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REVIEW

Is video review of patient encounters an effective tool for medical student learning? A review of the literature

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Purpose: To determine if video review of student performance during patient encounters is an effective tool for medical student learning.

Methods: Multiple bibliographic databases that include medical, general health care, education, psychology, and behavioral science literature were searched for the following terms: medical students, medical education, undergraduate medical education, education, self-assessment, self-evaluation, self-appraisal, feedback, videotape, video recording, televised, and DVD. The authors examined all abstracts resulting from this search and reviewed the full text of the relevant articles as well as additional articles identified in the reference lists of the relevant articles. Studies were classified by year of student (preclinical or clinical) and study design (controlled or non-controlled).

Results: A total of 67 articles met the final search criteria and were fully reviewed. Most studies were non-controlled and performed in the clinical years. Although the studies were quite variable in quality, design, and outcomes, in general video recording of performance and subsequent review by students with expert feedback had positive outcomes in improving feedback and ultimate performance. Video review with self-assessment alone was not found to be generally effective, but when linked with expert feedback it was superior to traditional feedback alone.

Conclusion: There are many methods for integrating effective use of video-captured performance into a program of learning. We recommend combining student self-assessment with feedback from faculty or other trained individuals for maximum effectiveness. We also recommend additional research in this area.

Keywords: feedback tools, self-assessment of performance, self-directed learning with feedback, feedback and self-assessment, video review of performance with feedback

Introduction

There is a significant body of literature providing evidence that feedback is critical to effective learning.[1–3] There is also significant evidence to support how, who, where, and when feedback should be provided,[4–6] as well as different models of feedback.[6,7] This is especially critical for formative feedback (designed to help learners improve performance)[2] versus summative feedback (informing learners, often through a grade, to show what learning objectives have been achieved).[8]

More recent research strategies related to feedback and learning build upon previous theories and reveal increasingly complex approaches to considering and giving feedback. Studies link feedback with motivation,[9] perception/self-esteem ("face threat"),[10] perceptions and attitudes,[11] and self-reflection.[12] Researchers are also gathering evidence to support the notion that formative feedback can help students

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guide their own learning,[13] something they will need to be able to do if they are to be effective self-directed learners in their professional lives.

Formative feedback can be given to learners in "real time" or subsequent to testing/observation at a scheduled time. Sometimes the faculty member will review a test performance by going over test questions with the learner, providing more information than just a score. For performance-based feedback (eg, how the learner performed conducting an interview), video review has proven to be an excellent feedback resource since the 1960s.[14] The use of video makes feedback unique because it allows the learner to look at him/herself "from the outside," thereby giving them a realistic perspective of their skills in context(s).[15,16] Multiple dimensions of performance can be reviewed or assessed such as content (what is said), tone (how it is said), and non-verbal (body) language (eg, eye contact, body posture).[17] Using video as a feedback tool also precludes disagreement between the instructor and the learner over whether a particular behavior did or did not occur.

The literature linking formative assessment (feedback) with self-assessment has a lengthy history[18] – some even believe that one of the primary goals of formative feedback is to help learners become more effective self-assessors[19,20] and self-regulated learners.[5] More and more, educators believe that formative feedback from the instructor, to be most effective, should be accompanied by self- and/or peer-assessment.[2] There is also evidence that self-assessment can significantly enhance learning.[21] While it is well understood that not all learners (or professionals, for that matter) are effective self-assessors,[22,23] it also known that self-assessment is a skill that can be taught in a cycle of self-regulated learning that includes feedback from external sources.[24,25]

When video feedback first gained popularity, its primary value was felt to be the opportunity for "self-confrontation," and so learners often viewed their performance in isolation.[26] Over time, however, video feedback has come to be viewed as more effective when combined with other forms of feedback or instruction, such as examples of desired behaviors or role modeling,[27,28] or discussion between instructor and learner.[29] One study also reported that specifically understanding the expected behaviors (eg, a standard form to use when viewing performance) yielded considerably greater learning outcomes.[26] This form with specific behaviors constitutes a list of criteria by which learners can self-assess their performance. Without specific guidance, they might not see what they missed ("you don't know what you don't know"), or focus on some behavior that is irrelevant or inconsequential. Video can also provide concrete evidence of behaviors that might need improvement – since "the camera does not lie."[16]

Called by some "the gold standard of communication teaching,"[30] video feedback is now common in many professional higher education programs such as education, psychology, social work, nursing, and medicine. As technology for digitally capturing clinical performance has advanced dramatically in the last several decades, more studies involving video, feedback, self-assessment, and learning have been conducted in medical student education over the years. In this review article, we sought – through a structured and comprehensive analysis of the medical education literature – to answer the question: "Is video review of patient encounters an effective tool for medical student learning?"

Methods

Two of the authors (professional librarians [JL, ME]) searched multiple bibliographic databases to cover medical, general health care, education (general and medical), psychology, and behavioral science literature. A total of 19 databases were searched: Academic Search™ Premiere (1975–), AgeLine® (1978–), Applied Social Sciences Index and Abstracts (1987–), CINAHL® (1982–), Communication and Mass Media Complete™ (1915–), Computer and Information Systems Abstracts (1981–), ERIC (1966–), Education Full Text (1983–), Education Index Retro (1929–), Health Source®: Nursing/Academic Edition (1952–), Professional Development Collection™ (1930–), Psychology and Behavioral Sciences Collection™ (1930–), PsycINFO® (1887–), PubMed/MEDLINE® (late 1940s–), Sociological Abstracts (1952–), Sociological Collection™ (1975–), SPORTDiscus™ with Full Text (1930–), Teacher Reference Center (1984–), and Web of Science™ (1864–).

All searching was completed by September 19, 2011. Key search terms included: medical students, medical education, undergraduate medical education, education, self-assessment, self-evaluation, self-appraisal, feedback, videotape, video recording, televised, and DVD. Relevant terms from controlled vocabularies were used where available, such as MeSH (Medical Subject Headings) for PubMed, ERIC Thesaurus terms, and CINAHL Headings. Otherwise, combinations of textwords (ie, keywords) were used and supplemented with search features such as truncation. In addition, JL and ME examined the reference lists of the selected studies and review articles to identify any additional relevant articles.

A sample search for PubMed was:

(Students, Medical[mh] OR "medical students"[tiab] OR "Education, Medical, Undergraduate"[mh] OR "undergraduate medical education"[tiab]) AND (Videotape Recording[mh] OR Videotap*[tiab] OR DVD[tiab]) AND (Self-Evaluation Programs[mh] OR Self-Assessment[mh] OR "self assessment"[tiab] OR Self Efficacy[mh] OR Self Concept[mh] OR "self evaluation"[tiab]) AND English[la]

Selection criteria included limiting to English language literature, medical students (excluding residents, practicing physicians, and other health care professional students), the use of videotaping to record student–patient clinical interactions, and student viewing of his/her own videotape with particular focus on self-assessment as part of the feedback procedure. Videotape review by non-student independent raters was excluded unless students were also allowed to view the videotapes. Both group (peer) and individualized student viewing were included.

All initial abstracts were reviewed and duplicates were eliminated. Review articles were set aside for later examination of their reference lists. Abstracts that met the selection criteria (above) were brought to the full group of authors for a committee review. Citations that did not contain enough information to reach a clear decision regarding inclusion or exclusion without viewing the full-text were also sent to the full group for review. The full-text articles of the remaining citations were obtained, read, and discussed in a full committee review by all authors. Based on the complete article text, more citations were identified as not meeting selection criteria and were eliminated. The remaining articles were divided among three of the authors (MH, HM, CW) for detailed review. In addition, two of the authors (JL, ME) examined the reference lists of the selected studies and identified any additional relevant articles, which were subjected to a secondary review. Relevant studies identified were reviewed by the entire committee.

Results

The initial searches yielded a total of 1023 abstracts, of which only 156 met the selection criteria (above). Another 69 duplicates were removed, leaving a total of 87 abstracts. The discussion of the entire committee eliminated another ten abstracts that did not meet selection criteria; seven were identified as review articles. All authors reviewed the full-text of the remaining 70 citations; 19 more citations were eliminated as not meeting selection criteria. Examination of the reference lists of the 52 selected studies and seven review articles yielded 16 more citations, resulting in 67 articles that were completely reviewed in detail (Figure 1).

Of the 67 total studies that we examined in this review, there were 20 descriptive studies that described programs that used video technology in medical education, and 47 evaluative studies that specified quantitative outcomes. The first of these studies was published in 1968, and in the following four decades multiple studies from over 14 countries have been published. Many of the earlier studies used videos purely for summative purposes alone.[31–35] In these studies, students were videotaped performing a patient interview, and then scored for specific interviewing criteria. Students were either given the option of reviewing their own videos independently, or the videos were reviewed in groups and individual settings with faculty discussion and feedback. The idea of using video to improve self-assessment has been widely described in many descriptive studies.[36–41] Many of the descriptive studies also examined student satisfaction with using video review, and reported high student satisfaction rates with their programs.[42–45]

Among the evaluative studies, 17 were conducted in the preclinical years and 30 studies were conducted in the clinical years. There was great diversity in study design, number of students, type of encounter videotaped, and outcomes evaluated. The outcomes studied were student self-assessment, student satisfaction, feedback, faculty assessment, other assessment (often a simulated patient), and peer assessment. Most of the studies focused on communication skills, but some also looked at physical examination skills. A few studies examined technical skills such as wound closure and foley catheter placement,[46] and laryngoscopy.[47]

Twelve of the 17 studies on preclinical students reported their outcomes on the use of video without the use of a control group (Table 1). All but three of these twelve studies reported that video review was a useful learning aid. The outcome that was evaluated in the majority of these studies was student interviewing skills which improved after video review.[48–52] One study showed that student satisfaction with video review was initially very low, but improved tremendously after faculty education and development.[53] Two out of the three studies that reported that video was not helpful specifically looked at self-assessment skills. Medical students struggled with self-assessment, even with the aid of a video review of their performance. One study looked at students learning adult Basic Life Support skills, and the authors reported that even after video review, the students were not able to improve their self-assessment accuracy.[54]

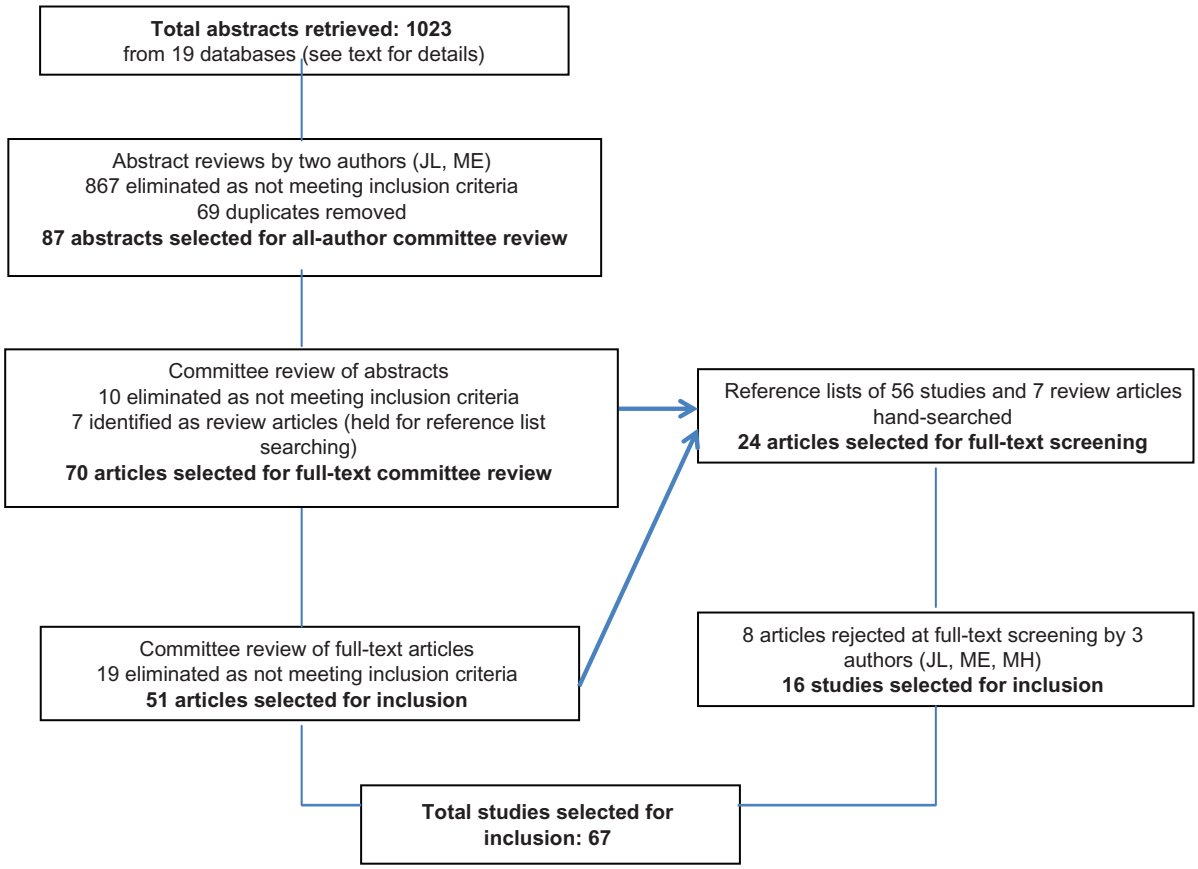

Figure 1 Flow chart of the selection process for publications inclusion and exclusion.

An older study that examined self- and peer-assessment of physical exam skills found that the students did not improve in either after video review.[55] The authors of this study postulated that perhaps students in their preclinical years had not yet developed the cognitive ability to perform self- and peer-assessments, given their lack of experience in these skill areas.

Five of the 17 studies on preclinical students had a control group that was evaluated in comparison to a group that had the videotaped interaction (Table 2). All five of these studies reported that the video was a positive learning aid; four found that faculty feedback with use of the video was superior to traditional faculty feedback (without video review).[56–59] One study examined how a video with a running commentary provided by a faculty member compared with face-to-face feedback.[60] This study demonstrated that students rated their satisfaction levels equally with video commentary compared to face-to-face feedback. This study also looked at student satisfaction with reviewing the video on their own, and reported that students had higher satisfaction rates with faculty review, either face-to-face, or with the running commentary on the video.

Sixteen of the 30 studies performed with clinical medical students reported their outcomes without the use of a control group (Table 3). Fourteen out of these 16 studies reported that video review was a useful learning aid. Many of these studies reported high student satisfaction with video review.[61–65] Two studies also reported an improvement in interviewing skills after video review and feedback.[33,66] There were also studies that reported improvements of interviewing and physical exam skills after introduction of a curriculum that included video review, but also included other educational interventions that were not examined separately.[67–69] Most of the studies videotaped students performing communication and/or physical exam skills, but one study videotaped students performing laryngoscopy, and reported that self-assessment skills improved after reviewing their video.[47] Of the two studies that reported that video was not helpful, one found that student satisfaction was higher with feedback from a standardized patient than with private review of the video themselves.[63] Of note, there was no specific feedback given to the student about their video. The other study that reported that video was not helpful was a smaller, older study that reported that four students

Table 1 Non-controlled studies during the pre-clinical years

Author	Year	N	Type of encounter			Video review setting		Outcome studied						Findings	Video helpful	
			CS	PE	TS	I	G	SA	S	FB	FA	OA	PA		Yes	No
Calhoun[55]	1988	187		X				X	X				X	Video review demonstrated that students not very good at self and peer assessment		X
Cassata[53]	1976	48	X				X		X					Student satisfaction initially very low, however improved after faculty education		X
Farnill[52]	1997	60	X				X	X	X			X		Improved student confidence and improved interview skills	X	
Farnill[90]	1997	60	X				X			X	X	X	X	Students improved interview performance after video review	X	
Hoppe[48]	1988	30	X				X	X		X				Interviewing skills improved	X	
Hulsman[49]	2009	304	X				X	X	X				X	Interviewing skills improved. Self-assessment not improved	X	
Kneebone[46]	2002	51	X		X	X		X	X	X		X		Students perceived video review as very helpful for improving wound closure and foley catheter placement skills	X	
Rudy[91]	2001	82	X				X	X			X		X	Used video review to compare self-assessment, peer assessment and faculty assessment	X	
Terasaki[50]	1984	32	X			X				X	X			Compared interviews before and after video feedback	X	
Vnuk[54]	2006	95	X		X	X		X						Self-assessment skills did not improve after video review		X
Werner[51]	1974	87	X				X				X			Students improved interview performance after video review	X	
Zick[92]	2007	674	X			X		X						Enabled students to give open ended self-assessment of their own videos	X	

Abbreviations: N, number of students; CS, communication skills; PE, physical exam; TS, technical skills; I, individual; G, group; SA, self-assessment; S, satisfaction; FB, feedback; FA, faculty assessment; OA, other assessment; PA, peer assessment.

Table 2 Controlled studies during the pre-clinical years

Author	Year	N	Type of encounter			Video review setting		Outcome studied						Findings	Video helpful	
			CS	PE	TS	I	G	SA	S	FB	FA	OA	PA		Yes	No
Davis[56]	1981	29	X				X			X				Feedback with video better than traditional feedback	X	
Kirby[60]	1983	32	X			X			X					Students rated video with running commentary as effective as face-to-face feedback	X	
Moreland[57]	1973	24	X				X				X			Feedback with video better than traditional feedback	X	
Ozcakar[58]	2009	52	X	X		X		X		X				Feedback with video better than traditional feedback	X	
Shavit[59]	2010	71			X		X	X			X		X	Feedback with video better than traditional feedback	X	

Abbreviations: N, number of students; CS, communication skills; PE, physical exam; TS, technical skills; I, individual; G, group; SA, self-assessment; S, satisfaction; FB, feedback; FA, faculty assessment; OA, other assessment; PA, peer assessment.

had difficulty identifying the hidden agenda in simulated interviews even after video review.[70]

Fourteen of the 30 studies performed with clinical medical students had a control group that was evaluated in comparison to a group that had the videotaped interaction (Table 4). Six of these studies looked specifically at video review with faculty feedback versus traditional faculty feedback, and all of them found video to be helpful.[71–76] One study compared video review with feedback versus audio review with feedback, and found the former to be superior.[77] Another study compared video review with feedback to a reading and observation curriculum, and found the video intervention to be superior.[78]

Data comparing outcomes after video review versus a traditional didactic curriculum were varied in the three controlled studies that examined this question. One study found that video review with feedback was superior when evaluating students' ability to disclose cancer diagnoses to simulated patients.[79] Another study compared alcohol intervention skills in students who had received a traditional didactic curriculum to students who had received the same traditional didactic curriculum as well as video review of an interview and feedback, and found that there was no difference between the two groups.[80] Similarly, another study reported that students receiving a didactic curriculum on interviewing skills did as well as students who had video review and feedback.[81] Both of these studies discussed that this was a surprising finding – they expected the students in the video review cohort to perform better than the didactic curriculum students. Several studies commented specifically on the importance of faculty development and education in order for the video review and feedback to be effective for the students.[53]

One controlled study looked at whether clinical students had improvement in their self-assessment skills after video review, and found an improvement.[82] Many of the clinical studies that did not include a control group showed a similar improvement in self-assessment after video review.[47,66,69] The earliest studies focused on faculty members providing feedback in conjunction with video review. Several studies reported that receiving feedback from a simulated patient was superior or equal to video review with a faculty member.[63,83]

Discussion

We know from research that formative feedback to students is an essential element of learning. Methods to provide the most effective feedback are constantly evolving, particularly

Table 3 Non-controlled studies during the clinical years

Author	Year	N	Type of encounter			Video review setting		Outcome studied						Findings	Video helpful	
			CS	PE	TS	I	G	SA	S	FB	FA	OA	PA		Yes	No
Del Mar[61]	1992	140	X				X		X				X	Students found video review and feedback helpful	X	
Ellison[62]	2008	42	X			X	X	X	X				X	Students found video review and feedback helpful. Self-assessment and peer assessment not analyzed	X	
Goldschmidt[93]	1987	20	X			X		X		X				Students found video review and feedback helpful	X	
Kardash[47]	1997	25			X	X		X						Self-assessment improved after video review	X	
Kraan[67]	1990	563	X				X						FA	Interviewing skills improved after 4 year curriculum that included video review	X	
Lane[66]	2004	60	X			X		X			X			Interviewing and self-assessment skills improved after video review	X	
Sharp[63]	1996	104	X			X		X	X		X	X		Student satisfaction higher with standardized patient instructor feedback compared to video review		X
Shepherd[64]	1984	67	X				X	X	X				X	Students found video review and feedback helpful	X	
Simek-Downing[68]	1986	64	X			X					X			Interviewing skills improved after clerkship curriculum that included video review	X	
Wagstaff[65]	1990	68	X			X		X	X		X			Students found video review and feedback helpful. Self-assessment and faculty assessment not examined	X	
White[69]	2009	42	X	X		X		X		X				Remediation involving video review, reflection and self- assessment resulted in improved performance	X	
Cushing[94]	1995	150	X				X		X					Students found video review and feedback helpful	X	
Menahem[70]	1987	4	X			X					X			Students had difficulty finding "hidden agenda" in simulated interviews, even with video review		X
Paul[95]	1998	27	X	X			X	X	X		X		X	Students found video review and feedback helpful. Other outcomes not examined	X	
Myung[96]	2010	NA	X	X		X			X					Students found video review and feedback helpful.	X	
Menahem[33]	1987	4	X	X		X					X			Interviews improved after video feedback	X	

Abbreviations: N, number of students; CS, communication skills; PE, physical exam; TS, technical skills; I, individual; G, group; SA, self-assessment; S, satisfaction; FB, feedback; FA, faculty assessment; OA, other assessment; PA, peer assessment.

Table 4 Controlled studies during the clinical years

Author	Year	N	Type of encounter			Video review setting		Outcome studied						Findings	Video helpful	
			CS	PE	TS	I	G	SA	S	FB	FA	OA	PA		Yes	No
Brown[71]	1980	62	X			X					X			Students performed better on interview after video feedback compared to traditional feedback	X	
Levenkron[83]	1987	128	X			X			X		X	X		Students rated simulated patient feedback superior to video feedback. Interviewing skills improved more after patient feedback more than video feedback		X
Maguire[77]	1978	48	X			X					X			Video superior to audio and paper feedback	X	
Mason[81]	1988	60	X			X		X			X			Didactic video as helpful as video review		X
Quirk[78]	1982	84	X			X					X			Interview skills improved after feedback with video compared to reading and observation	X	
Rutter[72]	1976	14	X			X					X			Video feedback superior to traditional feedback	X	
Scheidt[97]	1986	105	X	X		X		X			X			Video review with feedback superior to video review with self-assessment alone	X	
Schreier[73]	1981	52	X			X		X	X			X		Students found video review and feedback helpful	X	
Srinivasan[82]	2007	280	X	X		X		X			X			Self-assessment improved only if feedback given in conjunction with video review	X	
Stillman[75]	1977	64	X			X					X	X		Interview skills improved after feedback with video	X	
Stillman[74]	1976	36	X			X						X		Video feedback superior to traditional feedback	X	
Stone[76]	1989	16	X	X		X				X	X			Video with running commentary as effective as video review with faculty feedback	X	
Supiot[79]	2008	40	X			X				X	X			Video review with feedback superior to didactic curriculum alone	X	
Walsh[80]	1999	55	X				X				X			Video review and feedback not superior to didactic curriculum		X

Abbreviations: N, number of students; CS, communication skills; PE, physical exam; TS, technical skills; I, individual; G, group; SA, self-assessment; S, satisfaction; FB, feedback; FA, faculty assessment; OA, other assessment; PA, peer assessment.

for performance-based learning. The use of video as a tool for teaching and learning in medical education is appealing for many reasons cited above, and its use has progressed over time especially due to technological advancements that simplify the process. It has become much easier to record student performances and to share taped encounters with them for review. While most early studies focused on the video technology itself and students' attitudes towards its use, more recently the attention has been on actual improvement in performance based on the wide use of video in medical student education.

There are a few review articles focused on the use of videotape analysis as an instrument for learning, but the reviews are not systematic or comprehensive. Findings were generally positive, even if occasionally it was difficult to determine which of the studies were actually evidence-based (some had limited details). Pinsky and Wipf[84] cited a study[85] showing that retention was drastically and significantly more positive for "showing and telling" (reviewing and providing feedback) than for showing alone or telling alone. When videotape review was linked with self-assessment, improved self-awareness and improved skills were documented.[66,86] An older review by Hargie and Morrow[16] cited evidence in support of self-review as motivating, and as resulting in significant improvement in self-perception.[87] A comprehensive review of self-assessment in health professions education described studies with video review and self-assessment that were not necessarily consistent in terms of whether video review improved self-assessment accuracy.[88] Finally, a comprehensive review on teaching interviewing skills found that programs that incorporated structured feedback using videotape were more effective than those that utilized practice alone.[89]

Although our review of older and more recent literature was generally positive, a wide range of study designs, methods, and outcomes was described, which made it challenging to reach specific generalizations about results. Studies had a large range of number of students included – some were clinical, some were preclinical. A variety of methods for including video in teaching and learning were described. These included taping the encounter for student review in the form of self-assessment, peer review in groups of students, faculty review with the student, simulated patient review with the student, or a combination of some or all of these techniques. Also, different outcomes were measured. Some included student satisfaction and attitudes, some included self-assessment, some included performance measures on the actual encounter, and others looked at performance measures on subsequent encounters. It was evident that video review with self-assessment alone was not effective because learners do not necessarily know what they don't know. Guidance of some kind is necessary, whether it be feedback from peers and/or faculty (including standardized patients), a checklist of expected behaviors, or a "gold standard" performance against which students could measure their own performance.

While self-assessment is a critical skill for lifelong learning, it cannot be learned in a vacuum. Opportunities to self-assess in a cycle of goal-setting, external feedback, reflection, and adjustment must be integrated into learning opportunities. Students must understand why self-assessment is a key set of skills to master, and they must be given responsibility and accountability for teaching and learning to embed these skills into daily habits. E-portfolios are increasingly popular for these very reasons, especially when coupled with an opportunity for students to choose their "best" work (self-assessment), reflect on their development of knowledge and skills over time (reflection), and review this body of work with faculty mentors (external feedback).

Vital to this intentional integration of self-assessment into the curriculum is faculty development. To be most effective in providing feedback about performance and self-assessment accuracy, faculty must also possess a deep understanding of and commitment to helping students achieve self-assessment outcomes. Feedback to students must also be consistent, and based on specific program outcomes, to be most effective. Many faculty are committed to improving their own knowledge, skills, and attitudes related to teaching and learning, as evidenced by the growing number of professional development modules for faculty in medical schools (eg, weekly, year-long "medical education scholars" programs), as well the growing number of opportunities for health professionals to earn masters' degrees in medical education.

This is also important because faculty development can play a critical role in medical education research. We commented above on the wide variety of study designs and subjects that described some form of video capture; there was a wide variety of study quality as well. Faculty participating in formal education related to teaching and learning can make significant contributions to the quality of future studies focused on tools and methods for teaching and learning, including those studies using video as an effective tool for learning and feedback.

Table 5 Recommended steps for effective use of video-captured performance

1. Write and share specific learning objectives for video-captured performance, including self-assessment (use Bloom's and Simpson's taxonomies as a guide).[98]
2. Introduce students to video as a tool for learning (so method/technology does not impede performance).
3. Video-capture student's performance.
4. Give each student an opportunity to review and reflect on his/her performance against "gold standard" and learning objectives.
5. Student shares reflective self-assessment with (trained) expert, then receives feedback from expert – discuss similarities and differences between self- and expert-assessment.
6. Give each student subsequent opportunity to have performance captured on video, and to note improvements.

Conclusion

After conducting such an extensive literature review, we can summarize several key points. Although not always specifically measured, authors generally reported positive outcomes when video-captured performance was used as a tool for learning, for self-assessment, and for feedback. And, although there were multiple study designs, the use of video-captured performance can foster self-reflection and self-assessment, both of which are key to lifelong learning. Finally, although we identified many studies, this field would benefit from additional, rigorous investigation. Multi-institutional studies would add significantly to the literature in this field.

From the findings of the many studies we reviewed, we are also able to make a recommendation as to specific steps educators can take when constructing curricula and/or studies involving the use of video-captured performance (Table 5). The answer to the original research question appears to be that when programs involving video-captured performance are designed effectively, video can be a powerful tool for learning.

Disclosure

The authors report no conflicts of interest in this work.

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