Chapter 64

Monitoring program in developmental biology and embryology for the medicine course at escola paulista de medicina/ Universidade Federal de São Paulo

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ABSTRACT
The Discipline of Developmental Biology and Embryology is part of the UC Bases Morfológica da Medicina, taught to students enrolled in the 1st year of the medical course at Escola Paulista de Medicina (EPM) of the Federal University of São Paulo (UNIFESP). The process of transition from face-to-face teaching to emergency remote teaching, in the context of the need for social distancing due to the pandemic caused by SARS-CoV-2, involved restructuring methodological approaches to teaching and assessment, through the use of digital technologies of information and communication. Thus, given the limitation in the use of the Microscopy Laboratory, the contents were adapted from the inclusion of new tools and the preparation of complementary materials, to direct the theoretical-practical study. Likewise, monitoring activities were also readjusted and included: planning and reformulation of didactic material and practical class scripts, assistance to teachers in practical activities of the Subject, taught remotely, in addition, to support for students in resolving doubts. Such monitoring activities were added by the development of didactic virtual games, which can be used both in the remote teaching scenario, as well as in complementing the face-to-face practical study. In this perspective, didactic games were elaborated and produced, in different formats, using institutional or free platforms and photomicrographs obtained from a specific slide, addressing contents related to Developmental Biology and Embryology. The performance of the monitors enabled the continuous improvement of the Discipline, the implementation of technological didactic resources and active learning methodologies in the virtual environment, promoted academic cooperation and the approximation between students and professors, as well as contributed to the deepening of practical and theoretical knowledge in Developmental Biology and Embryology, provided the experience in the teaching process and enabled the development of interpersonal relationships and organization to carry out the various academic activities.

Keywords: Didactic games, Gamification, Monitoring, Developmental biology, Embryology.

1 INTRODUCTION

The Subject of Developmental Biology and Embryology is included in the Curricular Unit Morphological Bases of Medicine, together with the Subjects of Descriptive Anatomy Histology, and Structural Biology. This discipline has extensive program content (theoretical-practical) and workload and

is taught to students enrolled in the 1st year of the Medicine course at Escola Paulista de Medicina (EPM) - Federal University of São Paulo (UNIFESP).

In the year 2020, all educational institutions, whether public or private, from basic to higher education, some more prepared than others, found themselves facing a major obstacle to implementing the teaching-learning process. The transition process, therefore, from face-to-face teaching to emergency remote teaching, in the context of the need for social distancing due to the pandemic caused by SARS-CoV-2, has become a challenge for teachers and students. It was necessary to restructure the methodological approaches to teaching and assessment, through the use of digital information and communication technologies (HODGES et al., 2020; PIMENTEL et al., 2020).

Such restructuring of this UC occurred from the adaptation of the contents through the inclusion of new tools and the production of complementary materials, to direct the theoretical-practical study. Given the limited access to the Microscopy Laboratory of the Escola Paulista de Medicina, in the context of the pandemic, the practical contents related to the study of Developmental Biology and Embryology required adaptations and the making of effective teaching materials for the study of the specific slide provided for the syllabus content of the Discipline. In this context, the search for different teaching strategies to cover and provide the learning of the proposed contents became particularly important.

Likewise, monitoring activities also needed readjustments for their continuity. Academic monitoring consists of a facilitating tool in the teaching-learning process. For students, monitoring facilitates learning based on different methodologies, guiding the study of the content taught, favored by bringing students closer to the monitor, which facilitates the search for clarification of doubts through different languages. For monitors, academic monitoring contributes to their academic training, as it: enables greater consolidation and deepening of practical and theoretical knowledge in Developmental Biology and Embryology; awakens autonomy in the teaching-learning process and the ability to criticize; favors the development of interpersonal relationships and the organization for carrying out the various academic activities; in addition to providing monitor students with the possibility of improving their curriculum, integrating teaching and research activities, developing important technical and theoretical skills in their future professional activity and expanding their network. Also, monitoring promotes academic cooperation between students and professors and contributes to the improvement of the discipline, by identifying the main difficulties encountered by students and proposing solutions for their improvement (MELO, 2017; GONÇALVES et al., 2021; NASCIMENTO et al., 2021).

Guidance for the execution of activities linked to the monitoring project and on the planning and organization of the contents covered in practical activities adapted for remote form was given in periodic meetings (videoconferences), through Google Meet. Gsuite was used as a support for the provision of support materials (articles, video lessons, images of the slide) for the preparation and implementation of

the activities of the monitors. The monitors also had access to the Discipline Classroom to monitor, in real-time, the content that was taught to students enrolled in the UC.

WhatsApp was defined as a tool for quick communication between monitors and the professor in charge, and also for communication between monitors and students to clarify doubts regarding the subjects taught. Another form of contact between monitors and students was carried out through the organization and availability of complementary directed studies, supervised by the professor in charge, of non-mandatory delivery that was not computed for the final concept of the discipline but aimed to provide other instruments to facilitate the learning process.

In addition to assisting teachers in the reformulation of didactic material and in the preparation of complementary study materials, supervised by the professor in charge; advise professors in the practical activities of the Subject, taught remotely; and support students in solving doubts, monitoring activities were added with the development of didactic virtual games, which can be used both in the distance learning scenario, as well as in complementing the classroom practical study.

The use of educational games can stimulate, dynamically and attractively, the assimilation of information and stimulate logical reasoning and student engagement. In general, a game consists of an activity aimed at developing cognitive skills, and not just providing entertainment, within a context, in which participants need to achieve one or more goals, following pre-established rules. They should be interactive, challenging, motivating for learning, and very attractive, but without excessive images, sounds, and movements so as not to interfere with cognitive performance during learning - in this way, the balance should always be promoted in the entertainment and instruction characteristics of the students. computer games so that the learning objectives are achieved (GOG, 2014; ARAÚJO, 2016; PIMENTEL, 2018; PIMENTEL et al., 2020; STAFUSA et al., 2020).

Educational games, if well planned, can contribute to the development of skills necessary for academics, such as facing challenges, and seeking solutions, in addition to stimulating argumentation, organizing ideas, criticism, intuition, and the creation of strategies. In this way, games mobilize, in an integrated way, cognition, emotions, and actions. Memorizing is fundamental to the learning process, as it involves appropriating knowledge and being able to retrieve it when necessary and not just repeating it automatically. However, the use of educational games is not restricted to memorizing content, but also promotes the development of skills and abilities. Skills are based on knowledge and are manifested in action and improvement through practice, leading to the reconstruction of knowledge. The acquisition of skills enables the individual to achieve a technical, social, or artistic aptitude. Educational games can explore numerous skills such as: observing, comparing, organizing, analyzing, identifying, communicating, classifying, interpreting, ordering, describing, and calculating. Competence, in turn, involves properly mobilizing skills, knowledge, and values in the face of challenges (PIMENTEL et al., 2020; AMORIM & COSTA, 2021; OLIVEIRA et al., 2021).

From this perspective, didactic games were designed and produced, in different formats, using institutional (Moodle/H5P) or free platforms (Educaplay - https://www.educaplay.com/ and Genially - https://app.genial.ly/) and photomicrographs obtained from slides of embryonic material that are used in practical face-to-face activities of the Discipline of Developmental Biology - Department of Morphology and Genetics - EPM/ UNIFESP, through a microscope coupled to the image analysis system.

The finished didactic games are described in table 1:

Table 1: Description of the games already developed referring to the contents taught by the Discipline of Developmental Biology and Embryology (EPM/UNIFESP).

Theme	Platform	Game type	Game description
Male Gametogenesis	Educaplay	Crosswords	Clues are given for each word through the use of a testis photomicrograph, containing the structure of interest pointed out.
		Hunting words	It consists of a puzzle-type game in which you have to find all the hidden words from a list made available containing terms related to the spermatogenic process.
		Matching Columns Game	The objective of this game is to match an item in one column (in text form) with its pair in a second column (a photomicrograph containing the structure of interest pointed out in a micrograph of the testis). The player must identify the corresponding pair by clicking on the two items that form it.
	Genially	Interactive image	Interactive images containing photomicrographs containing icons on various structures that make up the testicle allow the visualization of their description.
Female Gametogenesis	Educaplay	Crosswords	The clues for each word are given by a descriptive text or in a photomicrograph of an ovary with the structure of interest pointed out.
	H5P/ Moodle	Image sequencing	The activity comprises the ordering of the stages of maturation of ovarian follicles.
Formation of the trilaminar embryonic disc and embryonic inflection	H5P/ Moodle	drag and drop	The game allows students to drag the embryonic leaflet (in text) and drop it on one of the corresponding drop zones, which must contain the image of a structure originating from this embryonic leaflet.
	Educaplay	Play ABC	This activity consists of identifying the name of the embryonic structure, related to the process of gastrulation and embryonic inflection, for each of the letters of the alphabet, based on a clue in text or photomicrography. The structure name must start with the corresponding letter or, in some indicated cases, will contain the letter. The game will only end when all letters are answered.
	Genially	Interactive image	Interactive images containing photomicrographs containing icons on various structures that make up the placenta and allowing the visualization of their description.
Stages of lung maturation	H5P/ Moodle	Pairing images	The game consists of dragging and dropping the image related to one of the stages of lung development and pairing it with the photomicrograph corresponding to this same stage of lung maturation.
		Image sequencing	The activity involves ordering the stages of lung maturation in the correct chronological order
ear development	H5P/ Moodle	Flashcards	Cards were created containing photomicrographs related to the development of the inner, middle, and outer ears and the correct name of the pointed structure should be entered.

Despite the challenges imposed during the pandemic for teachers, monitors, and students, the experience of academic monitoring activity in special home activities (ADEs) has fulfilled the proposed objectives due to the commitment and commitment of all those involved. Monitoring has great academic

relevance and, despite the difficulties, the monitors were able to make important advances, through the search for new technological resources and digital platforms to enable the performance of theoretical and practical activities, contributing to student learning and enabling the continuity of the institution's monitoring programs.

The performance of the monitors made possible the continuous improvement of the Discipline; the implementation of technological didactic resources and active learning methodologies in the virtual environment; in addition to promoting academic cooperation and bringing students and professors together. The monitoring program also actively contributed to the deepening of practical and theoretical knowledge in Developmental Biology and Embryology, necessary for the proposal and production of teaching materials. That is, the program provided experience in the teaching process, enabled the development of interpersonal relationships, and the organization to carry out various academic activities. Finally, the project activities related to the elaboration and execution of didactic games involving the syllabus of the Discipline of Developmental Biology and Embryology are still in progress.

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