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The videoconference system as a way to serve students with absenteeism for medical reasons

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Abstract

This educational innovation is aimed at students who are forced to interrupt their schooling process for a period of time due to a medical issue. Its goal is to minimize students' loss of knowledge, skills or abilities.

To achieve this goal, we propose the use of a classroom videoconferencing device whereby different sessions can be viewed, either from home or from the hospital, by students who cannot attend class.

Sessions can be watched either synchronously (online or live display), enabling students to follow the overall progress of the session and participate in different activities in real time; or asynchronously (display on demand) when real-time display is not an option, by recording the session so that students watch it once the class is over. This system can be integrated into any learning platform so that students can self-organize and do assignments all activities more easily.

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1. Introduction

It seems obvious to mention the crucial importance of new technologies in contemporary society. New systems for transmitting and distributing information are constantly being created whose main goal is communication between people.

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The term ICT has many meanings. A 2009 benchmarking activity performed on the concept arrived at the following definition: Information and Communication Technologies (ICTs) are technological devices (hardware and software) that permit the editing, production, storage, exchange and transmission of data among different information systems that have common protocols. These applications, which make up computer media, telecommunications and networks, enable interpersonal (person-to-person) as well as multidirectional (one-to-many or many-to-many) communication and collaboration. The tools perform a substantial role in the generation, exchange, diffusion, management of, as well as access to, knowledge. ICT use is undergoing exponential growth in our era, increasing the digital and social gap between different generations.

The global character of ICTs permits 24-hour access, from almost any point on the Earth, to a great quantity of resources. Thus, ICTs are used in all fields today—for example, health monitoring, e-commerce, robotics, personal and professional communication, following news, email, audio and music, TV and film, social networks, the search for information, videogames, online banking, e-learning, access to culture, and others.

2. The digital divide

Despite the current proliferation of ICTs—and taking into account the important technological advances present in our daily life, such as personal computers, mobile devices, television and Internet—we must remember that not everyone owns such devices. Economic, social and geographic reasons, as well as knowledge of how to use them, make these tools inaccessible to a significant sector of the population.

This situation is known as the digital divide, defined by Tello (2008) as the differences in development opportunities for populations that have and do not have access to these technologies.

By way of synthesis, Tello (2008) describes the digital divide as a line that separates people who already communicate and coordinate activities through digital networks from those who have not yet reached this state of advanced development.

It is worth stressing, as Rodríguez, Rueda & Ardila (2013) note, that “the people on the less fortunate side of the digital divide have fewer opportunities for intellectual, cultural and economic development” (p. 2).

From this concept stem many types of digital divide, depending on the population experiencing this difference in access to and use of the new technologies. The types of divide include:

- Economic divide. Based on the economic capability to access those elements needed to acquire and transmit information through digital platforms.
- Social digital divide. Focuses on the possibility of access to ICTs, taking into account each individual’s social level.
- Educational-cultural divide. Focuses on the level and capability of use each person possesses for the new technologies.
- Digital access divide. Based on whether or not one is connected to Internet.

In sum, we see that the digital divide is one of the greatest negative effects of the progressive and systematic use of ICTs. The use of new technologies is a hidden problem, since some sectors of the population use them and benefit from their possibilities, while others have no access to them. This difference tends to increase the social, economic and educational difference between the two parties.

3. ICTs in schools

ICTs provide important pedagogical support in the area of teaching, due to the capability to transmit information and the ease of communication they enable. The different ICTs are contributing to achieving universal access to education, equality in education, and improvement of teaching quality, which means that instructors need to be prepared to guide students in this field.

For Cobo (2009), “education in the 21st century is called upon to advance at the direction and speed appropriate to facing the different challenges and opportunities that the knowledge society offers” (p. 298).

Cobo (2009) also argues that there should be a close relationship between learning, knowledge generation, continuous innovation and the use of the new technologies.

Trigueros, Sánchez & Vera (2012) believe that teachers value ICTs very positively as a pedagogical tool in the classroom, although these new technologies are not used much due to the difficulty in obtaining training in their use and the excessive amount of time involved in preparing pedagogical materials.

The use of ICTs in the classroom brings a series of advantages and disadvantages. One advantage is motivation, since the material is more attractive and enjoyable, sparking greater interest in the subject matter and interaction. The student can communicate and exchange experiences with classmates, and ICTs increase cooperation between students and teachers, provide learning as feedback, develop the student's initiative and imagination, provide more openness in communication and enable the student to gain autonomy in searching for information.

On the other side, we find a series of disadvantages, such as distraction, which occurs frequently in learning with games, the time used to search for specific information and the reliability of the information (much information is not reliable). Although fast, ICTs may yield incomplete information and thus lead to confusion, as well as to the student's potential isolation due to constant use of computer tools.

Based on the foregoing, we can establish that the progressive use of ICTs has some positive and some negative effects, but the number and importance of the benefits granted, as well as achieving ever-desired harmony with the development of life and society outside school, make the positive aspects more prominent than the negative.

4. Hospital classrooms

According to Serrano, Prendes & Gutiérrez (2011), hospital classrooms are "school units whose main objective is to serve students ages 3-18 or those pursuing a phase of education within compulsory education" (p. 2).

These classrooms arose from the need to serve children who, for health reasons, cannot attend their usual school for a specific period of time.

Originally, hospital classrooms were merely recreational spaces, but this trend has been changing in recent decades to provide educational instruction that aims to be as similar as possible to that given at the student's school.

In these school units, it is important to stress the coordinated collaboration of professionals, both in the fields of medical and health care and in education, and the importance of family participation.

The exceptional situation of such students means that teaching activity changes relative to work in the ordinary classroom, since the teacher's action is subject to differences in students and to their environment.

The teacher in the hospital classroom must combine two complex functions: on the one hand, continue with a teaching model similar to that developed in the ordinary classroom and, on the other, seek an attractive methodology to make the hospital stay as easy as possible. This methodology seeks to make the time in the hospital as enjoyable as possible and to try to evolve capabilities and skills that enable the development of students' abilities, creativity and imagination.

Hospital classrooms usually receive students from early childhood to secondary education (ages 3-16), although students beyond these ages occasionally attend as well. There are currently 29 hospital classrooms in the Region of Andalusia.

The ultimate goal of hospital classrooms is to normalize the time the child spends in the hospital as much as possible and to make this stage as pleasant, educational and productive as possible.

5. Goals of the project

Through this educational innovation based on viewing (by videoconference) the different classes held in the classroom that the student could attend for medical reasons, we propose the following series of goals:

- To minimize the deficit of knowledge and values that students incur when they cannot attend class temporarily
- To seek the normal development of the education process using the innovation proposed
- To encourage the daily use of ICTs in the teaching-learning process
- To foster students' proper, responsible use of ICTs as support and reinforcement in their learning
- To establish an innovative method through which a medical condition does not prevent the student from receiving education

- To minimize to the extent possible the problems that can arise when a student cannot attend class regularly
- To increase the importance of transparency, information and communication among the different members of the education community
- To promote use of ICTs by teachers, who are sometimes reluctant to use them
- To take advantage of ICTs as a method to improve and perfect teaching activity by taking advantage of the number of pedagogical possibilities they offer
- To use new technological possibilities as a means of socialization and communication

6. Planning for innovation

The main goal of this project has been to enable the student who for medical reasons cannot attend class for a specific period of time (hereafter, the affected student) to enjoy a teaching-learning process as similar as possible to that received in the classroom, thanks to the work of all members involved and the inclusion of videoconferences.

To achieve this goal, we seek to minimize to the extent possible the differences in the work that the students present in class perform and the work that the affected student will perform from the hospital classroom or his/her home. That is, we seek to make this student just one more member of the class, participating with his/her classmates in all of the activities carried out in the classroom, even though he/she is not physically present.

The work that the new technologies perform in this innovation can prevent school absence from causing a loss of knowledge and values. When facing deprivation of schooling due to illness, the case that concerns us here, we will thus attempt as much as possible from the teacher's perspective to avoid the abrupt change in the habits and routines that the student experiences.

As mentioned in the theoretical framework, such measures have been adopted by schools for several years. These measures are usually supported by both public and private entities and institutions whose goal is to prevent the student affected by an illness from not being able to enjoy the right to education he/she shares with classmates. Based on this premise, the various proposals mentioned above have emerged—home care education and hospital classrooms, among others. All of these proposals have important benefits, such as continuity in the student's educational development, personalized attention and constant communication between student and teacher.

In spite of their important qualities, these methods lack one very important aspect, the possibility that children continue to share their time and space (although not physically) with their teachers and classmates while hospitalized. This is the potential for improvement that a measure like the videoconference provides over the other, more common measures in existence. Through the videoconference, the student who cannot attend class physically can experience something closer to the classroom experience, since he/she will be present virtually for all that happens in class.

The videoconference has now become one of the most commonly used tools in business, politics and trade, as a rapid, easy, effective system for instantaneous communication between two parties. In the educational environment, this type of communication has recently begun to be developed through a new communication tool, but we are not yet enjoying its full potential, the importance and utility this tool could possess if we consider its possibilities. (Cabero y Prendes, 2009)

A videoconference enables two-way communication between two subjects in real time. It enables both parties to communicate through sound and image, such that the exchange of information and response to it is immediate. This is precisely one of the important potentials that the videoconference provides relative to other similar methods. Its implementation in the classroom ensures speed of response between sender and receiver. Thus, even when the receiver is physically outside the classroom, the response to any question or doubt can be immediate, making this situation as similar as possible to that found in the classroom.

To set up the videoconference, we need technology tools, which we will explain later, such as the computer and an Internet connection. The portability of today's computers and of webcams enables the teacher to move them so that the student can always see what he/she should be observing (teacher, blackboard, screen, classmates). Translating the use of this tool to the classroom on the model of its use in other fields could benefit all components in the educational community, above all, students who cannot attend class. We could say that the videoconference is the method closest to attending class in cases of physical absence from the classroom.

Since the main goal is to integrate the affected student into the normal development of the classroom, this student must carry out (medical conditions permitting) the same procedures as the other students. That is, the school day will

begin at the same time as for others, except that the affected student attends from the hospital classroom or from home, while the other classmates will be present in the classroom. From this moment, the school day will develop as usual, according to the teacher's plan. Not being present in the classroom will not make a considerable difference relative to the other students.

Of course, to achieve this goal, the student who is not present in the classroom will have to have the usual materials wherever he/she is in order to follow the normal development of the classes. In typical classroom tasks, such as listening to the teacher's explanations, reading, performing the relevant activities or correcting them, there will be no difference between the students, as all students will participate, whether or not they are physically in the classroom. The goal is that all students do the same work, even though they are in different spaces.

Other, less common tasks can also be performed diligently in the classroom, proceeding in a normal way that seeks to minimize differences between the work of the different students. Here we would mention tasks such as taking tests, where the student not present in the classroom takes the test from home or in the hospital classroom under supervision of the teacher by computer, obviously with the possibility of asking questions in the same way.

Correcting and grading exams or tests will proceed as with the other classroom activities. When possible, a family member can submit the student's work to the teacher. If this is not possible, the communication between families and teachers can occur by email, and all work the teacher must assess can be submitted through this medium.

Another, somewhat more complex situation that could occur in the classroom is the task of group work. In this situation, the procedure will be the same as in the rest of the process—normalization. Assuming the computer can be moved, the affected student will form part of a group and will contribute equally in preparing the project. Despite all of the effort at normalizing this situation, it naturally has its limitations, due in large part to the connection and the mobility of the devices. These conditions may jeopardize normalization in circumstances like field trips or gym class, since these activities require mobility, which cannot be fully guaranteed.

Due to the medical complications that can arise, the student may be absent from the classroom or unable to watch various sessions in real time. More pressing commitments, such as doctor's appointments, check-ups, operations, etc. may intervene to prevent the student from being present at the exact moment when classes are taught. In this situation, the possibility of the videoconference will not solve the problem. In such situations, we would proceed to on-demand viewing, in which the classroom classes would be held as usual but recorded to enable the student to watch all that happened in class after having attended to his/her medical commitments.

This possibility has some drawbacks, mentioned above. Affected students cannot receive immediate answers to questions or "direct contact" with classmates and fluid communication among the different members in the classroom. Still, being able to watch the class session is a positive way of furthering the main goal of the innovation, even if the student cannot be present in class at that moment either physically or virtually. In this case, the work of families is even more important and can be very helpful in answering questions and solving problems that arise for their children.

Another situation in which the innovation could be developed is that of viral illnesses that cause a considerable number of students to be absent from the classroom. We all know that there are times of year when viruses like the flu shrink the number of students present in class. In this situation, we could also apply this educational innovation, since we can obtain collective benefit for both present and absent students, as well as benefits for the teachers themselves.

This measure would only be implemented in a case of considerable need; it is not necessary if all students are in class. The measure would provide very significant benefits for the affected student, but if no student needs it, viewing or recording the sessions would not be necessary. We should clarify that the innovation would not be performed to permit families to view the classes or in circumstances of temporary absences or justified lateness, since these situations would not fulfill the main goal for which the innovation was created.

Finally, the videoconference—or, when this is not possible, subsequent viewing—aims to enable the student who cannot attend class at school to keep up with the contents involved.

7. Materials and resources

Putting the proposed educational innovation into practice requires the following resources and materials:

- PC or tablet in the classroom. Serves to send image or sound, needed for the sender to share what happens in class.

- PC, tablet or mobile device for the student or family. Through some of these tools, the receiver can hear or see the progress of the class from wherever he/she is.
- Internet connection. Crucial for transmission of data and information.
- Wide bandwidth. Since we aim for the receiver to obtain good image and sound, we will need sufficient connectivity to ensure good video quality and avoid interruptions or errors in the connection.
- Elements to facilitate communication. These are not indispensable, but they could be extremely useful to improve the transmission channel needed between sender and receiver. The tools to facilitate communication include loudspeakers, earphones and microphones, among others.
- Video device. If it is not possible to record the image using the PC or tablet, video devices could be substituted, such as a camera or cell phone with a built-in video recorder to capture the image and sound. This device could in turn be connected to the computer or tablet from which the connection is established and the information transmitted to the receiving computer.
- Webcam or similar device. If the computer does not have a built-in camera, one could use a webcam to capture and transmit the image received. The webcam would of course be connected to the computer itself.
- Software. This is a fundamental tool, since it permits synchronous communication between classroom and student, that is, between sender and receiver. There is currently a great variety of software available. Skype is the best-known and most frequently used, but in addition to Skype there are other similar programs, which also have some differences. These include DimDim, Yugma, OoVoo, WizIQ and Vyew.

Among the benefits that these tools provide are ease of use, the possibility of online viewing, the option of recording the session to be viewed later, and the fact that they are free.

Although it might seem at first glance that the preparation needed to hold the videoconference or video recording requires complex elements that are difficult to manage or involve high economic cost, the opposite is really true. Currently, most schools have laptops with the elements needed for this innovation built in, such as webcam microphone or loudspeaker, which, with the right Internet connection, enable us to carry out the initiative.

8. Expected results

Clearly, the most significant results expected from implementing this educational innovation would be the benefit for the student in the class. If implementing this measure prevents interruption of his/her education and development during absence, the innovation will have achieved its main objective. Distance and state of health will no longer be insurmountable obstacles to education thanks to the work of all members involved and to the technology available.

This attempt to minimize the change a child experiences through hospitalization focuses not only on the area of education but also on the personal and emotional, since the child is experiencing many sensations and feelings that teachers and doctors attempt to reduce, such as sadness, anxiety and lack of motivation. We should thus aim for both educational and emotional development, placing special emphasis on social and affective relationships.

Through this innovation, we will make the student's return to the daily routine following an absence as easy as possible, within both the academic and the personal framework.

The other fundamental area that will benefit from this innovation is the increase in fostering the use of and benefit from using ICTs in schools.

We hope that this use of the videoconference will become another step behind the growing intervention of new technologies in performing the daily education process. A measure like this shows the commitment of the teachers and the school to the integration of ICTs, seeking the fullest development possible for their students.

This measure is easy to integrate in the classroom. The materials needed for putting it into practice are relatively accessible to any school, as most schools already have most of the materials. Further, the knowledge of computers teachers need to implement the process is very simple and does not require advanced technological notions.

This innovation would also save a significant amount of time on the part of both the student and the teacher. We all know that the student has often received no academic schooling during the time he or she missed school. When he or she returns to class, the teacher must teach the student all of the content covered during his/her absence, which can slow the normal development of class and affect the other classmates.

Another result of implementing this measure could be the increase in collaboration and coordination among the groups that should ensure the student proper education and development, even during times of ill health. As to the

groups that should work together for the students' benefit, we must clearly focus on cooperation between teachers and the medical team, who share time with the student, as well as the ever-vital collaboration of families, which is even more important in these situations.

9. Conclusions

The videoconference is an ideal resource for situations like the ones proposed here, since it constitutes a feasible, useful system that only requires resources as basic as a computer, microphone, webcam and Internet connection. With this system, we can avoid a situation in which the student is deprived of relevant knowledge, abilities, skills and values just because he/she could not go to the class.

If technology makes it possible to satisfy a current deficit through which students suffer a loss of learning due to health, we should do everything possible to make that technology a reality to enable education to reach all students, independently of their personal circumstances.

Schools should become aware of the integration of ICTs both in the area of teaching and in training and management. Although some schools offer methods of integrating the new technologies, most of their use in classrooms corresponds to projects and programmes conceived or established by teachers, whose schools often make it difficult to carry them out (Cobo, 2009)

Teachers have the obligation to come up with innovative ideas in the classroom (whether using ICTs or not), with systems and projects that seek the greatest benefit possible for their students. To achieve this goal, schools must have all resources possible to carry out these innovations (Trigueros, Sánchez & Vera, 2012).

Finally, if we can get teachers proper training in the use and integration of ICTs in the classroom and develop methodologies that truly respond to their 21st-century interests and needs, both social and educational, we will have all of the ingredients needed to overcome the challenges that arise as the information and communication society continues to evolve.

References

- Cabero, J., & Prendes, M. P. (2009). *La videoconferencia: aplicaciones a los ámbitos educativo y empresarial*. Sevilla: Eduforma
- Cobo, J. C. (2009). El concepto de tecnologías de la información. Benchmarking sobre las definiciones de las TIC en la sociedad del conocimiento. *ZER*, 14(27), 295-302.
- García, F. (2012). *Atención educativa en el Hospital: "Las aulas hospitalarias"*. Sevilla: Escuela Hospital Infantil "Virgen del Rocío".
- Prendes, M. P., Sánchez, M., & Serrano, J. L. (2012). Posibilidades educativas de las TIC en las aulas hospitalarias. *Journal for Educators, Teachers and Trainers*, 3, 37-48.
- Rodríguez, A., Rueda, F. y Ardila, I. (2013). Designing a methodology to measure the digital divide of the national plan for information technology and communications. *Revista Matices Tecnológicos*, 4, 1-5.
- Serrano, J. L., & Prendes, M. P. (2014). TIC para la mejora educativa en aulas hospitalarias. *Pixel-Bit. Revista de Medios y Educación*, 45, 23-36.
- Serrano, J. L., Prendes, M. P. & Gutiérrez, I. (2011). *Resultados de la evaluación del uso de TIC en las aulas hospitalarias de la Región de Murcia* Internacional EDUTEC. Congress 2012. Las Palmas de Gran Canaria, Spain.
- Tello, E. (2008). Las tecnologías de la información y comunicaciones (TIC) y la brecha digital: su impacto en la sociedad de México. *Revista de Universidad y Sociedad del Conocimiento*, 4, 3-4.
- Trigueros, F. J., Sánchez, R., & Vera, M. I. (2012). El profesorado de Educación Primaria ante las tic: Realidad y retos. *REIFOP*, 15(1), 101-112.