambridge Assessment English (2017), on the other hand, has six categories for digital professional development: the digital world; the digital classroom; the digital teacher; designing learning; delivering learning; and evaluating learning. In the digital teacher category, specifically, the framework guides teachers to reflect on their teaching and share knowledge and best practice through a professional community.

Another example is the UK-based Education and Training Foundation's (2018) Digital Teaching Professional Framework. It has seven elements: planning your teaching; approaches to teaching; supporting learners to develop employability skills; subject-specific and industry-specific teaching; assessment; accessibility and inclusion; and self-development. For each element, it specifies three competency levels: "Stage 1 Exploring – Practitioners assimilate new information and develop basic digital practices; Stage 2 Adopting – Practitioners apply their digital practices and expand them further; Stage 3 Leading – Practitioners pass on their knowledge, critique existing practice and develop new practices" (p. 4).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) ICT Competency Framework for Teachers (ICT-CFT) (UNESCO, 2018) highlights six focus areas (understanding ICT in education; curriculum and assessment; pedagogy; application of digital skills; organization and administration; and teacher professional learning) across three levels of teacher development (knowledge acquisition; knowledge deepening; and knowledge creation). The framework is currently available in nine languages: English, French, Arabic, Chinese, Russian, Spanish, Khmer, Kyrgyz, and Tajik.

More recently, the Digital Language Teacher Development Framework (DLTDF) was developed and published by Son (2020). The framework is based on Son's (2018) Exploration-Communication-Collaboration-Reflection (ECCR) model of teacher development. It guides language teachers to engage with ECCR in three competency levels (beginner, intermedia, and expert). Table 1 shows key activities associated with the four components of the framework.

Table 1
The Digital Language Teacher Development Framework (DLTDF)

	Components			
	Exploration	**Communication**	**Collaboration**	**Reflection**
Activities	• Collect information on digital technologies, tools and resources • Learn about	• Interact with learners, colleagues, administrators, other practitioners, teacher	• Work together with others in professional communities • Share information, experiences,	• Examine experiences critically • Reflect on one's own learning and teaching

	computer-assisted language learning (CALL) • Learn how to use digital technologies in the classroom • Trial new technologies	educators and researchers • Use computer-mediated communication (CMC) tools to interact with others personally, socially and professionally • Develop online communication skills	ideas and resources with other teachers • Plan, design and manage collaborative activities • Facilitate collaboration with online communication tools	practices • Think and practice reflectively • Do self-monitoring • Engage with critical and contextualized reflection

(Son, 2020, p. 7)

Conclusion

All technology standards and frameworks mentioned in this article provide teachers with a guide to professional development in digital learning and teaching environments. They support teachers to be competent in their teaching in the digital age. Teachers are invited to explore and choose what they want or need in their contexts. They are encouraged to engage with various professional development activities and increase their knowledge and skills for effective teaching. It is their responsibility to reflect on their learning and practice in a way to improve their ongoing professional development.

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