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WIP: Utilizing short-format videos to enhance science communication in AECO Students

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Utilizing short-format videos to enhance science communication in AECO Students

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Abstract

Communicating complex ideas, especially technical ones, is a challenge for engineering students, particularly when addressing non-expert audiences. This project aimed to enhance their communication skills by incorporating a creative assignment into their courses, where students created a 1-minute Reel-style video explaining an engineering concept. The videos, designed to be engaging and entertaining, were uploaded to a class social media account with a "public audience" setting. If a video went viral, students could earn extra credit. This project was implemented in three civil engineering courses, involving 55 students, and aimed to encourage concise, accessible communication. At the end of the semester, a survey revealed that students found it difficult to convey technical content through short, fun videos, though the assignment helped them discover new ways to communicate. The authors discuss the factors influencing these results and propose future directions for improving science communication in academia, with implications for both research and practice.

Introduction

Incorporating communication technologies into education has become a key element in modern curricula, helping students develop their skills in new and effective ways [1]. One example is the use of Reel-style videos as an educational tool, which allows engineering students to creatively share their subject knowledge [2]. This approach not only enables students to expand their understanding but also encourages them to communicate in a way that is accessible to a broader audience, not just specialists in the field. The activity promotes creativity, innovation, and autonomy, which increases students' involvement with the subject and enhances their ability to explain complex technical concepts. Using social media in assignments can make students see them as easier, more interesting, and connected to their daily lives [3]

The study emphasizes the development of communication skills through the use of Reel-style videos, which aligns with modern trends in technology-enhanced education. By integrating widely used technological tools [4], students can deepen their understanding of scientific concepts while reaching a larger audience, ultimately fostering the social appropriation of knowledge. This approach not only contributes to students' academic growth but also expands the reach of scientific knowledge in an engaging and accessible manner [5].

Communication plays a crucial role in the sciences today, as it shapes the scientific image and

makes complex ideas accessible to a broader audience. Technical communication, particularly in fields like engineering, presents unique challenges [5]. Scientific language is often complex, making it essential to promote new educational approaches that enable students to connect scientific topics with methods that foster public engagement with knowledge. The significance of this study lies in how innovative teaching strategies can increase student engagement and improve learning outcomes, while also enhancing communication skills, which are vital for professional success in the field of engineering [6], [7], [8], [9].

Background

Human beings are inherently social, and communication is an essential element in all aspects of life, including professional environments. In any scenario, communication needs to be effective, harmonious, flexible, and assertive. These qualities are crucial because many actions, projects, and goal achievements hinge on clear communication [10], [11], [12], [13]. For communication to be effective, it is not only important to understand different perspectives but also to communicate our own ideas in a way that others can grasp. The purpose of communication is to share, receive, and understand messages while ensuring that the final objective is maintained. This can become challenging when addressing audiences that cannot directly relate to the topic being discussed. As Quaranta notes, the complexity of communication increases when interlocutors belong to different groups, each with its own established language [14]. These linguistic differences can make communication more difficult and require extra effort to ensure clarity and mutual understanding.

In today's society, science communication plays an essential role, both in the dissemination of knowledge and in shaping the scientific image within both academic communities and the general public. Science communication is vital because it serves as the primary way through which educated individuals, who may not be specialists in science, acquire scientific knowledge. Additionally, it is a key responsibility in presenting the image of science to both experts and non-experts alike. The rapid evolution of social platforms has significantly transformed communication by providing innovative new media that enhance the processes of reading and writing. These new tools allow information to be transmitted quickly and interactively, extending the reach of communication far beyond that of traditional media outlets [15], [16], [17], [18], [19], [20], [21]. According to Pantoja, social networks help address the gap between the increasing demand for social communication and the means to fulfill this need [22].

Social media, especially since its emergence in the late 1990s, has dramatically reshaped personal and professional communication. Platforms that allow the creation of Reel-style videos, which launched in 2016 and gained international popularity by 2017, have become central in how people share information. These platforms, in particular, has grown to be the most downloaded apps globally, with more than 800 million active users across 150 countries. Its primary demographic includes young adults aged 16 to 24, who account for 41% of interactions on the platform [23], [24]. The rapid rise of Reel-style platforms illustrates the profound impact social media has had on shaping communication habits, particularly among younger generations.

Reel-style platforms allow users to create, edit, and upload videos, providing a platform for both creators and consumers. This interactive format has fueled the app’s massive success by catering

to a diverse range of content and interests. While it initially focused on short music videos, Reel-style platform now supports a variety of formats, making it a versatile platform for creative expression, entertainment, and knowledge sharing. This evolution in content types has contributed to Reel-style platform's appeal, as it allows individuals to consume information in short bursts during leisure time, blending entertainment and education in a way that is highly accessible and engaging [25]. Reel-style platform's format, particularly its short, fragmented videos, makes it easy for users to digest information, which has further facilitated the spread of knowledge and information across diverse audiences.

Furthermore, Reel-style platform has proven to be a valuable tool for learning. The platform allows users to share knowledge on various topics, addressing real concerns and facilitating the exchange of information. It also enables individuals to absorb new concepts more quickly while interacting with a large, specific audience. This has led to the development of communities of practice, where users learn from one another through feedback and shared experiences. This process of collective learning and knowledge sharing highlights Reel-style platform's potential as a platform for educational engagement, where users can continuously build on their understanding through the content shared within the community [26], [27], [28], [29]. The shift in learning practices reflects a broader digital transformation that has affected the way people approach education, emphasizing the need to adapt teaching methods to leverage technological advancements effectively.

The digital revolution has introduced significant changes to educational strategies, and these shifts require the adoption of new teaching and learning approaches [30], [31], [32], [33]. Technological tools alone are not enough to foster innovation in education; they must be integrated with novel educational methods that reflect changes in attitudes and sociocultural practices. As educational environments evolve, so too must the tools and approaches used to facilitate learning. The widespread adoption of social media platforms such as Reel-style platform provides a prime example of how these tools can enhance educational experiences. They offer new ways to engage with content, promote interactive learning, and provide opportunities for students to deepen their knowledge [34], [35]. For these reasons, such digital tools should not be overlooked in educational settings, as they offer unique and dynamic opportunities for learning through engagement and communication.

The importance of effective communication in education cannot be overstated. Through Reel-style platforms, complex subjects can be distilled into short, understandable presentations that make challenging content accessible to a broad audience. One of the main challenges in communication, especially in education, is the ability to convey technical concepts in an engaging and easily digestible way. Effective communication helps to ensure that messages are not only delivered but understood clearly, with no room for ambiguity or misinterpretation. By using creative, concise formats, educators and content creators can transform complex information into something that resonates with the audience, making learning more efficient and effective [36].

Open and effective communication is crucial in engaging human resources and maintaining competitiveness in any organization, including educational institutions [37]. The ability to communicate clearly and effectively is a skill that can greatly enhance the chances of success in

any field. The rise of digital communication tools has also led to changes in how language is used and adapted, highlighting the importance of teaching communication skills that help individuals articulate their ideas clearly and tailor their messages to specific audiences. These skills not only help in transmitting knowledge but also enable deeper, more beneficial interactions between teachers, students, and peers. As social networks continue to shape the ways we communicate, understanding how to use these tools effectively is essential for maximizing the potential of both personal and educational communication [38], [39], [40]. Likewise, collaborating in teams, along with delivering oral presentations, improves public speaking skills, boosts confidence without depending on scripts, and strengthens non-verbal communication—key components for successful interaction in a professional environment [41], [42], [43].

Methods

This study employs a qualitative and mixed-methods approach to assess the role of Reel-style videos in enhancing communication skills among civil engineering students. Data collection took place during the Fall 2023 and Fall 2024 semester, involving students from three engineering courses: Construction Cost (n=16), Construction Project Management (n=18), and Structures-1 (n=21), totaling 55 participants. The researchers used a survey to gather feedback from students who had completed the short-video assignment. Table 1 shows the topics covered in each of the short videos in order to integrate scientific knowledge. The survey included both closed and open-ended questions to capture their self-reported experiences and reflections at various stages of the activity—before, during, and after the creation of the short-video. The analysis focused on the days leading up to the video's creation and the moment it was presented. Surveys were distributed via Qualtrics software, and responses were processed and analyzed in Excel. The data was coded for content analysis, following both a priori and emergent coding techniques, as outlined by Saldana and Yin [44], [45], [46].

Table 1. *List of topics covered in each short video*

Groups	**Short-videos themes**
Group 1	Definition of stress unit
Group 2	Axial Stress (Compression or Tension) vs. Shear Stress
Group 3	Stresses in oblique planes
Group 4	Graph of material behavior Stress vs. Unit Def.
Group 5	Axial Deformation "PL/EA".
Group 6	Buckling in columns
Group 7	What is bending?
Group 8	Transformation of concrete beam cross section
Group 9	Design of beams
Group 10	Internal forces in flat frames

The survey consisted of two sets of questions. The first phase contained five open-ended questions that explored the students' planning process for the video, what they had learned, the challenges they faced, the benefits of creating the video, and the advice they would give to future participants. The second phase included closed-ended questions with five response options:

much more than, more than, the same, much less, and a little less. This set of nine questions aimed to assess how students felt the short-video task compared to traditional project assignments. Questions focused on aspects like whether students needed to consider their audience more carefully, connect with the content on a deeper level, present information as a story rather than a sequence of facts, look for real-world examples, pay attention to the language used, and ensure the clarity of the message conveyed [44], [46].

All the courses involved in this study were taught by the same instructor, ensuring consistency in the project's design and implementation. The task assigned to the students across all three engineering courses was uniform in terms of difficulty, pedagogical approach, problem-solving strategies, and subject matter. For the short-video assignment, students were required to create a 30-second video in pairs, explaining a specific topic from their course content. The goal was for students to review the material they had learned during the semester, collaborate with their partner to plan the video, and creatively adapt the information for a wider audience. The key challenge was to make the content accessible to people without specialized knowledge of the subject. Therefore, students were encouraged to be mindful of their language and presentation style, ensuring the message was clear and engaging [44].

In the final phase of the assignment, each course gathered to watch the videos created by their peers. The students were invited to comment on and provide feedback on the videos, particularly focusing on how well the message was conveyed and understood. The instructor emphasized the importance of ensuring that the audience grasped the core message. One key finding from the responses was that creating the video was a valuable learning experience, as it required students to review and internalize the material covered in class. This process of distilling complex topics into a concise video format helped students retain the information in the long term. Additionally, students reported improvements in their communication skills, noting that the task helped them organize their thoughts, structure their messages clearly, and present information in a manner that was both accurate and easily understood by a broad audience [45], [46].

Results

Once all data from both the qualitative and quantitative questions were gathered, the responses were organized with the quantitative answers presented first, followed by the qualitative responses. The first table displays the results from the quantitative questions provided by the students. These six questions highlighted the importance of organization and preparation in completing the task successfully. Meanwhile, the qualitative questions revealed several factors that influenced the development of the assignment. Key findings related to communication skills development included avoiding jargon, incorporating visuals, understanding communication objectives, and crafting an elevator pitch. These aspects were primarily linked to improvements in public speaking, overcoming stage fright, better organization, and enhanced planning.

The results from the multiple-choice questions were analyzed based on students' perceptions of this assignment compared to traditional projects, as can be seen in Table 2. The response options included: much more than, more than, the same, much less, and a little less.

Table 2. *Results from the multiple-choice questions*

DESCRIPTION	A whole lot	A lot	Some	Not so much	Almost nothing
Consider your audience.	31	16	1	1	1
Develop and connect the content with the main message.	30	16	3	0	1
Engage with your audience.	30	16	3	0	1
Present the idea more as a narrative than a sequence of facts.	32	12	3	0	3
Look for advice or examples of similar deliverables.	18	15	13	3	1
Ensure that my words and message are clear and understandable.	31	9	9	1	0
Avoid including sensitive or controversial topics.	20	13	9	5	3
Pay more attention to the accuracy of my words.	33	11	5	0	1
Do practice exercises (such as writing a script, making a video attempt, drafting, or sketching the idea).	33	9	7	1	0

The multiple-choice survey, which included six questions, revealed that the majority of participants felt the task required more preparation and organization than traditional projects. For instance, in response to the first question, 31 out of 50 students reported that they paid more attention to the audience when creating their video. Additionally, when it came to engaging the audience by presenting ideas as a story rather than as a series of facts, about 60% of the students indicated they had to put much more thought into this compared to a typical project.

The survey also showed that students needed to give extra consideration to the clarity of their language and the understanding of their message. As a result, precision in word choice became essential. It was further noted that 36% of students sought advice or tips to complete the assignment, and 40% intentionally avoided sensitive or controversial topics. Finally, 66% of students reported that the task encouraged them to engage in practical exercises, such as drafting a script, creating a video outline, or sketching ideas, all of which contributed to the development of their communication skills.

Open questions results.

Results were also analyzed to address the first research question: How do Reel-style videos contribute to improving students' communication skills? The next Table 3 displays the findings.

Table 3. *Results from the research question*

Steer clear of technical language.	The short-video activity assisted students in reviewing the assigned subject for the video.	➢ It helped students synthesize the subject and explain it clearly. ➢ Encouraged them to search for additional information, summarizing it in more casual

		language while retaining the key ideas of the topic.
	The short-video encouraged students to use simpler language.	➢ Students prepared diagrams and graphics that enhanced our understanding of the subject.
Use visual aids.	This activity taught them how to navigate the platform and edit videos on Reel-style platform.	➢ The views and engagement were important. ➢ The use of popular viral trends. ➢ Virality depends not only on the content but also on current "trends," songs, and effects.
Define the objectives of communication.	It helped develop skills like creativity in producing educational videos.	➢ The goal was to make the content entertaining to attract attention, as this would make it easier for others to understand. ➢ Focus on explaining every detail of the process. ➢ The video should be original, blending trends with unique elements to stand out from other content.
Create a concise elevator pitch.	The time constraint helped them organize their ideas in a concise manner.	➢ All key information was reviewed, and the most important points were emphasized. ➢ Allowed for abstracting concepts in a very concise manner. ➢ A well-crafted script helped students organize their ideas, stay focused, and deepen their understanding of the topic.
	Effective organization enabled many students to recall topics they had previously learned.	➢ Summarizing and repeating the idea while planning, writing, and practicing the script helped reinforce the concept for long-term retention. ➢ Planning every second and using visual examples ensured clarity, even for technical explanations. ➢ Focus on explaining one concept at a time, ensuring that both the text and vocal delivery were clear.
	Communication skills were significantly enhanced.	➢ Helped students overcome the fear of speaking or appearing in a video. ➢ Several students mentioned that they were initially afraid of speaking in front of the camera, but this assignment boosted their self-confidence and helped them overcome that fear.

Student self-reported responses indicated that the short-video assignment was beneficial for reinforcing their understanding of the assigned subject. Many students mentioned that the activity helped them synthesize the material and present it in a concise and understandable format. One student shared, "It helped me synthesize the subject and explain it in a short video. In that way, I was able to transmit it to other people." Additionally, the task encouraged students

to conduct further research, and while they simplified the content using more casual language, they retained the essential ideas of the topic. Another student highlighted the difficulty in summarizing the subject effectively, stating, "The main challenges were summarizing correctly the topic and proposing clear ideas." Furthermore, students found that using brainstorming, diagrams, and thorough research assisted them in organizing their thoughts. One student explained, "We prepared ourselves with diagrams and graphics that helped us get a better understanding of the topic." They also noted the value of receiving feedback from both familiar and unfamiliar audiences, as it helped them improve the clarity of their explanations. As one student mentioned, "It helped me get a better understanding of some terminology. When I was preparing myself, I had to clarify some terminology, made up my ideas, and exposed them to my family. They gave me feedback on what and how I could change so it could be more understandable."

Additionally, students reported learning how to effectively use the Reel-style platform and edit videos. One student acknowledged that the main challenge was "Getting an external audience to understand me and in turn, use the app to make a Reel-style video. I had never done one, and it felt strange that my first short-video was graded." [47]. Students also noted that understanding viral trends and using popular songs or effects could increase views and engagement. One student suggested for future assignments, "That they are more present on this network since the dynamism of each video and the fact that it goes viral depends not only on the content but also on the 'trends', songs, and effects that are on trend. Therefore, the fact of adding a song that has gone viral or an effect in the video will make it have many more visits and be much more dynamic."

Another important aspect highlighted by students was the need for creativity in crafting educational videos. One student remarked, "We try to make it recreational, to draw people's attention because, with it, they would be more likely to understand us. And we try to tell every detail of the procedure." Moreover, students recognized the importance of originality in their videos. Although the content could follow current trends, it was essential to infuse creativity to make their videos stand out. As one student mentioned, "I had to correctly analyze an exercise, and I had to creatively develop at a higher level. All this is to show an original and interesting Reel-style video, with general knowledge of the subject studied in class." Furthermore, the use of clear and accessible language was emphasized, as students aimed to ensure that their videos were understandable to a broad audience. One student noted, "Seek to be as clear as possible with the subject to present. You must look for people to understand the topic not the same, but something like us. This can be achieved using friendly words and if possible, raising similarities to everyday life."

The 30-second time limit imposed on the videos presented another challenge. Many students reported that the brief duration forced them to focus on the most important points of the topic and to be concise. One student explained, "Totally, since all the information on the subject was reviewed and the most important points were rescued, which allowed abstracting the concepts in a very concise way given the 30 seconds required." To address this challenge, students found that preparing a solid script was crucial in organizing their ideas and effectively communicating the topic. One student mentioned, "Making a script and reducing the words more and more, using simple and easy language, and practicing telling and showing the information to a younger

sibling to see if they can understand it, and thus know that it could be explained simply." Moreover, the act of planning, summarizing, and repeatedly practicing the script helped students internalize the material for the long term. As one student stated, "Plan every second and try to make visual examples of what you are explaining so that it is clear even if it is a technicality. Focus on explaining one thing and try to make not only the text clear but also the vocalization."

Finally, many students reported that the assignment helped improve their communication skills, particularly in terms of overcoming the fear of speaking in front of a camera. One student shared, "Overcome the fear of speaking or appearing in a video and saying something that is not educational because what is said is not true." Several students expressed that they were initially apprehensive about speaking in front of a camera, but the assignment helped them gain confidence. As one student noted, "I lost my fear of speaking on camera a bit and part of speaking in public." This improvement in self-confidence was seen as a valuable aspect of the assignment, which not only enhanced their technical knowledge but also helped them become more comfortable with public speaking and presenting.

Discussion

The results of the study aligned with expectations, confirming that the primary goal of the assignment was to enhance students' ability to communicate the knowledge they gained in class. Effective communication is a vital skill for civil engineering students, as it aids in understanding and internalizing concepts for long-term retention [48], [49]. In today's world, social media is increasingly used to improve student performance, with many students engaging with it frequently. Incorporating social media into assignments can change the perspective on their complexity, making them more engaging and relevant to students' everyday lives [3]. The survey results showed that students not only learned more about the assigned topics but also applied creative thinking, as the task required them to perform activities they had not encountered before. This, in turn, contributed to the development of new ideas and concepts that helped them better understand the material. Moreover, the assignment played a crucial role in improving communication skills, which are essential for expressing ideas clearly, networking, and succeeding in job interviews. As is well known, communication is one of the most important skills in the professional world. Teamwork, including oral presentations, enhances public speaking abilities, confidence without relying on scripts, and non-verbal communication, all of which are vital for effective interaction in the workplace [41], [42].

While the activity primarily aimed to develop communication skills, it also encouraged students to improve their collaboration with peers and develop social skills relevant to the industrial world. The assignment’s time limit required students to plan and structure their ideas carefully, and many reported that this constraint helped them present their ideas more concisely and clearly. The pressure of the 30-second video format encouraged them to rephrase and refine their message until it fit within the time frame, resulting in a more focused and precise explanation [47]. However, a small number of students did not find the activity particularly helpful. To improve the analysis and evaluation of such assignments in the future, it is recommended that both quantitative and qualitative questions be included to capture the full student experience during the task. Additionally, incorporating a single-word answer question about how the project

contributes to their learning would allow for a quick identification of the specific skills acquired or enhanced through the activity.

Conclusions

This Work in Progress aimed to enhance science communication skills in engineering students through a pedagogical activity, specifically a Reel-style video assignment. Communication is a valuable skill in the professional world, and this task enabled students to improve their public speaking, oratory, and overall communication abilities. Many students reported a noticeable improvement in their communication skills, or developed new ones that helped them complete the assignment. The study suggests that providing the right tools can significantly enhance students' abilities across different areas. The activity also fostered organizational and planning skills as students developed scripts on engineering topics while encouraging collaboration and peer communication. Future research will involve a larger sample of students at various stages of their majors, focusing on how specific aspects of the assignment influence cognitive communication skills, how such activities can benefit instructors, and exploring how assignments like this can facilitate ongoing practice throughout the semester.

References

[1] S. E. Paucarina, J. D. Batallas, M. A. Guerra, y V. Guerra, «Board 44B: Work in Progress: TikTok Format Videos to Improve Communicating Science in Engineering Students», en *2023 ASEE Annual Conference & Exposition*, 2023. Accedido: 29 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/board-44b-work-in-progress-tiktok-format-videos-to-improve-communicating-science-in-engineering-students

[2] J. L. Klosky, S. M. Katalenich, B. Spittka, y S. F. Freyne, «Inspiring Student Engagement through Two-Minute Follies», presentado en 2014 ASEE Annual Conference & Exposition, jun. 2014, p. 24.762.1-24.762.29. Accedido: 26 de noviembre de 2024. [En línea]. Disponible en: https://peer.asee.org/inspiring-student-engagement-through-two-minute-follies

[3] R. B. Cassin, «Leadership and Communications in Civil Engineering: Past, Present, and Future», *Leadersh. Manag. Eng.*, vol. 3, n.º 3, pp. 145-147, jul. 2003, doi: 10.1061/(ASCE)1532-6748(2003)3:3(145).

[4] R. Toscano, M. A. Guerra, S. Durán-Ballén, y B. M. Valarezo, «WIP-Development of Critical Thinking in AEC Students Aided by Artificial Intelligence», en *2024 IEEE Frontiers in Education Conference (FIE)*, IEEE, 2024, pp. 1-6. Accedido: 30 de abril de 2025. [En línea]. Disponible en: https://ieeexplore.ieee.org/abstract/document/10893092/

[5] J. D. Bakos, «Communication Skills for the 21st Century», *J. Prof. Issues Eng. Educ. Pract.*, vol. 123, n.º 1, pp. 14-16, ene. 1997, doi: 10.1061/(ASCE)1052-3928(1997)123:1(14).

[6] R. F. Herrera, J. C. Vielma, y F. M. La Rivera, «Impact of microteaching on engineering students' communication skills», *Int. J. Eng. Educ.*, vol. 34, n.º 6, pp. 1768-1775, 2018.

[7] R. Saleh, I. Widiasanti, y H. Hermawan, «Development of communication competency for civil engineering students», *J. Phys. Conf. Ser.*, vol. 1402, n.º 2, p. 022024, dic. 2019, doi: 10.1088/1742-6596/1402/2/022024.

[8] D. Cartuche, M. A. Guerra, y H. Murzi, «Work in Progress: Influence of COVD-19 in Cultural Dimensions in Civil Engineering Students in», en *2023 ASEE Annual Conference & Exposition*, 2023. Accedido: 29 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/work-in-progress-influence-of-covd-19-in-cultural-dimensions-in-civil-engineering-students-in

[9] D. Cartuche, M. A. Guerra, y H. Murzi, «Board 2A: WIP: Opportunities in Cultural Dimensions between Architecture and Civil Engineering students in Ecuador», en *2023 ASEE Annual Conference & Exposition*, 2023. Accedido: 29 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/board-2a-wip-opportunities-in-cultural-dimensions-between-architecture-and-civil-engineering-students-in-ecuador

[10] C. Bello, «Comunicación efectiva desde la gerencia educativa», *EPISTEME KOINONIA Rev. Electrónica Cienc. Educ. Humanidades Artes Bellas Artes*, vol. 2, n.º 3 (Enero-Junio), pp. 24-40, 2019.

[11] M. A. Guerra, H. Murzi, J. Johnny C. Woods, y A. Diaz-Strandberg, «Understanding Students' Perceptions of Dimensions of Engineering Culture in Ecuador», presentado en 2020 ASEE Virtual Annual Conference Content Access, jun. 2020. Accedido: 11 de noviembre de 2024. [En línea]. Disponible en: https://peer.asee.org/understanding-students-perceptions-of-dimensions-of-engineering-culture-in-ecuador

[12] H. Murzi *et al.*, «Cultural dimensions in academic disciplines, a comparison between Ecuador and the United States of America», en *2021 ASEE Virtual Annual Conference Content Access*, 2021. Accedido: 11 de noviembre de 2024. [En línea]. Disponible en: https://peer.asee.org/cultural-dimensions-in-academic-disciplines-a-comparison-between-ecuador-and-the-united-states-of-america

[13] M. A. Guerra y C. Gopaul, «IEEE Region 9 Initiatives: Supporting Engineering Education during COVID-19 Times», *IEEE Potentials*, vol. 40, n.º 2, pp. 19-24, mar. 2021, doi: 10.1109/MPOT.2020.3043738.

[14] N. Quaranta, «La comunicación efectiva: un factor crítico del éxito en el trabajo en equipo», *Enfoques*, vol. 31, n.º 1, pp. 21-46, jun. 2019.

[15] C. García, «La comunicación de la ciencia y la tecnología como herramienta para la apropiación social del conocimiento y la innovación», *J. Sci. Commun. - América Lat.*, vol. 2, n.º 1, p. Y02, jun. 2019, doi: 10.22323/3.02010402.

[16] M. Guerra y Y. Abebe, «Pairwise elicitation for a decision support framework to develop a flood risk response plan», *ASCE-ASME J. Risk Uncertain. Eng. Syst. Part B Mech. Eng.*, vol. 5, n.º 1, p. 011004, 2019.

[17] M. Guerra y T. Shealy, «Teaching User-Centered Design for More Sustainable Infrastructure through Role-Play and Experiential Learning», *J. Prof. Issues Eng. Educ. Pract.*, vol. 144, n.º 4, p. 05018016, oct. 2018, doi: 10.1061/(ASCE)EI.1943-5541.0000385.

[18] J. Ubidia, M. A. Guerra, V. Viteri, y H. Murzi, «Understanding Student's Perceptions of Cultural Dimensions in construction majors: Deconstructing barriers between architecture and civil engineering students», en *2022 ASEE Annual Conference & Exposition*, 2022. Accedido: 11 de noviembre de 2024. [En línea]. Disponible en: https://peer.asee.org/understanding-student-s-perceptions-of-cultural-dimensions-in-construction-majors-deconstructing-barriers-between-architecture-and-civil-engineering-students

[19] H. M. Matusovich, M. C. Paretti, B. D. Jones, y P. R. Brown, «How Problem-based Learning and Traditional Engineering Design Pedagogies Influence the Motivation of First-

year Engineering Students», presentado en 2012 ASEE Annual Conference & Exposition, jun. 2012, p. 25.702.1-25.702.17. Accedido: 26 de noviembre de 2024. [En línea]. Disponible en: https://peer.asee.org/how-problem-based-learning-and-traditional-engineering-design-pedagogies-influence-the-motivation-of-first-year-engineering-students

[20] M. A. Guerra, J. Ubidia, M. Mariño, y F. J. Valverde, «Work in Progress: Designing a First-Year Hands-on Civil Engineering Course to Reduce Students Dropout and Improve the Overall College Experience», en *2022 ASEE Annual Conference & Exposition*, 2022. Accedido: 11 de noviembre de 2024. [En línea]. Disponible en: https://sftp.asee.org/work-in-progress-designing-a-first-year-hands-on-civil-engineering-course-to-reduce-students-dropout-and-improve-the-overall-college-experience.pdf

[21] M. A. Guerra, J. Ubidia, M. Mariño, y F. J. Valverde, «Work in progress: designing a first-year hands-on civil engineering course to reduce students dropout and improve the overall college experience», en *2022 ASEE Annual Conference & Exposition*, 2022. Accedido: 29 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/work-in-progress-designing-a-first-year-hands-on-civil-engineering-course-to-reduce-students-dropout-and-improve-the-overall-college-experience

[22] A. Pantoja Chaves, «Los nuevos medios de comunicación social: las redes sociales», 2011, Accedido: 26 de noviembre de 2024. [En línea]. Disponible en: http://148.202.167.116:8080/xmlui/handle/123456789/3535

[23] C. Zhu, X. Xu, W. Zhang, J. Chen, y R. Evans, «How health communication via Tik Tok makes a difference: A content analysis of Tik Tok accounts run by Chinese provincial health committees», *Int. J. Environ. Res. Public. Health*, vol. 17, n.º 1, p. 192, 2020.

[24] N. Becerra-Chauca y A. Taype-Rondan, «TikTok:?` una nueva herramienta educativa para combatir la COVID-19?», *Acta Médica Peru.*, vol. 37, n.º 2, pp. 249-251, 2020.

[25] Y. Yang, G. Brosch, y B. Yang, «Dissemination and Communication of Lessons Learned for Project-Based Business with the Applications of Information Technology: a Case Study with a British Manufacturer», *Procedia Manuf.*, vol. 39, pp. 1899-1905, ene. 2019, doi: 10.1016/j.promfg.2020.01.243.

[26] V. Tobeña, «Pensar el futuro de la escuela desde comunidades de prácticas. Claves desde TikTok», *Dilemata*, n.º 33, pp. 221-233, 2020.

[27] J. Acosta y M. A. Guerra, «Validating Guerra's Blended Flexible Learning framework for Engineering Courses», en *2022 ASEE Annual Conference & Exposition*, 2022. Accedido: 26 de noviembre de 2024. [En línea]. Disponible en: https://peer.asee.org/validating-guerra-s-blended-flexible-learning-framework-for-engineering-courses

[28] N. Granja, M. A. Guerra, y V. Guerra, «Give me a coffee break! Pilot study on improving exam performance and reducing student stress», presentado en 2022 ASEE Annual Conference & Exposition, ago. 2022. Accedido: 11 de noviembre de 2024. [En línea]. Disponible en: https://peer.asee.org/give-me-a-coffee-break-pilot-study-on-improving-exam-performance-and-reducing-student-stress

[29] R. E. Toscano, V. Guerra, y M. A. Guerra, «Work in Progress: Introducing a coffee break to improve exam performance and reducing student stress in construction majors», en *2023 ASEE Annual Conference & Exposition*, 2023. Accedido: 29 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/work-in-progress-introducing-a-coffee-break-to-improve-exam-performance-and-reducing-student-stress-in-construction-majors

[30] I. Guerra, «WIP: Utilizing Mind-Mapping to Connect the Skillsets of Architecture Students for Both Hands-On and Lecture-Oriented Teaching Approaches», en *2024 ASEE Annual*

Conference & Exposition, 2024. Accedido: 30 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/wip-utilizing-mind-mapping-to-connect-the-skillsets-of-architecture-students-for-both-hands-on-and-lecture-oriented-teaching-approaches

[31] J. M. Bonilla, M. S. Valarezo, y M. A. Guerra, «WIP: Unannounced Tests and Examinations to Improve Student Performance and Build Academic Integrity», en *2024 ASEE Annual Conference & Exposition*, 2024. Accedido: 29 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/wip-unannounced-tests-and-examinations-to-improve-student-performance-and-build-academic-integrity

[32] J. M. Bonilla, M. S. Valarezo, B. D. Villacrés, y M. A. Guerra, «Board 44A: Work in Progress: Unannounced Frequent Examinations to contribute student learning and building academic integrity», en *2023 ASEE Annual Conference & Exposition*, 2023. Accedido: 29 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/board-44a-work-in-progress-unannounced-frequent-examinations-to-contribute-student-learning-and-building-academic-integrity

[33] D. E. Abril y M. A. Guerra, «WIP: Using Real Materials Scale-Modeled for Learning about Construction», en *2024 ASEE Annual Conference & Exposition*, 2024. Accedido: 29 de abril de 2025. [En línea]. Disponible en: https://peer.asee.org/wip-using-real-materials-scale-modeled-for-learning-about-construction

[34] M. A. Medina Angarita y A. Nolte, «What Do We Know About Hackathon Outcomes and How to Support Them? – A Systematic Literature Review», en *Collaboration Technologies and Social Computing*, vol. 12324, A. Nolte, C. Alvarez, R. Hishiyama, I.-A. Chounta, M. J. Rodríguez-Triana, y T. Inoue, Eds., en Lecture Notes in Computer Science, vol. 12324. , Cham: Springer International Publishing, 2020, pp. 50-64. doi: 10.1007/978-3-030-58157-2_4.

[35] C. Hayes, K. Stott, K. J. Lamb, y G. A. Hurst, «"Making Every Second Count": Utilizing TikTok and Systems Thinking to Facilitate Scientific Public Engagement and Contextualization of Chemistry at Home», *J. Chem. Educ.*, vol. 97, n.º 10, pp. 3858-3866, oct. 2020, doi: 10.1021/acs.jchemed.0c00511.

[36] M. Miceli, «Say what?: The importance of effective communication in engineering», *JOM*, vol. 63, n.º 12, p. 25, 2011.

[37] Z. Stacho, K. Stachová, J. Papula, Z. Papulová, y L. Kohnová, «Effective communication in organisations increases their competitiveness», *Pol. J. Manag. Stud.*, vol. 19, 2019, Accedido: 26 de noviembre de 2024. [En línea]. Disponible en: https://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-58996337-f574-4b2f-ab99-cdc983bf5eac

[38] G. C. T. Reyes, E. I. V. San Martín, F. I. R. Cea, J. E. de L. R. Maldonado, y R. P. de León, «Características del lenguaje y la comunicación en redes sociales en estudiantes de enseñanza básica», *Rev. Reflexión E Investig. Educ.*, vol. 2, n.º 1, pp. 35-56, 2019.

[39] J. Acosta, J. Ubidia, M. A. Guerra, V. Guerra, y C. Gallardo, «Work in Progress: Collaborative Environments in Architecture and Civil Engineering Education–Case Study», en *2022 ASEE Annual Conference & Exposition*, 2022. Accedido: 11 de noviembre de 2024. [En línea]. Disponible en: https://sftp.asee.org/work-in-progress-collaborative-environments-in-architecture-and-civil-engineering-education-case-study.pdf

[40] A. Bedón, H. Velásquez, M. A. Guerra, y M. Jiménez, «Exploring Interdisciplinary Contributions to More Sustainable Solutions in the Built Environment and Infrastructure Development Students: 129th ASEE Annual Conference and Exposition: Excellence

Through Diversity, ASEE 2022», *ASEE Annu. Conf. Expo. Conf. Proc.*, ago. 2022, Accedido: 11 de noviembre de 2024. [En línea]. Disponible en: http://www.scopus.com/inward/record.url?scp=85138290411&partnerID=8YFLogxK
[41] R. Fries, B. Cross, J. Zhou, y C. Verbais, «How Student Written Communication Skills Benefit During Participation in an Industry-Sponsored Civil Engineering Capstone Course.», *Adv. Eng. Educ.*, vol. 6, n.º 1, p. n1, 2017.
[42] A. Jennings y J. D. Ferguson, «Focusing on communication skills in engineering education», *Stud. High. Educ.*, vol. 20, n.º 3, pp. 305-314, ene. 1995, doi: 10.1080/03075079512331381575.
[43] H. VELÁSQUEZ, M. A. GUERRA, y E. CERVANTES, «SDG LENS TO ASSESS INTERDISCIPLINARY SUSTAINABLE DESIGNS FOR INFRASTRUCTURE SYSTEMS», *Proc. Int. Struct. Eng. Constr.*, vol. 11, p. 1, 2024.
[44] R. K. Yin, *Case Study Research: Design and Methods*. SAGE Publications, 2013.
[45] J. Saldaña, «The coding manual for qualitative researchers», 2021, Accedido: 26 de noviembre de 2024. [En línea]. Disponible en: https://www.torrossa.com/gs/resourceProxy?an=5018667&publisher=FZ7200
[46] M. A. Guerra y T. Shealy, «Operationalizing Prototyping as a Design Method for More Sustainable Infrastructure Projects», en *Proceedings of the 16th Engineering Project Organization Conference (EPOC 2018)*, 2018, pp. 148-157.
[47] S. Narayan, C. Gardent, S. B. Cohen, y A. Shimorina, «Split and Rephrase», 21 de julio de 2017, *arXiv*: arXiv:1707.06971. doi: 10.48550/arXiv.1707.06971.
[48] P. Pourmand, B. Pudasaini, y M. Shahandashti, «Assessing the Benefits of Flipped Classroom in Enhancing Construction Students' Technical Communication Skills», *J. Civ. Eng. Educ.*, vol. 147, n.º 1, p. 04020010, ene. 2021, doi: 10.1061/(ASCE)EI.2643-9115.0000025.
[49] P. D. Hedges y W. J. Walley, «An Approach to the Integration of Communication Skills Development within an Undergraduate Civil Engineering Program», *J. Tech. Writ. Commun.*, vol. 20, n.º 2, pp. 165-175, abr. 1990, doi: 10.2190/6YHC-30E9-30VE-JVX3.