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The Future is Connection:

Collaboration, Creativity and Compassion in a Digital Society

To see or not to see: Improving learner access to demonstrations using multi-angle video

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This concise paper reports on a work in progress initiative at Unitec in Aotearoa, New Zealand exploring how multi-angle EchoVideo capture supports teaching and learning in automotive trades education. In trade teaching, practical demonstrations often happen in spaces where ākonga (learners) cannot always clearly see the teacher's hand movements, tool use, or the detailed sequence of actions. This study builds on previous experimentation of 360-degree and action camera video in trades education by examining how multi-angle video may further improve onsite visibility, access to demonstrations, and review of learning for ākonga. The paper outlines the local context, the rationale for using multi-angle video in automotive teaching, and a small-scale mixed-methods case study design that will use student survey data, EchoVideo analytics, and coded assessment results. It argues that multi-angle video may strengthen teaching and learning in automotive education by improving visibility, learner access, and the ability for ākonga to review learning for consolidation.

Keywords: automotive trades education, vocational education, multi-angle camera, 360 video, active learning, EchoVideo, case study

Introduction

Teaching in automotive education environments depends heavily on learners (ākonga) being able to observe their lecturer (kaiako) clearly; however, this is not always possible in an automotive workshop space. Practical tasks often take place within engine bays or around steering, brake, and suspension components, where physical crowding can interrupt the line of sight for many ākonga. This means that only some students can directly see crucial details required to complete the task. In automotive vocational education this creates a challenge not only for ākonga visibility, but also for equitable access to teaching and learning.

Australasian research suggests that the value of the video depends on how it is designed and used to support learning rather than simply accessing recorded material (Colasante, 2022; Fyfield et al., 2019). Furthermore, studies highlight that video is most useful when it is intentionally designed for active learning and is used to improve review and engagement (Gedera & Zalipour, 2018; Lokuge Dona et al., 2017; Munro & Clarke, 2020). This is particularly important in practical and experiential learning contexts like trades education where traditional lecture recording approaches may miss crucial details, not capturing task demonstrations accurately.

At Unitec in New Zealand, earlier work that explored the use of 360-degree and action camera video in trades education identified a clear teaching issue: during class demonstrations in the workshop, not all students were able to see what the teacher was doing clearly enough to follow the task with confidence (Williams, 2025). That earlier work also suggested that video could support learners before, during, and after class by allowing them to replay demonstrations and revisit key steps at their own pace (Williams, 2025). The present study builds on that foundation by shifting the focus more specifically to multi-angle video shared with learners through the EchoVideo platform, with up to four simultaneously viewed video streams, and its potential to improve visibility, learner review, and access to practical demonstrations in automotive teaching.

The aim of this study is to explore how multi-angle EchoVideo resources can support teaching and learning in automotive trades education in Aotearoa, New Zealand. In doing so, the paper suggests multi-angle video, as

an intentionally designed learning resource, may strengthen practical, demonstration based teaching in a context where seeing tasks clearly is central to learning. This paper is a work in progress report illustrating work completed to date in developing the resource and the intended method for evaluation. Initial feedback suggests that the resources will provide useful support to ākonga and this will be evaluated through the use by ākonga in semester two, 2026.

Literature review

The use of video for instructional teaching and learning is a well-established part of tertiary education. Arkenback notes that using video in vocational education to demonstrate actions and behaviour has been around since the 1920s (2023, p. 252). However, its educational value depends on how it is designed and used to support learning, rather than on simple access to recorded material.

Fyfield et al. (2019) argue that research on educational video in higher education falls into three areas: improving video design, developing platforms and technologies that increase engagement, and creating approaches to teaching and learning that make better use of video's affordances. Colasante (2022) similarly argues that video should be understood as a multidimensional teaching tool and that the value of it lies in the intentional ways it can support explanation and demonstration of active learning. This emphasis on purposeful design is reinforced in New Zealand research on interactive video. Gedera and Zalipour (2018) found that staff and students held positive attitudes toward the use of video but also stressed that video is most effective when it includes interactive learning moments that prompt learners to pause, think, respond, and engage actively with content. Their work positions video as more than presentation or illustration. Instead, video can support active learning when the kaiako includes questions and opportunities for reflection or discussion. They also noted that analytics can help teachers understand whether video activities are being used by the ākonga.

Research on lecture recording also highlights the need to avoid a blanket approach. In an Australian case study of Echo360, Lokuge Dona et al. (2017) found that students were generally positive about the affordances of lecture recording, particularly for review, revision, and flexible access, while kaiako were more uncertain. Importantly, they identified differences in how lecture recording was experienced. They noted that lecturers in science and engineering were especially concerned about the limitations of standard, more traditional recording for capturing discipline specific demonstrations. Their study concludes that lecture recording may not serve all disciplines equally well and that more flexible video options are needed. This point is especially relevant to automotive trades education, where practical demonstrations often involve difficult viewing angles, small hand gestures and details that cannot be captured through a single view.

The importance of context is also evident in New Zealand research on experiential learning. Munro and Clarke (2020) found that students in engineering and sports coaching valued practical activities and were unhappy when these were replaced with online alternatives. However, they also reported that specially prepared videos and accessible prerecorded materials were more positively received to support student learning when face to face practical experiences were unavailable. Their findings suggest that digital resources can support practical learning when they are intentionally designed and aligned with students' needs for review.

Some similarities exist between the use of 360 video and multi-angled video approaches. In their systematic literature review on 360 videos in education, Rosendahl and Wagner (2024) highlight the benefits to learners in being free to change the perspective of the video that they are viewing with 360-degrees of freedom. Kavanagh et al. (2025) also note the benefit of use selected perspectives; however, learner feedback highlights the challenges of distraction in full 360 environments and the limitation that all viewable perspectives come from one fixed predefined point where the 360 camera was.

Together, these studies suggest that video is most valuable when it is treated as an intentionally designed learning resource rather than a simple recording. They also indicate that the effectiveness of video depends on its alignment with teaching and learning practices already happening in the classroom. However, there is limited research on how multi-angle video can be used to improve visibility and access in automotive trades

education in Aotearoa, New Zealand. The authors believe that a multi-angle, multi-camera based approach has the potential to harness the benefits of approaches such as 360 video while addressing the limitations. The present study responds to that gap by examining the use of multi-angle EchoVideo resources in automotive trades education.

Context and intervention

Automotive teaching often occurs in active workshop spaces where practical demonstrations take place in and around vehicles, creating challenges of line of sight, noise, safety, and crowding. In such settings, only a small number of students may be positioned well enough to observe the kaiako's hand movements and sequencing of actions clearly. EchoVideo QuadraVision provides an opportunity to address this challenge by enabling multi-channel recording, potentially combining wider workshop views with close-up or task-specific camera angles. One of the unique features of this platform is that all video feeds retain full resolution and the user can choose their preferred layout at any stage during playback, allowing them to prioritise the most important angle at any time.

In this study, the pedagogical intervention is the deliberate use of multi-camera capture to support practical demonstrations so that students can observe, pause, replay, and revisit expert performance before, during, and after workshop sessions. Innovative durable cameras that were easy to position in unique locations and operate were utilised to empower kaiako to create recordings like these on their own without the need for a film crew. As part of the project we have developed three demonstration clips showing different aspects of tyre and brake pad changing. For each clip we worked with the kaiako to determine the angles that would be the most useful for students, and which camera would offer the best results. Early academic stakeholder feedback is very positive about the value of these recordings and suggests the project is ready to move to student testing during semester two.

The example recording shown below is captured using a 360 camera worn by the kaiako to show their point of view (POV), plus a magnetic camera attached to the side arm of the tyre machine and an action camera positioned behind the tyre. In this particular example the video from the 360 camera has been reframed to provide the angle that the kaiako deemed to be most useful for ākonga, thus reducing the distractions of other activities occurring around the workshop (Kavanagh et al., 2025). The screenshot illustrates how the ākonga can switch the focus from the POV camera to the back of the machine in order to clearly view the demount head (duck head) as it separates the tyre from the rim, providing them with the freedom to focus on what is most important for their learning (Rosendahl & Wagner, 2024). At key stages of the video learners are also prompted with questions, encouraging a more active learning experience (Gedera & Zalipour, 2018).



Figure 1. *Example screenshot from a multi-angle tyre-changing video*

Method

This study uses a small-scale mixed-methods case study to investigate the potential of multi-perspective video resources to support learning in automotive trades education. The intervention involves recording practical activities using EchoVideo, from multiple camera angles, with the resulting resources to be made available to learners as part of normal teaching and learning activities.

Planned participants are ākonga enrolled in the relevant automotive courses in which the resources are used. All eligible ākonga will be invited to participate voluntarily, and no ākonga will be included or excluded based on performance, background, or relationship with teaching staff. Data collection will comprise an online survey and anonymised EchoVideo analytics. The survey, administered through Microsoft Forms, will invite ākonga to compare their experience of the multi-perspective video resources with previous similar learning experiences. It will include both Likert-scale items and short open-text responses. A third party not involved in the research will distribute the survey, code responses, and anonymise the dataset before it is shared with the researchers. This process was designed to preserve participant anonymity in relation to the researchers while enabling analysis of ākonga perceptions and patterns of use.

EchoVideo analytics will include measures such as number of views, frequency of access, duration of viewing, and patterns of replay or review. Comparison will also be made between assessment results for activities that are supported by the Echo360 resources and similar ones that are not.

Conclusion

The researchers believe that the educational value of multi-angle video in automotive workshop teaching lies in its ability to address a specific pedagogical challenge rather than simply introduce a new technology. In this study, the three emerging themes; improved visibility of expert practice, learner control and review, and reflective teaching practice, suggest that EchoVideo QuadraVision may extend the effectiveness of practical, demonstration-based trades teaching by making practical instruction more visible, more reviewable, and more pedagogically deliberate.

This project looks to contribute to a relatively underexplored area, by focusing specifically on multi-camera video in automotive trade education. While adjacent fields such as nursing, engineering, and health

professions provide promising evidence for the value of viewpoint and camera design in procedural learning (Boucheix et al., 2018; Fiorella et al., 2017; Tjorven et al., 2026), there remains limited published research on how these ideas translate into automotive workshop teaching. The present study therefore offers an early contribution by showing how a practical teaching problem in the trades can be addressed through pedagogically informed use of multi-angle video.

As an exploratory study, this work is necessarily limited in scale. However, its early indications suggest that multi-camera capture may offer a feasible and valuable way to support more equitable and effective practical teaching in automotive education. Future research could extend this work through larger comparative studies, deeper analysis of learner outcomes, and investigation of how different camera configurations shape the learning of specific workshop procedures.

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