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**Communication Strategy in Education,
Research and Products Development
Projects in Applied Engineering**

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INTRODUCTION

In the dynamic and rapidly evolving field of applied engineering, effective communication strategies play a pivotal role in the success of education, research, and product development projects. These domains are intricately linked and require robust communication frameworks to facilitate collaboration, innovation, and dissemination of knowledge. The integration of communication strategies within these areas not only enhances the efficiency of project execution but also ensures that the outcomes are impactful and widely recognized .

In educational settings, particularly in applied engineering, communication strategies are essential for fostering an environment conducive to learning and innovation. Educators must effectively convey complex engineering concepts to students, bridging the gap between theoretical knowledge and practical application. This involves the use of diverse communication tools and techniques, including interactive lectures, multimedia presentations, and collaborative projects, which cater to different learning styles and enhance student engagement. Moreover, clear and consistent communication between educators, students, and industry partners is vital for aligning educational

objectives with real-world engineering demands, thereby preparing students for future challenges in the field.

Research in applied engineering is inherently collaborative, often involving multidisciplinary teams spanning various institutions and geographical locations. Effective communication is critical in these projects to coordinate activities, share findings, and integrate diverse perspectives. This includes leveraging digital communication platforms, conducting regular meetings, and maintaining comprehensive documentation practices to ensure all team members are aligned and informed.

In addition to internal collaboration, communicating research outcomes to the broader scientific community and stakeholders is essential. This strategic approach ensures that findings are accessible, comprehensible, and impactful. Researchers achieve this through the preparation of research papers, presentations at conferences, and utilizing digital media to reach a wider audience.

Beyond the scientific community, effective communication with the general public and citizens plays a crucial role in raising awareness and justifying public investments in applied engineering. This communication must utilize

channels beyond scientific realms, such as sector magazines, newspapers, television, and radio, using accessible language that resonates with a broader audience. By highlighting the societal benefits and practical applications of research outcomes, researchers can demonstrate the value of their work and garner public support. This engagement not only enhances understanding but also fosters a supportive environment for continued research and innovation in applied engineering.

The development of new engineering products is a complex process that necessitates seamless communication among various stakeholders, including engineers, designers, marketers, and end-users. Effective communication strategies in this context are essential for ensuring that the product development process is efficient and that the final product meets the needs and expectations of the target market. This involves the use of project management tools, regular updates and feedback loops, and clear documentation of product specifications and development milestones. Moreover, communicating the benefits and features of new products to potential users and clients requires a strategic marketing approach that highlights the product's unique value proposition and its applications in the real world.

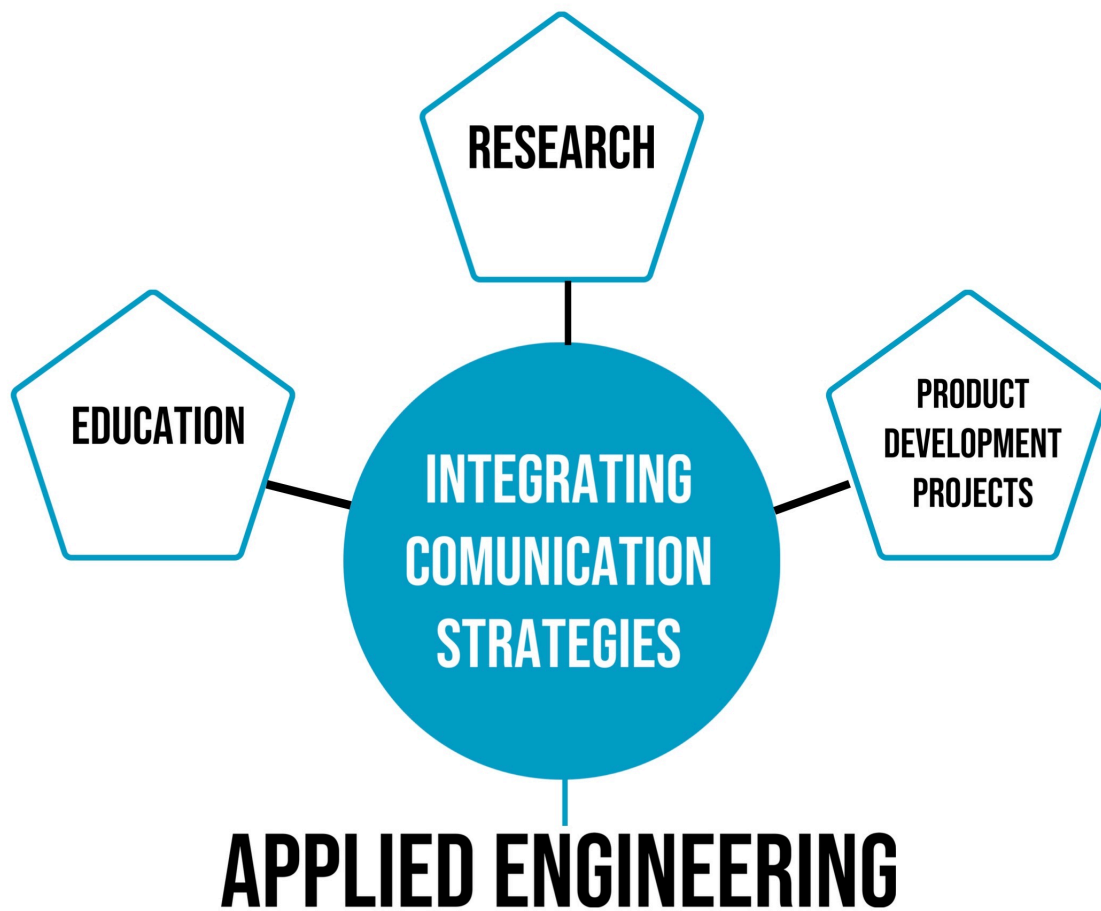


Fig. 1

Integrating communication strategies across education, research, and product development projects in applied engineering creates a cohesive and synergistic environment that fosters innovation and progress. By aligning communication practices across these domains, institutions can ensure that educational programs are informed by the latest research developments and that research projects benefit from practical insights gained through product development initiatives. This integrated approach not only enhances the overall quality and impact of projects but also promotes a culture of continuous learning and improvement within the field of applied engineering.

1 - COMMUNICATION STRATEGY IN EDUCATION

In the realm of engineering, education is the cornerstone that prepares the next generation of engineers to tackle complex challenges and drive innovation. A well-crafted communication strategy is essential in this educational process, ensuring that information is conveyed effectively, learners are engaged, and educational outcomes are optimized. This chapter delves into the key elements of communication strategy in education, highlighting its importance, methodologies, and best practices within the context of applied engineering. [1]

1.1 Importance of Communication in Education

Effective communication in education is crucial for multiple reasons. It connects theoretical knowledge with practical application, rendering complex engineering concepts more comprehensible for students. Furthermore, it cultivates an interactive and engaging learning atmosphere, prompting students to actively participate and collaborate. Additionally, clear communication among educators, students, and industry partners guarantees that educational programs stay relevant and aligned with the evolving demands of the industry. [2]

1. Enhancing Understanding: Clear and effective communication helps students grasp difficult concepts and theories in applied engineering, making learning more efficient and impactful.
2. Promoting Engagement: Interactive communication strategies, such as discussions, group projects, and hands-on activities, keep students engaged and motivated.
3. Facilitating Collaboration: Open lines of communication between students, educators, and industry professionals foster a collaborative learning environment that is essential for solving real-world engineering problems.
4. Aligning with Industry Needs: Regular communication with industry stakeholders ensures that the curriculum and educational practices are aligned with the latest technological advancements and industry requirements.

1.2 Key Components of Communication Strategy in Education

1. Interactive Lectures: Traditional lectures are enhanced with interactive elements such as Q&A sessions, live demonstrations, and real-time feedback. This approach encourages active participation and makes learning more dynamic.

2. Multimedia Tools: Utilizing videos, simulations, and animations can make complex engineering concepts easier to understand. Multimedia tools cater to various learning styles and help in visualizing abstract concepts.

3. Collaborative Projects: Group projects and team-based assignments promote peer-to-peer learning and collaboration. These projects simulate real-world engineering challenges, requiring students to communicate effectively and work together to find solutions.

4. Digital Platforms: Online learning management systems (LMS) and digital collaboration tools facilitate communication beyond the classroom. They provide platforms for discussions, resource sharing, and continuous feedback.

5. Industry Partnerships: Engaging with industry professionals through guest lectures, workshops, and internships provides students with practical insights and real-world perspectives. This connection helps bridge the gap between academic knowledge and industry practices.

1.3 Best Practices for Effective Communication

1. Clear Objectives: Define clear learning objectives and outcomes for each course or module. Communicating these objectives helps students understand what is expected of them and aligns their efforts with the course goals.

2. Active Listening: Encourage active listening among students by fostering an open and respectful classroom environment. Active listening skills are crucial for effective communication and collaboration.

3. Feedback Mechanisms: Implement regular feedback mechanisms, such as formative assessments and peer reviews, to provide students with constructive feedback on their progress. This helps them identify areas for improvement and enhances their learning experience.

4. Cultural Sensitivity: Be aware of the diverse cultural backgrounds of students and incorporate culturally sensitive communication practices. This includes using inclusive language and being mindful of different communication styles.

5. Continuous Improvement: Regularly evaluate and update communication strategies based on feedback from students and colleagues. Continuous

improvement ensures that the communication practices remain effective and relevant.

1.4 Challenges and Solutions

1. Technological Barriers: Not all students may have equal access to digital tools and resources. Solutions include providing alternative resources, ensuring all students have access to necessary technology, and offering support for those who need it.

2. Language Barriers: In a diverse educational environment, language differences can hinder effective communication. Solutions include offering language support services, using simple and clear language, and incorporating visual aids.

3. Engagement Issues: Keeping students engaged, especially in large classes or online settings, can be challenging. Solutions include interactive teaching methods, regular check-ins, and varied instructional materials to maintain interest and participation.

A robust communication strategy is indispensable in the field of applied engineering education. By employing a variety of communication methods

and best practices, educators can create an engaging and effective learning environment that prepares students for future challenges. Effective communication not only enhances understanding and engagement but also ensures that educational programs are aligned with industry needs and technological advancements. As the field of engineering continues to evolve, the importance of strategic communication in education will only grow, underscoring the need for ongoing innovation and improvement in communication practices. [3]

2 - COMMUNICATION STRATEGY IN RESEARCH

Effective communication is the cornerstone of successful research in applied engineering, playing a pivotal role in the progression and impact of research endeavors. It ensures that complex ideas and findings are articulated with clarity, making them accessible and comprehensible to a wide range of audiences. This clarity is essential for fostering collaboration among multidisciplinary teams, which often include experts from various fields, each contributing unique perspectives and expertise. [4]

In multidisciplinary research, there is also a strong need to understand each other, avoiding the use of "domain-specific language" or explaining its meaning before using it. This mutual understanding phase fosters education and cross-pollination of ideas, enriching the research process.

By facilitating clear and efficient communication, researchers can integrate these diverse inputs into a cohesive whole, driving innovation and enhancing the overall quality of the research. This approach not only enhances the depth and breadth of insights but also ensures that research outcomes are robust and impactful across different disciplines and sectors. [5]

2. 1 Importance of Communication in Research

Effective communication in research is essential for several reasons. It ensures that all team members are on the same page, promotes efficient collaboration, and helps in the clear articulation of research findings. Moreover, it plays a critical role in securing funding, publishing results, and translating research into practical applications.

1. Facilitating Collaboration: Research in applied engineering often involves interdisciplinary teams that may span various institutions and geographical locations. Effective communication is crucial for coordinating activities, sharing insights, and integrating diverse perspectives.

2. Ensuring Clarity: Clear communication helps in articulating research goals, methodologies, and outcomes, making complex ideas more understandable to both specialists and non-specialists.

3. Promoting Dissemination: Communicating research findings effectively ensures that the knowledge generated reaches the appropriate audiences, including academic peers, industry professionals, and policymakers.

4. Securing Funding: Well-articulated research proposals and progress reports are essential for attracting and maintaining funding from various sources, including government agencies, private companies, and non-profit organizations.

2.2 Key Components of Communication Strategy in Research

1. Project Planning and Documentation: Clear and comprehensive project planning documents, including research proposals, work plans, and timelines, provide a roadmap for the research process. Regular documentation of progress and findings ensures that the research stays on track and that all team members are informed.

2. Team Meetings and Updates: Regular meetings, whether in person or virtual, are essential for discussing progress, addressing challenges, and making decisions. Scheduled updates and reports keep everyone aligned and engaged with the project's objectives.

3. Collaboration Tools: Utilizing digital collaboration tools such as shared document platforms, project management software, and communication apps

facilitates seamless information exchange and coordination among team members.

4. Dissemination Channels: Identifying and utilizing appropriate channels for disseminating research findings is crucial. This includes peer-reviewed scientific journals, conferences, workshops, and digital media platforms. Each channel serves different purposes and reaches different audiences.

2.3 Best Practices for Effective Communication

1. Clarity and Precision: Use clear, concise language to articulate research goals, methods, and findings. Avoid jargon whenever possible to ensure that the information is accessible to a broader audience.

2. Regular Updates: Provide regular updates on research progress to team members, stakeholders, and funding bodies. This maintains transparency and builds trust among all parties involved.

3. Visual Aids: Employ visual aids such as charts, graphs, and diagrams to illustrate complex data and concepts. Visuals can enhance understanding and retention of information.

4. Engagement with Stakeholders: Actively engage with stakeholders throughout the research process. This includes seeking feedback, addressing concerns, and incorporating stakeholder input into the research.

5. Ethical Communication: Ensure that all communication is conducted ethically, with honesty and integrity. This includes giving proper credit to contributors and being transparent about the limitations and potential implications of the research.

2.4 Challenges and Solutions

1. Multidisciplinary Collaboration: Working with teams from diverse disciplines can pose communication challenges. Solutions include establishing common terminology, fostering a culture of open dialogue, and using collaborative tools effectively.

2. Geographical Barriers: Teams spread across different locations may face difficulties in coordinating efforts. Solutions include leveraging virtual communication tools, scheduling meetings at convenient times for all parties, and using time management software.

3. Complexity of Concepts: Conveying complex engineering concepts to non-specialist audiences can be challenging. Solutions include using analogies, simplifying language, and providing context to make the information more accessible.

3 - COMMUNICATION STRATEGY IN PRODUCT DEVELOPMENT PROJECT IN APPLIED ENGINEERING

Product development in applied engineering is a multifaceted process that involves the collaboration of various stakeholders, including engineers, designers, marketers, and end-users. Effective communication strategies are crucial in this context, ensuring that the development process is efficient and that the final product meets the needs and expectations of the target market. This chapter explores the key elements of communication strategy in product development projects, emphasizing its importance, methodologies, and best practices within the field of applied engineering. [6]

3.1 Importance of Communication in Product Development

Effective communication is critical in product development for several reasons. It facilitates coordination among diverse teams, ensures that project objectives are clearly understood, and helps in aligning the product with market needs. Moreover, it plays a vital role in managing timelines, budgets, and resources effectively. [7]

1. Facilitating Collaboration: Product development involves the collaboration of multidisciplinary teams, each with their own expertise and perspective.

Effective communication ensures that these teams can work together seamlessly, integrating their contributions into a cohesive final product.

2. Ensuring Clarity and Alignment: Clear communication of project goals, specifications, and requirements ensures that all stakeholders are on the same page. This alignment is essential for avoiding misunderstandings and ensuring that the product meets its intended purpose.

3. Managing Expectations: Regular communication with stakeholders, including clients and end-users, helps in managing expectations and ensuring that the product development process remains transparent and accountable.

4. Enhancing Innovation: Open lines of communication encourage the sharing of ideas and feedback, fostering a culture of innovation and continuous improvement.

3. 2 Key Components of Communication Strategy in Product Development

1. Project Planning and Documentation: Comprehensive project planning documents, including project briefs, timelines, and milestones, provide a clear roadmap for the development process. Regular documentation of progress

ensures that all team members are informed and that any issues are promptly addressed. [8]

2. Stakeholder Engagement: Engaging with stakeholders throughout the development process is crucial. This includes regular updates, feedback sessions, and reviews to ensure that the product remains aligned with stakeholder needs and expectations.

3. Cross-functional Team Meetings: Regular meetings involving all relevant teams (engineering, design, marketing, etc.) facilitate the exchange of information and coordination of activities. These meetings are essential for identifying and resolving issues early in the development process.

4. Digital Collaboration Tools: Utilizing digital tools such as project management software, communication platforms, and shared document repositories enhances collaboration and ensures that information is readily accessible to all team members.

5. Prototyping and Testing Feedback: Effective communication of feedback from prototyping and testing phases is crucial. This feedback helps in refining

the product and ensuring that it meets quality standards and user requirements.

3.3 Best Practices for Effective Communication

1. Clear Objectives and Requirements: Clearly define and communicate the objectives, requirements, and constraints of the product development project. This clarity helps in aligning the efforts of all team members and stakeholders. [9]

2. Regular Updates and Reports: Provide regular updates and reports on project progress, including achievements, challenges, and next steps. These updates help in maintaining transparency and keeping all stakeholders informed.

3. Visual Communication: Use visual aids such as sketches, diagrams, and prototypes to convey ideas and concepts more effectively. Visual communication can enhance understanding and reduce the potential for misunderstandings.

4. Active Listening: Encourage active listening among team members and stakeholders. Active listening fosters a collaborative environment where everyone feels heard and valued.

5. Iterative Feedback Loops: Implement iterative feedback loops throughout the development process. Regularly solicit and incorporate feedback to ensure that the product evolves in line with stakeholder needs and expectations.

3.4 Challenges and Solutions

1. Multidisciplinary Coordination: Coordinating efforts across diverse teams can be challenging. Solutions include establishing clear communication protocols, using collaborative tools, and fostering a culture of open dialogue and mutual respect.

2. Geographical Disparities: Teams spread across different locations may face communication barriers. Solutions include leveraging virtual communication tools, scheduling regular virtual meetings, and ensuring that all team members have access to necessary resources.

3. Evolving Requirements: Product requirements may evolve over time, posing communication challenges. Solutions include maintaining flexibility in

communication strategies, regularly reviewing and updating project plans, and ensuring that all changes are clearly communicated to relevant stakeholders. [10]

4 - DISSEMINATION

Dissemination refers to the deliberate and systematic process of sharing information, findings, and outcomes from research, education, and development projects to a broader audience. In the context of applied engineering, dissemination is critical for ensuring that the knowledge generated and innovations developed reach the relevant stakeholders, including academic peers, industry professionals, policymakers, and the general public. Effective dissemination maximizes the impact of projects, fosters further innovation, and contributes to the advancement of the field.[11]

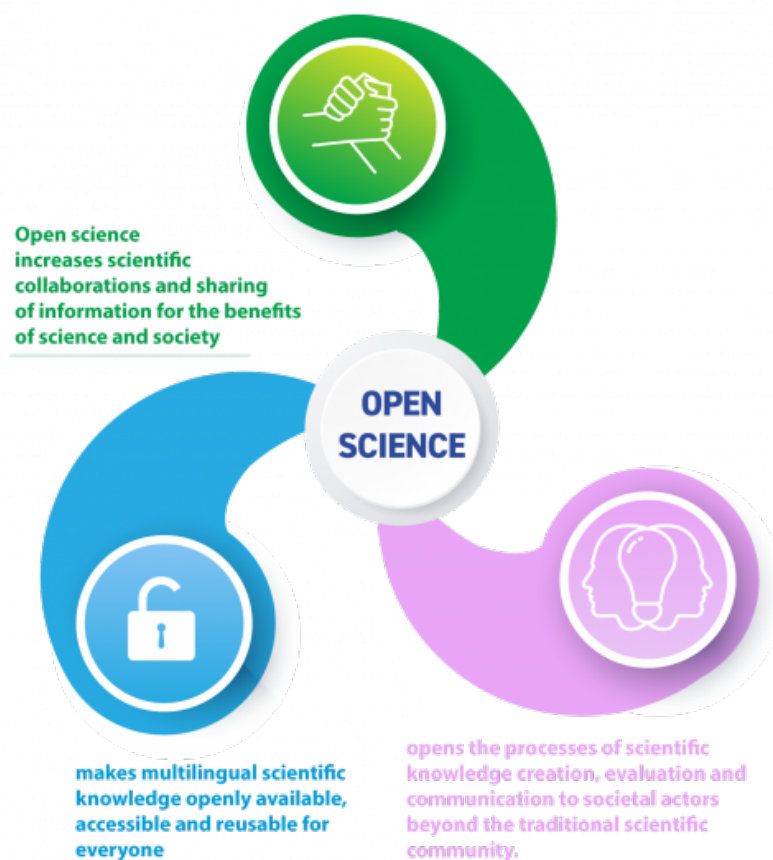


Fig. 2

4.1 Goals of Dissemination

1. Knowledge Sharing: Dissemination aims to spread new insights, discoveries, and technological advancements to a wide audience, facilitating knowledge exchange and collaborative learning.
2. Impact Maximization: By sharing results with a broader audience, dissemination ensures that the benefits of research and development are fully realized and can be applied in practical contexts.
3. Engagement and Feedback: Dissemination encourages interaction with stakeholders, gathering feedback that can improve future research and development efforts.
4. Transparency and Accountability: Disseminating results ensures transparency in the research and development process, building trust and accountability among stakeholders.

4.2 Methods of Dissemination

1. Academic Publications: Publishing research findings in peer-reviewed journals is a traditional and highly respected method of dissemination. These

publications provide a rigorous platform for validating and sharing new knowledge with the academic community.

2. Conferences and Workshops: Presenting at conferences and workshops allows researchers and practitioners to share their work with peers, engage in discussions, and receive immediate feedback. These events also facilitate networking and collaboration.

3. Digital Media: Utilizing websites, blogs, webinars, and social media platforms to disseminate information can reach a broad and diverse audience. Digital dissemination is especially effective for engaging with non-specialist audiences and the general public.

4. Technical Reports and White Papers: Detailed reports and white papers provide comprehensive insights into research and development projects. These documents are valuable for industry professionals and policymakers seeking in-depth information.

5. Educational Materials: Developing instructional content, such as textbooks, online courses, and training modules, helps integrate research findings into educational programs and professional development activities.

6. Press Releases and Media Coverage: Engaging with media outlets through press releases and interviews can amplify the reach of dissemination efforts, bringing attention to significant findings and innovations.

7. Collaborative Platforms: Online collaboration tools and databases enable continuous sharing of data, methodologies, and results among research teams, fostering ongoing collaboration and knowledge exchange. [12]

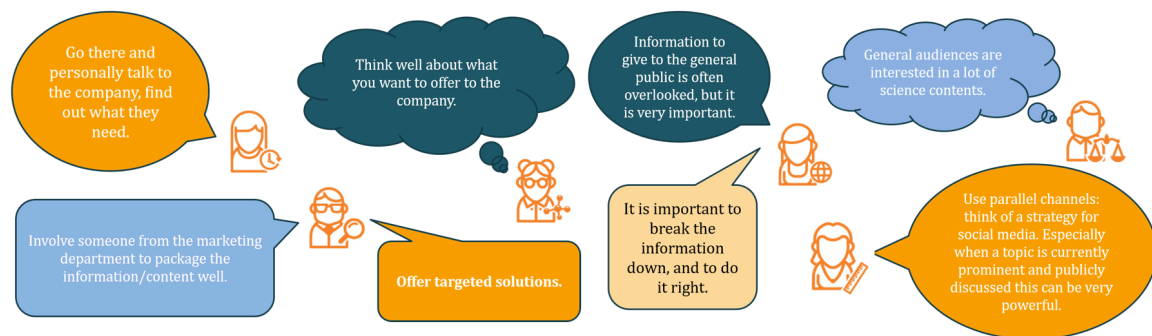


Fig. 3

4.3 Best Practices for Effective Dissemination

1. Identify Target Audience: Tailor dissemination strategies to the specific needs and preferences of different stakeholder groups, ensuring that the information is relevant and accessible to each audience.

2. Clear and Concise Communication: Use clear, jargon-free language to make complex information understandable to non-specialist audiences. Visual aids, such as infographics and videos, can enhance comprehension.

3. Engage Stakeholders Early: Involve stakeholders in the dissemination process from the beginning to ensure that their needs and perspectives are considered. This approach can enhance the relevance and impact of the dissemination efforts.

4. Utilize Multiple Channels: Employ a variety of dissemination methods to reach a broader audience. Combining traditional and digital channels can maximize the reach and effectiveness of dissemination activities. [13]

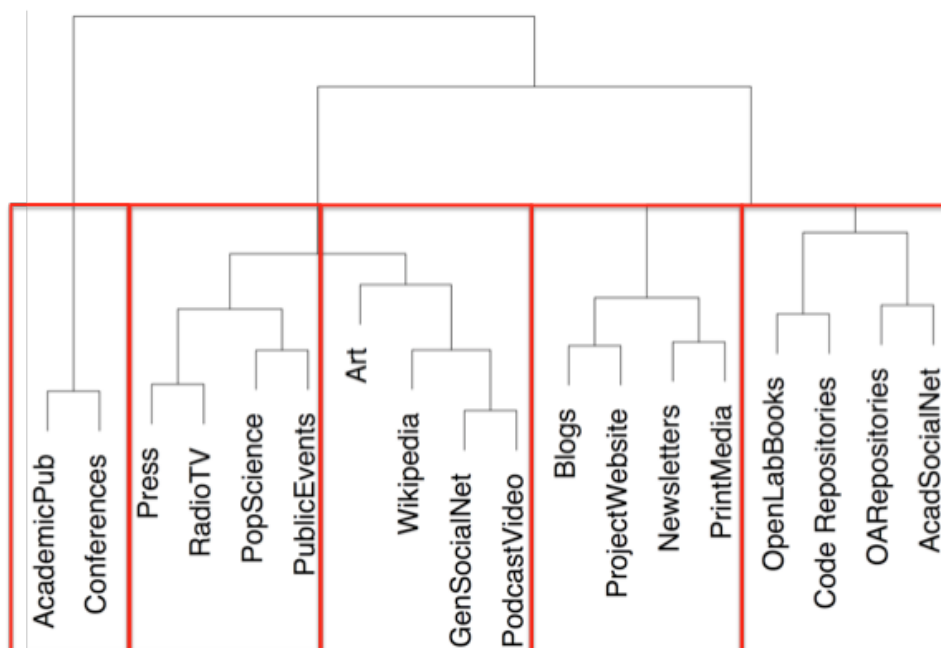


Fig. 4

5. Measure Impact: Evaluate the effectiveness of dissemination efforts through metrics such as citation counts, attendance at presentations, online engagement, and feedback from stakeholders. Use this data to refine future dissemination strategies.

5 - RAISING PUBLIC AWARENESS

Raising public awareness is a critical component of communication strategies in education, research, and product development within applied engineering. Engaging the public not only enhances understanding and appreciation of engineering innovations but also fosters a supportive environment for scientific and technological advancements. This chapter explores the importance of public awareness, effective communication methodologies, and best practices for engaging the public in applied engineering projects. [14]

5.1 Importance of Public Awareness in applied Engineering



Fig. 5

1. Enhancing Understanding and Appreciation: Public awareness initiatives help demystify complex engineering concepts, making them accessible and comprehensible to a broader audience. By improving public understanding, these initiatives foster appreciation for the role of engineering in society.

2. Building Support and Engagement: Engaging the public can generate support for educational programs, research projects, and new product developments. Public backing is crucial for securing funding, influencing policy decisions, and encouraging community involvement.

3. Driving Innovation and Adoption: Public awareness campaigns can accelerate the adoption of new technologies and innovations by highlighting their benefits and applications. Informing potential users about new products and research outcomes can drive market demand and encourage further innovation.

4. Promoting STEM Education: Raising awareness about engineering achievements and career opportunities can inspire the next generation of engineers. Public awareness efforts can stimulate interest in STEM (Science, Technology, Engineering, and Mathematics) education among young students.

5.2 Key Components of Public Awareness Communication

1. Target Audience Identification: Identifying the target audience is the first step in any public awareness campaign. This includes considering different demographics such as students, parents, industry professionals, policymakers, and the general public.

2. Clear Messaging: Crafting clear and concise messages that convey the significance and impact of engineering projects is essential. Avoiding technical jargon and using relatable language helps ensure the message resonates with a broader audience.

3. Storytelling: Using storytelling techniques to highlight the human aspects of engineering projects can make them more relatable and engaging. Stories about real-life applications, benefits to society, and the challenges overcome during the project can captivate public interest.

4. Visual and Multimedia Tools: Utilizing visual aids such as infographics, videos, and animations can make complex information more digestible and appealing. Multimedia tools can enhance the reach and impact of public awareness efforts.

5. Engagement Platforms: Leveraging multiple platforms for dissemination, including social media, websites, public events, and traditional media, ensures broader reach and engagement. Each platform has unique strengths and can be used to target specific segments of the audience effectively.

5.3 Best Practices for Raising Public Awareness

1. Collaborate with Media: Partnering with media outlets can amplify the reach of public awareness campaigns. Engaging journalists and media professionals in the storytelling process can help convey the message to a wider audience.

2. Community Involvement: Involving local communities in engineering projects through workshops, public lectures, and interactive demonstrations can build grassroots support and foster a sense of ownership and pride in local achievements.

3. Educational Outreach: Implementing educational outreach programs in schools and universities can inspire students and inform educators about the latest developments in applied engineering. Hands-on activities, science fairs, and guest lectures can make learning more interactive and exciting.

4. Feedback Mechanisms: Establishing channels for public feedback ensures that the audience feels heard and valued. Collecting and responding to feedback can improve future communication strategies and build stronger connections with the community.

5. Transparency and Honesty: Maintaining transparency about the goals, progress, and challenges of engineering projects builds trust with the public. Honest communication about potential risks and benefits helps manage expectations and fosters credibility.

5.4 Challenges and Solutions

1. Overcoming Technical Jargon: Translating technical jargon into layman's terms can be challenging. Solutions include working with communication experts to simplify language and using analogies that relate to everyday experiences.

2. Engaging Diverse Audiences: Reaching diverse audience groups with varied interests and knowledge levels requires tailored messaging and targeted outreach strategies. Segmenting the audience and customising content for each group can enhance engagement.

3. Resource Constraints: Limited resources for public awareness campaigns can hinder efforts. Solutions include leveraging partnerships, volunteer networks, and digital platforms to maximize impact with minimal costs.

4. Maintaining Interest: Sustaining public interest over time can be difficult. Solutions include regularly updating the public with new information, success stories, and interactive content to keep the audience engaged.

Raising public awareness is a vital element of communication strategies in education, research, and product development in applied engineering. By effectively engaging the public, these initiatives enhance understanding, build support, and drive the adoption of new technologies. Through clear messaging, storytelling, visual tools, and diverse engagement platforms, public awareness efforts can significantly contribute to the success and impact of engineering projects. Emphasizing best practices and proactively addressing challenges will ensure that public awareness campaigns are effective and resonate with a wide audience, fostering a culture of appreciation and support for applied engineering. [15]

6 PRACTICAL EXPERIENCE - Product Development Projects

In the serene coastal town of Ancona, nestled within the Università Politecnica delle Marche (UNIVPM), lies the U-Sense Laboratory a spin-off of cutting-edge research and innovation. This chapter delves into the meticulous process of creating a promotional video for the G3F device, a state-of-the-art Portable IIoT laser triangulation sensor designed for profiles and Gap and Flush measurements. This narrative unfolds the stages of production, from conceptualization to the final cut, highlighting the storytelling methods and communication techniques that align with industry standards and best practices mentioned in the previous chapters.



Fig. 6

6.1 Conceptualization and Planning

The journey commenced with an extensive brainstorming session, bringing together a diverse team of engineers, marketing experts, and videographers in a collaborative effort. The primary goal of this assembly was to crystallize the video's core message and accurately identify the intended target audience. Throughout this session, the team meticulously detailed the G3F's unique selling points, emphasizing its exceptional precision, remarkable portability, and capability for real-time data acquisition. The main objective was to develop a compelling narrative that effectively showcased these features, ensuring that technical accuracy was maintained while presenting the information in an engaging and accessible manner. This careful balance aimed to appeal to both technical professionals and a broader audience, making the intricate details of the G3F easily understandable and visually captivating.

6.1.1 Goals and Objectives

- Primary Goal: To showcase the G3F device's capabilities and applications.

- Objectives: Highlight the device's technical specifications and ease of use.

Demonstrate real-world applications in various industries.

Establish the G3F as an indispensable tool for quality control and manufacturing processes.

6.1.2 Storyboard Development

A detailed storyboard was created, outlining each scene's visual and narrative elements.

Key components included:

- Device Introduction: Close-up shots of the G3F, focusing on its design and build quality.
- Functionality Demonstration: Real-time footage of the G3F in action, measuring various profiles and gaps.
- Conclusion: Demonstration of how data can be immediately transmitted to the pc and processed

6.2 Pre-production

With the storyboard in place, the team moved to pre-production. This phase involved logistical planning, such as securing filming locations, gathering equipment, and scheduling shoot dates.

6.2.1 Equipment and Setup

The equipment and setup for the production were meticulously chosen to ensure the highest quality of both footage and audio, aligning with the technical sophistication of the G3F device.

- Cameras: To capture detailed, high-definition footage, we opted for the latest iPhone 15 Pro. This choice was made due to the iPhone 15 Pro's cutting-edge camera system, which boasts advanced sensors and sophisticated computational photography capabilities.



Fig.7

The camera's ability to shoot in ProRAW and ProRes formats offered us unparalleled flexibility during post-production, allowing for extensive adjustments and enhancements without compromising quality. This ensured that every minute detail of the G3F device from its intricate design elements to its precise operational functions was captured with exceptional clarity and

color accuracy. The high dynamic range and low-light performance of the iPhone 15 Pro's camera were particularly beneficial in highlighting the device's features, ensuring a visually stunning and technically accurate portrayal of the G3F.

- Lighting: To complement the high-definition footage, we employed professional lighting setups. These included a mix of softbox lights, ring lights, and adjustable LED panels, all strategically positioned to minimize shadows and glare. The lighting was crucial in highlighting the G3F device's features and ensuring that the fine details of its construction and operation were clearly visible. By creating a balanced and well-lit environment, we ensured that the device's contours and surface finishes were presented in the best possible light.

- Sound: High-quality microphones were essential for capturing clear and precise audio, especially during the practical demonstrations of the G3F device. We used directional microphones to ensure that the ambient sounds of the device in action were recorded with high fidelity. This setup was critical for maintaining clear and professional audio quality, enabling viewers to fully grasp the operational nuances and benefits of the G3F device.

By utilizing the iPhone 15 Pro for video capture, combined with professional lighting and audio equipment, we were able to produce a promotional video that not only showcased the G3F device's technical excellence but also engaged and informed our target audience effectively.

6.2.2 Scriptwriting

To ensure a coherent narrative flow, an elaborate script was meticulously drafted. This script was carefully crafted to strike the perfect balance between being informative and engaging. It wove together complex technical details with accessible language, making sure that the content was both educational and captivating. The intention was to cater to a diverse audience, which included industry experts who would appreciate the intricate technical specifications, as well as laypersons who would benefit from a more simplified explanation. [16]

By doing so, the script aimed to communicate the G3F's advanced features and practical applications in a manner that was both compelling and comprehensible. This approach was designed to ensure that the promotional video would resonate with a broad spectrum of viewers. The script sought to highlight the precision, portability, and real-time data acquisition capabilities of the G3F, making these technical aspects understandable and appealing to

all. This thorough and thoughtful scripting process was fundamental in creating a video that was not only informative but also engaging, ensuring the message was effectively conveyed to a wide-ranging audience.

6.3 Production

The production phase extended over several days, characterized by meticulous attention to detail at every stage. Each scene was filmed multiple times to guarantee the highest quality footage. This approach allowed for a range of shots to be carefully reviewed and selected during the editing process, ensuring that the final video would be polished and professional.

Throughout the production, the team focused on capturing every aspect of the G3F device's functionality and design with precision and clarity. This included close-up shots of the device in operation, wide shots to provide context, and dynamic angles to emphasize its versatility. By taking this thorough approach, we ensured that we had ample material to work with in post-production. This extensive footage provided a comprehensive visual narrative, highlighting the G3F's advanced features and practical applications.

The attention to detail during the production phase was crucial in creating a final video that effectively showcased the G3F device's capabilities. By

capturing high-quality footage from multiple angles and perspectives, we ensured that every important aspect of the device was clearly and accurately represented, resulting in a video that was both informative and visually engaging.

6.3.1 Filming Techniques

During filming, a variety of techniques were employed to capture the essence of the G3F device and its capabilities, ensuring a comprehensive and visually compelling portrayal.



Fig. 8

- Close-ups and Macro Shots: Extensive use of close-ups and macro shots was employed to meticulously capture the intricate details of the G3F device,

emphasizing its precision engineering and innovative design features. These shots highlighted the fine craftsmanship and technical sophistication of the device, providing viewers with a clear view of its components and operational intricacies.



Fig. 9

- Dynamic Shots: Panning and tracking shots were utilized to showcase the G3F device in action. These dynamic camera movements offered a sense of movement and functionality, illustrating how the device operates in real-world scenarios. By capturing the device from different angles and perspectives, these shots emphasized its versatility and practical applications across various industries.

- Ambient: well-lit environments with minimal background noise. This setup ensured clarity and professionalism in capturing the main characteristics about the G3F device. The shots real-world perspectives, reinforcing the device's capabilities and benefits in practical settings.



Fig 10

These filming techniques were instrumental in creating a comprehensive and engaging visual narrative for the promotional video. By combining close-ups to showcase details, dynamic shots to illustrate functionality, the video effectively communicated the G3F device's innovative features and its relevance in industrial applications. The careful execution of these techniques ensured that the video not only informed but also captivated viewers, reinforcing the device's value proposition and enhancing its market appeal.

6.3.2 Challenges and Solutions

Throughout the production process, various challenges were encountered and effectively addressed to ensure the high quality and consistency of the promotional video.

- Technical Glitches: During the real-time demonstration of the G3F device, technical glitches occasionally arose. These issues were promptly addressed through meticulous troubleshooting of device settings and configurations. In instances where issues persisted, reshooting specific segments was undertaken to capture flawless footage that accurately showcased the device's functionality and performance.

- Environmental Factors: Managing lighting conditions across different filming locations presented another challenge. To maintain visual consistency throughout the video, portable lighting kits were strategically utilized. These kits enabled the adjustment of lighting intensity and direction, ensuring optimal visibility and highlighting the G3F device's features consistently across all scenes. This approach mitigated the impact of varying environmental conditions and ensured a polished final product that met our high standards of production quality.

By proactively addressing these challenges with effective solutions, the production team successfully navigated obstacles encountered during filming. This commitment to overcoming technical and environmental hurdles ultimately contributed to the creation of a cohesive and visually impactful promotional video for the G3F device, showcasing its capabilities with clarity and professionalism.

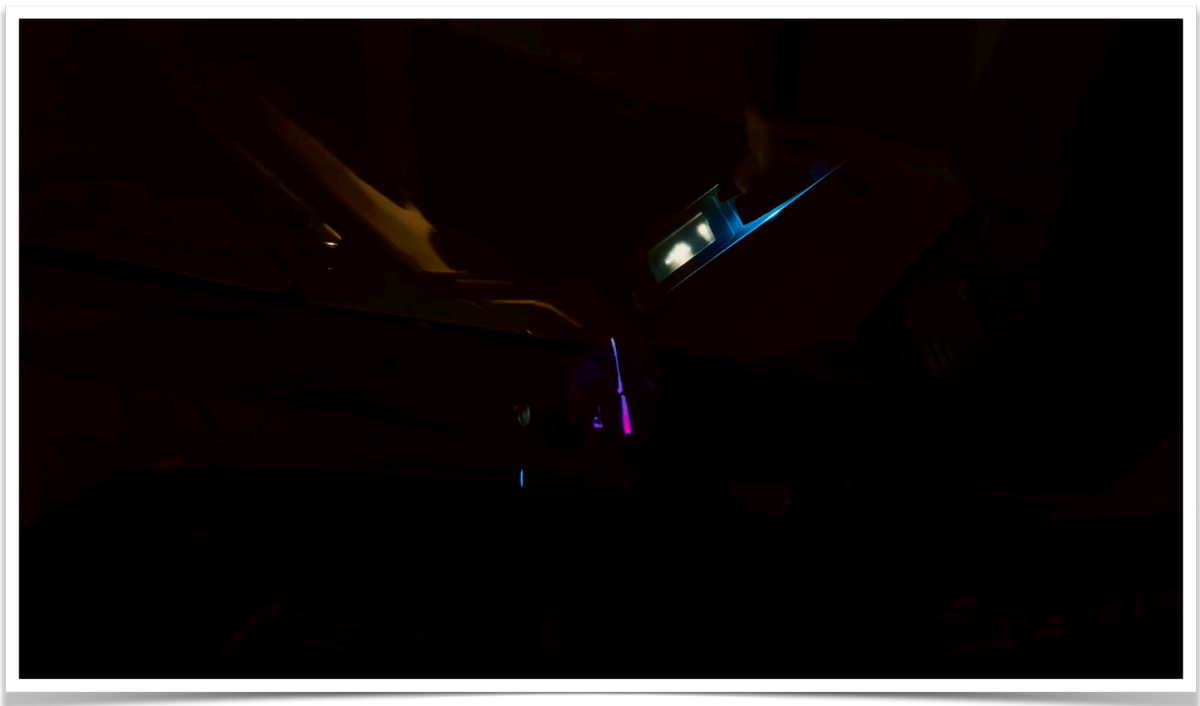


Fig. 11

6.4 Post-production

Post-production was a pivotal phase in transforming raw footage into a compelling promotional video that effectively conveyed the essence of the G3F device and met the project's objectives.

6.4.1 Editing Process

The editing process focused on meticulously crafting the video to maintain its quality and coherence.

- Footage Selection: Careful selection of the best clips was paramount, considering factors such as clarity, relevance to the narrative, and visual appeal. This ensured that each scene effectively contributed to telling the story of the G3F device's capabilities and applications.

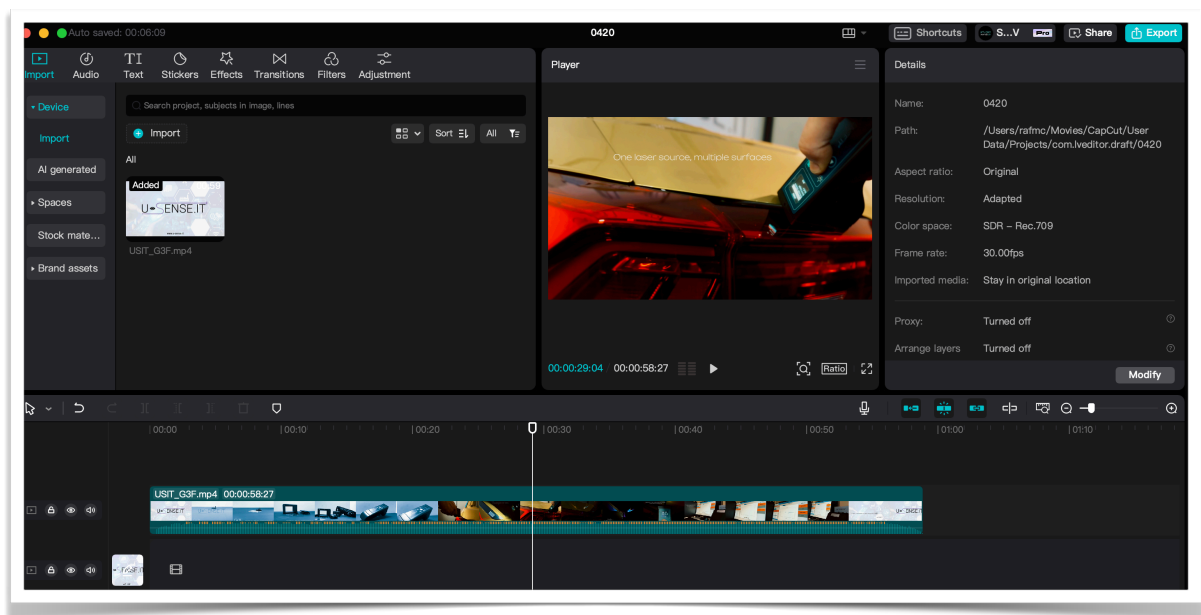


Fig. 12

- Visual Effects: Minimal visual effects were applied to maintain a professional and realistic aesthetic. Enhancements such as color correction and image stabilization were employed to enhance the visual clarity and

consistency of the footage, ensuring that the G3F device appeared in its best light.

- Audio and Text Editing: Sound played a crucial role in enhancing the video's narrative impact. Background music and explicative text message were strategically integrated to complement the visuals and convey the device's features effectively. Sound levels were meticulously balanced to ensure clear and consistent audio throughout the video, providing a cohesive viewing experience.

6.4.2 Final Review and Feedback

Following the initial editing phase, the draft video underwent rigorous review by the project team. Feedback was solicited to identify areas for improvement and ensure alignment with project goals.

Adjustments were made based on the feedback received, incorporating refinements to enhance visual clarity, narrative flow, and overall impact. This iterative process aimed to refine the video to meet the high standards set for showcasing the G3F device's innovation and utility.

By prioritizing precision in editing and responsiveness to feedback, the post-production phase culminated in the creation of a polished and engaging promotional video that effectively communicated the G3F device's advanced features and practical applications.

6.5 Distribution and Promotion

With the final promotional video complete, the project's focus transitioned to the critical phase of distribution and promotion. The goal was to ensure that the video reached a broad and relevant audience, effectively showcasing the G3F device's capabilities.

6.5.1 Strategic Distribution

- U-Sense Website: The video was prominently featured on the official U-Sense website, strategically placed to capture the attention of visitors immediately.

This ensured that anyone visiting the site had instant access to the video, significantly enhancing the site's content. By serving as a central hub for information about the G3F device, the website became a go-to resource for detailed insights into its capabilities and applications.

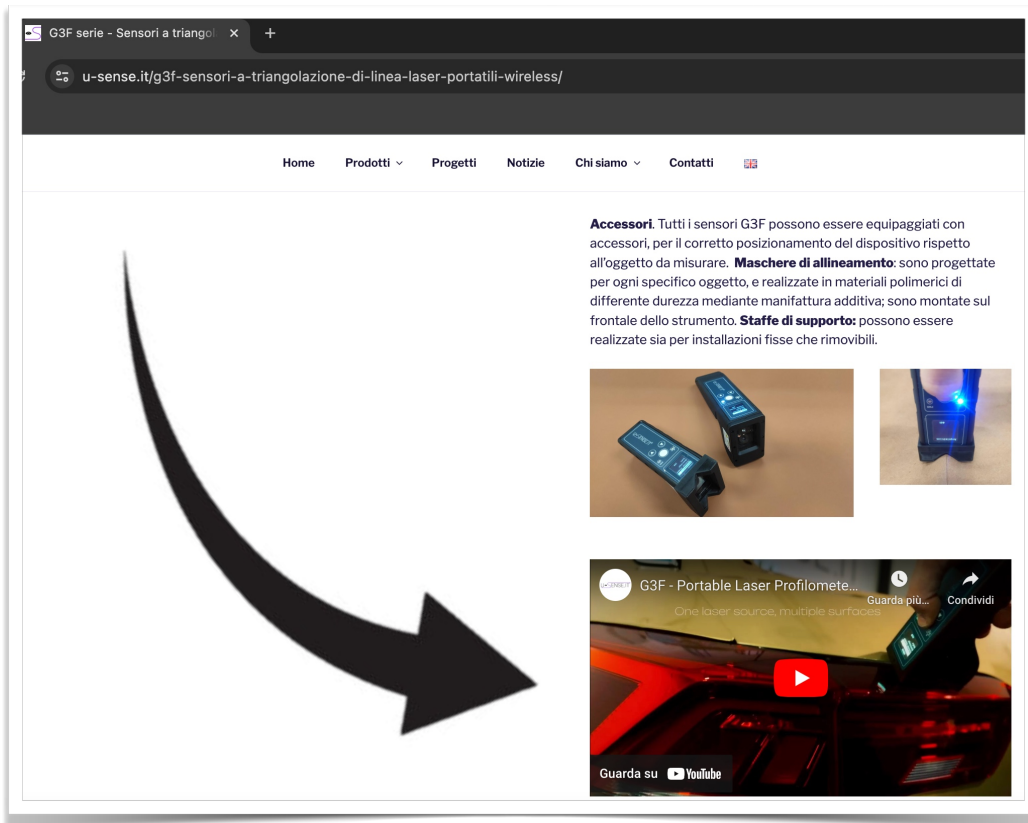


Fig. 13

- Social Media Channels: To leverage the broad reach and diverse user base of social media, the video was shared across various platforms, including LinkedIn and X (formerly known as Twitter).

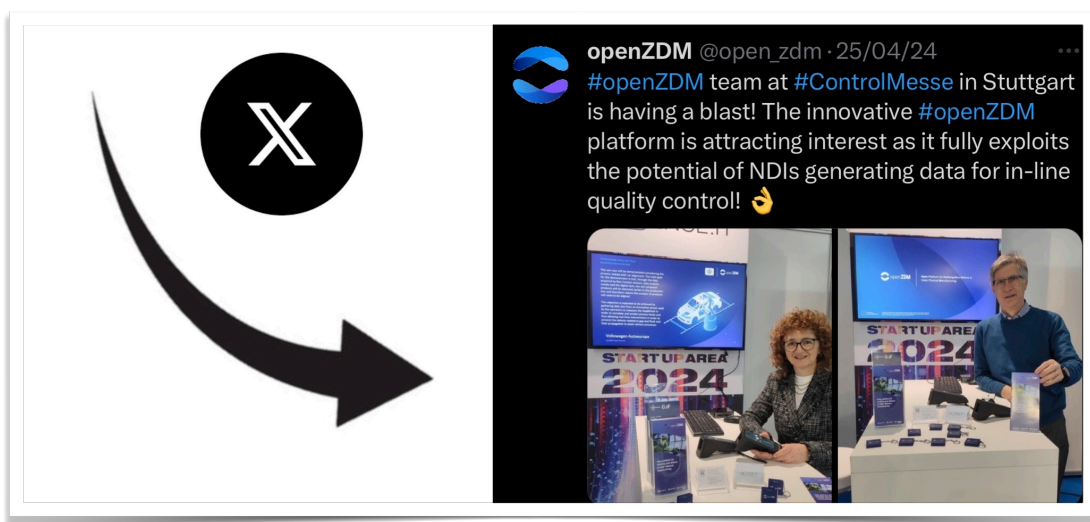


Fig. 14

Each post was carefully tailored to the specific audience of each platform, employing targeted hashtags and engaging captions designed to attract attention and encourage sharing.



Fig. 15

On LinkedIn, the focus was on professional insights and industry relevance, appealing to business leaders and technical experts. On X, the posts were crafted to be more dynamic and conversational, aiming to generate buzz and foster broader engagement. This strategic approach ensured that the video reached a wide and relevant audience, maximizing its impact and visibility across social media networks.

- Professional Networks: The video was also disseminated through professional networks such as industry-specific forums, online communities, and newsletters. This approach aimed to reach industry experts, potential clients, and stakeholders who would benefit from learning about the G3F device.

- Video presentation in the U-sense booth at 36th Control international trade fair for quality assurance from the 23rd to the 26th of April, 2024 in Stuttgart. Control is an internationally unique meeting place for QA professionals. It's definitely one of the industry's most interesting and important events. The trade fair highlight is entirely unique throughout the global market because it features different types of metrology and presents them in a relevant manner for all industries.

6.5.2 Promotion Campaigns

To further amplify the video's reach, several promotional campaigns can be launched:

- Email Marketing: Personalized emails containing the video link can be send to existing contacts, including industry professionals, academic partners, and

potential clients. These emails highlighted the key features of the G3F device and invited recipients to view and share the video.

- Webinars and Online Demos: If live webinars and online demonstrations were to be organized, they would feature the video as a key component. These events would allow for real-time engagement with the audience, providing an opportunity to answer questions and discuss the G3F device's applications in detail.

- Press Releases and Articles: If press releases and articles about the G3F device and the promotional video were published in relevant industry publications and blogs, this would generate additional buzz and drive traffic to the video through backlinks and mentions, answering questions and discussing the G3F device's applications in detail.

By employing a multi-faceted distribution and promotion strategy, the team ensured that the video not only reached a wide audience but also engaged viewers effectively. This comprehensive approach helped to raise awareness of the G3F device's innovative features and its potential impact across various industries, driving interest and facilitating further conversations about its applications.

6.6 Analysis

The promotional video for the G3F device stands as a testament to the collaborative efforts of the U-Sense Laboratory team at UNIVPM. This project, characterized by meticulous planning, innovative storytelling, and strategic communication techniques, effectively showcases the G3F's capabilities. Through this video, the G3F is positioned as a leading tool in the field of industrial measurement, highlighting its advanced features and practical applications.

This endeavor not only underscores the technical prowess of the G3F but also exemplifies the power of multimedia in conveying complex information in an accessible and engaging manner. The collaborative approach ensured that every aspect of the G3F, from its precision engineering to its real-time data acquisition, was presented with clarity and impact. This video serves as a powerful example of how well-crafted visual content can bridge the gap between technical complexity and audience engagement, making sophisticated technology comprehensible and appealing to a wide audience.

Video Link:

<https://youtu.be/watch?v=f70H3LQZzwI>

7 PRACTICAL EXPERIENCE - Education Sector

On May 24th, 2024, Professor Fatone organized a visit for students of the GREEN INDUSTRIAL ENGINEERING program to the WVEELab Research Group at the SIMAU Department of the Polytechnic University of Marche in Ancona.



Fig. 16

The laboratory, based in 1996, plays a role in supporting research, development, design and management of advanced and innovative technologies and processes for the treatment and valorisation within the concept of circular economy. The laboratory is aimed at urban and industrial wastewater and liquid and solid wastes, with particular reference to organic matrices. The activities include research and development of projects in which analytical and experimental support is provided, in cooperation with other University Departments.

The laboratory also provides support for the training of students, undergraduates, trainees, PhD students and research fellows. The laboratory equipment is in continuous upgrading in relation to the national and international projects financed and allow for wastewater and wastes

The visit was part of the course on Chemical Processes and Plants For Circular Bioeconomy. This event not only provided valuable hands-on experience for the students but also presented a perfect opportunity to create a promotional video tailored for social media platforms like LinkedIn and Instagram.

This chapter delves into the practical aspects of creating that video, emphasizing innovative methods suitable for engaging audiences on these platforms.

7.1 Conceptualization and Planning

The idea was to conveying a clear and immediate message through the video, emphasizing the importance of students seeing up close the tools and technologies they had studied in theory. The ultimate goal was to create an engaging and informative video that showcased the innovative processes and educational inside the laboratories

7.1.1 Planning the Video

Objective:

Our goal was to produce a compelling, informative, and visually captivating promotional video that would effectively highlight the students' laboratory experience, emphasizing its crucial role in the field of green industrial engineering.



Fig. 17

We aimed to showcase the hands-on learning opportunities provided by the WHEELab Research Group, illustrate the innovative processes and

underscore the significance of practical laboratory work in preparing students for future challenges in sustainable energy solutions.

Target Audience:

Our primary audience includes prospective students who are considering a career in green industrial engineering, industry professionals who are keen on the latest advancements in sustainable practices, academic peers who are interested in collaborative research and educational methodologies, and the general public who have an interest in sustainable engineering solutions and their impact on the future of energy.

Key Messages:

1. Highlight the critical role of biofuels in advancing sustainable energy solutions and reducing our carbon footprint.
2. Showcase the unique hands-on learning opportunities available to students through the WHEELab Research Group, providing practical experience and real-world skills.

3. Emphasize the cutting-edge research and state-of-the-art technology utilized at the SIMAU Department, illustrating their commitment to innovation and excellence.

4. Underscore the importance of practical laboratory experiences in enhancing the engineering education at the Polytechnic University of Marche (UNIVPM), preparing students to meet the challenges of a rapidly evolving industry.

7.2 Pre-Production

Storyboard Creation:

- Introduction: Briefly introduce the purpose of the visit, the students, by Professor Fatone's collaborators
- Laboratory Tour: Highlight key areas and equipment used in wastewater treatment
- Student interaction : Capture students' thoughts and experiences.
- Professor's Insight: Include a segment with Professor Fatone explaining the significance of the lab work.

- Conclusion: Summarize the day's activities and their impact on students' learning.

Script Development:

- Craft concise and compelling narration to accompany the visuals.
- Given that the video is designed for social media platforms, it will be recorded in vertical mode to ensure optimal viewing on mobile devices



Fig 18

Logistics:

- Arrange filming permissions and schedule.
- Gather necessary equipment: cameras, microphones, lighting, and stabilizers.
- Prepare the lab for filming, ensuring all areas are clean and organized.

7.3 Production

Filming Techniques:

- Establishing Shots: Used wide-angle shots to set the scene and show the laboratory environment.
- Close-Ups: Focus on specific equipment and processes involved in wastewater treatment to capture details.
- Sequences: has been used a combination of stationary and dynamic shots to keep the viewer engaged. We've secured Ensure good lighting.

Visual Storytelling:

- Show the progression of a typical day in the lab, from arrival to departure.
- We highlighted key moments of discovery and learning.
- dynamic transitions has been used to maintain viewer interest.

7.4 Post-Production

Editing:

- Software: We employed professional video editing software such as Final Cut Pro to ensure high-quality production and advanced editing capabilities.



Fig. 19

- Cuts and Transitions: The video was kept concise (under 60 seconds) with smooth transitions. Jump cuts and fade-ins/outs were used to enhance flow.
- Music: Background music that matched the video's optimistic and forward-looking tone was incorporated.
- Branding: The university and WHEELab logos were incorporated for branding.

Color Grading and Effects

- The visual appeal was enhanced with color correction and grading to achieve a polished look.
- Effects were applied subtly to maintain a professional appearance without distracting from the content.

7.5 Distribution

Platform-Specific Strategies:

LinkedIn:

- Focus on the professional and educational aspects of the experience.
- Use a formal tone in the accompanying text post.
- Include relevant hashtags like #Green #Industrial #Engineering
- Tag relevant profiles and organizations to increase visibility.

Francesco Fatone's Post

Francesco Fatone
4w

WVEELab Research Group - Università Politecnica delle Marche Dipartimento SIMAU organized the lab experience for the students of #GREEN #INDUSTRIAL #ENGINEERING focusing on biofuels production from waste biomass

STUDIOWEBRV is kindly acknowledged for the excellent video

Università Politecnica delle Marche

WVEE LAB
Water and Waste Environmental Engineering

2nd YEAR - GREEN INDUSTRIAL ENGINEERING
Chemical Processes and Plants For Circular Bioeconomy
PROF. ENG. FRANCESCO FATONE

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Francesco Fatone · 6y

Explore topics

- Sales
- Marketing
- Business Administration
- HR Management
- Content Management
- Engineering
- Soft Skills
- See All

Fig. 20

Suggestions for future publications also on Instagram:

- Highlight visually appealing and engaging content.
- Use a mix of photos, short clips, and the full video on IGTV.
- Employ a more casual and approachable tone in captions.
- Leverage Instagram Stories for behind-the-scenes content and teasers.
- Utilize popular and trending hashtags such as #SustainableEnergy, #StudentLife, and #Innovation.

Engagement Tactics:

- Encourage students and faculty to share the video on their personal profiles.
- Interact with viewers by responding to comments and questions.
- Monitor analytics to gauge the video's performance and refine future content strategies.

7.6 Analysis

Creating a promotional video for the student visit to the WHEELab Research Group was a meticulous process that demanded thorough planning, precise execution, and a deep comprehension of social media intricacies.

By prioritizing coherent storytelling, employing professional production techniques, and implementing tailored strategies for each platform, we effectively underscored the critical role of hands-on laboratory experiences in the education of green industrial engineering.

The video served as a powerful showcase, not only spotlighting the pioneering research conducted at the SIMAU Department but also instilling a broader audience with a profound appreciation for the transformative potential of sustainable energy solutions.

Video Link:

[https://www.linkedin.com/posts/francesco-fatone-0662821_green-industrial-engineering-activity-7201550111833755648-1wOY?
utm_source=li_share&utm_content=feedcontent&utm_medium=g_dt_web&utm_campaign=copy](https://www.linkedin.com/posts/francesco-fatone-0662821_green-industrial-engineering-activity-7201550111833755648-1wOY?utm_source=li_share&utm_content=feedcontent&utm_medium=g_dt_web&utm_campaign=copy)

8 CONCLUSION

Effective communication is the linchpin that binds the multifaceted domains of education, research, and product development in applied engineering. Each of these areas, while distinct in their objectives and methodologies, shares a common reliance on robust communication strategies to facilitate collaboration, innovation, and dissemination of knowledge. This conclusion synthesizes the key insights from the previous chapters, underscoring the vital role of communication in fostering success across these interconnected fields.

8.1 Integrated Communication Strategy

The integration of communication strategies across education, research, and product development is essential for creating a cohesive and synergistic environment. By aligning communication practices, institutions and organizations can ensure that the advancements in one domain seamlessly inform and enhance the others.

1. Education: In educational settings, effective communication bridges the gap between theoretical knowledge and practical application, making complex engineering concepts accessible to students. Interactive and engaging communication methods foster an environment of active learning

and collaboration, preparing students to meet real-world engineering challenges.

2. Research: In research, clear and consistent communication is crucial for coordinating multidisciplinary teams, articulating research goals and methodologies, and disseminating findings. Effective communication ensures that research efforts are transparent, collaborative, and impactful, contributing to the broader scientific community and society.

3. Product Development: In product development, communication strategies facilitate the seamless integration of diverse stakeholder inputs, ensuring that the final product aligns with market needs and expectations. Clear communication of project objectives, timelines, and feedback loops enhances the efficiency of the development process and drives innovation.

8.2 Best Practices and Key Components

The successful implementation of communication strategies in applied engineering projects hinges on several best practices and key components:

1. Clarity and Precision: Whether in educational settings, research projects, or product development, clarity and precision in communication are paramount.

Clear articulation of goals, requirements, and feedback helps in aligning efforts and avoiding misunderstandings.

2. Interactive and Engaging Methods: Utilizing interactive and engaging communication methods, such as multimedia tools, collaborative platforms, and visual aids, enhances understanding and participation across all domains.

3. Regular Updates and Feedback: Providing regular updates and incorporating iterative feedback loops ensure that all stakeholders remain informed and engaged. This approach fosters a culture of continuous improvement and responsiveness.

4. Stakeholder Engagement: Actively engaging stakeholders, including students, researchers, industry professionals, and end-users, is essential for ensuring that the outcomes of educational programs, research projects, and product development efforts are relevant and impactful.

5. Utilization of Digital Tools: Leveraging digital tools and platforms enhances communication efficiency and accessibility, particularly in geographically dispersed teams and organizations.

Despite the critical importance of communication, various challenges can arise in each domain:

1. Multidisciplinary Coordination: Coordinating efforts across diverse teams requires establishing common terminology and fostering open dialogue. Collaborative tools and clear communication protocols can mitigate these challenges.

2. Technological Barriers: Ensuring equal access to digital tools and resources is vital. Providing necessary support and alternative resources can address disparities.

3. Cultural and Language Differences: Being mindful of cultural and language differences, and employing inclusive communication practices, helps in creating an inclusive environment.

8.3 Future Directions

As the field of applied engineering continues to evolve, the importance of effective communication strategies will only grow. Future directions may include:

1. Enhanced Digital Communication: Embracing advanced digital communication technologies, such as augmented and virtual reality, to create more immersive and interactive communication experiences.
2. Cross-disciplinary Training: Developing training programs that emphasize communication skills across disciplines to prepare students and professionals for collaborative environments.
3. Adaptive Communication Strategies: Implementing adaptive communication strategies that can evolve with changing project requirements and stakeholder needs, ensuring continued relevance and effectiveness.

8.4 Final Thought

In conclusion, communication strategies are fundamental to the success of education, research, and product development in applied engineering. Clear, interactive, and collaborative communication significantly enhances the quality and impact of these efforts, ensuring that complex ideas and innovations are effectively conveyed and understood.

As these fields continue to evolve and intersect, strategic communication will become increasingly crucial. It will drive innovation and excellence by

facilitating the exchange of ideas, fostering collaboration, and ensuring that advancements reach their intended audience. By adhering to best practices and remaining adaptable to emerging challenges, effective communication will remain a key driver of success in this dynamic landscape.

Moreover, as the boundaries between disciplines blur and new technologies emerge, the role of communication will be even more critical. It will enable interdisciplinary collaboration, support the dissemination of cutting-edge research, and ensure that new products and technologies are accessible and comprehensible to a diverse audience.

Ultimately, the ongoing commitment to strategic communication will empower the fields of education, research, and product development to achieve greater heights and make a lasting impact on society.

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