

Video-analysis in health sciences: a simulation experience in a clinical interview in physiotherapy

Vídeo-análisis en ciencias de la salud: una experiencia de simulación en entrevista clínica en fisioterapia

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Abstract: Technologies make it possible to remove the spatial and temporal barriers that higher education has suffered due to the current COVID-19 pandemic, providing new educational scenarios. Video-analysis opens a window for evaluation in clinical teaching in Health Sciences. The objective of this research is to study the feasibility of video-analysis to analyze skills in the clinical interview in physiotherapy. An exploratory study with video analysis and checklist was conducted on first-year students. Thanks to the videos collected, it was determined that the students analyzed have better developed skills related to asking appropriate questions in the interview, while on the contrary there are more difficulties in listening skills. The results show that video-analysis is a practical and valid tool to analyze tasks in simulation environments in health sciences, as it has been in this clinical interview activity. This new form of teacher evaluation, in addition to providing quantifiable data, is a new way of justifying the student's mistakes and successes during the test, allowing potential feedback to be established to improve their clinical skills. Likewise, the possibility of being evaluated with a simulated patient supposes an approach to the professional reality that they must face once they graduate.

Keywords: evaluation, simulation, higher education, video-analysis, physiotherapy

Resumen: Las tecnologías posibilitan la supresión de las barreras espaciales y temporales que la educación superior ha sufrido por la actual pandemia COVID-19, aportando nuevos escenarios educativos. El vídeo-análisis abre una ventana para la evaluación en la enseñanza clínica en Ciencias de la Salud. El objetivo de esta investigación es estudiar la viabilidad del vídeo-análisis para analizar habilidades en la entrevista clínica en fisioterapia. Se realizó un estudio exploratorio con análisis de video y lista de cotejo en estudiantes de primer año. Gracias a los videos recopilados, se determinó que los alumnos analizados tienen mejor desarrolladas las habilidades relacionadas con realizar preguntas apropiadas en la entrevista, mientras que por el contrario existen más dificultades en las habilidades de saber escuchar. Los resultados muestran que el vídeo-análisis es una herramienta práctica y válida para analizar tareas en entornos de simulación en ciencias de la salud, como ha sido en esta actividad de entrevista clínica. Esta nueva forma de evaluación docente, además de aportar datos cuantificables, supone una nueva forma de justificar al alumno sus errores y aciertos durante la prueba, permitiendo establecer un potencial feedback para mejorar en sus habilidades clínicas. Así mismo, la posibilidad de evaluarse con un paciente simulado supone un acercamiento a la realidad profesional a la que se deben enfrentar una vez egresados.

Palabras clave: evaluación, simulación, educación superior, vídeo-análisis, fisioterapia

1. Introduction

In March 2020, a state of alarm was declared as a result of the pandemic caused by COVID-19. This situation forced a drastic change in the teaching methodology, leaving aside the presence in the classroom, which was replaced by the virtualization of teaching,

and therefore also its evaluation (1–3). Evaluation has been and is one of the issues that most concerns us in this teaching process, and even more so from the new perspective that the non-attendance that COVID-19 has imposed on us. The need to evaluate objectively, quickly, efficiently and remotely is a stimulus for teachers to search for new dynamics and systems that facilitate this process (2, 4).

University education has been in a process of change for several years, where situations such as the adaptation to the European Higher Education Area (EHEA) through the Bologna Process, the importance of acquiring skills (5) and the need to be able to evaluate teaching methods. The development of Information and Communication Technologies (ICT) and their application in the field of education has been one of the objectives to be developed by the EHEA (6).

That is why the need arises to make the higher education system more flexible, resulting in the integration of the use of ICT in training processes (1, 7). It is necessary to mention the use of video recordings as an ICT tool, applied in the field of education. Some authors (8) identify three basic modes of educational use of digital video: as a communication tool, as an observation and analysis tool, and as a reflection tool. Being some of its uses and fields of application: carrying out video activities and subsequent sharing among students (9).

It has been observed that digital video is a powerful means of communication and visualization that opens up new possibilities and that, from the pedagogical point of view, favors the development of skills and abilities (7). However, there are few articles that use video as a means of evaluation, as well as those reviews that are carried out with software that assesses and quantifies the information. The integration of video-analysis can imply an advance in the improvement of practical skills in Health Sciences and in their forms of evaluation. To this end, we are faced with the need to include one of the skills of primary clinical practice that requires interaction with the patient, the clinical interview, as a process monitored and reviewed under video-analysis systems that could enrich the quality of teaching in health sciences. The objective of the study is to determine if the video-analysis is a valid and viable tool for the evaluation of the clinical interview in students of the Degree in Physiotherapy.

2. Methods

An exploratory feasibility study using observation and data analysis in a simulated environment was developed to determine the feasibility of video analysis for evaluating clinical interviewing in physical therapy.

Sample

The research was carried out at the University of Las Palmas de Gran Canaria, specifically in the Faculty of Health Sciences, with Physiotherapy students (n=35), during the first semester of the 2019/2020 academic year.

Assessment instrument and task

The video software used has been CODIMG^R, a recently created video analysis tool, which allows it to be used in academic environments. On the one hand, it is useful from the teacher's perspective, allowing them to offer much more detailed feedback to students; on the other, students can benefit from watching their own videos and self-assessing their work. One of the main advantages of this tool is the ease with which it can be used. It is simply necessary to record a video, establish the parameters that we want to analyze and mark them as we find them in the video; in this way, at the end, we can extract the video clips that interest us for our final analysis (10).

The video-analysis task selected was the clinical interview in a simulation environment, with a previously trained simulated patient. Starting from the advantage offered by this type of work as a didactic method for the development of improvements in teaching-learning processes, guaranteeing patient safety and bringing the student closer to environments that are as real as possible (11). In the chosen sample, the contents related to this activity have been previously trained in the development of the Fundamentals of Physiotherapy subject corresponding to the first year of the Degree in Physiotherapy.

A clinical interview checklist was designed based on the objectives and characteristics that should be evaluated in a physiotherapy interview according to Gallego (12). Subsequently, several tests were carried out in the interview software among the evaluators, to detect possible errors and/or confusion that the checklist could present before the intervention. This is made up of 12 items grouped into the following dimensions designed in the CODIMG software:

1. Know how to listen and pay attention to the patient: within this category it is intended to assess whether the student is active during the interview. He maintains an attitude of continuous attention and if he performs non-verbal expression with the patient.

- Item 01: if the student names the patient by his/her own name.
- Item 02: if the student explains the interview procedure to the patient.
- Item 03: if the student maintains eye contact with the patient.
- Item 04: if the student remains calm when talking to the patient.

2. Appropriate questions: As the name of the category indicates, what is evaluated in the item is the student's ability to adapt their interview to what is truly necessary in the therapist/patient intervention.

- Item 05: if the student asked about the reason for the query.
- Item 06: if the student asks open questions.
- Item 07: if the student avoids personal questions.
- Item 08: if the student records the patient's responses.

3. Confidence: In this category, a description of their problem is made, the student must have patience during the conversation, allowing it to flow while respecting the silences that the patient needs to communicate, as well as making a final synthesis of all the information obtained.

- Item 09: if the student is active in the conversation.
- Item 10: if the student has patience when talking to the patient.
- Item 11: if the student respects the silences.
- Item 12: if the student is able to make a final summary with the patient at the end of the interview.

To analyze whether or not the students performed the items developed in the checklist, they were qualified by giving a numerical score to each item, YES = 1 point, NO = 0 points; This was done during the analysis of the video itself, with the intention of qualifying a task developed within a specific subject so that it would count as a grade for an evaluable activity within the teaching project. This allows quantitative results to be obtained from the checklist.

The three dimensions of the assessment instrument are considered to be of equal importance, but the item study allows a precise analysis of the items to be carried out by transferring everything to the software interface (see Figure 1).

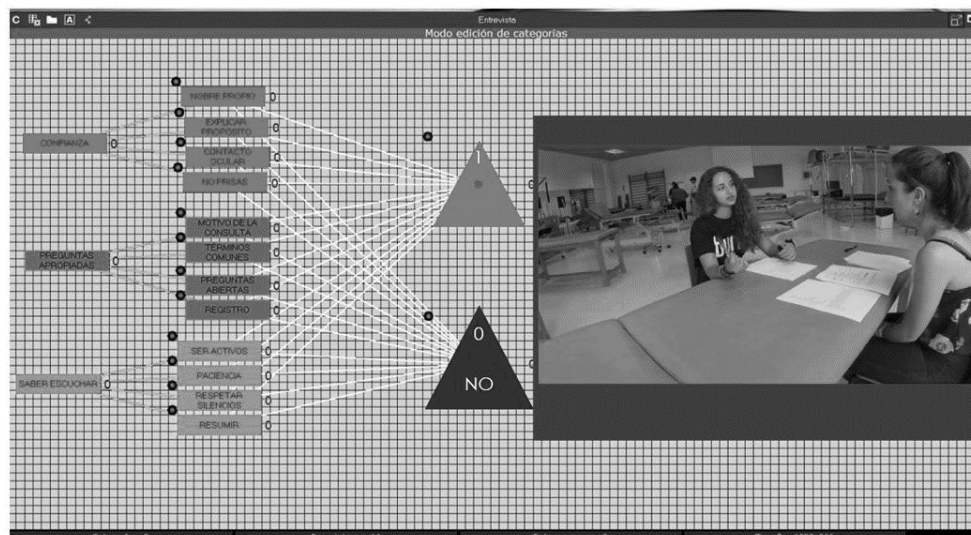


Figure 1 . Software interface sign. A screenshot of the CODIMG Software used is shown, with the dimensions and items of the checklist, as well as the video analyzed at that time. The software allows you to press the Yes or No button depending on what was perceived to be done in the video.

Procedure

The evaluated activity was a clinical interview that the student had previously prepared. In it, the student conducted the interview with a simulated patient (who was a physiotherapy professional with a simulated patient protocol that was the same in all cases). This entire process was recorded. The time reserved for each analysis was fifteen minutes. The activity was developed in the practical laboratory of the University of Las Palmas de Gran Canaria, previously prepared by those responsible for the subject with two Go-Pro type cameras for recording; In addition, the evaluator was present throughout the procedure.

After collecting all the videos, they were independently evaluated by three observers, following the following procedure:

- Each observer analyzed each video using the software, obtaining scores from the checklist, as explained above.
- At the end of the individual analyses, a common analysis of the three observers was carried out, comparing their results with the purpose of analyzing each of the actions of the observed students.
- Subsequently, a final video of each student was edited where the items were indicated and whether they were correct or not during the interview. This video was sent to the participants to offer them feedback and corrections during the confinement (period that included in Spain from March 13 to May 1, 2020).

Statistical analysis

After studying the data, its analysis is carried out using the statistical program IBM SPSS version 22. A descriptive analysis of the sample is carried out; analysis of the percentage of completion of the items on the checklist; a quantitative analysis of each student's checklist scores. In addition, the study of the reliability of the inter-observer analysis and the Kappa index of the checklist is carried out, which was used to make 3 independent observations of the videos collected.

Ethics

All students signed an informed consent for participation and use of images. This research has been approved by the human ethics committee of the University of Las Palmas de Gran Canaria (CEIH-2021-02).

3. RESULTS

Sample Description and Checklist Results

Of the participating students (n=35), 51.4% were men and 49.6% women. There was no loss of subjects at any point in the evaluation. After collecting and analyzing the videos, the results of the items on the checklist evaluated throughout the interview are shown below (figure 2).



Figure 2. Frequency results for each item.

The items related to the category "Know how to listen" (items 01-04) show that 97.1% of the students name the patient by name during the interview (item 01) and 73.4% are able to report what is heard. will perform in the interview process (item 02). The ability to maintain direct eye contact with the patient during the process is present in 97.1% of the students (item 03). 74.3% are calm and calm to talk to the patient (item 04).

In the evaluation of the items collected in the category of "Appropriate questions", we found that 97.1% of the sample asks open questions during the interview (item 06) and asks for the reason why the patient comes to the consultation (item 05). All students (100%) manage to avoid personal questions during the process. However, only 45.7% record the answers obtained.

Regarding the category of "Trust", we find that 94.3% of the students are active in the conversation (item 09), 68% show patience when dealing with the patient (item 10), 40% are able to respect silences (item 11) and, finally, , only 14.3% of the sample made the final explanatory summary to the patient (item 12).

Quantitative results of checklist.

All the students in the sample (n=35) obtained a score higher than 6 points, that is, of the 12 total items, they were able to perform 6 of them. Table 1 shows the scores obtained in the test (see table 1), where it is observed that the majority of the students reach between

8 and 10 points (62.8%), and only 5.7% of the students (n=2) manages to carry out an impeccable interview, obtaining 12 points, corresponding to the performance of all the items analyzed.

Qualification	Frequency	Percentage	Valid percentage	Accumulated percentage
6	3	8.6	8.6	8.6
7	3	8.6	8.6	17.1
8	7	20.0	20.0	37.1
9	9	25.7	25.7	62.9
10	6	17.1	17.1	80.0
11	5	14.3	14.3	94.3
12	2	5.7	5.7	100.0
Total	35	100.0	100.0	

Score values between 0 and 12 points. Scores below 6 points are not seen in the sample.

Agreement

The analysis of the Kappa Fleiss index was performed, due to the presence of more than 2 observers. This showed that 66.7% of the items (items 01, 02, 04, 05, 07, 08, 10 and 12) present a very good or good concordance with values >0.71 points, 25% of the items (items 03, 09 and 11) presents moderate agreement >0.42 points, and only item 06 presents weak agreement of 0.22 points. Therefore, 91% of the items show agreement between the 3 observers. (See table 2). Regarding the analysis of the internal consistency of the items used, *Cronbach 's Alpha* is 0.508 points, showing a poor coefficient according to the *Cronbach value scale* .

Items	Kappa	P Value	Kappa Cat.0 (No)	Kappa Cat.1 (Yes)	P Value
Item 01	1,000	0.000	1,000	1,000	0.000
Item 02	0.949	0.000	0.949	0.949	0.000
Item 03	0.490	0.000	0.490	0.490	0.000
Item 04	0.720	0.0000	0.720	0.720	0.000
Item 05	1,000	0.000	1,000	1,000	0.000
Item 06	0.220	0.240	0.220	0.220	0.240
Item 07	1,000	0.000	1,000	1,000	0.000
Item 08	0.885	0.0000	0.885	0.885	0.000
Item 09	0.480	0.0000	0.480	0.480	0.000
Item 10	0.714	0.000	0.714	0.714	0.000
Item 11	0.428	0.000	0.428	0.428	0.000
Item 12	0.918	0.000	0.918	0.918	0.000

Values of the Fleiss Kappa indices for each item.

4. Discussion

The results show that video-analysis is a practical and valid tool to analyze tasks in simulation environments in health sciences, as it has been in this clinical interview activity. It has allowed extracting visual and content information, accompanied by a checklist. In the most in-depth analysis of the sample, it has been possible to determine that all the

items, with the exception of 8, 11 and 12, were successfully developed in the entire sample. This has allowed us to identify that the students have more difficulties in collecting and recording the information transmitted by the simulated patient (item 8), which may be related to the difficulty that they may have in taking notes while having to follow the conversation. In addition, the vast majority forgot to make the final summary of the information collected, which is intended to explain the data in case there are errors, inconsistencies or to allow the patient to contribute something else (item 12) (12). On the other hand, they showed difficulty in respecting the silences that occur during the patient's speech (item 11), the cause of which can be attributed to the need to want to finish the task soon, which could translate into difficulty when it comes to know how to listen, despite showing mostly active conversation, with good eye contact and non-verbal communication.

Regarding the formulation of the questions, it is observed that they are aware of the importance of using open questions that allow the patient to speak, being able to avoid those that are closed questions, inappropriate or that are not related to the topic (items 6 and 7).

Thus, it is determined that the students analyzed have better developed the skills collected in the category of "appropriate questions" while on the contrary there are more difficulties in the category of "knowing how to listen". These data will allow us to design better training focused on these deficiencies in future teaching processes, in classes related to the clinical interview.

As far as video-analysis is concerned as a tool, these video-analyzed evaluations allow evaluators to view them countless times, thus making an exhaustive analysis of the test (10). In turn, they allow you to create a new video with those fragments that you want to highlight. This use was very useful given the situation of confinement and loss of presence. Teachers were forced to transfer all their academic activity to the online format, therefore, the use of the video database provided teachers with a powerful tool for feedback to students. This fact has been a useful tool for teaching and working with students at a time of accelerated change in methodology due to the situation.

Video-analysis, in addition to being viable, can be used as a method to qualify tasks that need to be scored as part of the subject's grade, as is usually done with other types of qualifying activities such as exams, theoretical exercises and / or practical. This makes this tool more attractive, since it is not only useful for analyzing a practice or task, but also makes it possible to qualify it. This is an advantage for the teacher as part of their daily practice.

This new form of teacher evaluation, in addition to providing quantifiable data as already described, is a new way of justifying the student's errors and successes during the test, allowing potential feedback to be established (15) to improve their clinical skills, in this case. case the clinical interview. Likewise, the possibility of being evaluated with a simulated patient supposes an approach to the professional reality that they must face once they graduate (11).

In general, the bibliography on the evaluation of clinical practices with video analysis is not widely studied in the field of university education in health sciences. There are works that use this method with university students to capture thoughts aloud during simulations (16) or focus groups (17). Other studies have also been conducted that use videos or vodcasts of standardized examples to educate and train students in clinical skills (18) or OSCE assessments in different disciplines (7,19–21). However, there are no publications in health sciences, until now, where video-analysis is used as a clinical

interview evaluation method, and there are few studies with the software tool CODIMG[®] (10).

Certain limitations of this study should be noted, such as the limited amount of the sample, so it is necessary to carry out expansion studies in larger samples to confirm inter-observer agreement and generalize the data not only in the area of physiotherapy but also in other disciplines of the health sciences. The future lines that are proposed are in extension studies, in teacher training studies, or with other objectives such as group training or ECOEs in all areas.

5. Conclusions

- Video-analysis is a valid tool for evaluation by teachers and could allow future implementation in the didactics of teaching in health sciences.
- This tool is a viable and useful method as a tool to evaluate the clinical interview.

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Author contributions :

Irene García-Rodríguez¹: Conception of the idea, execution of data collection, analysis

María del Pilar Etopa-Bitata²: Interpretation of the results and review of the manuscript

María García-Escudero³: Interpretation of the results and revision of the manuscript

D. David Álamo-Arce⁴: Execution of data collection and analysis

Marlene García-Quintana⁵: Execution of data collection and analysis

Raquel. I Medina-Ramírez^{6*}: Planning and conception of the idea, analysis and preparation of the manuscript.

References

1. García-Peñalvo FJ, Corell A, Abella-García V, Grande M. Online assessment in higher education in times of COVID-19. *Education in the Knowledge Society (EKS)*. 2020;21:26-26. <https://doi.org/10.14201/eks.23086>
2. Calvo ST, Cervi L, Tusa F, Parola A. Education in times of pandemic: reflections of students and teachers on virtual university teaching in Spain, Italy and Ecuador. *Latin Magazine of Social Communication*. 2020;(78):1-21. <https://doi.org/10.14201/eks.23086>
3. Ng L, Seow KC, MacDonald L, Correia C, Reubenson A, Gardner P, et al. eLearning in Physical Therapy: Lessons Learned From Transitioning a Professional Education Program to Full eLearning During the COVID-19 Pandemic. *Physical Therapy*. 2021;101(4):pzab082. <http://doi.org/10.1093/ptj/pzab082>
4. Fardoun H, Yousef M, González-González C, Collazos CA. Exploratory study in Ibero-America on teaching-learning processes and evaluation proposal in times of pandemic. *Education in the Knowledge Society*. 2020;21(17). <https://doi.org/10.14201/eks.23437>
5. Salinas J, de Benito B, Lizana A. Teaching skills for new learning scenarios. *Interuniversity magazine of teacher training*. 2014; 28(1):145-63. <https://dialnet.unirioja.es/servlet/articulo?codigo=4840056>
6. Garmendia C. On the construction of the European Higher Education Area, "Bologna" and other demons. *The University Question*. 2016;0(5):3-8. <http://polired.upm.es/index.php/lacuestionuniversitaria/article/view/3332>
7. Massey D, Byrne J, Higgins N, Weeks B, Shuker MA, Coyne E, et al. Enhancing OSCE preparedness with video exemplars in undergraduate nursing students. A mixed method study. *Nurse Education Today*. 2017;54:56-61. <https://doi.org/10.14742/ajet.1298>
8. Kearney M, Schuck S. Spotlight on authentic learning: Student developed digital video projects. *Australasian Journal of Educational Technology* [Internet]. 2006;22(2). Available at: <https://ajet.org.au/index.php/AJET/article/view/1298>

9. Gomez-Pablos VB, Valverde GH. Learning through collaborative projects with ICT. Analysis of two experiences in the educational context. *EduTec Electronic Magazine of Educational Technology*. 2013; (44):a240-a240. <https://doi.org/10.21556/edutec.2013.44.324>
10. Fernandez LMP. Video analysis: a new approach towards consecutive interpreting didactics. *MonTI Monographs on Translation and Interpreting*. 2019;(11):263-79. <http://dx.doi.org/10.6035/MonTI.2019.11.10>
11. Ramos G, Botero DA. Perception of clinical simulation as didactic in the teaching of postpartum hemorrhage in the Degree in Medicine. *Spanish Journal of Medical Education [Internet]*. 2022;3(1). Available at: <https://revistas.um.es/edumed/article/view/501861>
12. Left, GT. *Theoretical bases and fundamentals of physiotherapy*. Spain: Ed. Médica Panamericana; 2007. 167-191 p.
13. Medina-Ramirez RI, Alamo-Arce DD, Rodriguez-Castro F, Cecilio-Fernandes D, Sandars J, Costa MJ. Self-regulated learning microanalysis for the study of the performance of clinical examinations by physiotherapy students. *BMC Med Educ*. 2020;20(1):233. <https://doi.org/10.1186/s12909-020-02149-7>
14. Rosário P, Lourenço A, Paiva MO, Núñez JC, Pienda JAG, Valle A. Self-efficacy and perceived usefulness as necessary conditions for self-regulated academic learning. *Annals of Psychology / Annals of Psychology*. 2012;28(1):37-44. <https://revistas.um.es/analesps/article/view/140502>
15. Hattie J, Timperley H. The power of feedback. *Review of Educational Research*. 2007;77(1):81-112. <https://doi.org/10.3102/003465430298487>
16. Thackray D, Roberts L. Exploring the clinical decision-making used by experienced cardiorespiratory physiotherapists: A mixed method qualitative design of simulation, video recording and think aloud techniques. *Nurse Education Today*. 2017;49:96-105. <http://doi.org/10.1016/j.nedt.2016.11.003>
17. Hurst KM. Using video podcasting to enhance the learning of clinical skills: A qualitative study of physiotherapy students' experiences. *Nurse Education Today*. 2016;45:206-11. <http://doi.org/10.1016/j.nedt.2016.08.011>
18. Forbes H, Opreescu FI, Downer T, Phillips NM, McTier L, Lord B, et al. Use of videos to support teaching and learning of clinical skills in nursing education: A review. *Nurse Education Today*. 2016;42:53-6. <http://doi.org/10.1016/j.nedt.2016.04.010>
19. Cueva Reguera M de la, Martínez Pascual B, Torija L, Martínez Caro L. OSCE in Physiotherapy: objective evaluation of learning outcomes. 2018; Available at: <https://abacus.universidadeuropea.es/handle/11268/8293>
20. Mitchell O, Cotton N, Leedham-Green K, Elias S, Bartholomew B. Video-assisted reflection: improving OSCE feedback. *The Clinical Teacher*. 2021;18(4):409-16. <http://doi.org/10.1111/tct.13354>
21. Tan JY, Ma IWY, Hunt JA, Kwong GPS, Farrell R, Bell C, et al. Video Recording in Veterinary Medicine OSCEs: Feasibility and Inter-rater Agreement between Live Performance Examiners and Video Recording Reviewing Examiners. *Journal of Veterinary Medical Education*. 2021;48(4):485-91. <http://doi.org/10.3138/jvme-2019-0142>

