

# UNIVERSITY LICENSING AND THE PROBLEMS OF PERUVIAN SOCIETY

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## ABSTRACT

*For many people there is not much clarity about the level of relationship between the Academy and the problems of the Society. Perhaps the first question to be asked is: is there a need for such a relationship, or is it not necessary? Then doubts arise as to how it can be proven that there should be this interrelation; meanwhile, it could be qualified as a risk or uncertainty, which can positively or negatively affect the country. The model is supported by the results of indicators from OECD and World Economic Forum reports. This paper develops the first reasons that justify this approach and presents the Problem/Solution/Product/Project model and the first findings of two applications and some lessons learned.*

**Keywords:** Educational Model, Competencies, Problem Solution, Product

## INTRODUCTION

The labor of the Academy is a work of high impact when it is quantified in its real magnitude. The contact with young students during the exercise of the teaching work allows to perform a task that is not properly valued by many, but represents a high impact in the changes required by the society. This condition may generate a risk because the impact of education on society may be either positive or negative depending on whether the topics in the development of any course or subject obey a real need for academic training at the highest level, and that is oriented to work for the competitiveness of the country. All this effort requires the development of adequate and necessary competencies in relation to clear vision about the model or professional profile to be achieved, and the requirements of the country for reaching present and future goals.

These considerations merit thinking about the degree of rapprochement that the Academy has with the current problems of society; for this reason, this study proposes an educational model aimed at achieving a rapprochement between students in training with the problems of society.

The Problem/Solution/Product/Project model, which for ease of reference will be called PSPP, is based on the information provided by the students themselves, who point out the problems that affect society's environment and which therefore require work in terms of solution proposals by the Academy.

This proposal is framed in Article 51 of the new University Law that states: "In conjunction with public and private entities, universities must permanently coordinate the attention of research that contributes to solve the problems of the country." According to what is stated in this article, a total reciprocal approach of the Academy with the problems of society is required, and clearly the leadership role would correspond to the Academy.

The OECD (2016) report states in the "OECD Skills Strategy, Diagnostic Report: Peru" that the need and criticality of improving skills to enhance the country's competitiveness is analyzed, and to the simple question: Where are key skills generated? The answer is in the academy.

According to this report (OECD, 2016), "In the 21st century, skills have become a key factor in achieving individual well-being and economic success for any country. Without adequate investment in skills, people are left on the margins of society, (...)"

Finally, in the present study, the objectives oriented to achieve the relationship of the Academy with the Society will be presented and the solution of the country's problems will be proposed.

## METHODOLOGY

### Need to Improve the Global Competitiveness Index

According to the report cited above from (OECD, 2016), in terms of competencies, "(...) countries strive harder to achieve higher levels of innovation and competitiveness in their economies, and will have to focus more on generating the right mix of skills, ensuring that these skills are fully activated in the labor market (...)."

From the same report (OECD, 2016), OECD countries have developed a number of instruments to foster knowledge dissemination and collaboration between academia and business. While knowledge and research generated by the public research system is disseminated through a variety of channels, such as academic staff mobility, scientific publications, congresses, contract research with industry and licensing of academic inventions, a great deal of policy attention in OECD countries has focused on promoting knowledge transfers, through publications, patents and licensing of academic inventions and the promotion of university projects.

The OECD report that the "Skills Strategy Diagnostic Report: Peru" touches on a key issue that is reflected in the global competitiveness index and that, according to data from the 2019 and 2018, reports have been elaborated, as shown in Table 1.

It is clearly observed that there is a drop in the global competitiveness index, and for the purposes of this report, the data of the two key pillars are detailed in Table 1. It is important to point out that these pillars are directly related to the competencies of the graduates of all universities and the direct relationship of the Academy with the problems of Society. For this reason, it is necessary to improve the actions carried out in Peru in relation to the components of each of the two pillars detailed in Table 1

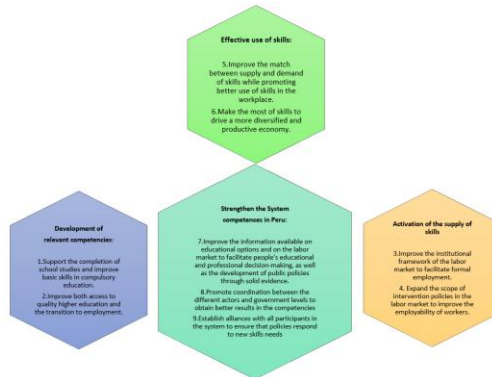
	<b>2019</b>	<b>2018</b>
Global Competitiveness Index		
6th pillar: Skills		
Current staff		
6.01 Average years of schooling		
Skills of the current workforce		
6.02 Scope of Personnel Training		
6.03 Quality of vocational training		
6.04 Graduate skills	110	
6.05 Digital skills among the labor force		

6.06 Ease of finding qualified employees	114	
Future workforce		
6.07 School life expectancy in years		
Skills of the future workforce		
6.08 Critical Thinking in Teaching		
6.09 Pupil/teacher ratios in primary education ratio		
12th pillar: Innovation capacity		
Interaction and diversity		
12.01 Workforce diversity		
12.02 Status of cluster development	102	101
12.03 International co-inventions per million population.		101
12.04 Multi-stakeholder collaboration		
Research and development		
12.05 Scientific publications score		
12.06 patent applications per million inhabitants		86
12.07 R&D expenditure as a % of GDP		
12.08 prominence of research institutions		
Marketing		
12.09 Buyer sophistication		
12.10 Trademark applications per million inhabitants.		
Source: own elaboration		

### Competencies as Results of the Academy-Society Relationship

According to (OECD, 2016), It is the time to leverage Peru's human capital skills to drive innovation and inclusive growth for the future, while effectively tackling informality.

On the other hand, in the same report (OECD, 2016), skills do more than increase employment, income and aggregate growth. The information collected in the PIAAC shows that, in all countries, adults with high basic skills, such as literacy and numeracy, are healthier, perceive themselves as participants in political processes, and trust others more than those with lower skills. In short, the achievement of higher skill levels fosters equity and facilitates people's participation in democracy and society. Figure 1 shows the nine challenges in terms of competencies in Peru, and according to this model, there are four (04) grouping categories of competencies.



**FIGURE 1**  
**9 COMPETENCY CHALLENGES IN PERU**

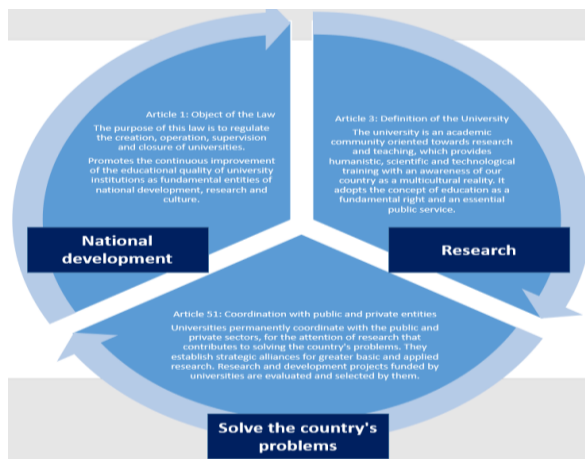
Source: OECD Skills Strategy Diagnostic Report: Peru

As shown in Figure 1, it is necessary for Peru to develop models, actions and strategies to improve competencies. This supports the proposal of the present study of bringing the academy closer to the problems of society.

**New University Law 30220 and the Need for Academia-Society Relationship**

The new University Law 30220 was enacted on July 03, 2014 to date it has more than six (06) years of implementation. For the purposes of this research, special emphasis will be given to the analysis, discussion and implementation of three articles of the Law that are considered key:

- Article 1. Object of the Law.
- Article 3. Definition of the University.
- Coordination with public and private entities.



**FIGURE 2**  
**INTERRELATIONSHIP BETWEEN ARTICLES 1, 3 AND 51**

Source: Own elaboration.

Figure 2 represents the support for the following sentence: "Universities must develop research to solve the country's problems and thus lead national development".

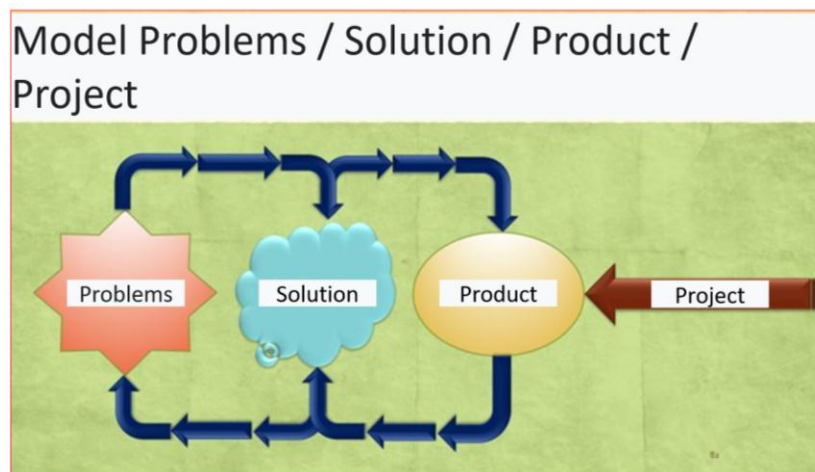
As part of the analysis carried out, Law 30220 is considered to be a disruptive event. The word disruptive is used as an adjective to qualify an abrupt rupture. On the other hand, the term disruptive refers to something that causes a decisive change.

### **Problem/Product/Solution/Project Model**

The Problem/Solution/Product/Project model (see Figure 3) has been implemented in the Mechanical Engineering Faculty of the Universidad Nacional de Ingeniería since 2018, in the MS 413 project management course.

This innovative model requires a change in the methodology of engineering education, since it brings together a series of criteria, skills and expected competencies, in the face of criticism of academic training:

- a) A number of studies have pointed out the lack of problem-solving skills of university graduates.
- b) Similarly, the lack of capacity to apply the knowledge acquired is criticized, and it is often pointed out that pre-professional internships are needed.
- c) There is no facility to identify problems and be able to propose solutions that represent the satisfaction of society's needs and problems.
- d) In view of the problems foreseen by the new Law 30220 in its key articles detailed in Figure 2, this model becomes an interesting option in accordance with Article 51 of Law 30220:
- e) The model seeks to take society's problems directly as its own.
- f) To implement the model, it is necessary to apply the basics of applied research methodology.
- g) The model considers a series of tools, options and measures that respond to scientific research in its connotation of applied research.
- h) Through the application of the proposal, students attain new capabilities that allow them to have human capital oriented to the solution of problems.



**FIGURE 3**  
**EDUCATIONAL MODEL APPLIED IN THE MS 413 PROJECT MANAGEMENT COURSE**

Source: Own Elaboration.

### **Problem/Product/Solution/Project Model Applications**

#### **Application of the model at UPAO course for Civil Engineering professors**

On August 21, 22, 28 and 29/2020, the course Project Management: Basis of Civil Engineering Education was for professors of Civil Engineering at UPAO (Universidad Privada Antenor Orrego). The content of the course was as shown in Table 02, which shows that an

important part of the course was to develop and apply the Problem/Solution/Product/Project model. In this case it is more important, since the twenty-two (22) participants were teachers, and therefore have a multiplying effect on their students.

<b>Table 2</b>			
<b>CONTENTS OF THE COURSE PROJECT MANAGEMENT: BASIS OF CIVIL ENGINEERING EDUCATION</b>			
<b>DAY</b>	<b>DATE</b>	<b>SCHEDULE</b>	<b>CONTENT</b>
Day 1	21/08/2020	18.00 to 22.00	-Premises -Engineering definition and mission. Case and project discussion - Problem/Solution/Product/Project Model
Day 2	22/08/2020	08.00 to 14.00	Role of engineering in public policies. PNCP case. Discussion of cases and projects
Day 3	28/08/2020	18.00 to 22.00	Project management philosophy. Discussion of scope, time, cost, cost, quality, uncertainty model and project management baselines.
Day 4	29/08/2020	08.00 to 14.00	- Project management philosophy. Development of scope, time, cost, quality, uncertainty model and project management baselines. - Application of the integral model - Conclusions and recommendations
Source: Own elaboration			

A survey was applied to all teachers in order to validate the model and the results are shown in Tables 3, 4 and Figure 5: a) Table 3: Details of the questions of the survey conducted *via* the Survey Monkey application, b) Figure 5: details the responses of teachers surveyed and 18 teachers responded, and c) Table 04: Question 7 had an option for an open answer and 14 teachers gave their opinion and it is detailed in this table. All 14 teachers gave their opinion on the need for the application of the model presented.

<b>Table 3</b>					
<b>PERUVIAN UNIVERSITIES RANKED IN THE TOP 200 IN LATIN AMERICA</b>					
<b>No</b>	<b>QUESTIONS</b>	<b>YES</b>	<b>NO</b>	<b>NO</b>	<b>Score</b>
1	Do you agree that research is the key or part of the academic mission?	18	0	0	0
2	For the academy to fulfill its mission, it must necessarily articulate with its environment.?	18	0	0	0
3	Do you consider that in order to fully comply with Article 51 of Law 30220 it will be necessary to strengthen the research methodology?	18	0	0	0
4	Do you agree that for the country to take off in the development of its academia, it must fulfill its role of preparing the appropriate human capital?	18	0	0	0
5	Do you consider that applied research requires the development of programmed courses?	17	1	0	0
6	Do you consider that the teacher-student relationship is the key for each course to provide solutions to the problems of the environment?	16	1	1	0
7	What is your opinion on the proposed Problem/Solution/Product/Project model as a means for Applied research?	4	0	0	14
8	Do you believe that academia should lead the construction of the country's future, setting the lines of development and training the appropriate human capital?	15	1	2	0
*	Express your opinion (be explicit)				
Source: Own elaboration.					

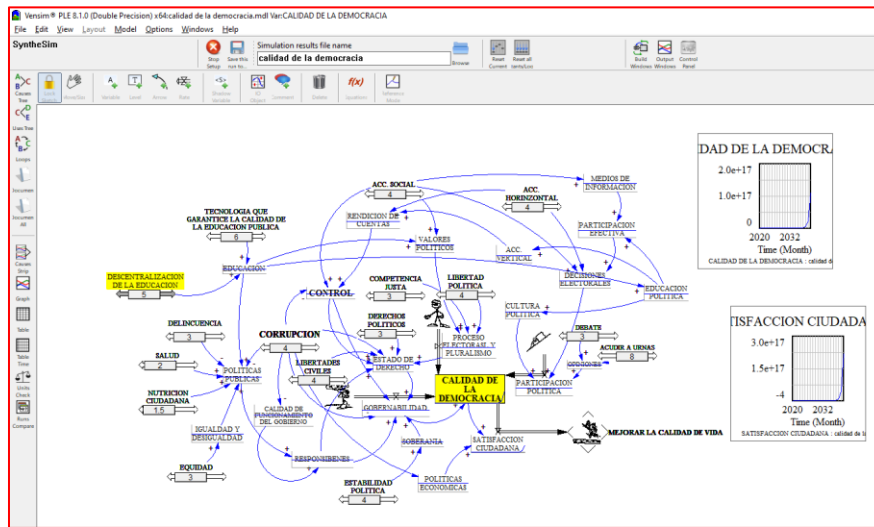
<b>Table 4</b>	
<b>OPINION DEVELOPMENT</b>	
<b>No</b>	<b>OPINION DEVELOPMENT</b>
1	It is the ideal way to understand the problem from the beginning and relate it to the solution.
2	Its application is adjusted to our reality, in such a way as to fulfill the Academy, Business and Society circuit.
3	It is very important because it gives us a didactic sequence to identify the problem and the solution through a systematized process that guides the research.
4	A good methodology to use
5	Excellent model according to reality and facts
6	This is the best way to recognize and solve the country's problems in a sustainable manner.
7	Frames the methodology of applied research.
8	Research is very important
9	It is very practical
10	It must become a culture, without altering the essence of civil engineering (Generate infrastructure)
11	It would help each course produce an observable product, and it also prepares students to get to their thesis.
12	It is a methodology applicable to civil engineering, as a reinforcement of applied research and the solution of society's problems.
13	In my opinion, it is necessary to integrate research proposals of the courses of lines that are directed to produce projects for the development of the population and to make them sustainable in order to make them known to public and private entities.
14	It is simple and practical
<b>Source:</b> own elaboration	

### **Application to Students of the UNI/FIM Project Management course**

In the Faculty of Mechanical Engineering of the National University of Engineering, the MS 413 Project Management course is scheduled. This is the third time that the Problem/Solution/Product/Project methodology is applied in the 2020-I academic year.

As evidence of the results achieved, the work of one of the students of the course is presented below. Authorization has been requested from the student Karina Esther Ulloa Aliaga code 20160143i to disseminate her model.

In the present cycle, as a result of the COVID 19 Pandemic, classes were conducted *via* the WEBEX platform. In the first part of the course, the topics foreseen in the Syllabus were worked on and in this semester a simulation model was first developed using the VENSIM software. The model worked on was to improve the Quality of democracy (see Figure 4), the variables and others were recovered from the scientific paper "What is the quality of democracy? Theories, measurements and evidence", from the author: Nicolás Schmidt, whose tutor was Adolfo Garcé. Week by week, the model of each of the work teams was improved. Figure 6 shows the model after being presented in class.



**FIGURE 4**

**VENSIM SIMULATION MODEL ON QUALITY IN DEMOCRACY WORKED IN A TEAM OF STUDENTS (IN THE IMAGE THE ORIGINAL SIMULATION IN SPANISH).**

Source: Own elaboration.

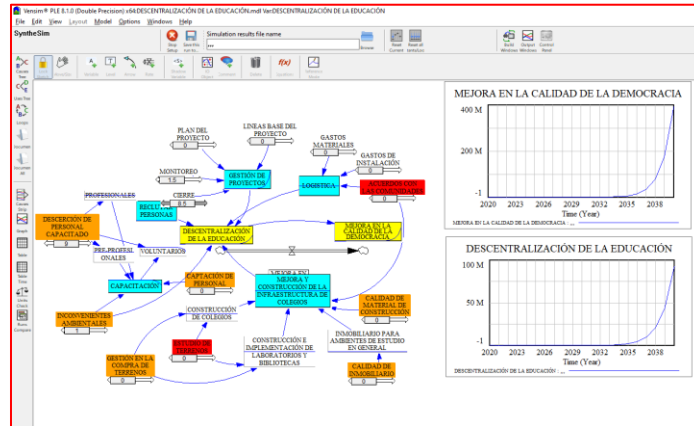
Then, each of the students identified ten (10) projects that had an impact on improving the quality of democracy (see Table 5). Figure 5 shows the individual project that the student in question will take as her individual project: Decentralization of Education.

**Table 5  
LIST OF INDIVIDUAL PROJECTS OF STUDENTS IN THE COURSE**

NO.	HOME		FIN		STUDENT PROJECT
1.	08:00	a	08:07	hours	Investment in the areas of development and research - Acuña Morillo, Jesús Teodomiro.
2.	08:07	a	08:14	hours	Communication strategies aimed at public opinion - political authorities - Arias Rosales, Yahir.
3.	08:14	a	08:21	hours	Plan for the prevention and reduction of disaster risks due to the effect of rainfall - Caballero Guerra, Jhonatan Jesús.
4.	08:21	a	08:28	hours	Technologies that guarantee education in Peru - Cárdenas Gonzales, Wilber.
5.	08:28	a	08:35	hours	Housing with heating powered by clean energies for inhabitants of the Alto Andinas - Castillo Huarcaya, Bryan Carlos.
6.	08:35	a	08:42	hours	Decentralization of educational resources for the student sector - Figueroa Sánchez, Bryan Luis.
7.	08:42	a	08:49	hours	Vortex turbine mini power plant - García Pillaca, Jesús Alexander.
8.	08:49	a	08:56	hours	Strategies to curb environmental pollution - Gutarra Socualaya, Jean Carlo.
9.	08:56	a	09:03	hours	Project to improve rail transportation for the benefit of the social and commercial sectors - Huayta Rivera, Oki Antonio
10.	09:03	a	09:10	hours	Digital system for better control of public projects - Inoñan Cruzado, Oscar Aldair.
11.	09:10	a	09:17	hours	Zero malnutrition - Lizana Toledo, Jocsan.
12.	09:17	a	09:24	hours	Formalization of informal enterprises - Macario López, Wilfredo Manuel.
13.	09:24	a	09:31	hours	Improving the nutrition program for vulnerable populations - Marcelo Calixto, Luis Michael.



14.	09:31	a	09:38	hours	Follow-up of activities of parliamentarians - Moreno Zavaleta, Manuel Alberto.
15.	09:38	a	09:45	hours	Comprehensive education with emphasis on values and political education for parents and children - Quispe Montalvo, Roberto Carlos.
16.	09:45	a	09:52	hours	Comprehensive family assistance plan - Reymundo Flores, Hiuston.
17.	09:52	a	09:59	hours	Decentralization of Education - Ulloa Aliaga, Karina Esther.
Source: Own elaboration					



**FIGURE 5**  
**VENSIM SIMULATION MODEL INDIVIDUAL PROJECT: DECENTRALIZATION OF EDUCATION (IN THE IMAGE THE ORIGINAL SIMULATION IN SPANISH).**  
 Source: Own elaboration.

### FINDINGS

#### Application of the model at UPAO course for Civil Engineering professors

The findings were as follows:

After completing the 22-hour workshop course and the development of the Problem/Solution/Product/Project methodology, UPAO civil engineering professors were convinced of the need to modify the course syllabus as a priority theme in the solution of society's problems.

The survey applied and the fourteen open-ended responses on the Problem/Solution/Product/Project model demonstrate the appropriateness of its application in the training of UPAO civil engineers.

#### Application to Students of the UNI/FIM Project Management Course

Regarding the findings found with the students of the project management course at UNI/FIM cycle 2020-I it was obtained that:

- To properly understand the existing problems of society and to be able to identify the key problems that need to be addressed; therefore, the model made by the student Karina Esther Ulloa Aliaga is presented. Each student also developed his or her own personal project, see table 5. This fact demonstrates achievements in favor of generating development from the students' own work, as long as an autonomous development is achieved in them.
- The model has the ability to identify problems, which will allow to come up with ideas for solutions to problems, and not only that, but they will have the skills to manage such projects.

- The model allows to identify the project whose product could really enable it to provide a solution to society's problems.
- The students have proven the effects of using the Problem/Solution/Product/Project model, and under its development, step by step, it has been demonstrated how beneficial it is to identify the projects worked on by each student.
- The study model contributes directly to improving the quality of life of the population.

## CONTRIBUTIONS

The results achieved between both implementations, *i.e.*, the first one to civil engineering professors at UPAO, and the second one by project management students at UNI/FIM, allow establishing clear relationships between the training based on the project management philosophy, and the need to apply the Problem/Solution/Product/Project model; as a means to achieve the goals of the key articles of Law 30220, and that universities can contribute directly to the national development of Peru.

The applications of the Problem/Solution/Product/Project model allowed clarity regarding the materialization of the universities in the achievement of their mission to improve the competencies of the human capital, and to verify the need to bring the academy closer to the problems of society.

## CONCLUSIONS

The results of the implementation of the Problem/Solution/Product/Project model carried out in two different scenarios:

- Firstly, *via* the development of a course of 22 teaching hours: "Project Management: Basis of Civil Engineering Education" offered to Civil Engineering professors at the Universidad Privada Antenor Orrego (UPAO) and the findings described.
- Secondly, *via* the development of the MS 413 Project Management course at the Faculty of Mechanical Engineering (FIM) of the National University of Engineering (UNI), and the findings described.

On the one hand, those results from the professors of Civil Engineering of UPAO allows to conclude that they need to change the Syllabus of their courses, and on the other hand, the results of the students of the UNI/FIM allow to conclude that in order for the Universities to achieve their objective prescribed in the new University Law 30220, they would need to change their educational model directly oriented to the treatment of the problems of society *via* an approach of the Academy with the problems of the Society.

## POSSIBLE LIMITATIONS OF THE PROJECT

As possible limitations, it is necessary to consider the improvement of the competencies of the leaders who would carry out these proposals in the different universities of the country.

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