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Context

Project details

Applicant organisation	Universitatea Nationala de Stiinta si Tehnologie POLITEHNICA Bucuresti
Applicant organisation OID	E10339364
Project code	2023-1-RO01-KA220-HED-000155412
Project title	European Network for Additive Manufacturing in Industrial Design for Ukrainian Context
Action type	Cooperation partnerships in higher education [KA220-HED]
Field	Higher Education
Project start date	15-11-2023
Project end date	14-11-2024
Grant awarded	120000

National Agency receiving the report	RO01 - Agentia Nationala pentru Programe Comunitare in Domeniul Educatiei si Formarii Profesionale
Language used to fill in the form	EN

Project summary

Please summarise the information about your project in form of short answers to the following questions.

Please use full sentences and clear language. The provided summary will be made public by the European Commission and the National Agencies.

Background: Why did you apply for this project? What were the needs you have addressed?
Realization of an European network for additive manufacturing in the field of Industrial Design, in the problematic context of Ukraine, the consortium project consists of 4 organizations, which also includes a university from Ukraine, the needs were the new technogies and digital skills.
The AMAZE project provides the chance for the students and professors in mixing the studying / teaching experience and traineeship mobilities periods abroad, with the main aim of further enhancing the learning outcomes and development of transversal skills. Multiplier Events and the results within the AMAZE project were extremely disseminated and had great success and visibility, with persons from 4 continents (Europe, Africa, Asia and South America) participants being from universities, research centers, companies, ministry from 14 countries (Romania, Spain, Poland, Ukraine, Norway, Marroco, Slovakia, Portugal, Costa de Marfil, Uzbekistan, South Sudan, Germany, Belgium, and invitees Peru). These impressive results, events and mobilities that took place in AMAZE project conducted to other new Erasmus+ Agreement for students mobilities between Edibon International S.A. Spain and UNSTPB Romania, PUT Poland and University of Agder Norway.

Objectives: What did you want to achieve by implementing the project?
By implementing the AMAZE project, all consortium achieved an European network for additive manufacturing in the field of Industrial and Architectural Design, in the problematic context of Ukraine, the consortium project consists of 4 organizations (Romania, Spain, Poland and Ukraine).
The AMAZE project provides the chance for the students, the professors and the companies in mixing the studying / teaching and practical experience and traineeship mobilities periods abroad, with the main aim of further enhancing the learning outcomes and development of transversal skills. The most relevant propriety according to the objectives of AMAZE project is Supporting Higher Education institutions in their cooperation with Ukrainian conterparts to respond to the war in Ukraine, being involved as partner a prestigious and one of oldest classical university from Ukraine, The Yurii Fedkovich Chernivtsi National University, that aim of training highly qualified specialists who will ensure the implementation of engineering-constructive, architectural-design and design solutions.

Implementation: What activities did you implement in your project?
The AMAZE proposal is suitable for creating synergies between different new technical fields, such as Additive Manufacturing (AM), CAD/CAM/CAE Design, Smart Materials, Reverse Engineering, Computer Programming, Sensors and Electronics, and VR/AR platforms. At the project activities (Transnational Project Meetings, Multiplier Events, Summer School, and Staff Training STTE), professors, students, researchers, and companies participated. The courses and the laboratories were in the field of Industrial Engineering, regarding the design and the new Additive Manufacturing technologies to make industrial and architectural products with complex shapes.
Also, within the mobility of students and teaching staff within the Summer School, respectively the training, the courses, and laboratories were combined with socialization, companies visiting and developing of new partnerships and projects. The AMAZE project has a strong potential impact on the development, testing and adaptation of existing and novel learning and teaching methodologies and pedagogical approaches, delivering and enhancing key competencies and skills through education and collaboration, and focusing on use of VR/AR platform and new manufacturing technologies AM.

Results: What were the concrete outputs and other results of your project?
The project achieved the following results on AMAZE site http://www.amaze2023.eu/: 1 – AMAZE e-book for developing of complex design industrial parts, published at Printech Publishing House, Bucharest, 2024, E-ISBN: 978-606-23-1569-6; 2 –AMAZE e-toolkit manual for digital learning in producing of complex design industrial parts, at Printech Publishing House, Bucharest, 2024, E-ISBN: 978-606-23-1595-5; 3 – AMAZE e-learning VR/AR platform; IO4 – AMAZE e-case studies - attached: on http://www.amaze2023.eu/
-2 academic papers accepted/published (in journals with high visibility, open-acces) - Physics and Chemistry of Solid State Journal and Open Journal of Applied Science;
-2 papers accepted/published in International Conferences, open-acces at KreativEU Targoviste 2024 (JOSA) and Bramat Brasov 2024 (Bull. Transylvania Brasov);
-Article send for publishing open-acces in Processes 2024;
-Article send for publishing open-acces in Applied Sciences 2024.
-2 Erasmus+ Mobilities Agreements between UNSTPB and Edibon International S.A., from Madrid, Spain for practical stages of the romanian students and Erasmus+ Mobilities Agreement between PUT Poland, and University of Agder Norway and Edibon Interantional S.A., grace of ME1

Project Description

In this section you are asked to give information about the objectives and topics addressed by your project

Most relevant horizontal or sectoral priority according to the objectives of your project as defined at application stage.	HE: Supporting Higher Education institutions in their cooperation with Ukrainian counterparts to respond to the war in Ukraine

Did your most relevant priority change since application stage?
NO

Other relevant horizontal or sectoral priorities addressed by your project as defined at application stage.	HE: Supporting digital and green capabilities of the higher education sector HE: Promoting inter-connected higher education systems

Did your other relevant priorities change since application stage?
NO

Most relevant topics addressed by your project at application stage.	Science, technology, engineering and mathematics (STEM) Digital literacy skills and competences Information and communication technologies (ICT)

Did your most relevant topics change since application stage?
NO

What are the concrete outcomes and achievements of your project, and how do they link back to the project objectives? Were all original objectives of the project met? Please comment on any objectives initially pursued but not achieved and describe any achievements exceeding the initial expectations.
All original objectives of the AMAZE project were met by combining additive manufacturing technologies, with smart materials, with electronics, with design, reverse engineering and with virtual and augmented reality. The Erasmus+ project Agreement number 2023-1-RO01-KA220-HED-000155412 , with the title: European Network for Additive Manufacturing in Industrial Design for Ukrainian Context has 4 Intellectual Outputs and all were realized successfully.
The AMAZE project contributed to the achievement of the most relevant priorities grace of the four Intellectual Outputs, that were implemented grace of the experience of all project consortium. The four Intellectual Outputs were: IO1 -AMAZE e-book for developing of complex design industrial parts-
1 open access e-book – published – E-ISBN: 978-606-23-1569-6, Publishing House Printech 2024;
IO2 -AMAZE e-toolkit manual for digital learning in producing complex design industrial parts -
1 open access e-toolkit manual – published – E-ISBN 978-606-23-1595-5, Publishing House Printech 2024;
IO3 - AMAZE e-learning VR/AR platform for virtual laboratory-
1 virtual platform (videos from each institution) – on the AMAZE site platform: http://www.amaze2023.eu/;
IO4 - AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)-
The Intellectual Output IO4 contains 5 e-studies cases, realized by all project partners 5 e-cases studies: (1-PUT Poland, 1-YFCNU Ukraine, 1-Politehnica Bucharest Romania, 2-Edibon International S.A. Spain (Augmented Reality / Virtual Reality).
All concrete outcomes and achievements of AMAZE project were realized, the IO1-e-book and the IO2- e-toolkit were published with e-ISBN, the IO3-AMAZE e-learning VR/AR platform for virtual laboratory and IO4 - AMAZE e-case studies (5 e-case studies) were attached on AMAZE project site: http://www.amaze2023.eu/.
Concerning the research articles, the AMAZE consortium realized more articles that in project proposal (2 articles in Conferences and 2 article in Journals)
-2 academic papers accepted/published (in journals with high visibility, open-acces) - Physics and Chemistry of Solid State Journal and Open Journal of Applied Science;
-2 papers accepted/published in International Conferences, open-acces at KreativEU Targoviste 2024 (JOSA) and Bramat Brasov 2024 (Bull. Transylvania Brasov);
-2 Articles send for publishing open-acces in Processes 2024 and Applied Sciences 2024.
-Initially, it was proposed to send a patent, but it was abandoned due to lack of materials and time.
-2 Erasmus+ Mobilities Agreements made between UNSTPB and Edibon International S.A., Spain for practical stages of the Romanian students and Erasmus+ Mobilities Agreement between PUT Poland, and University of Agder Norway and Edibon International S.A., due of ME1.

How did the project contribute to the achievement of the most relevant priorities as indicated in the description section?
The AMAZE project contributed to the achievement of the most relevant priorities grace of the four Intellectual Outputs, that were implemented grace of the experience of all project consortium. The four Intellectual Outputs were: IO1 -AMAZE e-book for developing of complex design industrial parts (15.11.2023 – 14.03.2024) – Leading organisation – UNSTPB Romania
1 open access e-book – published – E-ISBN: 978-606-23-1569-6, Publishing House Printech 2024;
IO2 -AMAZE e-toolkit manual for digital learning in producing complex design industrial parts (15.03.2024 – 14.06.2024) – Leading organisation YFCNU Ukraine
1 open access e-toolkit manual – published – E-ISBN 978-606-23-1595-5, Publishing House Printech 2024;
IO3 - AMAZE e-learning VR/AR platform for virtual laboratory (15.06.2024 – 14.09.2024) - Leading organisation Edibon International S.A. Spain
1 virtual platform (videos from each institution) – on the AMAZE site platform: http://www.amaze2023.eu/;
IO4 - AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models) (15.09.2024-14.11.2024) – Leading organisation PUT Poland
The Intellectual Output IO4 contains 5 e-studies cases, realized by all project partners 5 e-cases studies: (1-PUT Poland, 1-YFCNU Ukraine, 1-Politehnica Bucharest Romania, 2-Edibon International S.A. Spain (Augmented Reality / Virtual Reality).
-1 article presented at International Conference KreativEU Targoviste 2024, and published open-acces (Acceptation Letter) in Journal of Science and Arts (JOSA), vol 4, 2024, (indexed Web of Science, ISI, IF2023=0.3), authors; DIANA IRINEL BAILA, IGOR FODCHUCK , REMIGIUSZ LABUDZKI, MIRIAN BONILLA, ACCURACY OF SLA AND MATERIAL MORPHOLOGY USED IN ARCHITECTURE, Journal of Science and Arts, vol.4, 2024, ISSN 1844-9581 | eISSN 2068-3049. (indexed Web of Science, ISI, IF2023=0.3).
-1 article with the title: WETTABILITY CHARACTERIZATION OF MDF COMPOSITE MATERIALS USED FOR INDUSTRIAL PRODUCTS, presented at BRAMAT Conference Brasov 2024 and accepted/published (Acceptation Letter) in Bulletin of Transylvania Brasov, Vol. 16(65) No. 1–2023
-1 article was accepted for publishing open-acces (Acceptation Letter) in Physics and Chemistry of Solid State Journal - indexed in Web of Science (ISI), IF2023= 0.9 (Q4) I.M. Fodchuk, S.V. Balovsyak, M.S. Solodkyi, M.D. Borcha, D.-I. Băilă, R. Labudzki, M. Bonilla, Spatial distributions of local strains in synthesized diamond crystals from the normalized parameters of Kikuchi patterns. PHYSICS AND CHEMISTRY OF SOLID STATE, ISSN 1729-4428, 2024.
-1 article: Baila D & others - "Experimental research on the fabrication of modular devices for drilling using PLA for model parts" published in Open Journal of Applied Science, vol. 14, pp. 2790-2800, 2024, DOI: 10.4236/ojapps.2024.1410182, https://www.scirp.org/journal/paperinformation?paperid=136632.

In what way was the project innovative and/or complementary to other projects already carried out? Please describe how the needs of the identified target groups were addressed and what were the benefits of cooperating with transnational partners.
The innovative and originality aspects of the AMAZE project include:

-providing of excellent opportunities for early-stage researchers in the EU and Ukraine to be scaled up through the multidisciplinary research in the AMAZE project so as to develop versatile skills and own independent research careers.
-bringing together under the umbrella of AMAZE European network of multi-disciplinary partners from design, industrial engineering technologies and additive manufacturing domains to work in a coherent manner to carry out international cooperation (EU and Ukraine institutes), to develop knowledge exchange networking, to investigate technical solutions of conceiving, developing and realizing of different industrial products with complex design that are about to be produced by Additive Manufacturing technologies, and to organize research outreach activities to companies/organization stakeholders.
-examining of the effectiveness of the AMAZE solutions through case studies from the European and Ukrainian partners.
Other innovative aspects of AMAZE consortium are: the e-book and e-toolkit realization for Assisted Learning that is enable for Ukrainian staff and students to pass this difficult period. The research teams in this consortium represent a wide geographic spread across EU and Ukraine. AMAZE project site http://www.amaze2023.eu/, is therefore one valuable resources for research dissemination to create extensive impact for all institutions involved.
In the educational programs of the universities in Romania, Ukraine and other universities, the study of the disciplines regarding the use of Additive Manufacturing technologies in industrial engineering, in design, in architecture is completely missing or appears only as a discipline optional or facultative, although the rapid development of these technologies led to the third industrial revolution, being the technologies of the future. The AMAZE project aims to teach and study Additive Manufacturing, being a must-have of the moment to can realize rapid prototypes in industry, design and architecture.

Please reflect on the quality of the implementation of your project. What went well and what was more difficult? Which are the lessons that you learnt?
The AMAZE project was carried out exactly according to the project proposal. There were no changes regarding the events, Intellectual Outputs, activities, results, they remained exactly as in the initial proposal. The total budgets of the partners remained the same as in the proposal of the AMAZE project, only in the case of the Edibon International S.A. company, the budget was changed between the work packages and a certain part of the money from mobility from IO1 and IO3 was transferred to the researchers' salaries from IO4 , to create an additional chapter, thanks to the special experience they have in AR/VR platforms and manufacturing. All AMAZE project partners were very energetic, enthusiastic and serious and we were able to realize all the events (TPMs, MEs, STTE and Summer School) and IOs results and published/accepted articles exactly as in the initial proposal of the AMAZE project. The risks encountered by the AMAZE project were regarding the mobilities of the YFCNU partners from Ukraine to the events (MEs, STTE, Summer School and TPMs) within the AMAZE project because martial law is instituted in Ukraine due to the war. The men Prof. Yuriy Sobko and Prof. Igor Fodchuk required special approvals from the Ministry of Education in Kyiv, Ukraine to participate in the Staffs Training STTE of AMAZE project hosted by Edibon International S.A. company and for participation in Summer School and Transnational Project Meetings in Poland, Romania and Spain. Likewise, in the case of the creation of scientific articles, e-book and e-toolkit chapters, colleagues from Ukraine had problems with electricity, and implicitly with the functioning of the Internet and research equipment, but they made huge efforts and managed well all project activities. The organization of ME3 at YFCNU - Ukraine was very risky because in the afternoon started the alarms. Another risk we encountered was the drafting of the Final Report, because in Romania, there were turbulent times regarding the presidential election, but we also made huge efforts to complete the Final Report of the AMAZE project on time. The publishing of the research articles was very difficult, because the time was short, and perhaps it was necessary a long period for research on this project. The lessonsw that we learnt, that start with the research, earlier, because the publishing period is very long for all International Conferences and Journals.

What steps were taken (if any) to address the Erasmus+ horizontal aspects of project implementation (inclusion and diversity; digital transformation; environement and fight against climate change; participation in democratic life, common values and civic engagement)?
The steps that were taken to address the Erasmus+ horizontal aspects of project implementation were for digital transformation, to learn the new digital skills for all AMAZE project participants, espacilly for Ukrainian university.

Was the granted lump-sum amount approriate to implement properly the work packages? If not, please elaborate.
Yes, the granted lump-sum amount was appropriate to implement properly the work packages.

Summary of Participating Organisations

Role of the Organisation	OID of the Organisation	Name of the Organisation	Country of the Organisation	Type of Organisation	Partnership Entry Date	Partnership Withdrawal Date
Partner Organisation	E10060431	EDIBON International, S.A.	Spain	Small and medium sized enterprise	15/11/2023	14/11/2024
Beneficiary	E10339364	Universitatea Nationala de Stiinta si Tehnologie POLITEHNICA Bucuresti	Romania	Higher education institution (tertiary level)	15/11/2023	14/11/2024
Partner Organisation	E10207348	CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH	Ukraine	Higher education institution (tertiary level)	15/11/2023	14/11/2024
Partner Organisation	E10208306	POLITECHNIKA POZNANSKA	Poland	Higher education institution (tertiary level)	15/11/2023	14/11/2024

Total number of participating organisations	4

Associated Partners

In addition to the above formally participating organisations, did you involve associated partners in your project?
NO

Work Package n° 1 Project Management

How did the project partners contribute to the project management work package? Please detail specific contributions made by the partner organisations

Transnational Project Meetings TPMs were crucial in driving discussions related to budget control & time management at the level of each institution involved in the AMAZE consortium. In these meetings, comprehensive reviews of the progress have been carried out, ensuring in this way permanent alignment with the initial goals stated in the proposal, targets & KPIs stated in the AMAZE project so as to be sure that all will be reached in the end as they have been assumed in the project & in the signed agreements (contracts). For a more detailed perspective on the individual objectives of the AMAZE project, specific responsibilities have been assigned to specific responsible persons (at the level of the executive team) on each institution of the AMAZE consortium.
For instance, concerning the Intellectual Output activities, responsibilities have been provided to different responsible persons in the AMAZE consortium, such as prof. Băilă Diana – National University of Science and Technology Politehnica Bucharest, Romania (for IO1), prof. Fodchuk Igor - Yuriy Fedkovych Chernivtsi National University, Ukraine (for IO2), Mrs.Bonilla Mirian – EDIBON International S.A. company Madrid Spain (for IO3) & Prof. Łabudzki Remigiusz - Poznań University of Technology, Poland (for IO4).
Each responsible person which was designated have conceived concrete action plans, concrete tasks, certain responsibilities to certain individuals in the consortium (according with their experience & expertise)

How did you ensure sound time management in your project? How did you communicate and cooperate with your partners? What are the positive and negative elements of the cooperation process? What would you improve if you were to carry out a similar project in the future?

The period of implementation of AMAZE project was short, only 1 year, and very much objectives, activities, mobilities and results to made, but all AMAZE project partners have great experience in management of the Horizon projects, SEE& Norway projects, and Erasmus+ projects, and grace of their qualifications and professionalism, the AMAZE project obtained impressive results, especially from the Additive Manufacturing companies feedbacks, and by the great visibility by foreigner persons that participated at Multiplier Events, from 4 continents Europe, Asia, Africa, and South America), and from 12 countries. The AMAZE project was very courageous because involved a Ukrainian partner, and with very ambitious results (IOs and 4 research articles - accepted/published at the final of the project), that were obtained exactly in the project proposal. The communication and cooperation with the AMAZE project partners were wonderful, all was perfect, because all partners have a great professionalism, and were very serious. In this cooperation process, were only positive and very great beautifull surprise for professors and for students, grace of the facilities and the amiability of EDIBON International S.A. company, Madrid, Spain, who shared with us all from their extensive experience in the realization of the VR/AR e-learning platform, which they created during the Covid period, for countless universities and schools in Spain. Also, they presented us with new research project ideas and various teaching staff from the Juan Carlos University in Madrid and the private Francisco Vitorio University in Madrid with a view to cooperation and the realization of new European projects. Also, with UNSTPB Romania, the Edibon International S.A. company, Madrid, Spain, signed 2 Erasmus+ Mobility Agreements for students, as well as with PUT Poland, respectively with the University of Agder, Norway, thanks to the Multiplier Event ME1. In the future i will realize Erasmus+ or European research projects for a longer period for implementation, to have more time for write and for research.

If relevant, please describe any difficulties you have encountered in managing the implementation of the project and how you and your partners handled them.

Regarding relationship & cooperation, the AMAZE consortium has demonstrated complementarity, supportiveness, proactivity & responsibility in every activity undertaken by each partner based on their designated tasks in the project. There were some difficulties at the beginning of the project since there were registered some delays (2 months) in the project at the Promoter of the project (National University of Science and Technology Politehnica Bucharest Romania) side in particular, because change the name of the university because of affiliation with University of Pitesti. Politehnica Bucharest institution had not fully allocated its budget internally, even after receiving 80% from the Erasmus+ funds through the Agency. Politehnica Bucharest is sending the partners budget (80% from initial budget) necessary to start the AMAZE consortium activities.
All AMAZE project partners were very energetic, enthusiastic and serious and we were able to realize all the events (TPMs, MEs, STTE and Summer School) and IOs results and published/accepted articles exactly as in the initial proposal of the AMAZE project. The risks encountered by the AMAZE project were regarding the mobilities of the YFCNU partners from Ukraine to the events (MEs, STTE, Summer School and TPMs) within the AMAZE project because martial law is instituted in Ukraine due to the war. The men Prof. Yuriy Sobko and Prof. Igor Fodchuk required special approvals from the Ministry of Education in Kyiv, Ukraine to participate in the Staffs Training STTE of AMAZE project hosted by Edibon International S.A. company and for participation in Summer School and Transnational Project Meetings in Poland, Romania and Spain.
Likewise, in the case of the creation of scientific articles, e-book and e-toolkit chapters, colleagues from Ukraine had problems with electricity, and implicitly with the functioning of the Internet and research equipment, but they made huge efforts and managed well all project activities. The organization of ME3 at YFCNU - Ukraine was very risky because in the afternoon started the alarms. Another risk we encountered was the drafting of the Final Report, because in Romania, there were turbulent times regarding the presidential election, but we also made huge efforts to complete the Final Report of the AMAZE project on time.

If relevant for your project, did you use or do you plan to use Erasmus+ online platforms (e.g. EPALE, European School Education Platform) for the preparation, implementation and/or follow-up of your project? If yes, please describe how.

Yes, i use and plan to use Erasmus+ online platforms for the preparation, implementation and/or follow-up of your project, to establish the impact of AMAZE project and to know what i must to improve for future.

Implementation

Work package	Number of activities	Total amount allocated to activities
IO1 - AMAZE e-book for developing of complex design industrial parts	1	19 580 €
IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts	1	29 256 €
IO3 - AMAZE e-learning VR/AR platform for virtual laboratory	1	29 398 €
IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)	1	17 788 €

Overview of work packages

Work package n°2 - IO1 - AMAZE e-book for developing of complex design industrial parts

Activity title	Leading Organisation	Venue of the activity	Activity start date	Activity end date	Activity duration(days)	Grant amount allocated to the activity (EUR)
IO1 - AMAZE e-book for developing of complex design industrial parts	Universitatea Nationala de Stiinta si Tehnologie POLITEHNICA Bucuresti	Romania	15/11/2023	14/03/2024	121	19 580 €
					Total	**19 580 €**

Work package n°3 - IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts

Activity title	Leading Organisation	Venue of the activity	Activity start date	Activity end date	Activity duration(days)	Grant amount allocated to the activity (EUR)
IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts	CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH	Ukraine	15/03/2024	14/06/2024	92	29 256 €
					Total	**29 256 €**

Work package n°4 - IO3 - AMAZE e-learning VR/AR platform for virtual laboratory

Activity title	Leading Organisation	Venue of the activity	Activity start date	Activity end date	Activity duration(days)	Grant amount allocated to the activity (EUR)
IO3 - AMAZE e-learning VR/AR platform for virtual laboratory	EDIBON International, S.A.	Spain	15/06/2024	14/09/2024	92	29 398 €
					Total	**29 398 €**

Work package n°5 - IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)

Activity title	Leading Organisation	Venue of the activity	Activity start date	Activity end date	Activity duration(days)	Grant amount allocated to the activity (EUR)
IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)	POLITECHNIKA POZNANSKA	Poland	15/09/2024	14/11/2024	61	17 788 €
					Total	**17 788 €**

Project Lump Sum	120 000 €

Work package n°2 - IO1 - AMAZE e-book for developing of complex design industrial parts

How did the project partners contribute to the work package? Please detail specific contributions made by the partner organisations.
The project contribution consisted in the publication of IO1 – AMAZE e-book for developing of complex design industrial parts in the Publishing House PRINTECH Bucharest, 2024, having e-ISBN: 978-606-23-1569-6, comprising the next module courses:
1-Additive Manufacturing (UNSTPB);2-Smart (Intelligent) Materials (YFCNU+PUT); 3-CAD/CAM/CAE design (YFCNU); 4-Reverse Engineering (PUT); 5-Computer Programming (Edibon); 6-Sensors and Electronics (UNSTPB);7-Virtual Reality/Augmented Reality (Edibon). Courses were prepared by the experts of the AMAZE consortium, exactly as in the project proposal and students which were selected to follow this curriculum so as they were constituted on the inter-complementary and transnational bases.
The leader of this work package was the UNSTPB, which monitored the progress of the activities and results obtained within this work package (WP2). The launch conference of the AMAZE project, was hosted by UNSTPB, during 27-29 November 2023. As part of this work package, there was a project multiplication event ME1 that took place in Madrid, Spain, hosted by the Edibon International S.A. company, on 25 April 2024, where participated 54 participants as, the special guests Mr. Bogdan Bădescu - Economic Counselor from the Romanian Embassy in Madrid, Spain and Prof. Filippo Sanfilippo from the University of Agder, Norway, 40 Spanish and 14 foreign participants were from: Norway, Costa de Marfil, Morocco, Uzbekistan, South Sudan and other invitees from Peru.

Were there any major differences between the planned activities and the implemented activities? If so, please explain.
There were no major differences between planned activities and implemented activities. Looking at the e-book proposed in the AMAZE project proposal, the number of chapters was exactly respected, namely 7, all the partners made the book chapters according to the project proposal. The publication of IO1 – AMAZE e-book for developing of complex design industrial parts in the Publishing House PRINTECH Bucharest, 2024, e-ISBN: 978-606-23-1569-6, comprise the next module courses:
1-Additive Manufacturing (UNSTPB);2-Smart (Intelligent) Materials (YFCNU+PUT); 3-CAD/CAM/CAE design (YFCNU); 4-Reverse Engineering (PUT); 5-Computer Programming (Edibon); 6-Sensors and Electronics (UNSTPB);7-Virtual Reality/Augmented Reality (Edibon). Courses were prepared by the experts of the AMAZE consortium, exactly as in the project proposal and students which were selected to follow this curriculum so as they were constituted on the inter-complementary and transnational bases.
The leader of this work package was the National University of Science and Technology Politehnica Bucharest, which monitored the progress of the activities and results obtained within this work package (WP2). The launch conference of the AMAZE project, was hosted by UNSTPB, during 27-29 November 2023. At the first TPM1, hosted by Politehnica Bucharest, participated 2 staffs persons by each university involved in project (YFCU, PUT) and 1 staff person from Edibon International S.A. Spain, and other professors from UNSTPB.
In project proposal was specified that from Edibon will participate 2 persons, but participated at this event only 1 person, the manager Mirian Bonilla. The money rested from this TPM1 mobility for Edibon International S.A. company was transferred to IO4 (Intellectual Outputs 4) for Edibon researchers salaries.
As part of this work package, there were a project multiplication event ME1 that took place in Madrid, Spain, hosted by the Edibon International S.A. company, on 25 April 2024, having 54 participants with 40 Spanish people (from outside the company, from other companies, universities such: University Rey Juan Carlos from Madrid Spain and University Francisco de Vitoria in Madrid, etc.) and 14 foreign participants from: Norway, Costa de Marfil, Morocco, Uzbekistan, South Sudan, and other participants from different Spanish institutes, interested in the activities and results of the AMAZE project, participated, growing the project dissemination. In the project proposal was specified 48 participants for Multiplier Event (ME1), hosted by EDIBON International S.A., from wich: 40 Spanish people (from companies, universities, research centers, etc.) and 8 foreign participants. The number of people participating in ME1 exceeded the number of people specified in the project proposal. The students and professors from University Rey Juan Carlos from Madrid, University Francisco de Vitoria in Madrid, but also different foreigner's participants were impressived by Multiplier Event 1.

Planned results of the work package at application stage.
The main results of this work package consist in:
-e-book elaboration using new learning methods, for help the students to quick understanding, being clear theoretical concepts through practice, saving time and for help the professors, permitting an easy teaching, increasing the teaching efficiency, reduction of teaching costs and integration of classroom and laboratory on the AMAZE platform, using digital skills. The AMAZE e-book for developing of complex design industrial parts, will comprise the next module courses that will be charge on the AMAZE project site for responde for all students demand and for all stakeholders interested by the project domains: 1-Additive Manufacturing (UPB); 2-Smart (Intelligent) Materials (YFCNU+PUT); 3-CAD/CAM/CAE design (YFCNU); 4-Reverse Engineering

(PUT); 5-Computer Programming (Edibon); 6-Sensors and Electronics (UPB); 7-Virtual Reality/Augmented Reality (Edibon).
-The Multiplier Event ME1 (1day) realized at Edibon company P4, having invitated 40 persons from different companies, universities, research centers and 8 foreigner persons that will participate, will permit to a greater visibility of AMAZE project activities and results.
All teaching methods and resources realized within the AMAZE consortium (e-book, e-toolkit manual, e-learning platform), research activities in developing new complex industrial parts and ideas shared through the AMAZE e-learning platform will be used for attracting the main stakeholders which are activating in the industrial engineering/design/ additive manufacturing / architecture domains, all these stakeholders being encouraged through the organized events to join the AMAZE e-learning platform in order to realize finally one European Network for Additive Manufacturing in Industrial Design for Ukrainian Context formed by major EU institutions that are coming from the Higher education domain, SMEs, IT sector, etc. which are interested in using the resources of the AMAZE project. Articles published.

Explain how those results were achieved and how they helped reaching the project objectives. Please elaborate on the quality of the results and include the reference of the supporting documents that support this evaluation

For establish the AMAZE project objectives and the results, the launch conference (Transnational Project Meeting TPM1) of the AMAZE project, was hosted by UNSTPB, during 27-29 November 2023. At the first TPM1, hosted by Politehnica Bucharest, participated 2 staffs persons by each university involved in project(YFCU, PUT) and 1 staff person from Edibon International S.A. Spain.
In project proposal was specified that from Edibon will participate 2 persons, but participated at this event only 1 person, the manager Mirian Bonilla. The money rested (848 euro) from this TPM1 mobility for Edibon International S.A. company was transferred to IO4 - ecase studies for Edibon researchers salaries.
In order to obtain the results within Work package 2, all the partners of the AMAZE consortium made huge efforts to write and publish the AMAZE e-book for developing of complex design industrial parts, in Publishing House Printech Bucharest, 2024, eISBN: 978-606-23-1569-6, comprising the next module courses:
1-Additive Manufacturing (UNSTPB);
2-Smart (Intelligent) Materials (YFCNU+PUT);
3-CAD/CAM/CAE design (YFCNU);
4- Reverse Engineering (PUT);
5-Computer Programming (Edibon);
6-Sensors and Electronics (UNSTPB);
7-Virtual Reality/Augmented Reality (Edibon)
To create the book, all partners wrote exactly the number of chapters and the title of the chapters specified in the project proposal, thus, the proposal of the AMAZE project submitted on the EU platform was fully respected. In this book, it can find new technologies of Additive Manufacturing, which are used both in industry, design and architecture, as well as various CAD/CAM/CAE software, Reverse Engineering, a state-of-the-art 3D Scanning technique, using - Smart materials for the manufacture of parts with complex shapes and designs, the part of Electronics and sensors that can be found in all the latest generation products and processes and the part of Virtual Reality/Augmented Reality, which facilitates an e-learning platform for virtual labs.
The First Multiplier Event (ME1) of the project - Agreement number 2023-1-RO01-KA220-HED-000155412, Acronym: AMAZE with the title “European Network for Additive Manufacturing in Industrial Design for Ukrainian Context”, took place on 25 April 2024, being hosted by EDIBON International S.A. from Madrid, Spain, and were participated in total 54 participants, meaning 40 Spanish persons (not involved in project and out of Edibon International S.A. company) and 14 foreigner participants from University of Agder Norway, METFPA Costa de Marfil, UM6P Morocco, NSMTU Uzbekistan, University of Juba South Sudan, and other participants from different Spanish companies (ACOM Murcia and DGM Murcia) and invitees from Peru. The coordinator from National University of Science and Technology Politehnica Bucharest, Romania and the employers at Edibon International S.A. company participated at this event too.
The event was attended by representatives of the 4 partners: National University of Science and Technology Politehnica Bucharest - Romania, Poznan University of Technology (PUT) – Poland(on-line MS Teams), Yuriy Fedkovych Chernivtsi National University – Ukraine (on-line MS Teams) and EDIBON International S.A. Madrid - Spain.
The special guests Mr. Bogdan Bădescu - Economic Counselor from the Romanian Embassy in Madrid, Spain and Prof. Filippo Sanfilippo from the University of Agder, Norway participated at the Multiplier Event (ME1) held at Edibon International S.A. from Madrid, on 25.04.2024.
Multiplier Event ME1 was a very great resonance in the economical companies and in universities, respectively in the research institutions, remarking this fact by the exceeded numbers of participants specified in the AMAZE project proposal. The first Multiplier Event ME1 had a great role for the internationalization of the AMAZE project results. The students and professors from prestigious universities from Madrid, as: University Rey Juan Carlos and University Francisco de Vitoria, but also different foreigner’s participants assisted to this impressive Multiplier Event at EDIBON International S.A. company in Madrid. The persons participants were from these companies: ACOM Murcia - Spain, DGM Murcia - Spain.
At the final of Multiplier Event ME1 were visited Edibon International S.A. company. All participants signed the attendance list and the feedback forms.
Grace of these activities, was realized the AMAZE e-book, that represents a manual of good practice concerning Additive Manufacturing in industry for complex parts, for all professors, students, researchers, engineers, and skateholders interested by this domain and the project results.
1 article with the title: WETTABILITY CHARACTERIZATION OF MDF COMPOSITE MATERIALS USED FOR INDUSTRIAL PRODUCTS, presented at BRAMAT Conference Brasov, 13-16 march 2024, and published in Bulletin of Transylvania Brasov, Vol. 16(65) No. 1 – 2023.(https://webbut.unitbv.ro/index.php/Series_I/article/view/8541)

Describe the target group for those activities and results and explain how those were beneficial for them.

Concerning the publishing the AMAZE e-book for developing of complex design industrial parts, in Publishing House Printech Bucharest, 2024, with eISBN: 978-606-23-1569-6, this e-book is open access on the AMAZE project http://www.amaze2023.eu, who permit to be accessible for every students, researchers, professors, engineers, architectures, designers or stakeholders interested by the Additive Manufacturing domain, used both in industry, design and architecture, as well as various CAD/CAM/CAE software, Reverse Engineering, a state-of-the-art 3D Scanning technique, using different Smart materials for the manufacture of parts with complex shapes and designs, the part of Electronics and sensors that can be found in all the latest generation products and processes and the part of Virtual Reality/Augmented Reality, which facilitates an e-learning platform for virtual labs.
The AMAZE e-book comprises the next module courses:
1-Additive Manufacturing (UNSTPB);
2-Smart (Intelligent) Materials (YFCNU+PUT);
3-CAD/CAM/CAE design (YFCNU);
4- Reverse Engineering (PUT);
5-Computer Programming (Edibon);
6-Sensors and Electronics (UNSTPB);
7-Virtual Reality/Augmented Reality (Edibon)

At the Multiplier Event ME1, hosted by Edibon International S.A. company, Madrid, Spain on 25 April 2024, were invited famous personalities, such as the Economic Counselor from the Romanian Embassy in Madrid, Mr. Bogdan Bădescu, Prof. Filippo Sanfilippo from the University of Agder, Norway, professors and students from two great universities in Madrid, namely, University Rey Juan Carlos from Madrid, and University Francisco de Vitoria in Madrid, various companies and foreign participants from Norway, Costa de Marfil, Morocco, Uzbekistan, South Sudan and invitees from Peru. Practically, this Multiplier Event ME1 turned into a transnational event with participants from 10 countries, respectively from 4 continents (Europe, Asia, Africa and South America).
Following this meeting, the first Erasmus+ Agreement for the practical stage for the students was made, between National University of Science and Technology Politehnica Bucharest, Romania and Edibon International S.A. company, Madrid, Spain for 2023-2024, were participated yet 3 Romanian students. Grace of the Multiplier Event ME1, were realized too Erasmus+ Agreement between Edibon International S.A. company, Spain and University of Agder, from Norway, respectively with PUT from Poland. The target group of these Intellectual Outputs were the students, the professors, the researchers, the engineers, the architectures, the designers and the stakeholders.
1 article with the title: WETTABILITY CHARACTERIZATION OF MDF COMPOSITE MATERIALS USED FOR INDUSTRIAL PRODUCTS, presented at BRAMAT Conference Brasov, 13-16 march 2024, and published in Bulletin of Transylvania Brasov, Vol. 16(65) No. 1–2023. This article results are interested for students, professors, reserchers and economic companies, interested by composite materials field.

Provide information on the level of achievement of the selected qualitative and quantitative indicators. How were the progress, quality and achievement of this WP results monitored.

Quantity indicators KPI1. Number of participants 54 participants (students, engineers, researchers, professors) participated at Multiplier Event ME1, realized at Edibon company KPI2. Number of participants was 10 staffs from all project partners, different students from Politehnica Bucharest and Mr. Adrian Popescu from WATT company from Craiova at Transnational Project TPM1, sustained on 27-29 November 2023, at National University of Science and Technology Politehnica of Bucharest, Romania.
Used Methods - filling out attendance sheets and feedbacks
Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants at ME1 from 10 countries (Spain, Romania, Poland, Ukraine, Norway, Costa de Marfil, Morocco, Uzbekistan, South Sudan, and invitees from Peru), respectively from 4 continents (Europe, Asia, Africa and South America);
Number of universities participants at ME1 hosted by Edibon International S.A., Madrid, Spain = 9 universities and the Economic Counselor from the Romanian Embassy in Madrid, Mr. Bogdan Bădescu, the participants from the Ministry of Technical Education METFPA (Costa de Marfil) and 3 Spanish companies.
Participants universities: National University of Science and Technology Politehnica Bucharest UNSTPB (Romania), Poznan University of Technology PUT (Poland), YFCNU (Ukraine), University Rey Juan Carlos from Madrid (Spain), and University Francisco de Vitoria in Madrid (Spain), University of Juba (South Sudan), Mohammed VI Polytechnic University UM6P (Morocco), Navoi State Mining and Technology University NSMTU (Uzbekistan), University of Agder (Norway).
Spanish companies that participated at ME1: Edibon International S.A., Madrid (Spain), ACOM Murcia (Spain), DGM Murcia (Spain).
Number of participants that visit the AMAZE project website.
Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are foreseen to be reached:
- activities implemented according to the project's timelines: >95%
- an accomplishment of the project objectives: >95%
- objectives of each transnational meetings have been clear to participants: >80%
- satisfaction of participants to the transnational project meetings (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- quality of the intellectual outputs prepared by all partners: >95%
- learning objectives for the international training sessions have been met: >85%
- satisfaction of participants to the international training sessions (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- satisfaction of participant in the training (summer school) activities : >80%
- overall project quality assessment (made by partners): >80%
- satisfaction of participants to the multiplier events meeting (logistical arrangements, facilitation skills, respected schedule and timing, prepared materials) > 80%.

Work package n°3 - IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts

How did the project partners contribute to the work package? Please detail specific contributions made by the partner organisations.

For the Intellectual Outputs IO2, the AMAZE project contribution consisted in the publication of IO2 – AMAZE e-toolkit manual for digital learning in producing complex design industrial parts, in the Publishing House PRINTECH Bucharest, 2024, having e-ISBN: 978-606-23-1595-5, comprising seven laboratories. The leading was YFCNU.
In this work package, there was a project Multiplication Event ME2 that took place in Bucharest, Romania, hosted by the National University of Science and Technology Politehnica Bucharest, on 18 June 2024, where participated 24 participants (outside Politehnica Bucharest and not involved in AMAZE project), more than in project proposal (20 participants), and three great companies (Leykom, Admasys and Nutechnnologies) specialized in Additive Manufacturing participated with equipments and presentations. The Multiplier Event ME3 was hosted by YFCNU, Ukraine, on 20 June 2024, where participated 20 Ukrainian participants (exactly as in the project proposal), they were outside from YFCNU and not involved in AMAZE project.
Staffs Training STTE was hosted by EDIBON International S.A. company, Madrid, Spain, during 7-12 may 2024, and participating from each partner institution 4 persons, exactly as in project proposal.
The Transnational Project Meeting - TPM2 of the AMAZE project, was hosted by Poznan University of Technology, Poland, during 10-12 June 2024, where participated 2 staffs by each institution involved in project, exactly as in project proposal.

Were there any major differences between the planned activities and the implemented activities? If so, please explain.

There were no major differences between planned activities and implemented activities. Looking at the AMAZE e-toolkit manual for digital learning in producing complex design industrial parts, the number of chapters was exactly respected, namely 7, all the

partners made the book chapters according to the project proposal. The publication of IO2 – AMAZE e-toolkit manual for digital learning in producing complex design industrial parts, in the Publishing House PRINTECH Bucharest, 2024, having e-ISBN: 978-606-23-1595-5, comprising the next module laboratories:
1-Additive Manufacturing (UNSTPB); 2-Smart (Intelligent) Materials (YFCNU+PUT); 3-CAD/CAM/CAE design (YFCNU); 4- Reverse Engineering (PUT); 5-Computer Programming (Edibon); 6-Sensors and Electronics (UNSTPB); 7-Virtual Reality/Augmented Reality (Edibon).
The laboratory modules were prepared by the experts of the AMAZE project consortium, exactly as in the project proposal and student participants to the Summer School, were selected to follow this curriculum so as they were constituted on the inter-complementary and transnational bases.
The leader of this work package was the YFCNU, which monitored the progress of the activities and results obtained within this work package (WP3).
In this work package, there was a project Multiplication Event ME2 that took place in Bucharest, Romania, hosted by the National University of Science and Technology Politehnica Bucharest, on 18 June 2024, where participated 24 participants (outside Politehnica Bucharest and not involved in AMAZE project), more that in project proposal (20 participants), and three great companies (Leykom from Bucharest, Admasys from Targu Mures and Nutechnnologies from Timisoara) specialized in Additive Manufacturing participated with equipments and presentations. The Multiplier Event ME3 was hosted by YFCNU, Ukraine, on 20 June 2024, where participated 20 participants (exactly as in the project proposal), they were outside from YFCNU and not involved in AMAZE project.
Staffs Training STTE with title VR and AR programming was hosted by EDIBON International S.A. company, Madrid, Spain, during 7-12 may 2024, and participating from each partner institution 4 persons, exactly as in project proposal.
The Transnational Project Meeting - TPM2 of the AMAZE project, was hosted by Poznan University of Technology, Poland, during 10-12 June 2024, and participating from each partner institution 2 persons, exactly as in AMAZE project proposal. Exactly as in AMAZE project proposal, 1 article published in Open Journal of Applied Science, vol. 14, pp. 2790-2800, 2024, DOI: 10.4236/ojapps.2024.1410182 Baila Diana, Labudzki Remigiusz, Fodchuk Igor, Bonilla Mirian, "Experimental research on the fabrication of modular devices for drilling using PLA for model parts", Open Journal of Applied Science, vol. 14, pp. 2790-2800, 2024, ISSN Print: 2165-3917, ISSN Online:2165-3925 DOI: 10.4236/ojapps.2024.1410182
https://www.scirp.org/journal/paperinformation?

Planned results of the work package at application stage.

The main results of this work package WP3 consist in:
- AMAZE e-toolkit manual for digital learning in producing complex design industrial parts using new learning methods, for help the students to obtain practical and digital skills, saving time and for help the professors, permitting an easy teaching, increasing the teaching efficiency, reduction of teaching costs and integration of classroom and laboratory on the AMAZE platform. The AMAZE e-toolkit for developing of complex design industrial parts, will conceive the concepts of the new complex design of industrial parts, proving details related to the designed solutions used for conceiving the new complex design industrial parts, validation of the complex design industrial parts (solution designed by CAD systems based on CAE analyses), solutions related to the materials to be used for the realizing of new developed complex design industrial parts,
Additive Manufacturing of the components to be realized for the new complex design industrial parts, description of assembling and programming of the systems, aspect related to the set-up/functionality of the presented solutions/repeatability of the process/troubleshoot and control; inputs regarding the methods of testing of these new developed complex design industrial parts by AR/VR – solutions conceiving, realizing and materializing of different scenarios in AR/VR used by students.
-The Multiplier Events realized at UPB (ROM) and YFCNU (UKR), having invited 20 persons (each university) from different companies, universities, research centers, will permit to a greater visibility of AMAZE project activities and results.
-The training staff will take part at Edibon company from Spain, where will participated 4 persons for each partner institution involved in AMAZE project, during 4 days.
- Within the AMAZE project consortium will be published articles in different International Conferences/ Journal with higher visibility.

Explain how those results were achieved and how they helped reaching the project objectives. Please elaborate on the quality of the results and include the reference of the supporting documents that support this evaluation

To obtain the results within Work package 3, all the partners of the AMAZE consortium project collaborated to write and publish for Intellectual Output IO2 , the AMAZE e-toolkit manual for digital learning in producing complex design industrial parts, in the Publishing House PRINTECH Bucharest, 2024, e-ISBN: 978-606-23-1595-5, comprising the next module laboratories: 1-Additive Manufacturing (UNSTPB); 2-Smart (Intelligent) Materials (YFCNU+PUT); 3-CAD/CAM/CAE design (YFCNU); 4- Reverse Engineering (PUT); 5-Computer Programming (Edibon); 6-Sensors and Electronics (UNSTPB); 7-Virtual Reality/Augmented Reality (Edibon).
For realize the AMAZE etoolkit, all partners wrote exactly the number of laboratory modules and presented exactly the research fields specified in the AMAZE project proposal, thus, the proposal of the AMAZE project submitted on the EU platform was fully respected.
In this e-toolkit, it can find new technologies of Additive Manufacturing used for manufacturing complex design parts in industry, design and architecture (as hydraulic pump body, cable fixing clamp, and flange), as well as various CAD/CAM/CAE software (by example creation an architectural design of the old Brewery in Chernivtsi using Revit, or SolidWorks software), Reverse Engineering, Smart materials for the manufacture of complex design parts from industry and from architecture, (by example the ferroic nanocomposites with shape memory effect, nitinol, cement matrix), Electronics and sensors that can be found in all the latest generation products and processes (especially for 3D printers type do it yourself), and the part of Virtual Reality/Augmented Reality, which facilitates an e-learning platform for virtual labs, using different videos about the Additive manufacturing technologies, CAD/CAM/CAE software, smart materials, respectively the VR/AR principles.
The leader of this work package was the YFCNU, which monitored the progress of the activities and results obtained within this work package (WP3).
In this work package, there was a Multiplier Event ME2 with the title: “Applied Research Methods for Additive Manufacturing in Industrial Design’, that took place in Bucharest, Romania, hosted by the UNSTPB on 18 June 2024, where participated 24 participants (outside UNSTPB and not involved in AMAZE project), more that in project proposal (20 participants), and three great companies (Leykom, Admasys and Nutechnnologies) specialized in Additive Manufacturing participated with equipments and presentations. The participants at the ME2, hosted by National University of Science and Technology Politehnica Bucharest, Romania, were from different Romanian research centers as: COMOTI and Ilie Murgulescu Institute of Physical-Chemistry from Romanian Academy, different companies that were interested by AMAZE project results as: Leykom Bucharest, Admasys Targu Mures, NUTechnologies Timisoara, S.C. MGM Star Construct S.R.L. Bucharest, Allio Group Bucharest, Betrandt and students from University of Medicine and Pharmacy Carol Davila, Bucharest and from Politehnica Bucharest. The ME3 with the title: “Applied Research Methods for Additive Manufacturing in Architectural Design” was hosted by YFCNU (Ukraine), on 20 June 2024, where participated 20 participants (exactly as in the project proposal), they were outside from YFCNU and not involved in AMAZE project. The participants at the Multiplier Event ME3, hosted by Yuriy Fedkovych Chernivtsi National University – Ukraine, were from different Ukrainian companies as: Chernivtsizhytlobud company, Vodogray LLC, Chernivtsi, Three A Studion, Dar Group, Urbanhause, Addline Group, SAGA Software company, DataWiz IT company, Symbols Fund and Association Joseph Schumpeter Bukovynian Innovative Technology Cluster and professors and students from Yuriy Fedkovych Chernivtsi National University – Ukraine. Staffs Training STTE in the field of VR and AR programming was hosted by EDIBON International S.A. company, Madrid, Spain, during 7-12 may 2024 (4 days), and participated 17 persons from consortium

partners: UNSTPB (Romania), PUT (Poland), YFCNU (Ukraine) and EDIBON International S.A. (Spain).
The STTE addressed to professors which are involved in teaching Industrial Design, Additive Manufacturing, new Smart (Intelligent) Materials, Reverse Engineering, Sensors and Electronics, Computer Programming, CAD/CAE, as to other engineers and, researchers interested to the developing, manufacturing and testing new industrial design of products with complex form using the innovative Additive Manufacturing technologies.
The TPM2 of the AMAZE project, was hosted by PUT, Poland, from 10-12 June 2024, participated 2 persons/institution. An article "Experimental research on the fabrication of modular devices for drilling using PLA for model parts" published in Open Journal of Applied Science, vol. 14, pp. 2790-2800, 2024, DOI: 10.4236/ojapps.2024.1410182, https://www.scirp.org/journal/paperinformation?paperid=1

Describe the target group for those activities and results and explain how those were beneficial for them.
AMAZE e-toolkit manual for digital learning in producing complex design industrial parts published in the Publishing House PRINTECH Bucharest, 2024, e-ISBN: 978-606-23-1595-5, dedicated for the students, professors, researchers, engineers and stakeholders interested by additive manufacturing, CAD/CAM/CAE, Reverse Engineering, smart materials, VR/AR, sensors and electronics, computer programming used in industry, design and architecture. The participants at the ME2, hosted by UNSTPB, Romania, were from different Romanian research centers as: COMOTI and Ilie Murgulescu Institute of Physical-Chemistry from Romanian Academy, different companies that were interested by AMAZE project results as: Leykom Bucharest, Admasys Targu Mures, NUTechnologies Timisoara, S.C. MGM Star Construct S.R.L. Bucharest, Allio Group Bucharest, Betrandt and students from University of Medicine and Pharmacy Carol Davila, Bucharest and from Politehnica Bucharest. The participants at the Multiplier Event ME3, hosted by YFCNU– Ukraine, were from different Ukrainian companies as: Chernivtsizhytlobud company, Vodogray LLC, Chernivtsi, Three A Studion, Dar Group, Urbanhause, Addline Group, SAGA Software company, DataWiz IT company, Symbols Fund and Association Joseph Schumpeter Bukovynian Innovative Technology Cluster and professors and students from Yuriy Fedkovych Chernivtsi National University – Ukraine. The Multiplier Event ME3 of AMAZE project had a great visibility, very much personalities from Chernitvsi region, Ukraine participated at this event, such as: Mr. Vasyl Zazulyak (Deputy mayor of Chernivtsi), Mr. Yaroslav Pavlik (Head of the department of housing and communal services in Chernivtsi), Mr. Yaroslav Kushniryk (Deputy General Director of the utility enterprise Chernivtsivodokanal for the development), Mr. Dmytro Domitryuk (Chef architect of the Chernivtsi), Mr. Oleg Pikuschenko (Head of the Architectural Chamber of Ukraine), Mr. Yaroslav Boyko (Head of the Ukrainian National Union of Architects in the Chernivtsi region), Mr. Marian Stasyuk (Guild of designers in construction in Chernivtsi region), Mr. Doctor Viktor Polyovyi (Head of the General Surgery Department in Bukovinean State Medical University, Chernivtsi) and Mr. Doctor Petro Kovalchuk (Head of the Traumatology and Orthopedics Department in Bukovinean State Medical University, Chernivtsi). The event was attended by representatives of the all AMAZE consortium partners: Yuriy Fedkovych Chernivtsi National University – Ukraine, Poznań University of Technology (PUT) – Poland (on-line MS Teams), National University of Science and Technology Politehnica Bucharest - Romania (on-line MS Teams) and EDIBON International S.A., -Spain (on-line MS Teams).
Staffs Training STTE in the field of VR and AR programming was hosted by EDIBON International S.A. company, Madrid, Spain, during 7-12 may 2024, and were participated 17 persons from consortium partners. One article was published open acces in International Journal.

Provide information on the level of achievement of the selected qualitative and quantitative indicators. How were the progress, quality and achievement of this WP results monitored.
The AMAZE e-toolkit manual for digital learning in producing complex design industrial parts uses new learning methods, for help the students to obtain practical and digital skills, saving time and for help the professors, permitting an easy teaching, increasing the teaching efficiency, reduction of teaching costs and integration of classroom and laboratory on the AMAZE platform.
Quantity indicators KPI1. Number of participants = 24 participants (students, engineers, researchers, professors) participated at ME2 (1day), realized at UNSTPB - Romania on 18 June 2024 and
Participants from: 2 Research Centers (COMOTI si IMIPC), 7 Companies (EDIBON, Leykom Bucharest, Admasys Targu Mures, NUTechnologies Timisoara, S.C. MGM Star Construct S.R.L. Bucharest, Allio Group Bucharest, Betrandt) and 4 Universities (UNSTPB - Romania, PUT - Poland, YFCNU - Ukraine and University of Medicine and Pharmacy Carol Davila, Bucharest, Romania).
KPI2. Number of participants = 20 participants that participated at ME3 (1 day), realized at YFCNU (Ukraine) on 20 June 2024.
Participants from: 4 Universities (UNSTPB - Romania, PUT - Poland, YFCNU - Ukraine and Bukovinean State Medical University - Ukraine).
10 Ukrainian companies and Spanish company EDIBON International S.A. Spain.
KPI3. Number of participants = 10 participants (UNSTPB, PUT, EDIBON INTERNATIONAL S.A., YFCNU) were at TPM2, hosted by Poznan University of Technology (Poland), during 10-12 June 2024.
KPI4. Number of participants = 17 participants were at Staff Training STTE that took place at Edibon International S.A.company, Spain, during 7-12 may 2024.
Methods - filling out attendance sheets. feedbacks and for STTE - initial and final tests.
Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants that visit the AMAZE project website
Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are reached:
- activities implemented according to the project's timelines: >95%
- an accomplishment of the project objectives: >95%
- objectives of each transnational meetings have been clear to participants: >80%
satisfaction of participants to the transnational project meetings (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- quality of the intellectual outputs prepared by all partners: >95%
- learning objectives for the international training sessions have been met: >85%
- satisfaction of participants to the international training sessions (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- satisfaction of participant in the training (summer school) activities : >80%
- overall project quality assessment (made by partners): >80%
- satisfaction of participants to the multiplier events meeting (logistical arrangements, facilitation skills, respected schedule and timing, prepared materials)

Work package n°4 - IO3 - AMAZE e-learning VR/AR platform for virtual laboratory

How did the project partners contribute to the work package? Please detail specific contributions made by the partner organisations.

For the IO3, the AMAZE project contribution consisted in the realization of IO3 - AMAZE e-learning VR/AR platform for virtual laboratory, comprising the next applied modules: Additive Manufacturing of metallic complex lattices used in industry (UNSTPB); AMAZE VR/AR e-learning platform for virtual laboratory used for Additive Manufacturing of industrial parts (Edibon); Reverse Engineering (PUT), Additive Manufacturing in Architecture Design (YFCNU).
The modules and the videos were prepared by the experts of the AMAZE project consortium and presented on the AMAZE project site: http://www.amaze2023.eu/, exactly as in the project proposal and student participants to the Summer School, were selected to follow this curriculum so as they were constituted on the inter-complementary and transnational bases.
The leader of this work package was the EDIBON International S.A., Madrid, Spain, which monitored the progress of the activities and results obtained within this work package (WP4).
The Summer School of the project - 2023-1-RO01-KA220-HED-000155412, took place on 8.07.2024-17.07.2024, and were participated students and staffs from project partners (PUT, YFCNU and Edibon International S.A. company) and were invited professors and students from UNSTPB. The TPM3 of the AMAZE project, was hosted by Edibon International S.A., Madrid, Spain, during 4-6 September 2024., and participated all project partners (8 persons – 2 persons/institution).1 Article accepted at KreativEU Conference.

Were there any major differences between the planned activities and the implemented activities? If so, please explain.
There were no major differences between planned activities and implemented activities, for Intellectual Outputs IO3 and the leader of this work package was the EDIBON International S.A. company, Madrid, Spain, which monitored the progress of the activities and results obtained within this work package (WP4).
For the realization of IO3 - AMAZE e-learning VR/AR platform for virtual laboratory, all AMAZE project partners participated, and comprises the next applied modules: Additive Manufacturing of metallic complex lattices used in industry (UNSTPB); AMAZE VR/AR e-learning platform for virtual laboratory used for Additive Manufacturing of industrial parts (Edibon); Reverse Engineering (PUT), Additive Manufacturing in Architecture Design (YFCNU).
The modules and the videos were prepared by the experts of the AMAZE project consortium and presented on the AMAZE project site: http://www.amaze2023.eu/, exactly as in the project proposal and student participants to the Summer School, were selected to follow this curriculum so as they were constituted on the inter-complementary and transnational bases.
The Summer School of the project - Agreement number 2023-1-RO01-KA220-HED-000155412, Acronym: AMAZE with the title “European Network for Additive Manufacturing in Industrial Design for Ukrainian Context”, took place on 8.07.2024-17.07.2024, and were participated students and staffs from project partners (PUT, YFCNU and Edibon International S.A. company) and were invited professors and students from National University of Science and Technology Politehnica Bucharest. The event was hosted by National University of Science and Technology Politehnica Bucharest, Romania. Because the company Edibon International S.A. Spain didn’t participate physically in the Summer School, their mobilities money (3180 euros) for 2 persons mobilities, was moved to the Intellectual Outputs IO4 for the researcher's salaries.
The event was attended by representatives of the 4 partners: National University of Science and Technology Politehnica Bucharest - Romania, Poznań University of Technology (PUT) – Poland, Yuriy Fedkovych Chernivtsi National University – Ukraine and EDIBON International S.A. Madrid – Spain.
The participants at the Summer School, hosted by UNSTPB - Romania, were from PUT – Poland (5 students and 2 staffs), from Yuriy Fedkovych Chernivtsi National University (YFCNU)– Ukraine (5 students and 2 staffs) and from EDIBON International S.A. company (2 staffs from Romanian branch, and on-line MS Teams), and different professors and students from Politehnica Bucharest involved in the AMAZE project.
The Transnational Project Meeting – TPM3 of the AMAZE project, was hosted by Edibon International S.A. company, from Madrid, Spain, during 4-6 September 2024., and participated all project partners (8 persons – 2 persons/institution), exactly as specified in the planned activities. Article presented at Conference KreativEU Targoviste 2024, and accept for publishing in JOSA.

Planned results of the work package at application stage.
-All teaching methods and resources realized within the AMAZE consortium (e-book, e-toolkit manual, e-learning platform), research activities in developing complex design industrial parts. and ideas shared through the AMAZE e-learning platform will be used for attracting the main stakeholders which are activating in the industrial engineering/design/additive manufacturing/architecture domains, all these stakeholders being encouraged through the organized events to join the AMAZE e-learning platform in order to realize finally one European Network for Additive Manufacturing in Industrial Design for Ukrainian Context formed by major EU institutions that are coming from the Higher education domain, SMEs, industrial companies, IT sector, etc. which are interested in using the resources of the AMAZE project (which will be shared on open access level) and could be actively involved further on in building of strategic partnerships for applying for different research or institutional EU projects.
-Most of the case studies launched on the level of the e-learning platform of AMAZE project will be defined in cooperation and based on the input provided by the major stakeholders that are activating in the field of industrial engineering/design/additive manufacturing/architecture. Sources and resources provided for students aims to reduce the drop-out rate of the students in the time of war from Ukraine. Better education, student impact and competence development, motivation at local level, as well as higher attractiveness for potential (graduate) students at Regional and National level are impact that are foreseen to be reached on the AMAZE consortium level. Increasing of the reputation in the university community and in company networks, as well as providing of higher attractiveness for potential (graduate) students, reputation among partner universities, reputation by significant publications are important KPIs that are expected to increase the project visibility.

Explain how those results were achieved and how they helped reaching the project objectives. Please elaborate on the quality of the results and include the reference of the supporting documents that support this evaluation
Concerning the realization of IO3 - AMAZE e-learning VR/AR platform for virtual laboratory, all AMAZE project partners participated, and comprises the applied modules, attached open access on the AMAZE project: http://www.amaze2023.eu, who permit to be accessible for every students, researchers, economical companies, professors, engineers, architectures, designers or stakeholders interested by the Additive Manufacturing domain, used both in industry, design and architecture. The IO3 - AMAZE e-learning VR/AR platform for virtual laboratory contains the next modules: Additive Manufacturing of metallic complex lattices used in industry (UNSTPB); AMAZE VR/AR e-learning platform for virtual laboratory used for Additive Manufacturing of industrial parts (Edibon); Reverse Engineering (PUT), Additive Manufacturing in Architecture Design (YFCNU).
The modules and the videos were prepared by the all experts of the AMAZE consortium and presented on the AMAZE project site: http://www.amaze2023.eu/, exactly as in the project proposal and student participants to the Summer School, were selected to follow this curriculum so as they were constituted on the inter-complementary and transnational bases.
The Summer School of the project - Agreement number 2023-1-RO01-KA220-HED-000155412, Acronym: AMAZE with the title “European Network for Additive Manufacturing in Industrial Design for Ukrainian Context”, took place on 8.07.2024-17.07.2024, and were participated students and staffs from project partners (PUT, YFCNU and Edibon International S.A. company) and were invited professors and students from UNSTPB. The event was hosted by UNSTPB Romania. Because the company Edibon International S.A. Spain didn’t participate physically in the Summer School, their mobilities money (3180 euros) for 2 persons mobilities, was moved to the Intellectual Outputs IO4 for the researcher's salaries to create a supplementary module for IO4-e-

case studies. During to the Summer School, hosted by UNSTPB, the participants visited Castel Bran from Brasov, Castle Peles from Sinaia, the Black Sea (Mamaia) grace of Constanta University, Parliament Palais, Unirii Square from Bucharest, etc. The participants visited the Campus Research Center from National UNSTPB, Romania. The participants at the Summer School, hosted by National University of Science and Technology Politehnica Bucharest, Romania, were from PUT – Poland (5 students and 2 staffs), from YFCNU– Ukraine (5 students and 2 staffs) and from EDIBON International S.A. company (2 staffs from Romanian branch, and on-line MS Teams), and different professors and students from Politehnica Bucharest involved in the AMAZE project.
YFCNU sustained the course about CAD/CAE software (Autodesk Revit) used in architecture and in industry, by Mrs. Prof. Nataliia Vatamaniuk. From Politehnica Bucharest, Mr. Prof. Dumitrescu Andrei presented the course about Industrial Design – Approaches for a definition. Mr. Prof. Remigiusz Labudzki, and Mrs. Natalia Wierzbicka from PUT - Poland, presented the course about Smart (Intelligent) Materials used for industrial products. From Edibon International S.A. company, Romanian branch from Craiova, Mr. Adrian Popescu presented the Edibon industrial products in Romania and computer programming used for them. It was presented a course about Sensors and Electronics and Additive Manufacturing used in industry, by Mrs. Prof. Băilă Diana, from Politehnica Bucharest and was started the workshop 3D CAD, for the students, to permit realization of the design and stl file for their 3D parts (the guide support, the brewery building, and the case phone). The course about Smart (Intelligent) Materials used in Architecture was presented by Mrs. Prof. Borcha Mariana, from YFCNU, Ukraine and the course about Reverse Engineering sustained by Mr. Prof. Remigiusz Łabudzki, from PUT Poland. Mr. Prof.Dr.Eng. Zaharia Cătălin from National University of Science and Technology Politehnica Bucharest, Romania, realized the presentation concerning the Additive Manufacturing used in industrial design, with the title: “Polymeric Materials in 3D Printing Transforming Manufacturing and Design”. It was realized the Enterprise Dynamics workshop – for virtual reality simulation and the Romanian companies’ presentation from Additive Manufacturing domain. EDIBON International S.A. company, presented by MS Teams on -line the course about Developing of VR/AR applications, realized by Mr. Eng. Sergio Vizcaino. At the final of the Summer School, the students realized different presentations concerning the 3D printed parts with complex forms, manufactured by Additive Manufacturing techniques. The TPM3 of the AMAZE project, was hosted by Edibon International S.A., Madrid, Spain, during 4-6 September 2024., and participated all project partners (8 persons – 2 persons/institution). 1 article presented at KreativEU Confernce 2024 and accepted for publishing in Journal of Science and Arts (ISI , Q4- IF2023=0.3), vol.4, 2024.

Describe the target group for those activities and results and explain how those were beneficial for them.
The target group for those activities and results of IO3 - AMAZE e-learning VR/AR platform for virtual laboratory, that contains the applied modules, attached open access on the AMAZE project http://www.amaze2023.eu, who permit to be accessible for every professors, researchers, students, economical companies, engineers, architectures, designers or different stakeholders interested by the Additive Manufacturing domain, used both in industry, design and architecture and by the AMAZE project results. The IO3 - AMAZE e-learning VR/AR platform for virtual laboratory contains the next modules: Additive Manufacturing of metallic complex lattices used in industry (UNSTPB); AMAZE VR/AR e-learning platform for virtual laboratory used for Additive Manufacturing of industrial parts (Edibon); Reverse Engineering (PUT), Additive Manufacturing in Architecture Design (YFCNU). All modules in format pdf and the videos were prepared by the all experts of the AMAZE project consortium and attached on the AMAZE project site: http://www.amaze2023.eu/, exactly as in the project proposal and student participants to the Summer School, were selected to follow this curriculum so as they were constituted on the inter-complementary and transnational bases. The Summer School of the project - Agreement number 2023-1-RO01-KA220-HED-000155412, Acronym: AMAZE with the title “European Network for Additive Manufacturing in Industrial Design for Ukrainian Context”, was an event for students, professors, researchers, stakeholders and for companies to can realize different common objectives for next researches cooperations and for students practical stages. The Summer School took place on 8.07.2024-17.07.2024, at UNSTPB Romania and were participated students and staffs from project partners (PUT, YFCNU and Edibon International S.A. company) and were invited professors and students from UNSTPB. The participants at the Summer School, hosted by National University of Science and Technology Politehnica Bucharest, Romania, were from Poznań University of Technology (PUT) – Poland (5 students and 2 staffs), from Yuriy Fedkovych Chernivtsi National University (YFCNU)– Ukraine (5 students and 2 staffs) and from EDIBON International S.A. company (2 staffs from Romanian branch, and on-line MS Teams), and different professors and students from Politehnica Bucharest involved in the AMAZE project.
The Transnational Project Meeting – TPM3 of the AMAZE project, was hosted by Edibon International S.A. company, from Madrid, Spain, during 4-6 September 2024., and participated all project partners (8 persons – 2 persons/institution), exactly as specified in the planned activities. Two Mobilities Erasmus+ Agreements were signed between National University of Science and Technology Politehnica Bucharest Romania and Edibon International S.A. Spain, for the students practical stages, for years: 2023-2024 (3 students realized yet their practical stage at Edibon, in july-august 2024), respectively 2024-2025.

Provide information on the level of achievement of the selected qualitative and quantitative indicators. How were the progress, quality and achievement of this WP results monitored.
Quantity indicators KPI1. Number of participants participated at the Summer School hosted by UNSTPB: 5 students and 2 professors from Poznan Universiti of Technology (PUT), Poland and 5 students and 2 professors from Yuriy Fedkovych Chernivtsi National University (YFCNU) Ukraine, and from EDIBON International S.A. company (2 staffs from Romanian branch, and on-line MS Teams), 5 professors and 3 PhD students from National University of Science and Technology Politehnica Bucharest. The number of girl students was 11 and the boys students was 2.The number of women participants (14) was greater that of men (12).
KPI2. Number of participants at Transnational Project Meeting - TPM3, that took place at Edibon company, Spain, during 4-6 september 2024, and participated all project partners (8 persons – 2 persons/institution).
Methods - filling out attendance sheets, feedbacks, (Summer Schools) and filling out attendance sheets, feedbacks (TPM3).
Quality indicators: KPI3. The initial and final tests, students’ presentations, addressed to students participating to the Summer School in the AMAZE project with questions appropriate to the subjects taught in the project.
The learning material quality defined trough evaluation marks of questionnaires (IO3). KPI4. The AMAZE portal accessibility
and usability (IO1, IO2, IO3, IO4)
Methods: evaluation marks of questionnaires, number of participants that visit the AMAZE project website
The grades from PUT:
- Ms Iryna Kachura-Zhechytska - 10
- Ms Klaudia Jańczak - 9
- Ms Emilia Smolarek - 9
- Mr Jakub Gapsa - 10
- Mr Sebastian But - 10
The grades from YFCNU:
- Ms. Auryte Anastasiia - 10
- Ms. Bazyniak Vita - 10
- Ms. Kolodrivska Sofiia - 9

- Ms. Auzyak Angelina - 9
- Ms. Panivnyk Nataliia - 10

All students participants at the Summer School, updated their knowledges about Additive Manufacturing, and digitals skils.
Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants that visit the AMAZE project website
Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are foreseen to be reached:

- activities implemented according to the project's timelines: >95%
- an accomplishment of the project objectives: >95%
- objectives of each transnational meeting have been clear to participants: >80%
- satisfaction of participants to the transnational project meetings (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- quality of the intellectual outputs prepared by all partners: >95%
- learning objectives for the international training sessions have been met: >85%
- satisfaction of participant in the training (summer school) activities : >80%
- overall project quality assessment (made by partners): >80%
- satisfaction of participants to the international training sessions - Summer School (logistical arrangements, facilitation skills, respected): >80%.

Work package n°5 - IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)

How did the project partners contribute to the work package? Please detail specific contributions made by the partner organisations.

All AMAZE consortium partners (UNSTPB Romania, PUT- Poland, EDIBON International S.A. – Spain, YFCNU Ukraine) participated at Intellectual Outputs IO4 - AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models).
IO4 - AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies were attached on the AMAZE project site: http://www.amaze2023.eu/.
Multiplier Event ME4 realized at PUT (POL), on 4 november 2024, having invited 20 Polish persons from different companies, universities, research centers (out of PUT), as: WSKIZ, PAM, USNOZ and 5 foreigner's participants Slovakia (University of Žilina) and Portugal (University of Minho, from Braga and University of Porto), exactly as in planned activities. One article was accepted for publishing in Physics and Chemistry of Solid State Journal - indexed in Web of Science (ISI), IF2023= 0.9 (Q4). The numbers of articles accepted for publishing/published were realized exactly as in project proposal. (2 in International Conferences and 2 in Prestigious Journals).
Suplementary, other two articles were send for publishing in prestigious International Journal: Applied Sciences (ISI, Q1) and Processes (ISI, Q2). It was realized the Final Report of AMAZE project

Were there any major differences between the planned activities and the implemented activities? If so, please explain.

There were no major differences between planned activities and implemented activities, for Intellectual Outputs IO4 and the leader of this work package was the Poznan University of Technology, Poland, which monitored the progress of the activities and results obtained within this work package (WP5).
All AMAZE consortium partners (UNSTPB - Romania, PUT- Poland, EDIBON International S.A. – Spain, YFCNU - Ukraine) participated at Intellectual Outputs IO4 - AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models).
IO4 - AMAZE e-case studies (for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies) contains the next five e-case studies modules: 1- Realizing the VR/AR e-learning platform (Edibon International S.A. Spain), 2- CAD/CAM/CAE software (PUT Poland),
3- Design of complex industrial assembly using SolidWorks (UNSTPB Romania), 4- 3D Design using Autodesk REvit software in architecture (YFCNU Ukraine), and 5-Additive Manufacturing of industrial parts (Edibon International S.A. Spain, UNSTPB Romania). The fifth module with the title Additive Manufacturing of industrial parts (Edibon International S.A. Spain, UNSTPB Romania) was a supplementar module, and the researchers from Edibon International S.A. had a supplementary amount from the mobilities where they didn't participate at IO1 (1 person for TPM1 – 848 euro) and IO3 (2 persons for Summer School – 3180 euro). Overall, the budget of the Edibon company remained the same as in AMAZE project proposal, only changes were made between the budgets of the workpackges, from IO1 and IO3, to IO4. This change for Edibon International S.A. budget between workpackges was made through an additional act signed by the UNSTPB Rector and approved by the ANPCDEFP Romanian Agency.
The budgets of all partners remained the same as in the initial proposal of the AMAZE project, and the events within it took place according to the activities planned in the project proposal. Multiplier Event ME4 hosted by PUT (POL), on 4 november 2024, having invited 20 Polish persons from different companies, universities, research centers (out of PUT), as: WSKIZ, PAM, USNOZ and 5 foreigner's participants Slovakia (University of Žilina) and Portugal (University of Minho, from Braga and University of Porto), exactly as in planned activities. All AMAZE project partners participated on-line by MS Teams.
One article was accepted for publishing in Physics and Chemistry of Solid State Journal - indexed in Web of Science (ISI), IF2023= 0.9 (Q4). The numbers of articles accepted for publishing/published were realized. (2 in International Conferences and 2 in Prestigious Journals).
Suplementary, other two articles were send for publishing in prestigious International Journals

Planned results of the work package at application stage.

The main results of the work package WP5
The list of participants and feedbacks at Multiplier Events existing in AMAZE proposal project, especially the number of them (if are from other countries) they give the event an international dimension, increasing the visibility of the results and activities carried out in the project. The Multiplier Event ME4 realized at PUT (POL), having invited 20 persons from different companies, universities, research centers (out of PUT) and 5 foreigner's participants, will permit to a greater visibility of AMAZE project activities and results, will take place in period 15.07.2024-14.09.2024.
In order to combine the practical part with the course modules, 4 case studies of industrial parts with complex forms to design (some 3D models, cases of design or architectural models), will be presented (Intellectual Outputs IO4) that will be proposed by the partners from Poland and Romania, these case

studies aim to develop design, digital and manufacturing skills of students and for all participants to AMAZE project, all stakeholders interested by these domains. The number of visualizations on AMAZE site and the number of courses, toolkit and cases downloaded is other dissemination method of AMAZE project results.
Other AMAZE project results consists in articles published in different International Conferences/International Journal with higher visibility.
The AMAZE final report including all activities, tasks, responsibilities, costs and results of all partners involved in AMAZE project represent other important result of the partners work that will be sent to Erasmus+ Agency, for monitoring and feedback of AMAZE results.

Explain how those results were achieved and how they helped reaching the project objectives. Please elaborate on the quality of the results and include the reference of the supporting documents that support this evaluation

All AMAZE consortium partners (UNSTPB - Romania, PUT- Poland, EDIBON International S.A. – Spain, YFCNU - Ukraine) participated and collaborated to realize the Intellectual Outputs IO4 - AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models). The leader of this work package was the Poznan University of Technology, Poland, which monitored the progress of the activities and results obtained within this work package (WP5).
IO4 - AMAZE e-case studies (for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies) contains the next five e-case studies modules: 1- Realizing the VR/AR e-learning platform (Edibon International S.A. Spain), 2- CAD/CAM/CAE software (PUT Poland), 3- Design of complex industrial assembly using SolidWorks (UNSTPB Romania), 4- 3D Design using Autodesk REvit software in architecture (YFCNU Ukraine), and 5-Additive Manufacturing of industrial parts (Edibon International S.A. Spain, UNSTPB Romania). The fifth module with the title Additive Manufacturing of industrial parts (Edibon International S.A. Spain, UNSTPB Romania) was a supplementary module, and the researchers from Edibon International S.A. had a supplementary amount from the mobilities where they didn't participate at IO1 (1 person for TPM1 – 848 euro) and IO3 (2 persons for Summer School – 3180 euro). Overall, the budget of the Edibon company remained the same as in AMAZE project proposal, only changes were made between the budgets of the workpackges, from IO1 and IO3, to IO4. This change was made through an additional act signed by the UNSTPB Rector and approved by the ANPCDEFP Romanian Agency.
The budgets of all partners remained the same as in the initial proposal of the AMAZE project, and the events within it took place according to the activities planned in the project proposal.
The IO4 - AMAZE e-case studies were attached on the AMAZE project site: http://www.amaze2023.eu/.
Multiplier Event ME4 realized at PUT (POL), on 4 november 2024, having invited 20 persons from different companies, universities, research centers (out of PUT) as: WSKIZ, PAM, USNOZ and 5 foreigner's participants from Slovakia (University of Žilina) and Portugal (University of Minho, from Braga and University of Porto), exactly as in planned activities.
At the ME4, the specialized international companies in additive manufacturing were invited to make presentations about professional additive manufacturing techniques and systems. MATERIALISE NV company from Belgium presented the subject of Rapid Prototyping Development in Choosen Industries.
The company ViscoTec Pumpen- und Dosiertechnik GmbH (Germany) sustained a presentation concerning 3D Print Heads Solutions for Extrusion - Based Additive Manufacturing. The company Omni3D Sp. z o. o. (Poland) presented Application of industrial 3D printing.
One article was published open-acces (Acceptation Letter) in Physics and Chemistry of Solid State Journal - Web of Science (ISI), IF2023= 0.9 (Q4) I.M. Fodchuk, S.V. Balovsyak, M.S. Solodkyi, M.D. Borcha, D.-I. Băilă, R. Labudzki, M. Bonilla, Spatial distributions of local strains in synthesized diamond crystals from the normalized parameters of Kikuchi patterns. PHYSICS AND CHEMISTRY OF SOLID STATE, Vo.25, No.4, pp.773-781, 2024, ISSN 2309-8589, DOI: 10.15330/pcss.25.4.773-781. The numbers of articles accepted for publishing/published were realized, exactly as in AMAZE project proposal (2 in International Conferences and 2 in Prestigious Journals).
Two supplementary articles written by AMAZE project consortium were send for publishing in prestigious International Journal: Applied Sciences (ISI, Q1) and Processes (ISI, Q2). Article send for publishing open-acces in Processes 2024 (indexed Web of Science, ISI, IF2023=2.8, Q2) Tribological Properties of FDM-Printed PLA and PLA-CF: Impact of Process Parameters and Internal Structure Paweł Zawadzki *, Justyna Rybarczyk, Adam Patalas, Natalia Wierzbicka, Remigiusz Łabudzki, Diana-Irinel Băilă, Igor Fodchuk, Mirian Bonilla, Tribological Properties of FDM-Printed PLA and PLA-CF: Impact of Process Parameters and Internal Structure, Processes 2024 (indexed Web of Science, ISI, IF2023=2.8, Q2). Article send for publishing open-acces in Applied Sciences 2024 (indexed Web of Science, ISI, IF2023=2.5, Q1) Băilă Diana Irinel *, Trusca Roxana, Bibis Adrian, Remigiusz Łabudzki, Fodchuk Igor, Bonilla Mirian Morphology and design of lattices structures manufactured by SLM (Selective Laser Melting) using different metallic powders, Applied Sciences 2024. The final report of AMAZE project was realized, specifying that all objectives, results and planned activities of AMAZE project were realized, grace of very fruitful collaboration on AMAZE project consortium.

Describe the target group for those activities and results and explain how those were beneficial for them.

The target group for those activities and results of IO4 - AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models) attached on http://www.amaze2023.eu, are professors, researchers, students, economical companies, engineers, architectures, designers or different stakeholders interested by the Additive Manufacturing domain, for complex parts from industry, design and architecture.
The IO4 - AMAZE e-case studies contains five e-case studies modules: 1- Realizing the VR/AR e-learning platform (Edibon International S.A. Spain), 2- CAD/CAM/CAE software (PUT Poland), 3- Design of complex industrial assembly using SolidWorks (UNSTPB Romania), 4- 3D Design using Autodesk REvit software in architecture (YFCNU Ukraine), and 5-Additive Manufacturing of industrial parts (Edibon International S.A. Spain, UNSTPB Romania). The fifth module with the title Additive Manufacturing of industrial parts (Edibon International S.A. Spain, UNSTPB Romania) was a supplementary module.
To combine the practical part with the course modules, 5 ecase studies of industrial parts with complex forms to design (some 3D models, cases of design or architectural models), these case studies permit the development design, digital and manufacturing
skills of students and for all participants in the AMAZE project, all stakeholders interested by these domains. The Multiplier Event ME4 hosted by PUT (POL), on 4 november 2024, permitted an internationalization of AMAZE project results, having invited more than 25 participants; such as 20 persons from different companies, universities, research centers (out of PUT) and 5 foreigner's participants, exactly as in planned activities.
One article was published open-acces (Acceptation Letter) in Physics and Chemistry of Solid State Journal - Web of Science, IF2023= 0.9 (Q4) I.M. Fodchuk, S.V. Balovsyak, M.S. Solodkyi, M.D. Borcha, D.-I. Băilă, R. Labudzki, M. Bonilla, Spatial distributions of local strains in synthesized diamond crystals from the normalized parameters of Kikuchi patterns. PHYSICS AND CHEMISTRY OF SOLID STATE, vol.25, no.4, pp.773-781, 2024, DOI: 10.15330/pcss.25.4.773-781. In total, the number of open-acces articles accepted for publishing/published was realized, exactly as in AMAZE project proposal (2 in International Conferences and 2 in Prestigious Journals), and grace of them, the results of AMAZE project can be disseminated in all international academic world. Two supplementary articles written by AMAZE project consortium were send for publishing in prestigious International Journal: Applied Sciences (ISI, IF2023=2.5, Q1) and Processes (ISI, IF2023=2.8, Q2). All planned results in the project proposal were realized by AMAZE consortium with succes, this being remark by the participation of great companies from Europe at the final Multiplier Event ME4 a

Provide information on the level of achievement of the selected qualitative and quantitative indicators. How were the progress, quality and achievement of this WP results monitored.

Quantity indicators KPI1. Number of participants = 25 participants from different institutes (not involved in project and out of Poznań University of Technology - students, engineers, researchers, professors) participated at Multiplier Event ME4, realized at Poznan University of Technology (Poland).
20 participants were from different Polish institutions such as: WSKIZ, PAM, USNOZ (not involved in project and out of Poznań University of Technology) and 5 foreign participants from Slovakia (University of Žilina) and Portugal (University of Minho, from Braga and University of Porto).
2 Romanian students from National University of Science and Technology Politehnica Bucharest participated at this event.
The specialized international companies in additive manufacturing were invited to make presentations about professional additive manufacturing techniques and systems. MATERIALISE NV company from Belgium presented the subject of Rapid Prototyping Development in Choosen Industries.
The company ViscoTec Pumpen- und Dosiertechnik GmbH (Germany) sustained a presentation concerning 3D Print Heads Solutions for Extrusion - Based Additive Manufacturing.
The company Omni3D Sp. z o. o. (Poland) presented Application of industrial 3D printing
Methods - filling out attendance sheets, feedbacks of ME4.
Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants that visit the AMAZE project website
Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are foreseen to be reached:
- activities implemented according to the project's timelines: >95%
- an accomplishment of the project objectives: >95%
- objectives of each multiplier events meetings have been clear to participants: >80%
- satisfaction of participants to the multiplier events meeting (logistical arrangements, facilitation skills, respected schedule and timing): >80%.

Participants' Recognition

Did your project make use of European instruments like Europass, Youthpass, ECTS etc. or any national instruments/certificates for recognition or validation of the learning outcomes of the participants in the learning, teaching or training activities?
NO

If you have used other recognition/validation instruments, please describe them:
We used for CV, the Europass CVs.

Follow-up

The following question represents your feedback to the European Commission about application, implementation and reporting procedures for your Erasmus+ project. When answering this question, please take into account the opinion of all organisations involved in your project.

Do you consider that the procedures applicable to your project were proportionate and simple?
YES

The following questions should be addressed taking into account effects on the coordinator organisation and partner organisations (including associated partners, if any).

Do you consider that your organisations have developed high-quality practices as a result of their participation in Erasmus+ Key Action 2?
YES

Please provide more information about your reply: what type of high-quality practices you developed or did not manage to develop? Why?
The high-quality practices, that we developed in AMAZE project, were: Additive Manufacturing technologies, CAD/CAM/CAE used for the design of complex parts in industry and architecture, digital skills, Smart (Intelligent) Materials, Computer Programming, Sensors and Electronics, Reverse Engineering, presented in the Intellectual Outputs (IOs) such as: e-book, e-toolkit, VR/AR platform and e-case studies.

Impact and sustainability

What was the project's impact on the participants, participating organisations, target groups and other relevant stakeholders?

The AMAZE project provides the chance for the students and professors in mixing the studying / teaching experience and traineeship mobilities periods abroad, with the main aim of further enhancing the learning outcomes and development of transversal skills. Multiplier Events and the results within the AMAZE project were extremely disseminated and had great success and visibility, with persons from 4 continents (Europe, Africa, Asia and South America) participating in these events, the participants were from universities, research centers, companies, ministry from 14 countries (Romania, Spain, Poland, Ukraine, Norway, Marroco, Slovakia, Portugal, Costa de Marfil, Uzbekistan, South Sudan, Germany, Belgium and invitees from Peru). The AMAZE project impact was very impressive, especially concerning the number of participants, at the project activities (Transnational Project Meetings, Multiplier Events, Staff Trainings STTE, Summer School) and grace of the Intellectual Outputs IOs and their results that were realized by the researchers from consortium.

What was the impact of the project at the local, regional, European and/or international levels?

The AMAZE project impact was very impressive, by the number of participants, at the project activities (Transnational Project Meetings, Multiplier Events, Staff Trainings STTE, Summer School) and due of the Intellectual Outputs IOs and their results that were realized by the researchers from consortium.
At the ME1, hosted by Edibon International S.A., Spain on 25 April 2024, were invited famous personalities, such as the Economic Counselor from the Romanian Embassy in Madrid, Mr. Bogdan Bădescu, Prof. Filippo Sanfilippo from the University of Agder, Norway, teachers and students from two renowned universities in Madrid, namely, University Rey Juan Carlos from Madrid, and University Francisco de Vitoria in Madrid, various companies and foreign participants from Norway, Costa de Marfil, Morocco, Uzbekistan, South Sudan, Romania, Spain, Poland and Ukraine and invitees from Peru. Practically, this event turned into a transnational event with people from 4 continents participating (Europe, Asia, Africa and South America).
The participants at the ME2, hosted by UNSTPB, Romania, were from different Romanian research centers as: COMOTI and Ilie Murgulescu Institute of Physical-Chemistry from Romanian Academy, different companies that were interested by AMAZE project results as: Leykom Bucharest, Admasys Targu Mures, NUTechnologies Timisoara, S.C. MGM Star Construct S.R.L. Bucharest, Allio Group Bucharest, Betrandt and students from University of Medicine and Pharmacy Carol Davila, Bucharest and from Politehnica Bucharest.
The ME3 with the title: “Applied Research Methods for Additive Manufacturing in Architectural Design” was hosted by YFCNU (Ukraine), on 20 June 2024, where participated 20 participants (exactly as in the project proposal), they were outside from YFCNU and not involved in AMAZE project. The participants at the ME3, hosted by YFCNU, were from different Ukrainian companies as: Chernivtsizhytlobud company, Vodogray LLC, Chernivtsi, Three A Studion, Dar Group, Urbanhause, Addline Group, SAGA Software company, DataWiz IT company, Symbols Fund and Association Joseph Schumpeter Bukovynian Innovative Technology Cluster and professors and students from YFCNU – Ukraine.
The ME4 hosted by PUT (POL), on 4 nov 2024, permitted an internationalization of AMAZE project results, having invited more than 25 participants; 20 participants were from different Polish institutions such as: WSKIZ, PAM, USNOZ (not involved in project and out of Poznań University of Technology) and 5 foreign participants from Slovakia (University of Žilina) and Portugal (University of Minho, from Braga and University of Porto), and companies from Belgium and Germany. The long-term impact of the AMAZE project consists of the e-book, e-toolkit, VR/AR platform, and ecase studies and articles published/attached on AMAZE project site, which will be used to improve the disciplines of Manufacturing Processes and Products and Advanced Manufacturing Processes (Master degree, UNSTPB).

What are the activities and results that will be maintained after the end of the EU funding, and how will you ensure the resources needed to sustain them? How have you ensured that the project's results will remain available and be used by others?

The activities and the results of the AMAZE project will be maintained after the end of the EU funding, grace of the AMAZE site, and the research from the Erasmus+ project - AMAZE will be continued by the research activities of the students from Bachelor's degree, Master's degree and PhD doctorand students, involved in the Summer School and in the AMAZE project activities.
The AMAZE project's results will remain available and be used by others, due of the site of the project: http://www.amaze2023.eu/, which permits to all persons interested by the AMAZE project results to read and be inspired from the project results, and the four published articles open-acces can permit to be read and cite the interested persons. Other two articles are send for publishing in Applied Sciences and in Processes. After the enf of the EU funding, we will maintained the e-book, e-toolkit, VR/AR platform, and e-case studies and articles published/attached on AMAZE project site, which will be used to improve the disciplines of Manufacturing Processes and Products and Advanced Manufacturing Processes (Master degree, UNSTPB). The research articles consist inspirational sources for PhD students that realize their research practical stages.

Dissemination and Use of Project Results

To whom did you disseminate the project results inside and outside your partnership? Please define in particular your targeted audience(s) at local/regional/national/EU level/international and explain your choices.

The AMAZE project results were disseminated inside our partnership in the participant Institutions (National University of Science and Technology Politehnica Bucharest - Romania; Edibon International S.A. Madrid - Spain; Poznan University of Technology - Poland; Yuriy Fedkovych Chernivtsi National University -Ukraine), this things can be remarked by the number of students, professors and employers involved in the AMAZE project activities.
Concerning the international dissemination of the results and activities of AMAZE project, the Multiplier Events realized in this project were an impressive success with great internationalization, especially by the number of participants and the diversity of countries of provenience of the participants.
Multiplier Events and the results within the AMAZE project were extremely disseminated and had great success and visibility, with persons from 4 continents (Europe, Africa, Asia and South America) participating in these events, the participants were from universities, research centers, companies, ministry from 14 countries (Romania, Spain, Poland, Ukraine, Norway, Marroco, Slovakia, Portugal, Costa de Marfil, Uzbekistan, South Sudan, Germany, Belgium and invitees from Peru). At the impressive Multiplier Event ME1 at EDIBON International S.A. company in Madrid, the Spanish companies that participated at this event, were: ACOM Murcia - Spain, DGM Murcia - Spain. The special guests Mr. Bogdan Bădescu - Economic Counselor from the Romanian Embassy in Madrid, Spain and Prof. Filippo Sanfilippo from the University of Agder, Norway participated at the Multiplier Event (ME1) held at Edibon International S.A. from Madrid, on 25.04.2024.
The companies participants at the Multiplier Event ME2, hosted by National University of Science and Technology Politehnica Bucharest, Romania, were from different Romanian research centers as: COMOTI and Ilie Murgulescu Institute of Physical-Chemistry from Romanian Academy, different companies that were interested by AMAZE project results as: Leykom Bucharest, Admasys Targu Mures, NUTechnologies Timisoara, S.C. MGM Star Construct S.R.L. Bucharest, Allio Group Bucharest and Betrandt. The companies participants at the Multiplier Event ME3, hosted by YFCNU – Ukraine, were from

different Ukrainian companies as: Chernivtsizhytlobud company, Vodogray LLC, Chernivtsi, Three A Studion, Dar Group, Urbanhause, Addline Group, SAGA Software company, DataWiz IT company, Symbols Fund and Association Joseph Schumpeter Bukovynian Innovative Technology Cluster.
At ME4 hosted by PUT Poland, participated 3 great companies specialized in Additive Manufacturing, Omni3D Sp. z o. o. (Poland), MIMICS from MATERIALISE NV company from Belgium and ViscoTec Pumpen- und Dosiertechnik GmbH (Germany).

What kind of dissemination activities did your partnership carry out and through which channels? Please also provide information on the feedback received, if any.

Concerning the dissemination activities, all university partners used the university's sites (UNSTPB, PUT, YFCNU), respectively, the Facebook, whatsapp and telegram for Edibon International S.A. from Spain.
The feedback forms realized by the participants at this events organized in AMAZE project, demonstrated that the courses and the activities were very innovative and interesting.
Link Dissemination for ME1 – Edibon International S.A. company, Madrid, Spain – 25.04.2024
https://upb.ro/politehnica-bucuresti-promotor-al-proiectului-international-de-cooperare-universitara-erasmus/
EDIBON - El próximo día 25 de abril nuestra sede de EDIBON... | Facebook
Link Dissemination for ME2 – UNSTPB, Bucharest, Romania – 18.06.2024
https://upb.ro/comunicat-de-presa-european-network-for-additive-manufacturing-in-industrial-design-for-ukrainian-context-amaze/
Link Dissemination for ME3 – YFCNU, Cernauti, Ukraine – 20.06.2024
Багатостороння зустріч у рамках Міжнародного проєкту AMAZE - Чернівецький національний університет імені Юрія Федьковича (chnu.edu.ua)
Зустріч у рамках проєкту «European Network for Additive Manufacturing in Industrial Design for Ukrainian Context» - Чернівецький національний університет імені Юрія Федьковича (chnu.edu.ua)
Link Dissemination for ME4 – PUT, Poznan, Poland – 4.11.2024
https://dmef.put.poznan.pl/artykul/spotkanie-multiplier-event-4-podsumowujace-projekt-amaze
Link Dissemination for Staff Training STTE – Edibon International S.A. company, Madrid, Spain – 7-12.05.2024
https://www.facebook.com/photo/?fbid=2669984953155130&set=pcb.2669987476488211
https://www.facebook.com/photo/?fbid=2670779796408979&set=pcb.2670781599742132
https://www.facebook.com/photo/?fbid=2671345213019104&set=pcb.2671346953018930
Link Dissemination for Summer School – UNSTPB, Bucharest, Romania – 8-17.07.2024
https://upb.ro/summer-school-proiect-eramsus-amaze/
Link Dissemination for TPM1 - UNSTPB, Bucharest, Romania – 27-29.11.2024
https://upb.ro/unstpb-anunta-lansarea-proiectului-international-erasmus-european-network-for-additive-manufacturing-in-industrial-design-for-ukrainian-context-amaze/
Spotkanie Kick-Off Projektu AMAZE | Wydział Inżynierii Mechanicznej (put.poznan.pl)
https://www.chnu.edu.ua/novyny/mizhnarodna-diialnist/inaugural-meeting-of-participants-of-the-international-project-european-network-for-additive-manufacturing-in-industrial-design-for-ukrainian-context/
https://www.chnu.edu.ua/mizhnarodna-diialnist/mizhnarodni-proiekty/erazmusplus-ka2/amaze/
Link Dissemination for TPM2 - PUT, Poznan, Poland – 10-12.06.2024
https://www.dmef.put.poznan.pl/artykul/spotkanie-partnerow-projektu-amaze
Link Dissemination for TPM3 - Edibon International S.A. company, Madrid, Spain – 4-6.09.2024
https://upb.ro/comunicat-de-presa-tpm3-amaze-erasmus/
https://www.facebook.com/Edibon.International/posts/pfbid02XiQz6LaecKMg5T69eVEH7CQVz4gbySvDocXy8Qwkx9kWsBVVQpbsLhPKCF4sMKefl
https://www.whatsapp.com/channel/0029VaDneK88kyyPL4TJHZ1Q
https://t.me/+LLPJVFKvTqkwNmY

Erasmus+ promotes an open access requirement for all materials produced through its projects. In case your project has produced project results/tangible deliverables, please describe if and how you have promoted free access to them by the public. In case a limitation was imposed for the use of the open licence, please specify the reasons, extent and nature of this limitation.

All documents (Intellectual Outputs results) and activities are attached on the site of AMAZE project and are open-access. The four research articles accepted/published in the AMAZE project, they are published in Open-Access Journals, exactly to can be read by all students, professors employers, engineers, and stakeholders, interested by the AMAZE project results. Other 2 articles are send for publishin in ISI (Web of Science) open-access journals, Applied Sciences (MDPI) and Processes (MDPI).

How did you see the potential to use this project's approach and/or results in other projects on a larger scale and/or in a different field or area of knowledge?

The potential is very great to use AMAZE project's approach and/or results in other projects on a larger scale and/or in a different field or area of knowledge. All AMAZE consortium partners and all invitees from Multiplier Events, we realized some plans to realize new European Research Project Horizon, and EEA&Norway grants, of course in the Additive Manufacturing fields, especially because in Politehnica Bucharest, in the Faculty of Industrial Engineering and Robotics (where i work), was bought a TRUPRINT 2000 Titan - robot machine from Trumpf company (that manufacture with metallic powders by Additive Laser Manufacturing - Direct Metal Deposition), and of course in this case, can realize great researches.

European Language Label

The European Language Label is an award set up by the European Commission as part of the Erasmus+ programme. Its objectives are to recognise excellent projects in the area of multilingualism, to help sharing their results, and to promote public interest in language learning.

European Language Labels are awarded in each EU member state and in third countries associated to Erasmus+. The labels are awarded either on annual or biannual basis, depending on the country. You can learn more about the European Language Label on the Europa web, here:

European language initiatives

Thanks to having completed a Key Action 2 cooperation partnership project, your organisation has the opportunity to apply for the European Language Label.

Please note that applying for the European Language Label will not influence the evaluation of your final report in any way. All the information provided in replies to questions in this section will be used exclusively in the selection procedures for the European Language Label.

Would you like to apply for the European Language Label?
NO

Annexes

The maximum size of a file is 15 MB and the maximum total size is 100 MB.
The maximum number of all attachments is 100.

Declaration on honour

Please download the declaration on honour, print it, have it signed by the legal representative and attach.

Other documents

Please attach any other relevant documents.
If you have any additional questions, please contact your National Agency. You can find their contact details here: List of National Agencies

List of documents

No	Name	File size (kB)	Type of document	
0	Honoured_Declaration_AMAZE_Rector_-_6.12.2024.pdf	246	Declaration on honour	
1	Declaratie_Rector_AMAZE.pdf	317	Other document	
2	8-Declaration_on_honour_UPB_dated.pdf	2130	Other document	
	Total size (kB)	**2693**		

Checklist

Before submitting your report form to the National Agency, please make sure that:

- You have uploaded the relevant results on the Erasmus+ Project Results platform: http://ec.europa.eu/programmes/erasmus-plus/projects/; If project results have not been uploaded: I confirm that the project has not produced any results that could be uploaded.
- All necessary information on your project has been encoded in Beneficiary Module;
- The report form has been completed using one of the mandatory languages specified in the Grant Agreement;
- All the relevant documents are annexed:
- Declaration on Honour, signed by the legal representative of the beneficiary organisation;
- The necessary supporting documents proving that the activities foreseen in the project effectively took place;
- You have saved or printed the copy of the completed form for your records.

Conditions for the Final report submission

Final report can only be submitted if:

- All mandatory fields in the report have been filled in
- All work packages in the project are in status Complete, see List of work packages
- Declaration on Honour has been uploaded
- Checklist has been fulfilled
- Participating organisations involved in activities are valid throughout the entire duration of the activities.

PROTECTION OF PERSONAL DATA

Please read our privacy statement to understand how we process and protect

your personal data