



Digital Resilience Blended learning in a time of Pandemics Impact Report



Introduction

This report looks at the overall impact from the project. It looks at the impact on the training and gives some examples of case studies.

In order to compile this report, each partner has completed an evaluation questionnaire, gathering feedback from both school leaders and teachers and in some cases teaching assistants. It has gathered feedback on the various strands of the project and also. The report also includes some case studies.

This report is based on the final evaluation. Some changes were made to the scheme based on an interim evaluation part way through the trials. These were mainly concerned with the resources.

Numbers involved in the pilots.

All modules were trialled but not all the resources were tested, as they were designed to enable partners to address their specific needs and therefore to be used flexibly. It is also the case that some partners found some modules more relevant to their needs at the time of the trials and therefore some were tested more intensively. For example, although Assessment was found to be useful, it did not necessarily address the specific needs at the time.

The numbers involved have varied from one country to another, due to the different approaches taken by different partners, staff changes and the impact of Covid, which led to a single set of trials rather than two as initially planned. The numbers of teachers reached overall, however, exceeded the initial targets.

	Target	UK	Italy	Spain	Finland	Slovenia
Numbers of Teachers involved in the pilots	10	60	10	12	12	10
Total Teachers involved	50	104				



Digital Resilience Blended learning in a time of Pandemics Impact Report



Feedback on the Training Modules.

Participants were asked to evaluate the impact of the training on their practice, not every teacher responded to every question, which is why the totals differ but overall the results were as follows:

Module 1 Preparing an Effective Learning Approach	A lot	Some	No difference	Not a lot	Not at all
Understand the difference between synchronous, semi-synchronous and asynchronous learning	30	9		4	1
Feel able to plan for a semi-synchronous learning to accommodate closure or absence	25	12	1	4	2
Are able to set rules and behaviours for online learning	28	12	1	3	
Understand the additional challenges faced by disadvantaged students	19	22	1	2	
Are able to put in place different strategies to support disadvantaged learners	9	27	2	5	

Module 2: Subject specific needs	A lot	Some	No difference	Not a lot	Not at all
Are aware of the different approaches required by different subjects	59	18		4	
Can identify the gaps in provision that cannot be addressed online	41	35	1	4	2
Feel able to adapt schemes of work and lesson plans to incorporate a blended learning approach	54	24	12	2	1
Can set up offline activities to ensure continuity of provision in a closure or absence situation	56	28	7	2	
Feel that exploring case studies has enabled you to explore new approaches in your teaching	38	34	19	2	



Digital Resilience Blended learning in a time of Pandemics Impact Report



Module 3: Maximising Engagement	A lot	Some	No difference	Not a lot	Not at all
Understand the factors in online learning that contribute to a lack of engagement	44	29	7	2	2
Identify students who are disengaged	31	31	11	5	2
Are aware of strategies that can be used to promote online engagement	37	35	4	1	
Feel able to put in practice different technologies, resources and techniques to promote engagement	38	24	12	6	
Can implement individualised strategies with disengaged students	17	46	12	4	2

Module 4: Assessment	A lot	Some	No difference	Not a lot	Not at all
Are aware of the different types of platforms that can be used for online assessment	22	17	1	1	1
Understand the technical, legal and licencing requirements to use online platforms	18	16	2	6	3
Are able to select the most appropriate online platform for my own subject needs	29	8	4	4	2
Feel confident using online assessment in my teaching	17	14	5	6	1

Teachers were asked if they had any additional comments to make and some of the general comments were:

- Every topic was relevant to my practice
- It was good to share practice from other countries.
- Each module was designed well but given the different school set ups some modules were less useful, such as Module 1
- Some interesting points but I didn't have time to use them
- I am limited in my digital ability so learning to use this was a personal challenge
- Cooperative learning in PE has been a valid tool
- I am (mostly) aware of the needs in my own subjects, not necessarily in others
- I liked the brainstorming. I got ideas I didn't think about during the pandemic
- Nothing can be achieved without engaged students. So for me as a teacher, maximizing engagement is a crucial goal in remote learning
- I really liked how versatile the resources were and I also liked the activities



Digital Resilience Blended learning in a time of Pandemics Impact Report



Teachers were also asked if they had any examples to share that demonstrate the strategies in practice, some of their responses were:

- Multi-choice quizzing with responses in “Chat” MFL teacher
- Using animated slides to demonstrate as clearly as possible the steps to understanding grammar
- Sending links to audio recordings to support listening skills MFL teacher
- Sharing links to practical examples / demonstration of practicals science teacher
- Live modelling using the visualiser and tablet mathematics teacher
- Use of camera and visualiser Dyslexic specialist teacher
- Peardeck allows students to reveal answers without other students being able to see one another’s responses PE teacher
- Use of breakout rooms to accommodate synchronous lessons with instruments at A level Music teacher
- Visualiser in Art lesson
- Recorded asynchronous demonstrations for Food Technology lessons
- Using visualiser to live annotate sources – history teacher
- Visualiser for live drawing and modelling – geography teacher
- Using breakout rooms for debating RE teacher
- Using online polls to identify grammar misconceptions MFL teacher
- Using simulations and videos to replace practical work
- I have tried to maximize students' engagement by using YouTube for explanations and demonstrations of various topics (pronunciation, British history etc.)

Conclusions

- All modules had significant numbers reporting that the training had either a lot or some impact on their performance and there was little difference by Module, with 89% reporting either a lot or some impact for Module 1, 87% for Module 2 and 82% for Module 3. The numbers reporting similar impact for Module 4 were 72% but this may be explained by the fact that individual teachers sometimes have little control over assessment policy.
- When looking at the responses that teachers gave in terms of a lot of impact, the picture changes slightly with Module 2 having the most impact, followed by Module 1.
- In terms of the specific activities having the greatest impact they were as follows:

Module 4: Assessment	A lot of difference	A lot or some difference
Are aware of the different approaches required by different subjects	72.8%	95.1%
Understand the difference between synchronous, semi-synchronous and asynchronous learning	68.2%	88.6%
Are able to set rules and behaviours for online learning	63.6%	90.9%
Can set up offline activities to ensure continuity of provision in a closure or absence situation	60.2%	90.3%



Digital Resilience Blended learning in a time of Pandemics Impact Report



Case Studies

Testimony of the impact from a teacher's point of view Ceste Foundation - Spain

¿In your opinion, what impact has the project got on teachers?

Impact is very important. Our school has always been aware of the importance of training teachers, even before the pandemic, so this helped us face it with less difficulties.

Moreover, this project has let us improve in different abilities like ensuring, studying more in depth and consolidating our digital capacities in different levels.

How do you think these resources can help a teacher who is not used to teach online classes?

These resources can help in many aspects: from a new way of teaching- learning process and methodologies (see module 1), to learning how to engage, in a better way, students in different subjects (developed in module 2) and finally knowing beforehand which could be the difficulties that can be found, how to acknowledge them and how to face them (see module 3). It is also important to highlight the importance of assessment regarding the fulfillment of objectives, establishing ways of online evaluation that also respects the GDPR (to be found in module 4).

How has the project made an impact on you? How has it contributed to your way of giving classes?

This project has helped me to learn some tools that I did not know so far. It has, also, given me the chance to read about case studies with very interesting ideas that I can now incorporate in the teaching-learning process. As I said before, all 4 modules are important and they complement each other. I would highlight module 2, not only because of the topic it deals about, but also for the quality of the lesson plans. It has helped me and it has, also, given me many ideas to apply them in my classes in the different subjects I teach.

Would you have found these resources useful during the pandemic?

I already had some materials, though, but it is a project that would have helped me during the beginnings of the pandemic, no doubt.

Have you included any new methodology in your classes? Which one? Is it the same for each subject?

Yes, I have used the theory based on the psychological needs of students which I have used in all the subjects I teach. I have also used group video calls or I have done collaborative projects in groups (in subjects like philosophy or citizenship that are based on critical thinking).

What have you learnt from this project?





Digital Resilience Blended learning in a time of Pandemics Impact Report



I have learnt this new methodology on how to increase engagement in the students and that also helps students to follow the class more easily, since this methodology is flexible and personal to each student.

What has been the response of the students to this change in methodology?

In my case, the answer has been a positive one. These changes have let them have more interaction in and during exercises and activities, better presentations of those works and all of these have given a better learning and a long term learning. Moreover, it is important to highlight students with learning difficulties since I have been able to personalize activities to manage academic objectives proposed with this very attractive methodology.

Furthermore, I would also like to mention the importance of families. Although teachers are always trying to engage students to be better and improve, if, most of the time, families are not there supporting and being aware of what these online methodologies allow to achieve, all of these improvements could not be possible.

What about families? Have they noticed any changes?

As I said before, the role of families is very important. They have been, at all times, aware of the changes and they have seen them as a positive way of learning, giving positive feedback.

However, the families should, as much as possible, help teachers control and notice possible problems that could arise, such as not attending classes or not using the electronic devices in the correct way.

Finally, just to finish, it is important to highlight the individual responsibility of the students, which is crucial. Using the electronic devices and tools correctly can lead to a major autonomy of the student that, in a future, can lead to having better control in non academic issues.

In conclusion, all the academical community, together with parents, are needed in this process of teaching - learning online.

Slovenia. The school in Slovenia used the project for a much more substantial analysis and produced the following report:

1 THE IMPACT OF THE PROJECT ON THE TEACHER AND THE STUDENT

1.1 BACKGROUND

During the project, teachers had an excellent opportunity to test different ICT tools that might be suitable for distance learning (all tools are listed in the tables of Module 1, 2, 3 and 4). In doing so, we identified a number of factors that influence the effective use of each ICT tool.

1.2 Factors influencing the implementation of ICT-based testing and assessment



Digital Resilience Blended learning in a time of Pandemics Impact Report



We will observe the factors that influence the implementation of ICT-based assessment from the teacher's point of view. The impact of these factors can then be passed on to the student.

Many factors influence the teacher who implements the learning process with ICT, which can be divided into internal and external factors. Internal factors are defined as factors in which the teacher has a direct influence or is directly affected by them. In contrast, external factors are those factors that are external to the teacher and cannot be directly influenced by the teacher.

Internal factors are classified by adding positive and negative attributes respectively. Positive attributes of internal factors represent strengths (S-Strengths) and negative attributes represent weaknesses (W-Weaknesses). External factors can be classified in a similar way. Positive attributes of external factors represent opportunities (O-Opportunities) and negative attributes represent threats (T-Threats).

These strengths, weaknesses, opportunities and threats are put together in a 2x2 matrix called a SWOT analysis of external and internal factors (Figure 7).

1.2.1 Internal factors

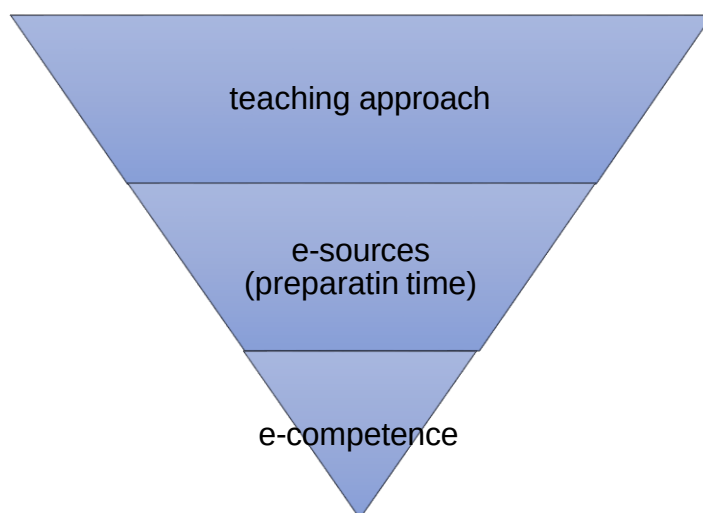
Internal factors are those that have a direct influence on the teacher. Therefore, if they affect the teacher negatively, the teacher has the opportunity to change them so that they affect the teacher positively. For the teacher, the following factors are fundamental: e-competence of



the teacher and the student, time to prepare/adapt the e-material (assessment and evaluation) or to review the existing assessment, pedagogical factors (teaching approach, didactic use of ICT, collaborative learning).

It makes sense to rank these fundamental factors in a hierarchical order. The basis for the implementation of the learning process with ICT and thus also for the assessment and evaluation of knowledge is certainly the e-competence of the teacher. This influences a number of other factors, such as: self-confidence in using ICT in the classroom, the ability to overcome possible technical problems, the ability to reorganise an otherwise well-planned lesson (e.g. no internet connection). This is followed by the time spent by the teacher reviewing existing e-materials, creating new e-materials, or correcting or adapting existing e-materials of their own/your own. Lastly, we would put the teaching approach, which is the most important for the teacher in the classroom. It directly relates to the work with students in the classroom and certainly carries as much weight, if not more, than the e-competence of the teacher (Figure 1).

Figure 1: Hierarchical ranking of internal factors



In a study, Slavit and Yeidel (1999) found that it is the harmony between the teaching approach and the appropriate use of ICT in the classroom that adds value and thus improves the quality of teaching.

1.2.1.1 Teacher and student e-competence



Digital Resilience Blended learning in a time of Pandemics Impact Report



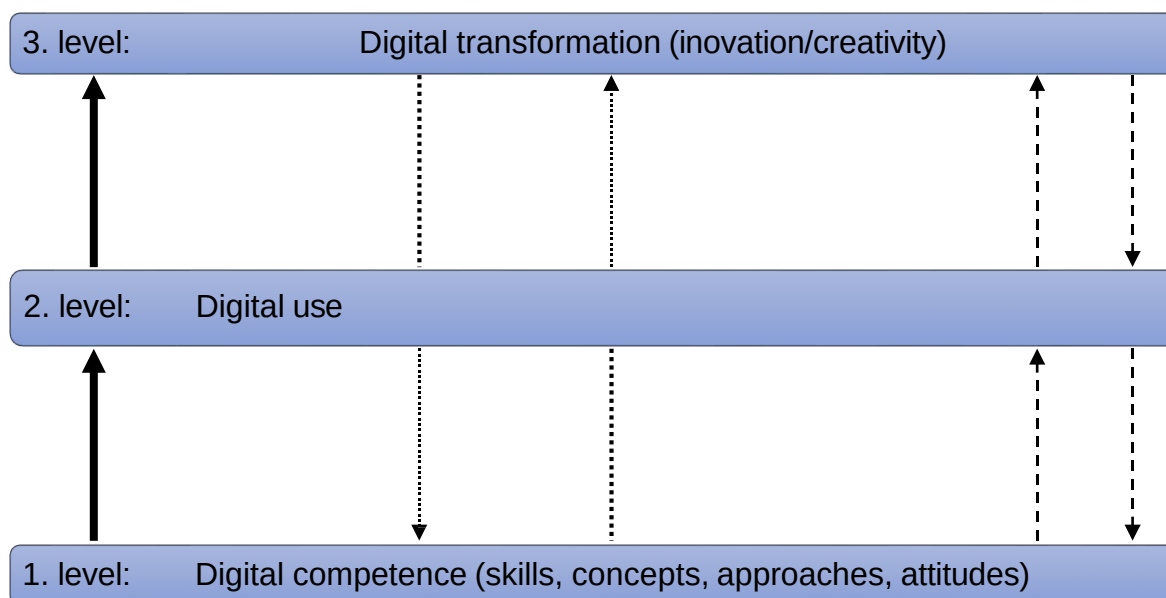
E-competence (digital literacy) of a teacher is defined as "[...] the awareness, attitudes and abilities of individuals to use digital tools and devices appropriately to identify, acquire,



process, integrate, evaluate, analyse and synthesise digital resources, construct new knowledge, create media expressions and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect on these processes" (Allan & Grudziecki, 2006).

The development of digital literacy is characterised by three phases (Figure 2).

Figure 2: Levels of digital literacy



Source: Modified after M. Allan, & J. Grudziecki, *Concepts and Tools for Digital Literacy Development*, 2006. Digital literacy can be viewed at both macro and micro levels. At the micro level, the teacher is initially introduced to a new ICT tool, learns how to handle it, concepts, approaches. After some time, he/she tries to apply the ICT tool to professional use and integrate it into the subject he/she is teaching. The highest level of e-competence is reached when the teacher creatively starts to innovate with the ICT tool. At the macro level, all digital skills from the micro level are integrated. Teacher e-competence is actually about digital literacy at the macro level and is therefore difficult to standardise. Therefore, teachers' digital literacy is heterogeneous.



Digital Resilience Blended learning in a time of Pandemics Impact Report



In Slovenia, in 2010, the Slovenian School of Education and Science attempted to standardise teacher e-competence into six core e-competence competences (Figure 3) and published the content on the Sio.si website (2010):



Digital Resilience Blended learning in a time of Pandemics Impact Report



»**1. Knowledge and ability to use ICT critically.** The teacher/administrator is familiar with hardware and didactic software and is able to use it skilfully in school and classroom work. Critically assesses its didactic value and integrates it meaningfully into his/her work and teaching, thus being able to provide students with appropriate support in acquiring new skills and competences. The head teacher must be familiar with and make meaningful use of IT support for school management or administration.

2. Ability to communicate and collaborate remotely. The teacher/teacher uses appropriate technology and virtual environments for communication and collaborative work in the classroom to support the acquisition of new knowledge and understanding of concepts. Using technology and virtual environments, the teacher/learner/teacher supports students in project work in the classroom. At the same time, it establishes communication and collaboration between students, parents and the wider community (including internationally) to encourage more activity and independent learning. It helps pupils to work together to solve problems, to explore and to create. It encourages the creation of online communities - learning circles.

3. Ability to find, collect, process, evaluate (critically assess) data, information and concepts. Teachers/educators know and use the World Wide Web as a source of data, information and concepts and integrate this into the classroom to acquire new skills or competences through project work, problem-based learning, etc. This helps students to develop the ability to find, collect, analyse, use and evaluate the information they gather. Through these capacities, they influence learners' cognitive development and their ability to process information, solve problems, work collaboratively and think critically.

4. Safe use and compliance with legal and ethical principles for the use and publication of information. Teachers/carers are aware of the potential dangers or abuse of children and young people when using online or mobile technologies. They are able to identify areas and developments in the school and environment that require attention to ensure online safety. They know how to make pupils aware of how to protect their data in lessons.

5. Creating, producing, updating, publishing materials. Teachers/educators are able to create,



Digital Resilience Blended learning in a time of Pandemics Impact Report



design or update e-materials and activities to enable learners to work collaboratively (remotely), problem-solve, explore or create. They are able to help learners to create



Digital Resilience Blended learning in a time of Pandemics Impact Report



multimedia messages and publish them as part of their project work to communicate or interact with the environment. They know the copyright of publishing products.

6. Ability to plan, implement, evaluate lessons using ICT. Teachers/teachers use ICT resources for their own professional development and pedagogical work, plan lessons using ICT, develop strategies with students for self-assessment of knowledge and abilities, monitor their own progress, evaluate knowledge or abilities, reflect on the learning of knowledge or abilities. They help learners to set and apply criteria for evaluating knowledge and skills to assess their understanding of key concepts, skills and processes.

All six competences contain basic ICT skills, which are a prerequisite for the acquisition of the core competences. Individuals who wish to achieve the standard must have these skills or competences."

Figure 3: Six core e-competence capabilities



Source: Sio.si, Six core e-competence capabilities, 2010.

Teachers are expected to acquire all six core competences of e-competence over time through various seminars and projects.



Digital Resilience Blended learning in a time of Pandemics Impact Report



Alongside these six core competences of an e-competent teacher, there are strong differences related to the subject area they teach. The core e-competence of the teacher differs in the fifth item, which is about the teacher's ability to prepare or update e-materials.



Digital Resilience Blended learning in a time of Pandemics Impact Report



Research worldwide has shown that teachers who have developed a high level of e-competence are more likely to use ICT in their teaching than those with a low level. They therefore try to avoid using it in the classroom. It can be argued that e-competence is a key factor that enables teachers to be self-reliant and confident in working with ICT. The level of self-reliance in working with ICT is further related to the training teachers receive in this area and to the technical support available in the school (Becta, 2004).

1.2.1.2 The role of the teacher in the classroom

When a teacher integrates ICT into his/her classroom, his/her role in the classroom changes, as he/she becomes a facilitator of the learning process and a key link (if not the author of the learning material) between the author of the learning material and the students. In fact, the author of the material is the one who transmits the knowledge and communicates with the students through the material. Therefore, it is no longer the teacher who has a direct influence on the delivery of the learning process, but the author of the material who guides the learning process.

Therein lies the trap. Every material is in some way universal and may not be relevant to a specific learning situation or may not follow the context of the subject matter. Which is comparable to ready-made clothes. It is rare for a ready-made garment to fit perfectly, because we are all different in stature. The best fit is definitely the one that is tailor-made. It is the same with teaching materials.

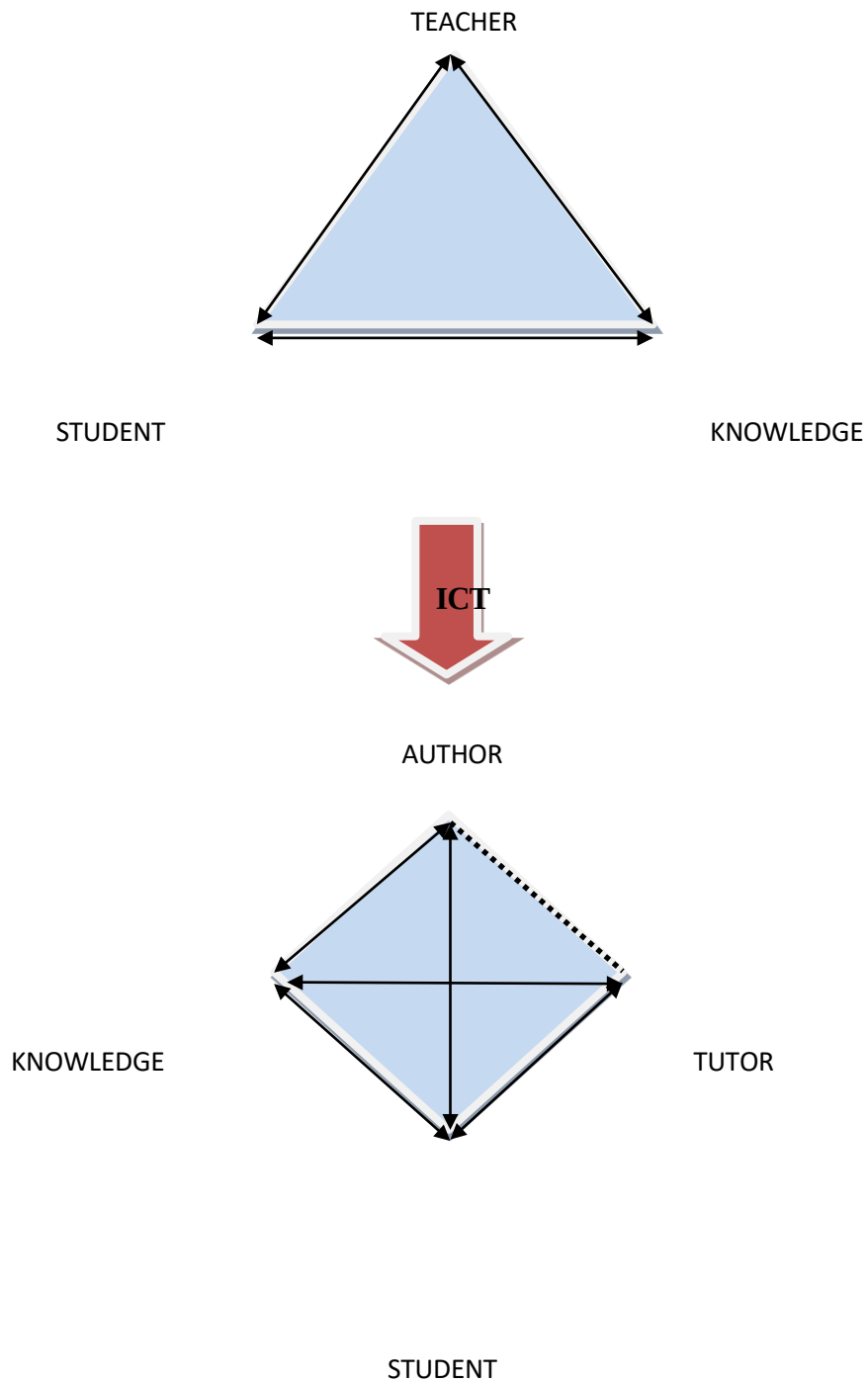
That is why we believe that it should be the teacher who is also the author of the material. In this way, he or she can fill the gap that arises between the foreign author of the material and the students.

On the basis of the above, it can be argued that the role of technology has changed and it is no longer just a teaching tool that is less frequently used by the teacher, but technology has become part of the learning process, an integral component of every learner and of the one who teaches (Figure 4).



The classical didactic triangle (Figure 4) is therefore transformed into a quadrilateral (Albano, 2005b).

Figure 4: Didactic Quadrilateral in Informatised Learning





Digital Resilience Blended learning in a time of Pandemics Impact Report



Source: Modified from: G. Albano, Mathematics and e-Learning: A Conceptual Framework, 2005b.

Information technology thus influences the very work of the teacher in the classroom, creatively intervening in the very content of the lesson, and thus engaging students in a direct way to think about the problems they are solving. The teaching approach is transformed by ICT, which allows the teacher to create problem states from which students derive general theoretical regularities. It is worth noting that proof in mathematics still needs to be done in the



traditional way, as this is the basis for mathematical-logical thinking that can serve us effectively in everyday life.

Students no longer expect the teacher to solve a problem in front of them, but to try to solve it themselves. The latter enables students to learn in active ways and thus to develop complex knowledge with the possibility of lasting transferability.

1.2.1.3 Teaching and learning approach

The teacher's teaching approach is linked to the form and method of classroom work and is based on theories of learning. The forms of work can be frontal, individual, pair or group work. Classroom methods include explanation, discussion, demonstration, experiment, text work, AV (audio-visual) work, role play, ICT and others.

In the traditional delivery of the learning process, the teacher mostly used a frontal learning format. This means that the teacher more or less dealt with the material in front of the blackboard, making sure that the blackboard was as clear as possible, while the students took notes. There was little interaction between teacher and student. Teachers relied on the so-called transmission model of learning, which, as we know today, does not contribute much to the sustainability of the knowledge acquired.

In ICT-mediated learning, a purely frontal form of working is impossible. Therefore, a hybrid model called blended learning has been developed in practice.

The en.wikipedia.org website (2010) defines blended learning as (Figure 5):

»[...] a concept of learning and teaching that blends and mixes different learning styles and uses a wide range of learning tools - from virtual to physical. Learning styles refer to the many different ways people use to learn. Blended learning gives priority to learning styles: on the one hand, by integrating a wide variety of tasks and activities into the classroom, and on the other hand, by using computer



Digital Resilience Blended learning in a time of Pandemics Impact Report



technology, e-learning materials, interaction between the tutor and the learners, and between the learners themselves.

The tutor can combine two or more teaching methods in the classroom. A typical example of such a combination is when self-directed learning using computer technology is complemented by face-to-face contact. The mentor may start the course with a well-structured contact lesson



Digital Resilience Blended learning in a time of Pandemics Impact Report



in the classroom, and then deliver the relevant learning material to the course participants online.

The term can also be used when it is a combination of e-learning and the use of computers in a contact lesson in the classroom, where there is also direct interaction between the tutor and the learners. Adequate guidance and direction, particularly in the use of computer technology, should be provided from the initial stages of the learning process; computer skills should also be part of the skills acquired on the course.

The role of the tutor is crucial in blended learning: the tutor is not only a teacher in the classical sense (helping, guiding, explaining), but also introduces and facilitates the learners to learn as independently as possible. In the context of lifelong learning, it is often the case that older generations entering education have limited skills in using electronic media. In this case, the mentor is also a helper in the use of the computer and computer applications and in accessing the internet."

From the above, it can be rightly said that the degree of resistance to change in the teacher's teaching approach is crucial. Teachers who are less receptive to change in their teaching approach are less likely to integrate ICT into their teaching than those who are not strangers to innovation and change (Becta, 2004).

Research has also shown that there is very little correlation between teacher age and resistance to change in teaching approach. In contrast, there is a strong correlation between the genders that integrate ICT into the learning process. Men use ICT in teaching to a greater extent than women. Therefore, we can be justifiably concerned as the proportion of female teachers in primary and secondary school is higher than that of male teachers (Becta, 2004).

We can agree with this approach because it does not prejudge any particular theory of learning, but on the other hand such a loose definition does not say much. It is therefore useful to look at some of the underlying theories of learning.



Digital Resilience Blended learning in a time of Pandemics Impact Report



Behaviourism. Behaviourism is characterised by teaching by making connections between stimuli and reactions. The link between them is reflected in knowledge. The association of the links between shaping, repetition, reinforcement and adaptation is called learning. The persistence of knowledge enables similar tasks to be solved. The predominant form of



Digital Resilience Blended learning in a time of Pandemics Impact Report



classroom work is frontal, but it can also be done individually or in groups. The method of work is explanation with lots of practice and the need for constant checking and assessment of knowledge. The theory assumes the integration of quality teacher explanation, the student's prior knowledge and independent learning (a large number of solved exercises), which is continuously checked and assessed. The learning process is based on students' cognitive maturity, intrinsic motivation and the sustainability of the acquired knowledge, which is not internalised but outcome-oriented. Assessments represent extrinsic motivation (Repolusk, 2009).

Cognitivism. Cognitivism gives high priority to cognitive learning processes, intrinsic motivation and deeper understanding. Students independently invent logical-mathematical knowledge through activities with objects. In a process of reflective abstraction, the pupil then compares his understanding with experience. The differentiation between new ideas, observations and insights in relation to prior experience and knowledge is called cognitive conflict. It guides the development of individual knowledge construction and the desire to establish a balance between old and newly acquired knowledge. The establishment of balance is accompanied by two processes: assimilation and accommodation. Assimilation refers to the integration of new information into the existing mental structure, while accommodation modifies the existing mental structure. The process of individual knowledge invention takes place at several levels: from simple to increasingly complex mental structures (Deutsch, 2008; Repolusk, 2009). This is why we speak of students' cognitive maturity. The form of classroom work is group work, supported by student activities and various presentations of the new concept. A deeper understanding is achieved by presenting the objectives of the lesson and developing intermediate strategies to achieve these objectives (Repolusk, 2009).

Constructivism. An important difference between cognitivism and constructivism is the externally received information and knowledge that is acquired through one's own mental activity and is thus a subjective construct. In order to build knowledge effectively, there must be certain conditions environment that make this possible (e.g. relating new mathematical content to everyday life). Learning by discovery (exploration of problems), problem-solving strategies involving procedural knowledge, learning by counterexamples are emphasised as working methods. Dialogue (peer, group and with the teacher) is important for social skills. The basic motivational mechanism for the construction of new knowledge is the creation of cognitive conflict, which, through the active role of



Digital Resilience Blended learning in a time of Pandemics Impact Report



the student, promotes understanding and thus the possibility of a lasting transfer of knowledge (Repolusk, 2009).



Digital Resilience Blended learning in a time of Pandemics Impact Report



Combined teaching and learning approach. It is a modern teaching practice that combines two teaching approaches:

- traditional (behaviourism, cognitivism, constructivism) and
- e-learning (ICT).

The aim of the combination of different working methods and teaching approaches is to enable students to achieve the learning content they can learn independently with the help of ICT used in a meaningful way (foreign/authored videos, applets, textbooks, quizzes, surveys, podcasts, ...).

Figure 5: Combined teaching and learning approach



Vir:

<https://didakt.um.si/oprojektu/projektneaktivnosti/Documents/Strokovna%20podlaga%20kombinirano%20u%C4%8Denje-13jun19.pdf>

The flipped learning approach has been established with the introduction of ICT in the classroom (both live and distance). It can include elements of flipped learning and the flipped classroom. An important distinction between flipped learning and blended learning is that in flipped learning, the student is introduced to new concepts or material on his/her own beforehand, through various ICT-based actions (e.g.: videos, SU Moodle tasks).

Each of these learning theories has its advantages and disadvantages. It would therefore be pointless to prejudge only one of them. Even if the behaviourist learning approach seems to be the least acceptable form of teaching today, for many students who are at some point unable to resolve a



Digital Resilience Blended learning in a time of Pandemics Impact Report



cognitive conflict on their own, it allows them to resolve it instantly and thus to connect new mental structures.



Digital Resilience Blended learning in a time of Pandemics Impact Report



1.2.1.4 *Evolution of the Teacher*

In order for a teacher who uses ICT in his/her work to use his/her full professional and personal potential more effectively, it is a necessary (but not sufficient) condition for him/her to go through the following stages of development (adapted from Hooper & Rieber, 1995; Figure 6):

1. Familiarisation,
2. Utilization,
3. Integration,
4. Reorientation,
5. Evolution.

- In the first phase of development (**familiarisation**), the teacher learns about ICT and its possible use in his/her work (making transparencies, e-grades, applets, using dynamic geometry software, etc.) through workshops and seminars. Once the teacher has completed the training, further activities related to the implementation of ICT in his/her work are also completed. At this point, the familiarisation phase ends.
- The second stage of development (**use**) is when the teacher uses the technology or the innovations in the classroom. The obvious difference between the first and the second phase is that the teacher is testing (the newly acquired knowledge) of ICT in the classroom. In this phase, there is a risk that the teacher becomes complacent with the existing knowledge (experience), or even that, when he/she encounters the first obstacle, he/she abandons further activities. A characteristic attribute attributed to teachers at this stage is "at least I tried". This is probably the highest stage of development that a teacher reaches in his/her work with ICT.
- The third stage of development (**integration**) represents the "breakthrough", when the teacher internalises the technology to such an extent that, if it is removed or is currently inoperative, he/she cannot (effectively) do his/her job without it (e.g. blackboard, textbook, computer, worksheets, etc.). It can be summarised that the widespread use of technology in this phase is the most critical point or characteristic of this phase. Although integration is the final stage for many teachers, it is in fact the beginning of their understanding of ICT. For some teachers, the integration stage marks the beginning of a transformation that continues a typical pattern of



Digital Resilience Blended learning in a time of Pandemics Impact Report



development.

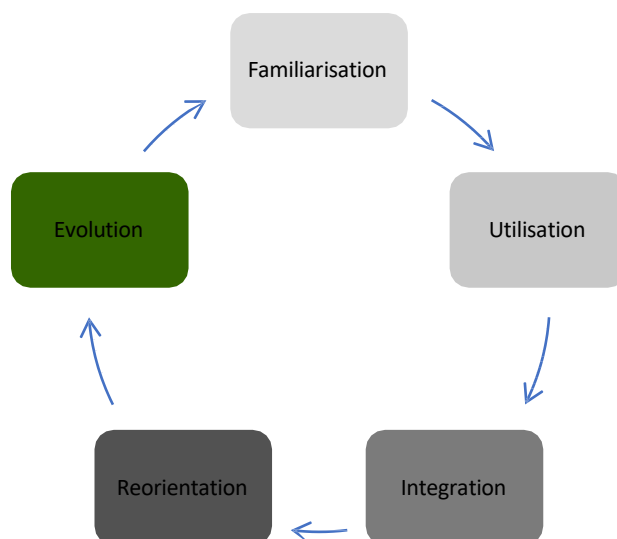


Digital Resilience Blended learning in a time of Pandemics Impact Report



- The fourth stage of development (**reorientation**) represents a significant cognitive shift in the teacher's perception of the student's role in the classroom. The teacher's role (function) in the classroom changes significantly. The pupil changes from an object to a subject, the teacher's focus is no longer on the delivery of the content, but on the pupil and his/her capacity to learn. The key role of the teacher in this phase is to create a learning environment that enables the student to construct and elaborate his/her own knowledge. Teachers at this stage of development are receptive to the use of modern ICT and do not see it as a simple substitute for themselves, but as a medium that allows them a higher degree of individualisation and to adapt the learning material to the student's level of perception and acceptance of knowledge.
- The fifth stage of development (**evolution**) serves as a reminder that the education system must constantly evolve and adapt in order to remain effective in its being. There will never be a final path or conclusion, a universal formula that will enable students to reach a higher level of knowledge and understanding of the material they are learning. The learning environment in the classroom should be constantly changing and challenging, with new insights into how people learn.

Figure 6: Development phases of an e-competent teacher





Digital Resilience Blended learning in a time of Pandemics Impact Report



The authors cite the teacher's teaching approach as an important factor between the integration and reorientation phases: the transition from behaviourism to cognitivism. The developmental phases can serve as self-evaluation for the teacher and are constantly intertwined for e- competent teachers.



Digital Resilience Blended learning in a time of Pandemics Impact Report



The e-competence of the student plays a key role in the active form of working with ICT. In the SWOT analysis (Figure 7) it will be considered heuristically by levels (Allan & Grudziecki, 2006).

Figure 7: SWOT analysis of assessment and evaluation using ICT tools

Strengths	Weaknesses
• Level 1 of student e-competence • Didactic use: motivation, demonstration, checking, training, assessment • Cognitive conflict (knowledge assessment) • Teaching approach: cognitive, constructivist, combined • Forms of work: individual work, pair work (assessment of knowledge) • Level of interactivity: high • Developing students' digital competences • Immediate response to an answer (knowledge assessment) • Time spent on knowledge assessment • No return of tests in physical form	• Level 3 of teacher e-competence • Increased teacher activity (preparation of quizzes, simulations, tests, etc.) • Need for teacher self-learning (lack of time) • Time to prepare or adapt existing tests and assessments • Use of additional technologies and tools (e.g. graphic board) to revise tests • Cheating (students)
Opportunities	Threats



Digital Resilience Blended learning in a time of Pandemics Impact Report



• Use of computers and mobile phones (increasing levels of e-competence) • Technical problems and assistance • Children with long term illnesses, athletes • Epidemic • Telework • Ecological awareness (no paper) • Continuous development of new ICT tools • Digital sustainability or resilience	• Reorganisation of the classroom (computer room, mobile classroom) • One teacher for the whole class (30 students) • Licence for specific platforms • Internet access • Server failure • Power outage • Development of new AI technologies and tools (ChatGPT)
---	---



Digital Resilience Blended Learning in a time of Pandemics Impact Report



2 Sources:

1. Allan, M. in Grudziecki, J. (2006). DigEuLit: Concepts and Tools for Digital Literacy Development. Pridobljeno s: <http://www.ics.heacademy.ac.uk/italics/vol5iss4/martin-grudziecki.pdf>
2. Albano, G. (2005b). Mathematics and e-Learning: A Conceptual Framework. Pridobljeno s: <http://telearn.noie-kaleidoscope.org/warehouse/Giovannina-Albano-2005.pdf>
3. Bielawski, L. in D. Metcalf. (2005). Blended Elearning: Integrating Knowledge, Performance Support, and Online Learning. Amherst, MA: HRD Press.
4. British Educational Communications and Technology Agency. Pridobljeno s: <http://about.becta.org.uk/>
5. Hadjerrouit, S. (2009). *Didactics of ICT in Secondary Education: Conceptual Issues and Practical Perspectives*. Issues in Informing Science and Information Technology. Pridobljeno s: <http://iisit.org/Vol6/IISITv6p153-178Hadjerrout605.pdf>
6. Ministrstvo za izobraževanje, znanost in šport RS. (2020). *Strokovna podlaga za kombinirano učenje 2019*. Pridobljeno s <https://didakt.um.si/oprojektu/projektneaktivnosti/Documents/Strokovna%20podlaga%20kombinirano%20u%C4%8Denje-13jun19.pdf>
7. Repolusk, S. (2009). *E-učna gradiva pri pouku matematike* (magistrsko delo). Maribor: Fakulteta za naravoslovje in matematiko.
8. Štular Mastnak, S. (2011a). 'Kako izdelati avtorsko matematično e-gradivo v spletni učilnici Moodle?', v: Vreča, M., Bohte, U. (ur.), Mednarodna konferenca Splet izobraževanja in raziskovanja z IKT – SIRIKT 2011, Kranjska Gora, 16. – 19. april 2011. Zbornik. Ljubljana: Arnes, str. 167.
9. Štular Mastnak, S. (2011b). *Analiza sodobne informacijsko-komunikacijske tehnologije za izboljšanje kakovosti pouka matematike v gimnaziji*. (magistrsko delo, Univerza v Ljubljani, Ekonomska fakulteta). Pridobljeno s: <http://www.cek.ef.uni-lj.si/magister/stular4246.pdf>