



# XR FOR PED

Mixed  
Realities  
for  
Pedagogues

## Before C-19, I thought digitalisation in education is evil

### **SURVEY REPORT:**

**Impact of C-19 on the use and acceptance of digital teaching in European education systems with a special focus on immersive learning**

2022

ONLINE SURVEY AND GUIDED INTERVIEWS IMPLEMENTED BY XRforPED PROJECT GROUP

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## I. Introduction

The starting point for working on the idea of *Mixed Realities for Pedagogues - XRforPED* ([www.xr4ped.eu](http://www.xr4ped.eu)) were two different observations:

On the one hand, this project was conceived under the impression of the first violent corona wave that had reached Europe. Most educational institutions were closed for months, yet somehow classes had to continue. This meant that large areas of teaching, as well as the communication with colleagues or parents that accompanies teaching, had to be carried out remotely and digitally. Many of the educators had their first experience with digital learning and communication platforms, document archives or data collection and assessment tools. We wanted to know what educators' experiences were during the period of lock-down-caused distance and digital learning, what media and tools they mainly used and to what extent this influenced their attitudes towards digital learning in general. These are extremely important findings because educators not only played a key role in maintaining social and professional life to cope with the C-19 pandemic, but because without their support, enthusiasm and competencies, a comprehensive digitisation of our society would be more difficult to achieve. Of course, children would continue to grow up as digital natives without the help of teachers, but it is necessary to provide children with appropriate digital knowledge and skills that will enable them to enter a successful professional life and participate meaningfully in social and political life. To do this, educators themselves need to be fully trained in digital working, learning and teaching. It was also interesting to collect data in this regard.

The second reason was that immersive technologies (virtual realities, augmented realities, mixed realities, extended realities) are becoming more and more established in our lives. While for a long time they were exclusively known in the fields of leisure and entertainment, their potential has now been discovered for many other areas, including education. Since it can be assumed that the success of these metaworlds will continue<sup>1</sup>, it is highly appropriate for educators to deal with these techniques in a timely manner and to find out whether, in which areas and under which conditions immersive learning makes sense and can be used in teaching, especially with larger groups. Therefore, we wanted to find out to what extent trainers and teachers are aware of immersive technologies and whether or not they have experience and/or interest in using them in the classroom.

In order to answer these questions, the project group conducted two Europe-wide studies with different set-ups, methods, instruments and target groups:

The first was an online-based questionnaire survey with largely closed questions, which ultimately asked 324 teachers and trainers with at least one year of teaching experience about their experiences with the

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<sup>1</sup> Just think of the renaming of Facebook to Meta.

use of digital methods and tools in the context of Corona, about their opinions and attitudes towards the digitisation of pedagogy in general and immersive technologies in particular.

In a second one, 21 coordinators of EU projects on immersive learning were asked in semi-standardised interviews about their experiences, what opportunities and risks they see for pedagogy and what advice they have for the orientation of the XRforPED training programme. In addition to the interviews, the studies and data collection carried out by these projects themselves were evaluated and analysed with regard to the project goals and products of XRforPED.

The data collection phases of both studies lasted from autumn 2021 to spring 2022. With the report *Before C-19, I Thought Digitalisation in Education is Evil*, the evaluation and the derivations for further project work from the online survey are now available. The evaluation and the conclusions drawn from the interviews with the 21 project promoters were summarised and published in the *Never Leave the Learner Alone* report. Both papers formed the basis for the development of our 4 ECTS training programme for students of pedagogy and educational sciences.

Both reports, the training programme and all other products of this project are freely accessible and downloadable at [www.xr4ped.eu](http://www.xr4ped.eu).

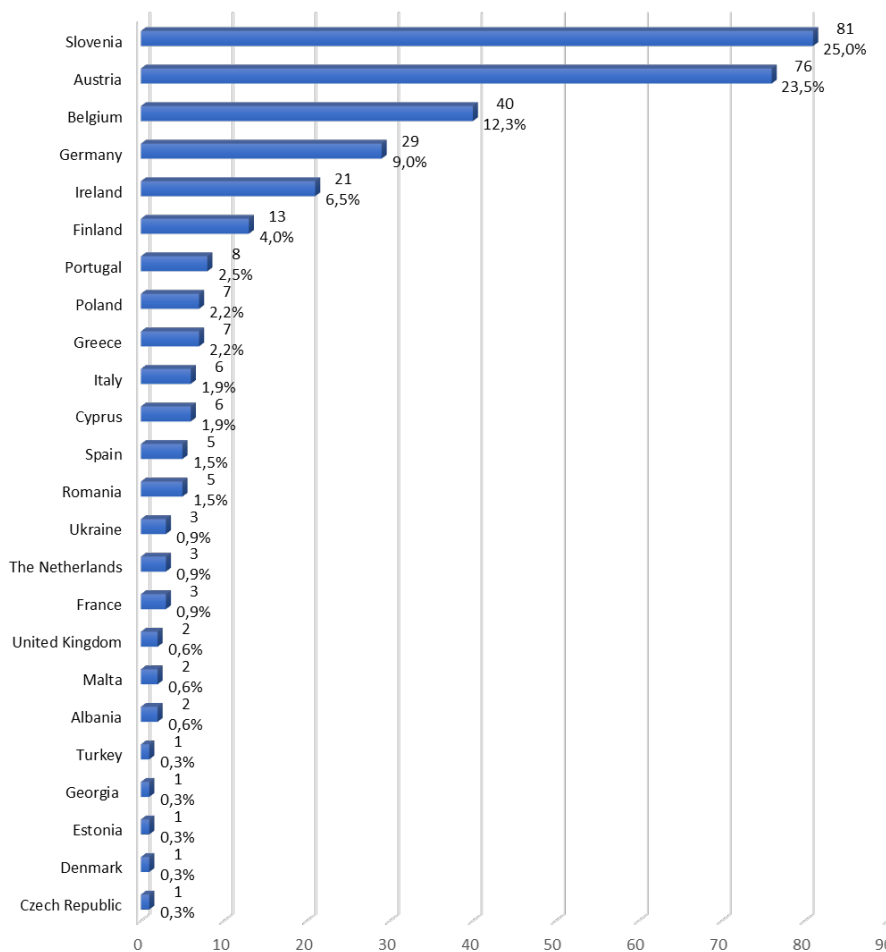
## II. Results and findings

### 1. The sample and its pedagogic education and experience

#### 1.1 Countries

From the total of 324 people who took part in our survey, Slovenia accounted for the largest share with 81 (25.0%) responses, followed by Austria 76 (23.5%), Belgium 40 (12.3%), Germany 29 (9.0%), Ireland 21 (6.5%) and Finland 13 (4.0%); among the responses from other EU countries, Portugal is strongest with 8 (2.5%) persons, followed by Poland and Greece with 7 (2.2%) each, Italy and Cyprus with 6 (1.9%) each and Spain and Romania with 5 (1.6%); there were 3 or fewer responses from a further 22 countries, 4 of them outside the EU. As Fig.1.1 shows, our overall sample represents pedagogues from 24 European countries, including 20 EU Members States.

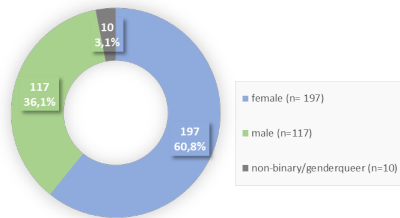
Fig. 1.1 Countries (N=324)



### 1.2 Gender split

In terms of gender, 197 (60,8%) women, 117 (36,1%) men and 10 (3,1%) non-binary/genderqueer persons participated in the online survey.

Fig. 1.2 Gender (N=324)

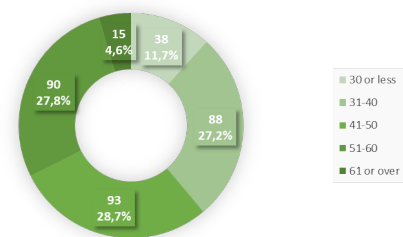


This is not entirely surprising because women are somewhat overrepresented in the education sector, especially in the primary and secondary levels of education as well as in socio-educational areas, which are all important areas in our project work. In general, gender issues do not play a major role in the sense of our study, therefore we also did not gender-sample the evaluation of the responses.

### 1.3 Age

The groups representing the three decades from 30-60 years are almost equally represented; the groups with younger and older respondents are smaller, which is explained by the fact that teachers and trainers usually start working in their mid-twenties and stop in their early to mid-sixties.

Fig. 1.3 Age (N=324)

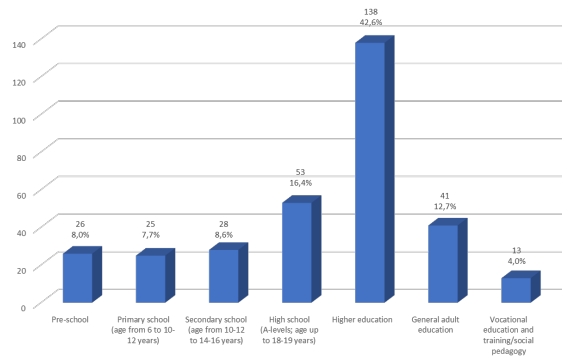


With regards to the reliability of data gained our survey, the sample was well selected. It represents well the real age ratios among educators and none of the age groups is dominant. This is important because *age* is a crucial factor in the knowledge, acceptance and use of digital methods and tools. IT literacy decreases in higher age groups and is acquired circumstantially by older persons, while younger persons already grow up with it. By having a balanced representation of all age groups in the sample, the results of the survey should also be balanced and not be distorted by one or the other age group.

### 1.4 Area/level of main teaching activity

In terms of areas/levels of educational activity, the sample is less balanced; with 138 (42.6%) respondents, higher education is clearly dominant and the other educational areas follow far behind with high schools (16.5%), adult general education (12.7%), secondary schools (8.6%), preschools (8.0%), primary schools (7.7%), and vocational training institutions (4.0%). This is explained by the fact that 4 higher education institutions are represented in the partnership and we generally focus on higher education. This is not a methodological problem in principle, but we must always be aware when looking at and evaluating the study results that there is a dominance of the higher education sector in these raw data.

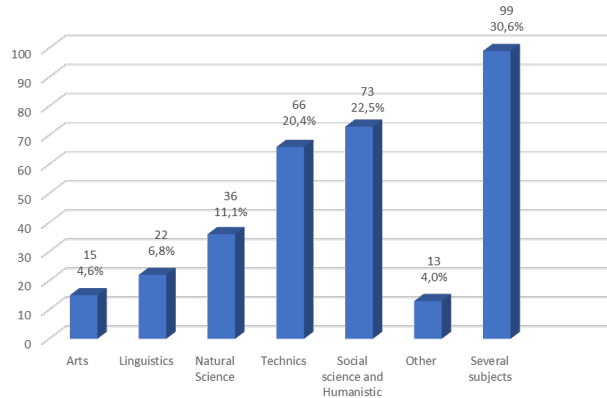
Fig. 1.4 Area/level of main teaching activity (N=324)



### 1.5 Main subjects/fields of teaching

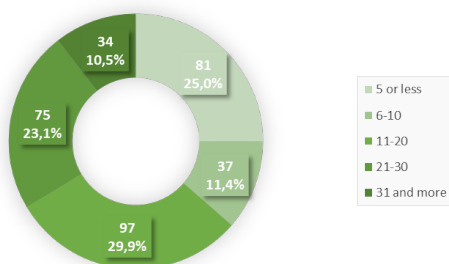
There also seems to be no over-dominance with regard to content areas and subjects that would lead to serious distortions of the results. The most frequent single discipline is social sciences and humanities with 73 (22.5%) respondents, closely followed by technical fields with 66 (20.4%); then come natural sciences (36; 11.1%), languages (22; 6.8%), arts (15; 4.5%) as well as 13 (4.0%) persons teaching other fields/subjects; the largest group of the sample, however, are those 99 (30.6%) educators who teach several subjects/fields. It can be concluded that also in this respect, the sample was very balanced and representative of a wide range of educational fields.

Fig. 1.5 Main subjects/fields of teaching (N=324)



### 1.6 Years working as teacher/trainer

Fig. 1.6 Years working as teacher/trainer (N=324)



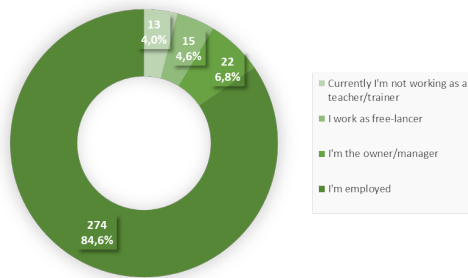
The distribution of work experience (Fig. 1.6) is quite similar to the distribution of age (Fig. 1.3) - a positive correlation that is not very surprising. Regarding the quality of data, this means that they are widely based on many years of professional and life experience. At the same time, data, opinions and experiences of younger people who are only at the beginning of their professional careers are also included to an extent that roughly corresponds to their statistical share in the real group of teachers and trainers.



### 1.7 Link to educational institute

We now know how old and experienced our respondents are and what areas and subjects they teach; what seemed interesting was how they are linked to the educational institutions in which they teach. So, we asked them exactly that.

Fig. 1.7 Link to educational institute (N=324)



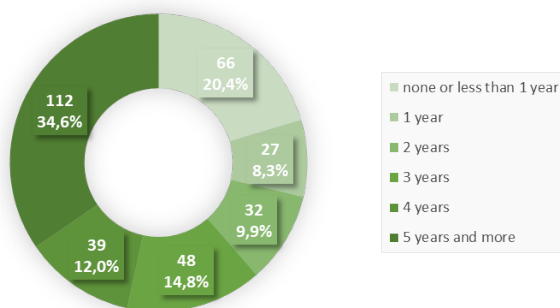
13 (4.0%) persons are trainers or teachers but were not working in this profession at the time of the survey (e.g., because they were unemployed, on parental leave or taking a sabbatical), 15 (4.6%) work as free-lancers and 22 (6.8%) are the owners or managers of an educational institution; with 274 (84.6%) the majority of the survey participants are educators employed by an educational institution.

This finding is not surprising and is in line with the information given in 1.4 - if people work mainly in schools, vocational schools and colleges, they are usually employed by these educational institutions, at least in the countries that participated in the study. This means that the respondents have a good inside perspective into the educational standards and philosophy of their employers and can therefore also judge well how things stand with digitalisation in general and immersive technologies in the classroom.

### 1.8 Years of professional education/training in pedagogy

The fact that people work as trainers or teachers does not mean that these people are also good pedagogues who know exactly how to guarantee knowledge transfer - regardless of the professional content - in the best possible way. A very good indicator of pedagogical expertise is the amount of professional pedagogical training someone has received themselves. Of course, someone with pedagogical training is not automatically a good trainer or teacher, but a certain level of expertise and skills in pedagogical methodology and didactics should be guaranteed by this.

Fig. 1.8 Years of professional education/training in pedagogy (N=324)

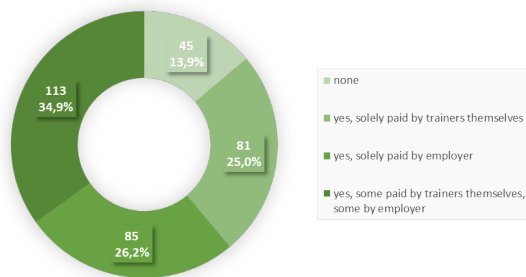


The individuals in the sample represent thoroughly well-trained teachers and trainers who not only have life and work experience, but also comprehensive theoretical knowledge and practical training: 79.6% have received at least 1 year of professional pedagogical training, 60.4% even at least 3 years and more! Only 20.4% have no pedagogical training or one that lasted less than 1 year.

This statement is very important because we assume that trainers and teachers are primarily shaped by their professional training in their methodological and didactic orientation. This means that if certain methods and tools are not taught in the pedagogical training, then they have a hard time finding their way into the classroom. Whether digital methods and instruments have found their way into the pedagogical training of the sample will be clarified in the next question.

### 1.9 Continuous education/training in pedagogy

Fig. 1.9 Regular continuous education/training in pedagogy (N=324)



It is very positively surprising that 86.1% of the respondents stated that they regularly(!) participate in further pedagogical training measures. This is a basically promising preposition: firstly, because it is a very high value; secondly, because it seems to ensure that teachers and trainers for the most part come regularly into contact with pedagogical innovations and should be sufficiently trained in their use.

Our study shows that the majority of teachers have completed a well-founded basic pedagogical education of several years and receive further postgraduate training on a regular basis. From a quantitative point of view, there seem to be sufficient measures to ensure high pedagogic quality when trainers and teachers. However, these trainings will only have a lasting positive impact on teaching if they are of a corresponding quality and intensity. In order to be able to check these two factors, other instruments must be chosen than an online survey. What we were able to find out from the respondents, however, is to what extent the training measures already dealt with the teaching of digital learning forms and skills before Corona.

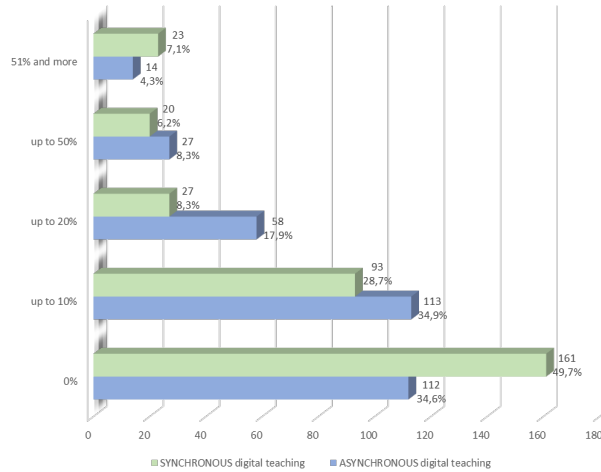
### 1.10 Prior to C-19 pandemic: Your pedagogical training in synchronous/asynchronous teaching

For the reasons mentioned above, we asked the educators how many percentages of their overall training was roughly dealing with synchronous or asynchronous digital forms of teaching. With 49.7%, pretty much half of them said they have had no training at all in asynchronous digital learning, and 34.6% that they had no training in synchronous learning. The second largest group is made up of those who were trained in digital learning for at least up to 10% of the pedagogical training (28.7% asynchronous; 34.9% synchronous), followed by those who were trained in digital learning for up to 20% of the time (8.3% asynchronous, 17.9% synchronous). Over 20% of the training time, 13.3% has been spent on asynchronous learning and 12.6% on synchronous learning.

From this data we see that the pedagogical training of trainers and teachers is extensive and continues after graduation, but that the content overwhelmingly does not deal with digital learning and teaching and up to 50% of trainers receive no training at all. It is therefore not surprising that the digitalisation of teaching, largely enforced by C-19, has posed major problems for teachers and trainers in almost all EU countries. Within a very short period of time, they had

to make a change for which they were hardly prepared in terms of methods and tactics. They were therefore forced to jump into the cold water of online teaching and to do what is methodically considered to be very sustainable: learning by doing!

Fig. 1.10 Continuous education/training (synchronous/asynchronous) in prior to C-19 pandemic (N=324)

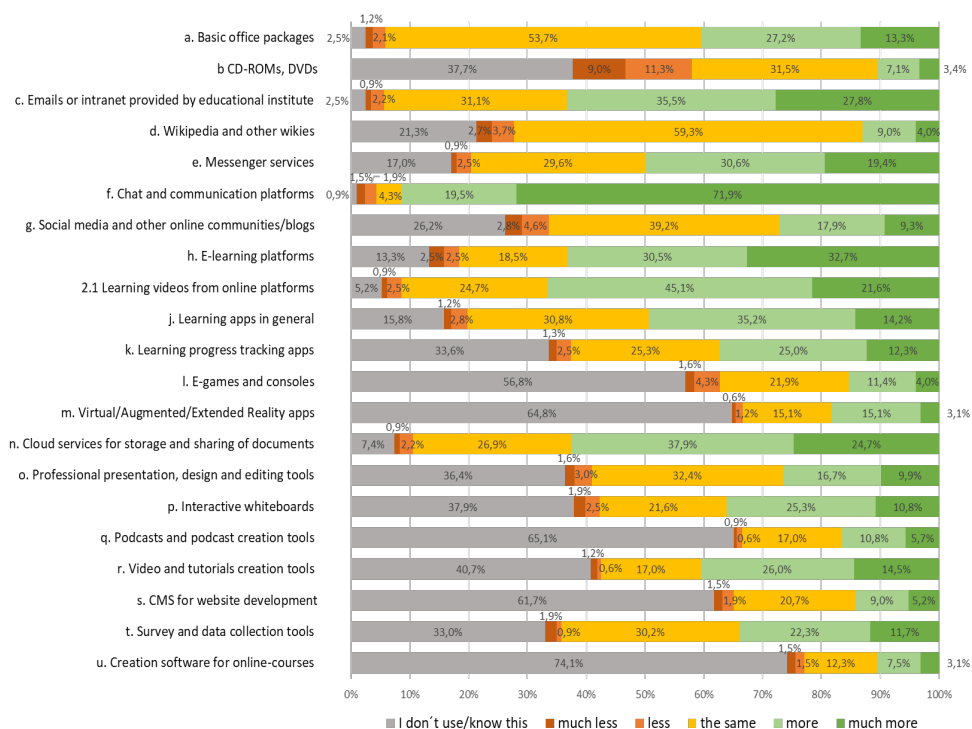


## 2. Digital teaching in the C-19 pandemic

### 2.1 Impact of C-19 on the quantitative use of learning methods and tools in the classroom

Many studies state that the C-19 framework has led to teaching becoming more digital at all levels and in all institutions in Europe. In our survey, we asked educators to indicate whether they used 21 different methods and tools less, as much or more during Corona.

Fig. 2.1 Impact of C-19 on the quantitative use of learning methods and tools in the classroom (N=324)



The light and dark green parts in the bars show how many teachers and trainers used the very teaching/learning methods and tools more often with the appearance of Corona than before; the orange parts of the bars indicate the proportion of teachers for whom the use of digital methods and tools did not really change much. The light and dark brown areas indicate when digitalisation has even become even less; the grey areas make visible when methods and instruments were either not known or not used at all. From the first spot, it can be seen that Corona had a promoting influence on the awareness and use of digital methods and instruments.

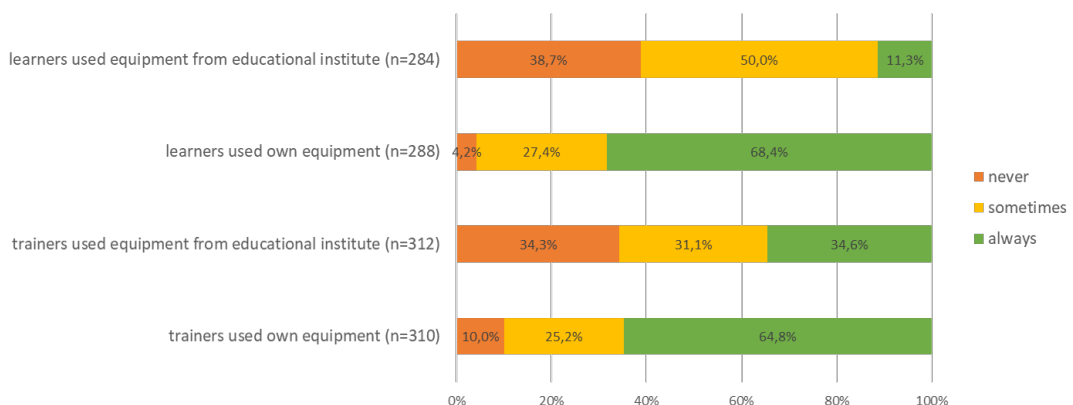
Looking at the details, it is noticeable that the use of communication (f) and learning (h) platforms in teaching were the digital success story of the Corona period, but other areas such emails/intranets (c), messenger services (e), learning videos (i) and cloud services for storage and sharing of documents (n) has have also experienced a real boost. Some of the items seems to have been very widespread even before Corona, such as basic office packages (a), Wikipedia and other wikies (d) or social media and online communities/blogs (g). The only area where there has been a decline seems to have been CD-ROMs/DVDs (b), but this is not really a surprise but very likely related to the fact that these methods and tools are considered technically outdated and have generally lost their relevance.

The fact that some of the methods and techniques (especially those in the second half of the diagram) were neither used before nor during Corona is certainly due to the fact that they are generally very specific and hardly known to a broad population, the technical and instrumental effort is high and the prior knowledge and application skills are very high. All these preconditions seem to be a hindrance to their use in the classroom; in addition, not all digital methods and tools per se bring added value to the classroom. With regard to our project topic, it is somewhat alarming that VR/AR/MR have the second lowest level of awareness or use among educators. Under these conditions, we have set the focus of XRforPED correctly - and still have a lot of work ahead of us.

### 2.2 Owner of the IT equipment used during the C-19 lockdowns

As a further indicator of the extent to which the digitisation of teaching is actively planned and promoted by education authorities and institutions, we have taken a look at the equipment made available to learners such as trainers and teachers.

Fig. 2.2 Owner of the IT equipment used during the C-19 lockdowns (N=324)

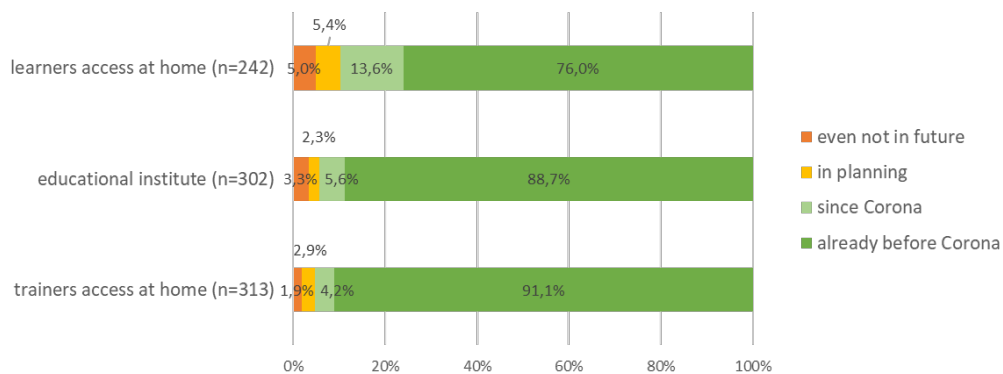


Things seem to have started to move here, because trainers and teachers always confirm that 34.6% of them get their digital equipment provided by the educational institution, for another 31.1% this is at least partly the case; 34.3% say that they are never provided with infrastructure and equipment in this respect. Among learners, 61.3% say that they always (11.3%) or occasionally (50.0%) receive IT equipment and access to the internet from their educational institution.

In both groups, however, the largest proportion is those who use their own IT equipment partly or at least occasionally (95.8% among learners and 90.0% among trainers and teachers); these high values are probably also related to the fact that computers, notebooks and mobile phones have become our everyday objects through which we now also learn or participate in lessons.

### 2.3 Access to high-speed internet

Fig. 2.3 Access to high-speed internet (N=324)



A look at access to high-speed internet also shows that this factor is no longer a major area-wide obstacle. Only 1.9% of trainers and teachers, 3.3% of educational institutions and 5.0% of learners say they do not have a stable broadband internet connection at present and will not have one in the future. It is striking that most of them were already sufficiently supplied with it before Corona. This means that poor internet connections can hardly be used as an excuse for the lack of digitisation in education; it is more the case that the connections are strong enough for many users to learn digitally and consume large volumes of data at the same time.

Nevertheless, it must of course be remembered that our data is not representative and that people from urban areas and with higher educational qualifications are over-represented in our sample. In terms of further digitisation of learning, intensive efforts should continue to be made to provide educational institutions, educators and learners with sufficient infrastructure, hardware and software free of charge! The costs for this must be borne by the public sector, especially to prevent people and institutions in disadvantaged regions or social classes from not being able to participate in the digital turnaround in education, or only to a limited extent.

### 2.4 Trainers' experiences and opinions on remote and digital teaching and learning

This question is, of course, one of the most central of the entire study. Two or three years ago, this would have been a rather academic and hypothetical issue for many educators, because the majority of them would have had little or no practical experience with remote and digital learning in their own teaching. Now, in 2022, this has changed completely. As we have learned from the previous sections of this questionnaire, all actors involved (educational institutes, learners, educators) have relatively good internet access, have the necessary equipment (at least privately) and, due to C-19, the use of digital methods and tools in the classroom has both spread and deepened enormously.

We would now like to hear how educators have fared with this and what their experiences have been and how these have affected their attitudes. Therefore, we asked them to agree or disagree with the following statements.

Fig. 2.4 Trainers' agreement/disagreement to statements with regards to remote and digital teaching and learning (N=324)



The evaluation of the answers leads to interesting findings. The statements a)-e) lead to largely positive feedback with regard to the fact that the European educational institutions are slowly beginning to arrive at digitalisation, that there are corresponding investments, training of educators and the provision of IT experts; about two thirds of the educators see positive or very positive developments at their institutions, one third sees this rather negatively or very negatively.

The vast majority (86.3%) agree that the impact of C-19 on educational institutions has had a great or very great influence on their openness to digital education. Since it is to be expected that after the C-19 pandemic is over and the end of school lock-downs, the digitisation of schools will also return, we have made the certainly controversial statement with f) that educational institutions should even be obliged to offer a certain percentage of their lessons digitally; educators are divided on this, but a majority of around 42% would be in favour of such a regulation.

The feedback on statements g)-n), which focus on practical, methodological and psychosocial areas of digital learning, is much more critical. When assessing whether or not digital learning is a useful pedagogical method, two almost equally strong camps of supporters and sceptics are formed. However, over 70% of educators report that digital learning has made it difficult to engage learners in the learning process (h) and to monitor the achievement of learning goals (i); over 80% say that it has made it difficult for learners to develop study habits (j), that it has increased psychological pressure on learners (m) and that it has increased socio-economic differences between learners (n); over 90% of educators believe that it has increased loneliness among learners (k) and has prevented learners from developing social skills (l).

In this set of questions, we also see some of the weaknesses of our study: first, the questions targeted multi-layered and complex situations, which makes it difficult to separate cause and effect (were the lockdowns the cause of learners' loneliness and their psychological stress or the distance learning sessions conducted in the lockdown?); secondly, educators and their learners are also a very heterogeneous target group that we were not able to survey in a sufficiently differentiated way (the development of social skills and the importance of digital media for social contacts may have a different significance for primary school pupils than for students); thirdly, it is also possible that these effects are more likely to occur if the methods of digital and distance learning are not used correctly (the problem then lies more with the poorly trained educator busy with many other issues at the same and not with the method) and because data from the online survey cannot be backed up by further data (e.g. from intensive interviews or expert round with educators) due to a lack of time and money: fourthly, we only asked the educators, if asking the learners we very likely would have had a different perspective and results. There are certainly more shortcomings, but this cannot be done any other way for such a study on such a complex field using very little financial, time and human resources. Therefore, we look at our data with due caution and know that bias are very likely. On the whole, however, we assume that the data tend to give us a correct picture and can be a very important basis for further decisions or research projects.

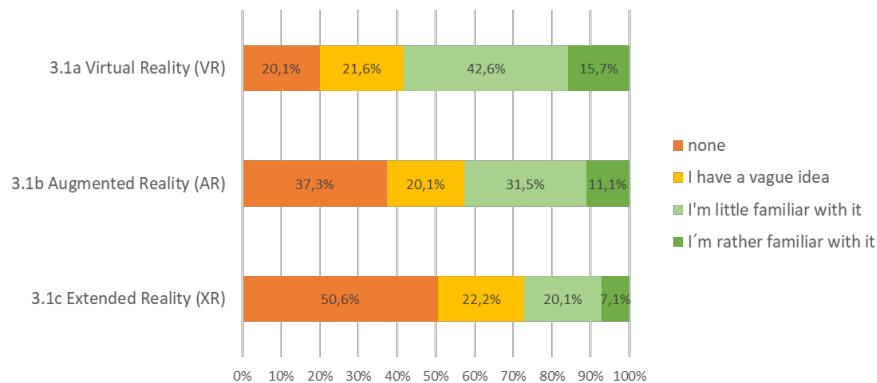
Coming back to our interpretation of the answers, it seems that neither the majority of educators nor trainers and teachers in their classes nor managers of educational institutions have (anymore) negative attitudes towards digital methods and remote learning, but that they are very critical of these methods in terms of social competence development, learning organisation and the mental health of the learners. These observations and reservations need to be taken seriously to increase confidence in digital learning; at the same time, comprehensive and profound measures need to be taken on several levels to eliminate or reduce negative impacts as much as possible (e.g., better orientation of methods and tools to the needs of people, better technical and didactical training of educators and a generally balanced use of digital technology).

### 3. Immersive teaching

We have seen that experiences and attitudes towards digital teaching in general have developed rather positively. In our last block of questionnaires, we wanted to know how this relates to immersive technologies (VR, AR, XR). But here we had to take a step back and ask whether the trainers are even aware of these technologies and what they are about.

#### 3.1 Knowledge about VR/AR/XR technologies within trainers

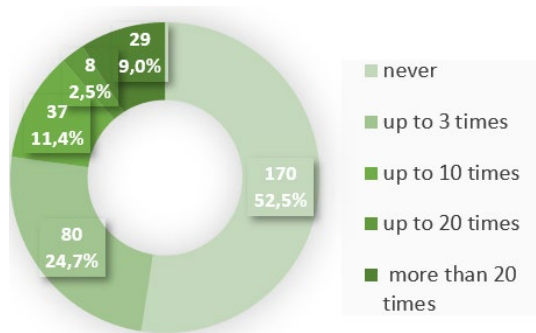
Fig. 3.1 Knowledge about VR/AR/XR technologies within trainers (N=324)



In question 3.1 we asked the trainers to self-assess their knowledge about different forms of immersive technologies. From their answers we can see that it is not particularly pronounced. Thus, 57.4% of the trainers state that they have no (37.3%) or only a vague idea (20.1%) of what is meant by augmented reality; with regard to extended reality, the figure is even higher with 72.85% (50.6% and 22.2%); the situation is somewhat better for virtual reality, where only 41.5% (20.1% and 21.6%) of the trainers declare themselves to be largely ignorant with regards to immersive technologies. This is understandable because VR is the oldest of these technologies and people who pick up VR glasses are quite common in the media and also conspicuous. From our perspective, however, we do not view this result too negatively. We were rather surprised to find that between 27.2% (XR) and 58.3% (VR) of the trainers are somewhat to fairly well versed in immersive technologies.

#### 3.2 Number of experiences

Fig. 3.2 How often have you tested/used VR/AR/XR technologies (N=324)



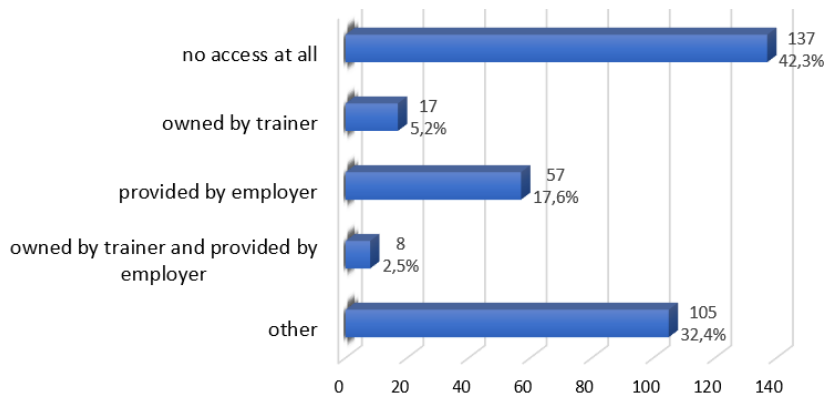
With 52.5%, more than half of the respondents have never come into contact with immersive technologies, another 24.7% at most 3 times. Only 9% have used immersive technologies more than 20 times. Based on these figures, it can be assumed that - regardless of how trainers themselves assess this - knowledge and skills in dealing with immersive technologies are only developed to a very limited extent among the majority.



### 3.3 Trainers' access to VR/AR/XR equipment

You can only learn something or build skills in it if you have access to it! This is a very banal fact, but one that is nevertheless quite often disregarded, e.g., by asking trainers to familiarise themselves with digital methods and tools without providing them with the necessary infrastructure, equipment or training. This is also reflected in our survey; 42.3% of trainers say they have no access to immersive technologies at all, 5.2% have provided themselves with equipment, and another 32.4% use other options. Nevertheless, around 20.1% have access to immersive technologies through their employer, which is usually an educational institution. Whether this is very pronounced can be doubted, considering the low experience scores in Fig. 3.2 and the low use in teaching in Fig. 3.5.

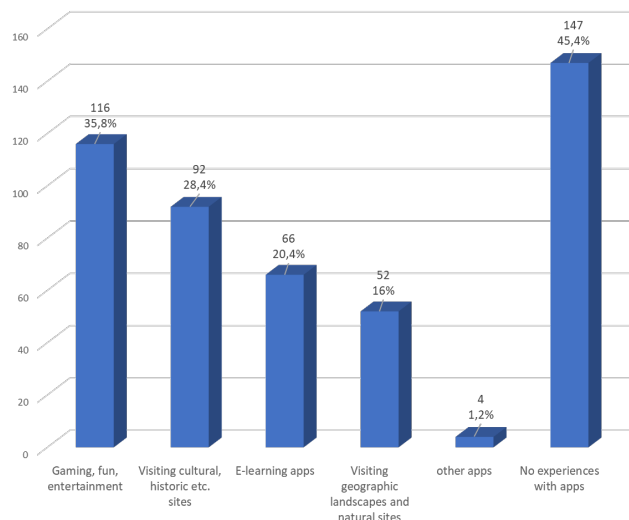
Fig. 3.3 Trainers' access to VR/AR/XR equipment (N=324)



### 3.4 VR/AR/XR apps trainers have experienced

First and foremost, the trainers had experience with immersive apps in the fields of games and entertainment (35.8%), followed by apps to explore cultural or historical sites (28.4%), special learning apps (20.4%), and apps around geographical landscapes and nature sites (16%); only 1.4% of the apps had to do with other topics. Although games and entertainment come first, the other app areas show that learning, experience and knowledge transfer - albeit in a broader sense - do play a certain role.

Fig. 3.4 VR/AR/XR apps trainers have experienced (N= 324; multiple answers possible)



### 3.5 Experiences and interests in immersive learning in the classroom

One of the most interesting questions when it comes to immersive learning in the classroom is whether trainers are interested in it at all, or whether they might even have experience of it. 91% of the trainers said they have no experience at all in using it in the classroom, which clearly answers at least this question. A very different picture emerges when asking trainers about their interests and curiosity in immersive learning apps and methods. Only 12.7% say they are definitely not interested, but a large majority of 55.2% are clearly willing to learn more; with 32.1%, about a third of the respondents are still undecided.

On the whole, the picture is similar to what we said above about the attitude of trainers towards digitalisation of teaching in general: there are certainly sceptics and those who do not think much of it, but there is a great openness and willingness among teachers to use digital methods and tools in teaching and a great curiosity to learn about new ones.

Fig. 3.5 Trainers with immersive teaching experience N=324)

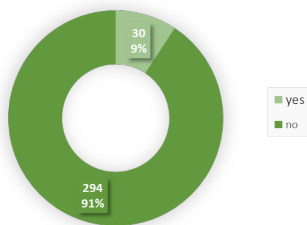
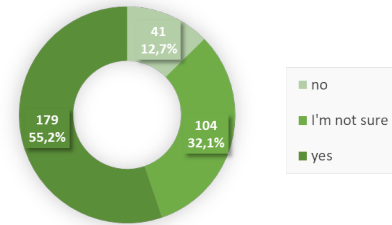


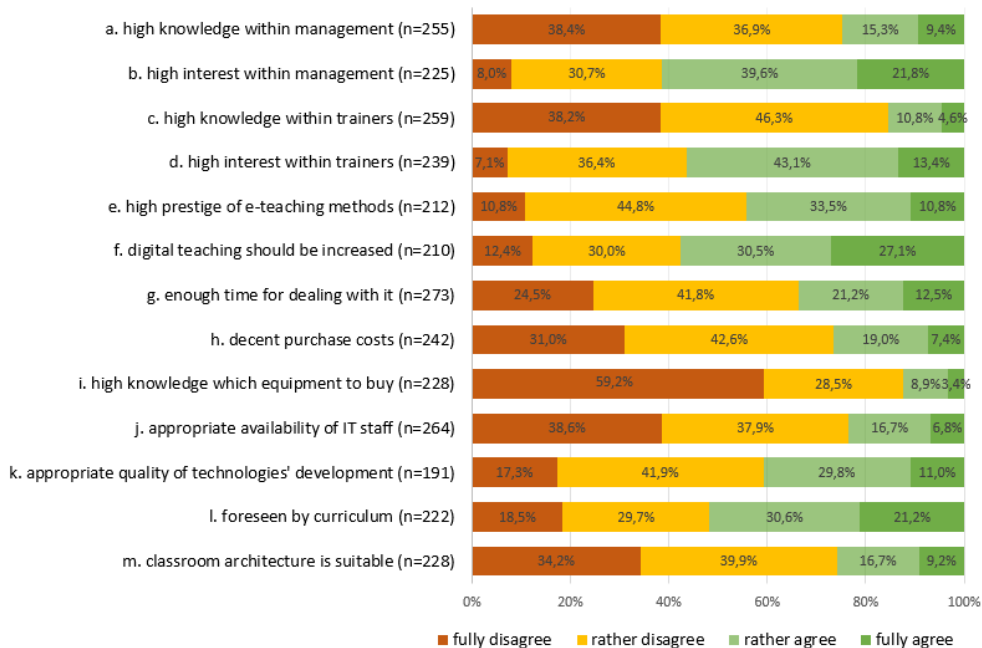
Fig. 3.6 Trainers interested in immersive teaching (N=324)



### 3.6 Trainers' agreement/disagreement with VR/AR/XR frameworks in educational institutions

Knowledge and experience of immersive learning is not particularly strong among educators, and few educational institutions offer it. Fig. 3.7 shows which reasons trainers and teachers see as responsible for this.

Fig. 3.7 Trainers' agreement/disagreement with VR/AR/XR frameworks in educational institutions (N=324)



Let's perhaps start with the positive results: There is a broad consensus among respondents that there is great interest and motivation to engage with immersive learning technologies both among management (b), who set the strategic direction of educational organisations and often provide funding, and among teachers (d), who are responsible for classroom applications. The majority also postulates that there is a positive attitude towards digital learning in educational institutions, which means that it should be pushed even further. There is therefore a clear commitment to increased digital teaching in general and interest in immersive learning in particular.

On the other hand, opinions are fairly balanced in the areas of whether e-teaching methods have a high prestige in general (e), whether immersive technologies are sufficiently developed for problem-free and meaningful use in the classroom (k) and whether curricula and training guidelines leave enough room for immersive learning experiments at all (l).

In the opinion of the educators, the difficulties and problems currently still predominate, among which they mainly include that there is too little knowledge on the subject at both management and teaching level (a, c), that they have too little time to deal with it, that the acquisition costs are too high (h) and - as the biggest problem of all - they do not even know what equipment they need, that there is too little support from IT specialists (j) and that the architecture of the classrooms makes it difficult to use immersive learning methods (m).

Although at first glance the feedback from educators seems to outweigh the disadvantages for experimentation or even sustainable use of immersive technologies in the classroom, we do not believe that we face insurmountable obstacles. The most important thing of all is that both groups relevant to teaching - management and teachers - show great interest, are motivated and are eagerly in favour of further digitisation of teaching. Many of the obvious problems can be solved by something that should not be foreign to educational institutions: learning! Basic knowledge about immersive technologies, what forms they take, what devices are used for them and what apps are available, how to get equipment cheaply (it is much less expensive than most expect), can be taught relatively easily. There are extremely informative EU projects on this topic that give a good overview (many of them can be found on [www.vam-realities.eu](http://www.vam-realities.eu)), also many companies now specialise in this, including sufficient offers for the comprehensive training of educators. The requirement for classrooms is minimal and can be made easily and quickly by rearranging tables and chairs. Somewhat more difficult is certainly the lack of time resources of teachers - here one can only be advised to carefully reconsider the existing curricula and to streamline them as much as possible so that much needed modern learning content and forms can be incorporated without overburdening teachers as well as learners. This will certainly require a lot of courage and some traditions will have to be broken, but it is better to take this step sooner than too late. The only problem that, in our opinion, cannot be solved so easily is the support by IT experts. The shortage of these professionals is not an institutional or sectoral one, but a general one. Many factors come together here - such as demographic change with fewer employees in general or the big pull of well-paid jobs in industry - that cannot be solved in the short term. A far-sighted strategy would be for any kind of educational institution to make the teaching of digital knowledge and skills a core task, which would help to increase the digital literacy of the entire population and thus make them less dependent on support from IT experts in their everyday lives.

### III. Summary and derivations

#### 4. Methodological set-up, sample and reliability of data

In our online survey, it was possible to obtain responses from 324 educators from 24 European countries (including 20 EU member states).<sup>2</sup>

60.8% of the respondents were women, 36.1% men and 3.1% non-binary/genderqueer. The age distribution is evenly distributed and roughly corresponds to the real distribution in this professional field.

With regard to the educational levels in which the educators work, the proportion of university teachers predominates, because many of the project partners are higher education institutes which is also the main target sector of the project; apart from this, the remaining educational levels (pre-school, school, vocational training, general adult education, social education) are more or less equally represented. The distribution of professional experience is also evenly distributed, which made it possible to collect feedback and opinions from both experienced and less experienced. With 84.6%, the majority of respondents are employed by educational institutions, the rest are freelancers, owners of educational institutions or not working at the time of the survey (e.g., due to parental leave, illness, unemployment, etc.). The respondents are well to very well trained in their profession; 61.4% have undergone three or more years of professional vocational training, only 20.4% have no training or training of less than one year at the time of the survey. 86.1% of all respondents participate in regular further training measures in pedagogy, didactics and methodology, which are partly organised and financed by the employer, but also by the educators themselves.

We are aware that our online survey, the sample is far too small to be considered representative according to scientific criteria, however, with the relatively limited resources of time, staff and money available in the context of an Erasmus+ pilot project, the project group managed to draw at least a balanced sample with relevant and competent representatives of the target group.

The results of the study led to important insights for the further project work and - together with findings from the interviews with 21 project leaders of EU projects on immersive learning - have significantly influenced the didactic and methodological orientation of our products. In these interviews, we also asked the project leaders how they see the framework conditions of immersive learning in the classroom - and they largely came to the same conclusions as participants in the online survey.<sup>3</sup>

Furthermore, the results of this work are also highly relevant for other educators and educational policy makers. On the basis of them, they can derive their own measures to improve the pedagogical training of educators on a national as well as on a European level.

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<sup>2</sup> The key criterion for answering the questionnaire was that respondents must have worked professionally as a teacher or trainer for at least one full year in one of the EU Member States.

<sup>3</sup> See *Never Leave a Learner Alone*, XRforPED (2022), [www.xr4ped.eu](http://www.xr4ped.eu)

## 5. Derivations in a nutshell

In our postulates below, we do not give an exclusive summary of the statements made above - they are already very concise and concrete - but make bold statements that should lead to critical reflection, intensive discussions and - above all - to innovative changes and innovation in pedagogy.<sup>4</sup>

1. The C-19 pandemic has led to an **enormous boost in the diversity of digital learning and work in our education systems**. Contrary to many expectations, many digital methods and tools were used even before. What is astonishing is that the **vast majority of educators have received little or no training in the use of digital methods and tools during their careers - and this does not seem to bother anyone much**. What would be unthinkable in any other profession - e.g., a surgeon who operates without knowing how to handle scalpels, a pilot who confidently takes the jet plane with passengers into the air without knowing modern aircraft, a dentist who says "please open your mouth" and at the same time looks in amazement at the completely unknown drill in his hand - seems to us to be completely normal when it comes to educating people. We should think very carefully about whether we want to continue to expose our learners to such risk.
2. Such ignorance not only casts doubt on whether homo sapiens even deserves its epithet, but is also - and this is quite serious - very dangerous. The next societies will be primarily (e-)knowledge-based and if Europe wants to be a world leader in this area, we have to prepare Europe's citizens, especially children and youth, for talking these challenges. Therefore, it is **imperative that rapid and intensive changes in educational standards are planned and implemented**. The **digitalisation of society, economy and politics** will be achieved most quickly and effectively if learners **not only learn about it as early as possible - but also through it!**
3. To ensure this, **educators in particular need to be trained quickly and comprehensively** in how to **prepare learners for an ever more rapidly digitising world, including using more digitised teaching methods and tools!** The good news – as our survey shows - is that educators themselves have grasped this necessity and want to further digitalise their teaching. It is extremely important to **build on this positive attitude and the existing interest** and to offer the educators **every support - quickly and sustainably, before frustration and demotivation spread due to a lack of support**.
4. One of the big problems in this context seems to be the **lack of time and a generally increasing shortage of skilled workers in pedagogy**, which leads to existing staff being even further stretched and not having the time and energy to deal with new methods and instruments. Several levels need to be applied here - one of them is certainly the **rigorous streamlining of training content and curricula**. We are currently teaching our children and learners largely outdated content, some of which is still based on a 19th century bourgeois understanding of education and whose concepts

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<sup>4</sup> The order of the listing does not necessarily represent a ranking of urgency or importance.

and methods date entirely from pre-digital times. Much of the content today is no longer relevant, bears little relation to real life, or is now easily provided on a daily basis by modern technologies.

**Very courageous decisions have to be made** here, because **a system that only ever adds new content, but does not jettison any old content, is doomed to failure within a very short time.**

5. A very important result of our research is that educators - in management as well as in teaching - seem to be **rather open-minded with regard to digital media and are interested in continuing their education and improving their skills.** But they need support in the form of better **equipment, advice on strategic and operational decisions, intensive training** in the use of new media and additional support from IT experts.
6. A special role plays the **vocational and continuous education and training of learning staff.** The concept of lifelong learning has meanwhile arrived in society and is propagated and demanded above all by the economy. It would be surprising if educators in particular were excluded from this. Especially for them, the **best available teachers must be engaged** to bring them up to speed immediately in all innovations of pedagogy. Since the rapid innovations in digitalisation will also lead to ever faster innovations in pedagogy, these **further training measures must also be carried out at short intervals – and participation should be obligatory.** Continuing education for educators should not be seen as a burdensome additional workload or, at best, as a nice-to-have, but as an integral part of a holistic educational philosophy of a knowledge-based society.
7. Comprehensive support for educational institutes is very likely not always to be covered internally, which is why **cooperation between education providers, research institutes and the private sector** is recommended. Educational institutes – no matter on which level and in which area - cannot have expertise in everything, they will have to look for support where it exists - on the open market! To be able to act in this way, **educational institutions need a certain amount of decision-making freedom and budgetary sovereignty.** This is especially true for public educational institutions (especially on school levels), which in many countries are still centrally controlled and administered and whose decision-making structures are characterised by low flexibility and rigid hierarchies. Here, it would be desirable to provide educational institutions with certain frameworks and budgets, but then - together with all stakeholders such as key authorities, teachers, learners, parents, external experts, etc. - let them make their own decisions. - to be able to make their own decisions. There is a reason why the Finnish school system - which is organised in exactly this way - is repeatedly voted the best in the world.
8. **All this costs money - a lot of money!** But there is no alternative but to admit that we are missing the connection to the digital age and leaving the field to other nations and economies - and then it will be really expensive! The largest future economic sectors will be services - largely digital - and if Europeans prepared – meaning: trained! - for this on a broad level, we will **lose the economic connection.** We can then only watch as other knowledge-based societies - such as the USA, China, Japan, South Korea, Australia, Canada, India and others - **continue to leave us behind.** A development

that **starts with education and will then affect other areas such as the economy, society and politics.**

We have to take this step in any case - the longer we wait, the more important time we lose and the more expensive it will be to catch up.

9. However, it should not be blamed solely on a lack of resources - especially money. All in all, the digital turn is above all a **psychological issue** in which older, analogue and newer, digital teaching paradigms seem to be at odds with each other, sometimes without understanding. But that would be the completely wrong approach and would not help us one step further in the matter itself. It is not a question of either/or and it is not about being right! It **is about the best possible combination of the best elements from both areas** in order to be able to prepare for the rapidly changing demands on knowledge, skills and competences. Here, educators and those responsible for education from both camps must approach each other **openly and cooperatively**, be prepared to critically and without prejudice question both the traditional and the new, and combine both into innovative methodological-didactic training concepts. First and foremost, educators must also learn and experience how learning should work best in the future. In addition to a high level of **methodological competence**, all experts involved need to be **very open**, have a **lot of understanding** for the other side, **consistently question meaningfulness** in all directions and have a lot of **courage** to change in different areas.
10. In all this, it should not be forgotten that **digitalisation just offers methods and instruments that are only as good and as bad as they are used.** And like every method and every instrument, the **digitised ones are not universally applicable** and can be used for everything. **Interdisciplinary groups of experts** made up of educationalists, psychologists, IT experts, sociologists, educational politicians, etc. are needed to define precisely in which areas the digitisation of teaching should be promoted first and foremost, and in which areas it makes only limited sense, and in which areas it does not make sense at all. Based on this, **training recommendations and guidelines** must be formulated - together with the **revised curricula** - which **must be integrated as quick and far as possible into the pedagogical training of teachers and educators.**

If you look at our derivations, many things will sound familiar. Our study has certainly brought out one or two interesting new aspects, e.g. that the motivation and interest of teachers and trainers in further expanding their digital teaching areas is higher than assumed. But it is not surprising that, on the whole, we have come to the same conclusions as many experts who have been calling for similar improvements for a long time. What is surprising, however, is that so little has been done in this area by educational policy makers. As said above, we consider this to be extremely dangerous, because we see education as the basis for all other areas of society, economy and politics. Completely unexpected impulses for the digitisation of education, however, have come from training lock-downs caused by the C-19 pandemic, which have brought many methods and tools from the IT sector in the classroom for the first and for a long time. Now it is important to train and further educate teachers as quickly as possible on how these and other methods and instruments can be incorporated into modern European teaching concepts in a pedagogically meaningful and long-term way. Under no circumstances should we fall back into old digitisation doubts and negligence. Rather, the highest means and

resources should be used to examine all digital innovations to see if and how they can be used for teaching, and then to train educators in their application. This should not be done to the detriment of traditional teaching and learning methods, but to enrich them. In essence, the question is not which methods one personally likes or dislikes, but which methods best prepare learners for the challenges of the present and future world.



### III. ANNEX



# European Survey online Questionnaire (Word version)

by



In cooperation with the whole partnership



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# Section 0 – How has the C-19 pandemic changed our teaching – and could VR/AR technologies help us become even better educators?

Welcome to this survey conducted by the XR4Ped project group within the framework of ERASMUS+, Europe's largest funding programme to foster education and training on all levels. XR4Ped deals with the questions, how C-19 has shaped all of us in our everyday teaching and what impact this will have on the future of education and training. The main aim is to develop a new training course to advance education students' digital teaching skills, with a special focus on the use of Virtual and Augmented Realities. For more information, please see [www.xr4ped.eu](http://www.xr4ped.eu) where this questionnaire is also available in Slovenian and German.

Your personal and professional life experiences are extremely valuable for this undertaking and will have direct impact on the content, shape and pedagogical set-up of our new training course. We would therefore be very grateful if you could spare about 15 minutes of your time to provide us with your points of view by completing the following questionnaire.

Before starting, please note:

- All data and information will be treated confidentially and evaluated anonymously in strict accordance with the European Data Protection Regulation (EDPR; <https://eur-lex.europa.eu/eli/reg/2016/679/oj?locale=en>). In general, your data will not be evaluated individually, but always together with all data.
- There are no right or wrong in answers – all that counts is your personal opinion and experiences
- The questionnaire is exclusively addressed to educators (teachers, trainers, lectures etc.) offering training at any educational level (pre-school, school, higher education, VET, social pedagogic etc.).

The online questionnaire is accessible until 31/03/2022. The results will be published in a Strategic Paper on Digital Teaching by September 2022 and forwarded to relevant bodies at the European Commission, the European Parliament as well as to national authorities and stakeholders.

In case of any questions or problems with the tool, please do not hesitate to contact Dr. Michael Schwaiger who is responsible for this survey: [michael.schwaiger@enter-network.eu](mailto:michael.schwaiger@enter-network.eu).

Thank you very much in advance for your efforts and support in making this survey a success!

The XR4Ped project group

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# Section 1 – Personal data and own pedagogic education

## 1.1 Country in which the educational institution you work at is located:

- a)  Austria
- b)  Belgium
- c)  [list with all EU countries + one option to insert "others countries"]

## 1.2 Gender identity:

- a)  female
- b)  male
- c)  non-binary/genderqueer
- d)  no answer

## 1.3 Age (in years):

- a)  30 or less
- b)  31-40
- c)  41-50
- d)  51-60
- e)  61 or over
- f)  no answer

## 1.4 Area/level of main teaching activity (due to the inhomogeneous education systems in Europe, the given categories may not fully correspond to your reality - thank you if you still choose the most appropriate of the answers; multiple answers possible):

- a)  pre-school
- b)  primary school level (learners approximately between 6 and 10-12 years of age)
- c)  lower secondary school level (learners approximately between 10-12 and 14-16 years of age)
- d)  secondary/high school level (learners up to 18-19 years of age)
- e)  higher education (university, college, etc.)
- f)  (continuous) VET
- g)  general adult education
- h)  social pedagogy/teaching learners with special education needs
- i)  other: \_\_\_\_\_

**1.5 Main subjects/fields of teaching (multiple answers possible):**

a)  natural science subjects/field respectively

b)  social science and humanistic subjects/field respectively

c)  technical subjects/field respectively

d)  linguistic subjects/field respectively

e)  arts subjects/field respectively

f)  several/all of the above subjects/fields

g)  other: \_\_\_\_\_

**1.6 Total number of years you work as a teacher/trainer:**

a)  5 or less

b)  6-10

c)  11-20

d)  21-30

e)  31 or over

**1.7 Current position in your educational institution:**

a)  I'm employed

b)  I work as a free-lancer

c)  I'm the owner/manager

d)  Currently I'm not working as a teacher

e)  other:

**1.8 How long approximately have you received professional education and training in pedagogy (here, we do not mean training in what but in how you teach; i.e., methodology, didactics, learning tools, communication with learners etc.)?**

a)  none or less than 1 year

b)  1 year

c)  2 years

d)  3 years

e)  4 years

f)  5 years and over

**1.9 Do you regularly undergo further pedagogical education and training?**

a)  yes, my employer organises/pays for this

b)  yes, I organise/pay for this myself

---

c)  yes, by self-studying (i.e., in the internet)

---

d)  Other: \_\_\_\_\_

---

e)  no

---

**1.10 Prior to the arrival of the C-19 pandemic, approximately what percentage of all your pedagogical education were you trained to deliver asynchronous digital teaching yourself (i.e., providing learning materials online, making students use office package/internet etc.)?**

---

a)  0 %

---

b)  up to 10%

---

c)  up to 25%

---

d)  up to 50%

---

e)  51% and over

---

f)  I never received professional education in pedagogy

---

**1.11 Prior to the arrival of the C-19 pandemic, approximately what percentage of all your pedagogical education were you trained to deliver synchronous/remote digital teaching yourself (i.e., giving online classes and webinars etc.)?**

---

g)  0 %

---

a)  up to 10%

---

b)  up to 25%

---

c)  up to 50%

---

d)  51% and over

---

e)  I never received professional education in pedagogy

---

## Section 2. Digital teaching in the C-19 pandemic

The pandemic had deep impact on many areas of our life, including education and teaching. With the next questions we want to learn how this situation has affected digital teaching in Europe and what have been your personal situation and experience with it.

2.1 On what occasions do you use the following digital tools/services in your teaching? (multiple answers possible)	in my classes/ during teaching	in my preparation or follow-up work	I make my learners use this	for communica- tion, meetings etc.	I don't use or know this
a) Basic office packages (Word, Excel, PowerPoint, Pages, Numbers, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) CD-ROMs, DVDs (i.e., from school books)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Emails/Intranet provided by educational institute	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Websites, Wikipedia and other wikies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Messenger services (WhatsApp, Snapchat, Twitter, Google Hangouts, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Chat and communication platforms (Skype, Teams, Zoom, Adobe Connect etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Social media (Facebook, Instagram, etc.) and other online communities and blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) E-learning platforms (Moodle, Fronter, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Learning videos (on TV, YouTube, Netflix, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Learning apps in general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Learning progress tracking apps (Kahoot, Socrative Quizlet, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) e-games and consoles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Virtual/Augmented Reality apps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Cloud services for storage and sharing of documents (Google Drive, Dropbox, Google Forms, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Professional presentation, design and editing tools (Visme, Prezi, Picpick, Flickr, Canva, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p) (Shared) Interactive whiteboards (Bubl.us, Padlet Flinga, Classroom-screen, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q) Podcasts and podcast creation tools (Podbean, Podomatic etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r) Video, tutorials and webinars creation tools (WeVideo, Wink, Camstudio, Screencast-O-Matic, Webinaria etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
s) Content management systems for website development (WordPress, Typo3, Joomla, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
t) Survey and data processing tools (Surveymonkey, SPSS, Survio, Google Forms etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

u) Creation software for online-courses (Ragoon Gang, Elucidat, Genie etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
v) Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.2 Prior to the arrival of the C-19 pandemic, how often did you apply these digital tools/services in your teaching (including preparation work and communication)?	Never	less than once a week	once or twice a week	(almost) daily
a) Basic office packages (Word, Excel, PowerPoint, Pages, Numbers, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) CD-ROMs, DVDs (i.e., from school books)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Emails/Intranet provided by educational institute	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Websites, Wikipedia and other wikies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Messenger services (WhatsApp, Snapchat, Twitter, Google Hangouts, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Chat and communication platforms (Skype, Teams, Zoom, Adobe Connect etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Social media (Facebook, Instagram, etc.) and other online communities and blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) E-learning platforms (Moodle, Fronter, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Learning videos (on TV, YouTube, Netflix, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Learning apps in general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Learning progress tracking apps (Kahoot, Socrative Quizlet, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) e-games and consoles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Virtual/Augmented Reality apps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Cloud services for storage and sharing of documents (Google Drive, Dropbox, Google Forms, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Professional presentation, design and editing tools (Visme, Prezi, Picpick, Flickr, Canva, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p) (Shared) Interactive whiteboards (Bubl.us, Padlet Flinga, Classroomscreen, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q) Podcasts and podcast creation tools (Podbean, Podomatic etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r) Video, tutorials and webinars creation tools (WeVideo, Wink, Camstudio, Screencast-O-Matic, Webinaria etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
s) Content management systems for website development (WordPress, Typo3, Joomla, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

t) Survey and data processing tools (Surveymonkey, SPSS, Survio, Google Forms etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
u) Creation software for online-courses (Ragoon Gang, Elucidat, Genie etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
v) Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.3 Following the arrival of C-19, how often do you now apply these digital tools/services in your teaching (including preparation work and communication)?	never	less than once a week	once or twice a week	(almost) daily
a) Basic office packages (Word, Excel, PowerPoint, Pages, Numbers, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) CD-ROMs, DVDs (i.e., from school books)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Emails/Intranet provided by educational institute	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Websites, Wikipedia and other wikies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Messenger services (WhatsApp, Snapchat, Twitter, Google Hangouts, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Chat and communication platforms (Skype, Teams, Zoom, Adobe Connect etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Social media (Facebook, Instagram, etc.) and other online communities and blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) E-learning platforms (Moodle, Fronter, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Learning videos (on TV, YouTube, Netflix, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Learning apps in general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Learning progress tracking apps (Kahoot, Socrative Quizlet, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) e-games and consoles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Virtual/Augmented Reality apps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Cloud services for storage and sharing of documents (Google Drive, Dropbox, Google Forms, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Professional presentation, design and editing tools (Visme, Prezi, Picpick, Flickr, Canva, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p) (Shared) Interactive whiteboards (Bubl.us, Padlet Flinga, Classroomscreen, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q) Podcasts and podcast creation tools (Podbean, Podomatic etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r) Video, tutorials and webinars creation tools (WeVideo, Wink, Camstudio, Screencast-O-Matic, Webinaria etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



s) Content management systems for website development (WordPress, Typo3, Joomla, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
t) Survey and data processing tools (SurveyMonkey, SPSS, Survio, Google Forms etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
u) Creation software for online-courses (Ragoon Gang, Elucidat, Genie etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
v) Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.4 During the shutdowns caused by C-19, whose equipment (laptops, tablets, smartphones etc.) was used for remote teaching/learning?	never	Sometimes	always	I don't know/ I didn't teach remote
a) I used my own equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I was provided with equipment by the educational institute I'm working for	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) The learners I'm teaching used their own equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) The learners I'm teaching were provided with equipment by the educational institute I'm working for	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.5 What about access to high-speed internet?	Yes, already before Corona	Yes, since Corona	Not yet, but it is in planning	No, also not in future	I don't know
a) Have you access at your home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Does your educational institute have access?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Do the majority of your learners have access at home?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.6 To what extent do you agree or disagree with these statements concerning your educational institute (1= Strongly disagree; 4 = Strongly agree)	1	2	3	4
a) Already prior to the C-19 arrival, my educational institute was now very open to digital and remote learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Due to C-19, my educational institute has developed into a more flexible educational institution open to digital and remote learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) My educational institute invests sufficiently in digital and remote learning hardware and software for all participants (trainers, learners, etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) My educational institute offers enough IT training courses for its teachers/trainers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) My educational institute provides enough IT support (i.e., own IT staff or external IT experts) to guarantee smooth running of digital and remote learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Remote services and chats should be maintained for team meetings, teacher conferences and communication with learners and parents (if appropriate)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

g) In future, educational institutes should be obliged to offer a certain percentage of classes and services digitally or remote.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Remote learning is generally of lower quality.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) It is more difficult to engage students in remote learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) It is more difficult to control the realisation of intended learning objectives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Remote learning makes it difficult for learners to develop appropriate learning habits.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) Remote learning increases loneliness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Remote learning makes it more difficult to develop social skills.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) Remote learning increases psychological stress of learners.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o) Remote learning widens socioeconomic disparities within learners.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
p) The use of digital/remote tools and communication in teaching is an important contribution to preparing learners for real life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
q) My learners have achieved good learning results in remote learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
r) My learners like digital and remote learning in general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
s) My learners like synchronous digital and remote learning (i.e., remote classes or small group meetings at a scheduled time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
t) My learners like asynchronous remote learning (i.e., watching videos on platforms, using apps themselves etc.).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
u) Learners are sufficiently IT-literate to cope with the challenges of digital and distance learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
v) Learners also want to be taught digitally/remote to a certain extent in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
w) During my own pedagogical education and training, I was sufficiently prepared for digital and remote learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
x) I regularly attend continuing education courses that familiarise me with digital innovations in pedagogy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
y) My personal digital teaching skills have developed very positively within the last years.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
z) I like digital teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
aa) I found remote classes very stressful even after some practice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
bb) If it were possible, I would offer more digital teaching in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
cc) My personal work-life balance would improve if I could teach more remote	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Section 3: Immersive teaching

With the advancements of digital and immersive technologies, Virtual, Augmented and Extended Realities (VR/AR/XR) are becoming popular. Initially they were only applied in specific areas (i.e., gaming industry) but now they appear in more areas such as tourism, psychology, education, architecture etc. There are also more and more learning apps that can be used in a variety of ways, but for all of them there is one urgent need – educators have to be trained in using them. By means of the next questions, we would like to get a better insight into the extent to which immersive technologies are already known or even used by educators - and which frameworks would favour their further use.

3.1 Are you aware of VR/AR/XR technologies and what they are about? (multiple answers possible)	no	I have a vague idea	Yes, but I'm not very familiar with using it	I'm rather familiar with using it
a) Virtual Reality (VR)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Augmented Reality (AR)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Extended Reality (XR)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 3.2 How often have you already tested/used VR/AR/XR technologies yourself?

- a)  never
- b)  up to 3 times
- c)  up to 10 times
- d)  up to 20 times
- e)  more than 20 times

### 3.3 How did you have access to VR/AR/XR equipment? (multiple answers possible)

- a)  I never had access to this technology
- b)  I tested it briefly in shopping centres, at fairs etc.
- c)  I own equipment myself
- d)  I have access to equipment in my social environment (family, friends etc.)
- e)  The organisation I'm working for provides equipment
- f)  I practiced it during my pedagogic education/training
- g)  Other: \_\_\_\_\_

### 3.4 What kind of VR/AR/XR apps have you experienced? (multiple answers)

- a)  I never experienced any apps
- b)  Gaming, fun and entertainment
- c)  Visiting cultural and historic sites
- d)  Visiting geographic landscapes and natural sites
- e)  Learning apps
- f)  Other: \_\_\_\_\_

**3.5 Have you already applied VR/AR/XR apps at your own teaching?**

a)  No

b)  Yes

If yes, please explain briefly:

**3.6 Are you curious to learn more about VR/AR/XR and how it could be used for teaching?**

c)  Yes

d)  I'm not sure

e)  No

**3.7 Do you agree or disagree to the following statements: A main obstacle for utilising VR/AR/XR teaching and learning at the educational institute I work for is that ...**  
(1= Strongly disagree; 4 = Strongly agree)

	1	2	3	4
a) ... there is little/no knowledge or motivation of management about these technologies and how they can be used in the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) ... there is little/no knowledge or motivation of the trainers/teachers about these technologies and how they can be used in teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) ... trainers/teachers would be motivated but are not trained in and familiar with the use of the technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) ... trainers/teachers are too busy with other arears of their work to deal with new forms of teaching	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) ... there are concerns that VR/AR/XR will not enable quality teaching and learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) ... there is already enough digital teaching and with also introducing VR/AR/XR teaching, negative impact and consequences of digital learning on learners will be further increased	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) ... high-speed internet is not sufficiently available at our institution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) ... we do not have any VR/AR equipment (hardware and software)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) ... we do not have the knowledge to select and purchase the right equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) ... that VR/AR/XR hardware/software are too expensive to afford	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) ... we have too few technical staff/experts at our institution to implement these technologies smoothly in classes and to run them on the long term	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) ... VR/AR/XR technologies are not yet sufficiently well developed (on technical, graphical design, learning content etc. levels) to be able to use them in the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) ... the curriculum we are obliged to implement does not include and to provide for the use of VR/AR/XR	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n) ... the architecture and structure of the classrooms and learning spaces are not designed for the use of VR/AR/XR	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3.8 You have now reached the end of the questionnaire. If there is anything else that has not yet been addressed but is important to you, or if there is anything you would like to share on this topic, please use the space below – but, of course, you are not obliged to do so.

Thank you very much for your great support in making this European study a success. The results will be published on [www.xr4ped.eu](http://www.xr4ped.eu). If you are interested to be informed about the survey results and further project activities, please follow us at [fb.com/XR4Ped](https://fb.com/XR4Ped).

The XR4Ped project group

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XR4Ped fosters digitisation in Higher Education in general  
and the promotion of XR-based immersive learning in particular.

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