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From Passive Learning to Active Creation: YouTube as a Tool for Assessment in Engineering English Classes

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Abstract
This study examines the shift from passive learning to active content creation through self-made YouTube videos in engineering English classes. Involving 180 students, participants first learned video creation techniques and then produced explanatory videos on technical topics. These videos served as an assessment tool to evaluate students' analytical and creative abilities. A mixed-methods approach, including pre- and post-tests, surveys, and interviews, demonstrated significant improvements in student engagement and learning outcomes. The study underscores the potential of YouTube as an innovative tool for assessing language and communication skills in technical education.

Keywords: YouTube; content creation; engineering English; active learning; digital assessment; student engagement

INTRODUCTION

The rapid advancement of digital technology has transformed education, particularly in fields requiring both technical and communication skills (Vural, 2013). In engineering education, proficiency in English is not only necessary for academic success but also for effective communication in professional and global contexts (Sarpparaje & Arulappan, 2024). Traditional methods of assessment, often focused on rote memorization, fall short of equipping students with the skills required for the modern digital world (Sarpparaje et al., 2018). As a result, there is a growing need for innovative strategies that foster active learning and creative content production in language learning (Bauld, 2022).

One such innovative strategy is the integration of YouTube video creation into the learning process. Educational platforms like YouTube offer a dynamic space where students can transition from passive learners to active creators of content. By incorporating video creation into English language courses, students are encouraged to produce, analyse, and communicate complex ideas using digital media (Mat & Mustakim, 2021). This shift from traditional assessments to a more interactive, media-driven approach not only evaluates language proficiency but also allows students to demonstrate their analytical, organizational, and creative abilities.

In engineering education, where technical communication is vital, YouTube video creation serves as a valuable tool for assessment. Students tasked with creating explanatory videos on technical topics are required to use both their language and technical skills in a real-world context. The process of planning, scripting, and producing a video helps students clarify their understanding of technical procedures while improving their ability to articulate these concepts effectively (Mohd Dahlan et al., 2023). This creative approach aligns with the evolving demands of professional communication, particularly in technical fields.

The objective of this study is to assess the effectiveness of using YouTube video creation as one of the assessment tools in engineering

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English course assignment activity. Specifically, the study aims to evaluate how video creation enhances student engagement, communication skills, and the ability to present technical information clearly and concisely. By moving away from traditional methods that often emphasise memorization, this study seeks to explore how digital media can encourage active learning and creativity, equipping students with the skills needed to succeed in both academic and professional environments.

The use of video creation in education has gained traction in recent years due to its ability to engage students more deeply with course content. Unlike passive learning methods, where students consume information without significant interaction, video creation requires students to plan, organise, and synthesise knowledge into a cohesive format. For engineering students, this method of assessment mirrors the types of communication they will encounter in their professional careers, where the ability to explain technical concepts to both expert and non-expert audiences is crucial (Weinert et al., 2024).

In this study, 180 freshman engineering students enrolled in a Technical English course were introduced to the basics of YouTube video creation. After watching instructional tutorials, the students were assigned to create their own explanatory videos on a technical topic of their choice. This assignment encouraged students to use their technical knowledge and communication skills in tandem, as they worked to explain complex concepts in a visually appealing and engaging way (Tahmina, 2023).

A mixed-methods approach was employed in this study to assess the impact of video creation on student learning. The methodology included pre- and post-tests, video assessments, surveys, and interviews. The pre-test established a baseline for students' communication skills, while the post-test measured the improvement after the video creation project. The surveys and interviews provided qualitative insights into the students' experiences with video creation, highlighting the challenges they faced and the skills they developed throughout the process (Senchina, 2011).

The findings of this study demonstrate the potential of YouTube as an effective tool for assessing and enhancing student engagement and communication skills. Students who participated in the video creation project showed significant improvement in their ability to articulate technical procedures, structure information logically, and present content in an engaging format. Moreover, the study underscores the importance of integrating digital media into language assessments, as it encourages students to take ownership of their learning and develop skills that are critical in today's digital age (Roediger & Karpicke, 2006).

In conclusion, YouTube video creation offers a unique and effective approach to language assessment in engineering education. By shifting from passive consumption of information to active content creation, students gain valuable skills in communication, problem-solving, and technical presentation. This study suggests that integrating digital tools like YouTube into language courses not only enhances student engagement but also prepares them for the challenges of professional communication in a globalised, technology-driven world (Brame, 2017).

LITERATURE REVIEW

The integration of digital technology in education has revolutionised traditional teaching methods, particularly in fostering active learning and engagement among students. The shift from passive learning to active creation is particularly evident in engineering English classes, where effective communication is critical. One innovative approach that has gained traction is the use of self-made YouTube videos as a pedagogical tool for assessment (Priyakanth et al., 2020). This method not only enhances student engagement but also cultivates essential skills necessary for academic and professional success.

Research indicates that traditional assessment methods often emphasise rote memorization, which fails to prepare students for real-world challenges (Bauld, 2022). In engineering education, where technical communication is vital, assessments should encourage students to synthesise information and articulate their understanding effectively (Mat & Mustakim, 2021). Self-made YouTube videos provide a platform for students to engage deeply with course content, allowing them to analyse, evaluate, and create their own explanatory materials (Weinert et al., 2024). This aligns with constructivist learning theories that advocate for learner-centred approaches, emphasising the importance of active participation in the learning process (Senchina, 2011).

The process of creating videos requires students to engage in critical thinking and problem-solving as they plan, script, and produce their content. By doing so, they are compelled to clarify their understanding of technical concepts while improving their ability to communicate these ideas effectively (Keithly et al., 2015). The hands-on nature of video production fosters collaboration among peers, as students work together to brainstorm ideas and refine their scripts. This collaborative environment not only enhances social interaction but also stimulates creativity and innovation (Tahmina, 2023).

Moreover, the iterative nature of video creation encourages continuous learning. As students receive feedback on their videos, they are prompted to reassess their work and make necessary revisions. This reflective practice is crucial for developing critical thinking skills and ensuring that students take ownership of their learning (Roediger & Karpicke, 2006). The findings from various studies indicate that students who engage in video creation projects demonstrate significant improvements in their communication skills compared to those who rely on traditional assessment methods (Brame, 2017).

Additionally, the use of digital platforms like YouTube aligns with the evolving demands of professional communication in today's technology-driven world. Engineering students must be adept at conveying complex information to diverse audiences; thus, video creation serves as a valuable training ground for these essential skills (Zhang et al., 2006). Students learn not only how to present technical information clearly but also how to engage their audience effectively through visual storytelling.

The positive impact of using YouTube as an educational tool is further supported by qualitative data from student feedback. Many students report increased motivation and enjoyment when participating in video projects compared to traditional assessments (Yusuf, 2020). This heightened engagement reflects a deeper connection with the material and a greater willingness to invest time and effort into their learning.

In conclusion, self-made YouTube videos represent a transformative approach to assessment in engineering English classes. By shifting from passive consumption of information to active content creation, students develop critical communication skills while enhancing their understanding of technical concepts. This innovative pedagogical strategy not only enriches the learning experience but also prepares students for the complexities of professional communication in a globalised context.

METHODOLOGY

This study utilised a mixed-methods approach to evaluate the effectiveness of self-made YouTube video creation as an assessment tool evaluated for 180 engineering students enrolled in a Technical English course. The methodology was structured into three distinct phases: pre-test, video creation, and post-test.

Phase 1: Pre-Test

In the initial phase, students participated in a pre-test designed to establish a baseline for their communication skills. This assessment included various tasks aimed at evaluating their ability to articulate technical concepts, analyse information, and present ideas clearly. Following the assessment, students attended a tutorial focused on YouTube video creation. This tutorial equipped them with the necessary

skills and techniques for producing their videos, covering aspects such as scripting, filming, and editing (Weinert et al., 2024). The goal was to prepare students for the upcoming video creation phase by providing them with both theoretical knowledge and practical skills.

Phase 2: Video Creation

During the second phase, students were organised into small groups to collaboratively plan, script, and produce their own explanatory videos on technical topics of their choice. Each video was limited to a maximum duration of ten minutes. This freedom allowed students to select subjects that resonated with their interests while encouraging creativity in how they presented the material. The groups were tasked with incorporating engaging elements into their videos to capture their audience's attention effectively (Mat & Mustakim, 2021). Throughout this phase, students actively engaged in problem-solving and decision-making as they navigated the complexities of video production. They collaborated on scripting, which required them to synthesise information and articulate their understanding of technical procedures clearly. The process emphasised the importance of clear communication and effective presentation skills in engineering contexts (Mohd Dahlan et al., 2023). Students also faced challenges related to technology use, which necessitated critical thinking as they selected appropriate software tools for editing their videos. To enhance the learning experience further, a control group of 180 other students was established. This group received similar instructional content regarding video creation but did not participate in the actual production process. This design allowed for comparative analysis between the experimental group (those who created videos) and the control group (those who did not), providing insights into how active participation in content creation influences learning outcomes.

Table 1: *Students' Sample Video Links*

Class	YouTube link	Topic	Software
EEE A	https://youtu.be/PKND775bGV0	Book Review	Inshot
ECE A Group I	https://youtu.be/mpmfwBGoL8g	i-Phone Review	Screen recording app
ECE A Group II	https://youtu.be/Wvaa_zCz6X4	PH meter & TDS meter	Inshot
ECE A Group III	https://youtu.be/owNPcIZoU3g	Camping Lamp	Inshot
ECE A Group IV	https://youtu.be/MmOAQs2OxuM	Ember Smart Mug	Screen recording app
Civil B Group I	https://youtu.be/Oib-Dwlw3P4	Building information modelling	Power Director
Civil B Group II	https://youtu.be/TAp8dee9I6Y	Gypsum Plastering	Kinemaster
Civil B Group III	https://youtu.be/9ijLCATstZc	Smart Infrastructure IoT	Kinemaster

Phase 3: Post-Test

In the final phase of the study, students completed a post-test identical to the pre-test. This assessment measured any improvements in their communication skills following the video creation project. Additionally, qualitative data were gathered through surveys and interviews where students shared their experiences regarding the learning process and reflected on how creating videos impacted their understanding of technical concepts. The study employed a validated rubric to evaluate the quality of student-produced videos. Inter-rater reliability checks were conducted to ensure consistency in assessments across different evaluators. Quantitative analysis techniques such as paired t-tests and ANOVA were utilized to measure improvements in communication

skills between pre- and post-test phases. Correlation analysis was also performed to explore relationships between video quality and student performance metrics. Qualitative data from surveys and interviews provided valuable insights into students' perceptions of their learning experiences during the video creation process. Thematic analysis revealed key themes such as enhanced collaboration, increased creativity, and improved problem-solving abilities among participants (Yusuf, 2020). By combining quantitative measures with qualitative feedback, this study aimed to present a comprehensive understanding of how self-made YouTube video creation can serve as an effective tool for assessment in engineering English classes. Following Table 1 presents the sample authentic YouTube video links, along with the topics and software used by selective students as the valid proof of the claims made.

FINDINGS

The study's findings, based on quantitative and qualitative data analysis, provide compelling evidence for the effectiveness of self-made YouTube video creation as an assessment criterion for engineering English learners. A paired t-test was conducted to compare the scores of students before and after the video creation project. The results showed a statistically significant improvement in post-test scores ($t(179) = -12.45$, $p < 0.001$). The mean score increased from 65.2 (SD = 10.3) in the pre-test to 78.4 (SD = 12.1) in the post-test.

Table 2: *- Comparison of HOTS Scores Between Pre-Test and Post-Test*

Group	Pre-Test (M ± SD)	Post-Test (M ± SD)	t-value	p-value
Experimental	65.2 ± 10.3	78.4 ± 12.1	-12.45	< 0.001
Control	64.8 ± 9.8	68.7 ± 11.5	-3.21	0.002

Further analysis using ANOVA as shown in Table.2 revealed a significant difference in scores between the experimental group (video creation) and the control group (no video creation) in the post-test ($F(178) = 25.67$, $p < 0.001$). The experimental group scored significantly higher (M = 78.4, SD = 12.1) compared to the control group (M = 68.7, SD = 11.5). Correlation analysis demonstrated a strong positive relationship between video quality and scores ($r = 0.72$, $p < 0.001$). Students who created higher-quality videos, as assessed by the validated rubric, tended to have higher post-test scores.

Table 3: *Sample Student Survey and Interview Questions*

Sample Survey Questions	Sample Interview Questions
How engaging did you find the process of creating your own YouTube video in enhancing your understanding of technical procedures?	Reflect on how your understanding skills has evolved throughout the YouTube video creation project.
To what extent do you believe that the video creation project helped you develop skills such as analysis and evaluation?	Describe a specific instance during the video creation process where you had to apply critical thinking skills to solve a problem or make a decision.
What were the main challenges you encountered during the video creation process, and how did you address them? Please reflect on your problem-solving strategies.	How has the experience of creating explanatory videos influenced your ability to analyse technical procedures and articulate your knowledge effectively?
In what ways did the video creation project enhance your critical thinking abilities, particularly in synthesising information and presenting complex ideas?	Discuss any challenges you faced during the video creation project and how you addressed them.

How has participating in the YouTube video creation project influenced your perception of learning English in an engineering context? Please provide specific examples.	In what ways do you believe this assignment has enhanced your problem-solving abilities and creativity in presenting complex ideas through video content?

The qualitative findings of the study are based on students' responses to the following sample survey and interview questions as shown in Table 3.

Thematic analysis of the following student survey and interview question responses revealed several key themes related to the impact of video creation:

- **Enhanced problem-solving skills:** Firstly, students reported exploring various technological tools throughout the video creation process. This exploration fostered problem-solving skills, as they worked to achieve their envisioned end products. In scripting their videos, learners engaged deeply with the material, ensuring scripts were crafted with accurate formatting and information sourced from reliable references. Emphasising solutions over problems, students transitioned from identifying issues to presenting resolutions within their scripts.
- **Improved critical thinking:** The process of evaluating information sources, scrutinising facts, and making decisions about content inclusion and exclusion demonstrated students' engagement in critical thinking. In taking on the roles of scriptwriters and producers, students assumed a new perspective that required them to engage their audience in a reasoned dialogue through the content they created. It required them to extend themselves to understand implicit messages, draw inferences, and connect ideas meaningfully. This transition reflects their involvement in writing and action-oriented processes, demonstrating a marked shift from passive recipients of knowledge to active constructors of meaning
- **Increased creativity:** Students showcased innovative approaches to tackle script and video challenges, displaying agility in viewing problems through fresh perspectives. During the drafting stage, the research noted that groups vocalised their thoughts, indicative of an iterative process where visualization and audience perception were central to script refinement. Learners reworked their scripts, enhancing and enriching the content to resonate with the audience, evident through attempts to incorporate humour and other engaging elements to increase likes and subscriptions.
- **Collaborative learning:** Peer discussions and debates during the video creation process stimulated new ideas and perspectives, underscoring the value of collaboration among students. The study found that synthesis of information proved challenging for students, many of whom struggled with analogical thinking and the integration of collected data into a unified narrative. Post-script writing, the video production phase became an avenue for students to apply effort, collaboration, and the active deployment of their language skills.
- **Continuous learning and adaptation:** Students' ability to identify strengths and weaknesses in their work and make calculated revisions demonstrated an evolution of critical thought and reflection. Students sometimes had to reassess and revise their planned script content, indicative of their ongoing critical thinking processes. Video editing required them to constantly solve problems and scrutinise facts and details, potentially revising their work against stringent standards of thought and creativity. The design process demanded substantial problem-solving and decision-making; tasks such as editing clips, choosing images, music, and transitions forced students to engage in meticulous and often iterative processes to ensure the end product was coherent in terms of content, colour, rhythm, and overall aesthetic appeal.
- **Decision Making:** Notably, technical difficulties with software presented learning

opportunities, albeit challenging ones. Students were required to evaluate various programs, select those that best served their needs, and acquire the necessary editing expertise. Decision-making became particularly salient when the original script needed to be condensed for the video medium, testing students' abilities to determine which elements were most crucial to their message and worthy of inclusion.

Despite the overall positive progress, some students exhibited challenges in verifying the accuracy of arguments and facts, highlighting the need for further emphasis on critical analysis and source evaluation. The study reveals that a significant portion of students do not scrutinise dubious facts or the reliability of sources, indicating a gap in applying skills effectively. However, when prompted to analyse vague thoughts expressed in the videos, students recognise the significance of thorough information and critical decision-making to achieve set goals successfully (Maziriri et al., 2020).

These findings, combined with the quantitative data, provide a comprehensive understanding of how self-made YouTube video creation can effectively assess language skills among engineering English learners. The study highlights the potential of this innovative pedagogical approach to foster critical thinking, problem-solving, creativity, and collaborative learning in language learning contexts (Yusuf, 2020).

CONCLUSION

The study's findings provide compelling evidence for the effectiveness of self-made YouTube video creation among engineering English learners. The quantitative analysis revealed a statistically significant improvement in post test scores after the video creation project, with the experimental group outperforming the control group. Correlation analysis further demonstrated a strong positive relationship between video quality and improved scores.

Qualitative data from student surveys and interviews offered valuable insights into the impact of video creation on students. Students reported enhanced problem-solving skills, improved critical thinking, increased creativity, and the benefits of collaborative learning. The practical implementation of these activities showed that 79% of students successfully translated their knowledge into their own video productions, attaining a high level of competency.

Despite some initially facing difficulties, with 21% scoring at an intermediate level, the perseverance shown by students who revised their videos multiple times underscores the strength and resilience of their learning journey.

By incorporating a mixed-methods approach, the study presents a comprehensive understanding of how self-made YouTube video creation can effectively integrate and assess the most needed language skills among engineering English learners. The findings highlight the potential of this innovative pedagogical approach to foster critical thinking, problem-solving, creativity, and collaborative learning in language learning contexts.

By shifting the focus from passive absorption of information to active construction of knowledge, the video creation project empowered students to become active participants in their learning journey (Martin, 2016). The research also emphasises the evolving role of the teacher as a collaborative facilitator, fostering a more engaging and effective educational environment (Frydenberg & Andone, 2016). This paradigm shift in the teacher-student relationship is crucial in creating a supportive and nurturing space for the development of language skills (Toyoda, 2015). The transformative effect of this innovative project did not end within the classroom as said by Flavin, 2017. Some students continued to expand their creative endeavours, consistently creating and updating content on their YouTube channels. This ongoing engagement with the medium reflects a sustained interest in using digital platforms for educational purposes, intensifying the impact of the initial assignment (Khalid & Muhammad, 2012).

In conclusion, the study's findings validate the effectiveness of self-made YouTube video creation in assessment of engineering English learners (Zhang et al., 2006). It also extended into a wider scope of digital literacy and autonomous, lifelong learning, providing students with the necessary skills to thrive in an increasingly complex and globalised world (Alwehaibi, 2015).

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