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Design Thinking Structuring multidisciplinary learning for innovation

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One of the challenges in higher education consists of incorporating knowledge, bringing needs and opportunities from companies and organizations, even if the students do not have practical experience yet. In professional learning, it is important to have a close relationship between the companies (or market) and academics. A possible bridge can be done with the application of didactic Design Thinking, a kind of learning by doing in which students, researchers and professionals adopt, together, the challenge of expanding knowledge. At the same time, they solve important problems and contribute to society.

One important learning experience consists of the application of Design Thinking in a didactic way with an interdisciplinary group, integrating students, teachers and professionals. It is established an objective of constructing a multidisciplinary knowledge with specific strands and clearly defined, according to the proper interest of each practitioner of the experience.

Design Thinking didactic aligns technology, people and business processes for service innovation

The case related is based in the triple areas of technology, people and business processes, to innovate in services for the user. The case developed consisted of genetic improving livestock services.

On the first strand, the technological, new digital technologies have been introduced in the formation of engineering students, as well as there have been applications in several fields of knowledge in the companies worldwide. These digital technologies are going to have a profound impact on the range of the three directives of improving project development. These directives are related with: 1) strong capturing and data treatment, which involves the technology of computer vision and Artificial Intelligence; 2) connectivity, which involves the Internet of things, connecting and devices, sensors and people, 3) treatment of data, embracing machine learning as well as image acquirement and treatment.

On the second strand, that of business processes, the development of learning is based on conceptualization and experimentation, having the Design Thinking as a methodological base, for this approach, fomenting innovation and bringing attention work in teams. With this approach, one can vary from the processes improving existing practices till expanding to the proposition of new businesses models.

On the third strand, the motivation came up from the alignment between the possibility of applying technological devices and software as a) Internet of things, b) image treatment, c) machine learning, d) artificial intelligence. The need for a better method of herd evaluation came up from empirical observations of livestock. The learning experience was with the emphasis on the development of an innovation design-driven, using Design Thinking as a methodological approach.

The subject of the learning research seemed to be very attractive and from the very beginning, the team counted on the knowledge of areas as Veterinary, Electrical Engineering, Computing Engineering, Mechatronic Engineering and Production Engineering. The learning environment was increasing and each other was learning from the others in the team, going deeper with individual knowledge.

The learning Project was named Torotech (a name considered strong, short, attractive and of impacts for the team) and is linked with LEDss (Service Design and Sustainability Study Lab), closely linked with Services

4.0 in which applications are more digital and interconnected.

Following the Design Thinking model, applied to the team learning, the Project observed the phases: 1) Empathy (divergent approach, with bibliographical research in the context Field of genetic improving livestock); 2) Definition (convergent approach, with the definition of technological strand and focus on the proper type of livestock, and a personal interview with an academic professional from the veterinary field); 3) Ideation (divergent approach exploring several devices and resources, as a result of bibliographic research on selected database papers); 4) Prototypation (convergent approach configuring the resources needed and investment needs); 5) Tests (experimentation and results evaluation obtained and a review comparing with expected results).

The team counted on a veterinary Professional, which contribution was to bring the point of view of the livestock (the market) in which the evaluations of the herd is executed in the farms, future perspectives, needs and difficulties on the actual methods. The rhythm of the Project was established with work meetings and sprints weekly, integrating the hole team, even though sometimes not all of them could be present simultaneously. That practices facilitated the whole view of the Project, helping in the formulation of the problem, identifying critical success factors in the actual practice and in searching land proposing future deployments.

The context view of the challenge, that allowed a homogenization of knowledge of the team, contributed to identify some aspects as 1. In the world market, Brazil is the largest exporter of beef and it has the best genetic quality and the largest commercial herd of cattle in the world, with the predominance of the Nelore breed. So the theme is of great impact; 2. The TGM (Total Genetic Method) index gathers different predictions of genetic value, including the EDP (Expected Progeny Difference). The EPD is an index that results from the need for an increment tool to optimize the gains and efficiency of beef cattle, seeking the genetic improvement of the animal according to economically interesting characteristics, such as weight, length and musculature. There are important body dimensions that suggest the use of visual scores for a better description of the morphological type, being considered a good way to identify animals with better productive conformation. This way there is the possibility of using digital technology to catch and treat the physical dimensions of the herd; 3. Genetic improvement programs use objective growth characteristics, although there may be sources of error in measurements. The different evaluation methods have in common the need for reliable collection of objective and morphological data from the animals to improve the quality and efficiency of the herd evaluation service. There is a need for new methods of work, which gives space for innovation.

Although the Design Thinking approach has not been developed with intentions to be applied for didactic learning in higher education, it can be applied as knowledge-driven innovation for learning, integrating innovation, technology and people.

As the knowledge was increasing in the team, spreading knowledge for the team and bringing more experience for students, it was developed a new business model. In the actual process of evaluation of herd, the direct client (of first-tier) is an organization that receives the data of the animals, prepare the statistical calculus and simulations regard the EPD and the client that receives the evaluations and correlations are the ranchers (second-tier). In the new business model, the proper veterinary Professional can be the user of the pieces of equipment, devices and software, changing to an elaborator of the EPD, so that his direct clients are the farmers participating on the Genetic Improvement Program from the National Government. It is a huge innovation change in the service of evaluating the breed.

The first results obtained are of a tremendous advance in the collective knowledge, integrating researchers e coming close the academia and the ranchers' companies. The system proposed and in development can be considered of radical design-driven innovation, with huge gains of time and precision of evaluation. The experimentation is still in development and the expected results are promissory.

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This article is a result of the author's ascertainment and analysis, without compulsorily reflecting CEST's opinion.