Technical Report

ISO/TR 29996

Education and learning services — Distance and digital learning services (DDLS) — Case studies

Services d'éducation et de formation — Services d'apprentissage numérique et à distance — Études de cas

First edition
2024-01

Reference number
ISO/TR 29996:2024(en)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Methodology and overview of selected cases **2**
4.1 Methodology 2
4.2 Overview of selected cases 2
5 Practices of needs analysis **4**
5.1 General 4
5.2 Market needs analysis for launching a new programme 4
5.3 Syllabus "Digital competences for PA" 5
5.4 Learning needs analysis for international talent cultivation 6
6 Practices of design of DDLS **7**
6.1 General 7
6.2 An ecological model indicating learner-centredness in online education 8
6.3 Engagement and co-design by administrations in "Digital competences for PA" 8
6.4 Intelligent design systems for training programmes 9
6.4.1 General 9
7 Practices of technology-supported distance learning **10**
7.1 General 10
7.2 An intelligent auxiliary environment with artificial intelligence (AI) and VEM technology 10
7.3 A "learning hub" IT platform 11
7.4 A "crowded innovation space" cloud classroom learning platform 11
8 Practices of learning materials available via distance learning **12**
8.1 General 12
8.2 Learning materials designed with the principle of 3-M learning 12
8.3 E-learning digital competences catalogue with course category as the elementary unit 12
8.4 A learning resource system with timely updating and rich test questions 13
9 Practices of learner support **13**
9.1 General 13
9.2 A mentorship model that highlights different learner support elements 13
9.3 A FAQ system on the public site 15
9.4 An intelligent talent development system for young learners 16
10 Practices of assessment of learning **16**
10.1 General 16
10.2 A dual system of both formative and summative assessment 16
10.3 Analysis of "incoming" and "outgoing" competences 17
10.3.1 General 17
10.3.2 Analysis of "incoming" competences 17
10.3.3 Analysis of "outgoing" competences 18

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 232, *Education and learning services*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Distance and digital learning services (DDLS) have been developing and increasing rapidly at the global level. In order to implement and maintain quality DDLS, there are some requirements and recommendations to be met by distance and digital learning service providers (DDLSP), which are provided by ISO 29992, ISO 29993 and ISO 29994, for example:

— ISO 29992 provides recommendations on assessment planning and assessment development applicable to DDLS;

— ISO 29993 puts forward requirements for education and learning services, including DDLS, from the aspects of needs analysis, design of the learning service, etc;

— ISO 29994 provides specific requirements for technology-supported distance learning, learning materials available via distance learning and learner support for DDLS on the basis of ISO 29992 and ISO 29993.

As a methodology, case studies can help DDLSP to identify, clarify and achieve the requirements and recommendations related to the goal of quality DDLS in the International Standards mentioned above, by providing practical solutions and effective experiences. By understanding and referring to the cases in this document, DDLSP can find out the applicable practices and strategies, and apply them under similar circumstances to promote and/or improve the quality of DDLS.

The purpose of this document is to support DDLSP to understand how to apply the related contents of ISO 29992, ISO 29993 and ISO 29994 through case studies, by providing DDLSP with situational understanding and practical illustrations for the relevant requirements and recommendations.

This document can be helpful for DDLSP who wish to analyse and improve their DDLS, by providing practical solutions and suggestions for DDLSP to pursue and realize quality DDLS with the help of ISO 29992, ISO 29993 and ISO 29994.

Education and learning services — Distance and digital learning services (DDLS) — Case studies

1 Scope

This document provides real cases, situational understanding and practical solutions to apply the related contents of ISO 29992, ISO 29993 and ISO 29994 in the scenario of DDLS.

This document can be used as a reference and/or inspiration for DDLSP analysing and improving their DDLS, and pursuing quality DDLS, by applying ISO 29992, ISO 29993 and ISO 29994.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 29992, *Assessment of outcomes of learning services — Guidance*

ISO 29993, *Learning services outside formal education — Service requirements*

ISO 29994, *Education and learning services — Requirements for distance learning*

ISO 29995, *Education and learning services — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 29992, ISO 29993, ISO 29994, and ISO 29995 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
distance and digital learning services
DDLS
sequence of activities, designed to enable learning, delivered by digital technology while learners and facilitators are separated by time, space or both

[SOURCE: ISO 29994:2021, 3.1, modified — Term and definition revised, examples removed.]

3.2
distance and digital learning service provider
DDLSP
organization or individual providing *distance and digital learning services* (3.1), including any associates involved in the provision of the distance and digital learning services

[SOURCE: ISO 29994:2021, 3.2, modified — Term and definition revised.]

4 Methodology and overview of selected cases

4.1 Methodology

This document contains cases with detailed descriptions of practices gleaned from countries, for the possible realization of quality DDLS.

The practices of these highly acclaimed cases were collected and determined their relevance to the related elements of ISO 29992, ISO 29993 and ISO 29994.

The linkages between the related elements from ISO 29992, ISO 29993 and ISO 29994 and the practices of cases in this document are identified in Table 1.

Table 1 — Relationship between related elements, cases and practices

Element of DDLS from ISO documents				Practice in this document		
Element	**ISO 29992:2018**	**ISO 29993:2017**	**ISO 29994:2021**	**Case 1**	**Case 2**	**Case 3**
Needs analysis	—	Clause 7	7.2, 7.3	1–1	2–1	3–1
Design of DDLS	—	Clause 8	8.2, 8.3	1–2	2–2	3–2
Technology-supported distance learning	—	—	10.1	1–3	2–3	3–3
Learning materials available via DDLS	—	—	10.2	1–4	2–4	3–4
Learner support	—	—	10.3	1–5	2–5	3–5
Assessment of learning	Clauses 4 and 5	Clause 12	12.2	1–6	2–6	/

4.2 Overview of selected cases

An overview of selected cases is shown in Table 2.

Table 2 — Overview of cases

No.	Country	Type of DDLS	Overview
Case 1	China	University/ college	DDLSP 1, established in 2000, offers online and distance tertiary degree education in over 20 provinces, with 100 learning centres distributed across the country, in nine specialities of English, business administration, accounting, information management, electronic commerce, international economics and trade, finance, computer science and technology, Chinese language and literature. DDLSP 1 is a school within a first-tier university, aiming to provide quality education via the use of digital technology to learners who do not have access to formal education across the country and contributes tremendously to education equity and inclusive education. DDLSP 1 provides three programmes for learners: 1) diploma programmes; 2) BA programmes; and 3) post-diploma BA programmes. To cater to the increasing needs of learners, DDLSP 1 has been providing master programmes in English language education and Chinese language education since 2015. Following the educational philosophy of "whole-person development", DDLSP 1 establishes a unique learner-constructed modular educational system through 3-M learning design (i.e. multimodal learning via multimedia in multiple environments), making possible a genuine "five-any" learning: anybody, any time, any place, any mode and any need. Whole-person development will enable learners to be: 1) able to learn independently as well as collaboratively; 2) capable of self-discipline, self-management and self-monitoring 3) capable of resource-seeking and resource-selecting; 4) capable of solving the conflict between study and other commitments; 5) capable of initiative-taking; 6) capable of applying interpersonal skills; 7) capable of help-seeking; 8) confident and persevering; 9) capable of developing personal learning styles and strategies; 10) able to lead and control.
Case 2	Italy	Continuing education (adult education)	DDLSP 2 is a division of the Prime Minister's office responsible for public sector modernization and reform policies. It was set up in 1983 to meet the need to modernize the public administration across the country. In 2019, DDLSP 2 launched the "Digital competences for PA (public administration)" project (recently renamed "Syllabus for digital competences training"), that aims at: — providing employees with personalized e-learning courses on foundational digital competences based on a structured assessment of training needs; — enabling the progress measurement at the individual and organizational levels through a dedicated IT platform. The Digital competences for PA project aims to strengthen common digital competences among non-IT professional civil servants (about 3,2 million employees), with the objective of increasing the overall inclination for change and innovation within public administration. In more detail, the project aims to: — strengthen civil servants' basic digital competences and spread a common vision on digital citizenship, e-government and open government topics; — promote competency mapping in administrations at different government levels and to foster more effective human resource policies, enacting data-driven policy-making processes.

Table 2 *(continued)*

No.	Country	Type of DDLS	Overview
Case 3	China	Vocational training	DDLSP 3 was established in December 2002. As an internal service provider of a public service enterprise, DDLSP 3 primarily serves incumbent employees of power utilities, with 300 staff members, including more than 70 instructional designers and implementers. DDLSP 3 adopts an instructional pattern that integrates online and offline methods. More specifically, offline, distance and online-offline blended teaching methods are applied to provide multi-user and cross-border learning services across the spectrum of service scenarios. In respect of distance learning, this agency implements over 300 projects on a yearly basis, providing more than 500 000 learning opportunities. DDLSP 3 has been certified with ISO 9001. Its distance and digital learning services, as well as international talent training, have been given the excellent practice award by the Association of Talent Development (ATD) and the excellent performance improvement award by the International Society for Performance Improvement (ISPI).

5 Practices of needs analysis

5.1 General

ISO 29994:2021, 7.2, 7.3 and ISO 29993:2017, Clause 7 specify the requirements for needs analysis.

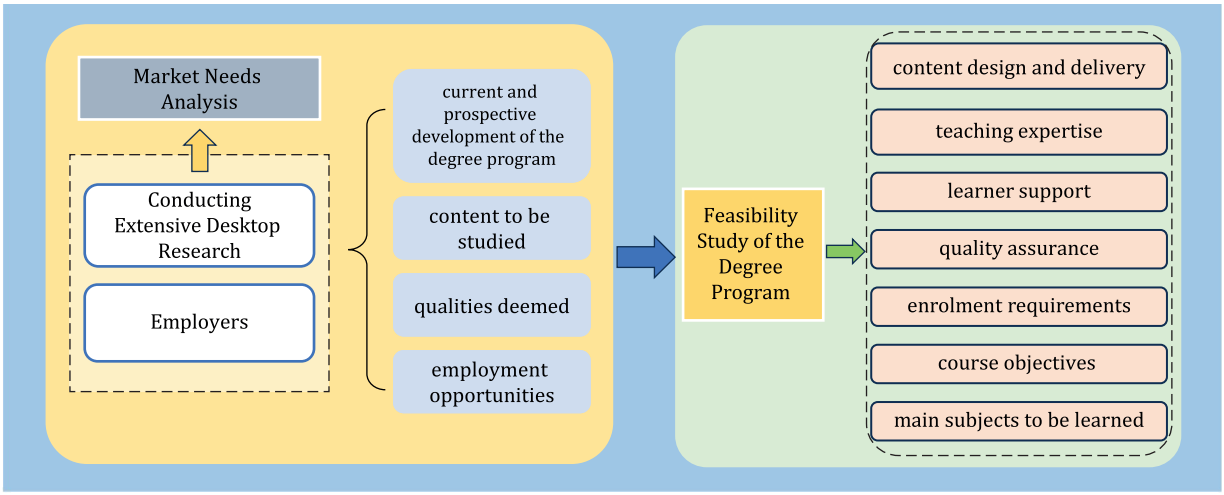
This clause presents practices from three DDLSPs on needs analysis.

5.2 Market needs analysis for launching a new programme

DDLSP 1 has a practice (1-1) that relates to ISO 29994:2021, 7.2 and 7.3 and ISO 29993:2017, Clause 7. This practice shows how DDLSP 1 conducts the market needs analysis for launching a new programme.

Prior to launching a new degree programme, DDLSP 1 first identifies the specific needs for the programme through conducting extensive desktop research and interviewing potential employers for their opinions on the current and prospective development of the degree programme, the content to be studied, the qualities deemed, employment opportunities, etc.

Then based on the result of preceding market needs analysis, DDLSP 1 conducts a feasibility study of the degree programme, including its strengths in terms of content design and delivery, teaching expertise, learner support and quality assurance, along with proposed enrolment requirements, course objectives and main subjects to be learned, as shown in Figure 1.



SOURCE Institute of Online Education, Beijing Foreign Studies University. Reproduced with permission.

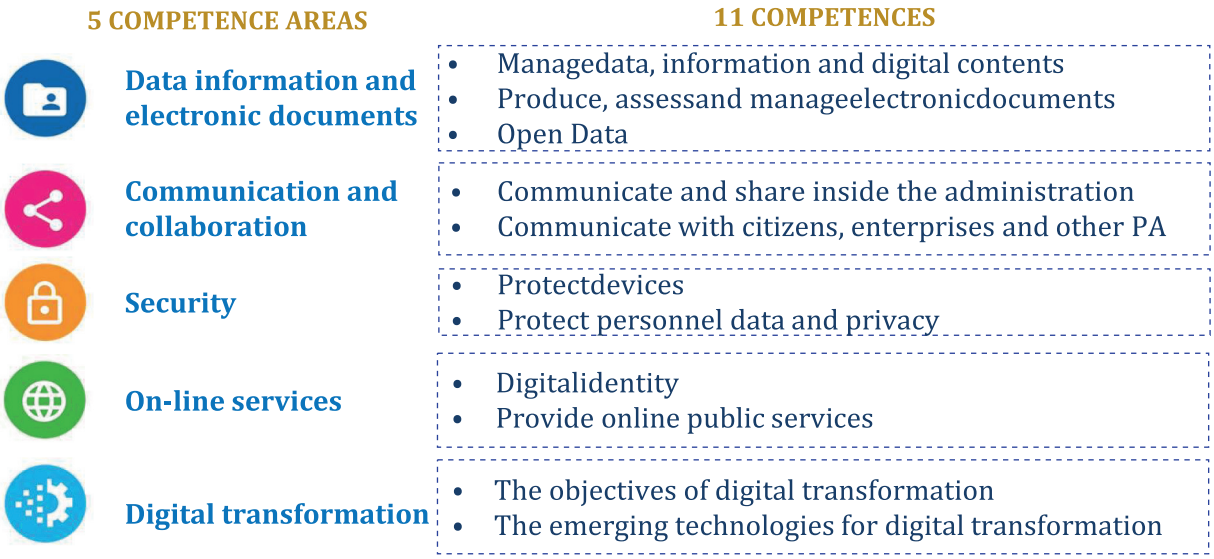
Figure 1 — Illustration of market needs analysis for launching a new programme

5.3 Syllabus "Digital competences for PA"

DDLSP 2 has a practice (2-1) that relates to ISO 29994:2021, 7.2, 7.3 and ISO 29993:2017, Clause 7. This practice introduces the syllabus "Digital competences for PA" of DDLSP 2, which is the document that describes the basic knowledge and skills which are required of any civil servant. The syllabus can represent a valid reference for a more advanced competence framework, more sophisticated assessment tools and training programmes aimed at addressing the specific needs of qualified civil servants profiles.

The syllabus "Digital competences for PA" (recently renamed "Syllabus for digital competences training") is the document that describes the basic knowledge and skills which are required by any civil servants (not IT specialists) to actively contribute to the digital transformation of the public administration across the country. The general aim of the syllabus is to make every civil servant capable of actively working in a safe, aware, cooperative and results-oriented way, within a more and more digital public administration.

The syllabus is composed of 11 competences organized into five competence dimensions, as shown in Figure 2.



SOURCE Italian Presidency of Council of Ministers, Department of Public Administration. Reproduced with permission.

Figure 2 — Illustration of custom control

The syllabus structure, which is based on the European Digital Competence Framework (DigComp), is organized according to four dimensions:

— dimension 1: competence areas;

— dimension 2: competence descriptors that are pertinent to each area;

— dimension 3: proficiency level for each competence;

— dimension 4: knowledge and/or skills applicable to each competence.

The syllabus is focused on two main components that contribute to defining competence:

— the knowledge, as the set of information and notions relating to specific digital topics connected to the daily work of a civil servant;

— the skill, as the ability to carry out some activities which make use of digital technologies.

The framework does not consider other distinctive competences' components, such as self-concept, traits and motivation.

Moreover, the syllabus envisages three proficiency levels: a) base, b) intermediate and c) advanced.

The syllabus can represent a valid reference for a more advanced competence framework, more sophisticated assessment tools and training programmes aimed at addressing the specific needs of qualified civil servants' profiles.

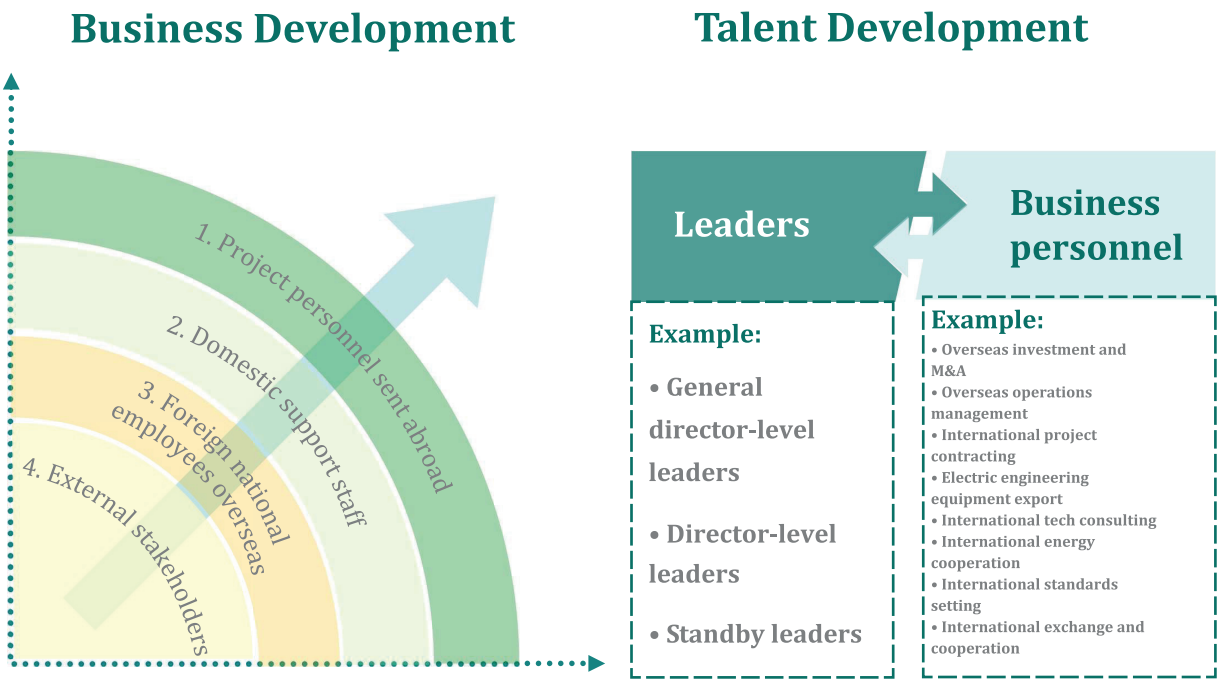
5.4 Learning needs analysis for international talent cultivation

DDLSP 3 has a practice (3-1) that relates to ISO 29994:2021, 7.2, 7.3 and ISO 29993:2017, Clause 7. This practice describes how DDLSP 3 implements the learning needs analysis for international talent based on subdivision (see Figure 3), which could be referred to by other multinational companies.

The international talents of the corporation to which DDLSP 3 belongs are spread all over the world. Digital technology enhances the accuracy, comprehensiveness and timeliness of learning need analysis.

DDLSP 3 divides the international talents of the corporation into four groups, namely project personnel sent abroad, domestic support personnel, overseas local employees and external stakeholders (see Figure 3),

from the dimension of international business development. When researching the learning needs of various international talents in remote learning, the competency model of target participants was taken as a basis, and many means were adopted, such as online questionnaires, telephone interviews and video conferences.



SOURCE Advanced Training Center of State Grid Corporation of China. Reproduced with permission.

Figure 3 — International talent subdivision

The contents of the investigation cover the shortcomings of the participants, the confusion and problems they face in their work, the feasibility of using the remote learning platform in their location, the appropriate daily length of online learning, the training topics interested in and specific knowledge needs. The feedback information from past projects was also investigated, such as the course arrangements considered effective by the previously trained participants and their opinions and suggestions on digital learning. This process is helpful to clarify the common and individual learning needs of participants from different countries and regions, design targeted courses and instructional activities, and provide the learning needs research results to the instructors.

The research covers all countries and regions where the corporation's international talents work, all professional categories (e.g. investment and M&A, overseas operation, engineering contracting) and all types of participants (e.g. project managers, project staff) to ensure the accuracy and comprehensiveness of the learning needs research.

6 Practices of design of DDLS

6.1 General

ISO 29994:2021, 8.2 and 8.3 and ISO 29993:2017, Clause 8 specify the requirements for design of DDLS.

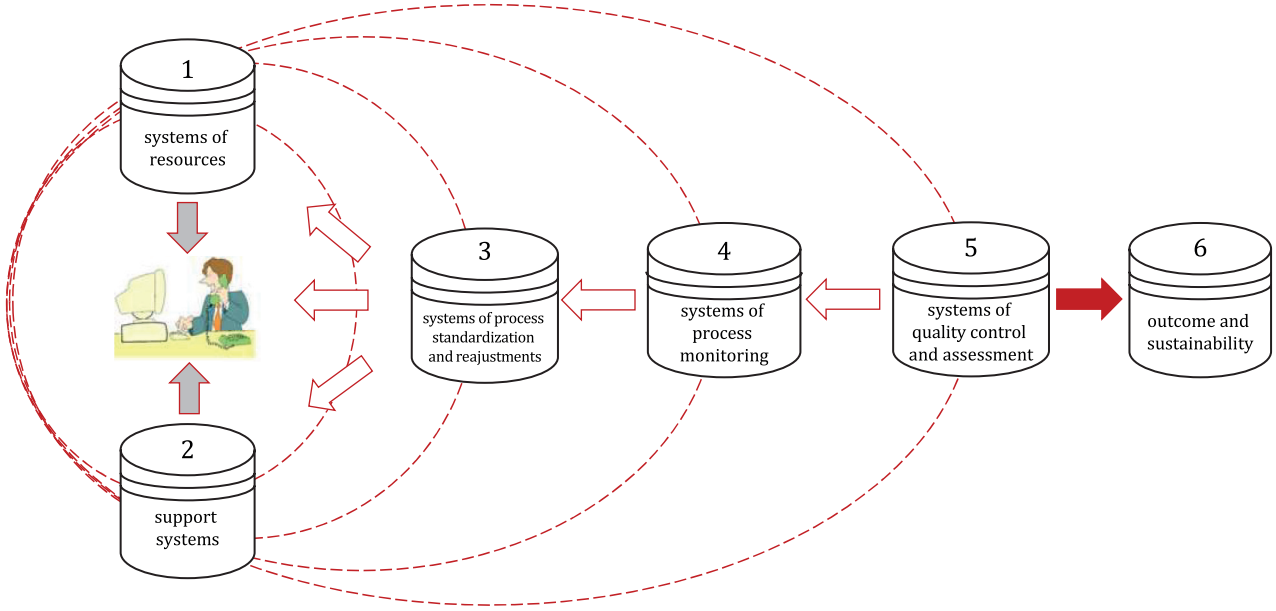
This clause presents practices from three DDLSPs on design of DDLS.

6.2 An ecological model indicating learner-centredness in online education

DDLSP 1 has a practice (1-2) that relates to ISO 29994:2021, 8.2 and 8.3 and ISO 29993:2017, Clause 8. This practice describes an ecological model of an online education comprising six subsystems encapsulated in six keywords: resource, service, process, monitoring, quality and outcome.

Resources are constructed on the basis of five dimensions: user type, modes of modality, scalability, dynamism and reusability. The concept of service is substantiated in three support systems, namely the learner support system, the tutor support system and the administrator support system. The learner support system is constructed on the notion of what constitutes a whole person; process is not restricted to the learning process. The teaching process, course development process, online delivery process, and so on, are all parts of the total process. Every bit of this total process has a built-in quality issue. Outcomes include three dimensions, the number of graduates, the financial return and public reputation. However, the three are not necessarily proportionate to one another.

The interactive relations between six subsystems are visualized in Figure 4. At the individual learner level, learning is an emergent property of learners' interactions with the systems, in terms of framing and enabling effects.



SOURCE Institute of Online Education, Beijing Foreign Studies University. Reproduced with permission.

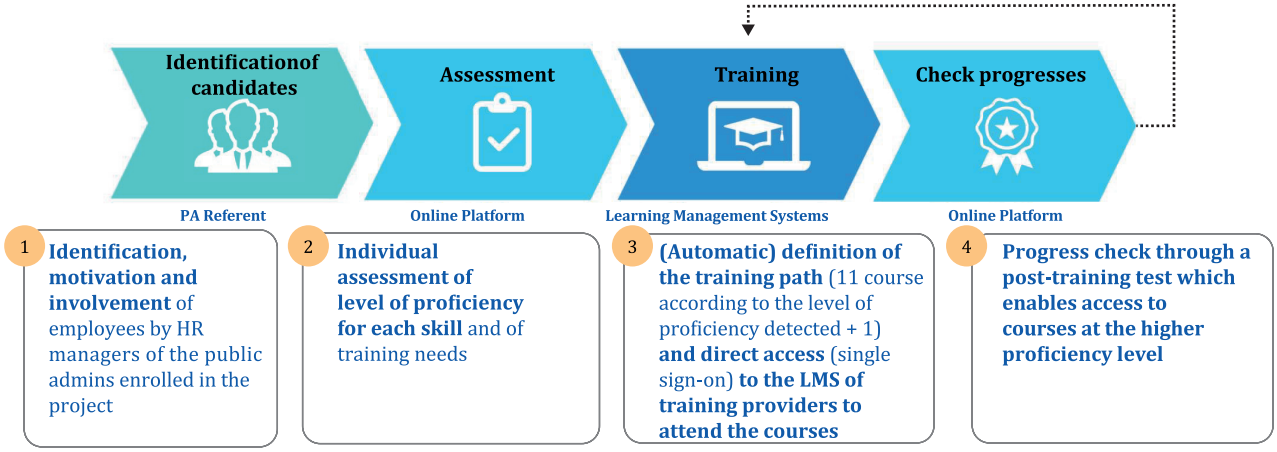
Figure 4 — Six sub-systems

It is important to note that all the arrows except the rightmost converge onto the learner. They indicate the underlying principle of learner-centredness that permeates the first five sub-systems. Resource, service, process and monitoring all involve quality issues, and quality is attained and guaranteed when they are optimally managed. In other words, the overall quality of the whole system will be affected by the poor performance of any sub-system.

6.3 Engagement and co-design by administrations in "Digital competences for PA"

DDLSP 2 has a practice (2-2) that relates to ISO 29994:2021, 8.2 and 8.3 and ISO 29993:2017, Clause 8. This practice describes how DDLSP 2 stimulates the engagement in the "Digital competences for PA" project of administrations, and its involvement in the co-design process, aimed at addressing the specific needs of qualified civil servants' profiles.

In order to participate in the "Digital competences for PA" project, employees have to be enrolled by their administration, as Figure 5 highlights.



SOURCE Italian Presidency of Council of Ministers, Department of Public Administration. Reproduced with permission.

Figure 5 — The training life-cycle

This is because training is considered primarily as a lever for organizational development. Consequently, each administration can establish its specific plan of personnel enrolment in training courses within a framework of general rules defined by DDLSP 2.

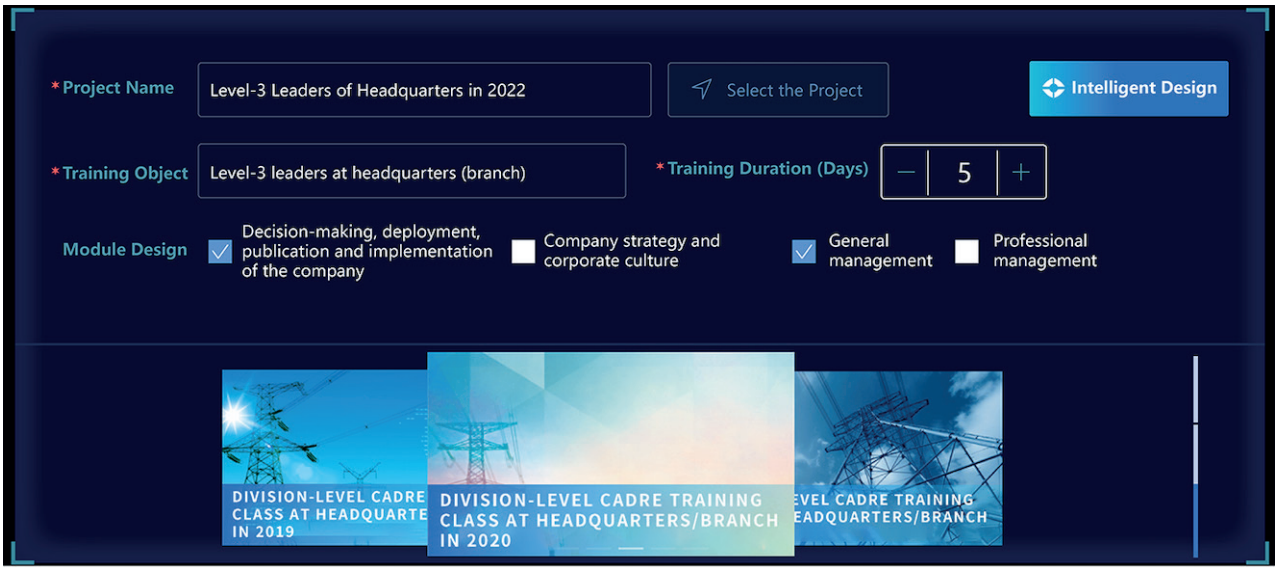
The initiative started as an experimental project and extended to other thematic domains that are strategic for the modernization of public administrations across the country (e.g. the ecological transition and the administrative transition). DDLSP 2 plans to develop new competence frameworks (or syllabuses) and evolve the assessment platform in a real digital learning environment for public administration, able to support the management and delivery of strategic training programmes and the monitoring of the public competence system.

In order to stimulate the engagement in the project of administrations and their involvement in the co-design process, related to the evolution of the digital tools and the methodologies for the adoption of the proposed training programmes in their HR development strategies, DDLSP 2 is also planning the development of a community and knowledge management system targeted at HR public managers. The aims of this new initiative are to foster and enable the exchange of good practices, ideas and knowledge and create a direct communication channel between administrations and DDLSP 2.

6.4 Intelligent design systems for training programmes

6.4.1 General

DDLSP 3 has a practice (3-2) that relates to ISO 29994:2021, 8.2 and 8.3 and ISO 29993:2017, Clause 8. This practice introduces the intelligent design systems for training programmes developed by DDLSP 3, which helps the training programme designers to do all the work from training needs analysis to course and instructor allocation and training programme drafting with high efficiency and quality. It covers four key functions and related innovations, as shown in Figure 6.



SOURCE Advanced Training Center of State Grid Corporation of China. Reproduced with permission.

Figure 6 — One-click intelligent design for general training programmes

a) Intelligent recommendation of courses and instructors: The system establishes rules for the intelligent design of training programmes. It recommends the best course and instructor resources that align most closely to training needs, generate the best learning effects and offer the latest contents of learning. It develops and trains algorithms that recommend courses and instructors for different types of projects to ensure that training programmes are timely, authoritative, professional, and pertinent, thus greatly improving the quality of learning services.

b) Real-time, intelligent updating of course and instructor resources: Data mining and analysis technologies are adopted to automatically generate proposals on developing new training courses, match them with one or more high-calibre instructors and update and improve courses and instructor resources. As a result, the resources are secured in terms of timeliness and richness.

c) One-click generation of training programmes: The system can automatically generate a complete, standardized draft of the training programme after completing the need analysis and curriculum design. Users can download it to revise or improve the draft later. So far, the system has enabled the intelligent design of 12 types of training projects, shortening the duration of training programme draft design in the wake of training need investigations from a week to just 3 minutes.

d) Regarding future international cooperation models, the system can be used to provide programme design reports for companies planning to conduct training and offer programme planning and technical consulting for companies planning to establish an intelligent design system for training programmes.

7 Practices of technology-supported distance learning

7.1 General

ISO 29994:2021, 10.1 specifies the requirements for technology-supported distance learning.

This clause presents practices from three DDLSPs on technology-supported distance learning.

7.2 An intelligent auxiliary environment with artificial intelligence (AI) and VEM technology

DDLSP 1 has a practice (1-3) that relates to ISO 29994:2021, 10.1. This practice describes how DDLSP 1 offers enough tailored resources and feedback for learning, allows learners to gain knowledge and skills

from technology-supported pedagogical contexts and thus cultivates learners' ability to solve real-world issues in future learning.

At DDLSP 1, technology-supported distance learning involves the efforts made to construct online teaching and learning resources, innovate teacher education through targeted online and offline training, ensure teaching and learning quality and efficiency by valid testing and assessment, and provide sufficient feedback and guidance for learners to meet their learning needs and promote their development as whole persons.

In particular, DDLSP 1's practices of technology-supported distance learning are faced with the challenges of offering mass education while attending to the needs of individual distance learners. To address this, DDLSP 1 uses big data technology to gather learners' learning process data, builds learners' models of learning mechanisms based on these data, diagnoses their cognitive differences and potential problems, and explores the use of artificial intelligence technology and virtual environment modelling technology to build an intelligent auxiliary environment.

This approach aims to provide adaptive learning content for distance learners, offer enough tailored resources and feedback for learning, allow learners to gain knowledge and skills from technology-supported pedagogical contexts and thus cultivate learners' ability to solve real-world issues in future learning and motivate them to fully develop themselves as humans. DDLSP 1 also has a future vision to provide high-quality distance education to ensure equity, diversity and inclusiveness for large-scale populations both nationally and worldwide.

7.3 A "learning hub" IT platform

DDLSP 2 has a practice (2-3) that relates to ISO 29994:2021, 10.1. This practice introduces a dedicated "learning hub" IT platform developed by DDLSP 2 for the realization of the DDLS project, which supports the management, administration and tracking of "incoming" and "outcoming" competence tests based on a syllabus, in order to meet the individual competence gaps.

The IT platform aims to become a learning hub that collects e-learning courses offered by several learning service providers through their learning management systems (LSM). The platform is able to interoperate with external learning management systems, through application programming interfaces (APIs), in order to allow data exchange (e.g. user registration, course start and end status). In this way, users can access from a single IT environment all the services available: initial test, training and post-training test.

In 2022, DDLSP 2 launched an important intervention in the IT platform re-engineering aimed at enriching the functionalities available to administrations, users and DDLSP 2 itself.

In the development of the new platform, particular attention was paid to accessibility. The IT platform is compliant with the accessibility requirements for web platforms and online content established by the agency for digitalization of the particular country. Moreover, specific features aimed at addressing special needs have been implemented, such as the possibility for people with special needs to obtain extra time for the tests.

7.4 A "crowded innovation space" cloud classroom learning platform

DDLSP 3 has a practice (3-3) that relates to ISO 29994:2021, 10.1. This practice describes how DDLSP 3 constructs a crowded innovation space cloud classroom learning platform to display and share the work experience, successful practices and learning insights gained by participants in their work and learning to promote grassroots co-creation and sharing.

Based on the learning management platforms developed since 2009, including digital campus, palm advanced training, a functional cloud classroom learning platform has been formed by DDLSP 3 through the system construction since 2020.

The cloud classroom learning platform effectively integrates all training scenarios, covers the whole training process and supports the real-time collection of learning data.

The cloud classroom learning platform supports PC, cell phone and pad learning, providing convenient and safe access for participants and training managers. It mainly covers five types of functional modules,

including the “Module of quality and rich learning resource system”, which contains more than 4 000 instructors, 3 700 online courses and 1 800 cases.

Featuring high scalability, the cloud classroom learning platform supports large-scale and high-concurrent learning scenarios and meets the online learning of millions of users. Supporting over 10 000 concurrent scenarios, it features strong stability to enable business failure of less than 3 % during peak hours. With an easily accessible interface, it boasts fast response and small latency (the average response time is less than 5 seconds during peak time), providing participants with convenient learning and user experience.

8 Practices of learning materials available via distance learning

8.1 General

ISO 29994:2021, 10.2 and ISO 29993:2017, 8.4 and 10.2.2 specify the requirements for learning materials available via distance learning.

This clause presents practices from 3 DDLSPs on learning materials available via distance learning.

8.2 Learning materials designed with the principle of 3-M learning

DDLSP 1 has a practice (1-4) that relates to ISO 29994:2021, 10.2 and ISO 29993:2017, 8.4 and 10.2.2. This practice describes how DDLSP 1 design learning materials with the principle of 3-M learning.

DDLSP 1 offers over 140 online courses of degree education with intellectual property rights, comprising nearly 13 000 learning hours. Additionally, DDLSP 1 has developed over 500 online courses in English and 20 languages in countries along the Belt and Road initiative.

The design of all the learning materials at DDLSP 1 is underlined by the principle of 3-M learning (i.e. multimodal learning via multimedia in multiple environments). The principle of multimodality in learning is considered a norm rather than an exception as learners naturally engage in multiple sensory modalities when learning. To enhance learner engagement, multimedia content representation is preferred over mono-textual representation.

8.3 E-learning digital competences catalogue with course category as the elementary unit

DDLSP 2 has a practice (2-4) that relates to ISO 29994:2021, 10.2 and ISO 29993:2017, 8.4 and 10.2.2. This practice introduces the e-learning digital competences catalogue of DDLSP 2 with 33 course categories (11 competences for three levels of proficiency) and the related competing courses provided by different training organizations.

The course category is regarded as the elementary unit of the e-learning digital competences catalogue by DDLSP 2, corresponding to a specific level of proficiency for one competence. Consequently, following the syllabus's architecture, the catalogue is structured by DDLSP 2 in 33 course categories (11 competences for three levels of proficiency). For each course category the catalogue collects several competing courses, provided by different training organizations, from which the employee or user can choose.

The first set of courses collected in the e-learning digital competences catalogue were developed by the in-house provider of DDLSP 2. In January 2022 a call of interest was launched for major public and private players in the training or ICT sector to collect new content “syllabus” compliant. The content can be provided through the DDLSP 2's learning management system (LMS) or by integrating the provider’s LMS with the syllabus platform.

DDLSP 2 plans to acquire additional MOOC on digital competences as well as on other thematic areas, in line with the strategy to extend the project to all key areas of competence for the process of modernization of national public administration.

The tracking of users' choices, combined with the results of the satisfaction questionnaire related to each course and with the results of the post-training test, enables the realization of a multidimensional evaluation of the courses that ensure high-quality standards of the training provided.

8.4 A learning resource system with timely updating and rich test questions

DDLSP 3 has a practice (3-4) that relates to ISO 29994:2021, 10.2 and ISO 29993:2017, 8.4 and 10.2.2. This practice describes the learning resource system established by DDLSP 3, which consists of a cloud library with an annual update rate of learning resources exceeding 34 % and a question bank for learning assessment with a total of over 160 000 test questions.

Following strategic orientation and talent support, DDLSP 3 has established the learning resource system, integrating courses, lecturers, cases and management and centring on the project resource system to provide intensive knowledge sharing and platform services.

The learning resource system covers all categories. Focusing on management positions of every profession at different levels of the corporation, online courses are developed to cover all professional lines, with a total of more than 3 700 courses produced.

Learning resources are timely updated. The cloud library owns 133 000 e-books and 265 million professional reports and industry news, with the annual update rate of learning resources exceeding 34 %.

The learning resources developed are highly relevant. The learning development paths were planned based on organizational ability, leadership and professionalism, and learning resources have been developed with a focus on demand. A learning feedback mechanism has been established to continuously optimize learning resources. A question bank for learning assessment has been built with a total of over 160 000 test questions, covering various knowledge areas.

Learning resources are collected from extensive sources. More than 1 400 high-level external instructors have been pooled, and more than 1 800 internal management instructors have been trained through the model, combining practices and actual scenarios. By working with all departments of the corporation, organizational experience is swiftly extracted to form the best cases, with more than 1 800 cases developed so far.

9 Practices of learner support

9.1 General

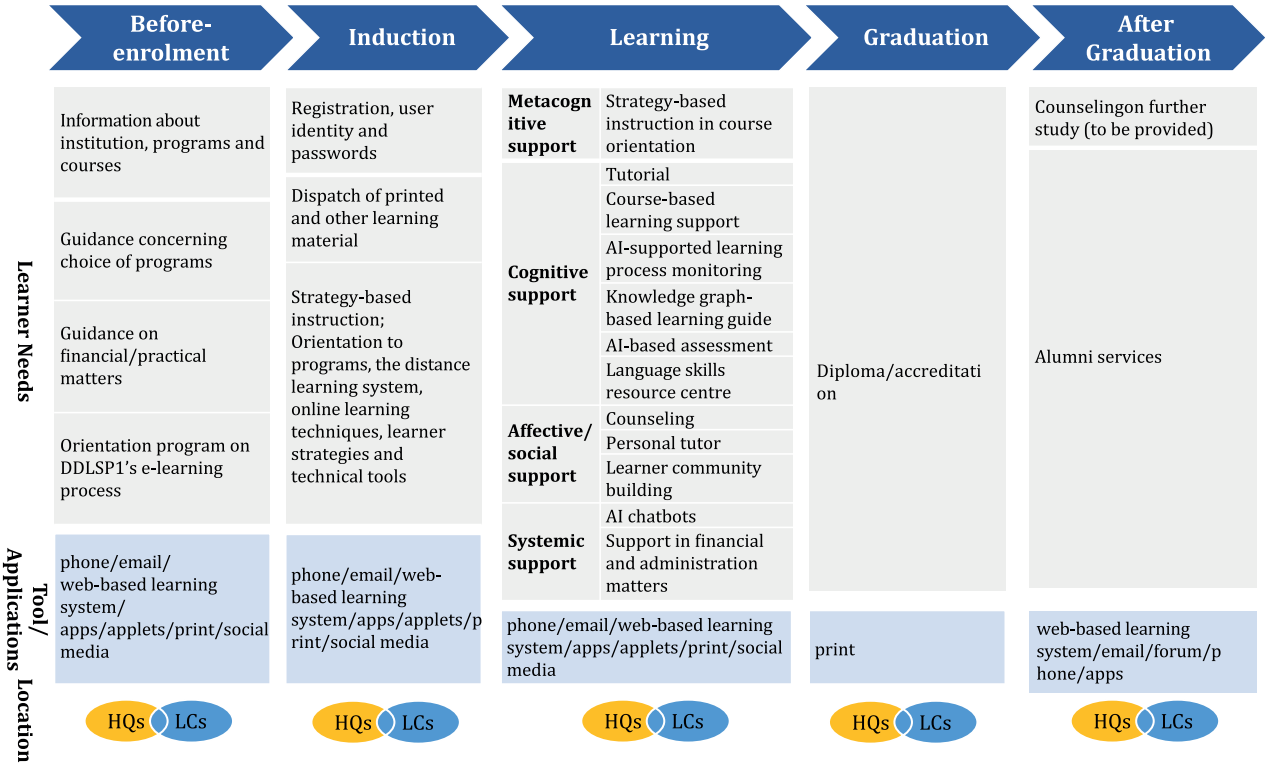
ISO 29994:2021, 10.3 specifies the requirements for learner support.

This clause presents practices from three DDLSPs on learner support.

9.2 A mentorship model that highlights different learner support elements

DDLSP 1 has a practice (1-5) that relates to ISO 29994:2021, 10.3. This practice describes a mentorship model of learner support designed by DDSLP 1, which highlights the different roles of learner support elements in the entire ecology of DDLS. This practice has already played a positive role in promoting teacher-student interaction, improving learning outcomes and increasing the homework submission and retention rates of students.

DDSLP 1 supports learners throughout the entire process: before enrolment, induction, course learning, graduation and after graduation. The learner support services are comprehensive and provided in Figure 7 and Table 3.



SOURCE Institute of Online Education, Beijing Foreign Studies University. Reproduced with permission.

Figure 7 — The circuit of learner support

Table 3 — An overview of learner support at DDSLP 1

Phase	Learner needs	Service provider	Location	Tool/ application
Before enrolment	Information about institution, programmes and courses	Administration	HQs, LCs	Print, website, other media
	Guidance concerning choice of programmes	Administration	HQs, LCS	Phone, email, website, print
	Guidance on financial/practical matters	Administration	HQs, LCs	Print, phone, email
	Orientation programme on IOE e-learning process	Administration	HQs, LCs	Print, phone, email
Induction	Registration, user identity and passwords	Administration	HQs	Email, phone
	Dispatch of printed and other learning material	Administration	HQs	Postal service
	Strategy-based instruction; orientation to programmes; orientation to the distance learning system; orientation to online learning techniques; orientation to learner strategies; orientation to technical applications	Administration Faculty	HQs, LCs	Website, email, phone, print, other media

Key
HQs headquarters
LCs (local) learning centres

Table 3 *(continued)*

Phase	Learner needs		Service provider	Location	Tool/ application
Learning	Metacognitive support	Strategy-based instruction in course orientation	Faculty	HQs, LCs	Website, print
	Cognitive support	Tutorial	Faculty	LCs	Face-to-face
		Course-based learning support	Faculty, fellow online students	LCs, HQs	Website, phone, email, forum
		Learning process monitoring	Faculty, administration	HQs, LCs	Website
		Assessment	Administration, faculty	HQs	Website, print
		Language skills resource centre	HQs	HQs	Website
	Affective/social support	Counselling	Faculty	HQs, LCs	Website, email, forum, phone
		Learner community building	Faculty, administration, fellow online students	HQs, LCs	Website, email, forum, face-to-face
	Systemic support	Technical assistance and training	Administration	HQs	Website, email, forum, phone
		Support in financial and administration matters	Administration	HQs, LCs	Phone, email, forum, face-to-face
Graduation	Diploma/accreditation		Administration	HQs	Website, print, forum, email
After graduation	Counselling on further study (to be provided)		Administration	HQs	Print, email, website
	Alumni services		Administration	HQs	Email, website, forum

Key

HQs headquarters

LCs (local) learning centres

To address the problem of insufficient teachers in distance education and to provide effective assistance to each student, researchers at DDSLP 1 have designed a mentorship model of learner support that highlights the different roles of learner support elements (e.g. teachers, mentors, peers) in the entire ecology of distance education. The results by comparing data indicate that this mentorship model of learner support plays a positive role in promoting teacher–student interaction, improving learning outcomes and increasing the homework submission and retention rates of students.

Overall, this model provides better support for learners by involving not only teachers but also mentors and peers. It can significantly improve the involvement of students in the learning process and foster a sense of community among them. Furthermore, the improvement in the homework submission rate and retention rate is particularly promising, as it is an indication of a higher level of engagement and motivation among distance learners.

9.3 A FAQ system on the public site

DDLSP 2 has a practice (2-5) that relates to ISO 29994:2021, 10.3. This practice briefly introduces a FAQ system available on the public site and a help desk service via email, which were both designed and implemented by DDLSP 2.

To provide technical and operational support to the users of the IT platform (HR managers of administrations and employees), a FAQ system available on the public site of the project by DDLSP 2 and a help desk service based on ticket management via email have been implemented. Periodically, DDLSP 2 launches information

campaigns on the initiative through the newsletter sent to all national public employees, the different social channels and websites of the department.

9.4 An intelligent talent development system for young learners

DDLSP 3 has a practice (3-5) that relates to ISO 29994:2021, 10.3. This practice describes an intelligent talent development system for young learners established by DDLSP 3, with the functions of intelligent recommendation and automatic learning plan generating.

The intelligent talent development system, which was established by DDLSP 3 as a pilot project for young learners, aims to create sound archives that record youths' growth and build the life cycle training pattern for young talents. It assists the development of talents of both the learner and manager ends by recommending learning resources intelligently on the personal level and generating learning plans on the corporation level automatically. The system's key functions and innovations include the following:

— Supporting step-by-step talent development based on a learning map. It provides learning maps for different types of talents, such as managers and experts, in accordance with post roles and personal career development paths. Thanks to the platform, the duration of learners' autonomous learning increased by 23 %, while the number of those who take the initiative to participate in training grew by 26 %, respectively, on a year-on-year basis.

— Integrating learning with talent assessment and development:

  — Based on the ability model, talent assessment results and position knowledge map, the system automatically identifies weak points and learning needs of employees, filters courses that have been learned and intelligently recommends learning resources for individual learners. Thus, the recommendation is made more accurately, effectively and pertinently.

  — According to the results of interviews, questionnaires and the requirements of work or tasks, the system takes stock of all talents via stocktaking tools to find out common training needs. Based on the results of need analyses, the system can automatically generate learning plans for particular groups, including the name, objectives and target audience of the training.

10 Practices of assessment of learning

10.1 General

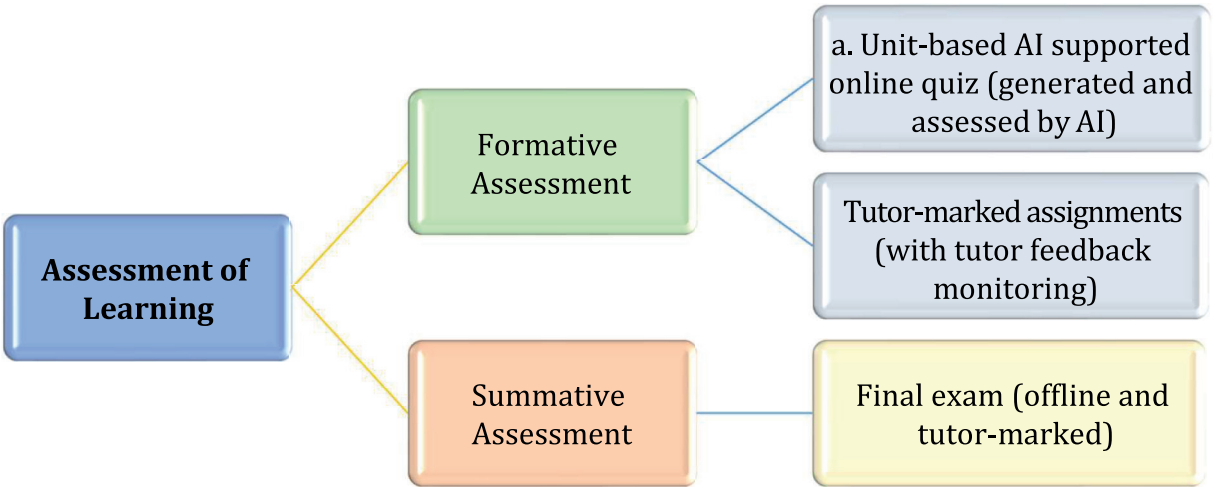
ISO 29994:2021, 12.2, ISO 29993:2017, Clause 12 and ISO 29992:2018 specify assessment of learning.

This clause presents practices from DDLSP 2 on assessment of learning.

10.2 A dual system of both formative and summative assessment

DDLSP 1 has a practice (1-6) that relates to ISO 29994:2021, 12.2, ISO 29993:2017, Clause 12 and ISO 29992:2018, Clauses 4 and 5. DDLSP 1 administers an entrance assessment prior to learners entering the degree programme, then adopts both formative and summative assessment in its assessment of learning, as demonstrated in Figure 8.

During the learning process, learners take the unit-based online quiz to check their understanding and mastery of knowledge learned and skills acquired, questions for the quiz are generated from the item bank and learner response is auto-marked with automated feedback. Learners also have to complete two or three tutor-marked assignments for each course. Tutor feedback will also be monitored by a peer tutor to ensure the sufficiency and quality of feedback given. AI technologies such as speech recognition and assessment and automated writing evaluation are applied in formative assessment. At the end of the course, learners take a final exam which is administered offline and marked by tutors. Learner performance in each course will be determined by their achievements in both formative and summative assessment.



SOURCE Institute of Online Education, Beijing Foreign Studies University. Reproduced with permission.

Figure 8 — The graphic procedure of formative and summative assessment of learning

10.3 Analysis of "incoming" and "outgoing" competences

10.3.1 General

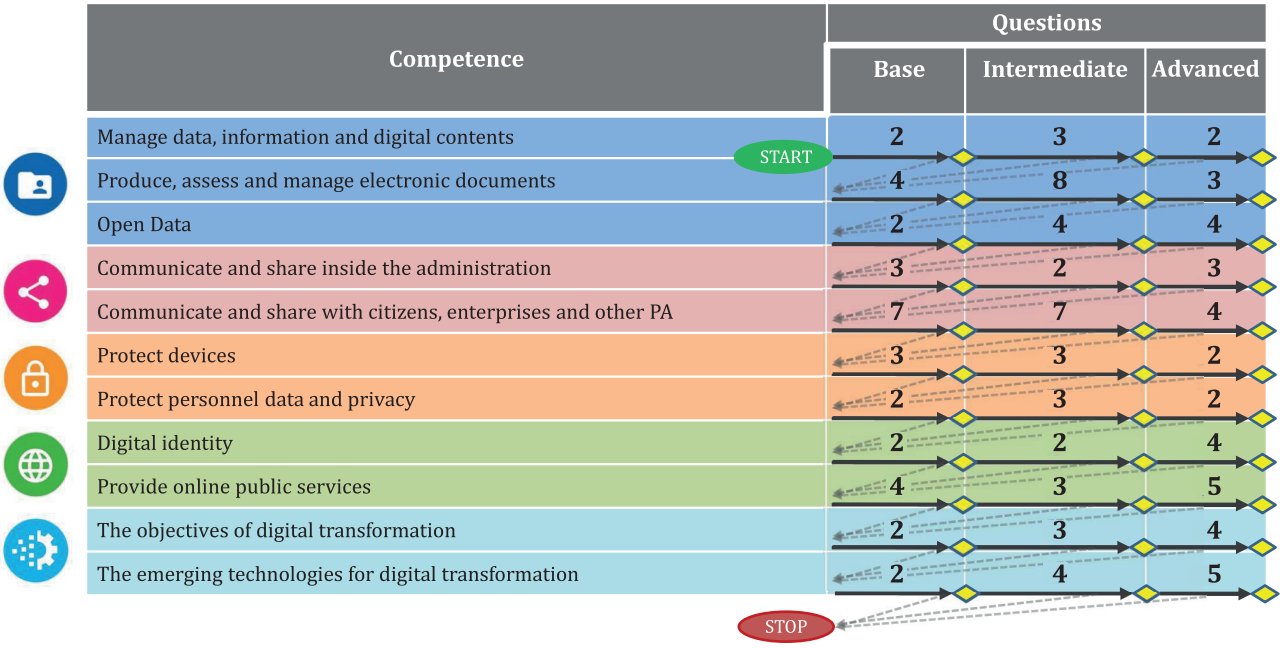
DDLSP 2 has a practice (2-6) that relates to ISO 29994:2021, 12.2, ISO 29993:2017, Clause 12 and ISO 29992:2018, Clauses 4 and 5. This practice describes how DDLSP 2 design and implement the analysis of "incoming" and "outgoing" competences based on the adaptive test.

10.3.2 Analysis of "incoming" competences

The analysis of "incoming" competences, and then of competences gaps, is carried out through an online assessment test.

The test, which consists of a set of multiple-choice questions with a single correct answer, is based on the structure and contents of syllabus "Digital Competences for PA". The test is adaptive: depending on the answers provided, the system evaluates whether to submit the questions of the higher proficiency level or move to another competence. Therefore, the test has a variable duration, from a minimum of about 30 minutes to a maximum of 113 minutes. For each competence, the transition from one level of proficiency to the upper one occurs if at least 60 % of the questions for that level have been correctly answered.

Figure 9 describes the algorithm adopted for the adaptive test.



SOURCE Italian Presidency of Council of Ministers, Department of Public Administration. Reproduced with permission.

Figure 9 — The algorithm adopted for the adaptive test

The test begins by submitting the two questions provided for the "base" level of the first competence (manage data, information and digital content). After answering these questions, there is a first decision point (represented by the yellow rhombus), where it is evaluated by the system if the number of correctly answered questions is sufficient for awarding the "base" level.

If the "base" level is awarded, the test continues by submitting the three questions for the "intermediate" level, to check whether also this level can be assigned; if not, the level is not achieved and, as represented by the dashed arrows, the system moves on to the next competence, starting from the "base" level.

This behaviour is repeated for all of the 11 competences of syllabus (see 5.3).

The questions to be submitted to the user are randomly selected from a data set organized per competence.

At the end of the test, the system returns a "report" which identifies the level of proficiency achieved (none, base, intermediate and advanced) for each of the 11 competences. The report also shows the number of correct answers given in relation to the number of questions expected for each skill and for each level of proficiency (e.g. "base 3/4" means that three of the four expected questions of the "basic" level have been correctly answered).

Finally, the report includes the list of selected courses from the catalogue: one for each competence focused on the upper level of proficiency than the level achieved with the test.

With the new release of the platform, under development, the rigidities of the assessment structure will be overcome, allowing the user to decide the order of competences to test and also to be able to distribute the test activity over time.

10.3.3 Analysis of "outgoing" competences

When an employee concludes an e-learning course, he/she can perform a new test to assess progress.

The post-training test consists of a set of multiple-choice questions, with one only correct answer. The number of questions submitted to the user is variable, from a minimum of 10 up to a maximum of 30, according to the complexity of the competence description (in terms of number of skills and knowledge)

and the level of proficiency. This post-training test is based on the same data set of questions used for the "incoming" test. In this case, questions are extracted randomly.

The post-training test is passed if at least 60 % of the proposed questions has been correctly answered. In this case, the system produces a certificate of the level achieved. The platform allows employees to consult all the results of tests carried out, with the possibility of sorting by area of competence, competence and result. Employees can also view, for each competence, the initial level, obtained after the incoming assessment test, and the progress achieved with the post-training tests.

The successful completion of the post-training test automatically enables access to higher proficiency-level training courses, with the aim of implementing a continuous training process for civil servants.

ICS 35.240.90; 03.180
Price based on 19 pages