Project nr. KA210-VET-5885CC61
Small partnerships in vocational education and training

# CRITERIA & EVALUATION METHODOLOGY FOR A 3D LAB DESIGN

## Activity 3.2. ALL4-3D LABS FOR DISABLED PEOPLE

Created by: CPU
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# 1. Defining the lab's objectives

The objectives of the 3D design lab, specifically tailored to serve the needs of disabled individuals, encompass a multifaceted approach that prioritizes accessibility, inclusivity, education, research, innovation, and product development. The central aims of the lab are as accessibility and Inclusivity in which our foremost objective is to create a 3D design lab that is fully accessible and inclusive for individuals with various disabilities. This involves the removal of physical, sensory, and cognitive barriers to ensure that all members of our community, regardless of their abilities, can engage with the lab's resources and activities. The lab's design will prioritize features such as ramps, elevators, tactile signage, assistive technology, and adjustable workstations, thereby fostering a universally accessible environment.

The second objective is educational, it is in alignment with the broader accessibility goals, our educational objectives focus on providing disabled students with equitable opportunities for skill development, learning, and personal growth. The lab aims to serve as an educational platform for hands-on 3D design, offering courses and workshops that empower students with disabilities to acquire valuable skills, explore their creativity, and participate fully in the educational experience. In Innovation and Research our 3D design lab seeks to advance disability-related research and innovation. By facilitating collaboration between researchers, engineers, and experts in the field of disability studies, we aim to address pressing challenges and discover innovative solutions. This includes exploring 3D printing technology's potential for creating assistive devices, custom adaptations, and accessibility solutions.

Our commitment to a user-centred approach underscores the importance of involving disabled individuals in the decision-making process. We will actively seek input from our target user group, understanding their unique needs, preferences, and challenges to ensure that the lab's resources and design fully align with their requirements.
We are dedicated to adhering to compliance with regulations and standards relevant disability-related regulations and industry standards. The lab's design and operations will consistently meet or exceed legal requirements, ensuring that our facility remains a model of best practices in accessibility and inclusion.

To maximize our impact and remain at the forefront of disability-focused 3D design, we will actively seek partnerships and collaborations with disability advocacy groups, local experts, and organizations dedicated to improving the lives of disabled individuals. These partnerships will provide us with valuable insights, resources, and opportunities to engage with the broader disability community.

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*Figure 1: Six key principles of 3D printing*

The infographic shown above outlines six key principles for 3D printing: Innovation, Education, Inclusivity, Collaboration, User-Centered Design, and Regulation. It uses clear, concise text and relevant icons to explain how each principle contributes to responsible and effective 3D printing practices

## 2. Identify key performance indicators (KPIs)

To effectively gauge our progress in achieving the lab's defined objectives, it is imperative to identify a set of Key Performance Indicators (KPIs). These KPIs will serve as quantitative and qualitative benchmarks that align with our overarching mission of accessibility, inclusivity, education, research, innovation, and product development. The following KPIs have been selected to provide a comprehensive evaluation of our lab's performance:

### 2.1 Project Completion Rate

KPI: The percentage of projects and initiatives successfully completed within the set timelines

Rationale: Measuring project completion rate ensures that we deliver on our commitments and maximize the lab's impact. A high completion rate reflects efficiency and effective resource allocation, which is essential for achieving our objectives.

### 2.2 User Satisfaction

KPI: User satisfaction levels among disabled individuals and the broader lab community. Rationale: User satisfaction is a critical measure of our success in creating an inclusive and accessible environment.

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High user satisfaction indicates that we are meeting the unique needs of our diverse user base, while low satisfaction highlights areas requiring improvement.

## 2.3 Efficiency

KPI: Efficiency metrics such as resource utilization, cost-effectiveness, and time management.

Rationale: Ensuring that resources are used efficiently is vital for achieving our objectives. Monitoring resource allocation and management helps us optimize the lab's operations and maintain a sustainable approach.

## 2.4 Innovation Metrics

KPI: Metrics related to the creation and adoption of innovative solutions for disabled individuals.

Rationale: As a key objective of the lab, tracking innovation metrics allows us to measure our contribution to disability-related research and the development of assistive devices. This includes the number of new innovations, patents, or industry partnerships.

## 2.5 Educational Impact

KPI: Educational metrics such as enrolment, student success rates, and skill development.

Rationale: Monitoring the educational impact of the lab is essential for assessing its role in providing equitable opportunities for disabled students. We aim to increase enrolment, graduation rates, and the acquisition of relevant skills. 3D printing encompasses a large amount of different technologies[1], which add to the educational impact.

## 2.6 Accessibility and Compliance

KPI: Compliance with accessibility standards and legal regulations.

Rationale: Ensuring our lab's design and operations consistently meet or exceed accessibility and compliance requirements is crucial. This KPI reflects our commitment to providing an inclusive space. The accessibility standards that we follow are the ones recommended by Harvard university.[2]

## 2.7 Collaboration Effectiveness

[1] An overview on 3D printing technology: technological, materials, and applications, 2019
[2] *Designing accessible laboratory spaces for people with disabilities, 2023*

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KPI: Metrics assessing the effectiveness of collaborations and partnerships with disability advocacy groups, experts, and organizations.

Rationale: Measuring the effectiveness of our partnerships helps us assess our contribution to the broader disability community and ensures that we continue to benefit from valuable insights and resources. These identified KPIs collectively offer a comprehensive and all-inclusive evaluation of our lab's performance, ensuring that we remain aligned with our objectives and continue to make meaningful contributions in the field of 3D design for disabled individuals. 3D printing can also be used for multidisciplinary collaboration, which increases the learning possibilities.[3]

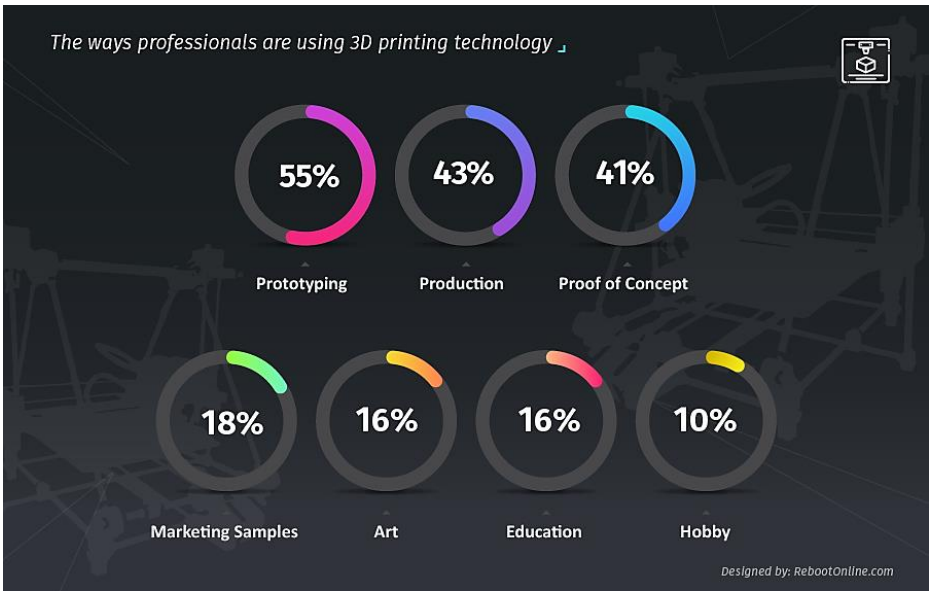


*Figure 2: Different professionals utilize 3D printing*

This detailed infographic showcases how different professionals utilize 3D printing. From architects to healthcare professionals, it highlights specific uses in each field, accompanied by visuals of 3D printed objects and concise descriptions of their applications.

## 3. Develop evaluation criteria

To effectively assess the performance of our 3D design lab with respect to our defined objectives and Key Performance Indicators (KPIs, we have established a set of comprehensive evaluation criteria. These criteria will serve as the basis for measuring our lab's success in promoting accessibility, inclusivity, education, research, innovation, and product development. The following evaluation criteria have been developed to align with our objectives and KPIs

### 3.1 Quality of 3D Designs Produced

Criteria: The quality of 3D designs produced by the lab, assessed based on precision, durability, functionality, and suitability for their intended purpose.

[3] *Guide to 3D printing in education*

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Rationale: High-quality designs are essential for addressing the needs of disabled individuals effectively. Quality serves as a foundational criterion, ensuring that our designs meet the highest standards and provide real-world utility.

## 3.2 User Feedback and Satisfaction

Criteria: The feedback and satisfaction levels of users, including disabled individuals, students, researchers, and other lab stakeholders.

Rationale: User feedback and satisfaction are critical indicators of our lab's performance. They provide insights into whether our services and resources are meeting the unique needs and expectations of our diverse user base.

## 3.3 Efficiency and Turnaround Time

Criteria: Efficiency metrics, including turnaround time for projects, resource utilization, and the effectiveness of time management.

Rationale: Efficiency is central to the success of our lab. These criteria help evaluate our ability to deliver results in a timely and cost-effective manner, ensuring that we optimize resource allocation and meet project deadlines. Hands on learning such as 3D printing is more efficient then regular learning, meaning the technology will save time that students need to learn.[4]

## 3.4 Resource Utilization

Criteria: How effectively resources, such as equipment, materials, and personnel, are used in lab operations.

Rationale: Efficient resource utilization is crucial for maintaining a sustainable and effective lab. This criterion ensures that we make the most of available resources, minimizing waste and inefficiency. 3D printing is mostly used to make objects needed, which if not printed would have to be bought. Schools are often in need of such items (holders, small parts, ….), which students can create using 3D printers, thereby learning and adding to better resource utilization. [5]

## 3.5 Cost-Effectiveness

Criteria: The cost-effectiveness of lab operations and projects, taking into account budget adherence and the cost-to-benefit ratio.

Rationale: Cost-effectiveness ensures that our lab's activities remain financially sustainable and that we make prudent use of available funding while maximizing the benefits for disabled individuals and the community. The lab should adopt all requirements to be disabled friendly as soon as possible, because any after adaptations are more a lot more expensive than making sure that the lab is disabled friendly from the beginning.[6] Generally speaking, 3D printers are a lot more cost friendly compared to almost every other manufacturing process, which has to be know by potential organisations, implementing

[4] *Why I use 3D printing in the classroom (and why you should too!), 2023*
[5] The resurgence of 3D printers in modern learning environments, 2020
[6] *Accessible design means better design, 2020*

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disability friendly labs, to prevent them from being repelled by possible long term operating and investment costs.[7]

## 3.6 Innovation and Creativity

Criteria: The extent to which the lab promotes and realizes innovative solutions and creative approaches to address the needs of disabled individuals.

Rationale: As a key objective, fostering innovation and creativity is pivotal. This criterion evaluates our capacity to push boundaries, introduce novel ideas, and contribute to the advancement of disability-related research and assistive technologies.

By developing these evaluation criteria, we create a robust framework for assessing our lab's performance against our overarching objectives and KPIs. This framework guides our efforts in ensuring that our 3D design lab remains dedicated to enhancing accessibility, inclusivity, education, research, innovation, and product development for disabled individuals. Different innovative and creative ideas for using 3D printing technology to teach people with special needs can be found in different guides and manuals, such as 3D printing guide for teachers.[8]

[7] What you need to know, 2020
[8] *3D Printing Guide for Teachers, 2024*

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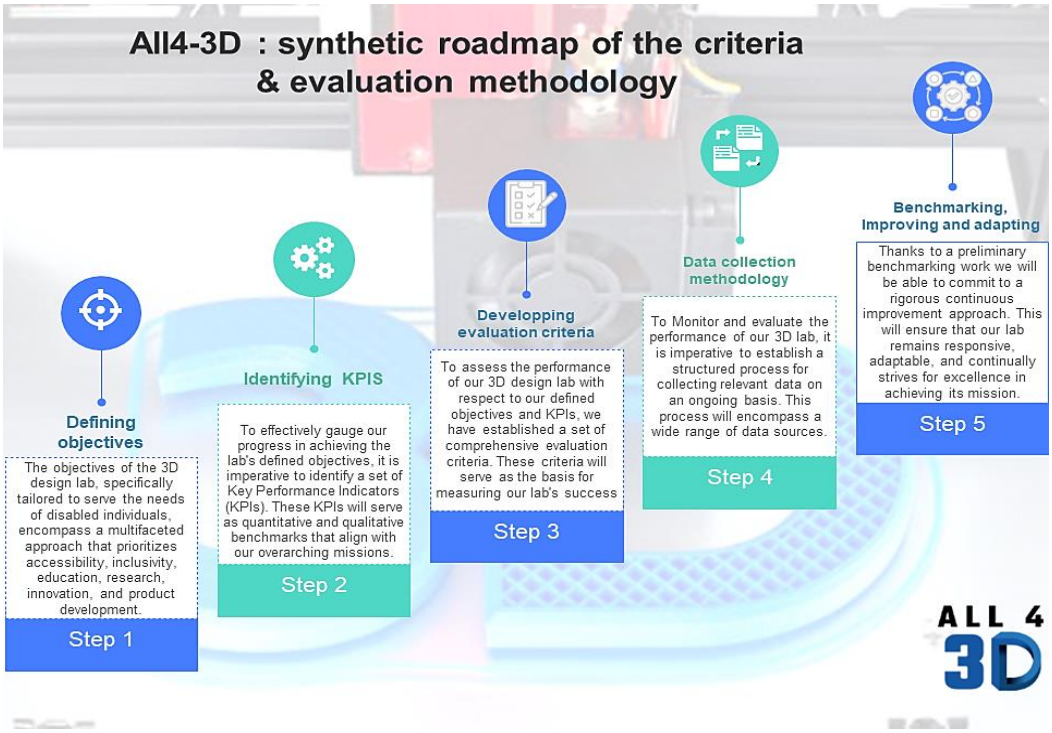


*Figure 3: Synthetic roadmap of the criteria and evaluation methodology in 5 steps*

The infographic shows the synthetic roadmap of the criteria and evaluation methodology, of which it shows all parts and explains each one in detail.

## 4. Data collection and measurement

To systematically monitor and evaluate the performance of our 3D design lab, we recognize the imperative need for a structured data collection and measurement process. This comprehensive approach encompasses various data sources, incorporating project management software to meticulously track ongoing projects, capturing critical information such as milestones, timelines, resource allocation, and deviations from initial plans. Regular reviews of this project data provide insights into the efficiency, progress, and quality of designs produced, enabling us to assess alignment with established objectives and key performance indicators (KPIs). Additionally, user feedback mechanisms, including surveys, suggestion boxes, and interviews, will be established to collect insights from disabled individuals, students, researchers, and other stakeholders. The analysis of user feedback becomes instrumental in gauging satisfaction, identifying improvement areas, and ensuring that our services meet the diverse needs and expectations of our user base. Our lab will implement resource and expense tracking systems to monitor equipment, materials, personnel utilization, and budget adherence. Regular reviews of resource and expense data allow us to measure efficiency, assess cost-effectiveness, and ensure compliance with budgetary constraints. Periodic audits will be conducted to evaluate compliance with accessibility standards, confirming our commitment to inclusivity and identifying areas for improvement. Moreover, mechanisms for tracking and documenting innovative solutions and creative initiatives developed within the lab will be established, aligning with our commitment to pushing boundaries and contributing to disability-related research and assistive technologies. This data-driven approach, encompassing diverse facets of lab operations, ensures that our decisions are well-informed, facilitating continuous improvement and steadfast progress toward our defined objectives and KPIs.

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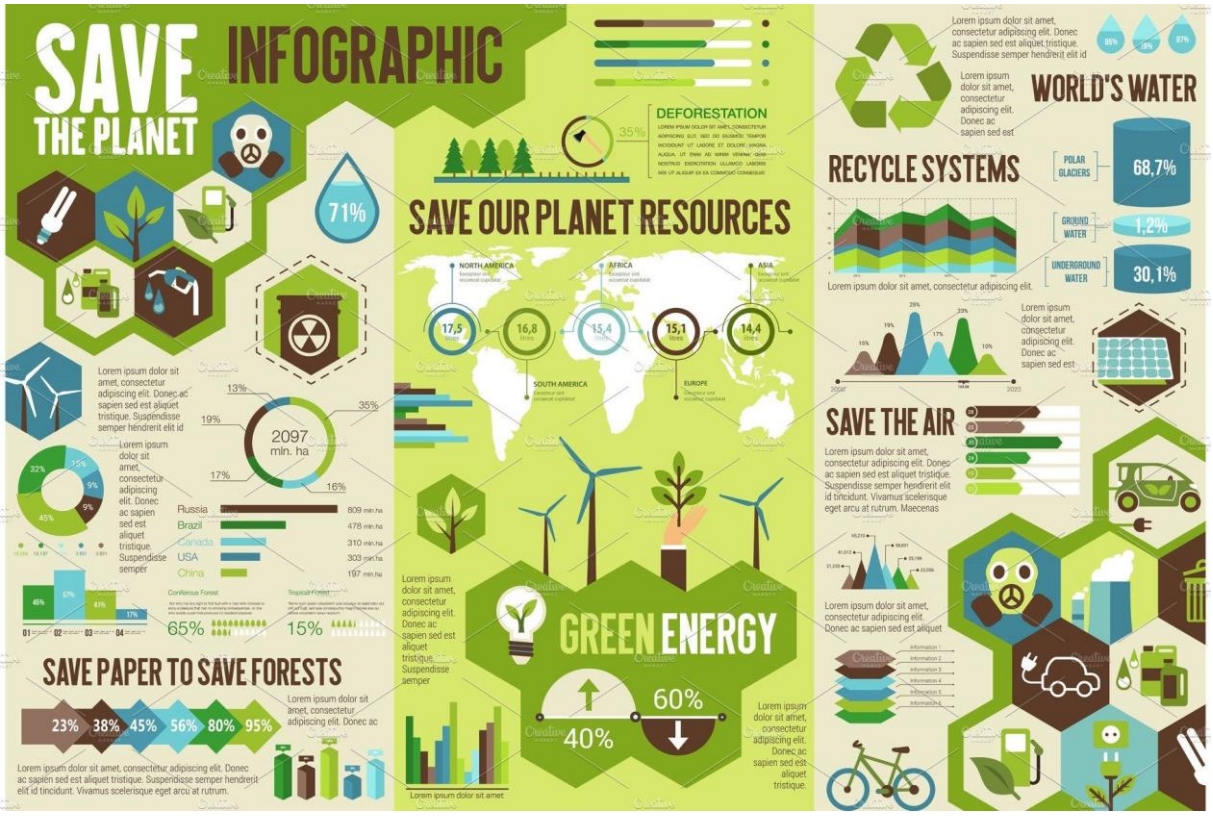


*Figure 4: Conserving the Earth's resources*

This vibrant infographic emphasizes the importance of conserving Earth's resources. It visually presents practical steps like recycling, using renewable energy, and reducing waste. Icons and statistics illustrate the impact of these actions on our environment, encouraging viewers to adopt sustainable practices.

## 5. Regular assessments

Annual assessments serve as comprehensive evaluations that provide an all-inclusive view of the lab's performance over the course of a year. This timeframe is chosen for several key reasons, such as the long-term impact assessment, which allows us to assess the cumulative impact of our 3D design lab. By reviewing data over a year, we can evaluate the lasting effects of our initiatives and strategies. This extended timeframe is particularly valuable for tracking the educational and research impact of the lab, as these outcomes often require a more extended period to manifest fully. Our strategic goal setting is an annual assessments that helps us set strategic goals for the upcoming year. With a year's worth of data and insights at our disposal, we can make informed decisions about our future direction, resource allocation, and priority areas. This longer-term perspective enables us to plan and execute projects that align with our objectives effectively.

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### 5.1 Time to Implement Changes

An annual assessment cycle provides sufficient time to implement meaningful changes based on the previous year's performance. This timeframe allows us to address any issues, make improvements, and measure the impact of those changes within a realistic time frame.

### 5.2 Resource Allocation and Budget Planning

Yearly assessments are essential for budget planning and resource allocation. They allow us to allocate resources more effectively and make informed decisions about resource management, ensuring that we maximize the impact of the lab's activities while adhering to budgetary constraints.

### 5.3 Alignment with Reporting Cycles

Many stakeholders, including funding organizations, universities, and institutions, often require annual performance reports. By conducting yearly assessments, we ensure that we have the necessary data and insights to meet reporting requirements promptly and comprehensively.

## 6. Feedback mechanism

Establishing an effective feedback mechanism is crucial for gathering valuable input from lab users, staff, and stakeholders. This system will facilitate ongoing communication, enabling us to assess the lab's performance, identify areas for improvement, and ensure that the needs and expectations of our diverse community are met. The feedback mechanism consists of the following components:

### 6.1 User Surveys

Method: Conduct regular user surveys that are distributed digitally or in printed format to lab users, including disabled individuals, students, researchers, and other stakeholders.

Purpose: User surveys allow us to collect structured feedback on various aspects of the lab's performance. Questions may cover user satisfaction, the quality of 3D designs, accessibility, and overall experiences within the lab.

Frequency: Surveys will be conducted on a biannual basis to ensure that we gather feedback from our user community at regular intervals.

### 6.2 User Interviews

Method: Organize one-on-one or group interviews with lab users and stakeholders. These interviews can be conducted in person, over the phone, or through video conferencing.

Purpose: User interviews provide a platform for in-depth conversations, allowing us to explore user experiences, needs, and suggestions more comprehensively. This method is particularly valuable for understanding the unique challenges and opportunities faced by disabled individuals.

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Frequency: User interviews will be scheduled annually, aligning with the yearly assessments to provide a comprehensive view of user perspectives.

### 6.3 Suggestion Boxes

Method: Install physical and digital suggestion boxes within the lab's premises and online platforms. Lab users and visitors can submit suggestions, comments, or concerns anonymously.

Purpose: Suggestion boxes offer a convenient and anonymous channel for lab users to share their feedback and recommendations. They encourage open communication and make it easy for users to voice their opinions.

Frequency: Suggestions can be submitted on an ongoing basis, with periodic reviews by lab management to ensure timely responses to user feedback.

### 6.4 Staff Feedback Sessions

Method: Conduct regular feedback sessions with lab staff, including researchers, instructors, and administrative personnel, to gather their input on lab operations and performance.

Purpose: Staff feedback sessions provide an internal perspective on lab functioning. They help identify potential process improvements, resource allocation issues, and staff development needs.

Frequency: Staff feedback sessions will be held quarterly to maintain a consistent dialogue and ensure that staff members have the opportunity to contribute their insights.

### 6.5 Stakeholder Engagement

Method: Maintain ongoing communication and engagement with external stakeholders, including disability advocacy groups, experts, and collaborating organizations. This can include regular meetings, conferences, and collaborative projects.

Purpose: Engaging with external stakeholders allows us to tap into their expertise, access valuable insights, and ensure our lab remains aligned with industry best practices and the evolving needs of the disability community.

Frequency: Stakeholder engagement will be ongoing, with regular meetings and updates to foster a strong and collaborative relationship.

By implementing this feedback mechanism, we create an environment of open and continuous communication, ensuring that the lab remains responsive to the needs and expectations of its users and stakeholders. The insights gathered through this system will be instrumental in shaping our lab's performance and promoting ongoing improvements.

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# 7. Benchmarking

Benchmarking is a valuable process for assessing our lab's performance and positioning it in relation to industry benchmarks or established standards. This comparative analysis enables us to identify areas of excellence and areas that may require improvement. Our benchmarking approach will include the following components:

## 7.1 Identifying Industry Benchmarks

Process: Begin by identifying relevant industry benchmarks, standards, and best practices in the field of 3D design for disability-related initiatives. This may involve consulting industry publications, guidelines, academic research, and engaging with experts in the disability community.

Rationale: Identifying industry benchmarks provides us with a set of well-defined criteria and performance indicators that are recognized and accepted by the broader industry. It helps us ensure that our lab's performance aligns with industry expectations and standards.

## 7.2 Comparative Analysis

Process: Conduct a comparative analysis that evaluates our lab's performance against the identified benchmarks and standards. This analysis may involve data collection, surveys, and assessments of various aspects of our lab's operations.

Rationale: Comparative analysis allows us to identify areas where we excel, as well as areas where there is room for improvement. By comparing our performance with recognized standards, we can make informed decisions about potential enhancements.

## 7.3 Gap Analysis

Process: After the comparative analysis, perform a gap analysis to identify the gaps between our lab's performance and the industry benchmarks. This involves recognizing areas where our lab falls short of the benchmarks.

Rationale: Gap analysis helps us prioritize areas for improvement. It allows us to focus our efforts on addressing specific deficiencies and ensuring that our lab's performance aligns with or surpasses industry standards.

## 7.4 Continuous Improvement Plan

Process: Develop a continuous improvement plan based on the findings of the benchmarking process. This plan should outline specific actions, initiatives, and strategies to address the identified gaps and enhance the lab's performance.

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Rationale: A continuous improvement plan ensures that the insights gained from benchmarking are translated into actionable steps. It guides us in making tangible improvements and elevating our lab's performance.

### 7.5 Regular Benchmarking Updates

Process: Schedule regular updates of the benchmarking process to ensure that our lab continues to evolve and adapt to changing industry standards and best practices. These updates can be conducted annually or as needed.

Rationale: Ongoing benchmarking updates enable us to stay current with industry advancements and adapt to emerging trends. It ensures that we remain at the forefront of disability-related 3D design initiatives.

By implementing benchmarking as a part of our lab's evaluation and improvement process, we ensure that our lab remains responsive to industry standards and continuously strives for excellence. This approach promotes a culture of ongoing improvement, innovation, and alignment with the best practices in the field.

## 8. Continuous improvement

Our commitment to excellence hinges on continuous improvement in our strengths & weaknesses where we identify them through evaluations, benchmarking, and feedback mechanisms. To solve our weaknesses and enhance our strengths we develop an action plan. We implement these plans efficiently, to make tangible changes, for which we have regular monitoring and evaluation assess to impact of improvements. The whole process is iterative, allowing us to adapt and continuously enhance our lab's performance. This approach ensures that our lab remains responsive, adaptable, and continually strives for excellence in achieving its mission.

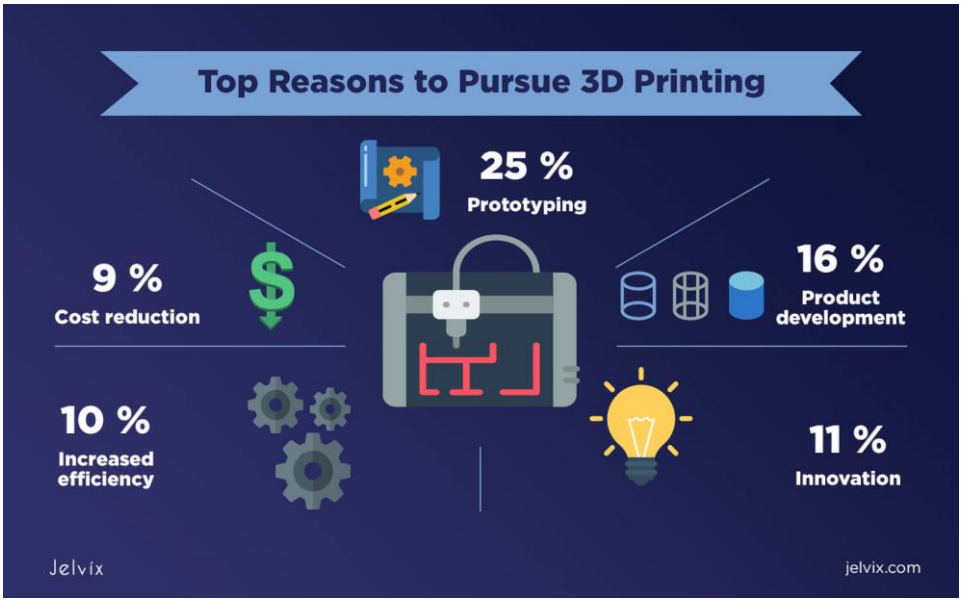


*Figure 5: Mayor reasons to engage with 3D printing*

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This engaging infographic lists major reasons to engage with 3D printing, such as product development, innovation, cost reduction, prototyping, and increased efficiency. It combines eye-catching graphics with short, impactful explanations to convey the advantages of 3D printing.

# 9. Budget and resource allocation

A well-structured budget and resource allocation process is critical to aligning with our lab's objectives and performance criteria. It ensures that we have the necessary financial and operational resources to support our mission. This process involves the following key components:

## 9.1 Objective Alignment

Process: Ensure that the lab's budget is aligned with our defined objectives, KPIs, and evaluation criteria. Resources must be allocated strategically to support these goals.

Rationale: Budget alignment with objectives ensures that financial resources are used effectively to achieve our mission and desired outcomes.

## 9.2 Performance Criteria Integration

Process: Integrate the performance criteria, as outlined in previous sections, into the budgeting process. Allocate resources based on the areas and initiatives that require funding to meet our criteria.

Rationale: Resource allocation tied to performance criteria helps us prioritize and invest in areas that will have the most significant impact.

## 9.3 Regular Review

Process: Regularly review the budget to ensure it remains aligned with changing needs, evolving objectives, and any identified weaknesses or opportunities.

Rationale: Regular budget reviews enable us to adapt to dynamic circumstances and make necessary adjustments to resource allocation.

## 9.4 Resource Optimization

Process: Optimize resource allocation to maximize efficiency and cost-effectiveness. Allocate resources where they will have the most significant impact.

Rationale: Resource optimization ensures that we make the most of available funding and operational resources, maximizing our lab's performance.

By establishing a budget and resource allocation process that is aligned with our objectives and performance criteria, we ensure that our lab remains well-equipped to pursue its mission effectively.

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Regular reviews and flexibility in the budgeting process help us adapt to changing circumstances and seize new opportunities for improvement. This approach fosters financial sustainability and ensures that resources are used to their full potential.

# 10. Flexibility and Adaptability

We value the ability to be flexible and adaptable in our criteria and evaluation methodology. This includes ongoing evaluation to keep in step with evolving objectives and industry standards, willingness to revise criteria and methodology based on assessments and emerging trends, stakeholder involvement for collaborative decision-making, ensuring alignment with current lab objectives, regular benchmarking against industry standards, scheduled periodic reviews to stay relevant and adaptable. Flexibility and adaptability are vital for our lab's long-term success and continuous alignment with evolving needs and industry trends.

# 11. Documentation

Clear documentation is crucial for maintaining a record of evaluation results, action plans, and changes made over time. This documentation serves several essential purposes: Accountability

Purpose: Documentation provides a clear record of our lab's performance, actions taken, and outcomes achieved. It establishes accountability for the decisions and initiatives undertaken.

## 11.1 11.2 Reporting to Stakeholders

Purpose: Well-documented results, action plans, and changes are essential for reporting to stakeholders, including funding organizations, university administration, and external partners.

## 11.2 Evaluation Transparency

Purpose: Transparent documentation enhances the credibility of our evaluation process and decision-making. It provides stakeholders with insight into our methods and the basis for our actions.

By maintaining clear documentation, we enhance accountability, reporting, knowledge preservation, and evaluation transparency, ultimately contributing to the lab's effectiveness and credibility.

# 12. Stakeholder involvement

The integration of key stakeholders into our evaluation process is a fundamental aspect critical to the sustained success and development of our 3D design lab. Our comprehensive stakeholder involvement strategy encompasses lab users, management, and decision-makers, recognizing their unique roles and contributions to the overall functioning of the facility. In the initial phase, we prioritize the identification and engagement of these key stakeholders, ensuring that those with the most substantial influence and impact on the lab's operations are actively included in the evaluation process. This

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deliberate approach allows us to tap into the wealth of knowledge and expertise possessed by individuals who are deeply invested in the lab's outcomes. Central to our stakeholder involvement strategy is the commitment to regular and open communication. We understand that keeping stakeholders informed about the ongoing evaluation, results, performance metrics, and proposed changes is essential for fostering a sense of transparency, ownership, and continuous engagement. This communication pathway serves not only to disseminate information but also to provide stakeholders with the opportunity to voice concerns, share insights, and actively participate in shaping the trajectory of the lab. The feedback gathering process is another crucial element of our stakeholder involvement strategy. Actively seeking input through various channels such as surveys, meetings, interviews, and suggestion mechanisms ensures that we embrace a diversity of perspectives. This inclusive approach is fundamental to aligning our decisions with the nuanced needs and expectations of our stakeholders. By actively seeking and incorporating their feedback, we aim to create an environment that not only responds to their concerns but also reflects their aspirations for the lab's future. Furthermore, our commitment extends to collaboration with stakeholders in the development of action plans based on evaluation results. This collaborative process ensures that the insights and recommendations provided by stakeholders are not only acknowledged but are actively integrated into the decision-making and planning processes. This collaborative approach fosters a sense of shared ownership and commitment to the changes and improvements required for the lab's sustained success. It reflects our belief in the collective responsibility of all stakeholders in steering the lab towards continuous growth and improvement. In conclusion, our all-inclusive stakeholder involvement strategy underscores our commitment to a transparent, inclusive, and collaborative evaluation process. By recognizing and actively engaging with the diverse perspectives and expertise of lab users, management, and decision-makers, we aim to create an environment where stakeholders are not just passive observers but active contributors to the ongoing success and evolution of our 3D design lab.

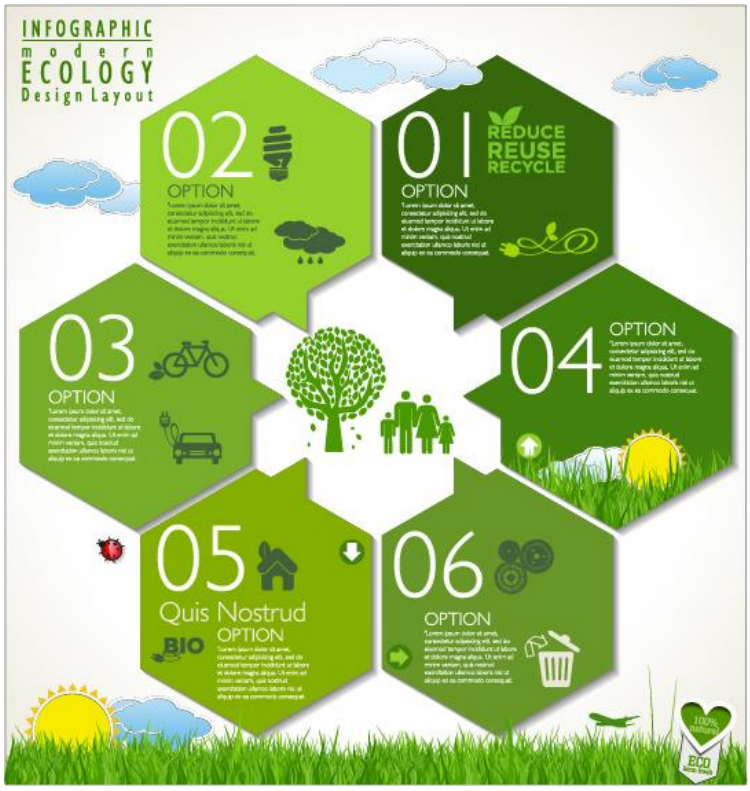


*Figure 6: 6 R's of ecology*

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This informative piece focuses on the 6 Rs of ecology: Rethink, Refuse, Reduce, Reuse, Recycle, and Rot. It uses symbols and brief descriptions to convey the essence of each R, promoting a more sustainable and ecologically conscious lifestyle.

## 13. REFERENCES


Ellis, L. D. (2023, September 28). *Designing accessible laboratory spaces for people with disabilities*. Executive and Continuing Professional Education. https://www.hsph.harvard.edu/ecpe/designing-accessible-labs-for-people-with-disabilities/

*Accessible design means better design.* (2020, May 21). McKinsey & Company. https://www.mckinsey.com/capabilities/mckinsey-design/how-we-help-clients/design-blog/accessible-design-means-better-design

*3D Printing Guide for Teachers*. (n.d.). PrintLab International Ltd. Retrieved February 16, 2024, from https://www.stem.org.uk/system/files/elibrary-resources/2018/09/PrintLab%20-%203D%20Printing%20Guide%20for%20Teachers.pdf

Hoffman, T. (2020, July 1). 3D printing: What you need to know. PCMAG. https://www.pcmag.com/news/3d-printing-what-you-need-to-know

*Guide to 3D printing in education.* (n.d.). Formlabs. https://formlabs.com/eu/blog/guide-3d-printing-education/

Shahrubudin, N., Lee, T., & Ramlan, R. (2019). An overview on 3D printing technology: technological, materials, and applications. Procedia Manufacturing, 35, 1286–1296. https://doi.org/10.1016/j.promfg.2019.06.089

Gimbel, E. (2020, May 6). The resurgence of 3D printers in modern learning environments. *Technology Solutions That Drive Education*. https://edtechmagazine.com/k12/article/2019/06/resurgence-3d-printers-modern-learning-environments-perfcon

Castaneda, F. (2023, December 13). *Why I use 3D printing in the classroom (and why you should too!)* UltiMaker. https://ultimaker.com/learn/why-i-use-3d-printing-in-the-classroom-and-why-you-should-too/

Previous reports and documents for the ALL4-3D project



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