Students' Perception of the Impact of Video Demonstrations Shared through Whatsapp® in Their Clinical Performance

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Abstract: Objectives: To identify the perception of the impact of the use of the WhatsApp® application in the development of clinical skills in dental students from Colombia, Costa Rica and Peru. Methods: An online questionnaire was applied to 119 students: One hundred and two undergraduate students from Peru (P) and seventeen graduate students from Colombia (C) and Costa Rica (CR). Results: Most of the students perceive that the videos improved their clinic performance, express that sharing videos through the App could complement the theoretical classes, and believe that it promotes the use of information and communications technologies. Conclusions: The students' perception towards the use of the WhatsApp® application for education purpose is very positive. This disruptive digital technology enabled the meaningful learning of the undergraduate and graduate dental students. Sharing videos through the App can complement traditional lectures and enrich the learning experience.

Keywords: M-Learning, Whatsapp® Application, Clinical Performance, Dental Students, Videos

1. Introduction

The classrooms are now almost completely filled with students who belong to Generation Z. Young people born between 1995 and 2010 have incorporated the internet in the earliest stages of their learning and socialization (Dalmolin et al., 2018; Ortega et al., 2016). Digital tools are an integral part of their lives and they question the traditional model of education, facts that allow the development of new learning methods based on the experiences (Ortega et al., 2016).

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We also find Millennials currently enrolled in college or graduate school (Kotz, 2016). They are young adults that were born in an emerging world of technology, specifically between 1985 and 1994 (Moreno et al., 2017; Popescu et al., 2019). The Millennials grew up with the technology and had to adapt to it (Gibson & Sodeman, 2014). They expect technology to be part of their learning process as they consider it a source of information (Franz, 1998).

The education is evolving and a balance has been achieved between the new methods of teaching and learning and the timeless principles of education (Muttappallymyalil et al., 2016). Thus, the newer educational technology can be effective tools of teaching and learning in this rapidly changing technological world (Muttappallymyalil et al., 2016).

In the past, the search for information was limited to concrete spaces like libraries. Nowadays, internet-connected devices such as smartphones, tablets and computers allow the access to online learning platforms, course resources and interact digitally anywhere and anytime. They are valuable learning tools that can be adapted to different subjects with different levels of educations and situations (Anagnostopoulos & Bielikova, 2010; Darko-Adjei, 2019).

The m-learning stands out among this context. M-learning or mobile learning is learning using mobile devices and wireless transmission (Kumar Basak et al., 2018). Since these devices are designed to be extremely portable, they can help expand teaching and learning beyond the traditional classrooms (Kumar Basak et al., 2018). The m-learning creates a collaborative learning environment focus on sharing information (Ozuorcun & Tabak, 2012). Advances in the operating systems and software, such as applications (Apps), facilitates the communication through different formats: Short messages, quizzes, and multimedia contents (Ozuorcun & Tabak, 2012).

Patil et al. (2016) found that undergraduate students showed interest and positive attitude towards the use of mobile devices for learning, and that in developing countries, the mobile technology has gained immense popularity and can be a potential tool to support and improve teaching and learning activities. Social media technologies like instant messaging (IM) have improved communication immensely (Moorhead et al., 2013). Currently, for young people, it is a much more popular and efficient communication tool than e-mails (Khatoon et al., 2014, 2020). IM Apps, such as WhatsApp®, allows users to chat simultaneously and create group chats to share audio files, video files and attached images (Khatoon et al., 2020).

Gen- Z learners spend almost ten to twelve hours online per day and Millenials, twenty-five hours/week (Nandhakumar, 2019). The former believe that their experience with technology will help them achieve their life goals (Nandhakumar, 2019). According to Khatton et al. (2020) students want IM to be part of their learning. Thus, the aim of this study was to identify the perception of the impact of the use of WhatsApp® application in the development of clinical skills of dental students from Colombia, Costa Rica and Peru.

2. Materials and Methods

This quantitative, non-experimental, descriptive research used non-probability sampling method by convenience. A total of 119 dentistry students (Aged between nineteen and thirty-three years) participated

in the study: 102 undergraduate students from Peru (P), ten graduate students from Colombia (C) and seven graduate students from Costa Rica (CR) (Table 1).

Table 1: Country of origin of the participants

Country	n	%
Peru	102	85.7
Colombia	10	8.4
Costa Rica	7	5.8
Total	119	100

Group chats were created with the students in the WhatsApp® application (one group for each country) and fifty-five videos of clinical activities carried out by dental students were shared through this App, prior signing of the informed consent by the patients. The student's experience was evaluated through an online questionnaire. The statements are shown in tables 2-7. The responses were anonymous, and the students were assured that there was no right or wrong answer. A descriptive analysis was performed.

3. Results

The videos shared through the WhatsApp® application were viewed by 99 % of the students from Peru, 100 % of the students from Colombia and 99,2 % of the students from Costa Rica (Table 2).

Table 2: Viewing of the videos shared through the WhatsApp® application

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Yes	101	99	10	100	7	100	118	99.2
No	1	1	0	0	0	0	1	0.8
Total	102	100	10	100	7	100	119	100

The results (Table 3) show that 91,2 % of the Peruvian students, 90 % of the Colombian students and 71,2 % of the Costa Rican students perceive that the videos improved their clinic performance (High and very high contribution). 16,7 % of the students from Peru 10 % of the students from Colombia and 42,9 % of the students from Costa Rica think that the multimedia contents contributed moderately (Moderate contribution) to their performance. 5,9 % of the Peruvian students and 28,6 % of the Costa Rican students believe that the videos had little contribution (Low and very low contribution). No Colombian students had that perception. Finally, only 2,9 % of the students from Peru perceive that they did not help to enhance their work (No contribution). None of the Colombian students nor the Costa Rican students believe that.

Table 3: Perception of the extent to which the videos have contributed to improve clinical performance

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
No contribution	3	2.9	0	0	0	0	3	2.5
Very low contribution	1	1	0	0	1	14.3	2	1.7
Low contribution	5	4.9	0	0	1	14.3	6	5
Moderate contribution	17	16.7	1	10	3	42.9	21	17.6
High contribution	51	50	6	60	1	14.3	58	48.7
Very high contribution	25	24.5	3	30	1	14.3	29	24.4
Total	102	100	10	100	7	100	119	100

77,5 % of the students from Peru consider that sharing the videos through WhatsApp® was more appropriate than through the traditional communication channels (Table 4).

Table 4: Sharing the videos through the WhatsApp® application was more appropriate than through the traditional communication channels

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Yes	79	77.5	4	40	3	42.9	86	72.3
No	23	22.5	6	60	4	57.1	33	27.7
Total	102	100	10	100	7	100	119	100

However, only 40 % of the students from Colombia and 42,9 % of the students from Costa Rica agree with that. 96,1 % of the Peruvian students, 100 % of the Colombian and the Costa Rican students express that sharing videos through the App could complement the theoretical classes (Table 5).

Table 5: Sharing the videos through the App could complement the theoretical classes

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Yes	98	96.1	10	100	7	100	115	96.6
No	4	3.9	0	0	0	0	4	3.4
Total	102	100	10	100	7	100	119	100

Considering the perception of the students about the competences that could be developed through this methodology (Table 6), most of the students (77,5 % of the Peruvian students, 90 % of the Colombian

students and 85,7 % of the Costa Rican students) believe that it promotes the use of information and communications technologies (ICT). A large number of them perceive that sharing videos through the WhatsApp application contributes to being critical, creative and innovative (74,5 % of the students from Peru, 90 % of the students from Colombia and 71,4 % of the students from Costa Rica), to the personal, academic and professional development (68,6 % of the Peruvian students, 80 % of the Colombian students and 71,4 % of the Costa Rican students), and promotes teamwork (52 % of the students from Peru, 60 % of the students from Colombia and 71,4 % of the students from Costa Rica). Fewer students think that it contributes to the efficient performance in sociocultural and professional contexts (38,2 % of the Peruvian students, 60 % of the Colombian students and 14,3 % of the Costa Rican students), and to the ethical behavior (34,3 % of the students from Peru, 50 % of the students from Colombia and none of the students from Costa Rica).

Table 6: Perception of the competences that could be developed through this methodology

Competences	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Ethical behavior	35	34.3	5	50	0	0	40	33.6
Teamwork	53	52	6	60	5	71.4	64	53.8
Use of information and communications technologies	79	77.5	9	90	6	85.7	94	79
Efficient performance in sociocultural and professional contexts	39	38.2	6	60	1	14.3	46	38.7
Personal, academic, and professional development	70	68.6	8	80	5	71.4	83	69.8
Being critical, creative, and innovative	76	74.5	9	90	5	71.4	90	75.6

Regarding the characteristics that can be attributed to this methodology (Table 7), most of the students believe that the videos were easily accessible (88,2 % of the Peruvian students, 100 % of the Colombian and the Costa Rican students), useful (79,4 % of the students from Peru, 100 % of the students from Colombia and 71,4 % of the students from Costa Rica), time-saving (73,5 % of the Peruvian students, 70 % of the Colombian students and 86 % of the Costa Rican Students), and nice (70,6 % of the students from Peru, 90 % of the students from Colombia and 42,9 % of the students from Costa Rica). A great number of students frequently accessed the videos (67,6 % of the Peruvian students, 90 % of the Colombian students and 57,1 % of the Costa Rican students), express that they aroused the interest in the subject (69,6 % of the students from Peru, 70 % of the students from Colombia and 28,6 % of the students from Costa Rica) and that the amount of information was adequate (52 % of the Peruvian students, 60 % of the Colombian students and 28,6 % of the Costa Rican students). Fewer students think that with this methodology they learn better than with other traditional methods (47,1 % of the Peruvian students, 10 % of the Colombian students and 14,3% of the Costa Rican students) and that it favors the autonomy (31,4

% of the students from Peru, 40 % of the students from Colombia and 28,6 % of the students from Costa Rica).

Table 7: Characteristics that can be attributed to this methodology

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Easy access	90	88.2	10	100	7	100.0	107	89.9
Frequent access	69	67.6	9	90	4	57.1	82	68.9
Nice	72	70.6	9	90	3	42.9	84	70.6
Useful	81	79.4	10	100	5	71.4	96	80.7
The amount of information was adequate	53	52.0	6	60	2	28.6	61	51.3
Learn better than with other methods	48	47.1	1	10	1	14.3	50	42.0
Favors the autonomy	32	31.4	4	40	2	28.6	38	31.9
Aroused the interest in the subject	71	69.6	7	70	2	28.6	80	67.2
Timesaving	75	73.5	7	70	4	57.1	86	72.3

4. Discussion

The aim of this study was to identify the perception of the impact of the use of WhatsApp® application in the development of clinical skills of dental students from Colombia, Costa Rica and Peru. The incorporation of information and communication technologies and active learning methods is transforming the education, and the field of health sciences has not been the exception (Dalmolin et al., 2018). Nowadays, most of the students are young people who grew up in a digital world and are highly adaptable to technology (Hampton & Keys, 2016; Kon et al., 2017).

These young people are considered media multitaskers (Hampton & Keys, 2016; Kon et al., 2017). They learn through different approaches, combining e-learning with traditional face-to-face teaching methods, which improves learning (Dalmolin et al., 2018). The use of mobile devices in the teaching and learning process has attracted great attention in recent years. Mobile devices have become a part of every person's life (Darko-Adjei, 2019; Patil et al., 2016) They are easy to use and are portable (Darko-Adjei, 2019; Kumar Basak et al., 2018).

Most health science students own a smartphone (Masika et al., 2015; Rung et al., 2014). Mobile devices with more advanced computing capability and connectivity than a feature phone (Mahamud et al., 2015). In the academic field, they use it as a search and learning tool (Masika et al., 2015; Rung et al., 2014) due to easy and quick access to the information, saving time and effort (Patil et al., 2016).

Several studies assure that learning through mobile devices is effective, generate strong interest and can be integrated into medical education as a complement to classroom lessons (Masika et al., 2015; Patil et al., 2016; Rung et al., 2014; Wang et al., 2009). In addition, it is a flexible method since the students can

communicate easily with the professors and classmates, regardless of the time and place,(Patil et al., 2016) being a promising method to enhance the education in developing countries, (Patil et al., 2016) like Peru, Colombia and Costa Rica (Ciocca & Delgado, 2017).

Smartphones can connect to internet and run applications that allow users to communicate with each other (Khatoon et al., 2020). One of the most popular is the WhatsApp® application that not only allows effective interpersonal communication but has also proven to be an adequate tool in higher education, even in dentistry (Khatoon et al., 2020) where clinical practice is extremely important.

In the present study, the participants were undergraduate and graduate dental students from different developing countries, which live in a digital world. There was a positive perception towards the use of WhatsApp to develop clinical skills, regardless of the country of origin. The results reveal that almost all the students watched the videos and believe that they were easily accessible, useful and time-saving, which greatly improved their clinical performance. What is more, the videos were viewed multiple times.

Video demonstrations can provide an enduring, on-demand, portable resource for revision (Hibbert et al., 2013). Hibbert et al. (2013) demonstrated that exposure to high quality videos demonstrating clinical skills can significantly improve students' performance, when used as an adjunct to face-to-face clinical practice. Professors can send some videos before the class to prepare and motivate the students (Jang & Kim, 2014). Our results show that, again, almost all the students consider sharing this type of videos through WhatsApp® can complement the lectures. According to Khatoon et al. (2020) students would like this App to be part of their learning. However, it should complement rather than replace the traditional methods of teaching, embracing the idea of blended learning (Gupta et al., 2004).

On the other hand, as it was perceived by the students, the WhatsApp application can be implemented in the learning process to effectively train critical thinking skills: The generation of ideas, development of imagination and a personal perspective, flexibility in thinking and discussion between the participants (Kustijono & Zuhri, 2018).

However, a large number of the graduate students consider that the traditional communication channels, such as the e-mail, are more suitable for sharing videos than the WhatsApp® and believe that they learn better with other methods. Unlike the undergraduate students, graduate students are mostly young adults born before the Gen- Z. This group belongs to the Millennials and spent much of their early lives without electronic devices and without Internet. The Millennials grew up with the gradual introduction of technology into homes and social medias. Thus, they learn best by combining both the traditional teaching methods and digital tools (Popescu et al., 2019). Conversely, the Generation Z does not know a world without the Internet (Curtis et al., 2019). They prefer the digital models (Popescu et al., 2019).

Curtis et al. (2019) found that the Millennials are more likely to use e-mail than the Generation Z. Probably because the communication via e-mail was the primary channel for rapid communication when the Millennials were teenagers (Curtis et al., 2019). It is also possible that this group thinks that despite the numerous advantages of smartphones in learning, they can be a double edge sword (Darko-Adjei, 2019; Kibona & Mgaya, 2015).

Certain Apps, such as the WhatsApp® and social medias, can be addictive and inadvertently steal away students' time, which negatively affects their academic performance (Darko-Adjei, 2019; Kibona & Mgaya, 2015). What is more, unreliable and slow internet connection and the screen size make smartphone uncomfortable for learning (Darko-Adjei, 2019). It is important that professors guide the students to use digital tools effectively for academic purpose and keep them motivated to avoid distractions (Darko-Adjei, 2019). In addition, the use of a strong Wi-Fi connection and high-quality videos is recommended (Darko-Adjei, 2019).

Professors and students must adapt to changes and take advantage of new digital tools to enhance the teaching and learning process. The students should take an active role in this process. In dentistry, these tools are well accepted among the current undergraduate and graduate students and can be used to improve clinic skills.

5. Conclusions

The students' perception towards the use of the WhatsApp® application for education purpose is very positive. This disruptive digital technology enabled the meaningful learning of undergraduate and graduate dental students from Peru, Colombia, and Costa Rica. Sharing videos through the App can complement traditional lectures and enrich the learning experience.

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Table 8: Country of origin of the participants

Country	n	%
Peru	102	85.7
Colombia	10	8.4
Costa Rica	7	5.8
Total	119	100

Table 9: Viewing of the videos shared through the WhatsApp® application

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Yes	101	99	10	100	7	100	118	99.2
No	1	1	0	0	0	0	1	0.8
Total	102	100	10	100	7	100	119	100

Table 10: Perception of the extent to which the videos have contributed to improve clinical performance

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
No contribution	3	2.9	0	0	0	0	3	2.5
Very low contribution	1	1	0	0	1	14.3	2	1.7
Low contribution	5	4.9	0	0	1	14.3	6	5
Moderate contribution	17	16.7	1	10	3	42.9	21	17.6
High contribution	51	50	6	60	1	14.3	58	48.7
Very high contribution	25	24.5	3	30	1	14.3	29	24.4
Total	102	100	10	100	7	100	119	100

Table 11: Sharing the videos through the WhatsApp® application was more appropriate than through the traditional communication channels

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Yes	79	77.5	4	40	3	42.9	86	72.3
No	23	22.5	6	60	4	57.1	33	27.7
Total	102	100	10	100	7	100	119	100

Table 12: Sharing the videos through the App could complement the theoretical classes

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Yes	98	96.1	10	100	7	100	115	96.6
No	4	3.9	0	0	0	0	4	3.4
Total	102	100	10	100	7	100	119	100

Table 13: Perception of the competences that could be developed through this methodology

Competences	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Ethical behavior	35	34.3	5	50	0	0	40	33.6
Teamwork	53	52	6	60	5	71.4	64	53.8
Use of information and communications technologies	79	77.5	9	90	6	85.7	94	79
Efficient performance in sociocultural and professional contexts	39	38.2	6	60	1	14.3	46	38.7
Personal, academic and professional development	70	68.6	8	80	5	71.4	83	69.8
Being critical, creative and innovative	76	74.5	9	90	5	71.4	90	75.6

Table 14: Characteristics that can be attributed to this methodology

	Peru		Colombia		Costa Rica		Total	
	n	%	n	%	n	%	n	%
Easy access	90	88.2	10	100	7	100.0	107	89.9
Frequent access	69	67.6	9	90	4	57.1	82	68.9
Nice	72	70.6	9	90	3	42.9	84	70.6
Useful	81	79.4	10	100	5	71.4	96	80.7
The amount of information was adequate	53	52.0	6	60	2	28.6	61	51.3
Learn better than with other methods	48	47.1	1	10	1	14.3	50	42.0
Favors the autonomy	32	31.4	4	40	2	28.6	38	31.9
Aroused the interest in the subject	71	69.6	7	70	2	28.6	80	67.2
Timesaving	75	73.5	7	70	4	57.1	86	72.3