Criteria for improving school's facilities from students' point of view

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Abstract

The benefits of school improvement are a growing topic of interest. This has raised the expectation of quality in all schools across the world. School improvements may contribute toward increased employment opportunities. Therefore, it is important for schools to provide favorable learning environment to increase the quality of students' outcomes. The objective of this article is to identify the best areas of improvement for La Salle High School in Mexico City. For this purpose, we asked students to express their opinion what the most important criteria are from a set of seven main areas. The results indicate that students give the highest priority to security system and technological improvements inside the classrooms. In addition, students see necessity of improvements in teaching dynamics and in the transmission of the knowledge. Regarding this area, female students stress the necessity to increase the respect inside the classrooms.

Key words: Analytic Hierarchy Process, Learning process, Schools facility improvements, Security system, Technological improvements.

Criterios para mejorar las instalaciones escolares a partir de la opinión de estudiantes

Resumen

Los beneficios que generan el mejorar las escuelas son un tema de gran interés. Como consecuencia las expectativas de calidad en todas las escuelas del mundo han aumentado. Mejorar las escuelas puede brindar mejores oportunidades laborales para el estudiante. Es por eso, que es importante que las escuelas tengan un ambiente de aprendizaje favorable que incremente la calidad de los resultados de los estudiantes. El objetivo de este articulo es identificar las áreas de mejora para La Preparatoria La Salle en la Ciudad de México. Con esta meta se les pidió a los estudiantes que dieran su opinión acerca de cuáles áreas deberían de ser mejoradas de acuerdo a un grupo de 7 áreas de interés. Los resultados indican que los estudiantes le dieron la prioridad más alta a los sistemas de seguridad y a las mejoras tecnológicas dentro del salón de clases. Adicionalmente los estudiantes creen necesario mejorar la manera en que se transmite el conocimiento y las dinámicas de clase. En este apartado las estudiantes femeninas expresaron principal preocupación en obtener respeto dentro del salón de clases.

Palabras claves: Analytic Hierarchy Process, Proceso de Aprendizaje, Mejora de Escuelas, Sistemas de Seguridad, Mejoras Tecnológicas.

1 Introduction

Education is one of the most important basic human rights, as education is fundamental for achieving the UN Sustainable Development Goals such as: elimination of poverty, lack of education and gender inequality. Education allows people to break the cycle of poverty as well as preparing societies to overcome difficult periods of time. Its mission is to help all people fully develop their talents and to realize their creative potentials, enabling the capacity to do analysis and contribute to society (UNESCO, 2020). A humanistic approach to education emphasizes the importance of developing individual and collective skills such as creative imagination, critical reasoning, and moral sensitivity. In general, humanistic education prioritizes the value of personal growth over the economic value (Khatib, Sarem & Hamidi, 2013). Education is also a powerful catalyst for combating poverty and inequality as well as improving health, wellbeing, and overcoming discrimination (UNESCO, 2020).

Indeed, in most countries, basic education is seen not only as a right, but also as a duty. Given the benefits of education, almost all societies invest in their education systems and worldwide governments are perceived responsible for the provision of accessible quality education. Investing in the development of talented minds can pay off through enhanced economic capability of the educated person (Ladd & Loeb, 2018).According to the information from the World Bank (World Bank, 2020), in the last decade, around 70% of the countries all over the world have significantly increased their expenditures on education. However, in practice, many countries, especially the developing ones, have not correctly prioritized the areas of investment. In countries like Malawi, post-secondary education is completely subsidized while households contribute with almost 20% of the cost of primary education (Roser & Ortiz-Ospina, 2020).This pattern of underinvestment repeats in many of Sub-Saharan African countries like Chad, Madagascar, and Mali where households pay twice as much for primary education than for post-secondary, despite the post-secondary level being accessible almost exclusively to wealthier students (UNICEF, 2015). In some Latin American countries, such as Uruguay, we can realize that households only contribute 11% of their total expenditure in post-secondary education and 25% in primary education (Acerenza & Gandelman, 2019).

Additional to the economic factor, there is a problem ensuring the quality of education. Quality in teaching can be defined and measured in many ways. For example, Heyneman (2004) measures school quality based on the level of expenditures in non-salary inputs (such as textbooks, computers and learning materials), whereas Hanushek and Woessmann (2008) define quality as the capability of preparing students to perform well on standardized tests. Other authors include in the definition several concepts such as relevance, pertinence, efficiency, equity and impact. The Mexican General Law of Education defines quality education as a process consisting in an ongoing effort to achieve reasonable improvement that can only come from within the system which shall be congruent with each other in terms of efficacy, efficiency, pertinence and equity (Ley General de la Educación, 2019). Quality education produces good learning outcomes and often corresponds to substantial improvements in terms of efficiency (UNICEF, 2015). According to the INEE (2018), a high-quality education system should always be improving and evolving based on the main objectives and standards of the institutions.

School desertion is one of the problems related to having an inefficient education system. Other factors related to premature school dropout are the inability of households to pay for school or the distance to school

(De Witte et al., 2013). Similarly, an analysis of one of Mexico's high school concluded that one of the main reasons of school desertion are economic factors, failure in some subjects, and the lack of interest in their studies (Abril Valdez et al., 2008). In Mexico, desertion rate for teenagers between 15 and 19 represents 14.9% of the population who studies. This means that around 700,000 students from post-secondary level of education deserts school (INEE, 2017). According to the OECD (2019), Mexico has one of the lowest post-secondary educational rates, the share of young adults who have completed post-secondary education is only 23%, way below the 44% average of the OECD countries. It is not surprising that when education investments do not result in adequate learning, parents do not keep their children in school (Epstein & Yuthas, 2012).

A solution which may improve the academic performance and help reduce the lack of interest is motivation. This aspect is key in the learning process because it helps students to be attentive and eager to learn (Fan & Wolters, 2014).

Motivated students can sustain any activity for longer periods of time (Espinar Redondo & Ortega Martín, 2015). There are many factors that may influence the level of motivation on a scholar such as well-prepared classes, teachers with positive attitude, dynamic classes and overall positive school environment that will make students feel safe and thus motivated (Silva, 2020). Similarly, Kapur (2018) highlights that learning environment, the academic performance, the parental support, and well-prepared teachers have a great potential of influencing student's interests. Teachers' quality is vital in improving students' achievements (Canales & Maldonado, 2018; Meltzer and Woessmann, 2012). In this sense, Ome, Menendez and Le (2017) state that teaching quality can be improved by modifying type of teachers, providing financial incentives or through training and professional development.

Classrooms are the basic unit of the educational environment where the learner develops physical and emotional skills (Elseragy, Elnokaly & Gabr, 2011). Children spend most of their early years in classrooms and schools, thus the school infrastructure is a fundamental component which may affect the complex environment where school learning happens (Barrett et al., 2015). In order to have an effective school improvement, the school community must reach a consensus and have a clear understanding of which are the highest priorities for action based upon the potential to improve the academic performances (NC State Board of Education, 2016). Institutions need to build adaptable, sustainable and high-quality environments that inspire learning and support the educational success of students, as well as design spaces that allow for recreational opportunities and generate positive responses from its community (OECD, 2012).

According to Perkins (2020), projectors, smartboards and speakers might be a powerful tool to aid students and help them to interact with their classmates and teachers. However, it is important to be careful in the way we place the interactive tools because if students are too distracted, we could end up with the same problem, students who do not pay attention and thus have negative results on the learning process (Elseragy, Elnokaly & Gabr, 2011). Another important aspect to take in consideration is the own student's opinion. According to Cummings Mansfield (2019), keeping student's voice in the discussion may be a powerful tool to determine strengths and needs of the schools as well as decreasing behavior problems, and increasing students learning.

In this article we are focusing mainly on finding a way to prioritize the improvements in the infrastructure of the schools, such as classrooms, availability of books and uniforms, and eventually improving the overall teaching and learning process. Therefore, the objective of this document is to analyze which factors are the most important when it comes to education and its improvement, using an efficient criteria selection method

and taking into consideration different criteria and sub-criteria. Throughout this article we will first introduce our proposed measures and models. Then, we will provide the obtained results. A concluding section will then summarize what could be done and possible shortcomings along with possible further lines of development.

Materials and Methods

Survey Development

In order to obtain students' opinion about their experience inside the school's facilities, an online questionnaire was sent through Google Forms to a sample of students of Universidad La Salle in Mexico City, Campus "Condesa". The questionnaire was disseminated and shared through Google Forms on April 2020 for around a month.

To create the structure of the questionnaire we classified seven areas of possible improvements in the school's facilities: *Classroom Improvements*, *Bathroom Improvements*, *WiFi Net Improvements*, *Improve Teacher's Knowledge and Skills*, *Improve School Security*, *Improve Infrastructure*, *Improve School's Services* and *Online Page*. The students were supposed to grade each area through a Likert scale according to their personal experience and opinion. The scale was a 5 points rate where the number 1 meant "Not Important at All" and 5 meant "Extremely Important". Each main area of improvement had at least 5 sub-criteria (Table 2 and Figure 1) which allowed us to have more specific data and being able to obtain average percentage of importance depending on the area evaluated. The answers will help us to establish the priorities between criteria and sub-criteria.

Sample

The sample consists of 180 students from La Salle University currently studying their first, second or third year of post-secondary education, representing 7% of the total. The dataset includes the subject's ID from La Salle, their gender and age, as well as their opinions over the previously mentioned areas of improvement. Out of those students, 66.29% were females and 33.71% males. In addition, 21.91% studies on 1st and 2nd year of post-secondary education and 78.09% are on their last 3rd year. In this article, we will analyze the data for 3rd year compared to the other two. The reason for this classification of data is because during the last year, students take more specialized courses based on their career interests and, therefore, graded more consciously the school's facilities. Moreover, the dataset for individual groups of 1st year and 2nd year students was insufficient for a complete analysis.

This analysis will focus on the different results depending in their maturity and more specialized education. This means that at the end, we will have 5 models of AHP.

Analytic Hierarchy Process (AHP)

Analytic Hierarchy Process was developed by Saaty (1977) and works with both qualitative and quantitative evaluation of preferences. To obtain criteria priorities, pairwise comparisons based on the fundamental verbal/numerical 1-9 scale is required (Saaty, 1977). The number of necessary comparisons for each comparison matrix is $n(n-1)/2$, where n is the number of criteria. Each criterion gains a geometric mean of its

comparisons, which are then normalized. An important requirement is to test consistency of our stated preferences, as human-made decisions can be mutually inconsistent because of the human nature. The most commonly used method for consistency check was developed by Saaty (1977) who proposed a consistency index (CI) related to eigenvalue method. CI is obtained as:

$$\mathrm{CI} = \frac{\lambda_{\max} - n}{n-1} \quad (1)$$

$\lambda_{\max}$ is the maximal eigenvalue of the pairwise comparison matrix. The consistency ratio (CR) is given by:

$$\mathrm{CR} = \frac{\mathrm{CI}}{\mathrm{RI}} \quad (1)$$

RI is the random index shown in Table 3.

n	3	4	5	6	7	8	9	10
RI	.58	.9	1.12	1.24	1.32	1.41	1.45	1.49

Table 1: AHP - Random indices (Saaty, 1977)

The priorities are considered consistent if the consistency ratio is less than 10%. Super Decisions software is used to count the criteria preferences and to test consistency of the preferences.

Structure of the AHP model

The school improvements were evaluated regarding seven main criteria and their set of sub-criteria:

- Bathroom: associated with the Toilets, Washing Hands Sink and other objects, divided into following sub-criteria: *Toiles*, *Sensors of the Toilets*, *Cubicles*, *Sink*, *Soap Dispenser*, *Dryer and Paper Towels*, and *Urinals/Pads*.
- WiFi: related to the signal reach, speed and app restrictions, divided into following sub-criteria: *Cafeteria's Reach*, *Apps Restriction*, *Gym Reach*, *General Speed*, and *Outside Reach*.
- Classroom: related to the materials and tools inside the classroom, divided into following sub-criteria: *WiFi Reach and Speed*, *Benches*, *Whiteboards*, and *Projector*.
- External Security: associated to the number of people, their aptitudes, and attitudes, divided into following sub-criteria: *Number of Staff*, *Attitude*, *Aptitude*, *More Cameras*, and *More Security Vehicles*.
- Infrastructure: related to improvements inside the school, divided into following sub-criteria: *Number of Bathrooms*, *ULSA Bus*, *Sport's Selection Transport*, *Lifts*, and *Library & Books*.
- Services: related to improvements in the quality of the services the school provides to improve the students' experience, divided into following sub-criteria: *Parking Lot Cost*, *Psychological Treatment*, *Ways of Accessing School*, and *Computer Lending*.
- Teaching: associated to the quality of the teacher's knowledge and skills, divided into following sub-criteria: *Punctuality*, *Knowledge*, *Knowledge Transmission*, *Respect to Students*, and *Class Dynamics*.

The basic structure of all the models is shown in Figure 1.

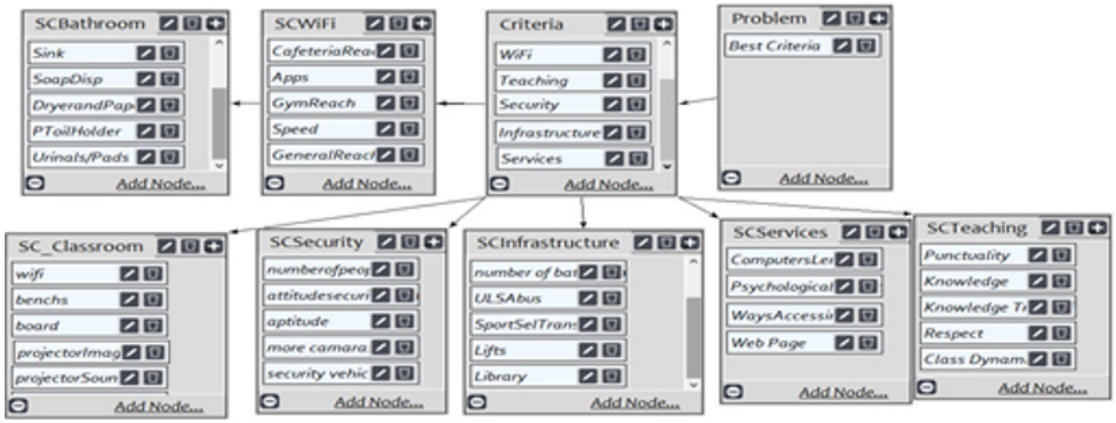

Figure 1: Super Decisions Network Model

Results

In this section, we present the obtained results from the analysis. We present the results separately for each model. For the purpose of this article, we will analyze the obtained information through the AHP Model regarding several models. The first model will include all the dataset. Then we will divide the dataset in male and female there creating 2 independent gender models. Finally, the last two models will analyze the data depending if they belong to their last year of education or not.

General model (Total Sample)

Table 2 shows the results of the General model. In this case, WiFi is the criterion with the highest priority for the entire sample, the students evaluated this area with an importance of 29.53%. The biggest issue in WiFi is mainly the speed and external reach (34.35%). A WiFi booster or repeater may significantly improve the reach and speed of the WiFi signal. The sub-criteria in which the students feel more comfortable regarding the WiFi are the coverage in Cafeteria and Gym with 5.51% and 12.9% respectively. Next, the second most important criterion is Teaching with a level of importance of 17.78%. In particular, the students perceive the most important part of the teaching the Course dynamics and Knowledge transmission, both with 30.61% importance. This implies that the students are finding difficult acquiring new knowledge due to the professors' way of teaching. The least inquiry is then placed to the Punctuality of professors (5.12%). The third most important criterion is linked to the Security in the campus. Students evaluated this criterion with an importance of 15.12%. More in detail, students feel that it is crucial to install more security cameras (45.41%) and extend the Aptitude of the security staff (30.03%). Thus, students feel that it is necessary to invest more in the technical and training part rather than the physical staff, as number of people is evaluated one of the least important criteria (8.19%).

Criteria	Sub-criteria							
Bathroom	Cubicles	Hands Dryer	Paper Holder	Sensor	Sink	Soap Dispenser	Toilets	Urinal/Pads
9.61%	14.65%	12.69%	10.99%	2.77%	4.02%	20.34%	10.99%	23.54%
Classroom	Benches	Board	Light	Projector Image	Projector Sound	WiFi	-	-
12.76%	10.43%	4.44%	6.66%	26.16%	26.16%	26.16%	-	-
Infrastructure	Library	Lifts	# Drinking Fountains	# of Bathrooms	Parking Lot	Selection Transport	ULSA Bus	-
5.53%	32.93%	21.11%	8.93%	21.11%	5.31%	5.31%	5.31%	-
Security	Aptitude	Attitude	Cameras	# of People	Security Vehicles	-	-	-
15.12%	30.03%	8.19%	45.41%	8.19%	8.19%	-	-	-
Services	Dev. Lend	Parking Lot Costs	Psycho Treat.	Accessing	Web Page	-	-	-
9.61%	14.46%	6.14%	26.47%	26.47%	26.47%	-	-	-
Teaching	Course Dynamic	Knowledge	Knowledge transmission	Punctuality	Respect	-	-	-
17.78%	30.61%	16.83%	30.61%	5.12%	16.83%	-	-	-
WiFi	Apps Restriction	Cafeteria's Reach	Outside Reach	Gym's Reach	Speed	-	-	-
29.59%	12.90%	5.51%	34.35%	12.90%	34.35%	-	-	-

Table 2: General Model Results

In case of the Classroom category (4th most important, 12.76%), students see the necessity to improve the quality of image and sound of the projectors and the accessibility of the WiFi inside the classrooms (26.16%). Again, students put main importance to the technical part rather than physical equipment. Services and Bathroom criteria are evaluated with the same importance of 9.61%, where the most important sub-criteria are Urinals (23.54%) and Soap Dispenser (20.34%) in the Bathroom area, whereas for the Services the highest priority was given to 3 sub-criteria: Web Page, Psychological Treatment and School Access Ways with an importance of 26.47%, representing almost 80% of the total importance. The criterion with the lowest priority is Infrastructure with a priority of 5.53%. In this case students see the highest necessity of improvements in the University library (32.93%).

The priority weights of the model were consistent as the consistency ratio was below 10% (2.65%). The CR for the sub criterion of Bathroom, Classroom, Infrastructure, Security, Services, Teaching, and WiFi were also consistent with a CR of .53%, 1.02%, .84%, .6%, .44%, .79%, and 1.24% respectively.

Male model

The General model gave us the initial overview about students' opinion of school's facility features. To obtain more specific overview, it is necessary to divide the initial results considering students' characteristics. Table 3 presents the opinions of male students. Similarly, as in the General model, WiFi is the most important Criteria with a preference of 37.55%, which has an importance +7.65% higher compare to the general result. Males evaluated the Security and Classroom criteria as the second most important with an importance of 16.35% each. Again, males perceive these criteria as more important compare to the General model, +1.25% in Security and +3.59% in Classroom.

On the other hand, male students evaluated the teaching criterion has less importance by -8.39%. The differences in the perspectives between males and the General model express that male students are perhaps more concerned on the superficial and tangible criteria in the school.

In the sub-criteria level, the priorities were almost the same except some differences, such as in the Bathroom criterion were the importance of Hand dryer grew by +7.43% to 20.12%. In the Classroom criterion male students evaluate as the most important criterion the Projector sound and WiFi (31.37%), in the infrastructure the Lifts (30.42%), necessity of more Camaras in Security (48.82%), whereas in the Teaching criterion the most important part is the Course dynamics and Knowledge transmission (34.35%).

The Consistency Rate of the male model was of .91%. The sub-criteria consistency rates were not bigger than 10% which makes the criteria and sub-criteria consistent. The biggest inconsistency was of the sub-criterion of Classroom with an inconsistency of 2.33%.

Criteria	Sub-criteria							
Bathroom	Cubicles	Hands Dryer	Paper Holder	Sensor	Sink	Soap Dispenser	Toilets	Urinal/Pads
5.48%	20.12%	20.12%	6.76%	6.76%	3.15%	20.12%	11.48%	11.48%
Classroom	Benches	Board	Light	Projector Image	Projector Sound	WiFi	-	-
16.35%	9.91%	3.57%	3.57%	20.20%	31.37%	31.37%	-	-
Infrastructure	Library	Lifts	# Drinking Fountains	# of Bathrooms	Parking Lot	Selection Transport	ULSA Bus	-
5.48%	18.39%	30.42%	10.41%	18.39%	10.41%	6.00%	6.00%	-
Security	Aptitude	Attitude	Cameras	# of People	Security Vehicles	-	-	-
16.35%	22.15%	13.42%	48.82%	7.80%	7.80%	-	-	-
Services	Dev. Lend	Parking Lot Costs	Psycho Treat.	Accessing	Web Page	-	-	-
9.39%	16.45%	6.49%	30.31%	16.45%	30.31%	-	-	-
Teaching	Course Dynamic	Knowledge	Knowledge transmission	Punctuality	Respect			
9.39%	34.35%	12.90%	34.35%	5.51%	12.90%	-	-	-
WiFi	Apps Restriction	Cafeteria's Reach	Outside Reach	Gym's Reach	Speed	-	-	-
37.55%	11.51%	5.28%	32.21%	18.81%	32.21%	-	-	-

Table 3: Male Model Results

Female model

The results for female students are presented in Table 4. In this case, we can see several important differences, as females grade their priorities for Security and Teaching as important as WiFi, all with the importance of 22.55%. This fact speaks a lot about the way female students feel inside their school as they care more about the teaching part than males (+13.16%) and less about the technological part (WiFi, -15%). More specifically, females are concerned a lot about Course dynamics (26.47%), Knowledge transmission (26.47%) and Respect inside the classrooms (26.47%). In the case of the Respect, females give to this part +13.57% bigger importance than males. This can reflect the problem of machisim in the Mexican population.

Females also see the biggest issue in the classroom features in the quality of the projectors and WiFi, as well as perceive crucial to increase the number of security camaras (36.36%) and improve the Aptitude of the security staff (36.36%). Again, slightly less importance to the technological part compare to male students. In

the female part of the sample there seems to be more interest in improving bathrooms than the male, where they seek improvements in the pads dispenser (29.30%). In the related problem, females also see a necessity to increase the number of Bathrooms in the campus.

Criteria	Sub-criteria							
Bathroom	Cubicles	Hands Dryer	Paper Holder	Sensor	Sink	Soap Dispenser	Toilets	Urinal/Pads
13.28%	6.00%	10.52%	10.52%	3.90%	10.52%	18.72%	10.52%	29.30%
Classroom	Benches	Board	Light	Projector Image	Projector Sound	WiFi	-	-
5.00%	9.71%	3.48%	9.71%	25.70%	25.70%	25.70%	-	-
Infrastructure	Library	Lifts	# Drinking Fountains	# of Bathrooms	Parking Lot	Selection Transport	ULSA Bus	-
4.67%	22.46%	34.17%	7.41%	22.46%	4.50%	4.50%	4.50%	-
Security	Aptitude	Attitude	Cameras	# of People	Security Vehicles	-	-	-
22.55%	36.36%	9.09%	36.36%	9.09%	9.09%	-	-	-
Services	Dev. Lend	Parking Lot Costs	Psycho Treat.	Accessing	Web Page	-	-	-
9.41%	11.51%	5.28%	32.21%	32.21%	18.80%	-	-	-
Teaching	Course Dynamic	Knowledge	Knowledge transmission	Punctuality	Respect	-	-	-
22.55%	26.47%	14.46%	26.47%	6.14%	26.47%	-	-	-
WiFi	Apps Restriction	Cafeteria's Reach	Outside Reach	Gym's Reach	Speed	-	-	-
22.55%	12.31%	7.29%	34.04%	12.31%	34.04%	-	-	-

Table 4: Female Model Results

The inconsistency of the model is 1.8%. The sub-criterion of Bathroom had an inconsistency of .72%. The CR of Classroom was 1.29%, Infrastructure CR was 1.04%. The inconsistency of Security was .41%. The inconsistency of Services was 1.32%. The CR of Teaching was .44% and WiFi inconsistency was .59%. These values were evidently lower than the limit of 10%.

Last grade model

After analyzing the effect of students' gender, it is also important to analyze the possible differences regarding the school year, which can to some extent represent students' age. These students expressed high importance for the Security, Teaching and WiFi areas, whereas low importance is also assigned to Infrastructure and Services. One of the biggest differences is observed in case of the Classroom area, where the students from the last grade evaluated this area with very low importance of 5%, which is -7.76% compare to the General model. Further, the last graders assigned high importance to the Library improvements with an importance of 27.98%, which has to do with the level of specialization they get on that last year that implies that they use much more the library. With no significant difference, the last graders also give very high importance to technical areas (projectors, WiFi) and Course dynamics and Knowledge transmission.

The CR for the Last Graders Model was consistent too, with an inconsistency of .76%. The sub-criteria were also consistent as the biggest inconsistency was Security with an inconsistency of .81%. This model has been the evaluation with the most consistent values of importance for the criterion.

Criteria	Sub-criteria							
Bathroom	Cubicles	Hands Dryer	Paper Holder	Sensor	Sink	Soap Dispenser	Toilets	Urinal/Pads
13.28%	7.49%	13.47%	7.49%	4.50%	7.49%	23.04%	13.47%	23.04%
Classroom	Benches	Board	Light	Projector Image	Projector Sound	WiFi	-	-
5.00%	13.69%	5.34%	8.29%	24.23%	24.23%	24.23%	-	-
Infrastructure	Library	Lifts	# Drinking Fountains	# of Bathrooms	Parking Lot	Selection Transport	ULSA Bus	-
4.67%	27.98%	27.98%	6.57%	17.74%	6.57%	6.57%	6.57%	-
Security	Aptitude	Attitude	Cameras	# of People	Security Vehicles	-	-	-
22.55%	25.73%	15.29%	41.47%	8.76%	8.76%	-	-	-
Services	Dev. Lend	Parking Lot Costs	Psycho Treat.	Accessing	Web Page	-	-	-
9.41%	16.45%	6.49%	30.31%	16.45%	30.31%	-	-	-
Teaching	Course Dynamic	Knowledge	Knowledge transmission	Punctuality	Respect	-	-	-
22.55%	30.31%	16.45%	30.31%	6.49%	16.45%	-	-	-
WiFi	Apps Restriction	Cafeteria's Reach	Outside Reach	Gym's Reach	Speed	-	-	-
22.55%	15.78%	8.88%	29.78%	15.78%	29.78%	-	-	-

Table 5: Last Grade Model Results

First and Second Year Model

Finally, the last model presented in Table 6 includes results from the first- and second-year students. WiFi and Teaching received the highest priority with 24.01% each. Another change is that in the infrastructure sub-criteria they graded higher the number of bathrooms (26.68%) and the elevators. In every model, including this one, students were worried about two areas of improvement inside their classrooms, WiFi and the quality of the projector, the projector being the most important with an importance of 32.17%.

Lastly the first/second-year students showed a great necessity of improvement in the area of respect they receive from teachers (26.75%) while the last year students gave the highest priorities to criteria associated to the improvement of their learning process such as Course dynamics (30.31%). In this last model, the CR was of .52%. All the sub-criteria were also consistent. Wi-Fi had the highest inconsistency with a CR of 1.25%.

Criteria	Sub-criteria							
Bathroom	Cubicles	Hands Dryer	Paper Holder	Sensor	Sink	Soap Dispenser	Toilets	Urinal/Pads
13.22%	18.21%	10.32%	18.21%	3.26%	3.26%	18.21%	10.32%	18.21%
Classroom	Benches	Board	Light	Projector Image	Projector Sound	WiFi	-	-
7.52%	4.90%	4.90%	4.90%	32.17%	32.17%	20.95%	-	-
Infrastructure	Library	Lifts	# Drinking Fountains	# of Bathrooms	Parking Lot	Selection Transport	ULSA Bus	-
4.8%	16.29%	26.68%	9.57%	26.68%	9.57%	5.61%	5.61%	-
Security	Aptitude	Attitude	Cameras	# of People	Security Vehicles	-	-	-
13.22%	28.08%	5.05%	28.08%	28.08%	10.70%	-	-	-
Services	Dev. Lend	Parking Lot Costs	Psycho Treat.	Accessing	Web Page	-	-	-
13.22%	6.12%	6.12%	33.65%	20.47%	33.65%	-	-	-
Teaching	Course Dynamic	Knowledge	Knowledge transmission	Punctuality	Respect	-	-	-
24.01%	26.75%	14.84%	26.75%	4.91%	26.75%	-	-	-
WiFi	Apps Restriction	Cafeteria's Reach	Outside Reach	Gym's Reach	Speed	-	-	-
24.01%	12.90%	5.51%	34.35%	12.90%	34.34%	-	-	-

Table 6: First and Second-Year Model Results

Discussion

Throughout all the 5 models we discovered that students give the highest priority to the WiFi criterion. This makes sense because the Internet is their technological tool to fully develop all their abilities and acquire new knowledge. The youngest generations (Millennials and Generation Z) are defined as the technological generations as they are comforted with new media technologies use incorporating communication and information technologies (CITs) into their daily lifes (Chicca & Shellenbarger, 2018; Gursoy, Geng-Qing Chi & Karadag, 2013; Myers, & Sadaghiani, 2010). Every day the Internet becomes a tool more useful in every school and household across the world and Mexico is not the exception. However, the access to Internet in the country is quite limited. Public schools have problems ensuring quality education and efficient learning spaces. Private schools are supposed to be better and it is no surprise that La Salle's students think they deserve a better quality of WiFi. Moreover, a quick WiFi network improves the teaching dynamics, in most cases teachers require the use of WiFi with the intention of planning more interactive and didactic courses.

According to a research study in the Czech Republic secondary school from Žumárová, Černá and Maněna (2014), young students rely heavily on the use of electronic channels of communication. The subjects of the study were 18-year-old students. The results showed that students use a lot Facebook and other Social Media. According to the authors, these technologies offer new options to ensure the student's learning processes and may help students gaining new skills and getting information easier (Žumárová, Černá & Maněna, 2014). What is more, Generation Z is so called the 'internet generation', thus, mobile phones are the most important part of their life (Ozkana & Solmaz, 2015).

Therefore, it is important to consider improvements in the technological areas of the schools (improving WiFi, projectors, etc.), which can also influence learning dynamics and, consequently, students' learning motivation.

The criteria of Teaching and Classroom are heavily related. If we improve, for instance, the tools used in the classrooms, teachers may have a better chance to create more effective activities and improve the learning process. For example, one of the students' concern in the different models is the quality of the projector inside the classrooms. This particular problem may be a little expensive to solve; however, if each semester the school renews some of the faculty projectors, eventually all the classrooms will be able to see and hear clearly the media transmitted through this device. As Chicca and Shellenbarger (2018) pointed out, students are often expected to complete large amounts of readings and class content may be presented using PowerPoint. However, considering the characteristics of Generation Z, this traditional way of teaching is not optimal in meeting the needs of the current students. Generation Z students want practical and relevant information. Therefore, education institutions authorities should require that teachers demonstrate the applicability of the theory in their courses (Flegl & Andrade Rosas, 2019).

The second biggest problem to solve after WiFi is the security inside and outside the school. It is very accurate considering the fact that the students, especially women, felt the need to improve the security system inside the facilities. In the recent years in Mexico, violence has become a clear problem. According to social work done by Paganelli and Madrigal Ramírez (2012), the incidence of violence among students is growing every day. A great percentage of the students suffers more from threats and physical aggression, theft, and sexual harassment especially against women. UN listed Latin America as one of the most violent regions and, according to the statement of the current chief of the UN Office on Drugs and Crime (UNODC) Angela Me, crime can be described as an epidemic in this region (Lissardy, 2019). In 2019, Mexico was evaluated as the second most violent country right behind Venezuela (Pérez, 2019). That is why, the students of the University La Salle gave one of the highest importance to the Security system. In every model, we observed that students asked for a better security camera system, perhaps because they do not feel safe enough. The necessity of the security improvements was marked more by the female students. This result is in accordance to Arabaci (2015) who revealed that female high school students do not perceived themselves safe inside or outside the school. What is more, the insecure school environments are negatively reflected in the student's health, school attendance and success. A way the University La Salle can improve its security is installing more cameras and providing efficient ways that give the students the possibility of asking and getting the security footage in case they are needed, especially in theft and harassment situations. Moreover, they could give more capacitation to the guards of the school so if there is a violent situation going on outside the school, the guards would be able to effectively act and protect the students.

Once the possible changes are identified we should ask an important question. Why should La Salle pursue school improvements? At one level school improvement shows organizational development and growth. At another ethical and moral level school improvements increase the life chances and achievements of all students (Harris, 2005). School improvement is essentially about building communities and establishing positive relationships. Even the school moto encourages the students to create community so with small changes La Salle high school could make a difference. In this sense, school improvements help creating an atmosphere of social responsibility and community instead of individualism. The authorities can plan the improvements in several phases. The first stage should involve improving the WiFi and start improving the projectors of the classrooms. During the second stage, the school should focus on improving the security by

adding an efficient system of security cameras. And, as the Infrastructure and Services criteria were given the lowest priorities, their improvement should be part of the third stage.

Limitations of the study

Firstly, we must remember that the sample represents just a small part of the entire community (approximately 7% of all students in all degree levels). Moreover, the study is based on students' opinions which may be biased or not entirely answered responsibly. Also, the sample is just of post-secondary high school so the results cannot be extended to graduate and postgraduate students. The purpose of this study is to give the students' opinions a numeric approach in order to begin to understand which may be the school's strategies. We can use the information of this study as a guideline; however, we have not analyzed an important factor which is the economic one. We do not know which are the school's economic perspectives, strategies, and rules. Even though the most important criteria should have priority, the cost-benefit analysis of the improvement may not give the university enough arguments in favor. Additionally, we have not considered exogenous factors such as the recent pandemic events which will compromise the school capacity to make changes.

Moreover, this study is based on the opinion of La Salle's students which presents two limitations. First of all, there might be subjectivity in the results and, second, the results can only be considered relevant for this institution or for local schools with similar characteristics. In other words, other the students of other schools may have different priorities and thus the results obtained might not be applicable. This might be caused because of the different installations, teachers, services, or facilities the schools provide. In order to extend this study to other schools we might need to share the questionnaire with schools of different countries and characteristics. Then we could compare the obtained results. This might be an extension to further analysis of this article.

Conclusions

The decision-making process is a series of steps that lead finally into a thoughtful decision. However, the more complex the problem is the more decisions are involved and sometimes it can become an impossible task. The Analytic Hierarchy Process (AHP) is a powerful tool especially when you have many equally possible alternatives. In this article we were able to identify some of the students' priorities regarding school facilities. All constructed models in this study indicate several common areas of improvement. First of all, the number one concern of the students was WiFi, Security system and Teaching. In some cases, students were also worried for the quality of classroom, specially the projector's quality. The obtained results can be taken as a guidance for future investments planning. Students commonly select their university (school) according to many criteria. However, the university reputation is and quality of teaching are among the most important criteria.

An extension to this study may include an analysis between post-secondary and university students. With further analysis and more information about the school's limitations and the student's opinion the AHP model could be of great help to beginning to explore different strategies La Salle could take in order to improve its income, the amount of students, the happiness of the students and improve other school's perception of La Salle. It is well known that La Salle is a school that cares for its students so maybe with the results of this and

other studies and analysis we could bring La Salle the optimal strategy to increase the community of our school and improve the experience inside the school facilities.

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