Technology in Mental Health and Education*
Applications, perspectives and challenges in the Colombian Caribbean.

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This symposium will focus on the emerging field of technology applied to mental health and education in the Colombian Caribbean, a region with great needs in science, technology, innovation, health and education. Speakers will address the future prospects, applications and challenges of introducing technological innovation in intervention for these fields. Throughout the presentations, the speakers will discuss creation opportunities, perspectives in development or future application, and ethical challenges in the framework of this progressive field that is beginning to consolidate in this region. Topics to be discussed include: (1) technological prototype for the study of sustained attention in educational settings; (2) preliminary perspectives of the study of an application for university students aimed at preventing gender violence and promoting mental health; (3) bases for the application of a virtual reality environment for intervention in ADHD; and (4) implications and ethical challenges inherent to this technological field, especially in the health care area. These topics were included as they provide a glimpse into the challenges that are developing in the region, as well as the ethical issues of considering the use of technological tools to address them. This symposium aims to highlight the opportunities of technology research in the domains of health and education in this region to promote science, innovation and social development, but also aims to make a critical analysis of this progress in the interests of establish the limitations and challenges that cannot be set aside only by the novelty and the boom of the technological revolution.

Keywords: technology, mental health, education, Colombian Caribbean, gender violence, ADHD, ethics.

Arduino technology to measure Sustained
Attention through the electrical activity of the heart

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The central nervous system is expressed through autonomic activity, and this is divided into the Sympathetic Nervous System and the Parasympathetic Nervous System, which directly affect the heart and is a source of union of cognitive and psychobiological variables, such as the case of the Sustained Attention, a variable of interest in educational processes. Heart rate and its variation have been identified by several studies as important means of evaluation of this process, since it is considered that this variation reflects the heart's capacity to adapt to changes in physiological conditions, which are reflected in human behavior. Thus, the electrical activity of the heart tends to be considered an objective measure of cognition, implicit learning and attention, in natural contexts of formal learning. A study demonstrates the validity and reliability of a system for recording heart rate variability using cardiac pulse and RR intervals. Twelve prototypes of arduino technology were created and paired with a standard electrocardiogram (EKG). Long segments were used with cardiac pulse recordings in ten minutes. A highly significant correlation index (p <0.01) and a significantly high Cronbach's alpha were obtained. The analysis of variance allowed to verify that all the analyzed data presented a value of p <0.05. It is concluded that there is no significant variation between paired systems; therefore, the heart rate variability-based attention detection system is valid and reliable. This could have a significant impact for the analysis of the cognitive engagement of students in classrooms based on this highly important variable.

This article was published [to be completed by publisher].
The Session Chairs acknowledge the following people: in addition to the co-authors mentioned here, to the entire team of the Cognition and Education Research Group of Universidad del Magdalena.

This research was supported, in particular for the SaludableMente project, by Universidad del Magdalena and its research fund Fonciencias. Also the Arduino project was financed by the Coordination for the Improvement of Higher Education (CAPES-Brazil)- code 001, the Organization of American States (OAS), Universidad del Magdalena, and Federal University of Rio Grande do Norte-Brasil, institution where it was registered with the code 2.683.191. The Session Chairs have no conflict of interest to disclose.

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SaludableMente: a technological proposal for the promotion of mental health and the prevention of gender violence in university students.

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The current health crisis that the world is going through has undoubtedly generated a significant impact on the multiple spheres of functioning of individuals. These changes have generated a significant impact on the mental health of the world population, to which is added the substantial increase in cases of gender-based violence. Objective. To evaluate the effectiveness of a web app in the promotion of mental health and the prevention of gender violence in university students in times of pandemic. Method. The study is aimed at university students over the age of 18, who attend between the second and ninth semester of the different programs offered by the university. Instrument. A web app was designed that consists of two modules, one for diagnosis and the other for psychoeducation. The activities of the modules focus on the variables of anxiety, depression, quality of life, sleep and gender violence. Results. Based on the implementation and evaluation of the web app, the aim is to have a tool that can be used from anywhere in the world, which facilitates access for university students to resources for the promotion of mental health and prevention of gender violence, under the current context of pandemic. Conclusions. The use of a web app is a first step to find, from the virtual sphere, new ways to guarantee access and intervention to populations that have been affected by Covid-19 at a global level.

Development of a virtual reality program for cognitive training in adolescents with ADHD

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The development and implementation of new technologies for the treatment of Attention Deficit Disorder (ADHD) has become the best therapeutic strategy for the rehabilitation of psychological conditions. Objective. The purpose of this work is to present a recent development based on virtual reality aimed at cognitively training adolescents with ADHD. Method. The study will reach students between the ages of 13 and 16 who are diagnosed as ADHD and who are not receiving neuropsychological treatment or cognitive training. Boys under the age of 13 will be excluded, as well as those with acute visual difficulties. Instrument. A virtual reality program was designed consisting of 3 gaming experiences. The tasks on which it focuses are: attention, following instructions, sequencing and inhibition. Technology. Virtual reality application, made in Unity, developed for Oculus Quest platforms. Expected results. This is an initial prototype which it is expected to develop usability studies in youths. The tasks contemplated are aimed at training users in aspects focused on attention, concentration and executive functions such as inhibition, working memory, interference, sequential organization and others that are expected to be developed in the future. Conclusions. The use of VR is promising for cognitive training. Given the characteristics of a game and the novelty factor, it is estimated that it could influence greater adherence and, therefore, lower dropout rates from multimodal treatments.

Ethical aspects associated with interactions mediated by technology: challenges of innovation

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Ethical considerations are fundamental, especially in the development and use of technologies in mental health, being such a challenging field in terms of effectiveness, designs, evaluations and potential harm for users. In this review, we discuss the importance of ethical guidelines for the use of technologies in mental health care, considering the recent impulse in the Colombian Caribbean, highlighting the reviews of authors such as Wykes, Burr, Floridi and others, who have understood that the great boom of the technological revolution has not only brought opportunities but also challenges and even inappropriate uses that can make lose sight of its possible drawbacks. Technology in health care cannot be seen only as a good thing per se, but it also has the responsibility of establishing and assuming fundamental ethical margins that guide development and research for an adequate implementation and evaluation of its effects on society. This implies the need for a greater consideration of ethical challenges, which does not in itself determine an obstacle to technological development, but rather makes it possible to take into account the social value of technology, also including the need to involve various groups of individuals and communities so that technological advances can respond to their needs. In this way, promoting the development of an ethical framework in response to technology and not simply as a reactive to failures, allows promoting effectiveness and ensuring the well-being of individuals, anticipating and avoiding errors that end up being not only costly but also unacceptable in every way.