EDURES

EDUcation RESearch

Report on the development of the set of tools and procedures for EDURES feedback and methods of continuous improvement

This report has been developed by the EDURES project partners within the project:

EDURES: Technology education in the digital era supported by the significant use of research results

Intellectual Output 5: *Report on the development of the set of tools and procedures for EDURES feedback and methods of continuous improvement*

Intellectual Output 5 lead:

HOCHSCHULE FURTWANGEN

Project partners:

- POLITECHNIKA RZESZOWSKA IM. IGNACEGO ŁUKASIEWICZA
- CENTOFORM SRL
- NATIONAL TECHNICAL UNIVERSITY OF ATHENS - NTUA
- HOCHSCHULE FURTWANGEN

Programme: Erasmus+

Key Action: Cooperation for innovation and the exchange of good practices
Action Type: Strategic Partnerships for higher education
Number of the project: 2020-1-PL01-KA203-082219

Webpage of the project: http://edures.prz.edu.pl

Project card: https://ec.europa.eu/programmes/erasmus-plus/projects/eplus-project-details/#project/2020-1-PL01-KA203-082219

Updated in August 2023.

Contents

1. Introduction

This report aims to create a framework for the collection and analysis of feedback for the EDURES results, and to identify effective methods for continuous improvement. The outcome of this report will include a set of tools and procedures for feedback collection, analysis, and improvement. Additionally, the report will integrate the insights gained from multiplier events.

The report will focus on several key aspects, including the practical analysis of tools. This analysis will be based on use cases that have been predefined by all the partners. Additionally, it will involve analyzing feedback data that is already available.

Based on the feedback collected, the project will develop methods that address local improvements as well as improvements for all implementations of the EDURES platform as a whole.

2. Main tools and procedures supporting feedback on the research results implementation

2.1. Survey utilization in recording opinion of students

Surveys are frequently used in order to record opinion. There are different tools (on-line), free of charge or commercial, which enable us to prepare a survey. Currently, using the Internet, we can easily prepare online survey questionnaires. The table below presents the most commonly used tools for this purpose. In some of these environments, creating surveys is one of the additional features. We have access to creating surveys after registering (e-mail). We can use our other online accounts to log in (e.g. Google, Facebook, LinkedIn, Microsoft, Apple). Most of these applications are commercial, but you can work with trial or educational versions.

In all these environments, we can prepare a survey, send it to respondents and analyze the results obtained. You can create the structure of the survey yourself or use the library of templates. The standard preparation of the survey form consists in:

•   definition of a set of survey questions,

•   setting the title page and thank you page,

•   choosing the form of presenting the survey (questions separately or collectively),

•   adjusting the appearance of the survey questionnaire (colors, background),

•   setting the deadline for completing the survey.

Survey questions can be of different types: single choice, multiple choice, text answer, image choice, star rating, semantic differential, rating scale, ordering, matrix- single choices, matrix- multiple choices, custom text.

Before sharing a survey, we may adapt the appearance of the survey to the screen of a computer, tablet or phone. The completed survey can be shared via email, hyperlink or social media.

The collected results can be made available in the form of reports as pdf, doc, ppt files or on the website. Collected survey results can be exported to spreadsheets and saved in databases. Some applications allow you to create backups on cloud drives (Dropbox, Google Drive, OneDrive). Some provide data protection with a 256-bit SSL connection, GDPR compliance, CCPA, form encryption option, and optional HIPAA compliance for healthcare professionals.

Table. Examples of tools which could be utilized in preparation of surveys

Tool name	Hyperlink
Asana	https://asana.com
Canva	https://www.canva.com
Surivo	https://www.survio.com
Startquestion	https://www.startquestion.com
Survey Monkey	https://www.surveymonkey.com/
Google Forms	https://www.google.pl/intl/pl/forms/about/
Jotform	https://www.jotform.com
Microsoft Forms	https://www.microsoft.com/pl-pl/microsoft-365/online-surveys-polls-quizzes
Survey Sparrow	https://surveysparrow.com
Zoho	https://www.zoho.com/survey/
Typeform	https://www.typeform.com/

Examples of question which could be used in surveys for students in order to record their opinion about research-based education:
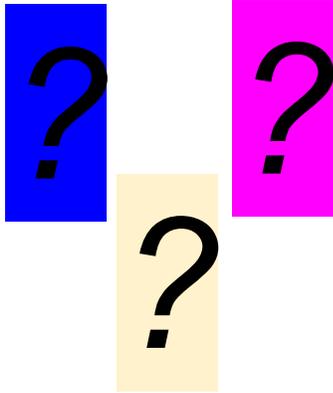
1. What kind of research would you like to perform during your classes?
2. Do you need any additional certificates which could confirm your skills regarding the use of research infrastructure?
3. Do you have any feedback from industry that points to the areas of necessary research?
4. Do you prefer team work or individual tasks in research-based class?
5. Are you familiar with the research needs of your region?
6. Would you prefer to work in the international group of researchers?
7. Would you like to be a research project team leader?
8. Do you know the difference between basic and applied research?
9. Do you know any software for statistical or other analyses?
10. Do you like technology transfer tasks (patent preparation, consultation with industrial partners, author and innovator rights and obligations studying, etc.) or prefer full concentration on problems of the research process?

2.2. Scientific fridays initiative continuation

On the basis of the EDURES methodology at PRz have been initiated periodic meetings on Microsoft Teams platform which support all types of scientific work dissemination, scientific initiatives and scientific challenges dissemination at the Rzeszów University of Technology.

The meetings have been named "Scientific Fridays" (see Fig. below).

These meetings are organized usually once a month on Friday and are open for PRz community (based on MS teams access rules). We will also be exchanging the good practices of our EDURES project partners within these meetings. We kindly invite our colleagues who would like to share their ideas and experience with us.

Scientific Fridays have been also consulted and recommended to the EDURES partners who shared their internal experience in this area. Scientific fridays were proposed and started as the additional activity to the existing didactic thursdays.

Fig. Scientific Fridays initiative

3. Feedback collection and analysis

This chapter gives the general overview on feedback collection methodology and analysis of feedback.

3.1 Types of developed questionnaires

The following content of questionnaires was thoughtfully developed and employed to gather valuable insights and feedback within the context of Edures training and satisfaction initiatives:

1. Edures Training Materials Feedback (Pilot Lectures):

This questionnaire was meticulously designed and administered to participants who engaged with Edures' pilot lecture sessions. Its primary aim was to assess the effectiveness of the training materials, comprehensively capturing participants' perspectives on content satisfaction, material clarity, and alignment with learning expectations. Through a series of targeted questions, this questionnaire facilitated an in-depth understanding of the pilot lectures' impact and provided essential feedback for future refinement.

2. Edures Training Materials Feedback (E-learning):

In the realm of digital learning, this questionnaire was skillfully crafted and distributed to individuals who undertook Edures' e-learning modules. Its purpose was to gauge the efficacy of the digital training materials, focusing on user engagement, interactive elements, and the overall e-learning experience. By eliciting feedback on technical usability, content presentation, and interactive components, this questionnaire played a pivotal role in enhancing the digital learning journey.

3. Edures Questionnaire for Continuous Improvement of Edures Methodologies:

The formulation and deployment of this questionnaire marked a crucial step in Edures' commitment to perpetual enhancement. Designed to capture nuanced insights, it was administered to participants familiar with Edures methodologies. The questionnaire's strategic inquiries delved into the relevancy and impact of the methodologies, inviting participants to provide suggestions for refining existing approaches and identifying potential areas for expansion. The gathered feedback has been instrumental in shaping ongoing improvements in Edures' training methodologies.

4. EDURES Satisfaction Questionnaire of theses.prz.edu.pl:

Tailored to the unique context of theses.prz.edu.pl, this questionnaire served as a means to assess user satisfaction and the overall platform experience. By gauging user satisfaction levels, navigation ease, and resource adequacy, it provided a comprehensive overview of users' interactions with the platform. Participants' input, garnered through this questionnaire, contributed significantly to identifying platform strengths, addressing challenges, and formulating targeted enhancements to meet the evolving needs of users.

The integration of these designed questionnaires into our research and feedback-gathering efforts has enriched our understanding, informed strategic decision-making, and enabled us to foster continuous improvement across Edures' training methodologies and digital platforms. The data collected through these questionnaires has played an integral role in shaping the future trajectory of Edures' offerings and ensuring a consistently exceptional experience for all stakeholders.

3.1.1. The survey for students and teachers for the collection of the feedback on the quality of the teaching materials, and platform

Evaluation questionnaire

Within the **Erasmus+ Edures** project was developed a **pilot lectures using the Edures methodology** at Master's level education, that you have been using. For the purposes of the project we would like to assess the usability of the developed didactic materials and its user-friendliness. We ask you to respond to the following questions and give us your feedback on the materials. In case you would like to ask any additional questions about the project or materials that have been developed you can contact Roman Wdowik rwdowik@prz.edu.pl

You can learn more about the project by the following link About EDURES Project / EDURES, Erasmus+, Ignacy Łukasiewicz Rzeszów University of Technology (prz.edu.pl)
Erasmus + EDURES - 2020-1-PL01-KA203-082219

1. **Demographic Information**

Name of Educational Institution	
Year of Study	
Country	

Gender	☐ Female ☐ Male ☐ Other
Age	☐ < 25 years ☐ 25 - 30 years ☐ > 30 years

Please give your opinion about the didactic materials using the following rates:
0= I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

No.	STATEMENTS	0	1	2	3	4
1	**Usage of the Didactic materials**					
1.1	The content/exercises are in line with what I have expected to learn					
1.2	The training materials is easy to read and follow					
1.3	The training material are well -written					
1.4	The training material are well structured					
1.5	The technical terminology in the training material is clearly explained					
1.6	I have found it easy to get the training material to learn practical lessons					
1.7	In the training material there a lot of practical key takeaways					
1.8	Interactive components (images/videos/schemes) are useful for a better understanding of the topics					
1.9	Interactive components (images/videos/schemes) are easy to understand, without any additional explanation					
1.10	The training materials are balanced to what is consider interactiveness and theoretical aspects					
1.11	The visual or interactive component(images/schemes/etc.) are of good quality					
2	**Reusability in practice**					
2.1	I used the training materials to learn practical lessons					
2.2	The training materials gave me enough knowledge to follow my university courses					
2.3	I intend to use the training materials in learning practical lessons in the future (e.g. for self-learning activity)					
3	**Learning outcomes**					
3.1	The training materials has improved my performance in doing practical work					

3.2	The training materials has speed up my acquisition of technical skills					
3.3	Using the training materials I learnt a lot, feeling myself really engaged					

Please rate the following questions:

Where: Excellent = 5, Very Good = 4 , Good = 3, Not Bad = 2, Bad = 1, 0 = I don't know

No.	STATEMENTS	0	1	2	3	4	5
1	Overall quality of didactic materials (exercises, videos, pictures, schemes)						
2	Overall usefulness of the training materials						
3	Overall quality and user-friendliness of the training materials						

Any other comment and/or suggestion:

Thank you for your answers!

Digital version is available at the following link

3.1.2 Feedback for students and teachers on the quality of the theses.prz.edu.pl website

EDURES-SATISFACTION QUESTIONNAIRE

Within the Erasmus+ EDURES project was developed a theses.prz.edu.pl website. This website allows supervisors to publish their thesis topics and students to find a thesis topic closely related to their interests and field of study, next contact a potential supervisor and establish cooperation   For the purposes of the project we would like to assess the usability of the developed platform and its user-friendliness. We ask you to respond to the following questions and give us your feedback on it. In case you would like to ask any additional questions about the project or materials that have been developed you can contact
Roman Wdowik rwdowik@prz.edu.pl

You can learn more about the project by the following link About EDURES Project / EDURES, Erasmus+, Ignacy Łukasiewicz Rzeszów University of Technology (prz.edu.pl)

Erasmus + EDURES -   2020-1-PL01-KA203-082219

Please give your opinion about the theses.prz.edu.pl using the following rates:
1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

No.	STATEMENTS	0	1	2	3	4
1.1	The theses.prz.edu.pl is a website which is able to meet my needs					
1.2	The theses.prz.edu.pl platform is well-structured and the language used is clear and simple to understand					
1.3	The theses.prz.edu.pl website is easy to navigate					
1.4	The visual or interactive components (images/schemes/etc.) are of good quality					
1.5	The websites, tools, and technologies are designed and developed in the way to be easily accessible by all					
1.6	Contents were consistent with the objectives of the website					
1.7	I will recommend / disseminate the theses.prz.edu.pl to others					

Any other comment and/or suggestion:

The survey in the digital version is available at the following link

Procedures for wider feedback will be developed. This includes feedback of the students towards the teachers, as well as feedback to those who implement and manage the digital platform.

3.1.3. Edures e-learning materials evaluation questionnaire

Within the Erasmus+ EDURES project were developed e-learning materials. This e- e-learning materials have been integrated into the theses.prz.edu.pl website and also a training course of the project's educational institutions for the facilitation of the selected training. For the purposes of the project we would like to assess the usability of the developed e-learning materials and its user-friendliness. We ask you to respond to the following questions and give us your feedback on it. In case you would like to ask any additional questions

about the project or materials that have been developed you can contact Roman Wdowik rwdowik@prz.edu.pl You can learn more about the project by the following link About EDURES Project / EDURES, Erasmus+, Ignacy Łukasiewicz Rzeszów University of Technology (prz.edu.pl)

Demographic Information

Name of Educational Institution	
Year of Study	
Country	
Gender	☐ Female ☐ Male ☐ Other
Role	☐ Teacher ☐ Student
Age	☐ < 25 years ☐ 25 - 30 years ☐ > 30 years

Please give your opinion about the didactic materials using the following rates:
0= I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

No.	STATEMENTS	0	1	2	3	4
1	**Usage of the Didactic materials**					
1.1	The content/exercises of the e-learning materials are in line with what I have expected to learn/teach in my course					
1.2	The e-learning materials are easy to read and follow					
1.3	The e-learning materials are well -written					
1.4	The e-learning materials are well structured					
1.5	The technical terminology in the e-learning materials is clearly explained					
1.6	In the e-learning materials there a lot of practical key takeaways					
1.7	Interactive components (images/videos/schemes) are useful for a better understanding of the topics					
1.8	The e-learning materials are balanced to what is consider interactiveness and theoretical aspects					
1.9	The visual or interactive component(images/schemes/etc.) are of good quality					
1.10	The overall quality of e-learning materials is good.					
2	**Reusability in practice**					

2.1	I used the e-learning materials regularly to learn/teach					
2.2	The e-learning materials gave enough knowledge					
2.3	I intend to use the e-learning materials in the future (e.g. for self-learning activity)					

I would like to suggest adding the following to this e-learning materials:

Any other comment and/or suggestion:

Thank you for your answers!

The survei in the digital version is available at the following link

3.1.4. Edures questionnaire for continuous improvement of Edures methodologies

We ask you to respond to the following questions and give us your feedback. In case you would like to ask any additional questions about the project or materials that have been developed you can contact Roman Wdowik rwdowik@prz.edu.pl

You can learn more about the project by the following link About EDURES Project / EDURES, Erasmus+, Ignacy Łukasiewicz Rzeszów University of Technology (prz.edu.pl) Erasmus + EDURES - 2020-1-PL01-KA203-082219

Demographic Information

Name of Educational Institution/ name of stakeholder	
Country	
Gender	☐ Female ☐ Male ☐ Other

What is your opinion about implementation of current research results in higher education?

What would you propose to increase the efficiency of current research results implementation in teaching?

How could Edures group strengthen utilization of research results in education based on Edures project results? What are the priorities in your opinion?

Do you think that digital tools may help to accelerate research results implementation?

☐ Yes ☐ No

Please indicate max. 2 necessary policy changes that can help to increase effectiveness of research results implementation.

The survey in the digital version is available at the following link

3.2. Results obtained by the partnership for the further improvement of the EDURES from the surveys

3.2.1 Target groups of the Questionnaires

Profiling the Target Audience by Profession:

In the comprehensive analysis of the survey participants, a meticulous profiling of the target audience by profession was undertaken, shedding light on the diverse spectrum of individuals engaged with Edures' initiatives. The distribution across various professions unveils valuable insights into the composition of respondents, allowing us to better understand their perspectives and tailor our strategies accordingly.
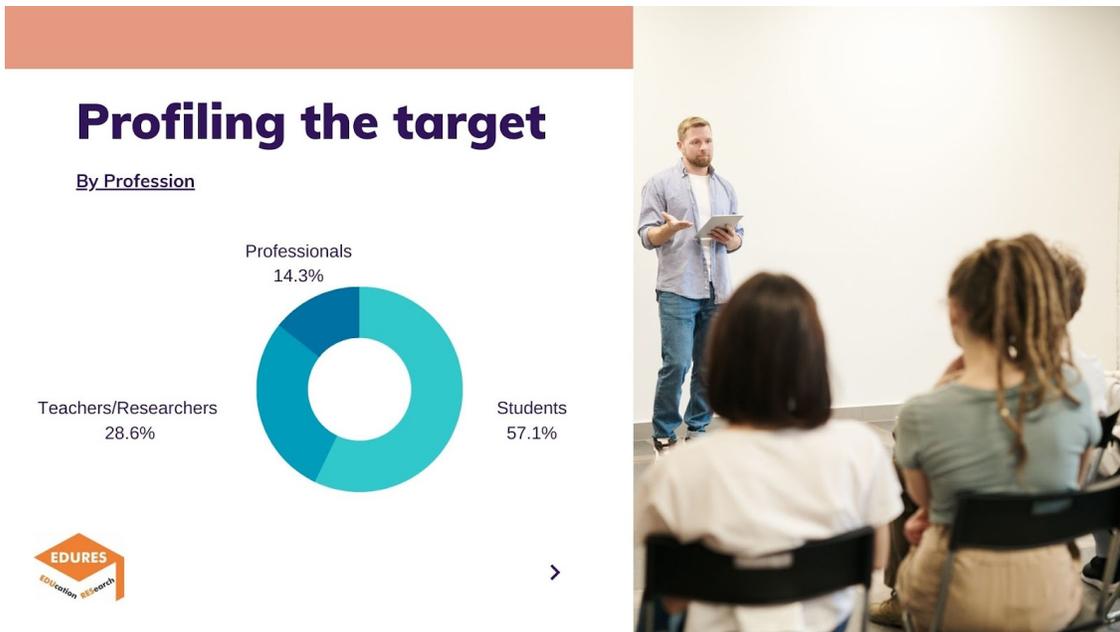
Professionals (14.3%):

2020-1-PL01-KA203-082219

A notable segment of the participants, comprising 14.3% of the total, identified themselves as professionals. These individuals bring their real-world experiences and practical insights to the table, offering a valuable perspective on the effectiveness and applicability of Edures' training programs. Their engagement highlights the relevance of our offerings to established practitioners seeking to augment their skills and knowledge.

Teachers (28.6%):

The educators' community, representing 28.6% of the participants, constitutes a significant portion of the survey respondents. This group's input is particularly insightful, as their engagement with Edures' training materials underscores the alignment between our content and the needs of educators. Their feedback is pivotal in refining our methodologies to better serve the educational sector, ultimately enhancing the quality of learning experiences for students.

Students (57.1%):

The largest contingent among the respondents, accounting for 57.1%, comprises students who have interacted with Edures' offerings. Their participation provides a crucial window into the impact of our training materials on the emerging generation. By understanding their perspectives, challenges, and learning preferences, we gain essential insights for tailoring our content and approaches to resonate effectively with the evolving needs of young learners.

Profiling the Target Audience by Country:

An in-depth profiling of the survey participants based on their country of origin provides a comprehensive view of Edures' reach and impact across different geographical regions. The distribution across various countries highlights the diverse international engagement with Edures' initiatives, allowing us to gain valuable insights into the preferences and perspectives of respondents from different parts of the countries.

Profiling the Target Audience by Gender:
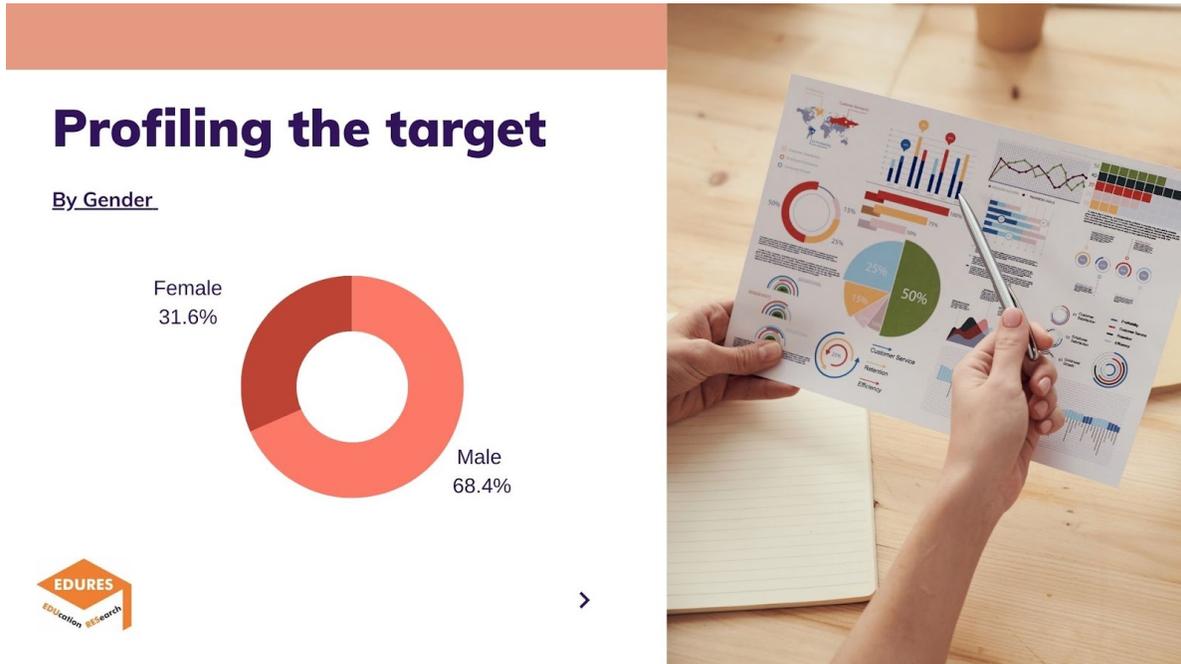
An insightful profiling of the survey participants based on their gender provides a deeper understanding of the diverse composition of Edures' engaged audience.

3.2.2 Results of the questionnaires

1. **Edures Training Materials Feedback (Pilot Lectures):**

In this comprehensive analysis of participant responses, a total of 16 individuals engaged with the survey, offering invaluable insights into their perceptions of Edures' didactic materials. This diverse cohort represents a cross-section of learners at various stages of their academic journey, contributing to a nuanced understanding of the materials' impact across different educational contexts.

Exploring the distribution of student years, it is evident that Edures' reach extends to a wide spectrum of learners:

Student's Year of Study
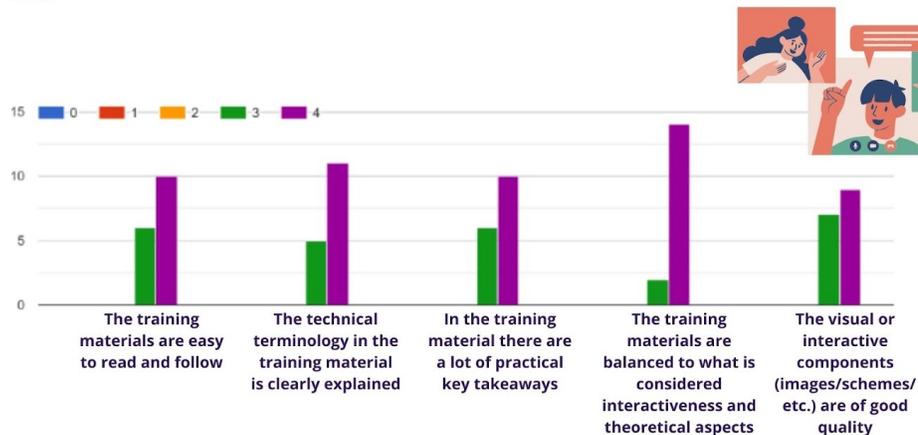
- PhD 11.1%
- 2nd 11.1%
- 5th 33.3%
- 4th 44.4%
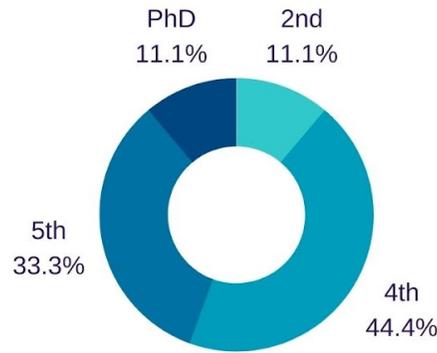
This rich diversity in student representation emphasizes the effectiveness of Edures' didactic materials in addressing the varied needs of learners, from aspiring scholars to those on the brink of professional roles. The data illuminates the materials' positive influence on learning outcomes, skill acquisition, and practical application, as well as their potential for future self-guided learning.

Usage of the Didactic Materials:

USAGE OF THE DIDACTIC MATERIALS

Legend: 0 — 1 — 2 — 3 — 4

| Category	3	4
The training materials are easy to read and follow	6	10
The technical terminology in the training material is clearly explained	5	11
In the training material there are a lot of practical key takeaways	6	10
The training materials are balanced to what is considered interactiveness and theoretical aspects	2	14
The visual or interactive components (images/schemes/etc.) are of good quality	7	9

0= I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

- Easy to read and follow: The majority of participants (average rating of 4) expressed a positive sentiment towards the readability and comprehensibility of the training materials.
- Technical terminology clearly explained: Respondents generally acknowledged the clarity in explaining technical terms, although there is an opportunity for enhancement, as reflected in the average rating of 3.5.
- Practical key takeaways: The training materials were noted to offer practical insights and key takeaways, garnering an average rating of 3.6.
- Balanced interactiveness and theoretical aspects: The balance between interactive elements and theoretical content within the training materials was perceived positively (average rating of 3.6).
- Quality of visual or interactive components: Respondents generally found the visual and interactive components of the materials to be of good quality (average rating of 3.6).
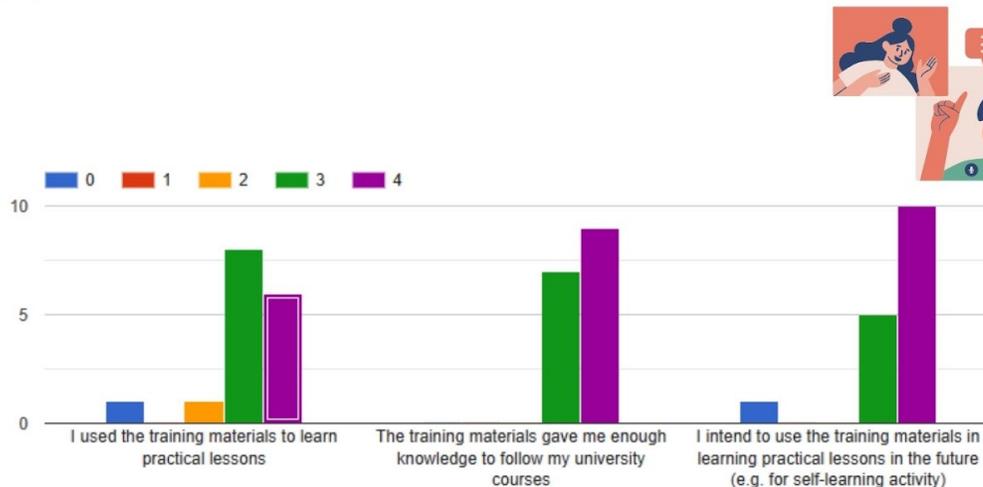
Reusability in Practice:

- Used for practical lessons: An encouraging average rating of 3.9 indicates a high inclination among participants to utilize the training materials for practical learning, attesting to their perceived relevance and effectiveness.
- Helped in university courses: The training materials were perceived to provide a moderate level of support in university coursework (average rating of 3.6), suggesting a potential for deeper integration into academic curricula.
- Intent to use for future self-learning: Participants expressed a positive intention to reuse the materials for self-directed learning in the future (average rating of 3.8), underlining their perception of enduring value.

Learning Outcomes:

LEARNING OUTCOMES
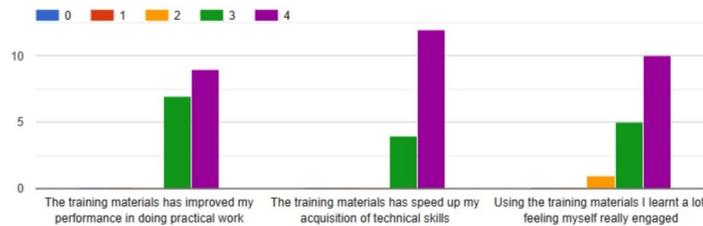
0 = I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

- Improved performance in practical work: The training materials were associated with improved practical performance (average rating of 3.8), indicating a tangible impact on enhancing participants' applied skills.
- Accelerated acquisition of technical skills: The materials were recognized for hastening the acquisition of technical skills (average rating of 3.8).
- Engaged learning experience: Participants felt engaged and enriched by the learning experience (average rating of 3.6), suggesting that the materials succeeded in fostering active and immersive learning interactions.

LEARNING OUTCOMES

0= I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree
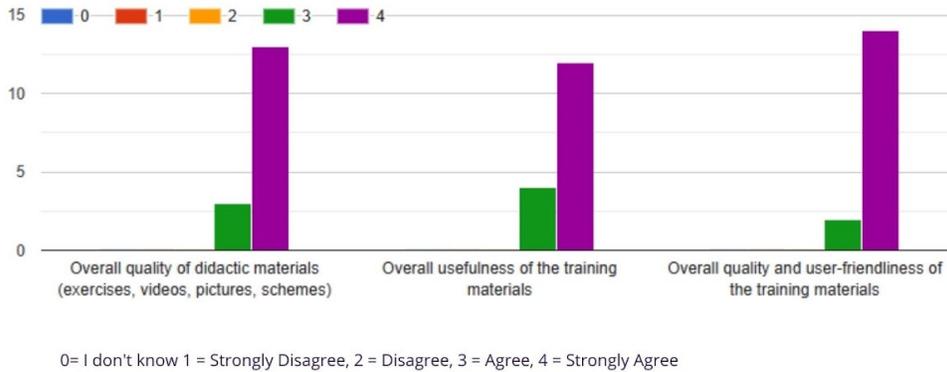
- Overall quality of didactic materials: Respondents acknowledged the overall quality of the didactic materials (average rating of 3.6).
- Overall usefulness of materials: The training materials were deemed useful across a spectrum of aspects (average rating of 3.9).
- Overall quality and user-friendliness: Participants held a favorable view of the overall quality and user-friendliness of the training materials (average rating of 3.9), emphasizing a positive user experience.
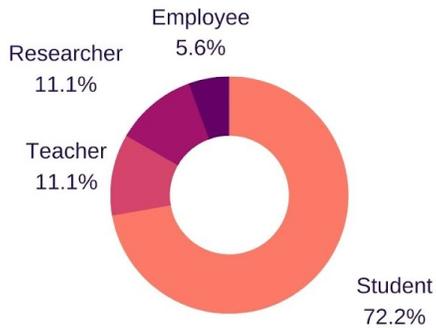
In summary, the collected feedback indicates a predominantly positive perception of the training materials. While commendable in multiple aspects, there is potential for refinement, particularly in clarifying technical terminology and optimizing the balance between interactive and theoretical content. The materials have exhibited their value through practical applicability, skill enhancement, and engaging learning experiences, with participants expressing an intent to leverage them in both academic and self-learning contexts.

2. Edures Training Materials Feedback (E-learning):

This analysis encompasses responses from a diverse group of participants, totaling 18 individuals. These respondents represent a range of academic stages, nationalities, genders, and roles, providing valuable insights into their perceptions of Edures' e-learning materials. Here is a breakdown of the findings:

Participants belong to various roles, including teachers, students, researchers, and employees.
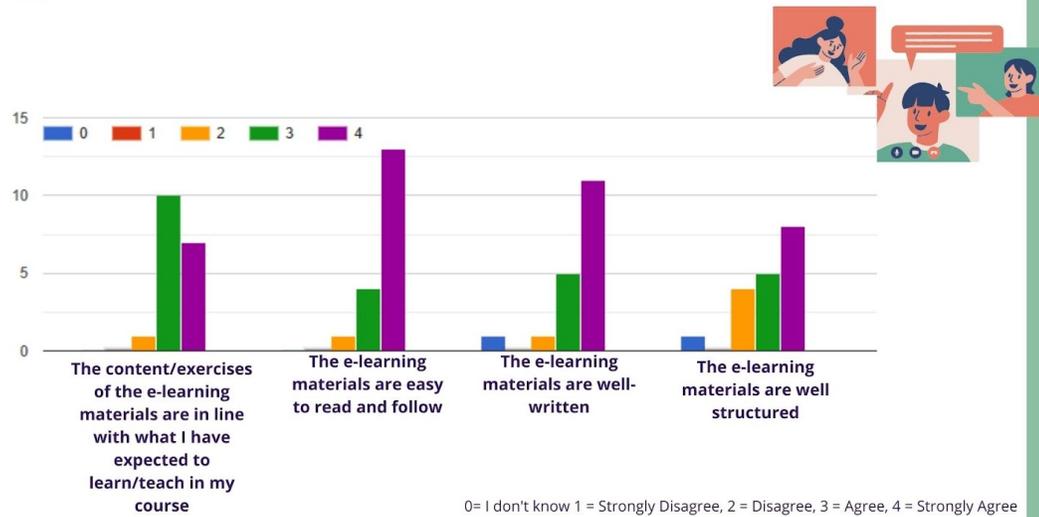
Proile of respondents

Employee
5.6%

Researcher
11.1%

Teacher
11.1%

Student
72.2%

- **Usage of the Didactic Materials:**

USAGE OF THE DIDACTIC MATERIALS

0 = I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

- Respondents generally found the e-learning materials in line with their expectations for learning/teaching content (average rating of 3.6).
- The materials' readability and ease of navigation were positively acknowledged (average rating of 3.7).
- The quality of writing within the materials received a favorable response (average rating of 3.1).

USAGE OF THE DIDACTIC MATERIALS

0= I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree
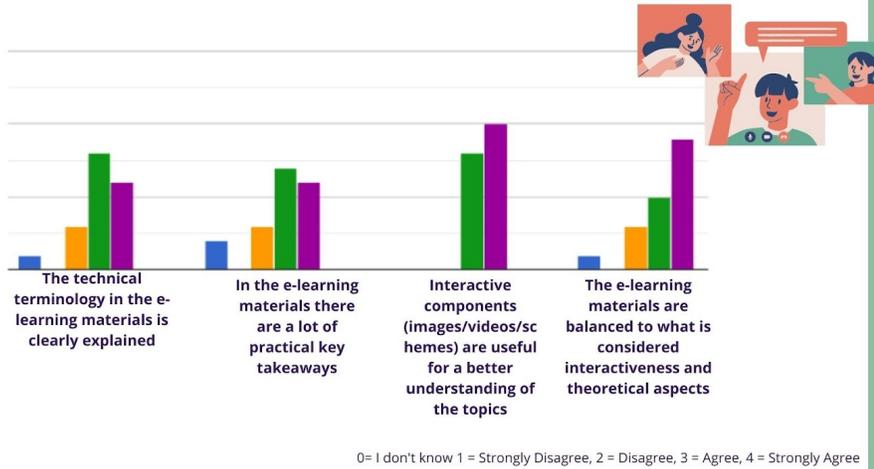
- The e-learning materials were perceived as well-structured (average rating of 3.2).
- The clarity of technical terminology garnered a moderate rating (average rating of 3).
- Practical key takeaways were appreciated (average rating of 3.1).
- Interactive components, such as images and videos, were found useful for enhancing understanding (average rating of 3.6).
- Balancing interactiveness and theoretical aspects received a favorable response (average rating of 3.2).

USAGE OF THE DIDACTIC MATERIALS

0= I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree
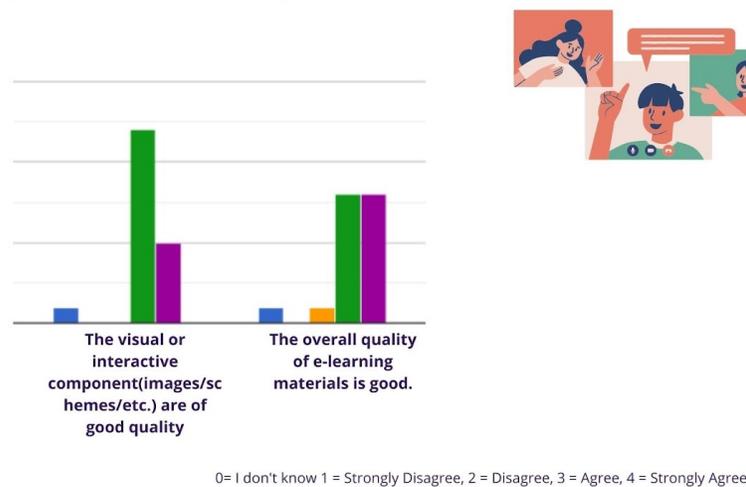
- The visual and interactive components were generally considered of good quality (average rating of 3.1).

- Overall quality of e-learning materials was rated positively (average rating of 3.4).

Reusability in Practice:

REUSABILITY IN PRACTICE

0= I don't know 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree
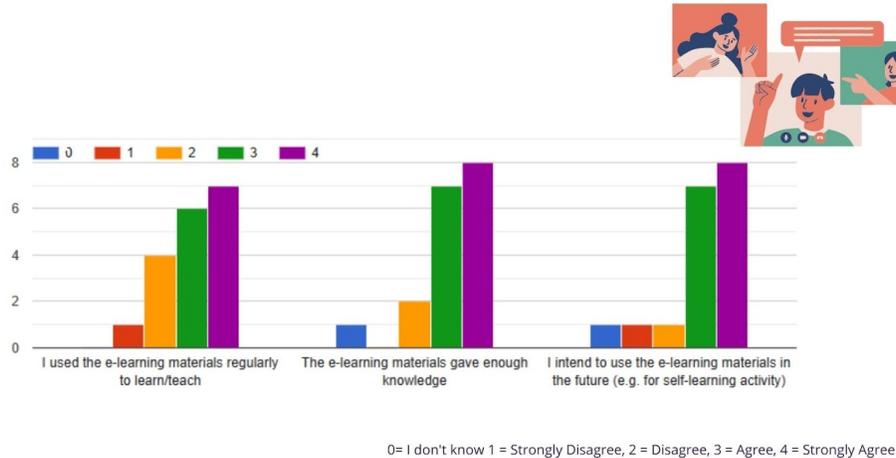
- Many participants reported using the e-learning materials regularly for learning/teaching (average rating of 3.3).
- The e-learning materials were seen to provide sufficient knowledge (average rating of 2.9).
- A positive intent to use the materials for future self-learning activities was expressed (average rating of 3.1).

In summary, this diverse collection of responses provides valuable insights into participants' perceptions of Edures' e-learning materials. The analysis underscores positive feedback regarding content alignment, ease of use, interactivity, and overall quality. Constructive suggestions and unique insights contribute to a holistic understanding of the impact and potential areas for improvement, enriching Edures' commitment to delivering effective and valuable e-learning resources.

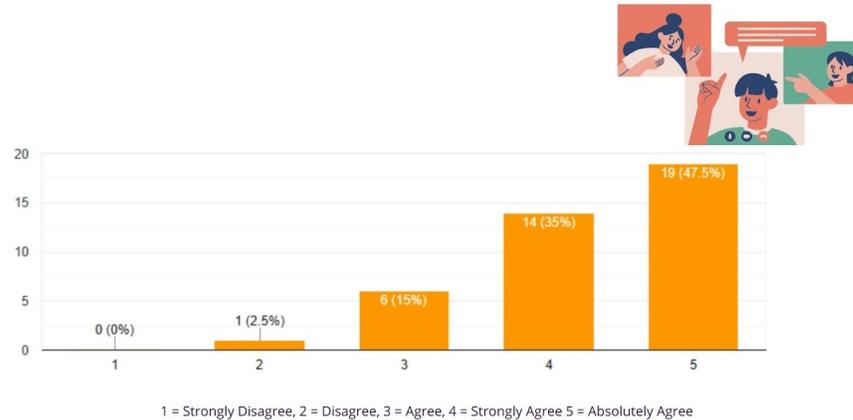### 3. EDURE Satisfaction Questionnaire of theses.prz.edu.pl:

This analysis focuses on the responses provided by participants in relation to their experience with the theses.prz.edu.pl website. A total of 45 participants contributed their feedback, revealing valuable insights into various aspects of the website's usability, structure, content, and accessibility.

User Experience and Usability:

THE THESES.PRZ.EDU.PL IS A WEBSITE WHICH IS ABLE TO MEET MY NEEDS

20
15
10
5
0

0 (0%)   1 (2.5%)   6 (15%)   14 (35%)   19 (47.5%)

1   2   3   4   5

1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree 5 = Absolutely Agree
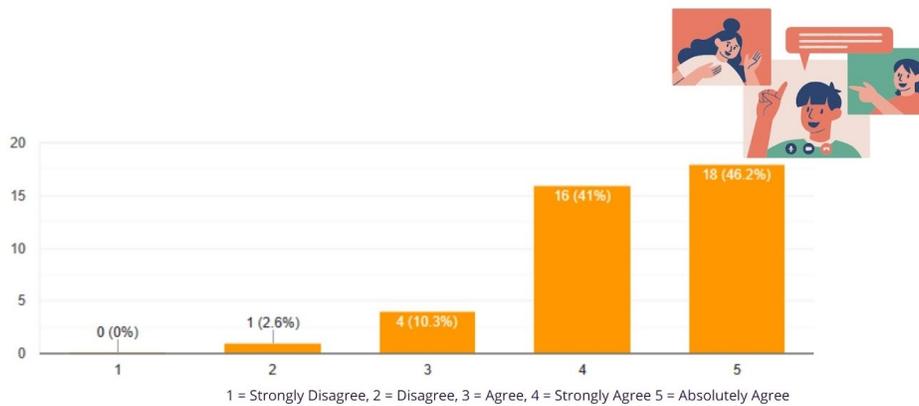
- The majority of participants (35 out of 40) gave the highest rating of 5 for the website's ability to meet their needs. This suggests a strong alignment between the platform's offerings and user expectations.
- Participants also acknowledged the website's well-structured design, ease of navigation, and clear language, with most ratings falling between 4 and 5.
- Visual and interactive components, including images and schemes, were consistently rated positively (average rating of 4.5).

Accessibility and Consistency:

THE WEBSITES, TOOLS, AND TECHNOLOGIES ARE DESIGNED AND DEVELOPED IN A WAY TO BE EASILY ACCESSIBLE BY ALL

20
15
10
5
0

0 (0%)   1 (2.6%)   4 (10.3%)   16 (41%)   18 (46.2%)

1   2   3   4   5

1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree 5 = Absolutely Agree
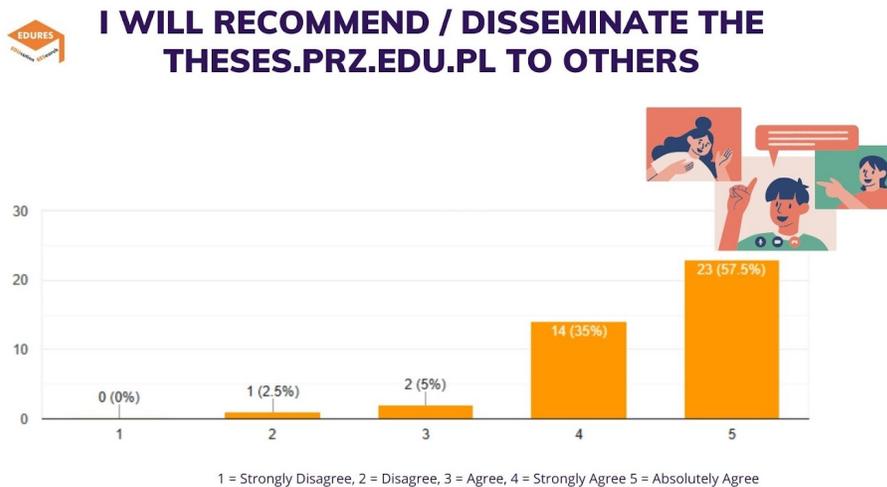
- Participants generally expressed satisfaction with the accessibility of the website, tools, and technologies, with ratings mostly in the range of 4 to 5.

- Most respondents agreed that the contents were consistent with the objectives of the website, highlighting a successful alignment of content with intended outcomes.

Recommendation and Dissemination:

- The majority of participants (35 out of 40) indicated their willingness to recommend or disseminate the theses.prz.edu.pl website to others, showcasing a strong level of endorsement.
- Additional Comments and Suggestions:

I WILL RECOMMEND / DISSEMINATE THE THESES.PRZ.EDU.PL TO OTHERS

1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree 5 = Absolutely Agree

4. Edures Questionnaire for Continuous Improvement of Edures Methodologies:

This analysis provides insights into participants' opinions and suggestions regarding the implementation of current research results in higher education, strategies to increase efficiency in research results implementation in teaching, the potential of Edures project results, the role of digital tools, and necessary policy changes. A total of 23 participants shared their perspectives, yielding a diverse range of views and suggestions.

Opinions on Research Results Implementation:

WHAT IS YOUR OPINION ABOUT THE IMPLEMENTATION OF CURRENT RESEARCH RESULTS IN HIGHER EDUCATION? - MAIN TAKEAWAYS

1 The implementation of current research results in higher education is very crucial for accelerating the pace of education especially nowadays, when the rate of learning is still increasing.

2 It is important to integrate current research results, to ensure that the curriculum remains relevant and aligned with the latest advancements and discoveries in the field.

3 It is very important to let students know the state-of-the-art of any new technology

4 I believe current research results are very important to the shaping of higher education curricula.

5 The implementation of EDURES research results in higher education is crucial for advancing teaching and learning practices. It can support improvements in curriculum design, and educational policies.

- Participants acknowledge the importance of implementing current research results in higher education to stay updated and promote innovation.
- Strong emphasis is placed on fostering a balance between basic knowledge and incorporating research results to enhance teaching efficiency.
- A recognition of the significance of providing students with state-of-the-art information and fostering motivation to engage with modern technologies and methods is evident.

Strategies to Increase Efficiency:

WHAT WOULD YOU PROPOSE TO INCREASE THE EFFICIENCY OF CURRENT RESEARCH RESULTS FROM IMPLEMENTATION IN TEACHING? - MAIN TAKEAWAYS

1 In my opinion, the ideal balance between basic knowledge and the capacity of incorporating current research results has to be sought in order for such courses to be as efficient as possible.

2 The research results should be appropriately presented to the students by facilitating them to briefly understand the procedure followed for the experimental or theoretical work, justifying the necessity of this work by mentioning relevant applications and providing them with the necessary skills in order to be able to participate in research activities themselves in the near future.

3 To increase the efficiency of implementing current research results in teaching, it is important to establish strong collaboration between academia and industry, promote interdisciplinary approaches, and encourage partnerships for the practical application of research findings. Additionally, providing adequate resources and support for faculty professional development in research-based teaching methodologies can enhance the effective integration of research results into the curriculum

4 I would propose the introduction of modern means of education such as Augmented Reality.

5 More pilot lessons including research results should gradually involved into the teaching process.

6 More pilot lessons including research results should gradually involved in the teaching process.

7 Encourage educators and institutions to prioritize evidence-based teaching and learning approaches. This involves creating awareness about the value of research in informing instructional decisions and cultivating a mindset that values continuous improvement through research-informed practices.

- Collaboration between academia and industry, interdisciplinary approaches, and partnerships are highlighted for effective implementation of research results.
- Appropriate presentation of research findings to students, helping them understand experimental or theoretical procedures, and encouraging participation in research activities are suggested.
- Dissemination of Edures project findings, for professional development for educators, and improved collaboration between researchers and policymakers are proposed.

Utilization of Research Results:

HOW EDURES GROUP COULD STRENGTHEN THE USE OF RESEARCH RESULTS IN EDUCATION BASED ON EDURES PROJECT RESULTS? WHAT ARE THE PRIORITIES IN YOUR OPINION? - MAIN TAKEAWAYS

1 More digital tools usage in courses as well as more emphasis in each department results could strengthen the utilisation of research results and should be prioritised in my opinion.

2 More digital tools usage in courses as well as more emphasis in each department results could strengthen the utilization of research results and should be prioritised in my opinion.

3 The results of the Edures project should be further disseminated and presented to educators in order to improve their skills relevant to the utilization of research results in education. Moreover, improved collaboration between researchers and policymakers is essential to close the gap between educational research and policy to better enable effective practice.

4 Results should be inclyded in education, with accesibility for everyone.

5 The EDURES project appears to be a valuable initiative that aligns with the growing recognition of sustainability as a critical topic in education.

- Dissemination of Edures project results to educators, targeted professional development, and collaborations with educational institutions are highlighted for strengthening research results utilization.
- Improved collaboration between researchers and educators is considered essential to bridge the gap between educational research and policy.
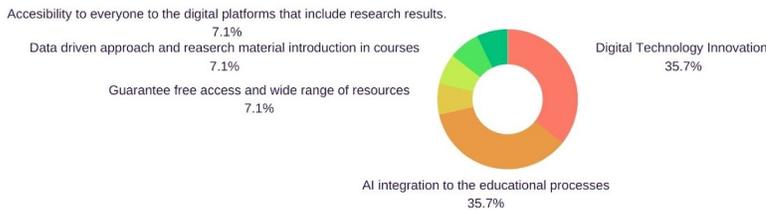
Role of Digital Tools:

DO YOU THINK THAT DIGITAL TOOLS MAY HELP TO ACCELERATE RESEARCH RESULTS IMPLEMENTATION?

100%

● Yes
● No

NECESSARY POLICY CHANGES THAT CAN HELP TO INCREASE THE EFFECTIVENESS OF RESEARCH RESULTS IMPLEMENTATION

Accesibility to everyone to the digital platforms that include research results.
7.1%

Data driven approach and reaserch material introduction in courses
7.1%

Guarantee free access and wide range of resources
7.1%

Digital Technology Innovation
35.7%

AI integration to the educational processes
35.7%

- Digital tools and technologies, such as artificial intelligence (AI) and digital technology, are seen as potential accelerators for research results implementation.

Policy Changes:

Participants suggest necessary policy changes, such as integrating research findings into the curriculum and funding research-practice partnerships, to increase the effectiveness of research results implementation.

Conclusion:

The responses demonstrate a shared recognition of the significance of implementing research results in higher education for promoting innovation, critical thinking, and evidence-based learning. Participants offer valuable insights into strategies, recommendations, and policy changes that could enhance the utilization of research

2020-1-PL01-KA203-082219

results in teaching, ultimately contributing to the advancement of education. The varied perspectives contribute to a comprehensive understanding of the challenges and opportunities associated with implementing research findings, providing a foundation for future efforts to improve the integration of research into education.

The Edures group publishes the abovementioned questions continuously on the project webpage for all who are interested in research-based education and utilization of research results:
https://edures.prz.edu.pl/intellectualoutputs/output-5 .

This approach may give a chance to other stakeholders also in the future to ask the questions and we will be able to improve our methodologies on that basis.

4. Methods of continuous improvement of the EDURES methodologies

EDURES methodologies require continuous improvements after the EDURES project completion. In this area it is necessary to find the proper ways of further results utilization at partner universities environments. Moreover, an increase of internal research results transparency should be recommended to local and international stakeholders of the project.

Main areas for further improvements should result from:

a) Partners ideas developed within the Intellectual Output 5.
b) Methods resulting from the analysis of the results of surveys sent to various stakeholders.
c) Discussion within Multiplier events and meetings.

4.1. New ideas developed within the Intellectual Output 5

On the basis of the discussions within consortium the following main approaches may be indicated:

1. Preparation of research-based lectures in the future based on EDURES methodologies.

It is suggested to include research results in didactic processes. We have identified a lack of recent research results obtained at the universities in didactic materials for students. We have proposed to look for actual updates of our own lectures and create new ones based on international collaboration of academics from at least several countries.

2. An increase of research-based collaboration between students and academic teachers.

Research collaboration of students and academics have a positive impact if the best practices are used, i.e. academics support their students by positive mentoring and help them to reach their goals . The effectiveness of work may be expected in this case.

3. Continuation of internal research discussions in a form of periodical stationary and on-line meetings (e.g. Scientific Fridays continuation)

Creation of various groups that are focused on internal discussion in the area of research may have a positive impact on research activities, dissemination of results and utilization of them. These discussions may also be suggested within international consortia of universities.

4. Engagement of students into paper preparation – mainly at the level of master studies and doctoral school level

Students who are taught how to write scientific papers are linked to dissemination of research results and start building their experience for further scientific activities. In this context, writing common papers with academics may be beneficial for both sides.

5. Development of additional educational projects co-funded by governmental, European and other institutions including industrial partners

International collaboration, comparisons of internal resources, strengths and weaknesses leads project

consortia to better understanding of necessary changes and modern requirements.

The research-based classes require the design process, testing of proposed contents and their presentation and approval by internal or external bodies before the final implementation (see Fig. below).

Research-based class design

Research-based class testing

Research-based class certifying (approval)
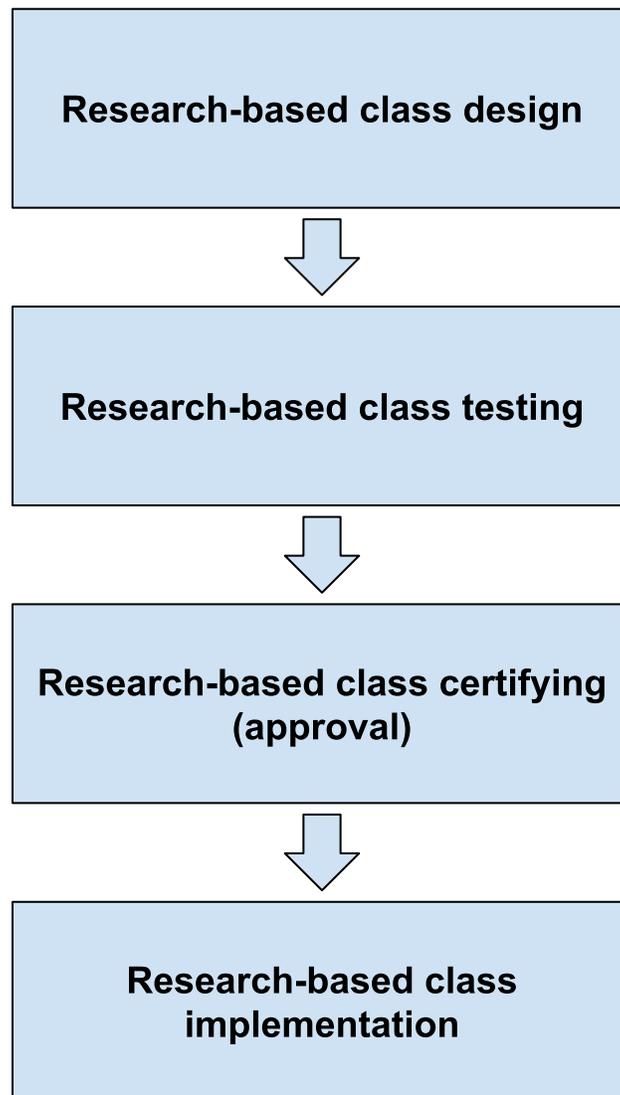
Research-based class implementation

Fig. Research-based class implementation into didactic process

Figure below presents selected possibilities of research results implementation in didactic process. Moreover, additional ideas have been proposed and discussed.
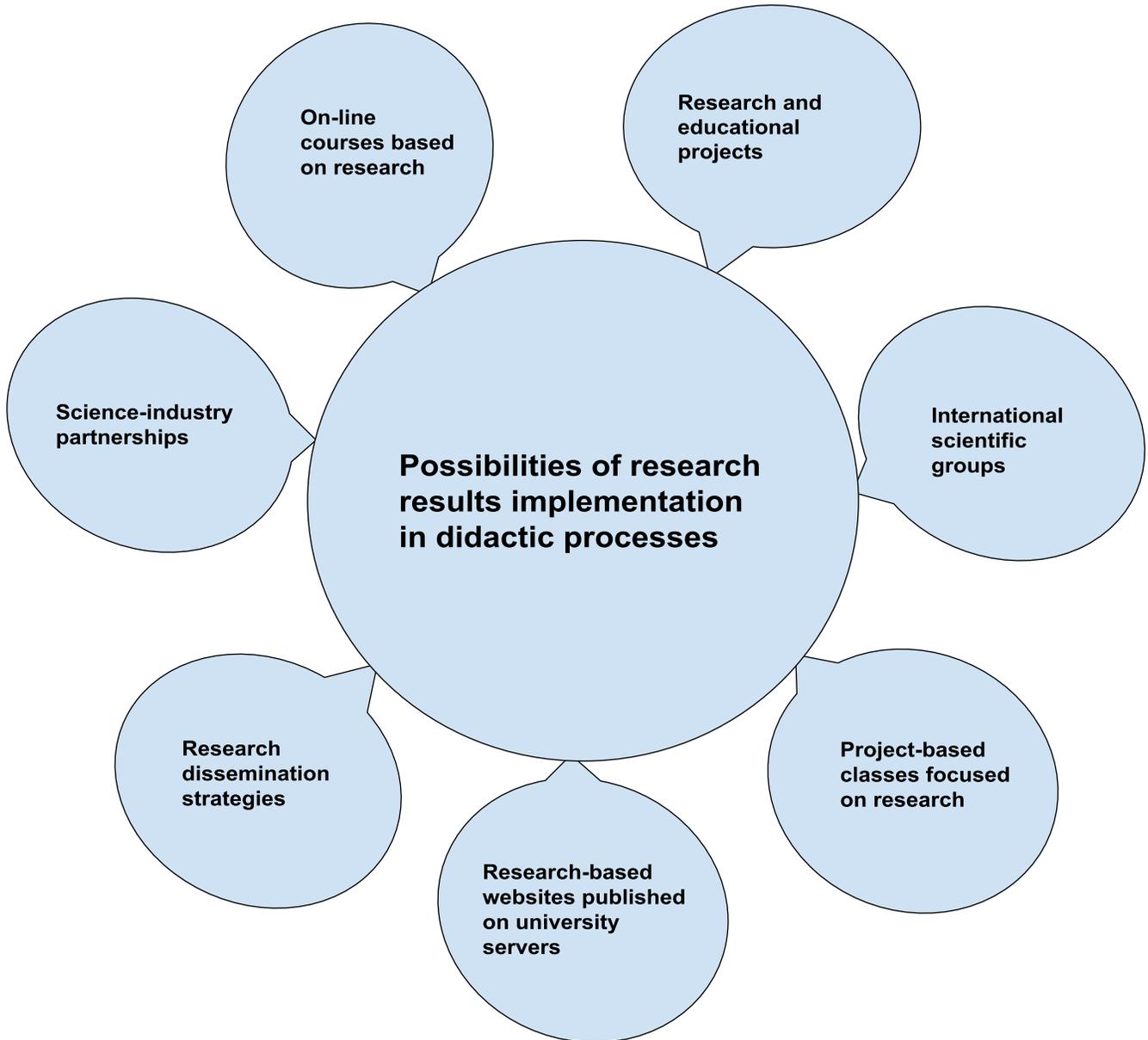

Fig. Selected possibilities of research results implementation in didactic processes

Below, a reader can find further suggestions on continuous improvement of the EDURES methodologies:

- involving other academics in research-based education initiatives,
- strengthening collaboration with industry for better understanding of current research needs,
- applying for external funds in order to support trainings of students (they have been very satisfied after EDURES trainings),
- extending access to research infrastructures both for academics and students,
- creating international scientific groups of students,
- collaborating with R&D departments of large enterprises and technological firms,
- establishing international and institutional law having positive impact on innovation recognition and quality of research results sharing,
- supporting high schools in teaching of basic problems that should not be thought at the academic level,
- developing new study programmes and post graduate courses including reskilling and up-skilling programmes,
- utilization of artificial intelligence in education which is recognized as a "hot topic",
- linking stationary and on-line teaching in the area of research,
- increasing virtual environments (VR) and augmented realities (AR) usage for conducting experiments,
- building inclusive scientific groups and supporting teamwork of students on basic and advanced research.

4.2. Discussion within Multiplier events and meetings

Multiplier events enabled discussion on the results of the EDURES project and underlined the necessity of research-based education. Partners gathered national and foreign (in the case of Polish partner) stakeholders and people interested in education improvements. The meetings also strengthened existing scientific and industrial contact with colleagues and partners, refreshed some collaboration ideas and generated new ones.

Fig. Multiplier event in Poland

Fig. presentations of project performers witing the Multiplier event of the EDURES project held in Poland

4.3. Involving students' opinion and preparation of surveys

Further tools/surveys and interviews and internal procedures are suggested in order to collect students' opinion about their research needs. It should also be consulted with industrial partners of the EDURES team how to increase a number of important research topics in didactic process. New teaching methodologies shall in this case be shaped by students too.

Fig. Photo from the training for students that was held in the NATional Technical University of Athens in Greece

4.4. Discussion on further research projects of the EDURES team

In the last Transnational Project Meeting which was held in Athens project partners have discussed possible areas of further common Research & Development projects and initiatives. The EDURES teams also discussed academic exchange capabilities and scientific publications perspectives. We have also shared our experience regarding new methods of teaching and existing activities in this area being performed in our communities.

Fig. Photo from the last Transnational Project Meeting held in the NAtional Technical University of Athens in Greece

5. Conclusions

The EDURES project started in 2020 year and has been carried out by the Rzeszów University of Technology together with the National Technical University of Athens (Greece), the Hochschule Furtwangen University (Germany) and Centofrom srl (Italy). Project partners have been focused on utilization of research results in technology education. Methodologies and approaches focused on research prioritization in education help to disseminate recent research results developed at partner Universities. The Edures project consists of several activities (types of actions) which have been building common strategic partnership. Five Intellectaual Outputs have been completing in the Edures project together with Transnational Project Meetings held on-line during covid times, and in stationary mode after normalization of situation. Partners have also completed two trainings. The first one was held on-line and organized by Polish partner in 2021 for teachers mainly. The second one was held in stationary mode at the National Technical University of Athens (Greece) in 2022. Students of our organizations took part in this case. Moreover partners completed meetings/events with stakeholders so-called Multiplier events and gathered local and foreign stakeholders. Continuation of the EDURES methodologies should have a positive impact on higher education institutions by appreciation of local scientific achievements and exchange of the best practices within international teams of partners. The approach started within the Edures project is one of the first initiatives od partners in this area, supporting wide utilization of research results in higher education. One of the most important fact is a necessity of conducting such projects as international initiatives also in the future.