Author’s response to reviews

Title: Video-based on-Ward Supervision for Final Year Medical Students

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Author’s response to reviews: see over
To
BMC Medical Education
Associate Editor Mrs Lauren Maggio
Mr Aldrin Ulep

17th April 2015


Dear Associate Editor Lauren Maggio,

Dear Mr. Aldrin Ulep,

Thank you very much for your email dated March 18th. We greatly appreciate the critical and helpful comments from the Editorial Board and the two reviewers. The comments have proven to be most valuable in revising the manuscript. Please find detailed responses to all points raised below. We would like to express our gratitude for giving us the opportunity of submitting a revised version of the manuscript BMC Med Educ 1503916828147615 entitled “An Innovative Model for Video-based on-Ward Supervision – A Descriptive Study”. We hope that the questions raised by the reviewers have been adequately addressed.

We appreciate you considering our article for publication and look forward to hearing from you soon.
Reviewer 1: Rachel Walker

Thank you for the opportunity to review this manuscript.

The authors of the paper provide interesting preliminary pilot data on an innovative three-way feedback model (supervisor, patient and student) to enhance final year medical student’s learning experiences in ‘real-life’ health settings. At the centre of this feedback loop is a video-recorded intervention undertaken by the student. This visual document provides a valuable tool for self-reflection, and when used in combination with the feedback loop, goes some way to address the theory to knowledge gap often associated with simulated learning. Hence with revision, its findings are likely to be of interest and importance to those involved in medical education.

However, I believe the manuscript requires major revisions to improve clarity of language and structure of the manuscript, particularly to the Methods, so that readers are able to obtain maximum benefit.

Thank you very much for your positive feedback. We highly appreciate the effort which you have invested in our manuscript. We have tried to integrate all of your suggestions (see answers to your comments below) and hope that the manuscript has substantially improved in this process.

Major compulsory revisions

1. Clarity of language

Comment 1:

The language is inelegant and verbose in places. Unfortunately, the
quality of written English is not yet suitable for publication unless extensively edited.

Thank you for addressing this point. In consequence, the manuscript has now been reviewed and extensively revised by a native speaker before resubmission.

Comment 2:

Avoid repetition. A better structured manuscript will assist with this.

Thank you for bringing this issue to our attention. Following your advice, we have now re-structured the manuscript in order to avoid repetition.

Comment 3:

Many of the section and sub-section titles are very long. Try to shorten these.

Thank you for pointing this out. As a result, we have shortened section- and sub-section-titles in the revised version of the manuscript, as presented below.

Page 13, line 4: “Students’ baseline-characteristics”

Page 8, line 16: “Supervisor’s field notes and video recording”

Page 13, line 11: “Quantitative assessment by students”

Page 10, line 10: “Qualitative assessment by students”

Page 11, line 4: “Quantitative assessment by patients”

Page 13, line 4: “Students’ baseline-characteristics”
Page 13, line 11: “Quantitative assessment by students”

Comment 4:

Ensure language used is in the past tense.

Thank you for highlighting this point. We have now ensured that the past tense is used in the revised manuscript.

2. Structure of the manuscript, particularly the Methods section.

Comment 1:

Each suggested section should be clearly identified. Consider having a separate Conceptual Framework section following Background and Aims.

- Suggested structure for the Methods section (guided by advice for authors provided by BMC Medical Education):
  - Design
  - Setting
  - Participants (inclusion/exclusion criteria)
  - Intervention (description of feedback loop)
  - Measures
  - Data collection
  - Analysis
  - Ethics
Thank you very much for your advice. We have changed the structure of the Methods section accordingly.

Minor essential revisions

Comment 1:

The title. Consider modifying the title to ensure the study population (final year medical student) is identified.

Thank you for bringing this to our attention. Accordingly, we have changed the title (see page 1) to:

“Video-based on-Ward Supervision for Final Year Medical Students”

Comment 2:

Abstract. The Methods section would benefit from being more specific. Refer to feedback outlined in the Methods section below. It would assist the reader if there was mention of the qualitative/quantitative analysis used.

Thank you for bringing this up. As a result, we have rewritten the abstract’s methods section following your suggestions (see page 2, line 9ff):

“Interviews were analyzed in a qualitative manner, using open coding to establish recurring themes and overarching categories in order to elucidate patients’ and students’ impressions. Data from questionnaires was analyzed in a descriptive quantitative manner.”

Comment 3:

Introduction. Consider defining ‘clerkship’ for the benefit of an international readership. A brief description of the current medical
education context in Heidelberg/Baden-Württemberg would benefit an international readership.

Thank you very much for this critical comment. We have now replaced the term ‘clerkship’ through the term ‘final year’ of medical education. Furthermore, we have explained the aims and objectives of this particular phase during medical education, which is similar in the whole country regardless of state and city (see page 4):

“In Germany, the final year of medical education comprises three four-month clerkships in medical specialties, namely internal medicine, surgery and a third elective subject, serving the integration of final year medical students into their future working environment. Final year students are expected to assist medical doctors with their daily routines on-ward. Thus, learning to admit patients, handle medical cases, manage ward rounds and perform routine procedures, like IV cannulation, drawing blood, or writing ECGs. Regarding these ambitious educational objectives, workplace learning seems to represent the most challenging facet of undergraduate education.”

Comment 4:
Consider moving the Conceptual Framework for the study (paragraph 2) to a separate section as described in feedback below.

Thank you for pointing this out. We have moved the excerpt ‘Conceptual Framework’ to a separate section in the manuscript (see page 5, line 18ff).

Comment 5:
Aims. Consider giving this section its own heading.

Thank you for your advice. As suggested, we have now given this section its
Comment 6:

Generally, pilot studies are not suitable for hypothesis testing (Leon et al. 2011). However, they are useful in evaluating the feasibility of an intervention as a pre-requisite strategy for a larger study. Feasibility criteria should therefore be the aims of your study. For example, you could say that while your overall aim is to develop and establish a video-based on-ward supervision model, the aims of this study are to 1) evaluate the feasibility and acceptability of the study via the assessment of process, resources, management and scientific factors; 2) obtain pilot data to enable appropriate sample size calculations and refine the protocol for a larger study and; 3) assess whether video-based on-ward supervision holds promise for better prepared medical students.

Thank you for bringing up this critical point. When setting up the study, feasibility criteria were our primary aim. Accordingly, we have now rewritten the corresponding section to ensure that this point is clear in the revised version of the manuscript (see page 5, Line 11ff):

"While the overall aim was to develop and establish a video-based on-ward supervision model, the aims of this study were to (1) evaluate the feasibility and acceptability of video-based on-ward supervision via the assessment of process, resources, management, and scientific factors, (2) obtain pilot data to enable appropriate sample size calculations and to refine the protocol for a larger study, and (3) assess whether video-based on-ward supervision is perceived beneficial by participating final year students."
Comment 7:

Conceptual Framework. Consider giving this section its own heading.

Thank you for your advice. To improve the clarity of the manuscript, we have now given this section its own heading (see page 5, line 18ff):

“Conceptual framework”

Comment 8:

Providing a rationale of Ericsson’s model of deliberate practice and feedback would strengthen this section and benefit the reader.

Thank you very much for this important remark, which has also been highlighted by the second reviewer. Accordingly, we have now changed the passage to read as presented below (see page 5, lines 19):

“Ericsson’s model of deliberate practice served as the conceptual framework for this approach. In this concept, Ericsson characterized training as a highly structured activity, directed at the improvement of performance in a particular domain. Therefore, deliberate practice can be understood as a focused approach to training, aimed at reaching a well-defined goal. Practical implementation of this construct is based on several design principles, one of which is specific, informative feedback, which can ultimately lead to more sustainable behavior modification. Video-based feedback can thus be seen as a training element to achieve certain goals.”

Comment 9:

Methods. Development of the video-based on-ward supervision model - Consider moving this section to Study Design.

Thank you for bringing this to our attention. Accordingly, we moved this
section to the segment ‘Study Design’.

Comment 10:

The title is quite long. Would you consider shortening it?

Thank you for your comment. We have shortened the title, but have also included "Final Year Medical Students“, as suggested above. Therefore, the new title reads:

“Video-based on-Ward Supervision for Final Year Medical Students”

Comment 11:

Sentence 1 – Meaning unclear. Consider the following suggestion.

Thank you very much for this suggestion, which aptly reflects what, was hoped to be expressed. We have now changed the sentence accordingly to read (page 6, line 9ff):

“Following on from a previously published on-ward supervision program an innovative model was developed by an expert team (CN, JG, TB, JS, AK).”

Comment 12:

Study Design. The mixed-method approach should be outlined, particularly your use of Grounded Theory to analyse the qualitative data from the semi-structured interviews.

Thank you for this comment. We have now outlined the mixed-method approach including a suitable reference (see 6, line 4f):

“involving the systematic integration of quantitative and qualitative methods for purposes of obtaining a fuller picture”
Furthermore, we have explained our Grounded Theory approach in Comment 34 of this cover letter.

**Comment 13:**

Ethics. This section would be better placed at the end of the Methods section.

*Thank you for this comment. We have now moved the ethics section to the end of the methods section (see page 12, line 5ff).*

**Comment 14:**

Setting. Details about the setting of the study – hospital, wards etc. – might be better placed under this heading.

*Thank you for bringing this to our attention. As a result, we have now placed these aspects under the suggested heading.*

**Comment 15:**

Participants. Final year students, Supervisor and Patients would be better placed in this section.

*Thank you for your observation. We have now moved the mentioned sections to the ‘participants’, as suggested.*

**Comment 16:**

How were final year medical students invited to participate - lecture,
email?

Thank you for bringing up this issue. Final year medical students were invited both by lectures and e-mail. We have therefore added the following sentence (see page 6, line 5ff):

“All final year medical students, working in the internal medicine departments at the University of Heidelberg Medical Hospital between December 2013 and March 2014, were invited (both via e-mail and personally during lectures) to participate in the video-based, on-ward supervisions described in this study.

Comment 17:

Readers might also be interested to know how you overcame issues of possible coercion.

Thank you for bringing up this delicate and important topic. The final year medical students were repeatedly informed that participation is entirely voluntary and that nonattendance would have no influence on their final year medical program or grades. We added the following sentence mentioning these statements (see page 6, line 18):

“Students were repeatedly informed that participation was entirely voluntary, with nonattendance having no influence on other aspects of their final year medical program or grades.”

Comment 18:

Provide a brief description of specific training on training medical students and giving feedback.
Thank you for bringing this to our attention. Specific training for doctors participating in the program for final year medical students at the University Hospital of Heidelberg is based on methods mentioned in a publication by Roos et al. (2014). Moreover, beside basic training, there is a long lasting tradition and expertise related to giving structured professional feedback within the team. We have rephrased the passage accordingly (see page 6, line 21ff):

“The same experienced supervising doctor (4th year internal medicine resident (JG)), who was specially trained in medical student education and not the supervising ward physician, observed all the final-year students’ patient admissions and their performance of procedural skills at bedside. Following direct clinical skill observation, the supervising doctor provided the final-year student with structured feedback following a supervisor's manual based on methods by Roos et al. (2014).”

Comment 19:

Intervention. Video-based on-ward supervision should be in this section. Consider re-writing the section titled ‘Feedback loop’.

For example: After having finished the supervised procedure, a standardised feedback loop was performed. Feedback itself was not video-taped. First, the student gave a self-reflective feedback including the setting (seating position, distance between student and patient, avoidance of disturbances), and the procedure (technical and communication skills). This was followed by the patient's oral feedback which addressed the setting and a subjective assessment of the student's performance. Finally, the supervisor gave the student oral feedback, regarding the setting, the student's behaviour and their performance undertaking the technical skill. Most of the supervisor's feedback was given in the patient's room in their presence only major
professional issues were addressed outside the patient's room, if necessary. Before watching the video, the supervisor identified the issues requiring focus. A quiet room was chosen on the ward for students to view their videos. In most cases, this was undertaken in the presence of the supervisor who did no comment during the video. After watching the video, the student was asked whether he/she was able to relate to the supervisor's feedback and whether new aspects not initially identified had been observed.

Thank you very much for your efforts in improving this section, they are highly appreciated. Following your suggestions, we have rewritten the section to read as follows (see page 9, line 5ff):

“After having finished the supervised procedure, a standardised feedback loop was performed. Feedback itself was not video-taped. First, the student gave self-reflective feedback including the setting (seating position, distance between student and patient, avoidance of disturbances), and the procedure (technical and communication skills). This was followed by the patient’s oral feedback, which addressed the setting and a subjective assessment of the student’s performance. Finally, the supervisor gave the student oral feedback, regarding the setting, the student’s behaviour and their performance undertaking the technical skill. Most of the supervisor’s feedback was given in the patient’s room in their presence. Only major professional issues were addressed outside the patient's room, if necessary. Before watching the video, the supervisor identified the issues requiring focus. A quiet room was chosen for students to view their videos on the ward. In most cases, this was undertaken in the presence of the supervisor, who did not comment during the viewing of video. After watching the video, the student was asked whether he/she was able to relate to the supervisor’s feedback and whether new aspects not initially identified had been observed.”
Comment 20:

Quantitative measures. A description of all measures used should be reported in this section.

*Thank you for reminding us of this necessity. We have added the following passage (see page 11, line 26ff):*

“A 7-point Likert scale was used for the evaluation of students’ abilities before the video-based supervision and a 6 point Likert scale was used to assess the patients’ and students’ opinions of the supervision.”

Comment 21:

Assessment of final year student’s baseline-characteristics should be in this section. Consider re-writing this section. Consider providing more information about the descriptions across the 7-point Likert scale.

*Thank you for this comment. We have moved the assessment of the final year student’s baseline-characteristics accordingly. We used 7-point Likert scale for the baseline evaluation of students. In the questionnaires, students were informed that full numbers ranging from 1 to 7 had to be used, 1 meaning “not true“ and 7 meaning „entirely true“, as already described in the manuscript. Students were not given further instructions for filling in these questionnaires.*

Comment 22:

**Quantitative assessment of the video-based on-ward supervision by final year students** should be in this section. Was there a neutral score in the 6-point Likert scale?
Thank you for your comment. We used a 6-point Likert scale, which has no neutral score. Students had to decide whether they tended to agree or disagree with the statements mentioned in the questionnaires. As this was a pilot study, we deliberately used a scale without a neutral score, since we wanted to establish if students benefitted from video-based, on-ward supervision or if they didn’t. Moreover, this is important because we wanted to evaluate whether it is worthwhile establishing video-based, on-ward supervision on a routine basis in the setting of final year medical student training.

Comment 23:

Quantitative assessment of the video-based on-ward supervision by final year students should be moved to this section. Consider providing more information about the descriptions across the 6-point Likert scale.

Thank you for your advice. Following your suggestion, we have moved this section to “Quantitative measures”. Further, we only informed the students that “1” means “I fully disagree” and “6” means “I fully agree”, without giving further details on the scale or specifically defining statements for every score on the scale. Accordingly, we have provided the same information to our readers.

Comment 24:

Consider the following edits:

The patients were asked to provide feedback after the post assessment questionnaire. The questionnaire was structured similarly to the aforementioned post-assessment questionnaires (statements to be rated from 1 to 6; 1 = I fully disagree, 6 = I fully agree) but
comprised only 7 items addressing the patient’s feelings during the supervision, their willingness to participate in future and...

Thank you for your revisions in this section. Following your suggestions, it now reads (see page 11, line 5ff):

“After supervision, patients were asked to provide feedback via a post-assessment questionnaire. The questionnaire was structured similarly to the aforementioned post-assessment questionnaires (statements to be rated from 1 to 6; 1 = I fully disagree, 6 = I fully agree) but comprised only 7 items addressing the patient’s feelings during the supervision, their willingness to participate in future and the patients’ opinions on how important they think video-based on-ward supervision is for final year students.”

Comment 25 [RW1]:

Or video?

Thank you, for your remark. However, patients gave feedback after one-on-one supervision in the patient’s room, not after the students’ video-session.

Comment 26 [RW2]:

Meaning unclear

“and the patient’s assessment of the importance to the final year student”

As the meaning of this sentence seems to be unclear, we have rephrased it and apologise for the inconvenience (see page 11, line 9):

“... and the patients’ opinion on how important they think video-based, on-ward supervision is for final year students.”
Comment 27:

Data collection. Final year students' and patients' quantitative assessment and semi-standardized final year student's interviews would be better placed in this section.

Thank you for your observation. We have moved this part to "Data collection", as suggested.

Comment 28:

Consider re-writing this paragraph. For example:

All participating students were interviewed in an individual face-to-face setting. Interviews lasted for approximately 20 minutes and were conducted by a trained interviewer experienced tutor. The interviews were semi-structured with open-ended questions to enable students to shed light on the benefits and specific aspects of video-based onward supervision. Interviews were audio-taped, and transcribed verbatim for interpretation. Additionally, the interviewer took notes immediately after the interview to record non-verbal behaviours and subjective characteristics of the interview. Using open-ended questions [43], the interviewer asked final year medical students about being videotaped, their perception of the supervision's setting and realism, as well as the quality of the feedback from different sources...

We would like to thank you again for your efforts improving this manuscript; your trouble is greatly appreciated. Following your suggestions, we have revised this paragraph. It now reads, (see page 10, line 1ff):

"The interview procedure followed the main items of the COREQ checklist and the Standards for Reporting Qualitative Research, as recently published. All participating students were interviewed in an individual face-to-face setting. Interviews lasted for approximately 20 minutes and were conducted by a trained interviewer experienced tutor. The interviews were semi-structured with open-ended questions to enable students to shed light on the benefits and specific aspects of video-based onward supervision. Interviews were audio-taped, and transcribed verbatim for interpretation. Additionally, the interviewer took notes immediately after the interview to record non-verbal behaviours and subjective characteristics of the interview. Using open-ended questions [43], the interviewer asked final year medical students about being videotaped, their perception of the supervision’s setting and realism, as well as the quality of the feedback from different sources..."
to-face setting. Interviews lasted approximately 20 minutes and were conducted by a trained interviewer, who was supervised by an experienced tutor. The interviews were semi-structured with open-ended questions, to enable students to shed light on the benefits and specific aspects of video-based on-ward supervision. Interviews were audio-taped and transcribed verbatim for interpretation, to record non-verbal behaviours and subjective characteristics of the interview. Using open-ended questions, the interviewer asked final year medical students about being videotaped, their perception of the supervision’s setting and realism as well as the quality of the feedback from different sources.”

Comment 29 [RW3]:

Meaning unclear. Consider explaining the COREQ checklist and Standards for Reporting Qualitative Research.

Thank you very much for this important remark – we have now explained both terms in the revised version of our study, (see page 11, line 21ff):

“The COREQ checklist was developed to promote comprehensive reporting of interviews and focus groups in qualitative studies. The 32 criteria included in the checklist can aid researchers in reporting important aspects of the research team, study methods, context of the study, findings, analysis and interpretations. In 2014, O’Brien et al. published their “Standards for reporting qualitative research” (SQQR) as a synthesis of recommendations, thus defining standards for reporting qualitative research. The SRQR consists of 21 items.”

Comment 30 [RW4]:

Is this information necessary? male, 30 years of age, MD
Thank you for bringing this to our attention. We absolutely agree with you on this point, we have therefore edited the information out (see text passage above).

Comment 31:

Analysis. Statistical analysis and qualitative analysis of semi-structured interviews would be better placed in this section. How were quantitative data managed? A little more detail would help the reader.

Thank you very much for your advice to write a little more about the statistics used. We have now added further information. Although, we have to admit that only very little statistics were used as we have hardly any quantitative data to manage in this manuscript (see page xxx, lines xxx):

"Descriptive quantitative data were managed with Microsoft Excel and are presented as means ± standard deviation and median with interquartile range when applicable."

Comment 32:

Consider the following edits:

Qualitative data

The conducted content analysis followed the principles of open coding of all of the interviews was conducted in order to search for recurring topics. Single or short sentences were identified as code, representing the most elementary unit of meaning [44]. These codes were then summarised in relevant themes for each participant, using MaxQDA software (2010 version, VERBI GmbH, Berlin). Recurrent themes among different participants were compared and adapted
until a number of overarching categories could be defined. The assignment of respective codes to specific themes was conducted by two independent analysts and subsequently discussed in order to reach consensus and were adjusted if necessary. In the final step, themes were consolidated into 4 relevant categories.

Quantitative data

Descriptive quantitative data are presented as means ± standard deviation

Thank you again for improving this section of the manuscript. We have now changed the text accordingly (see page 11, line 13ff):

“The conducted content analysis followed the principles of Grounded Theory. First, an open coding of all of the interviews was conducted in order to search for recurring topics. Single or a few sentences were then identified as a code, representing the most elemental unit of meaning. These codes were summarised in relevant themes for each participant, using MaxQDA software (2010 version, VERBI GmbH, Berlin). Recurrent themes among different participants were compared and adapted until a number of overarching categories could be defined. The assignment of respective codes to specific themes was conducted by two independent analysts and subsequently discussed in order to reach consensus and were adjusted if necessary. In the final step, themes were consolidated into 4 relevant categories.

Quantitative data

Descriptive quantitative data were managed with Microsoft Excel and are presented as means ± standard deviation and median with interquartile range when applicable.“
Comment 33 [RW5]:

Stated previously. The audio files of the interviews were transcribed verbatim.

Thank you for pointing this out. We have deleted the sentence in this section.

Comment 34 [RW6]:

Should be introduced to the reader in Study Design: Grounded theory

Thank you once again for this important remark. We have added the following sentences on our usage of Grounded Theory (see page 6, line 8ff):

“We used a minimally structured and open interview style to receive a broad variety of impressions and perceptions. There were no pre-defined categories reflecting the respective methodological approach.”

Comment 35:

Ethics. Would be better placed at the end of the Methods section.

Thank you for your remark. We have moved ‘Ethics’ to the end of the methods section as suggested.

Comment 36:

Results: This section is very long. Could better use of tables and figures be made to shorten this section?

Thank you for your advice on this point. However, after careful consideration, we feel that there are basically two potential formats which
we are able to consider: either presenting definitions and citations in table form or integrating citations into the definitions. As the later approach is frequently used and recommended, we have chosen to present our data in this way. Moreover, we feel that by doing so, the text becomes livelier, more enjoyable and attractive for the reader. However, we agree that this section is too long and we have shortened it following your comment (see page 14, line 20ff):

“Theme “Realism of the situation” (42 quotations)

As supervision took place on the actual medical wards, where the students were placed for work on a daily basis and in the patient’s rooms using actual patients, the situation was perceived as being highly realistic: “It felt like it usually feels when routinely performing an ECG recording in the same surroundings” was one quotation. The supervisors’ choice of patients was considered to be more realistic than students picking the patients themselves, as they would have had to first ask them for permission (written informed consent was always obtained by the supervisor). Respectively, one student noted that “the patient knew beforehand what my task was and that I am not his attending physician, that probably changed our relationship [i.e. to the patient]”. The students preferred real patients to actors, since “actors are fine, but by using real patients, you can draw a better comparison to how it really feels [to perform medical skills on a daily basis]”. Another student noted, “an actual patient usually has a more profound story to tell than an actor, who specifically prepared for one situation by learning the symptoms by heart”. “They [the actors] sometimes even help you”. Compared to working with an already admitted patient and simply repeating the history taking, having to actually admit a patient on ward also increased realism of the situation. In consequence, “you have to perform [the history taking] properly, otherwise you will have to go back to the patient to ask the questions you forgot, which I don’t like”.

Category 2: Influence of being supervised and filmed (65 quotations)
Theme “Behavioral changes due to filming” (32 quotations)

Students were familiar with the situation, having already experienced being filmed in earlier study courses. Most students stated to have generally performed skills according to their usual daily routine, but possibly with more diligence and dedication, for example, asking for more details during history taking due to being filmed. Although, it was conceded that being supervised could have also influenced their behavior, regardless of the camera. “I made more comments [than usual] for the camera [while doing the physical examination], which were of no interest for the patient”, was one comment. However, other students felt quite the opposite with the camera running, reporting to be less communicative and more focused on important subjects. A student stated critically that he thought “it is very difficult to be unbiased whilst videotaping, especially when it comes to behaviour [which will be different due to being filmed]”. “It felt 80% realistic, but you had more time than usual for performing the skills”.

Theme “Subjective feelings while being filmed” (33 quotations)

As students were familiar with being filmed during their studies at Heidelberg University, they were able to cope with and largely ignore the supervisor’s and camera’s presence. Only one student “realized [that she] occasionally looked into the camera instead of facing the patient”. However, not all students liked the feeling of being filmed, possibly experiencing a sense of shame while observing their behavior on film later. Another student was distracted by the camera indirectly, as the patient kept looking into the camera instead of talking to her during history taking.

Category 3: Students’ self-assessment (20 quotations)

Theme “Communicative skills” (7 quotations)

Most students felt self-confident during history taking, physical examination, and IV cannulation, stating to be usually able to build up good and trusting relationships with patients and reporting to feel no difference during supervision.
Nevertheless, video-based supervision was helpful, as some aspects, not perceived or addressed by the supervisor, were detected by the students themselves while watching the videotape. One student realized that she had “used her hands too much while talking, like some kind of sign language”, concluding that she should “get rid of that habit”.

**Theme “Procedural technical skills”** (13 quotations)

Generally, students felt confident in the technique and framework of history taking. Some students “didn’t note making any mistakes”. “I forgot [to ask] some things, but overall, I found it [history taking] to be pretty good”. One student thought he “knew the general sequence in history taking”, but there were “specific gaps of knowledge” regarding the patient’s suspected diagnosis. Another stated that “more preparation [reading the case history] beforehand” would have been beneficial. Most students began with an open question and followed with more specific questions. One student observed that “sometimes, when you let the patient talk, you will find out what you want without having to dig deeper”.

**Category 4: Relevance of feedback** (167 quotations)

**Theme “Patient’s feedback”** (22 quotations)

The patient’s layman perspective was seen as beneficial, highlighting “some aspects [the students] didn’t think of before”. One patient, for example, stated to have had no interest in being informed about the technical details of ECGs, while the student had not even realized to have given detailed information when performing the ECG. However, actual patients’ feedback was considered to be less beneficial than from specifically trained actors. Although, one student stated: “To be able to perform these skills on actual patients [under supervision] is more valuable”. Nevertheless, the patient’s feedback was considered to be useful, but “not as useful as the supervisor’s feedback”.

**Theme “Supervisor’s feedback”** (44 quotations)
The supervisor’s feedback was generally perceived as beneficial, especially in regard to procedural technical skills, giving them a frank analysis from a different and expert perspective. One student thought that “generally, the feedback from the supervisor [was] more helpful [than video-based supervision]”. Overall, students preferred receiving the supervisor’s feedback before watching the video, as they could focus their attention on important points in consequence. “I find the combination [i.e. MD’s feedback plus video-based feedback] very helpful. The patient’s feedback is likely to bring less in the specific situations, but the MD’s feedback in combination with the video feedback is very helpful, I think” was one quote. Another student stated that sequential feedback was “helpful, especially as you got it [the supervisor’s feedback] right after [patient contact], and then watched the video, because then I realized that the feedback was really justified and it helped a lot, yes.”

Theme “Video-based feedback” (101 quotations)

Video-based feedback was mostly positively received by students. Nevertheless, most students felt it was only beneficial as an addition to the previous oral feedback by the supervisor. “I self-reflect [my actions] a lot, but I experienced [my performance] in a different way thanks to the video”. Again, sequential feedback was regarded as most beneficial, i.e. first receiving feedback from the supervisor first and then watching the video, since “the video backs the supervisor’s feedback up, it is a tool for self-reflection, but without the supervisor’s oral feedback, it wouldn’t have helped much”. However, the video was not only considered to be beneficial for the evaluation of procedural technical skills, but also for communicative skills, with one student stating, for example, “I usually don’t see my body language”. Other statements were: “sometimes, I cut my sentences off, finishing them half a minute later, with a long period of silence in between” concluding that “[I] should speak more clearly and slowly, and let the patient finish her sentences”.

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Howbeit, not all aspects of video-based supervision were seen positively. Some Students felt uncertain about the benefit of filming procedures during the on-ward supervision, feeling that the additional study of the video material “didn’t help that much, since I don’t know in which way it will influence my behaviour in future”. “The problem is, I wouldn’t change anything [when performing the skill again] due to the video”, another student stated critically.

In addition, students expressed a desire for the evaluation of more complex procedures through video-based supervision in the future, like placing central venous catheters, for example.”

Comment 37:

Consider organising your results according to your aims/feasibility criteria

Thank you for your advice. We agree that there are several possibilities to organize this section. We have decided to organize the results section according to our timeline during video-based, on-ward supervision, hence emphasizing the sequence in which the performance took place. Since our primary goal was to describe the method, including its acceptance amongst both students and patients as well as its feasibility, readers might in turn be able to gain a better understanding of the workflow due to the chosen form of presenting the results.

Comment 38:

Avoid commencing a sentence with a numeral

Thank you for this remark. We have now avoided commencing sentences with numerals.
Comment 39:

In Tables 2 and 3, include a column with “n = “.

Thank you for this observation. We have now included the requested information in the tables’ descriptions, following your suggestion (see tables 2, 3 and 5):

Table 2: Students’ (n=9) quantitative pre-assessment evaluating participants self-confidence in important clinical domains using a 7-point Likert scale (1 = not true, 7 = entirely true). Medians and Interquartile range.

<table>
<thead>
<tr>
<th>How well do the following statements apply to you?</th>
<th>Median</th>
<th>IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel well prepared for starting my career concerning history taking</td>
<td>6</td>
<td>5-6</td>
</tr>
<tr>
<td>I feel well prepared for starting my career concerning physical examination</td>
<td>6</td>
<td>5-6</td>
</tr>
<tr>
<td>I feel well prepared for starting my career concerning case presentation</td>
<td>5</td>
<td>4-5</td>
</tr>
<tr>
<td>I feel well prepared for starting my career concerning IV cannulation</td>
<td>6</td>
<td>6-6</td>
</tr>
</tbody>
</table>

Table 3: Students’ (n=9) quantitative post-assessment for evaluation of program acceptance using a Likert scale from 1-6 (1 = I fully disagree, 6 = I fully agree). Median and Interquartile range.

<table>
<thead>
<tr>
<th>Question</th>
<th>Median</th>
<th>IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ward was appropriate for video-based on-ward supervision</td>
<td>6</td>
<td>6-6</td>
</tr>
<tr>
<td>I was ashamed to be filmed</td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>The patient’s oral feedback helped me to better assess my communicative skills</td>
<td>4</td>
<td>3-4</td>
</tr>
<tr>
<td>The patient’s oral feedback helped me to better assess my technical skills</td>
<td>4</td>
<td>3-5</td>
</tr>
<tr>
<td>The supervisor’s oral feedback helped me to better assess my communicative skills</td>
<td>5</td>
<td>4-5</td>
</tr>
<tr>
<td>The supervisor’s oral feedback helped me to better assess my technical skills</td>
<td>5</td>
<td>4-6</td>
</tr>
<tr>
<td>Watching the video helped me to better assess my communicative skills</td>
<td>4</td>
<td>3-5</td>
</tr>
<tr>
<td>Watching the video helped me to better assess my technical skills</td>
<td>4</td>
<td>4-6</td>
</tr>
<tr>
<td>I will be able to perform the supervised skills better due to watching the video</td>
<td>5</td>
<td>4-6</td>
</tr>
<tr>
<td>I wish to have had video-based supervisions in other settings</td>
<td>4</td>
<td>3-4</td>
</tr>
<tr>
<td>Watching the video was helpful for my practical training</td>
<td>5</td>
<td>4-6</td>
</tr>
<tr>
<td>Video-based, on-ward supervision was helpful for my practical training</td>
<td>5</td>
<td>5-6</td>
</tr>
<tr>
<td>I will participate in video-based supervision again in the future</td>
<td>6</td>
<td>6-6</td>
</tr>
</tbody>
</table>
Table 5: Patients’ (n=8) quantitative post-assessment to evaluate patients’ impressions of the session using a Likert scale from 1-6 (1 = I fully disagree, 6 = I fully agree). Median and Interquartile range.

<table>
<thead>
<tr>
<th>Question</th>
<th>Median</th>
<th>IQR</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was ashamed to be filmed</td>
<td>1</td>
<td>1-1.25</td>
</tr>
<tr>
<td>I felt inhibited due to being filmed</td>
<td>1</td>
<td>1-1.25</td>
</tr>
<tr>
<td>I felt distracted due to being filmed</td>
<td>1</td>
<td>1-1</td>
</tr>
<tr>
<td>Filming falsified the situation</td>
<td>1</td>
<td>1-1</td>
</tr>
<tr>
<td>I consider watching the video helpful for practical training of final year students</td>
<td>6</td>
<td>6-6</td>
</tr>
<tr>
<td>I benefitted from video-based, on-ward supervision</td>
<td>3.5</td>
<td>1.75-5</td>
</tr>
<tr>
<td>I would participate in video-based supervision again in the future</td>
<td>6</td>
<td>6-6</td>
</tr>
</tbody>
</table>

Comment 40:

It would benefit the reader to know if the scales were normally distributed. If not, consider using the median and IQR.

Thank you very much for this important observation. The data was not normally distributed, which is why we are now using Median and IQR in the revised manuscript (see tables 2, 3 and 5 above).

Comment 41:

Some suggested changes:

**Characteristics of students** - Nine final year medical students (56%) agreed to participate in this pilot study on a voluntary basis (3 male, 6 female, age 25.1± 0.7 years). Eight students had studied medicine at the University of Heidelberg, one at the University of Mainz. All participating students had previous experience in being video-taped during their studies as part of the communication training with standardized patients at our faculty [45].
Thank you for improving this section of the manuscript. We have changed the text accordingly (see page 12, lines 17):

“Students’ characteristics
Nine final year medical students (56%) agreed to participate in this pilot study on a voluntary basis (3 male, 6 female, age 25.1 ± 0.7 years). Eight students had studied medicine at the University of Heidelberg, one at the University of Mainz. All participating students had previous experience of being filmed during their studies as part of the communication training with standardized patients at our faculty.”

Comment 42 [RW7]:

Is this information relevant to the study?

“After completing their studies, students headed for conservative medicine, one for a surgical discipline, and two had not yet decided on their career aspirations.”

Thank you for pointing this out. We have deleted this sentence.

Comment 43:

Participating Patients. Eight internal medicine patients agreed to participate in the study (5 male, 3 female, age 59.3 ± 16.8 years). One of patients was willing to participate twice, so that one of the final year students took the patient's history and a different final year student performed a physical examination on the same patient an hour later.
Thank you for your corrections. We have changed the wording according to your suggestions: (see page 12, line 24ff):

“Eight internal medicine patients agreed to participate in the study (5 male, 3 female, age 59.3 ± 16.8 years). One of patients was willing to participate twice, so that one of the final year students took the patient’s history and a different final year student performed a physical examination on the same patient an hour later.”

Comment 44 [RW8]:
Identify the categories and themes (perhaps in a table or figure) in this introductory paragraph.

Thank you for pointing this out. We have now included a new table, “Table 4”, in the revised manuscript providing an overview of identified categories and themes (see page 27). In consequence, the former table “4” is now denoted as “Table 5”.

**Table 4: Overview of categories and themes identified from interviews.**

<table>
<thead>
<tr>
<th>Category 1: Setting and realism of the situation</th>
<th>Theme “Setting”</th>
<th>Theme “Realism of the situation”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 2: Influence of being supervised and filmed</td>
<td>Theme “Behavioral changes due to filming”</td>
<td>Theme “Subjective feelings while being filmed”</td>
</tr>
<tr>
<td>Category 3: Students’ self-assessment</td>
<td>Theme “Communicative skills”</td>
<td>Theme “Procedural technical skills”</td>
</tr>
<tr>
<td>Category 4: Relevance of feedback</td>
<td>Theme “Patient’s feedback”</td>
<td>Theme “Supervisor’s feedback”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Theme “Video-based feedback”</td>
</tr>
</tbody>
</table>
Comment 45
Themes from student interviews. During the interviews, all students appeared open-minded. With regard to the qualitative analysis of the interviews, 4 categories including 9 themes were covered, as defined below:

Thank you for your advice. The text has now been changed according to your suggestions (see page 14, line 3ff):

“Themes from student interviews
During the interviews, all students appeared open-minded. With regard to the qualitative analysis of the interviews, 4 categories including 9 themes were covered, as defined below:”

Comment 46:
Discussion. This section will be strengthened once improvements are made to the methods section and the overall structure of the paper.

Thank you for your supportive words. We absolutely agree that the overall structure you suggested, including all improvements mentioned above, will further strengthen the discussion.

Comment 47:
Specifically refer to aims/feasibility criteria.

We have now included the following sentences at the beginning of the discussion that specifically refer to aims and feasibility criteria (see page 19, line 13ff):
“The implementation of this method in an on-ward setting was feasible and well accepted by both students and patients. Nevertheless, some additional resources are required in order to implement video-based, on-ward supervision into the educational routine, such as equipment and manpower to manage and coordinate the process to ensure a beneficial one-on-one learning experience.”

Comment 48:

Avoid including limitations in this section.

Thank you very much for this comment, although we have to admit that we were slightly confused by it: To our mind, as scientific authors, we feel strongly encouraged to openly discuss all potentially relevant limitations of our study, which may have affected the quality of the evidence being presented. Following our current understanding, the discussion section represents the suitable place for reporting these. However, if the editorial team would like us to remove the paragraph or to move it to a different section within the manuscript, we will be very willing to do so.

Reviewer 2: Su-Ting Li

Major Compulsory Revisions

Comment 1:

Intro. Paragraph 3. I appreciated that the authors included a conceptual framework for their study – Ericsson’s model of deliberate practice and feedback. However, the argument for the usefulness of video feedback as part of Ericsson’s model could be stronger.
Thank you very much for bringing this point up. We absolutely agree with you that this point was not very well elaborated on. Therefore, we have now rewritten the corresponding paragraph in the hope of providing a clearer argument in the revised version of the manuscript.

“Ericsson’s model of deliberate practice served as the conceptual framework for this approach. In this concept, Ericsson characterized training as a highly structured activity, directed at the improvement of performance in a particular domain. Therefore, deliberate practice can be understood as a focused approach to training, aimed at reaching a well-defined goal. Practical implementation of this construct is based on several design principles, one of which is specific, informative feedback, which can ultimately lead to more sustainable behavior modification. Video-based feedback can thus be seen as a training element to achieve certain goals.”

Comment 2:

Video-based on-ward supervision. Paragraph 1. The variety of “procedures” videotaped seems too broad (especially since there was only 1 IV cannulation and 1 ECG recording) for this small of a sample to draw any useful conclusions. It would seem that while video-recording could potentially be useful for something like IV cannulation or ECG recording, these could also be done on a standardized patient, where many learners could be videotaped doing the same procedure on the same day. It may be more useful to videotape history taking or physical exam on real patients. By allowing PIV and ECG recording, the 9 learner experiences were really diluted to 7 learner experiences. In addition, only 1 learner elected to have a physical examination recorded, which only left 6 learners with a history recorded.

Thank you very much for this critical comment. We agree that the emphasis was on history taking and physical examination, although we wanted to give
students the opportunity to perform the whole procedure of admitting a patient to a hospital ward, including PIV and ECG. Therefore, we let them choose the procedures they wanted to perform. Although these procedures could also be performed on a standardized patient, the learning experience would potentially have been inferior in that setting, since very little is known about the transfer from simulation to real patients. Heaven et al. have shown that this transfer can be improved by practicing these procedures in a simulated setting first, with direct supervision afterwards in a clinical setting [Heaven C, Clegg J, Maguire P. (2006). Transfer of communication skills training from workshop to workplace: the impact of clinical supervision. Patient Educ Couns, 60(3):313-25]. Since there is extensive longitudinal skills training at the University of Heidelberg [Kruppa E., Jünger J., Nikendei C. (2009). Concept of a Longitudinal Skills Lab Curriculum at the University of Heidelberg. Research in Medical Education – Changes and Challenges: Heidelberg 2009], which all final year medical students have been required to attend during their earlier studies, we set our focus on the transition to the real, clinical setting.

Comment 3:

Feedback loop. Paragraph 1. This study would be more valuable if we could better determine the added relative value of videotaping patient interactions and having the learner watch the interaction after receiving feedback vs feedback alone. It seems that it is a lot of work to be able to set up a videocamera (sometimes requiring 2 people to do so with the entire process taking over an hour) and if the relative gain is little, perhaps the take-away point would be that learners should be directly observed more often and feedback given more often. Ultimately, if we can show faster improvement by the learner when they are able to watch themselves, then it may be worth the extra effort to videotape these interactions.
Thank you for this important comment. Indeed, it takes a lot of effort to perform video-based, on-ward supervision. However, extant literature has shown that video-based feedback is more potent than oral feedback. However, this has to be shown for on-ward situations in future studies. Moreover, a further aspect, which has to be highlighted, is cost efficiency in medical training.

To respond to your important critical point, we have added the following section to the conclusion paragraph of the manuscript (see page 22, line 10ff):

“To determine the added relative value of videotaping final year student-patient interactions, future research, based on data obtained in this pilot study, should aim at the objective assessment of a superior benefit of integrating video-feedback in the supervision program in terms of a justification study.”

Comment 4:

Qualitative analysis – While I appreciate the attempt at a qualitative analysis, it is unclear that a grounded theory was generated. In the Qualitative assessment of video-based on-ward supervision by final year students, paragraph 1, you state that the interviews were designed with the “aim to shed light on the benefits and specific aspects of video-based on-ward supervision.” This qualitative results section reads incredibly long for the very little information that is gleaned from it. It almost seems that the categories are grouped by the focus group questions themselves. The themes do not necessarily relate to the “benefits” of video-based on-ward supervision. For example, the category “Student’s self-assessment” has extraneous quotes that relate more to the student’s self-perceived communication skills, not necessarily how watching the video reinforced/revealed their communication skills. The valuable quote in the paragraph was the one referring to how the learner used her
hands while talking. The quotes that “the patient felt to be in good hands,” does not seem to relate to the aim of the interviews. Why are history taking skills grouped under “Theme ‘Procedural technical skills’?” These appear to be communication skills. Again, I am not sure how many of these quotes (while possibly interesting) relate to your central question. I would suggest concentrating on benefits of video-based feedback and how to optimize video-based feedback.

Thank you for bringing up this topic. Extant literature puts reference to the fact that procedural, technical skills are often trained in isolation, while ignoring accompanying communication. Moreover, communicative skills are a relevant and established aspect of the procedural skills checklists. The assessment of communicative aspects is very important, since technical procedures require the integration of both technical and communicative aspects. If technical aspects are only trained separately, there is a risk of overexcretion soon as students find themselves in a clinical situation, where, previously untrained, communicative skills have to be integrated into the technical aspects.

In consideration of your critical statement about the section “Self-perceived Communication Skills”, we have deleted the following sentence:

“Most students stated that they had experienced their performance as competent. “I think the patient felt to be in good hands” was one quote, “the patient had the feeling that I knew what I was doing” was mentioned by another student.”

Nevertheless, from our perspective, we do not completely agree with this understanding of grounded theory, as the interview questions were indeed focused on the research question as they were open questions followed by more in-depth and confirmatory questions according to qualitative research guidelines.
Moreover, which phenomena become the object of investigation by means of grounded theory [18] is independent of the research question itself. In this respect, in an investigation following grounded theory, the question is a specification, which itself determines the phenomenon which should be investigated. “Questions in grounded theory always possess an action- and process-orientation” [19]. To specify which action and process phenomena are meant, Strauss and Corbin (1996) [19] name three different levels of research interest: (1) questions, which focus on the interactions in specific situations or contexts in the analysis, (2) questions, which aim to examine organisation-specific sequences, tasks or dynamics, and (3) research-guiding questions, which focus on the biographical perspectives in the analysis [19]. Hence, the question encompasses that what one primarily wishes to examine and that what one would like to know about the object of research, i.e. in the current study the practicability of a new on-ward feedback model.

Comment 5:

Theme “Communication skills”. Paragraph 1. While you state that “most students stated that they had experienced their performance as competent,” we don’t know if that correlated to how the supervisor rated the learner’s performance. How does viewing videotapes of your performance change your self-assessment? How does it change how well you agree with your supervisor’s assessment?

Thank you for bringing this up. The first statement indicates that students are very pleased by their own performance and not perturbed by the interaction. However, it also indicates that it seems to be difficult for them to reflect critically upon their clinical performance and interactions with the patient. Our goal was to raise awareness and cause students to question their behavioural patterns. Video-based supervision enables students to view themselves from the outside and thus taking more distanced perspective, similar to being an external observer.
Comment 6:

Discussion. Paragraph 3. You state that standardized patients tend to give more detailed and productive feedback and state earlier that feedback from patients is less helpful. Perhaps what the real patients are asked to comment on can be somewhat different than standardized patients. While standardized patients might be trained to know what questions should be asked, real patients can evaluate professionalism and interpersonal and communication skills.

We absolutely agree with you on this point and want to thank you for highlighting it. Following your observations, we have added this argument to the discussion of the manuscript (see page 20, line 18):

“Moreover, real patients might be more eligible to evaluate professionalism, interpersonal and communication skills.”

Comment 7:

I think that you should make a stronger argument for the potential added benefit of videotaping for feedback versus direct observation and feedback. Without this stronger argument for why this study is important, feasibility of performing the videotaping is moot.

Thank you for this comment. As stated above, our goal was to enable students to gain a more distanced perspective by giving them the opportunity to perceive themselves from a different view, like for instance an external observer would. Compared to direct observation, this adds a further dimension to the process of supervision. Moreover, as stated in comment 3, video-based supervision has been shown to be superior to direct observation, especially in respect to sustainable behaviour modification. Since we wanted to give students the opportunity to question
their behavioural patterns by raising their awareness, video-based supervision seemed the ideal tool.

Editorial Comment:

Thank you for submitting your work on skills teaching to BMC medical education. As you can see, both reviewers are supportive of publication of the manuscript, and both have provided very pertinent and often consistent feedback. If you can address each of the points raised by the reviewers we would be pleased to publish your manuscript.

Dear Editorial Team, thank you very much, we feel greatly supported by the valuable and helpful comments of the reviewers.

Dear Associate Editor Lauren Maggio,
Dear Mr Aldrin Ulep,

We would like to thank you once again for offering us the opportunity to submit a revised version of our manuscript BMC Med Educ 5606894061146019. We appreciate you considering our article for publication as a web paper and look forward to hearing from you soon.

With best regards,

Christoph Nikendei