



# Accessible Immersive Learning in Art and Design

*an Erasmus Strategic Partnership*

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## Full Case Study Report

Can Immersive Technology help prepare students in Decorative and Applied Arts for the modern labour market?

A case study exploring the use of graphic tools in 3d modelling of Fashion Design & Accessories

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This report is provided in full for the purpose of demonstrating the scope of the Accelerate project.



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## Introduction

The introduction of new teaching methods and technologies in the modern teaching of art will ensure high-quality training of specialists in the field of fine, decorative, and applied art in connection with the demand of society in the use of 3D design technologies in all fields of human activity: engineering, education, art, architecture, design, construction, etc.

**“Technologies of augmented reality (AR)”** are capable of projecting digital information (images, video, text, graphics) outside the screens of devices and combining virtual objects with the real environment. Immersive learning methods can potentially become a major tool in education and revolutionise the education of art students. Teachers can use virtual and augmented reality for students to interact with various objects in three-dimensional space.

Technologies of VR and AR give students the opportunity to study art, various academic subjects in a more comprehensive way, and most importantly, in an easy and relaxed form, VR allows them to acquire a qualitatively new experience to which students (due to various circumstances) usually do not have access.

**“Inclusive learning environment”** is a set of conditions, methods and means of their implementation for joint learning, education, and training of students by taking into account their needs and capabilities. In order to achieve the goal of inclusive art education, the following strategic goal was formed in accordance with the Concept of Inclusive Education in Art: citizens, regardless of the peculiarities of mental and physical development, have equal rights and opportunities to access art education and are equally involved in the creation of cultural artistic product [1].

In the context of the development of inclusive education in art, the Department of Decorative, Applied and Fine art works in the following main aspects:

1. Students of the department use various types of learning, including distance learning.
2. The learning process at the department is psychologically comfortable for all its participants.
3. Compliance of the department’s territory and building with standards of physical accessibility and universal design.
4. The department is staffed by specialists who have received appropriate professional training for working with persons with special educational needs.
5. Teachers of the department use modern teaching and methodical materials to work with students with special educational needs.

The following project participants from the Department of Decorative, Applied and Fine Art worked on the development of the case study (creation of virtual rooms and a methodological guide):

1. **Myroslava Zhavoronkova** – Honoured Master of Folk Art of Ukraine, Head of the Department of Decorative, Applied and Fine Art, craftswoman in the field of fashion design and accessories.
2. **Nataliia Hatezh** – PhD in Pedagogical Sciences, assistant professor, lecturer of psychological and pedagogical disciplines at the Department of Decorative, Applied and Fine Art.

## **UNIT 1. Overview of the partner institutions**

### **1.1. Department of Decorative, Applied and Fine Art of Yuriy Fedkovych Chernivtsi National University (Ukraine)**

Yuriy Fedkovych Chernivtsi National University is one of the oldest classical universities in Ukraine, founded on October 4, 1875. It is located in the grand building in the modern part of Chernivtsi - a complex built between 1864 and 1882 as the residence of the Metropolitans of Bukovyna and Dalmatia according to the project of the famous Austrian architect of Czech origin Josef Hlavka.

Nowadays, the University has 2 educational and scientific institutes: the Institute of Biology, Chemistry and Bioresources and the Institute of Physical, Technical and Computer Sciences, 10 faculties: Geography; Economics; Foreign Languages; History, Political Science and International Relations; Architecture, Construction, Decorative and Applied Art; Pedagogy, Psychology and Social Work; Mathematics and Computer Science; Philology; Faculty of Physical Education and Human Health; Law; College of Pedagogy. Their structure includes 85 departments and the Department of Military Training as a general university unit. Over 14,000 students go to university. <http://www.chnu.edu.ua/index.php?page=ua>

On June 28, 2011, the 35th session of the UNESCO World Heritage Committee made a resolution to include the Architectural Ensemble of the Residence of the Metropolitans of Bukovyna and Dalmatia (now the Central Building of the University) in the list of UNESCO World Heritage Sites.

The Department of Decorative, Applied and Fine Art was formed in 2017 as a result of the merger of the Department of Decorative and Applied Art and the Department of Fine Art, which were created in 2005 as part of the Faculty of Fine, Decorative and Applied Art. <https://www.facebook.com/DPMCNU>

The Department trains BA and MA students in the major 023 “Fine Art, Decorative art, Restoration” with the following specialisation areas: fashion design, artistic woodwork, artistic metalwork (jewellery and blacksmithing), artistic painting, artistic textile. The management and teaching staff of the Department of Decorative, Applied and Fine Art aim at creating a clear and well-founded methodology for teaching professional disciplines. The study of artistic and stylistic features of the artistic traditions of Bukovyna, the development of students’ abstract thinking, mastery of analytical and constructive methods of form creation are the main conceptual foundations of the Department’s study programmes.

The Department takes a prominent place among art institutions of Ukraine, as teachers and students closely cooperate with the National Union of Artists of Ukraine, the National Union of Masters of Folk Art of Ukraine, and the Union of Masters of Blacksmith Art of Ukraine. Diploma qualification projects and works of the alumni of the Department are presented at many Ukrainian and international exhibitions, competitions, reviews, and have been repeatedly awarded prizes and diplomas of the 1st degree for originality and skill. In particular, creative works of students and alumni of the Department have been displayed at the Ministry of Education and Science of Ukraine; the Presidential Fund; George Enescu National University of Arts in Iasi (Romania); Ștefan cel Mare University of Suceava (Romania), as well as at many Ukrainian and international exhibitions, competitions, festivals. The most talented students are annually awarded the scholarship of the President of Ukraine within the category of young masters of folk art for their creative achievements.

An important achievement of the department is the opening of the Exhibition Hall of the Chernivtsi National University on May 22, 2019, the exhibits of which are term projects and diploma qualification works of students, which demonstrate the modern stage of development of all types of decorative and applied art, show its unique originality in all-Ukrainian modern art. The work programme of the hall also provides for the organisation and holding of master classes for students by leading teachers of the Department of Decorative, Applied and Fine Art in various areas of decorative and applied art.

The prospective directions of the department's work are the establishment of partnership relations with art institutions of higher education in Ukraine and abroad, the constant improvement of the professional skills of the teaching and training staff, the involvement of students in scientific and creative activities, publication of scientific works, publication of methodological manuals, textbooks, and monographs.

Another significant achievement of the Department is participation in the Erasmus+ project "Accelerate: Accessible Immersive Learning for Art and Design" since 2021, which provided a unique opportunity for participants (teachers and students) to get to know and master immersive technologies, contributed to professional growth, and revealed how to solve educational tasks efficiently by using various digital applications and programmes.

<http://artdeko.chnu.edu.ua/index.php?page=ua>

## **1.2. University of Social Sciences and Humanities (SWPS University, Warsaw, Poland).**

SWPS University of Social Sciences and Humanities (SWPS University) is one of the best humanitarian and psychological higher education institutions in Poland with its main campus in Warsaw and branches in Poznań, Wrocław, Sopot and Katowice. The total number of students in the SWPS university is about 17,000. A number of meetings have been held with colleagues of this institution:

- in Dublin, during full-time training;
- through correspondence and messengers.

As a result, it was planned to work on case studies and the participation of Polish and Ukrainian students in the project.

### **UNIT 2. Introduction to case study**

The Department of Decorative, Applied and Fine Art teaches students of various social stratas, mostly from small towns and villages, from single-parent families, low-income families, and large families; students whose parents have been drafted for war/were killed in action; or are Anti-Terrorist Operation veterans. Due to the aforementioned circumstances not all of the students have the opportunity to get expensive technical equipment for learning purposes. The learning process was complicated by the Covid-19 pandemic, as well as the full-scale war in Ukraine, which continues to this day.

Because of the war, both teachers and students have been in extremely difficult psychological conditions for almost a year (stress, concern for relatives, husbands, fathers, brothers who are fighting). There is not always inspiration for creative work, there is no strength and desire due to depressive attacks, which is reflected in the quality of performance of the assignments (students do not always have time to submit aesthetically finished works in the material, theoretical subjects, course projects, etc.) At the same time the introduction of distance learning into the educational process of the university made it possible for all students and teachers to continue their work, communicate with each other, exchange experience, support and help young people to grow professionally and be successful and socialised people.

The Department of Decorative, Applied and Fine Art offers a BA and MA program 023 “Fine Art, Decorative Art, Restoration”. Within the program there is a specialisation in the field of fashion design and jewellery. As for SWPS colleagues, their field of interest has been graphic design and silkscreen printing. Therefore, initially it was decided that SWPS students would create the silkscreen prints, implement those on fabric and CHNU students would incorporate those materials in their clothing models. However, there have been internal changes on SWPS end. Therefore, other suggestions and ideas were discussed to involve

students from another class. The idea was to create a few models of a piece of jewellery based on students' imaginative work. For this purpose the image of the jewellery model created by CHNU students was taken, the part of the image was cropped so that it would leave room for the SWPS students' imagination, as they would need to continue the creation of the model and add the missing part on their own by using their ideas.

### **UNIT 3. The aim of the case study**

It is worth noting that each experimental study has its own purpose, task, structure, methodology and generalisation. Therefore, at the beginning of our research, we formulated a leading goal, as well as a number of priority tasks that logically derived from the set goal.

**The purpose of the given case study** was to form a highly qualified socialised artist in the field of decorative and applied art, who will (1) possess a number of practical skills and abilities in the field of 3D modelling, immersive technologies, (2) successfully transform the acquired experience in the field of art into the field of digital applications, and (3) be competitive in the modern labour market.

We formulated a number of key tasks to meet this strategic goal focused on: "Using graphic functions in 3D modelling of fashion design and accessories":

1. Provision of students with a comprehensive understanding of immersive technologies, the principle of operation and functions of VR headsets, 3D modelling technologies, various programmes and platforms.
2. Acquisition of practical skills and abilities in the field of using immersive technologies and skills in working with various virtual design tools (Gravity Sketch, FrameVR, Blender).
3. Transformation of acquired practical experience in the field of decorative and applied art into the digital environment and vice versa.
4. Providing opportunities to all students (including those with certain limitations: social, physical, psychological, financial, territorial, technical) to learn and master the latest digital technologies overall and immersive technologies in particular.
5. Ensuring further professional self-fulfilment of the student in the modern labour market while taking into account the demand of society.

## **UNIT 4. Overview of methodology**

### **4.1. Description of research methods**

This case study “Using graphic tools in 3D modelling of fashion design and accessories” has been carried out with the use of the following methods:

- Empirical (conversations with students, interviews, questionnaires, testing).
- Modelling method (forecasting, creating models).
- Statistical (perusing data of student responses during questionnaires, testing, etc.).
- The method of analysis and generalisation (analysis of students’ responses, interviews, conclusions after each class, generalised research conclusions).

All the research methods described above in a complex ensured the timely and efficient conduct of the experiment.

### **4.2. Experimental methodologies of teaching students with the help of headsets**

Until the headsets were available, the learning process took place in the theoretical and informational space with the help of verbal and visual teaching methods, therefore an information campaign was conducted with groups of students about the essence and functions of immersive technologies, various digital applications, programmes in the field of 2D and 3D modelling, as well as theoretical preparation for working with headsets and various programs.

In the process of teaching students, we found the most effective method of teaching was the group method of students’ work under the guidance of a teacher, because it is in the group that the student has the opportunity to show themselves among others, evaluate their own activity and reach out to those who have already had experience in this field.

As soon as the Department received the headsets (November 11, 2022), the work on their exploration and practical application immediately began. We would like to add a few notes on the initial work with the headsets. What was the difficulty? It was definitely the fact that within a limited time the teachers first had to remember the algorithm for working with the headsets in order to then teach the students the main points, and this required some effort and additional time.

Therefore, before working with different 3D modelling programs, creating three-dimensional models, significant work has been completed on mastering the use of the actual headsets.

We would like to note that the students, young artists, quickly got onboarded with the headsets and learned how to use them. This was also facilitated by the fact that several students had previous work experience and helped the teacher in the process.

Also, we cannot ignore the method of didactic games, encouragement, and competitions, which in the process of training students proved to be effective and necessary, since the spirit of healthy competition, encouragement to work contribute to increasing the work capacity of learners and revealing their initiative and best personality features, including responsibility.

The practical lessons were based on topics that reveal the main regularities of the process of designing digital objects and environments. The purpose of the practical assignments was to form a complex and holistic understanding of the principles of object-spatial modelling in a virtual three-dimensional environment, texturing, visualisation for obtaining images of a professional level, as well as regular practice of using the acquired knowledge in the performance of current tasks.

#### **UNIT 5. Description of the case study (experience of staff/students)**

##### **“USE OF GRAPHIC TOOLS IN 3D MODELLING OF FASHION DESIGN AND ACCESSORIES”**

**Topic:** Modelling of fashion design and accessories in a new perspective. Creation of 3D models by various graphic means.

**Objective:** Creating the simplest and shortest way for mastering 3D technologies in decorative and applied art. The course is designed for students of education institutions specialising in art. It is aimed at simultaneous teaching in a group consisting from 5 to 10 students with practical skills of traditional shaping, knowledge of composition and basics of colour theory, basics of fashion design and accessories.

**Timeframe:** Classes are held twice a week for three hours.

**Description:** The course is designed for maximum assimilation of educational material in the shortest possible time. The main tool is a VR headset, the 3D design platforms Gravity Sketch, Frame VR, Blender.



Drawing of traditional costume





Drawing by Fashion Students

An experimental case study with students was conducted within the project at the Department of Decorative, Applied and Fine Art throughout 2022 and took place in **three stages**:

I – informative and introductory stage (February – June 2022)

II – practical and modelling stage (September – first half of December 2022)

III – formative and generalising stage (second half of December 2022)

12 full-time students obtaining the BA degree (students in their second, third, fourth year) participated in the experiment from the department, and a few more MA students who showed interest and initiative in the project were involved in the process. The teachers that took part in the case study: Myroslava Zhavoronkova, Nataliia Hatezh.

At the beginning, a group of ambassadors were recruited, who were supposed to analyse the training process, adjust, submit ideas and initiatives in order to improve and optimise the training. Since the department has a small number of students, some of them were involved both in the learning process and as ambassadors.

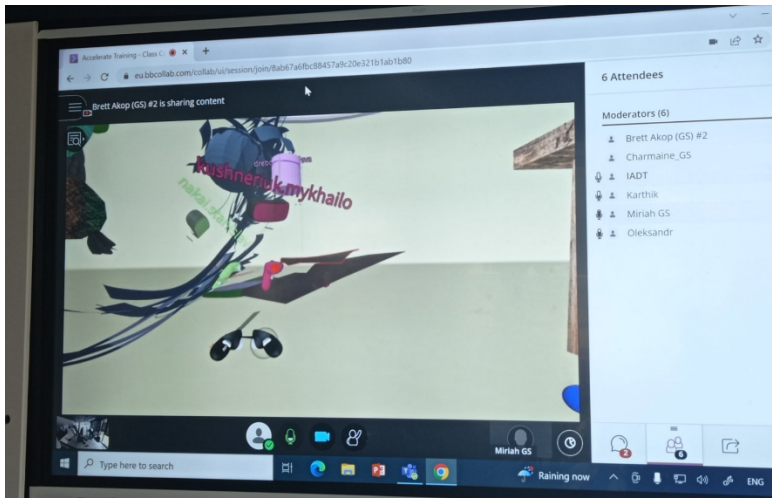
Furthermore, a survey has been conducted among the project participants throughout the entire period.

#### **I – informative and introductory stage (February - June 2022)**

At the first stage, students who would participate in the project were selected. The **main criterion** was voluntary participation and a great desire to learn new technologies. A group of ambassadors (6 students) was also selected among the students.

## II – practical and modelling stage (September – first half of December 2022)

All the students were divided into two groups: an **experimental group** (teaching was conducted by using headsets and innovative teaching methods) and a **control group** (teaching was carried out in the usual conditions by using traditional methods and techniques). After each class, discussions, selective interviews were done with the students, and additionally, consultations were held with students who found it difficult to master new technologies.



Screenshot of students working in virtual reality space



Students in VR headsets

At this stage, under the guidance of the teacher, students learned how to independently model clothes and accessories using various 3D applications and programs, shared their experience with others, went through the headset onboarding, while revealing their inclinations and talents at the same time.



Sketch of proposed clothing designs

Before creating, for example, such fashion design models in 3D space, it was first necessary to develop a series of sketches and outlines. Training took place in compliance with the principle of accessibility and systematicity, taking into account the interests and capabilities of students.

Assistance and guidance of Gravity Sketch played an immense role during this stage, as we would not have been able to begin the practice with the students without Gravity Sketch support and training. Gravity Sketch generously granted 10 headsets to CHNU, which allowed the teachers and students to begin the learning process earlier while getting plenty of practical experience. Once the headsets had been received and the students got onboarded with the technology, it made a great difference for the students and teachers to be able to test and reproduce everything on their own.

### **III – formative and generalising stage (second half of December 2022)**

At the third stage of the case study, we made the generalisation of all the data that had been collected, a detailed analysis of the students' thoughts and feelings, and the scope of their acquired practical experience. This stage did not last long, but it played a key role in our research due to the fact that we had to analyse the thoughts, answers, and practical work of the students, consider and reflect upon everything and arrive at reasonable constructive conclusions.

In the process of conducting the case study, taking into account all the advantages and disadvantages, **we developed criteria for the personality of a teacher:**

1. Possession of leadership qualities and powerful psychological and pedagogical potential.
2. High level of flexibility in planning, conducting and analysing work in the context of case study implementation.
3. Willingness to purposefully work with students with different levels of training in the field of immersive technologies, development of creative abilities.
4. Humanistic focus of activity, ability to understand, support and help students in mastering new technologies.
5. High level of empathy and balanced emotional stability of the teacher to effectively solve problems that arise in the learning process.

## **Findings:**

After summarising the results of the conducted case study, teaching students in the field of 3D modelling, analysing the positive and negative aspects of distance learning, teaching and learning with the help of headsets, we came to the following conclusions:

1. For students majoring in art, a significant part of whose education is practical work in classrooms, the ideal option is a blended type of learning, in which theoretical disciplines can be studied online, and practical ones, such as drawing, painting, composition, professional skills, must necessarily take place face-to-face in class in close collaboration: student-teacher, student-student.
2. The use of immersive technologies in the learning environment of the Department of Decorative, Applied and Fine Art contributes to the accessibility of art education for all groups of students irrespective of social, financial, psychological, physical, geopolitical factors.
3. Participation in the project provided a unique opportunity for all participants (teachers and students) to immerse themselves in the digital world, the world of new technological opportunities, test their creative abilities in mastering new technologies, transform their knowledge, skills, and abilities in the field of fine, decorative and applied art into 3D space.
4. Application of immersive technologies in the study process can be used as an additional means of realising creative knowledge and skills, since a student with a certain artistic background will learn a new technology more easily in VR than when studying a certain subject in theory. In this case, VR technologies become a visualisation tool.
5. An important aspect is the use of collective approaches and methods of teaching, in particular the group ones, which provide an opportunity for all participants to communicate with each other, help each other and learn from each other. This approach helps weaker students move towards their goals on a par with others.
6. The use of headsets during studying is more effective for senior students who already have experience in designing and modelling products, who have the understanding of plasticity, compositional laws, and know how to distinguish between different imagery means.
7. Participation in the project contributed to the exchange of experience between partners (project participants), each education institution in the process of work sought to achieve

the most fruitful results, while those that did not have experience working with immersive technologies aimed to master the key VR aspects in the fastest way possible.

8. Two rooms have been created on the Frame VR platform in the course of the case study. The first room has an informational and exhibitory nature, it introduces visitors to our institution, the specifics of the department's work, and features of fashion design and accessories. Along the perimeter of the room, on the walls, there are photos of students' works, videos showing the process of making clothes and accessories, as well as videos about CHNU. Visitors, entering this room, will be able to immerse themselves in the world of decorative art, the world of aesthetics and harmony, as well as get to know the cultural heritage of Ukrainians, their artistic vision and taste. The second room aims at showing the sequence and technological part of the production of art products, as well as to demonstrate the 3D models of clothing and jewellery created by students. In the second room, the stages of the execution of the work have been presented. Sketches of works have been placed on the walls, projects of collections of clothes or jewellery have been created on their basis, and photos of completed works have been added.
9. It was the "Accelerate" project that activated the work of all its participants (both teachers and students), actualized cognitive interest, we felt the push for new knowledge, interest in immersive technologies and the desire to realise ourselves in a new format.
10. We would like to emphasise that the workshops and meetings with the representatives and consultants of the company Gravity Sketch (representative Charmaine Chau) played an immense role during the execution of our research and the fulfilment of the assigned tasks of the project. The first acquaintance with Gravity Sketch was collective when students studied the settings, tools, and did elementary work under the guidance of a teacher. Afterwards, they shared their impressions and exchanged opinions. All project participants were in the same room so they easily communicated with each other, shared their first impressions of working in the program. After the first meeting with the representatives of Gravity Sketch our knowledge expanded and deepened significantly. We understood the settings algorithm, mastered import and export methods, driving processes in the field of 3D modelling. The following workshops from the company helped us even more to master the space of three-dimensional images, the latest technologies for creating clothing and jewellery models. We believe that such meetings were extremely constructive and productive, for which the company is greatly appreciated by the CHNU students and teachers. We hope to continue to maintain close contact with the company representatives for the purpose of further cooperation, organisation of training for students as well as support in the development of the new study program.

## Evaluation

### STAGE 1 - INTERNAL EVALUATION: STUDENTS' OPINIONS:

At the first stage, an internal evaluation of the case study and all the work done was carried out. It was essential for us to hear everyone, feel their successes and failures, support and inspire further work in this direction. We communicated with students, conducted anonymous surveys, which made it possible to record impressions (positive and negative ones). Please find the **fragments of the results of the student survey below**

### Determining the level of students' knowledge in the field of VR/AR technologies and their preferences:

#### 1. What are your impressions of distance learning or blended learning in 2020-2022?

**Responses:** 33.3% of students believe that mixed learning is the best; 25% - online learning is both useful and negative; 25% found that online learning mostly has negative consequences for learning; 16.7% believe that online learning is useful but has a number of disadvantages.



Pie chart showing students impressions of distance and blended learning in 2020-22

### Do you think VR/AR technologies can be used effectively and beneficially for your learning and why?

#### Responses:

- *Because now it will be possible to create three-dimensional projects without using physical projects. Owing to this technology, it is possible to show a three-dimensional project in the original size to the client in the future.*

- *I consider it to be effective, as these technologies open up new opportunities. First of all, it is interesting for personal development but in the future it can also give more opportunities to enter the labour market.*
- *You can master a new virtual reality and create your own new projects with their help. Development is possible in all spheres of human activity, taking into account their wishes and demands, requests from the environment and the needs of society.*
- *I believe it is useful because you can learn something new for yourself.*
- *I think it is a wonderful experience.*
- *I believe that yes, it will help to develop a better imagination and will allow one to master a new experience for themselves.*
- *I believe that VR/AR technologies are useful for my field of activity.*
- *So These are modern technologies that will open up new areas and methods of teaching.*
- *I think that it is worth integrating modern technologies into our education, because thanks to them, we will have many new opportunities, they will allow us to go beyond certain frameworks that we have at the moment.*
- *VR/AR is very useful for our future work. And the practice is good.*
- *Partially it is possible - it gives an opportunity to show a product or idea in 3D, which will improve communication and understanding between the student and the teacher*



Pie charts exploring if VR/AR technologies can be used effectively and beneficially for learning



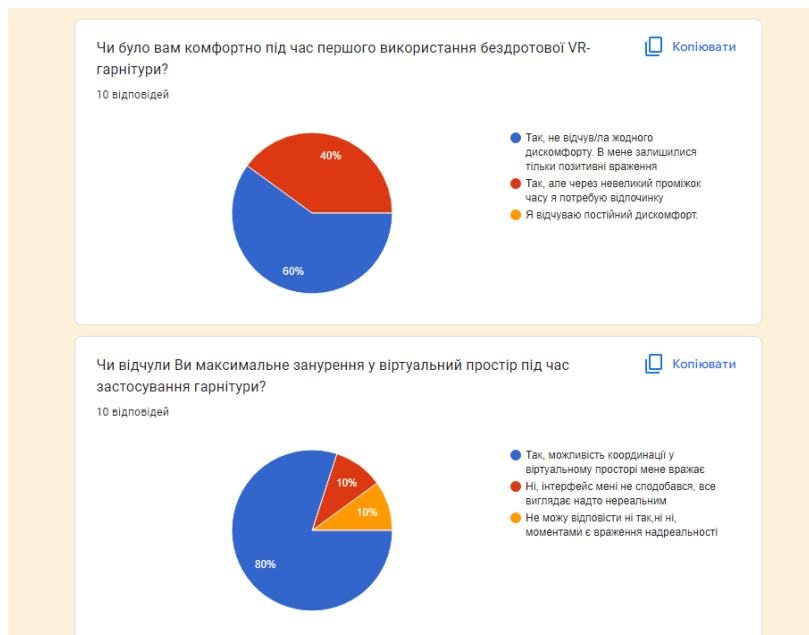
## Determining the students' impression from the first use of the headsets

### 1. Have your expectations from using the headsets been confirmed?

Responses: All the students responded with a "yes" (100%)

### 2. Were you comfortable the first time you used a wireless VR headset?

Responses: 60% - yes, I did not feel any discomfort; 40% - yes, but after a while I needed some rest.



Pie charts showing Headset user experience

### 3. Your recommendations for using VR headsets in your training. Give an example based on the study of one of the subjects.

Responses:

- *For me personally, the headsets proved to be very useful at the stage of turning a sketch into a final project. They allow you to easily adjust the shape, play with colour, specify technical nuances and help you imagine the final result of the product in a better way. You can experiment many times without wasting real resources (such as wood, metal, etc.) on unsuccessful attempts. After completing the simulation, you already know 100% in which sequence you will implement the product in real life.*
- *I suggest introducing a separate subject for a detailed exploration of VR headsets and programs in which you can work with them to study this topic in depth.*
- *It is great to realise everything related to the three-dimensional products in VR.*
- *Designing models and improving skills in the field of 3D*
- *Difficult to answer*

- *I suggest using VR headsets for further training, implementing 3D modelling to create projects*
- *For example, VR headsets can be used to showcase your works around the world*

## Questionnaire about working in Gravity Sketch:

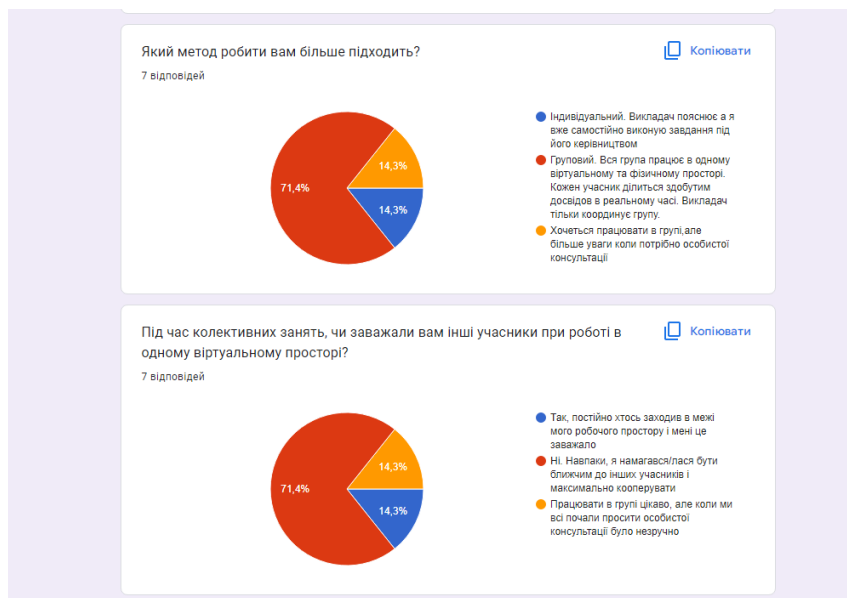
### 1. Your impression after using Gravity Sketch for the first time.

Responses:

- *It is interesting to start studying all aspects of the program.*
- *Unusual, but very interesting.*
- *Interest and passion for work. Desire to delve into this topic.*
- *Interesting, unusual and pleasant sensations, understanding of modern progress*
- *It was difficult to adapt.*
- *The impressions are incredible, I advise everyone to try it.*
- *It was an extremely interesting experience, the initial familiarisation with the program was easy, the subsequent more complex processes were more difficult.*

### 2. Were the workshops held by the Gravity Sketch application technologists useful for you?

Responses: 42.9% - yes, they showed a lot of new things; 57.1% - yes, but the language barrier made perception a little difficult.



Pie chart exploring Gravity Sketch user experiences

## Interviews with students

**Share your impressions (positive and negative) from working with headsets and from the project as a whole.**

*“My impressions are only positive. It is very interesting to get experience working with immersive technologies. The disadvantage lies in the lack of knowledge of the English language, however, the positive part is the new impressions from the process, learning something new, and in general - it is interesting! On the negative note - slight dizziness after working with glasses and the difficulty of understanding English when conducting consultations (so this is my drawback), but in the rest - everything is great!!!)”*

*The advantages are as follows:*

- *new impressions*
- *experience working with immersive technologies*
- *headsets help at the stage of turning your idea into a real object (from the decorative and applied art perspective, it helps to better understand certain constructive points, develop spatial thinking. From the point of view of fine art, one has unlimited possibilities in experimenting with colour, etc., there is no fear to make a mistake, because it can be easily corrected)*
- *new acquaintances and experience in communication (you need to leave the comfort zone of communicating only in your native language, which, I also believe, is a good impetus for self-development in mastering the English language)*
- *mobility of the headsets (students do not depend on the computer and its performance)*

*“It has been an interesting experience: this project opens up new possibilities both in terms of art and in industrial production. The positive thing is that this program helps make any projects a reality and view them from any point on our planet.”*

Very few disadvantages have been noted:

- *slight dizziness after the first use of the headsets (however, you adapt easily and after that there is no problem)*
- *connection of the headsets to Wi-Fi (we just have an unstable connection, so I don't know if this can be attributed to the disadvantages of the headsets themselves)*
- *“I can include only onboarding as a negative point, because I did not manage to register right away (the program did not accept the password, possibly there was an unstable connection).”*

## **Stage 2 – Institutional evaluation by teachers and management of the Department of Decorative, Applied and Fine Art.**

At the second stage of case study evaluation, the teachers themselves and the head of the department shared their impressions, who indirectly participated as observers of students and the learning process itself.

We would like to also note that certain shortcomings/difficulties arose during the implementation of the **practical part** of case study:

1. Rotation/motion of the 3D models cannot be removed, it only stops moving after the page gets refreshed.
2. Change of colours, different settings between Frame VR and Blender.
3. In FrameVR we needed to change every setting we placed on the model.

### **Disadvantages and minor problems**

1. Theoretical classes are not always effective, students' understanding of the problem appeared only after practical implementation.
2. It is always necessary to take into account the student's level of preparation, their individual and psycho-physiological features.
3. It is necessary to allocate more time to mastering the use of headsets and performing initial elementary tasks. Unfortunately, we were limited in the allocated time.
4. Students that were used to performing the best and would usually get everything right at once, found it challenging to master new technologies immediately.
5. Lack of high-quality technical indicators for effective work: unstable Wi-Fi connection, frequent power outages (due to mass shelling of the energy infrastructure of Ukraine), low computer capacity for working with various programs.

Summarising the opinions of the participating teachers, we can summarise:

1. Participation in the project and work with the headsets in the process of professional training of future specialists in the field of art contributed to the mastery of immersive technologies by all its participants.
2. Immersive technologies in combination with the headsets contribute to more effective performance of educational tasks in the following professionally oriented subjects: drawing, painting, composition, and computer design.
3. Each of the teachers, in accordance with their roles in the project, gained new knowledge and invaluable experience that had not been available before.
4. The given case study will contribute to the further scientific and creative growth of all participants, their self-development in the field of three-dimensional modelling.
5. We believe that the case study has been successful with positive consequences for everyone.

6. One of the aspects that leaves much to be desired is to establish closer contact with partners from other institutions for a more effective description of the research (perhaps due to subjective circumstances).

**Recommendations:**

1. Due to the time constraints, not all the aspects of VR have been explored. Many advanced topics have been broached. However, every single topic leaves room for further investigation and research. For example, the issue of exporting and importing files from one program to another leads to the loss of certain qualities of the 3D models, for which the wider study of formats and techniques is required.
2. The work of the project can be continued in a series of other projects that would allow for gaining practical experience in the field of development of immersive technologies.

**Prospective plan:**

Having analysed the work completed, the results of the conducted experimental case study, the opinions, and suggestions of the participants of the international project from students, ambassadors and teachers, we drew up an approximate prospective plan for the further work of the Department of Decorative, Applied and Fine Arts in the field of the use of immersive technologies:

1. Publish the results of the case study in the form of a methodological manual recommended by the Academic Council of Yuriy Fedkovych Chernivtsi National University, which can be used by students, teachers and everyone who is interested in immersive technologies and 3D modelling with the use of headsets.
2. Introduce mandatory content modules into the individual fundamental disciplines of teaching students majoring in 023 “Fine Art, Decorative Art, Restoration” as a technical tool for the performance of course assignments (which will involve the study of the use of immersive technologies in the context of building a three-dimensional model).
3. Continue work on the development of immersive technologies, professional growth of all teachers of the department in the field of digital technologies with the involvement of teachers from other departments.
4. Use immersive technologies as a tool for communication and mutual exchange of experiences in the international artistic space (trainings, seminars, webinars, workshops, guides).
5. Establish further cooperation between the department of Decorative, Applied and Fine Art with other partner universities participating in the project for the purpose of experience exchange, student training, teacher training.
6. Popularise the use of immersive technologies in the educational process of structural units of the university.

## References:

1. The concept of inclusive education in art.  
<https://mkip.gov.ua/files/pdf/%D0%9A%D0%BE%D0%BD%D1%86%D0%B5%D0%BF%D1%86%D1%96%D1%8F.pdf> .
2. Link to the questionnaire (Block 1. Determination of the level of knowledge in the field of VR/AR technologies and students' preferences).  
[https://docs.google.com/forms/d/1Q5tf-sWBQOWaQbxRSoNKmGO6OfBvhvKklpdW\\_QFzWA8/edit?pli=1](https://docs.google.com/forms/d/1Q5tf-sWBQOWaQbxRSoNKmGO6OfBvhvKklpdW_QFzWA8/edit?pli=1)
3. Link to the questionnaire (Block 2. Questions to determine impressions from the first use of the headset).  
<https://docs.google.com/forms/d/1J1rbYNjGAIAtEUJtgReK1glpMrFHhqBj1y631F3AwEA/edit#responses>
4. Link to the questionnaire (Block 3. Questionnaire on working in Gravity Sketch).  
<https://docs.google.com/forms/d/1qVR8avhHK1DBCb6vS3tPTnfMzW-OMeLJ-iDboA99zkU/edit>
5. Website of the Department of Decorative, Applied and Fine Art.  
<http://artdeko.chnu.edu.ua/index.php?page=ua>
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7. FB page of the Department of Decorative, Applied and Fine Art.  
<https://www.facebook.com/DPMCNU>
8. Links to the news articles.  
[http://artdeko.chnu.edu.ua/index.php?page=ua&data\[13626\]\[id\]=16178](http://artdeko.chnu.edu.ua/index.php?page=ua&data[13626][id]=16178)  
[http://artdeko.chnu.edu.ua/index.php?page=ua&data\[13626\]\[id\]=16179](http://artdeko.chnu.edu.ua/index.php?page=ua&data[13626][id]=16179)  
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[http://artdeko.chnu.edu.ua/index.php?page=ua&data\[13626\]\[id\]=17398](http://artdeko.chnu.edu.ua/index.php?page=ua&data[13626][id]=17398)  
[http://artdeko.chnu.edu.ua/index.php?page=ua&data\[13626\]\[id\]=17461](http://artdeko.chnu.edu.ua/index.php?page=ua&data[13626][id]=17461)
9. Link to the training events.  
[https://drive.google.com/drive/folders/1RKmQq\\_3BVwDbgPz\\_v97x-rVnycJWuJt5](https://drive.google.com/drive/folders/1RKmQq_3BVwDbgPz_v97x-rVnycJWuJt5)
10. Link to 3D models.  
[https://drive.google.com/drive/folders/1igM1nT4aTJN5tAqXsvB6yD\\_VJlixYUO1](https://drive.google.com/drive/folders/1igM1nT4aTJN5tAqXsvB6yD_VJlixYUO1)
11. Link to Frame VR room 1: <https://framevr.io/artchnu>
12. Link to Frame VR room 2: <https://framevr.io/art-chnu-1>

## APPENDICES

### EVENT I: ORGANISATIONAL MEETING WITH PROJECT PARTICIPANTS

#### Topic: “The essence, purpose and tasks of the ACCELERATE project”

On January 14, 2022, an online meeting of the participants of the Erasmus+ project ACCELERATE: Accessible Immersive Learning in Art and Design was held at the Department of Decorative, Applied and Fine Art at the Faculty of Architecture, Construction, Decorative and Applied Art of Yuriy Fedkovych Chernivtsi National University (Zhavoronkova M. , Toloshniak O., Hatezh N.) with full-time BA students who were selected to participate in the project as ambassadors.

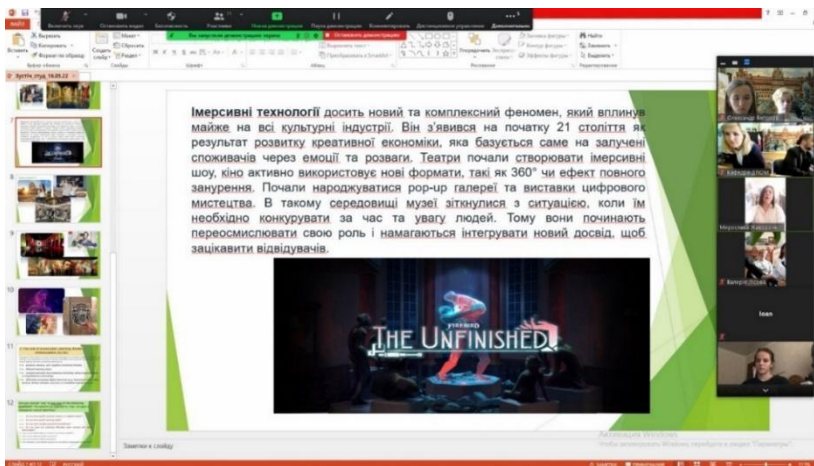
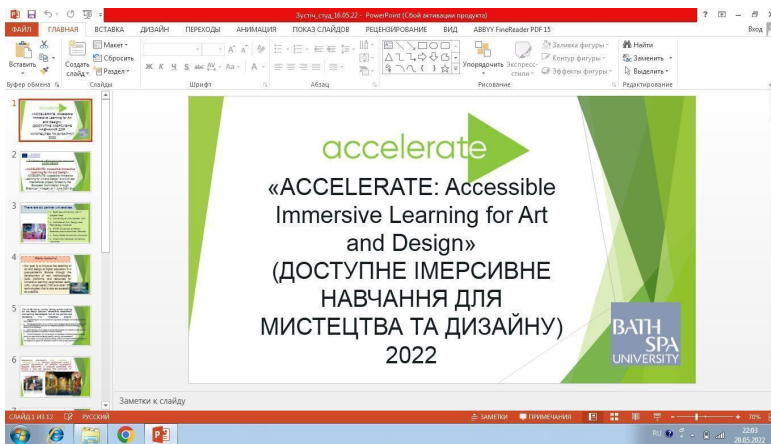
#### Objectives:

- \_ introduction to the ACCELERATE project, its goal and leading tasks (the goal of the project is to improve the teaching of art and design in higher education institutions in post-pandemic Europe by developing new methodologies, tools, platforms and resources for immersive learning (augmented reality (AR), virtual reality (VR) and other “XR” technologies);
- \_ an overview of the role of Accessible Learning Student Ambassadors (ALSA);
- \_ discussion panel on the positive and negative aspects of distance learning during the pandemic;
- \_ development of recommendations regarding further actions of students in the project;
- \_ expressing students’ expectations from participating in the project.

**Time:** 1 hour.

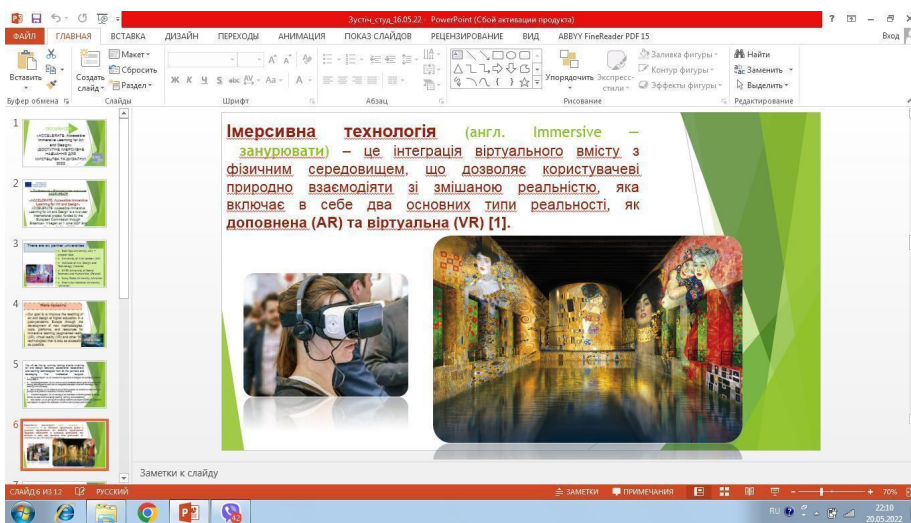
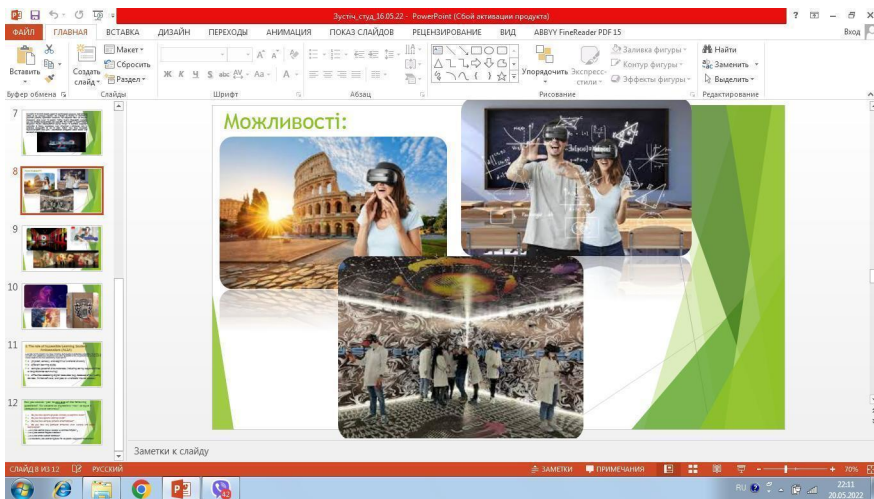
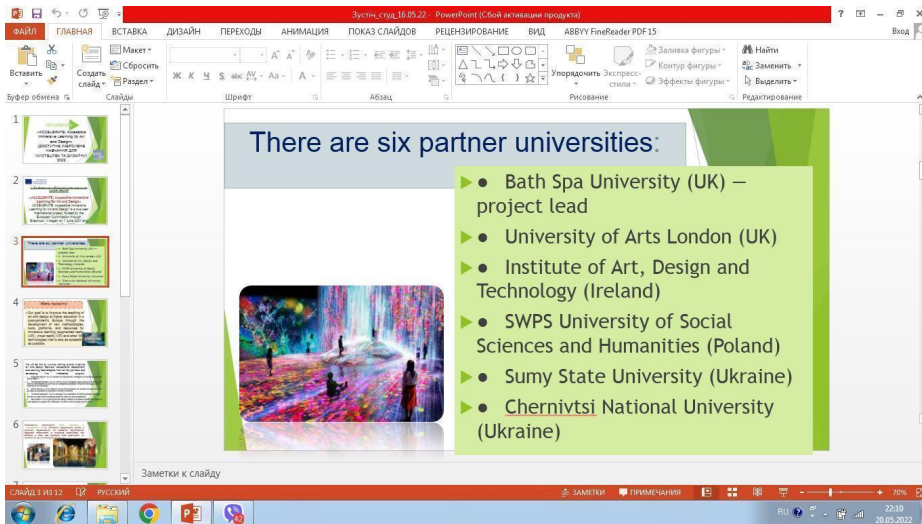
**Participants:** teachers, students.

During the meeting, the project participants presented the key aspects in an accessible form using a multimedia presentation, explained the essence of the project’s key concepts (immersive technologies, virtual reality, ambassadors, etc.), and organised a lively discussion according to the planned issues.



Images from a presentation about the Accelerate Project





Images from a presentation about the Accelerate Project

## **Conclusions**

As a result of the meeting with the teaching elements, students of the department:

- 1) received initial knowledge in the field of immersive technologies, which would help them master new areas in art more easily, in particular when creating creative projects and products in the field of decorative art;
- 2) became aware of the content, principles, tasks and leading principles of the project;
- 3) received tasks on which they began to work.

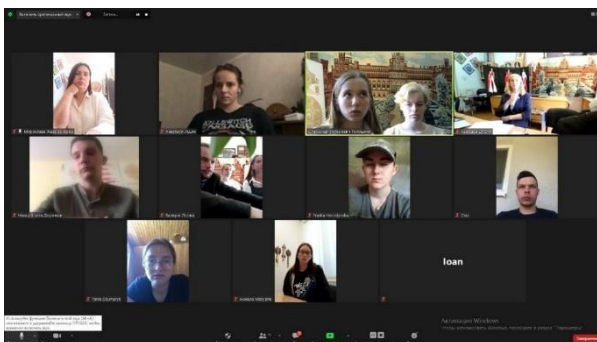
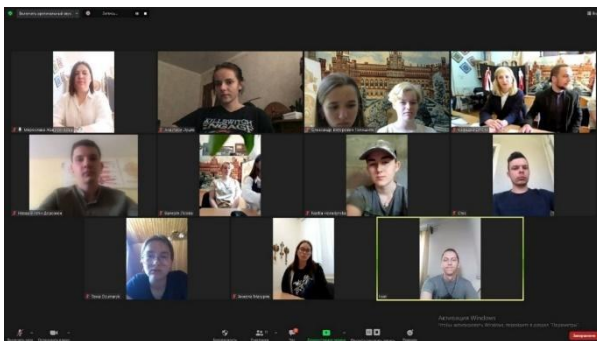
## EVENT II: SECOND ORGANISATIONAL MEETING WITH ALSAS, DISCUSSIONS AND SURVEYS REGARDING ADVANTAGES AND DISADVANTAGES OF DISTANCE LEARNING

**Topic:** Advantages and disadvantages of distance learning

**Objective:** Studying the problems, weaknesses, and strengths of distance learning in pandemic conditions through a discussion and diagnostic survey of student ambassadors.

**Time:** 1 hour

**Participants:** teachers, ALSAs

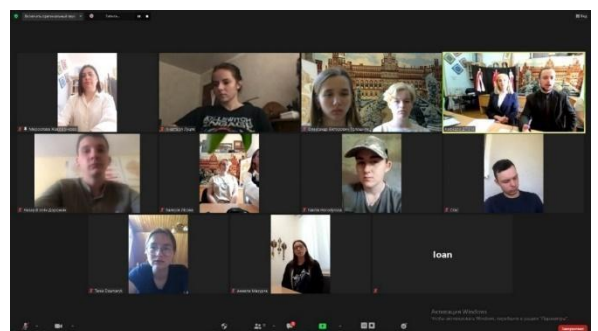


Screenshot of online meeting with participants

### Content:

#### Introduction:

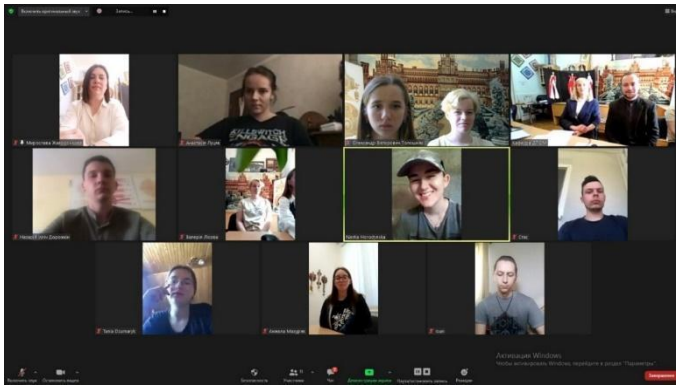
- Now each of you will introduce yourself, please tell us briefly about yourself and your preferences in the field of art.
- Dear students, friends! You have been selected as Accessible Learning Student Ambassadors (ALSA) for ACCELERATE: Accessible Immersive Learning in Art and Design, an EU funded project involving several universities in Europe.
- In today's meeting, we would like to analyse distance learning in the field of art and design at the university level, and therefore today we will talk about your online



learning experience since March 2020. We have 15 questions to discuss and our conversation will take about an hour.

- We are recording our conversation so that we can create an anonymous transcript for the project. This means that all personally identifiable information will be removed, but your words will be accurately transcribed. Once the transcripts are produced, the recording will be securely deleted. Anonymized transcripts will be discussed by project partners and excerpts may be used in public project reports.
- To begin with, I would like to ask about your experience of online learning during 2020/21, how you would rate the (art/design) classes delivered in this format, and your motivation for learning online.

### Approximate questions



- I. What do you think are the benefits of online learning? (Why do you think so? How did it affect your practical work in professional subjects?).
- II. What are the disadvantages of online learning? (What bothered you the most, what was missing, how did it affect your creative projects?).
- III. What has been the biggest challenge in studying design/art online?
- IV. Thinking specifically about your own accessibility issues, how has online learning affected them? Has online education helped or compounded these issues?
- V. How would you compare the level of your knowledge and skills gained during online classes compared to in-class learning? Do you feel that this level is higher/lower? Why?
- VI. Please provide examples of activities that could be a model of good online teaching and examples of failures (examples of courses/subjects that were not taught at all).
- VII. Let us move on to teamwork and group projects. What are some new challenges you have encountered while working together online? Please give an example of successful and unsuccessful teamwork.
- VIII. How would you rate your own motivation for online learning?
- IX. How would you rate online learning from March 2020? What would you change to improve the quality of online education? What did you miss the most?

### Artistic expression

- X. How did you manage without/with limited access to seminars and different tools (workshops, devices)?
- XI. Has online education stimulated your creativity and how?

XII. What additional non-university digital tools have you used for online learning? (this could be software you installed or additional hardware you used)

XIII. What tools/technologies were missing? What additional technologies can be useful for online learning?

XIV. What digital tools can be used in online learning?  
(AR, VR)

### Final question

XV. What are your thoughts on continuing online learning after COVID-19? In what areas do you think online education has proven successful and should continue?

### Conclusions.

- We would like to thank all participants for their active participation in the discussion, for their answers, and your conclusions regarding distance learning.
- Next, we suggest that you take a diagnostic survey in this context.
- We will then be able to summarise your responses and survey results. Thank you, see you soon!

### EVENT III: TRAINING CLASS 1

**Topic:** Getting to know the interface and tools of graphics editors: GRAVITY SKETCH, FRAMEVR, BLENDER.

**Objective:** Introducing students to digital tools in the field of 3D modelling.

**Participants:** teachers, students

**Time:** 1.5 hours



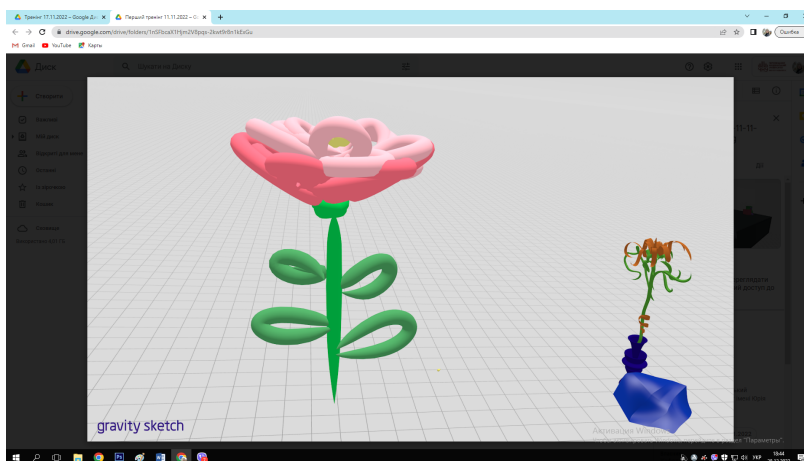
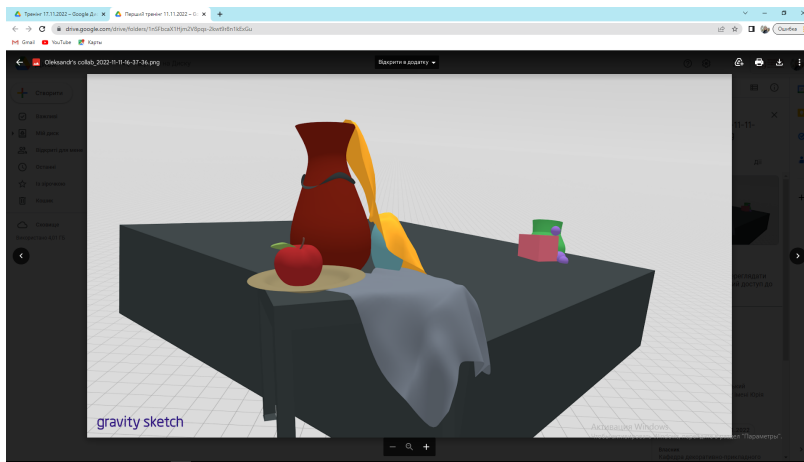
A collection of images showing students being introduced to digital tools



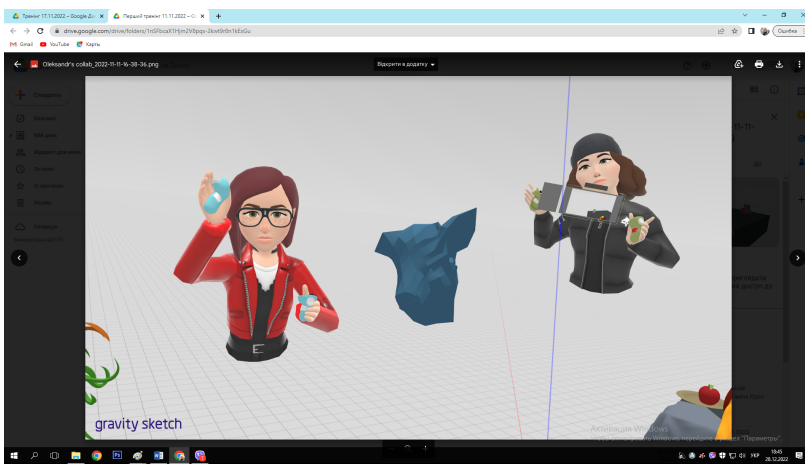
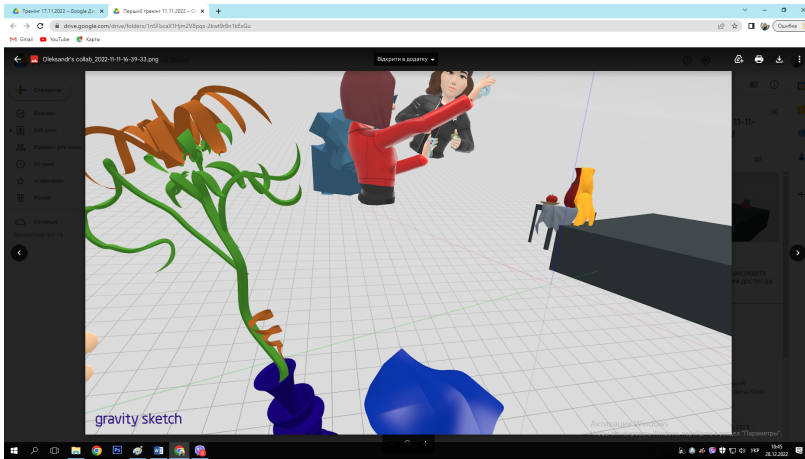


A collection of images showing students being introduced to digital tools

## EVENT IV: TRAINING BY GRAVITY SKETCH ON NOVEMBER 11, 2022



A series of images showing students work made in Gravity Sketch



A series of images showing students work made in Gravity Sketch

**EVENT V: TRAINING BY GRAVITY SKETCH ON NOVEMBER 17, 2022**



A series of images showing students working in Gravity Sketch





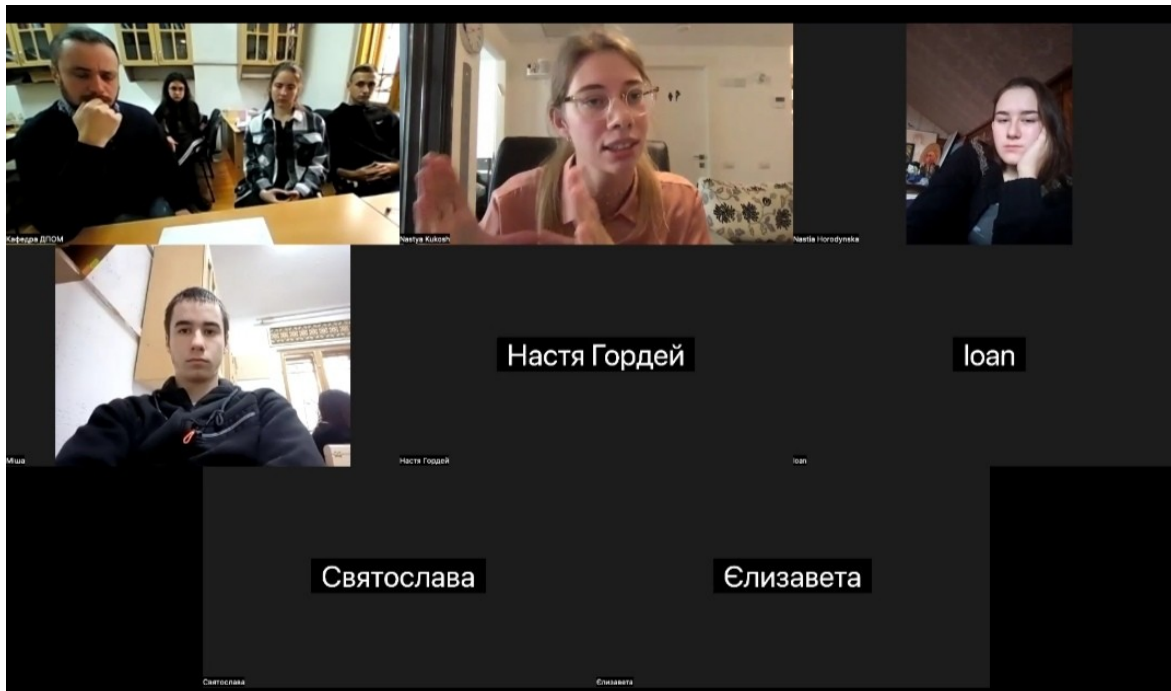


A series of images showing students working in Gravity Sketch

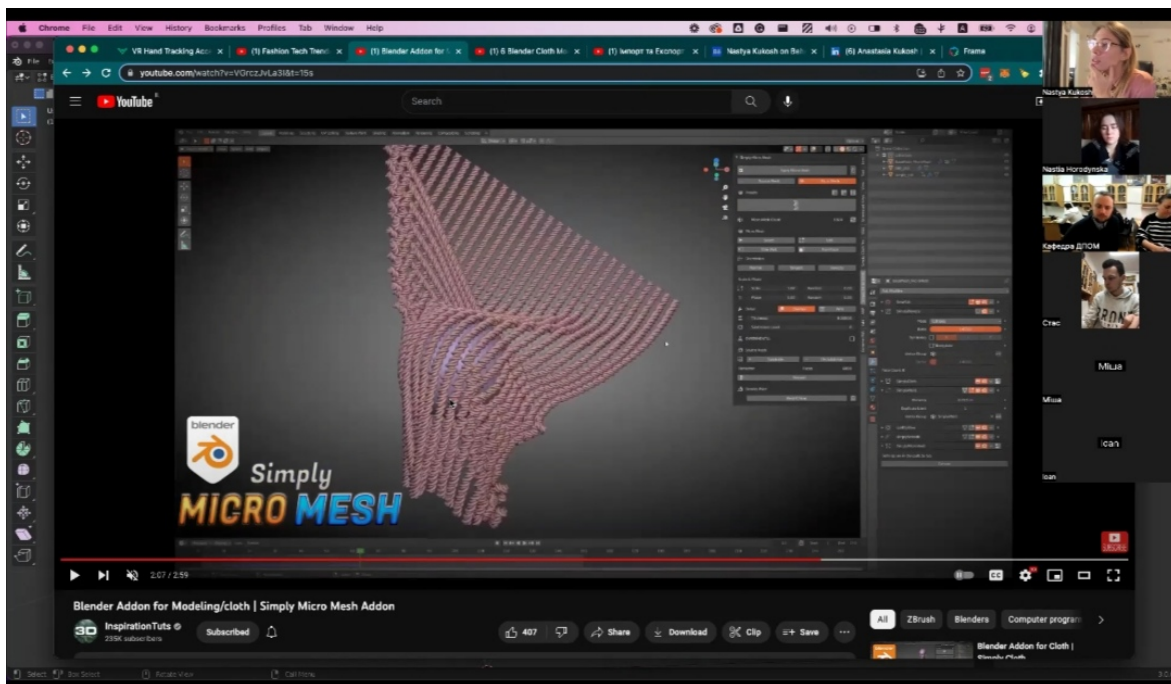


Gravity Sketch training session

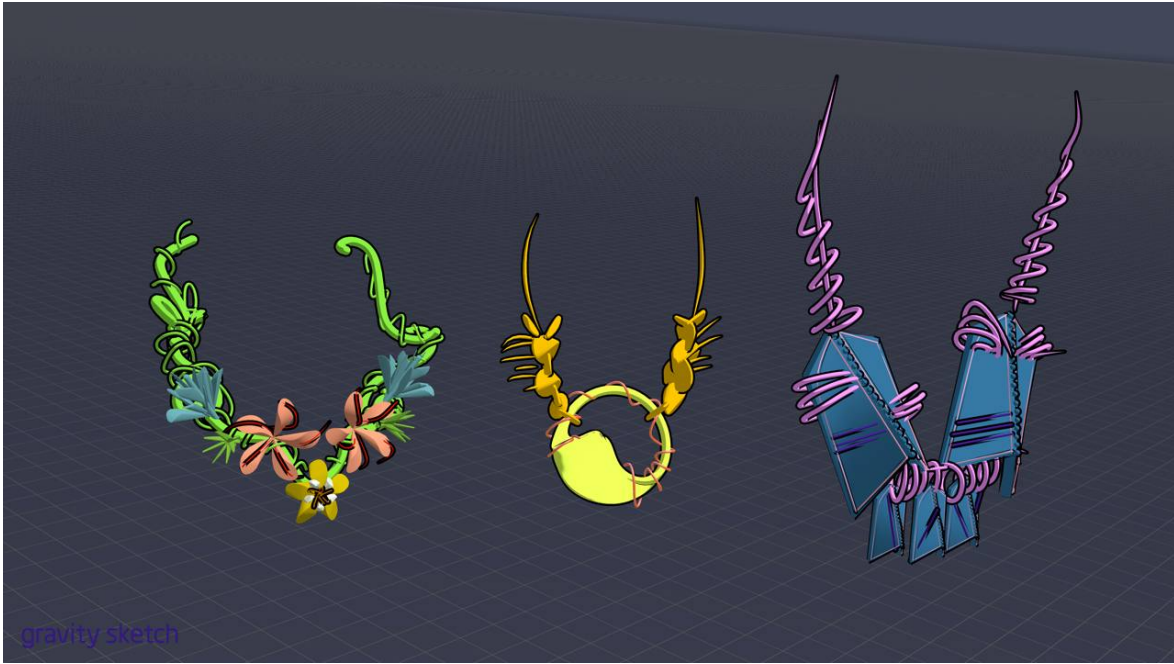
## EVENT VI: TRAINING BY THE DEPARTMENT ALUMNA ANASTASIIA KUKOSH



Screenshot of participants involved in a training session by alumni Anastasiia Kukosh



Work produced in training session by alumni Anastasiia Kukosh



Jewellery designs produced in Gravity Sketch by ChNu students



Examples of Fashion and Accessories design work by students in Gravity Sketch