

# Digital and inclusive pedagogical competences of educators

## Abstract

Teacher training focuses on generic technologies such as the European framework DigCompEdu, but special education students face them without being inclusive or adapted. DIPCE seeks to design inclusive learning activities where scientific and professional disciplines (pedagogy and didactics of the subject) and inclusive practices are added into a coherent whole. It was based on a selection of European countries by geographical location and a descriptive investigation taking samples from more than 8 educational centers and more than 50 teachers from each partner country. A model has been developed to incorporate digital resources and novel pedagogical approaches into teaching practices. A set of tools is being compiled that offers the means to create accessible and inclusive digital learning content to implement digital education practices. The results on how to transform conventional lessons to their digital format are being well received by teachers.

**Keywords:** competency, digital, DIPCE, inclusive, teachers

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**Abbreviations:** AMPAT, madrid association of early care professionals; COVID-19, enfermedad respiratoria muy contagiosa causada por el virus SARS-CoV-2; DigCompEdu, marco europeo para la competencia digital de los educadores; DIPCE, pedagogical, digital, and inclusive skills of educators; UCM, complutense university of madrid

## Introduction

The COVID-19 pandemic has had a strong impact on education and training systems,<sup>1</sup> in such a way that they have accelerated their digital transformation and have caused rapid change, on a large scale and in a short period of time. This brings new challenges, but also new opportunities. Know the availability, suitability and cost of technological tools and the role they play in teachers' adoption of digital content. The rapid evolution and choices of educational technology are having a profound impact on the levels of use of digital curricular resources in the classroom. However, it is not yet clearly understood and addressed how to make the most appropriate decision to select online tools and how to address accessibility for all children in the classroom (including those with learning difficulties, students from poor families, and students from different minorities). This situation should allow us to intensify our efforts and gradually evolve from temporary remote education focused on emergencies to more effective, sustainable, and equitable digital education, as part of inclusive education and training based on teaching practices and research.<sup>2-5</sup> These changes will contribute to guaranteeing access for all, regardless of their characteristics, place of residence (urban, rural, age, or the digital skills necessary in the 21<sup>st</sup> century,<sup>6</sup> but require strategic and concerted action, the pooling of resources, investments and political will to advance at all levels.<sup>7</sup> DIPCE is a project that aims to support the use of technology in the classroom with inclusive practices and experiences. It aims to promote student learning and inclusive education through teacher training.

Teacher education focuses on aspects of digital technologies that are generic to the teaching profession (e.g., the DigCompEdu framework). However, just as important as teacher education must also consider the more specific disciplinary practices and facets that characterize each individual school subject, particularly those practices that can address the challenges of an education system shaken by COVID-19 throughout Europe. Those most affected by

the impact of the pandemic on schooling are children with special educational needs,<sup>8</sup> who are lost in the new teaching reality. But it is also noteworthy that the support teachers are not present in person. Likewise, the day-to-day structure is different, and those who do not have the means to participate in online teaching (for example, lack of affordable hardware or software), are left out unless everything is provided by the centre, even on occasion. to the Internet connection. It has been verified by the partners of this project that there are very few actions carried out in Europe in this field and that these are not harmonized either.

## Marco DigComEdu

The DigCompEdu Framework<sup>9</sup> considers six different competency areas with a total of 22 competencies.

- I. Area 1, focuses on the professional environment.
- II. Area 2, sources, creation, and distribution of digital resources.
- III. Area 3, on how to manage and orchestrate the use of digital tools in teaching and learning.
- IV. Area 4, on digital tools and strategies to improve evaluation.
- V. Area 5, on the use of digital tools to empower students.
- VI. Area 6, on how to facilitate students' digital competence.

## Digital competence levels

Newbies/(A1) have had very little contact with digital tools and need guidance to expand their repertoire. The Explorers (A2) have begun to use digital tools, although without following comprehensive or consistent strategies yet. Explorers need the inspiration to expand their competencies. Integrators (B1) experiment with digital tools for a variety of purposes, trying to understand which digital strategies work best based on the context. Experts (B2) use a range of digital tools confidently, creatively and critically, in order to improve their practices. They continually expand their repertoire of practices. Leaders (C1) are based on a wide repertoire of flexible, complete and effective digital strategies. They are a source of inspiration to others. The Pioneers (C2) question contemporary digital and pedagogical practices, of which they themselves are leaders. They lead innovation and are a role model for younger teachers. También resulta conveniente

tener en cuenta las competencias digitales que son necesarias en el profesorado del siglo XXI.<sup>10</sup>

### Inclusive and universal design for learning

Inclusive design is “design that considers the full range of human diversity with respect to ability, language, culture, gender, age, and other forms of human difference”.<sup>11</sup>

- I. Awareness, compassion, and togetherness form the core values of inclusive design:
- II. Awareness to recognize diversity in students.
- III. Compassion to include the needs of those who are different from us.
- IV. Union to share positive results of the design process.
- V. The goal of inclusive design for learning is to harness human diversity in the design process to build a one-size-fits-all adaptive and adaptable learning experience that enables each learner to be the architect of their own learning.
- VI. Inclusive design for learning is not just a way of doing things; it is a way of thinking.
- VII. Inclusive design can be applied to learning along three dimensions:
- VIII. Recognition of diversity and uniqueness. All learners are unique and variable: The first dimension is about recognizing the diversity and uniqueness of each learner, which involves identifying and including the needs of learners along the edges or margins. It is also about enabling and promoting self-awareness and self-determination in students so that they can recognize their own needs with regard to a learning experience and make use of the available design and configuration options.
- IX. Use of inclusive processes and tools. The education design process must be inclusive: The second dimension is about ensuring that the design process and the tools used in the design are inclusive. A good design caters not only for students right in the middle of the target group but also for “hardcore users”. Inclusive design teams should be diverse and, if possible, include people who have lived experience with extreme users in the target group of designs. This is in line with the notion of “nothing about us without us” popularized by the disability community.
- X. Allow for a broader beneficial impact. The educational practice strives to create cultural change that benefits everyone in the context of the changing complex adaptive systems that make up our world: the third dimension requires designers of learning systems and services to be aware of the context and broader impact of what they create and strive for a beneficial impact beyond the intended beneficiaries. Inclusive design should strive to recognize the interconnectedness of users and systems, harness the “sidewalk effect” through its results, and trigger a virtuous circle of inclusion.

Universal Design for Learning (UDL), accessibility, and Inclusive Design for Learning (IDFL) are complementary, in that UDL and accessibility provide a baseline or range of options and technical conditions for practising inclusive design... UDL provides principles for preparing a learning environment that is designed for diverse abilities based on “scientific insights into how humans learn”.<sup>12</sup>

Inclusive Design for Learning differs in that:

- I. It is a process, not a set of criteria.
- II. Addresses any human differences marginalized by standard designs.

III. Involve the people whose needs are not being met in the design process.

IV. It is online to respond to the complex and changing context of education.

Inclusive education is about a fundamental change in the existing education system from seeing differences as a problem to be solved to celebrating the diversity of students and providing all the necessary support to enable equal participation.<sup>13</sup>

In general, inclusive education is based on 7 principles:

- I. Diversity enriches and strengthens all communities.
- II. The different learning styles and achievements of all students are equally valued, respected and celebrated by society.
- III. All students can develop their potential by taking into account individual requirements and needs.
- IV. Support is guaranteed and fully resourced throughout the learning experience.
- V. All students need friendship and support from people their own age.
- VI. All children and youth are educated together as equals in their local communities.
- VII. Inclusive education is incompatible with segregated provision both within and outside of general education.

Inclusive practice can be defined as attitudes and methods that ensure that all students can access general education. They all work to make sure that all students feel welcome and valued, and that they get the right support to help them develop their talents and achieve their goals. When education is truly inclusive, it can actually benefit all students, not just students with disabilities.<sup>14</sup>

### Technology and inclusive design for Learning

The goal of inclusive design for learning is to harness human diversity in the design process to build a one-size-fits-all adaptive and adaptable learning experience that enables each learner to be the architect of their own learning. Inclusive design for learning is not just a way of doing things; it is a way of thinking. It is a common myth that technology, which forms the brick-and-mortar of the digital world, creates accessibility challenges. Technology, by contrast, is incredibly malleable and can accommodate human differences in all its forms if we acknowledge human diversity and create with empathy, adhering to digital building codes in the form of accessibility standards (<https://www.d2l.com/accessibility/>).

### Inclusive teaching

By focusing on the range of needs rather than the average need, we create a wide range of options that benefit students who have complex and diverse minority needs, as well as students with majority needs who experience situational or temporary barriers (for example, injuries, displacement, crisis). Self-determination and self-awareness are nurtured by involving students in identifying their needs and helping them make informed decisions.<sup>15</sup>

### Material and methods

The partners have been selected following criteria of experience in the matter, technological capacity for the implementation of theoretical designs and a geographical distribution of project partners that guarantees a sufficiently representative balance and participation

at a European level. The composition of the consortium is as follows:

#### Coordinator:

Complutense University of Madrid, Spain

#### Partners:

- I. Madrid Association of Early Care Professionals (AMPAT) Spain.
- II. Sdruzenje Na Na Raboteshtite S Hora S Uvrezhdaniya, Bulgaria.
- III. HIS Paisiy Hilendarski, Bulgaria.
- IV. Special Educational Support Center, Bulgaria.
- V. PhoenixKM, Belgium.
- VI. Euphora Perivalontiki Chiou Meletonkai Ipiresion Monoprosopi Eteria Idiotiki Kefaleouxikis Eterias, Greece.
- VII. 3<sup>rd</sup> primary school in Hermoupolis, Greece.

The objective of the model that we present is for the school management to provide leadership and accept the challenge of achieving the integration of ICT (information and communication technologies) in inclusive education,<sup>16</sup> and to equip all students of the digital skills necessary to participate fruitfully in the digital society:

Raising awareness about the possibilities of digital tools to enable an inclusive education for all students.

- I. Establishing a solid alliance between schools, universities, support centres for inclusive education and professionals and organizations focused on disability.
- II. Empowering young people to ensure their full integration into education, society and well-being.
- III. Creating support didactic material.
- IV. Enabling schools to ensure the necessary infrastructure for the adoption of digital content, including available, appropriate and affordable technology tools.
- V. Achieving an effective integration of digital content in the inclusive pedagogical practices of teachers.
- VI. Contributing with the intellectual products of the project to the conceptualization of the inclusive professional competencies of digital and distance learning in the teaching profession.
- VII. Improving the preparation of teachers to face the educational challenges caused by the COVID-19 pandemic.
- VIII. Strengthening the competence of teachers, especially when it comes to distance education.

For the development of the didactic model, a manual, a resource search database and a website have been prepared:

Creation of a tool aimed at reflecting on the functioning of a school and supporting students in the development of ICT and ICT-AT skills, which allows for identifying positive aspects and areas in which the efforts of each should be increased. school to improve results and guide the definition of its activity.

#### There are two versions

- I. A short version, with a description of good practices in each area for schools that are beginning to think and plan strategies in this field.

- II. An extended version presenting four good practice descriptors for each area, with questions to understand the criteria and assess what stage of achievement you are in, thus improving your strategies. It collects important criteria that can be answered in more than one area. The participants (director, teacher, etc.) evaluate each criterion, which allows them to involve the participants and reach the central themes.

- III. La evaluación de la situación ayuda a las escuelas a establecer prioridades, planes de acción y a profundizar en los problemas.

- IV. Worksheets prepared for your use.

It presents 10 evaluation areas grouped into 2 chapters: policy and practices.

#### Section “Culture and school policies”

- I. Comprehensive school management and planning.
- II. Whole school environment.
- III. Fulfilling the student’s potential.
- IV. Fulfillment of staff potential.

#### The “Practices” section

- I. Curriculum planning.
- II. Individualized educational planning.
- III. Teaching and learning strategies - The learning experience.
- IV. Teaching and learning strategies - The teaching experience.
- V. Classroom management.
- VI. Support and recognition of learning.

Elaboración guía de “Pasos para transferir un curso en línea de forma inclusiva”.

It is aimed at teachers/trainers/researchers/youth workers. It includes a set of instructional graphics (online, mobile and printable), and animated explanatory videos to support the implementation of inclusive distance learning.

Development of a support portal that helps teachers and schools in the implementation of preparation for digital education and improves organization and school activity during and after the pandemic. Provides a searchable database of inclusive distance learning practices, pathways, inclusive learning environments and accessible open-source repositories (training materials, software, etc.) Figure 1.

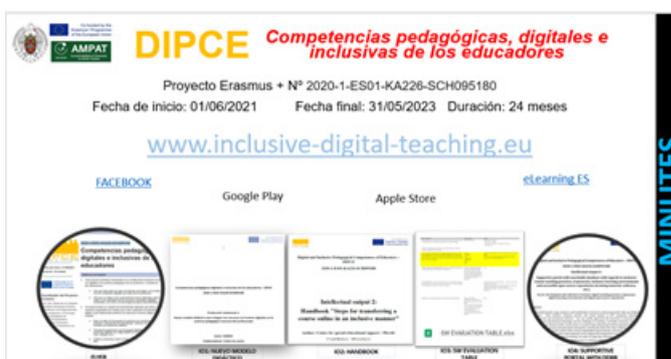


Figure 1 DIPCE project. Source: self-made.

## Project progress

To develop the project, face-to-face and, especially, virtual transnational meetings are being held through Zoom. The regulations on COVID-19 evolve differently in each European country and there are serious limitations to travel and attending meetings in person, so videoconference has become the most useful tool to solve the problem. To this end, the first meeting had to be kept in an online format due to the restrictions that still prevailed in many countries:

- I. Our first kickoff meeting had to be virtual. It was held with representatives of all partner countries: Spain, Bulgaria, Belgium and Greece, on June 25, 2021.
- II. The main objective was to outline the purposes and objectives of the project and to define the next steps in the work to be done by all partners before the next virtual meeting Figure 2.



**Figure 2** First DIPCE transnational meeting. Source: self-made.

The transnational meetings, mandatory in the design of the Erasmus+ projects, have been complemented with periodic control and monitoring meetings, of course, also virtual. with the generous participation of all the partners, since a consensus day and time has always been sought in which the majority of the people linked to the project could participate Figure 3.

20210910\_2nd Online Meeting

20211008\_3rd Online Meeting

20211209\_4th Online Meeting



**Figure 3** Virtual control and monitoring meeting. Source: self-made.

## Status of upcoming meetings

In-person transnational meeting postponed from 09-2021, which will take place between May 4 and 5, 2022.

- I. Plovdiv, Bulgaria.
- II. Review and finalization of the draft versions of IO1 and IO2.

Transnational meeting scheduled for 04-2022 to review apps, functionalities and database.

- I. Hermoupolis, Syros, Greece.
- II. Completion of the English version of IO1, IO2, IO3 and IO4.
- III. Transnational meeting scheduled for 05-2023. Meeting to draft the final report among the partners.
- IV. Review of results from the monitoring of partners in their respective countries.
- V. Meeting scheduled for 11-2023. Final report. Transnational meeting. Virtual.
- VI. Review and discussion of medium-term results from the evaluation of the interim report.
- VII. First global monitoring of results.

## Results

Implementation of the new didactic model to incorporate digital curricular resources in the inclusive pedagogical practice of teachers and in accordance with the W3C<sup>17</sup> standard. This result describes a model to incorporate digital resources in teachers' pedagogical practice. It helps to determine the factors associated with the adoption of digital content by teachers, the characteristics of the various actors (students with learning difficulties, gifted students, students with deviant behaviour, etc.), the nature of the resources digital curricula (content) and support technology (tools, their level of difficulty to be used, costs, etc.). We find them in the phase of elaboration of the manual "Steps to transfer an online course in an inclusive way", which shows teachers how to implement the regular teaching of lessons to digital content:

- I. What didactic approaches to use.
- II. What activities might be appropriate.
- III. What are open-source solutions.
- IV. What can they use to achieve this?
- V. Know how your decisions are influenced by your personality, experience, professional knowledge, relationships and context.

The evaluations received from teachers regarding the relevance (and value) of digital curricular resources are influenced by any combination of the previous sections.

The following aspects are considered when evaluating the relevance of digital curricular resources:

- I. The level of awareness that teachers have about the meaning and variety of digital curricular resources (and related terms such as "digital content" and "learning objects").
- II. The nature and degree of consensus among teachers, educational designers and policymakers regarding the orientation, relevance and use of digital content.
- III. Creation of a set of instructional graphics (online, mobile and printable) and explanatory animated videos to support the implementation of inclusive remote education.

## Intellectual product IO1

New didactic model to incorporate digital curricular resources in the inclusive pedagogical practice of teachers.<sup>18</sup>

This result will describe a model to incorporate digital resources in teachers' pedagogical practice.

This model will consist of two dimensions:

- I. The first deals with the types of factors associated with the adoption of digital content by teachers.
- II. The second refers to the characteristics of the various actors (students with learning difficulties, gifted students, students with deviant behaviour, etc.) and the nature of the digital curricular resources (content) and support technology (the tools, their level of difficulty to be used, the costs, etc.) Figure 4, 5.

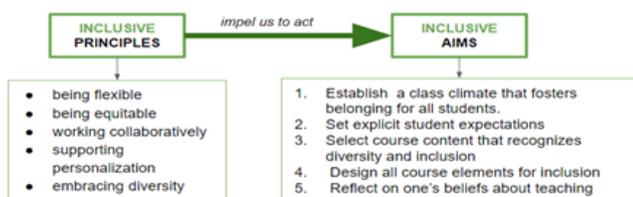


Figure 4 DIPCE schematic model. Source: DIPCE project.

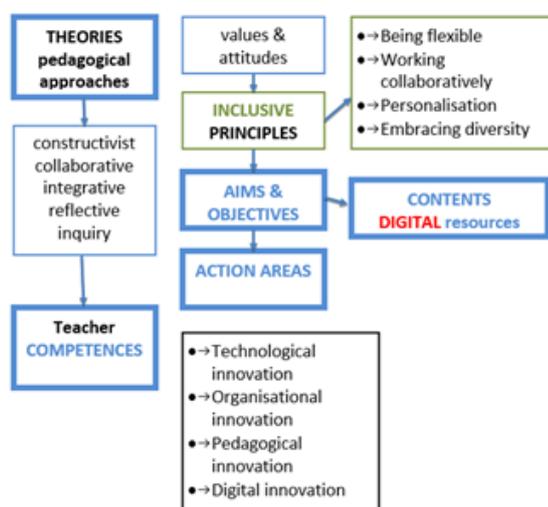


Figure 5 DIPCE didactic model (II). Source: DIPCE project.

### Intellectual product IO2

Manual “Steps to transfer an online course inclusively”. Today, an important issue for teachers is how to implement the regular teaching of lessons in digital content: what didactic approaches to use, what activities might be suitable and what open-source solutions they can use to achieve it. Your decisions are influenced by your personality, experience, professional knowledge, relationships, and context. Their assessments of the relevance (and value) of digital curricular resources are influenced by any combination of these.<sup>19</sup>

The following aspects should be considered when evaluating the relevance of digital curricular resources:

- I. First, how aware are teachers of the meaning and variety of digital curricular resources (and related terms such as “digital content” and “learning objects”)?
- II. Second, the nature and degree of consensus among teachers, educational designers and policymakers regarding the orientation, relevance and use of digital content.

### Intellectual product IO3

Set of instructional graphics (online, mobile and printable) and explanatory animated videos to support the implementation of inclusive remote education. The availability, suitability, and cost of

technology tools play an integral role in teachers’ adoption of digital content. Rapidly evolving technologies and market influence on teachers’ educational technology choices are having a profound impact on the levels of use of digital curriculum resources in the classroom. However, it is not yet clearly understood and addressed how to make the most appropriate choice when selecting online tools and how to address accessibility for all children in the classroom (including those with learning difficulties, students from poor families, and students from different backgrounds or minorities).

### Intellectual product IO4

Support portal with a searchable database regarding inclusive remote teaching practices, pathways, inclusive learning environments and accessible open-source repositories (training material, software, etc.). When considering the range of actors and stakeholders involved in improving the adoption of digital content by teachers, from teachers, students, parents and school leaders to ICT companies, education officials and ministerial advisers, one can easily appreciate the diversity of awareness and views on educational technology and the challenge of reaching a viable consensus on its value and use. There is a need for an open educational solution (portal) to increase the level of awareness and agreement among its constituents about the value of digital content and the means by which the actions of the various actors (governments, educational authorities, ICT companies, schools, teachers, and students) can be aligned and integrated to increase teachers’ use of these resources for the benefit of their students. They need easy and structured access to inclusive digital learning practices, pathways, learning environments, and open-source digital repositories that allow them to decide what might benefit them.

### Discussion

The DIPCE pedagogical model makes sense from the moment that, to date, inclusion in the classroom continues to be minimal or non-existent, as we have been able to practically verify in many schools in all the member countries of this consortium. We have also verified that the main problem for the lack of inclusion is the lack of knowledge on the part of the teaching staff and the management teams, on how to put true inclusion into practice.

Our pedagogical model reflects, step by step, what a teacher must do in the classroom so that all students have the same learning opportunities. DIPCE project: <https://www.inclusive-digital-teaching.eu>

### Conclusion

Using the simile of the software compilation CDs and DVDs that appear on the Internet called “All in one” that usually contain one of the following points:

- I. All versions of an operating system.
- II. All versions of an office software package.
- III. Everything you need in tools for web design, etc.

This is DIPCE, a project that aims to support the use of technology in the classroom with inclusive practices and experiences<sup>20</sup> to enhance the learning of special education students through teacher training so that they find in the DIPCE portal the “All in one” that allows them to obtain information, training, examples, and practical content ready to use in the classroom. When a teacher thinks about applying the different pedagogical models,<sup>21</sup> they should also think about including the DIPCE model, which provides inclusion, unlike those commonly reviewed.

## Acknowledgments

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## Conflicts of interest

As a member of the DIPCE project, the author declares there is no conflict of interest.

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