# A Study of Teachers' Reactions towards Video-Assisted Feedback

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**This paper presents results from a 4-week study investigating teachers' reactions towards the use of video as a feedback instrument. Four teachers in a public-private school in Pune, India, were treated to three feedback protocols involving video technology in different measures and modes of operation. Results indicate that teachers have a strong preference for feedback protocols that involve video, both in terms of effectiveness and ease of use, although most teachers view the advice of a human mentor as indispensable. We also found evidence to suggest that video technology improves the quality of human feedback by enabling rapid recall of events and by facilitating resolution of conflicts.**

***Keywords:*** *Education, Video-Based Self-Assessment, Teachers, Feedback*

## 1. INTRODUCTION

One of the best ways to assess and improve teacher performance in K-12 schools is to directly observe their actions in the classroom and to provide them feedback on different components of their classroom behaviour. Such feedback, if given carefully and on a regular basis, can help teachers reinforce positive behaviours and eliminate practices which are pedagogically ineffective. However, conducting classroom observations and giving meaningful feedback to teachers requires considerable human effort and expertise, which is often not easily available. As such, very few schools conduct classroom observations on an ongoing basis and even fewer use them as a tool for teacher improvement. This is particularly true in countries like India where most schools are starved for human personnel.

Video offers a potential solution to this problem. For one, video technology is becoming increasingly prevalent in schools and today, even schools without dedicated access to expert classroom observers are equipped with filming and film-viewing equipment. For two, video, by its very nature, offers certain facilities (like neutrality, objectivity, and flexibility of access) which are difficult to build into a purely human-driven feedback system. In schools where observation-based feedback is infrequent or absent, video-based self-assessment emerges as a natural candidate to provide feedback to teachers on their classroom practices.

We conducted an exploratory study with four teachers in one K-12 school in India in order to understand teachers' perceptions towards the use of video as a tool to give feedback on their classroom actions. We designed and implemented three feedback mechanisms, each utilizing video technology in a different measure or mode of operation, and studied these mechanisms in terms of their perceived effectiveness. Our findings suggest that video affords multiple benefits to teachers and many of these benefits cannot be rendered by human observers alone. The teachers in our study reported video to be a flexible and neutral assessment tool, and most of them ranked video-based self-assessment as a better mode of receiving feedback than feedback that is based only on human observation. At the same time, teachers also reported that video technology cannot completely substitute for human-driven feedback, wherein certain subjective inputs and improvement avenues can be provided, and which are difficult to capture using video alone. In general, teachers expressed a strong preference for the feedback protocol that had some elements of human observation and some elements of video-based reflection and discussion.

We also found considerable evidence to support the possibility that the use of video improves the quality of human-driven feedback sessions. Being a neutral evidence of past events, video increases teachers' receptivity of feedback given by human observers, and helps in resolution of human-to-human conflicts. Additionally, it enables observers and teachers alike to easily and accurately recall classroom events and discuss finer details about a class (e.g., time spent on individual segments of the class) which are difficult to recall without the help of video.

Our conclusion from this study is that video technology, if deployed for implementing teacher feedback and assessment in K-12 schools in India, should not be used solitarily, but instead in careful combination with human-based feedback systems. Additionally, since human-driven feedback systems seem to benefit from the use of video in multiple ways, it is recommended that, where accessible, video be used to aid the feedback process. Owing to the benefits of video, it is also plausible that the technology reduces resource demands on human-driven feedback in the long run, although the extent to and the manner in which this happens is still a subject of long-term research.

## 2. RELATED WORK

The idea of using video as a feedback instrument for teachers is not new and has been in practice for

several years (Jensen et al., 1994). Surprisingly, though, there is little documentation on the subject in the *research* literature, and in particular, understanding and measuring the relative effectiveness of video and human-driven feedback mechanisms has not received much attention. There has been considerable work on studying the value of video as a reflection tool for teachers (Jensen et al., 1994; Roth, 2007; Wright, 2008). It has been argued in various works that video-assisted reflection helps teachers improve teaching practices by identifying both their strengths and areas for improvement (Wright, 2008; Schwartz & Hartman, 2007; Grossman & Williston). In (Wright, 2008), Wright demonstrates that the impact of video-based reflection can be enhanced by having the principal of the school play a consultant's role and giving post-reflection feedback to teachers. However, what type of reactions is induced by such feedback is not thoroughly investigated in his work. (Roth, 2007) argues that the use of video as the only tool for providing feedback to teachers introduces some real dangers because teachers may merely rectify their discourses without changing beliefs or practices (often referred to as the "confirmation bias"). In our experiments, we did observe some instances wherein a human observer identified issues in a teachers' actions during class, but which went unnoticed by the teacher even during self-reflection.

Miller and Zhou discuss some difficulties in the process of extracting learning from classroom videos for the purpose of teacher training (Miller & Zhou, 2007). One of the challenges they discuss is that of building consensus amongst teachers on what constitutes good pedagogical practice and whether a given video depicts good practice or not. To what degree such consensus can be achieved in the context of a video-assisted "feedback" protocol (as implemented in the current work) is not explored by them.

Video can also be a powerful tool in peer discussion sessions amongst school teachers. (Achinstein & Meyer, 1997) describe an interesting 3-year long case study in which video aids the process of building "critical friendship" amongst a set of novice teachers, who share similar pedagogical goals but differ in their teaching environments. They find that such teachers can be very comfortable sharing classroom videos with each other and inviting critiques, *provided* they first work on building a relationship of trust amongst each other. Friendship amongst the teachers serves as a contributing context in the process of critiquing and improving practice, and once friendship is in place, video catalyzes teacher improvement by enabling effective communication of classroom events. In their model, teacher improvement is largely peer-driven, and the role of the mentor is limited to that of a facilitator. We are not aware of such practices in Indian schools (or at least none are well-documented), but it would be interesting to institute them here, given the shortage of human mentors, and the increase in penetration of video technology in schools.

In India, the practice of using video as a feedback instrument has been implemented in some schools in the higher strata (e.g., (Handa, 2004)), but there seems to be no documentation of the perceived or real benefits of such activities. An interesting video-based innovation in the space of teacher training is the Digital StudyHall project (Sahni et al., 2008); in this project, video recordings of charismatic urban-school teachers are distributed on DVDs to rural and peri-urban schools and used as a tool to institute good teaching practices in such places (through appropriate external mentorship and guidance). Like in the Digital StudyHall project, our goal here is teacher improvement through video, although our approach is radically different. Whether or not teachers benefit more from watching themselves on video (and subsequent mentor critiques, when available) or watching other teachers and learning from them is an interesting research question and the trade-offs between the two approaches are perhaps worth investigating in the future.

## 3. THE STUDY

### 3.1 Sample Information

Our research was conducted with 4 teachers at a municipal school in Pune, India. The school is in its third year and is one of the very few schools in India set up under a public-private partnership scheme. The basic infrastructure and student enrolment is managed by the Pune municipality, while the staff is provided and trained by a private organization. There are 16 full time Teachers and the students – 250 in number – come from slum communities across the city of Pune. Classes run from third grade to seventh grade and there are at least 25 and at most 30 students in every classroom (two classrooms per grade). The medium of instruction is English, although the Indian languages Hindi and Marathi are also taught.

The selection of teachers for the study was not random, but determined jointly by the researchers and the principal of the school based on various parameters including, in particular, availability of the teachers and the perceived need to receive external feedback. Out of the 4 teachers, 2 are teachers of English (at grades 5 and 6), one teaches Science to grade 4 and one teaches Mathematics to grade 7.

The demographics of the teachers are as follows. Three teachers are female, and one teacher (the Science teacher) male. The female teachers each have at least 3 years of teaching experience, including at least 2 years at the intervention school. The male teacher is the least experienced with less than 3 months of teaching experience at the time of intervention, although he has 4 years of corporate banking experience prior to his job as a teacher. One of the female teachers has taught at the university level

for 2 years and gained some experience in software testing, prior to her engagement as a K-12 teacher.

Since some of the feedback procedures required classroom observations, we identified two senior teachers at the school to play the role of observers. One observer is the head of the English department at the school and is responsible for giving feedback to the English teachers on a fortnightly basis under normal circumstances. During the study, she observed only the English teachers in our sample. The other observer is the vice principal of the school and is responsible for observing Maths and Science classes normally (again, on a fortnightly basis); during the study, she observed the other two teachers in our sample. The English observer holds a masters degree in Computer Applications and is currently pursuing a masters degree in Education at a deemed university; she has 3 years of teaching experience. The other observer holds a masters degree in Science and has seven years of teaching experience at 3 different schools.

### 3.2 Feedback Protocols

We implemented three simple feedback protocols for teachers as part of our research study.

**H** – Human (Observer) only feedback. In this protocol, the teacher is first observed by the observer during class. Within 48 hours, the observer gives feedback to the teacher. Feedback session is an open-ended conversation between the teacher and the observer, and lasts as long as the two mutually desire.

**V** – Video-only feedback (or video-based self-assessment). Here, the teacher is filmed in the class by a camera-person using a single camera[1]. After class, the teacher is provided a copy of the class video, along with a *reflection sheet*, described below. The teacher views the video, and while (or after) doing so, completes the reflection sheet in writing.

**HV** – A combination of human-driven and video-driven feedback. Here, the teacher is observed by the observer in the class, and *simultaneously* filmed by a camera-person[2]. The observer and the teacher are each provided a copy of the video of the class. The teacher is also provided a reflection sheet. The teacher completes the reflection sheet as in the case of **V** and then the observer provides feedback within 48 hours of the class. Feedback session is similar to that of **H**, except that observer can utilize the video during the conversation.

The *reflection sheet* given to the teachers (in the case of **V** and **HV**) was a critical component of our intervention. The goal was to assist teachers in phrasing their thoughts as they self-view themselves on video, in written form. Such written expression of thoughts has been used in prior work on video-based assessment other contexts and has been argued to be more effective than simple mental note-taking and subsequent recall (Yoo et al., 2009). In the literature on video-based self-assessment *for K-12 teachers*, we do not know of any precedent that formalizes the reflection process in written form, as we do here (although such forms seem to have been used to conduct classroom observations by some organizations like Teach for America in the US).

Our reflection sheet was a paper form that consisted of three sections. The first section was an open-ended question, requiring teachers to fill out two columns – one with items they liked about their class, and the other with items they did *not* like about their class. The second section was a *tally table*, which listed multiple measures associated with a teachers' conduct in the classroom, namely (a) number of discipline enforcing commands issued by the teacher, (b) number of negative reinforcements used by the teacher, (c) number of positive reinforcements used by the teacher, (d) number of instances in which the teacher's speech was unclear or incoherent, and (e) number of instances in which the teacher ignored a student's question or request. Teachers were required to measure these quantities for their classes (using tally marks) and fill out the space next to each measure as listed in the tally table. There was space provided to teachers to design their own measures (and to measure the same for their videos) if they deemed it fit.

The third section in the reflection sheet was a *ratings table*, which listed different aspects of the teaching activity, namely (a) preparation and planning, (b) communication of instructions and setting of deadlines, (c) ability to handle transitions without wasting time, (d) ability to handle disruptive behaviour, (e) sensitivity in response to error and difficulty, (f) use of blackboard, (g) use of other tools, if used, (h) voice – appropriate pace, pitch and clarity, and (i) overall confidence and clarity in conducting the class. Teachers were required to rate themselves on a scale of 5 on each of these dimensions of their behaviour in class.

### 3.3 Method

The study was conducted over a period of 4 weeks. Each teacher was scheduled to participate in one session of each feedback protocol, roughly one session a week. The order of the feedback sessions varied across the teachers. In the first week, all teachers received observer-only feedback **H** (which coincided with normal practice at the school with

[1] It is naturally difficult to capture all events that take place inside a classroom using a single regular camera, so we paid more attention to teacher actions (as opposed to student actions) in our videos. The use of multiple cameras or wide-angle lenses was avoided in order to minimize cost of the intervention.

[2] An alternate way to execute this protocol would be to have the observer watch the classroom video (anytime after the class is over) rather than observe the class directly. This approach has the advantage that observations can be conducted based on the observers' discretion and availability, although it suffers from the limitation that video capture of classroom actions is lossy in nature.

respect to giving feedback). In the remaining 3 weeks, each teacher received the other types of feedback, three teachers receiving **HV** before **V**, and one receiving **V** before **HV**. The feedback schedule (which included class observations, filming sessions, video-based reflection sessions and observer-driven feedback sessions) was prepared ahead of time, keeping in mind the regular school schedule of all the teachers and observers. Observations and filming processes happened during regular classes. Each teacher and each observer was aware of the feedback schedule ahead of time.

Data was collected in two forms. Each teacher filled out a paper-based questionnaire after every feedback session and each observer did the same (for a different questionnaire). Additionally, teachers filled out a questionnaire after every video-based reflection session they participated in. At the end of the 4-week period, all teachers and observers were administered a semi-structured interview through which we gauged their comparative attitudes towards all the treatments.

## 4. RESULTS

### 4.1 Perceived Effectiveness of Protocols

Quite expectedly, teachers expressed a strong preference for the **HV** feedback protocols, which had elements had both the other protocols we used. When asked to provide a strict ranking to all protocols in terms of their perceived effectiveness, 3 out of 4 teachers placed **HV** at the top; the fourth one ranked **V** in the first place and followed it with **HV**. Both observers had similar perceptions – **HV** was the most effective protocol, according to them. One observer stated that **HV** is effective *assuming* it is teacher-initiated and observer-mediated; otherwise, it is better to eliminate the reflection step in the protocol, thus making it logistically almost as easy as **H**.

Interestingly, all but one teacher placed the video-only protocol (**V**) above the observer-only protocol (**H**). Even the teacher who placed **H** above **V** (the sole male teacher in our sample) stated that in terms of the "amount" of learning extracted from the feedback process, **V** was better since it enabled the teacher to track and analyze fine details of the class like the time spent on individual activities. The primary reason teachers gave for their preference of **V** over **H** was that video afforded them flexible and neutral feedback on their classroom activities – teachers could watch their videos and conduct reflection at home and in school, they could pause and rewind the video for reinforcement, and feedback did not involve coordination with a human mentor.

Despite their general preference for video-only feedback, at least three teachers reported that the feedback that a human renders cannot be substituted for by video technology. According to them, a human observer provides certain "subjective" inputs which are not easy to obtain only by video-aided reflection**.** The male teacher in our sample, who was also the least experienced, was most emphatic in voicing this perception towards video. In his words:

> *Their [the observers'] feedback helps improve lessons. A video does not tell you how to go about a situation. [My observer] could clearly tell me where I was going wrong, where I needed to improve methodology, demeanour. She could tell me exactly which areas I failed to observe... A video can tell you what went wrong but cannot provide a solution to it.*

It is plausible that some of the optimism for video-only feedback we observed in the teachers' rankings was due to the novelty effect of using video as a feedback instrument. None but one of these teachers had been exposed to video-assisted feedback protocols prior to our research, and the only teacher who had been exposed to them, in fact, rated **H** above **V**. Whether the optimism around video-only self-assessment can be sustained over time will be evaluated in future work.

We remark that none of the teachers in our sample expressed any type of discomfort (even upon repeated questioning) in either watching themselves on video – as in the **V** and **HV** protocols – or in having their mentors watch them on video and use this to provide feedback – as in the **HV** protocol. This was a bit surprising given the hierarchical relationship between a mentor and a mentee and given that most of these teachers had never watched themselves on video prior to our intervention. It is unclear whether the perceptions of the teachers on this issue are generalizable or not, and is worth exploring with a larger sample in the future.

### 4.2 Video as a Reflection Tool

Based on the teachers' self reports, it appears that the biggest advantage of using video in any feedback process is that it facilitates reflection on their own actions in the classroom, and it does this differently from how a human mentor instigates reflection. For example, one teacher emphasized the flexibility in the video-only feedback process, compared to the observer-driven version:

> *Your video is always available with you. You are free to watch it when you want.*

Teachers reported several benefits of using video as a reflection instrument in the feedback process, and these benefits fell into two broad categories: (a) video exposes fine details about the class which a human observer may miss; and (b) video reveals details about the exact *time* spent by the teacher on different activities, and thus, aids in time management for future classes. While implementing both **V** and **HV**, teachers reported to have uncovered numerous events which they noticed in their videos, but which had gone completely unnoticed by them during class. Some

reported about incidents which even their observers had not noticed.

> *Vinayak was raising his hand but I did not notice it then. [He] got so angry that he slept off! Next time it happened, I gave him the opportunity to answer. He had a wonderful observation. Even --my observer-- did not notice it [Vinayak sleeping off].*

Three teachers explicitly said that video helps them analyze the amount of *time* they spend in different components of the class, particularly, the time spent in stating the lesson objective and that spent in assessing the amount learnt from the previous class. As one teacher told us:

> *The time factor was the biggest thing for me. I found a big difference in time used by the class to complete the 'Do now' [activity] and time taken by me to give instructions. I never realized I spend so much time on the 'Do now'.*

There were two teachers who said that through at least one of their classroom videos they were able to discover conceptual mistakes made by them in class, which they reportedly rectified subsequently.

Teachers' eagerness to use video for self-assessment seemed to grow during the study. Three out of the 4 teachers took the initiative to ask for a copy of their classroom video on the second occasion of being filmed whereas none did this on the first occasion. At the same time, other staff in the school (outside of the experiment) grew interested in video-only feedback once it had been introduced in the school: 3 of the other 8 teachers asked to be filmed in their classes and viewed the video on their own.

All 4 teachers expressed a preference for viewing the video by itself, as opposed to filling out a reflection sheet alongside and they explained this preference based on constraints in their schedules. We noticed that teachers wrote more in their reflection sheets in the **HV** protocol than in **V**; one possible explanation is that they knew there would be subsequent discussion about the class with the observer, which induced them to be more diligent about reflection. Two teachers did acknowledge that the reflection sheet, in particular the *tally table*, made them realize something new about their teaching style (in particular, issues like incoherence of speech, ignorance towards student responses, and lack of clarity in instructions) which they would have otherwise not noticed. One teacher stated that the tally table could be beneficial in identifying repeated behavioural mistakes (across different teaching sessions), which could later be corrected with the help a human mentor.

### 4.2 Video as a Reflection Tool

The other major benefit of using video was that it helped enrich the traditional human-driven feedback process in several ways: we recorded several instances in which video helped either the observer or the teacher in the **HV** protocol. At a high level, there were two benefits that teachers and observers derived from the presence of the video: (a) the video helped observers express their oral feedback better; (b) the video helped teachers become more receptive to the oral feedback given by the observer. As one observer put it,

> *Although the video did not alter what I wanted to tell the teacher in the feedback process, it helped me fine-tune as well as add/modify my suggestions to the teacher.*

The observer reported that having the teacher reflect on the video prior to the feedback session (**HV**) made him/her more receptive to feedback, as compared with his/her receptiveness in ordinary feedback sessions. The same observer also said that in one of the feedback sessions, the video helped her "cut down" on her own comments, and demonstrate part of what she wanted to say through the video[3]. The other observer stated that the video helped her express her feedback better by enabling the teacher to easily recall instances of the class she referred to.

The observers' interest and eagerness to use the classroom video during feedback sessions was noticeable: prior to every **HV** feedback session (except one, for which there was a serious time constraint), observers viewed the entire video, *even though they were not required to do so* by the protocol. Both observers later said they would rather view the video of the class than make a direct observation, *provided* the video captured sufficiently many classroom events. Both observers and at least one teacher also complained that the videos shot by us did not include enough information about student actions which made it difficult to rely only on the videos to build a complete understanding of classroom events.

From the teachers' perspective, the video served as a neutral third party in the feedback process which helped substantiate their observers' comments and criticisms. Some teachers explicitly stated that video was useful in resolving conflicts between them and their observers. One teacher recounted an episode from a feedback session:

> *Earlier, my observer would tell me that Harshad is too fidgety in class, but I did not believe her. Then, she showed me using the video. I saw that as long as I*

[3] An analysis of the video recordings of the feedback sessions did not reveal a consistent pattern in terms of the fraction of time observers spend talking in feedback sessions, with video (**HV**) vs. without video (**H**). However, in one case (for the observer under consideration), we did notice a drastic difference between talking times with/without the video: in the **H** feedback session, the observer spoke for at least 50% of the time, whereas in a subsequent **HV** feedback session (with the same teacher), the observer spoke for only 20% of the time.

> *had my eyes on him, he would behave; but the moment I looked somewhere else, he started fidgeting. That is the thing about video – it is a clear proof of everything that happened in your class. And the best part is one can 'time' every event carefully. In my case, we found periods of up to 3 minutes when Harshad was being fidgety, and I was totally unaware.*

The teacher reportedly tried to address the needs of this particular student in subsequent classes by engaging him in more "kinesthetic tasks".

In terms of the content of the feedback sessions, the issue of "time management" came up repeatedly in all feedback sessions that utilized video. Observers constantly used the classroom video to demonstrate to teachers their disproportionate expenditure of time on different portions of the class, and teachers were visibly surprised to view such examples illustrated to them by their observers.

### 4.4 Potential long-term benefit of video

Three out of four teachers stated that an advantage of using video in the feedback process is that it can reduce the frequency of human observations that are needed for teacher improvement: video-aided self-assessment can be used whenever a human is not available. One teacher explicitly said:

> *When you have less resources and human feedback is not available, video-based feedback should be used.*

One teacher stated that an ideal feedback system would be one where the teacher does video-based self-assessments every alternate week, and in between every two such assessments, s/he receives feedback using a combination of video and human observation. Another teacher felt that when being initiated into the profession, teachers should receive both human and video-based feedbacks, but in the long run, video-aided self-assessment – with occasional human intervention – should suffice. For the human intervention, the teacher said that the reflection sheet filled by the teacher could be used to identify aspects for which feedback was most needed.

### 4.5 Cost of video-assisted feedback

Using video to give feedback to teachers (using either self-assessment or observer-assessment) clearly adds cost to the feedback process. While teachers reported **HV** to be the most effective feedback protocol, they also consistently stated that it took the maximum effort to implement. This was expected since by its very design, **HV** necessitates teachers to spend more time and effort than the other methods. **V** required less effort but it lacked interaction with an observer which almost every teacher sought for satisfactory feedback.

In the short-run, both **HV** and **V** protocols are more expensive to implement than **H** (since they all involve investment in filming equipment), although given teacher – and hence observer – salaries in places like India, any type of video-assisted feedback is likely to be more expensive to implement than direct-observation based feedback. (Even by using very optimistic estimates for observer salaries and feedback frequency in a year and assuming sufficient sharing of camera equipment (e.g., single camera covers 40 teachers in a week without use of a dedicated camera person), we found that it can take up to 2 years for the cost of observer-only feedback to match up to the cost of video-only feedback.) Whether the added cost of all these protocols can be made up for by the benefit derivable from them is a question that requires more longitudinal research and is beyond the scope of the current paper.

## 5. CONCLUSION

This paper reports results from a preliminary study of the value of using video-assisted feedback for improving instructional quality in K-12 schools in India. Our focus till now has been primarily on understanding teacher attitudes towards different feedback instruments; measuring and comparing the impact of these feedback instruments on student outcomes is a much more intricate question, and is left open by this work.

Based on the outcomes of this study, it is clear that video – as a feedback instrument – affords multiple benefits to teachers in K-12 schools, which are difficult to achieve using a human-only protocol for feedback. Video is useful both as a tool for reflecting on classroom behaviour, as well as an aid in conducting human-driven feedback sessions. Given these benefits, it is plausible that video can be used to reduce resource demands on a human-driven feedback system (as also suggested by our research subjects), although providing a definite answer to this question requires further investigation.

It is important to remember that the benefits of video-assisted feedback come at a cost (in particular, the monetary cost of filming equipment) and our results do not establish that these benefits are compensable by the cost that is incurred. Studying this question will involve measuring the reported benefits of video-assisted feedback more quantitatively which is an issue we have not yet been able to resolve completely in our work with teachers.

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