The power of the storytelling in Anatomy learning

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Abstract: Academic teachers have a focus over "the day one skills", those that ensures that undergraduates are well prepared when starting their first job. Others have been gaining importance, known as interpersonal and soft skills. One of the challenges of teachers is innovation and diversification of learning possibilities and the reflection on the students' attitude in face of proposed methodologies. When we think about actual student's generations, we are aware that they enjoy social learning platforms and at the same time, we witness an increasing passivity of young people blasted with chaotic internet stimuli. In the learning process is desirable a correct development of thought and imagination, the mental process build-up of memories and perceptions recorded that might give rise to reproductive and constructive imagination (the storytelling process). The pedagogic project that we present and discuss combines the construction of the animal body or its parts with an aesthetic valuation, since semiotics are effective tools in the construction of knowledge. For the last 6 years, small groups of students selected an anatomical topic and represented it in models. The project provides cognitive effort and creativity. It has shown to be effective in developing the working memory, autonomous and active learning, soft skills and joy, and is shared with the academy and general public through regular exhibitions.

Keywords: cognition, art, constructive imagination, storytelling, anatomy, hard skills, soft skills, pedagogical project.

Introduction

One of the challenges of teachers is innovation and diversification of learning possibilities and, consequently, the reflection on the students' attitude in face of proposed methodologies. In other words, when changing things looking for what is gained, lost or is kept unchanged.

Of course, that when we think about academic teaching pressures and over idiosyncrasies of actual student's generations we must agree with Paglia (2012) in "Glittering images", where attention is called to the "increasing passivity of young people bombarded with chaotic stimuli of their digital devices". We see that all-around, whenever they are together at restaurants, coffee shops or cinemas, and we actually wonder if they manage to speak with each other without their digital devices, as they become so dependent on textual and electronic e-mail communication. Therefore, we understand that we have to explore the digital winds of changing in teaching, learning and evaluating. We are aware that they enjoy social learning platforms (Gardner and Davis, 2013) and that Kahoots (Plump and Rosa, 2017) must be considered an intelligent and amusing way

of evaluating the class consolidation of knowledge, for example. Students fell pleased and competitive trying to be the "gold medals winners ", the most rightful and the quicker in providing a right answer. Nevertheless, shy students can stay easily and quietly inside their world without developing other important competences beyond knowledge.

As academic teachers, we are indeed focused in "the day one skills", those that ensures that undergraduates are well prepared when starting their first job, to ensure both competence and confidence. Nevertheless, there are others of course, which have been gaining importance as not disposable ones, those known as interpersonal and soft skills (Whitmore, 1972; Robles, 2012).

As we know, didactics is the part of the pedagogy, which deals with the methods, and techniques of teaching. Among its elements, we found the teachers, the students, the learning contents, and the methodological strategies of learning. In our project, all of these parameters are involved, but a highlight is given to the methodological strategies of learning. Learning what subject? Learning veterinary anatomy.

Let us focus now in anatomical learning. Different teachers will provide a couple of answers concerning the possibility of using distinct processes or methodological strategies in order to provide anatomical understanding. Let us approach the concept of cognition. As we know, cognitive systems are composed of several parts, as thinking. Through thought, ideas are concentrated in the mind where the aptitude to reflect on specific subjects or items occurs. Among cognitive properties, we emphasize the following ones:

Reasoning which is the combination of the correct development of thought with the ability to reach conclusions;- Memory that is made of images and knowledge captured and engraved in the brain;- Imagination that is the mental development build-up of memories and perceptions recorded giving origin to the so called reproductive imagination or to the constructive imagination (the story telling process). This latter traduces an output or the re-arrangement of the experiences into new patterns as it reproduces the elements of experiences but it builds up new combinations. In fact, imagination is not the precise reproduction of past experiences since contents of experiences are indeed reproduced and joint into a new order (Kumool 2018; Osborn 2011; van Leeuwen, 2013).

Our goal with the present pedagogic project is to change the memorizing paradigm associated with morphological subjects, to operate a break from the practice in memorizing contents to the extent exceeding the morphological own language, and to achieve the development of individual and group dynamic activities in the process of self-learning. To do that, we changed the common scenario of theoretical lessons and practical lessons at the anatomical lab and we added as a methodological strategy the use of art to represent the animal body, its parts or function. This project involves students from anatomical classes that are asked to use the properties of constructive imagination (the storytelling process) to gather cognitive effort, memory and creativity and build an aesthetic design or project that reports anatomical truth, no matter the ingenious and creative way of performing it. Students broke into small groups and discuss scenarios of inquiry-based

education over a specific anatomical subject. The student put questions in order to achieve the knowledge that serves the construction of the anatomical model or artistic plan underneath the pedagogical project. This reflection related to the inquiry phenomena must be looked as a pedagogical approach that when used as a learning methodology can improve the creative potential among students. Moreover, by saying this it is underlined the fact that students faces their own doubts to build their knowledge with the interaction of all, providing autonomy and critical sense and consequently, the development of creative capacity, expanding their web of thoughts, learning more meaningful and deeper (Pederiva and Silva, 2019). Inquiry demands the perception of going deeper into something, gathering a better and focused cognitive effort over some anatomical domain, attainment over an issue with more depth. It has the quality of searching into something, going profounder, so that you can see what you could not been able to see before. So, at field sites, or when at the library, at the coffee table in discussion with colleagues about a specific issue that will give rise to the construction of the anatomical project of their responsibility, students engage in activities that gives privilege to autonomous thinking. It is important to underline that this inquiry scenario does not require students to behave as scientists do. As Deboer (2006) stated, scientific inquiry is a metaphor for what goes on in an inquiry-based learning. And this inquiring is a reflective approach that will provide a well-ordered knowledge.

Everything stated before bring us to a few more thoughts. When choosing an inquiring learning methodology what advantages can we get by adding to this educational paradigm the use of art in higher education? A few of them, as a matter of fact. When students are making a work of art, they develop critical thinking, as the process includes conceptual and interpretational thinking, which includes observation, reasoning, and problem-solving. When students work collaboratively on a project, they learn to communicate more efficiently, they learn to compromise. They improve skills that are important in any work environment where people work together for a common objective. Students also gain self-assurance in themselves. In fact, the feeling of pride over a finished aesthetic anatomical model/project inspires the students to keep trying and motivated to accomplish more. With confidence, they are more likely to take risks and do things outside their comfort zone. Finally, think imaginatively to develop the aesthetic anatomical model in a creative process allows students to express themselves, to try new things and think outside of the box (Begloyan, 2015).

Materials and methods

The project combines the construction of the animal body or its parts with an aesthetic valuation since semiotics are effective tools in the construction of knowledge. To do so, students from anatomical classes are divided in small groups (groups with 3- to 7 students from curricular units of the 1st, 2nd and 3rd semester) and are invited to select an anatomical topic and represent it in models (3D models, videos, Pop-Ups drawings, electronic constructions, etc.). They discuss the project idea with teacher's team and afterwards they initiate the process of investigating and dialogue

with co-workers in order to solve doubts and build up with rigour the project, fulfilling the development of an autonomous learning paradigm.

When they deliver the project they should also include a report that summarizes aspects that gain importance in the semiotics behind the aesthetics project, the anatomical reality behind it, its inherent function or even situations that result in breakdown of normality or homeostasis.

In each classroom each students must fulfil an anonymous inquiry where with all freedom can express the grade of satisfaction by the use of these learning methodologies (from not satisfied to highly satisfied). Each aesthetic project is thoroughly and independently evaluated by four teachers of the area of speciality and the project evaluation (maximum = 5 points) are added to the final mark of the curricular unit. It is taken in consideration the rigour of the anatomical story presented and the originality of the project.

Periodically works are presented in exhibitions, shared with the community in general, as a way of sharing science in the appropriate focus of citizenship that the university and school in a broad sense should fulfil as one of the rights of fourth generation (the quality of life).

Results

From the beginning of the pedagogical project instauration until the present time a total of 1640 students were involved in this learning methodology. The final aesthetic design can give rise to a panoply of possibilities, since two-dimensional and three-dimensional figurative models are common, of varying scales, using distinct techniques of moulding, sculpture, painting, collage, popups, electrical circuits, liquid injection with colouring inks, etc. (Figures 1 to 5).

Besides this exercise, each group is asked to write a report that summarizes aspects that gain importance in the semiotics behind the aesthetics project, the anatomical reality behind it, its inherent function or even situations that result in breakdown of normality or homeostasis. They must also share the level of difficulties found during the project (formal? content? making?) providing space to a constructive discussion shared with the elements of the group, teachers and classmates.

Works or artistic anatomical models produced during the last 6 years by a universe of 1640 students were evaluated. Each work was thoroughly and independently evaluated by four teachers of the domain area and the arithmetic mean of the classifications obtained by students involved in this learning methodology were 4.05 (0-5 range)-Figure 6.

The index of satisfaction of students with this learning methodology is > 4 (Figure 7).

Until the present time five editions of the exhibition entitled "Discourse on the anatomical method" have been presented in Lisbon, at the Faculty of Veterinary Medicine (2013, 2014, 2016, 2017 and 2019).

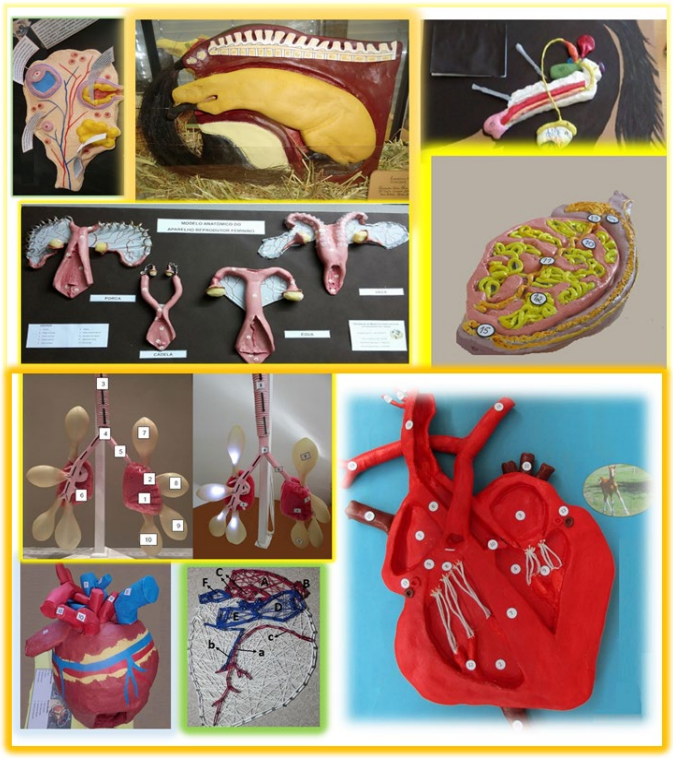

Figure 1.- Examples of aesthetic-anatomic projects related to the reproductive, cardiovascular and respiratory apparatus.

Figure 2 - Birds, reptiles and fishes presented in 3 dimensional maquette.

Figure 3.- The constructive imagination reinventing items from the digestive apparatus and anatomy of the movement.

Figure 4.- The anatomical storytelling concerning organ senses and anatomy of exotic animals.

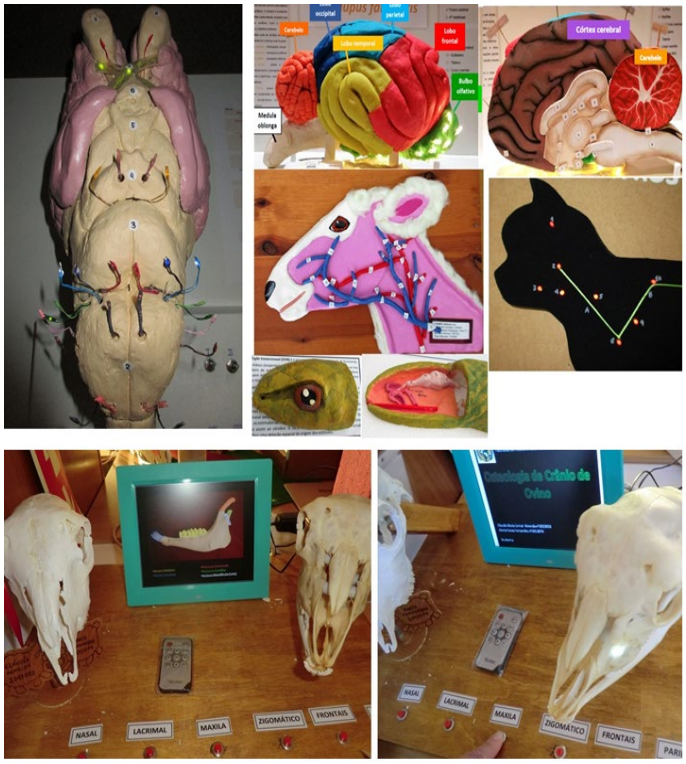

Figure 5 (I).- Nervous system, lymphatics, circulatory vessels and osteology represented in artistic and interactive models.

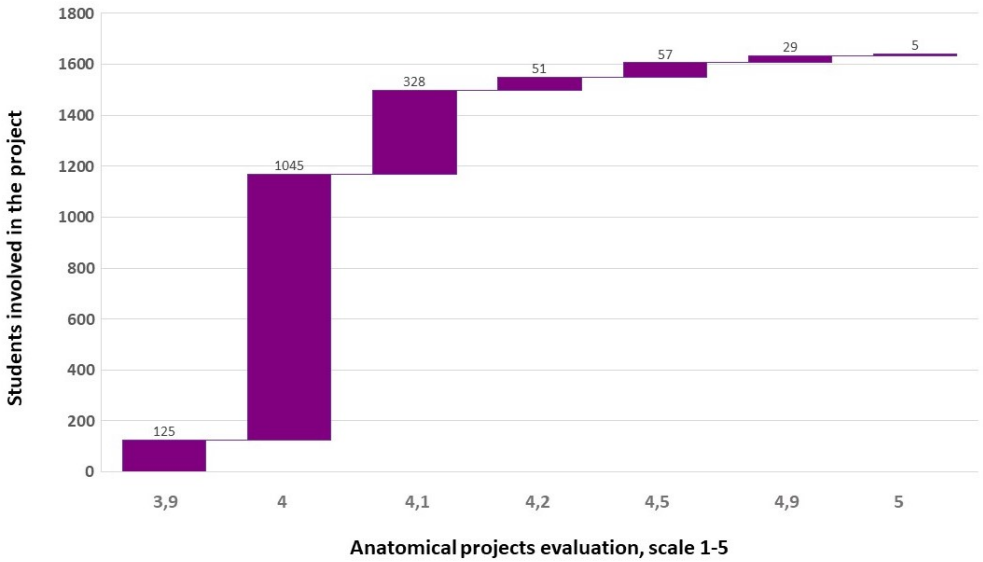

Figure 6.- Chart displaying the classifications given to the artistic works produced along the project (in the last 6 years). Each work was thoroughly and independently evaluated by four teachers of the domain area and the final punctuation reflects the arithmetic mean of the 4 classifications (minimum=0 points; maximum = 5 points).

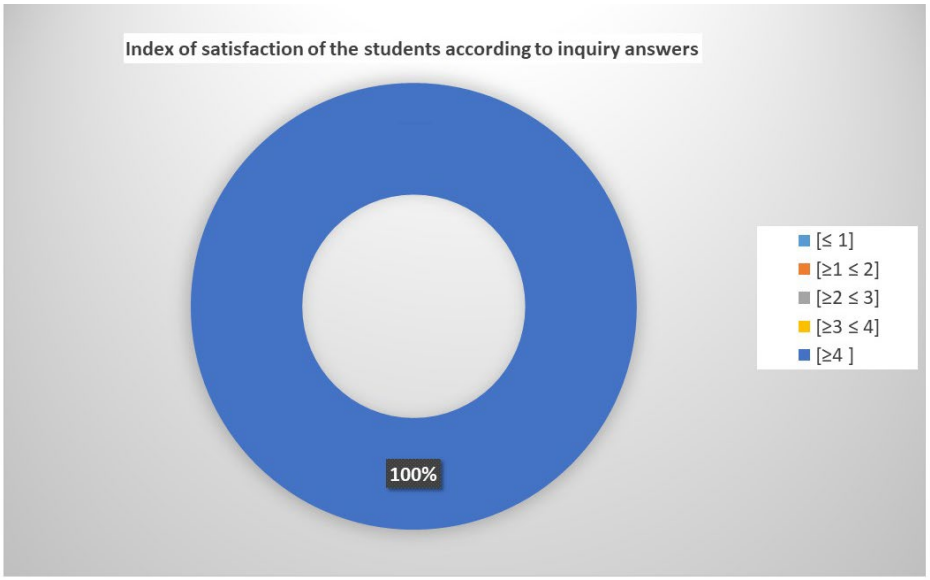

Figure 7.- Anonymous inquiry results through which with all freedom students can express its grade of satisfaction concerning the use of these learning methodologies (≤1 = not satisfied, >1and≤ 2 = poor satisfied, >2 and≤ 3 = satisfied, >3 and≤ 4 = very satisfied and >4 = highly satisfied).

Discussion

As already pointed out, one of the challenges of teachers is innovation, and broadening of learning possibilities. No modalities should be maintained without the evaluation of the effect of that methodology over knowledge and the output of students in face of that particular chosen methodology.

It might be asked why is worthily to revisit the use of art in veterinary education? Well, yes! Mainly because the use of creativity through art provides a more permanent learning. The importance of creativity in students, even in university degrees, relies in the fact that they are focused in discovering things for themselves, turn to be more open to new ideas and challenges and improve their abilities to solve problems. Instead of absorbing in a passive way information by its presence at theoretical classes and in not such a passive behaviour at practical ones at the anatomical lab, they get not only involved with its own process of learning a specific issue, but they have first of all to discuss with classmates and teachers the object of learning. Not a minor importance should be attributed to the fact that they learn to work well with others, something very important concerning their future jobs. They have to change the previous way of studying, where they needed to get good marks in order to access university education and modify its self-focused learning methodology by developing, at the lower years of higher education, strong interpersonal skills. These skills will be an advantage that will help them to cross through higher education subject's complexity, and ultimately to day-to-day tasks. Developing capacities in listening others with the purpose of gathering information and engaging with them, adjusting its own approach to work together effectively is a desirable skill for the developing of the anatomical project and subsequently a good evaluation. Moreover, is also a tool for life as the ability to work

together as a team is extremely valuable in every workplace (Robles, 2012).

As they become more effective learners they possess a better tenure over their learning (Bada, 2015) and generally became competitive in a positive mean with other groups, demonstrating respect for others group´s work and proud of their own work. When evaluated by the teacher's team the majority of the works/projects get more than a 4 (in a scale from 0-5) which reveals that students were committed to a good performance. As stated before, reflection on the students' attitude in face of proposed methodologies is a necessary step in didactics. So, the anonymous inquiries that each student had to answer concerning its own satisfaction about the use of this methodology in the learning process revealed that all students had a high grade of satisfaction in a scale where ≤1 is not satisfied, >1and≤ 2 is poor satisfied, >2 and≤ 3 is satisfied, >3 and≤ 4 is very satisfied and >4 is highly satisfied. In fact 100% of students answered that they were highly satisfied which is of course a result that allows us to believe that this project contributes to the improvement of autonomous learning in hands with development of soft skills, not forgetting a very important parameter, which is the increasing of happiness in learning a particular matter, namely, the anatomy.

In summary, this project in an unpretentiously way of introducing a learning methodology that comprises autonomous research for the development of the cognitive process over anatomical issues. The artistic construction, which encourage creativity, facilitates the learning process and prepares better students to the practice of their profession as explores their cognitive skills, emotional and interpersonal work, the development of individual and group dynamic activities, competences that are required and appreciated in professional world (Kermis and Kermis, 2010). Finally, results in the desirable working memory. The project has also been demonstrating the ability to take out anatomical science from the lab and classes and to share this knowledge with the Academy, its professors, administrative workers and the community in general. Because of that, has been looked from the teacher's point of view as joyful university extension work. In addition, we must underline that among students involved in the project and the respective teachers, the pedagogical project is seen as an efficient alternative of teaching/learning of anatomy. Something else must be stated at this moment. This methodological learning process involving the inquiry learning that is under the reflective construction of an anatomical artistic project or model (creativity in order to develop hypotheses and get the results for the possible problem in question, how to solve that specific problem or question (Gardner, 1999) is not necessary hands in hands with less teacher intervention. That kind of statement should be faced as an unbalanced impression, since less explicit teaching is better inquiry teaching, by definition (Harris and Graham, 1996). To build up a storytelling process (in anatomy subjects or in any other one) the story must become part of the student own mind and experience and the cognitive effort has more success (Stephens, Silbert and Hasson, 2010), Moreover, that there is a close relationship between the educational activity and joy and hope. The hope that (together) teachers and students can learn, produce and improve the different skills and their joy.

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