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Characterising the implementation of the *Grand Round* as a training strategy for Medical Technologist at the Pontifical Catholic University of Valparaíso

Caracterizando la implementación del Grand Round como estrategia de formación del Personal de Tecnología Médica de la Pontificia Universidad Católica de Valparaíso

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Abstract

The Grand Round is a strategy used in medical education based on the presentation of clinical cases that promotes the learning of practical and professional skills. The School of Medical Technology at the aforementioned university implemented a virtual mode of Grand Round during the pandemic to enable students to develop clinical reasoning, communication skills, and the ability to integrate knowledge. The objective of this article is to characterize the implementation of their strategy in the ophthalmology and bioanalysis specialties. Student interactions observed in the classes are analyzed using a phenomenological approach and a study designed on the basis of an intrinsic case study. The results suggest two main dimensions: first, the involvement of the

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students, and second, the mediation of the teachers. In conclusion, the Grand Round is an opportunity for active and meaningful learning that requires ensuring conditions for the best interaction of students and to enhance their positive attitude.

Keywords: learning strategy; case study; health education; group learning.

Resumen

El Grand Round es una estrategia utilizada en la formación médica basada en la presentación de casos clínicos del área de la salud que favorece el aprendizaje de competencias prácticas y profesionales. La Escuela de Tecnología Médica de la universidad estudiada instauró una modalidad virtual de Grand Round durante la pandemia con el fin de que el estudiantado desarrollara competencias de razonamiento clínico, habilidades comunicacionales y capacidad de integrar los conocimientos. El objetivo del artículo es caracterizar el modo de implementación de la estrategia en las especialidades de oftalmología y bioanálisis. Para esto, mediante un enfoque fenomenológico y un diseño basado en un estudio de casos de tipo intrínseco, se analizan las interacciones de los y las estudiantes observadas en las clases. Los resultados sugieren dos dimensiones principales, primero, la implicación del estudiantado y segundo, la mediación del cuerpo docente. Se concluye que el Grand Round es una oportunidad para el aprendizaje activo y significativo. Existe el anhelo y desafío por aumentar la interacción de los y las estudiantes y comprender sus actitudes.

Palabras clave: estrategia de aprendizaje; estudio de caso; educación sanitaria; aprendizaje en grupo.

Introduction

The 21st century requires training university students capable of making decisions through meaningful and autonomous learning (Matienzo, 2020). In this sense, competency-based learning models seek for students to demonstrate their ability to integrate cognitive, procedural and attitudinal knowledge (Cejas et al., 2019). The professional competences that must be developed by those studying health careers are varied, however, there is a common core to all of them: clinical reasoning. Various studies point to the relevance of developing this skill (Maurício et al., 2022; Moruno et al., 2019), which allows students to integrate information and propose solutions to situations in the professional world, through data analysis and hypothesis formulation (Barrows and Tamblyn, 1980).

In Chile, the professional who performs health examinations is the medical technology staff. The Pontificia Universidad Católica de Valparaíso (PUCV) is one of the 22 Chilean institutions offering this profession, with two specialisations: Ophthalmology and Contactology (hereafter, ophthalmology) and Clinical Molecular Bioanalysis, Immunohematology and Transfusion Medicine (hereafter, bioanalysis). The duration of

the course is 10 semesters, in which the student must pass the first three semesters of a common plan composed of general and introductory sciences of the course, and then choose the speciality. The graduate profile emphasises commitment to the community and the human being. Their strong knowledge of biomedical sciences enables them to develop competencies in the evaluation and detection of health problems with the aim of contributing to the diagnosis and timely referral of the patient. These traits are aimed at training a professional capable of integrating into multidisciplinary teams to provide the best health care. Their actions, therefore, are based on critical thinking to solve problems inherent to their position, which is why they must develop a complex cognitive process to evaluate and manage a patient's medical problem (Da Bove et al., 2022). This skill requires students to be immersed in a large number of health problems, which requires an innovative educational strategy that allows for curricular integration and articulation. This is where the *Big Round* strategy comes in.

In the 19th century, Sir William Osler, advocated bringing junior medical staff *to the patient's bedside* to enable *on-site* clinical case discussions as a new strategy to train them (Reddy et al., 2022). Although the benefits of this learning methodology were not proven, its popularity was demonstrated by the increase in attendance at such classes (Agee et al., 2009), whereby patients who were present were discussed and mediated expert learning by specialists to improve their clinical reasoning skills (Hull et al., 1989).

Over the years, the focus shifted from the sick person to the disease (Riley, 1992). Thus, this strategy took on a more academic approach, favouring the development of new competencies, such as organising information, selecting tests and developing clinical reasoning (Praschinger et al., 2007), as well as improving communication skills (Fahim et al., 2016; Xu et al., 2020). Today, *Grand Round* is a clinical case discussion strategy based on interaction between health professionals in training and their teacher-trainers (Meresh et al., 2019).

Within this framework, in March 2020, the PUCV Medical Technology course began to implement the *Grand Round* as a curricular articulation tool. It arises from the need to improve the clinical reasoning, knowledge integration and communication skills of its students. Similarly, it constitutes an instance of preparation for the degree exam and interaction with the community as a result of the participation of external professionals. This space brings together the teaching staff and students taking subjects with a clinical care component. The role of the student varies according to their curricular progress, in their first period of practice they are listeners, in their second and third period, they respond according to their academic progress and the professional practice staff present and guide the presentation of the clinical case. Regardless of these roles, all students are evaluated formatively, as in the case of curricular internships, and summatively, as in the case of a clinical case presentation.

While studies have been published highlighting the contribution of *Grand Rounds* (Bynum et al., 2020), there are also criticisms of their use as a formative instance. For example, its loss of attractiveness due to sporadic attendance and lack of engagement of learners (Crossman et al., 2021; Stanyon and Khan, 2015); the low participation and interaction of the audience with the presenters and the distracting impact of the use of mobile devices and/or access to information on the internet (Ali and Saikumar, 2015). For this reason, it is relevant to study in detail the implementations carried out in university classrooms, especially in careers such as medical technology, where this type of studies are scarce.

In this way, this article seeks to answer the following question: What opinions and evaluations does the implementation of the *Grand Round* strategy generate in the students of the medical technology course? The objective of this article is to characterise the functioning of the *Grand Round* classes implemented in the Medical Technology course at the PUCV from the perspective of the participating students.

Methodology

Method

A qualitative phenomenological method was used for this research. As such, it seeks to enter into the lived experiences from subjectivity to understand socio-educational phenomena, aspiring to elucidate them in a holistic way, that is, considering the facts and the significant experience about them (Fuster, 2019; Van Manen, 2003). From this perspective, the study investigates the practices experienced by students of a university degree in the area of health, when participating in the *Grand Round* strategy. For its implementation, an intrinsic case study design was chosen, which is selected for its value in itself and for the possibility of collecting the greatest amount and variety of data for analysis (Redon and Angulo, 2017; Thomas, 2021). For this case, it is a career that implements the studied strategy as part of its regular training activities.

Participants

The participants are 4th and 5th year undergraduate students of the PUCV Medical Technology course. In total, 125 students enrolled in *the Grand Round* activity participated, 52 ophthalmology students and 73 bioanalysis students, which represents all the people enrolled in the course. The unit of observation was the 18 virtual *Grand Round* classes developed and recorded during the second semester of 2022. No criteria were applied for their selection as they represent 100% of them. In addition, the teaching staff of the two mentions were also the object of study.

Strategies

The strategy used is non-participatory direct observation (Campos and Lule, 2013; Rodríguez, 2005). The choice of this technique is due to the need to know the research problem as it is evidenced in order to understand how the students work in this social environment. The situations that were observed correspond to the audiovisual material of the weekly *Grand Round* meetings of both specialities of the selected academic period.

Procedure

After establishing contact with the management of the course, the virtual sessions of the *Grand Round* corresponding to the second semester of the year 2022 were observed. Specifically, an individual review of the videos of the speciality of ophthalmology and bioanalysis was carried out during the months of September, October and November. In both specialisations, a weekly session was scheduled from 17.00 hours.

The observation of the audiovisual material in ophthalmology was done through the YouTube website, while in bioanalysis it was done from a shared folder on Google Drive. It is worth mentioning that some classes were accessed synchronously without any participation. The information obtained was recorded in a field notebook using a structured observation guideline. The *Grand Round* activities were transcribed and coded individually and independently, and then reviewed by the team, resolving discrepancies and generating emerging codes. A total of 18 videos with a total of 1463 minutes were analysed.

Notes in the field notebook included descriptions of events and activities as follows (Gibbs, 2012, pp. 52):

- *A record of what has happened.* It is the description of the events occurring in the moment, i.e. a reconstruction of the dialogue, the physical environment, accounts of particular events or activities taking place in the moment.
- *Recording one's own reflections on what happened*. Personal thoughts, speculations, emotions, ideas, ideas, questions, impressions and prejudices of what was visualised are noted.

The research had the Approved Certification, code BIOEPUCV-H 637-2023, issued by the Bioethics and Biosafety Committee of the PUCV.

Analysis of the information

The information from each observation was analysed thematically. This process was carried out in four phases (Gibbs, 2012; Valles, 1999):

- *Reading the text.* Underlining textual fragments from the notes. The text was delimited with different colours and notes were taken in the margins to indicate which section the fragment corresponds to.
- *Categories.* After coding each of the classes, a system of categories referring to the same theme was applied. Manual processing was chosen, allowing for a concrete and flexible classification in accordance with the objectives of the study.
- *Meta-categories.* Having defined the categories, the elements were separated into meaningful units from the students' and teachers' point of view.
- *Results.* Description of the strategy, selection of fragments and elaboration of matrices explaining the characteristics of the *Grand Round*.

Results

The results obtained from the review of 18 virtual *Grand Round* development classes, 9 classes for each speciality with an average length of 1 hour and 20 minutes each. Table 1 summarises these aspects per session:

Table 1

Characterisation of the Grand Round classes

	Ophthalmology				Bioanalysis			
Class	**No. Clinical case**	**Clinical case (min.)**	**Students consulted**	**Total class time**	**No. Clinical case**	**Clinical case (min.)**	**Students consulted**	**Total class time**
1	1	33	13	1:13:59	1	40	19	1:09:16
	2	35	10		2	29	13	
2	3	45	11	1:32:03	3	41	16	1:23:13
	4	43	10		4	41	13	
3	5	28	13	1:18:52	5	44	16	1:29:40
	6	49	19		6	45	9	
4	7	24	15	1:40:46	7	41	18	1:10:09
	8	75	17		8	29	15	
5	9	41	22	1:17:57	9	32	20	1:19:26
	10	34	9		10	47	15	
6	11	25	8	1:07:00	11	39	19	1:27:17
	12	36	12		12	38	25	
7	13	51	26	51:22	13	45	22	1:39:21

	-	-	-		14	54	27	
8	14	39	15	1:29:00	15	46	23	1:28:00
	15	40	13		16	42	19	
9	16	44	12	1:25:41	17	40	16	1:20:38
	17	41	8		18	40	19	

Descriptively, in each session a teacher acted as a moderator to help participants have the opportunity to make their contributions, their role was to ask each student to answer questions or doubts that were raised about the problem in question. The role of the teaching staff was to facilitate the understanding of content, transmit their experiences, evaluate the students' learning by answering doubts, explaining and asking questions to generate debates, as well as providing professional guidance, e.g. using technical language, supporting answers with precise concepts, improving the use of tone and volume of voice, analysing the information provided and improving the use of time when presenting. On the other hand, there is a coexistence of students who actively participate in *Grand Round* activities with those who show disinterest and difficulties in participating.

In both specialties, during the sessions, the role of *Grand Round* was verbally reinforced as a formal preparation space for the degree exam, clinical fields and the subjects of the curriculum itself because it favours clinical reasoning and speaking. Emphasis was also placed on the formative and cumulative nature of the evaluation by virtue of the percentage of attendance and participation of each individual. Table 2 characterises the development of the sessions for each speciality:

Table 2

Characterisation of the development of the Grand Round classes by speciality

Ophthalmology	**Bioanalysis**
The students individually took on the role of presenter and guide of their own clinical case. The second clinical case was guided by a different student than the previous one. Use of *PowerPoint* to support the presentation of the case. The resource had a set format of white background with black letters. Exhibitors declare that they have no conflict of interest in the case. Order of presentation: background,	The presentation of clinical cases was guided in groups of 6 to 9 students. Specific roles were established within the team: some were presenters and others were in charge of giving feedback. The second clinical case consisted of the same group. Use of *PowerPoint* to support the presentation of the case. Presentations had colourful or neutral designs.

development, diagnostic hypothesis and conclusion. Complementary scientific papers were presented. During the presentations, the presenters and teachers provided interpretations, doubts and discussions to clarify queries. They clarified misconceptions and gaps in knowledge, providing feedback at all times. Use of the Zoom Chat to ask questions. These comments were immediately read by the moderator to request explanations at the same time. By way of identification, all students illustrated in their session the nomenclatures of C2 (clinical 2) or PP (professional practice) followed by their first and last name. During the course of the class, participants kept their cameras turned off during all sessions, but not the day's speakers and teachers.	Order of presentation: background, development, diagnostic hypothesis and conclusion. The presentations incorporated information on the role of the medical technologist. Feedback from teachers and presenters took place mainly at the end of the presentation. There, the moderator would initiate a round of questions or read some of the comments from the chat to resolve doubts or generate a dialogue on the topic presented. Zoom chat information was only shared to the public when it was not resolved by the same means. Some learners did not identify their name when logging on to the virtual platform. Others used their name without any specific nomenclature. During the course of the class, participants kept their cameras off during all sessions, but some of the day's speakers and teachers did not.

From the analysis of the transcripts of the observations of each class video and their categorisation, 2 common meta-categories emerge: *Student Involvement and Teacher Mediation*, which are presented below. In order to ensure that the identity of the individuals cannot be traced, each person in the programme was assigned a random number, so that the texts presented below only individualise the terms *students and teachers*.

Student Involvement

Student absence

This instance includes all the times when the moderator's call was not answered and there was no sign of participation from the students. It should be noted that the teacher on several occasions made the call more than once to give the student the opportunity to speak, however, those present did not respond even though their session was active during the class.

Ophthalmology: "Student nº3 is asked to continue, but does not show up. We insist twice and continue with student nº4" (S3-00:16:51).

Bioanalysis:
"They call student Nº80 to answer the second question, there is silence, and they call student Nº81, who does not answer the call either. Teacher Nº7 says: uuh there is a lot of water today. Now they call student Nº82, and he doesn't answer either" (S5-00:02:07).

Difficulties or problems in their participation

In this category are the inconveniences that some trainees reported when participating in the class (e.g. travelling, observing from a mobile phone without access to a good image, being in the street, being at their place of practice, problems with the ZOOM platform, loss of internet connection, no mobile phone battery, being busy, not having a microphone to respond, not wanting to participate and arriving late to the class).

Ophthalmology:
"Student no. 25 has to answer the second question on diagnostic hypothesis and reports that he goes in the street in case he hears something wrong" (S2-00:04:03).

Bioanalysis:
"There is a moment of silence, so the teacher Nº6 asks what happened, and the student Nº92 says that the internet "stuck" to him, starting again with the explanation" (S2-00:47:00).

Voluntary participation

It was observed that students volunteered to raise their hands or talk via the platform's messaging system to ask questions or answer queries. It should be noted that we did not have access to the messages that were generated during the classes, so the category takes into account the participation of the chat only when the teacher mentioned in particular the name of the student who made the query.

Ophthalmology:
"Teacher nº2 asks if anyone else wants to contribute to the case. Student nº35 offers and answers about the diagnosis, giving a justification as to why he thinks so" (S3-01:04:21).

Bioanalysis:
"Student Nº120 asks for the floor to resolve a doubt, mentions that the case was "cool" and that it was "super" complete. Student Nº120 asks the group a question" (S6-00:27:40).

Students in doubt or unable to respond

This includes all the circumstances in which those present reported not knowing what they were being asked, mentioning that they did not remember the subject matter, that they were unclear about it or that they could not think of what to say, a situation that forced them to continue with another student or else the teacher took the floor to explain.

Ophthalmology:
"Teacher nº3 asks him if he can refer to the subject of the decrease in the visual field of the left eye and student nº44 mentions that he cannot think of what to say" (S4-01:17:58).

Bioanalysis:
"Teacher Nº10 asks a new question, student Nº56 mentions not knowing the answer, to which they call on anyone in the group to answer, student Nº93 responds" (S8-01:23:05).

Educational Mediation

Use of technical language and vocabulary

This classification refers to the use of terminology and expressions that belong to the professional field or to the formal language of a more serious body.

Ophthalmology:
"Then student nº46 is asked to describe some images, at this point teacher nº3 interrupts and tells student nº22 not to use "cachamos" when answering his question. Student nº22 apologises and the teacher indicates that this is the 1st GR" (S1-00:09:10).

Bioanalysis:
"Now teacher Nº10 mentions that he will make a suggestion regarding the use of certain words when speaking and explains it" (S1-01:05:10).

Time management

It is understood as the appropriate allocation of time for presentations.

Ophthalmology:
"After 48 minutes the second presentation begins, given by student nº1. Teacher nº3 tells him to please take the 30 minutes so as not to finish after closing time" (S2-00:48:10).

Clear and substantiated answers

In this category we find situations in which teachers demanded their students to justify their answers, in addition to the request to be able to explain with clear and understandable concepts.

Ophthalmology:
"Student #47 is asked to describe the image, he speaks, but teacher #3 asks him for explanations, asking him to give his opinion on something specific" (S5-00:09:40).

Bioanalysis:
"Teacher Nº10 talks about information that was given so that they understand its relevance, and asks 2 questions that must be answered with a scientific basis. Student Nº116 answers, but

the teacher asks the student for the basis, student Nº116 speaks again, and teacher Nº10 mentions that this is the explanation and that this is how they should answer" (S3-00:38:05).

Analytical skills

The school's teaching staff hoped that the participants would be able to reach a more complex processing of information in order to draw a clinical conclusion.

Ophthalmology:
"Teacher nº2 is asked for his opinion, he says that he will get to the point and tells the student that he got lost at the beginning, and that all he did was name the data, that they should make an analysis because they are almost medical technologists and asks student nº49 for ideas or suggestions for the exam" (S4-01:09:52).

Bioanalysis:
"An image of the Power Point is shown again to complement the answer. After the student responds, teacher Nº6 points out that they should analyse the information and that this was the analysis he was expecting" (S6-01:20:43).

Tone of voice

Tone of voice in oral communication is a rare requirement, but it is taken into consideration since one of the purposes of the *Grand Round* is to improve or strengthen communication skills.

Ophthalmology:
"Student nº28 introduces himself and teacher nº3 asks him to speak louder please because he cannot be heard well" (S6-00:24:39).

Teacher feedback

This refers to content feedback as part of the training process, as well as comments or opinions from a socio-emotional perspective.

Ophthalmology:
"Teacher nº2 interrupts and mentions that it is understandable that the students are going to collapse with this exam because this is something from another team that most of them have not seen, and that they should not stress, he advises them to breathe first, then think and talk because the data is there, they know it and it is just distributed in a different way" (S4-00:57:10).

Bioanalysis:
"Teacher Nº6 asks a question to the group. Student Nº126 answers the teacher, the teacher also explains the answer. Then he asks another question, and a student answers, but the camera is turned off so you can't see who is speaking. Teacher Nº6 gives feedback" (S5-00:59:02).

Based on the above, the information is reported in matrices that specifically show the frequency of categories observed in each class.

The observation of students in Ophthalmology (table 3) indicates that in class 2 all students responded to the moderator's call. As for difficulties in participation, no students reported problems in class 8, which allowed for smooth collaboration. Voluntary participation was evident in all classes, with at least one student complying with this characteristic. Finally, in class 9, all the students consulted responded to the questions posed. On the other hand, for Bioanalysis (table 4), the absence of students in all classes can be observed. Problems in participating were present in all sessions, with at least one student reporting some difficulty. In terms of voluntary participation, it can be observed that in class 1 no students from outside the presentation group participated during or at the end of the case study, while in class 5 there was more intervention. In all sessions at least one student stated that he/she did not remember the information that was asked.

Disparities between the two specialties can be seen in the data presented in tables 3 and 4. Although the bioanalysis participants logged in to the classes, a reduced percentage actively participated when their interaction was required compared to the ophthalmology speciality. This disparity is evident when analysing student absence and voluntary participation in both areas of study. An external factor that influences the interaction of all students are the difficulties they admit to face, such as problems with the Zoom platform, loss of internet connection or being in noisy environments, among others. These obstacles, together with the category "students with doubts", show a slight prevalence in bioanalysis.

Table 3

Ophthalmology Student Observation Matrix

Category	Session								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Student absence	1	0	7	7	7	1	6	4	2
Difficulties in their participation	4	1	4	2	1	1	2	0	2
Voluntary participation	4	8	5	4	1	4	4	4	3
Students with doubts	4	3	3	4	2	3	5	7	0

Table 4

Bioanalysis students' observation matrix

Category	Session								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Student absence	5	5	1	6	10	9	12	5	4
Difficulties in their participation	2	2	2	5	3	2	1	3	3
Voluntary participation	0	2	1	1	4	3	2	1	1
Students with doubts	6	1	1	3	4	3	7	5	3

With regard to the teaching role, in Ophthalmology (table 5) it is observed that the most recurrent category is feedback to the course. Aspects such as the use of technical language, clear and well-founded answers, and analytical skills stand out. Less commonly, categories related to time management and tone of voice are identified. For Bioanalysis (table 6), feedback is also the predominant category. It is noteworthy that at least three teacher mediators participated in each session. In addition, categories such as the use of technical language or analytical skills are less frequently reported. It should be noted that the elements of time management and tone of voice do not emerge for this speciality.

The data presented in tables 5 and 6 show the relevance of teacher feedback for both specialities. It also highlights the diversity of aspects that can affect the quality of teaching, ranging from the use of technical language to time management and tone of voice. The disparity observed in the categories could be attributed to the role adopted by each teacher and their commitment to assisting the learner effectively.

Table 5

Ophthalmology teacher observation matrix

Category	Session								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Use of technical language and vocabulary	1	1	0	1	0	1	0	1	1
Time management	1	1	0	0	0	0	0	0	0
Clear and substantiated answers	1	0	2	3	1	1	0	0	0
Analytical skills	0	0	0	3	0	0	1	1	1
Tone of voice	1	0	0	0	0	1	0	0	0
Teacher feedback	3	3	1	3	4	3	3	3	3

Table 6

Observation matrix for bioanalysis teachers

Category	Session								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Use of technical language and vocabulary	1	0	0	0	0	0	0	0	0
Time management	0	0	0	0	0	0	0	0	0
Clear and substantiated answers	2	1	4	0	2	1	0	2	0
Analytical skills	0	0	0	0	0	1	0	0	0
Tone of voice	0	0	0	0	0	0	0	0	0
Teacher feedback	3	3	3	3	3	4	4	3	3

Discussion and Conclusion

This research is the first study in Chile to evaluate the *Grand Round* strategy. The results of this study fulfil the objective of characterising the functioning of the classes implemented in the Medical Technology course. The analysis found two elements that were separated into meta-categories: student *involvement and faculty mediation*.

The student's absence is considered a disadvantage in virtual contexts as they are able to turn off their cameras. Although the evaluation rubric for the activity included a participation item, it did not generate a penalty in the grade when the answers were wrong, however, not answering the moderator's question is reflected in the student's final grade. Even so, the non-response rate was higher than expected, so it is recommended to look for motivational strategies that take into account the emotional component. Other publications report low participation in face-to-face mode (Crossman et al., 2021; Stanyon and Khan, 2015), so this aspect may not be related to virtuality. Bynum (2020) points out that low participation may be due to the fact that some speakers are less dynamic and that questions may be intimidating for participants, requiring further studies to identify the influence of embarrassment, anxiety or other feelings on students' expression of clinical knowledge.

On the other hand, the activity may become less attractive to learners due to the distracting impact of using mobile devices and/or accessing information on the internet (Ali and Saikumar, 2015), which is available during virtual sessions. Cruces Montes et al (2016) identified the problematic use of information technologies in university students, establishing a positive correlation with low impulse control and a negative correlation with responsibility, a variable that decreases the attention of attendees.

The absence or decrease in participation can also be explained by the problems reported by the students. Given this difficulty, it seems necessary to instruct students to

find a place with a stable connection for the activity, taking into account the travel times to their places of residence when planning the timetables of those enrolled in the subject. Peterson (2021) suggests instructing participants to log on to the platform a few minutes beforehand to check the audio and visual, so that there is advance preparation of the conditions under which the connection will be made for effective learning.

It should be noted that voluntary participation was significantly higher in the ophthalmology subject, which may be due to the interventions made during the case report, as opposed to what happened in the bioanalysis subject, where these were made at the end of the presentation. This active participation of the student shows interest and motivation to learn and should be encouraged by the tutors, so that the student takes an active role in the learning process. This role is also conditioned by students' perceptions of the learning environment, as these have an important influence on academic stress and performance (Stormon et al., 2022).

Those situations in which the students were not able to issue a direct message because they were in doubt or unable to respond, urges the students to review the contents by constituting a self-assessment of the knowledge acquired and in this process they are forced to develop problem-solving skills (Barrows and Tamblyn, 1980). Habituation and weekly training allow for the development of self-learning by providing the possibility of diagnosing each student's own shortcomings, thus constituting a tool for the articulation of the curriculum.

The discrepancies identified in Tables 3 and 4 lead us to reflect on the possible influence of various factors on students' performance. Internally, it is crucial to consider the individual characteristics of each subject, as well as their predisposition and satisfaction with the strategy employed. Externally, it is suggested that the teaching strategies and the distracters present in the virtual modality may be influencing these divergent results. It is important to note that bioanalysis has a higher number of enrolments, which could explain the disparities with ophthalmology. Despite the differences, both specialties show the same categories, suggesting the need for a more detailed analysis to fully understand these findings.

An important part of the process are the teaching staff, they are transcendental members in the success or failure of the academic programmes and they are the driving forces of incentive towards the students, that is why it is imperative to consider their role, since they collaborated in the activity as counsellors and orientators, giving instructions and advice to their students (Guamán and Espinoza, 2022). The analysis presented in tables 5 and 6 identifies differences in the consideration of elements such as time management and tone of voice between the different sessions evaluated. These highlight the diversity of aspects that can influence the quality of teaching, and suggest that the commitment and role adopted by each teacher can influence the effectiveness of student assistance.

The virtual format leads to interaction with the audience, which is considered valuable. Learners are encouraged to work on and improve clinical reasoning (Palaniappan et al., 2022; Praschinger et al., 2007), encourage informed responses and strengthen communication skills. The latter occurs when feedback is meaningful and improves presentation skills (Fahim et al., 2016), so that students are confronted with communicating with other people and future professionals using the precise disciplinary language to describe, interpret and reach conclusions in clinical contexts. This practice allows the incorporation of technical language in order to gradually advance towards its natural use. It is also observed that in the ophthalmology mention they exceed the time allotted for the activity on several occasions, possibly due to repeated interventions during the presentation of cases. Although the interaction is positive, the student must adapt to the established times, demonstrating a capacity for synthesis in his/her interventions.

Although the *Grand Round* in Chile may not be considered the sentinel strategy for knowledge dissemination, the results show, and the literature supports, its importance in the educational process. The *Grand Round* as an educational strategy in the training of medical technology personnel fits the literature review according to the presentation of health-related clinical cases (Meresh et al., 2019). The description of this strategy provides an opportunity to evaluate its contributions as a cross-cutting learning axis through the discussion of diversified clinical cases that integrate the different subjects and provide meaningful learning for audience members specialising in this field. However, there is a challenge to increase the participation of the audience and to encourage the use of the lighted cameras. The use of digital technologies forms the basis of this programme and is an appropriate working tool.

To standardise the strategy, it is suggested to standardise the general structure of the programme for both specialities, such as defining the group or individual work, the format of the presentation and the identification of the students, and it is also advisable to verbalise the comments generated in the platform's chat so that all listeners have access to the audiovisual material in its entirety.

Since this research evaluated the series of virtual rounds carried out in only one educational institution, one limitation could be that these findings are not extrapolable, however, studying two specialties with different disciplinary work opens the way to create a generalisable coverage. Finally, its use and application in other health care careers that work with clinical case discussion and novel curricular models is recommended. Future research should aim to understand the performance of learners, and study issues related to the *Grand Round* strategy, such as types of feedback, role of the teacher, evaluative practices, adherence to new professional competencies, physiological and emotional states.

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