Let's go to the video

This is the first part of a two-part series on using digital technology to help improve your coaching options. Our first installment is on using video. All levels of driver, from beginner to professional, can and should use video technology to improve their driving. Video helps with technique, understanding vehicle dynamics and gaining a better understanding of a specific track and the proper line.

Many of our students today will come to a track event with an action camera or smartphone mounted on their windscreen. It may be running lap timing applications such as: Harry's LapTimer, TrackAddict or RaceChrono. Many new action cams (e.g. GoPro) capture GPS data along with the video data. Stand alone "dash cam" system like Waylens Horizon record video and also capture GPS generated data and provide a summary of lap statistics. Most systems allow for wireless transfer of video and data for analysis without ever needing to remove the camera or phone from the car.

In Car Data/Video Systems from Major Car Makers

Here come the OEMs. Car manufacturers are also entering the track video - performance data market. The applications provided by car manufactures support external and internal HD cameras, GPS, IMU(CPU) on-vehicle processing units, and software with iOS & Android applications. The dashboard screen shot below is from BMW's M Dashboard Laptimer.

Porsche, Chevrolet and McLaren support Cosworth's Toolbox analysis software today.

BMW's M Laptimer App is being co-developed with Harman, a SAMSUNG Company.

Data from these OEM systems can be copied to a SD card and reviewed on a Laptop with the appropriate manufacturer software.

Other Video and Data Options
These are just some of the options available to our next generation of students BEFORE they venture into actual track data acquisitions such as AiM Sports, Vbox, Motech, or Traqmate.

Instructing with Video
I suspect most Green and Yellow students will have video and data installed before our NNJR instructors do! Clearly this is something as instructors, we need to address. The good news: it is actually very straight forward, easy to learn and you can apply almost all of your right seat experience when reviewing video.

Video review takes time. It is easy to spend 10 minutes reviewing a single lap. It can be done "in car" after a run group **if both the student and the instructor are fluent with the playback application**. If not, don't set the expectation of reviewing a video like you might review a run session before jumping out of the student's car. A better suggestion is to ask the student to set aside 15 minutes before their next run group or later in the day. Make it the student's responsibility to make sure everything is set up and ready to go, so you spend your time reviewing the video, not troubleshooting the student's video application.

Your student's camera should be set up and turned on before you leave pit lane and you should not touch it again until the car is parked. If the camera fails to start, slips in the mount or beeps while driving, ignore it until you are parked in the paddock. If the camera falls in the footwell, make your way back to pit lane, park the car and deal with it there. The last thing you want to be thinking about while driving at speed is a camera or smartphone flopping around on the floor.

Just like on track instructing, when you review a video, focus on the student's "line" just as you would from the passenger seat. The benefit of recorded video today is that it is easy to stop, rewind, and play. Most of the time you will be doing this on the student's smartphone or tablet. If you have extra time and the student has a laptop or tablet, you will have access to a larger screen. Also, with a laptop you may be able to view laps side by side, each in its own window, by starting two version of the same video and offsetting the playback timing.

I would also suggest doing only one video review per day. You will be able to highlight the key areas with the video, and help the student visualize what you are asking them to do. Hopefully, by the second day, you will be able to show and reinforce the improvements in your next video review. I have found this to be a very powerful reinforcement, and it gives the student a real sense of accomplishment that they can see.

For a review, I watch a few laps in a row before making any comments from the video. I am looking for overall consistency of the student's line, brake and turn in points. If a system has data overlays (most do), I will look for consistent timing and track location of when and where the student goes to the brake or throttle and establish reference points in the video that they can use on track. You can always "stop" the video when you see the brake icon come on, and then look for a reference point from the video screen. This is where the pause, return and replay becomes a very insightful observation and reinforcement tool for the student.

With video your instructing is very much the same as if you were in the right seat—but it all takes time, so you have to plan ahead. It is easy to spend 15 minutes with a student reviewing a two-minute lap. Try to focus on only one or two things that you may have picked up while on track and use the video to reinforce your instruction. After the event is over, students can save their videos on their phones or upload them to YouTube, iCloud or another video service. This gives them a terrific starting point for their next time on the track. They can show their instructor video from their last track day, and if student was using an inside mount for a product like Harry's or RaceChrono it will also record the instructor's commands.

Of course, the student will first look at the "lap time" and that's the downside of these new tools. It is important for the instructor to stress that the student needs to use video to gain consistency

in the driving and that their speed will come with an improved line and overall consistency, not trying to beat their best lap time.

The GPS breakthrough

Whether it is your smartphone or a GoPro action camera, GPS is a game changer for booth ease of use and sophisticated track mapping and data capture. Today's GPS is so accurate it will draw an actual track map where you can trace your driven line through a corner within a foot. You can even render your lines on a satellite image of the track, which is cool, but not necessary.

All of the current action sports camera manufacturers offer cameras that can turn themselves on and off based on location or activity. Many support Bluetooth and WiFi so after the session, you can wirelessly transfer video directly to your laptop or tablet. Of course, you can just sit in the car and review on the smartphone.

Harry's, TrackAddict and RaceChrono

I'm a big fan of Harry's LapTimer, TrackAddict and RaceChrono because they are just so damn easy to use.

Harry's PetrolHead IOS app costs $19.95, RaceChrono's App is $17.99 and TrackAddict is free! You will spend more on a good mount than the smartphone software, so each represents a ridiculously good bargain. Do invest in a good mount with a short "arm" to improve stabilization and use a phone case that you cut a hole in to secure a tether to the phone and the mount.

All the applications mentioned provide ongoing software updates at no charge. What follows is true for both RaceChrono and Harry's. Applications run on either an IOS (apple) or Android phone (Google) and leverage the phone's camera, GPS and accelerometer to capture video, speed and G-Force data.

A GPS function selects the track from your location and then loads the coordinates or you can "create a new track" by allowing he GPS to figure it all out. Presto!

When you select the video option, the application "starts up" the video camera when you cross the start-finish line. After a session is over, you can review your video right from the phone, "Airdrop" it to a tablet, laptop or with a couple of clicks, upload the video from the phone to a cloud service such as YouTube.

These applications can also integrate input from additional wireless cameras so you can have picture in picture video when using an editing software such as RaceRender.

Having a camera placement that shows the drivers inputs provides additional information for your instructing. You can look for smooth inputs and see if the driver is experiencing understeer or oversteer. If the dash is in view from a camera mounted behind the driver, you may also be able to notice if the traction control indicator comes on in the dash. An over aggressive student cranking in steering angle in the middle of turn with the traction control light blinking, makes it very easy to explain the concepts of understeer and "over driving" the car. Next time out, set a goal to have the student control the car, instead of the car controlling the student.

Video editing and data review tools

Most smart phones and in-car systems can produce a video and data file that can be used to add better graphics in "post processing." RaceRender is track day video editing software that allows you to import and sync video and data files to create terrific looking track videos. The synchronizing tool is very well executed and intuitive to use.

The software allows overlay data onto your video with graphical widgets for Speedometer, Tachometer, Gear, Brake, Throttle, G-Force, Lap Number, Best Lap, Best Time, Track map, and Shift lights (assuming the data exists). It also supports multiple camera views to produce that professional "window in a window" look. Of course, titles, headings, and text can be inserted anywhere in the video playback.

RaceRender a very slick piece of a track focused video editing software and works seamlessly with their TrackAddict phone application. If you purchase the Apple or Windows application, you can load a data file and a video file(s) to create works of art from just about any data logging and video system. Create your own YouTube Channel, and you are ready to take on Chris Harris.

Vbox CircuitTools is another terrific piece of software that combines Video with "squiggly line" data analysis in a single integrated view. So far it only works with their own Vbox video loggers but it can read just about any data logger's lap data. CircuitTools has a well-executed user experience combining synchronized video with lap segments, split times, color coded track map and "squiggly line" G-Force data graphics all on a single four quadrant screen.

A word of caution is needed here. Discourage your students from looking at the real-time LapTimer to check their position in an ongoing lap. Set the lap timers or camera to only display a lap time after start finish, not a predictive lap time.

If you want to learn more about Harry's LapTimer, TrackAddict or RaceChrono visit their website and follow the Online Forum or search YouTube for "how to" videos.

http://www.gps-laptimer.de/ Harry's
https://racechrono.com/ RaceChrono
https://www.hptuners.com/ TrackAddict