

Team 13



Operations: Economics and Strategy - MGT528
Team 13 Project Report: Handball Club Minibar

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Completion Date: 03/12/2020
Submission Date: 04/12/2020

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Very good

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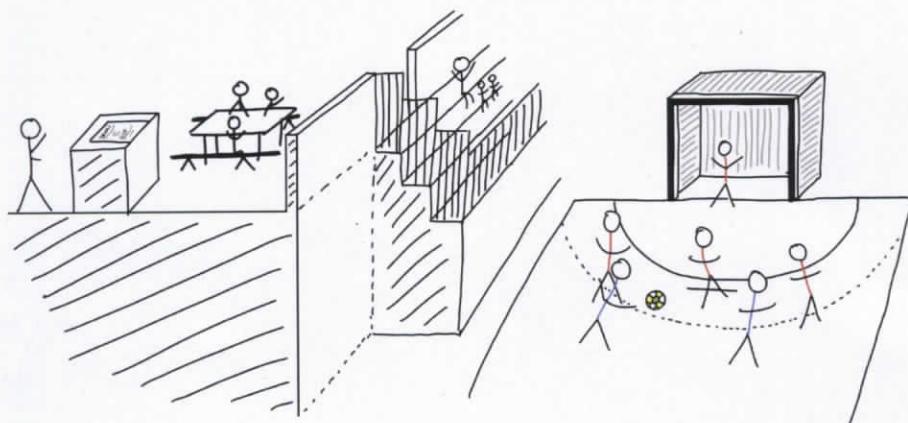


Figure 1: Illustration of the minibar's operations.

Executive Summary

In this report, we decided to study the case of the LVC Handball Club's Minibar to try and find which improvements and innovations could be made to the business. Therefore, after collecting the needed data, a survey was submitted to the customers in order to first establish a demand function of some products and find the main flaws and difficulties of the minibar. First, the idea of a set menu was proposed to increase sales and eventually attract more customers. A price optimization was computed in order to find the best price that could be charged for this menu. Afterward, an analysis of the inventory management of the minibar was made and two models were used, and then compared, to find the best order quantities : the Economic Order Quantity (EOQ) model and the Newsvendor model. Finally, several ideas and steps were proposed for the minibar in order to have a continuous and efficient improvement.

1 Introduction

LVC Handball stands for Lausanne-Ville Cugy Handball (<https://lvc-handball.ch/>), it is the handball club Nil and Filip play for. During the weekend, competition days, the club sets up a minibar (so called "*buvette*" in french) where people can find drinks and food to consume while they enjoy the matches, or even some occasional goodies with the club's logo on it. Covid restricting access to the place we made a drawing representation in Figure 1.

This minibar represents quite an important part of the club's annual revenue. Indeed, in 2019 for example, the revenue of the minibar was approximately 9000 CHF. Last year, due to COVID-19, those revenues were severely impacted as all competitions got cancelled. This forced the club to raise its players' fees from 550 CHF to 600 CHF.

This minibar is managed by the players themselves, several rotations a day are made to keep it up and running during the weekends. One person, volunteer, is in charge of replenishing the stock on the basis of "buy what's missing". We met with the person who was in charge of the minibar for two years, Kevin Cibran, to understand how they were running the business. We then reached Yann Delacombaz, current manager, to get the appropriate data to compute our analysis.

Customers usually come for a few hours to watch some matches, buy something to support the club and leave. They don't usually go to the nearby shops (closed on Sundays), so it partly makes it a mini-monopoly to analyse and the course theory could be applied. Also, the current operations are not optimized, improvement is clearly possible in this area.

Therefore, the goal of our project is to propose different types of improvement for the minibar by analysing the present data available to figure out if mistakes are being made and identify the most interesting aspects to work on. An attempt to identify areas to work on was made through the value map in Figure 13 in annex.

2 Demand Analysis

2.1 Available data

To be able to conduct an effective and well structured analysis, we collected all the data we could from the different club representatives and the person in charge of the minibar. We now have spreadsheets containing all the financial data relevant at the club level as well as some

related to the operations of the minibar itself (e.g. list of products, profit margins and number of sales per product over a sample period), its annual revenue and forecasts.

2.2 Starting point

First off, because getting a demand function to reevaluate the prices would be impossible in the scope of this project, we assume the current pricing as optimal.

During our meeting with Kevin Cibran we noted two interesting aspects related to demand: it varies depending on the time of the day, and it varies depending on the type of matches.

Depending on the type of matches, the demand is quite different. When the juniors are playing (M13 tournaments) the demand of croissants and coffee tends to increase as their matches usually take place in the morning and parents accompany their kids, sometimes from far away. On the other side of the spectrum, when adults are playing (H1) the demand of beers tends to increase, and if the visiting team is Swiss-German they usually consume even more beers, sometimes buying them by packs (more than 200 beers sold at times).

The sales are adapted to demand during the day. In the morning the focus is on products related to breakfast like coffee, tea or croissants and in the afternoon, focus shifts towards more substantial food such as hot dogs and crepes.

From the data we noted one important point the club does not take to its advantage well enough: organized events are the most lucrative events for the minibar. For example, the M13 tournament for example generates around 2100 CHF per weekend. This includes even non-sportive events such as the annual raclette evening. Taking advantage of that by organising these events more frequently, the club could improve its image, attract more customers and drive revenue upwards, not necessarily those of the minibar only.

2.3 Survey

2.3.1 Description

To find new ways of increasing demand we decided to poll our players and their families. The goal of the survey was to get a demographic understanding of the clientele and its respective demand trends, and gather opinions on some topics. Therefore, after asking a couple demographic questions we then offered menu propositions and proposed some improvements for them to evaluate before requesting some ideas of their own. The survey has been closed after a week with 75 answers to analyse, of which 3 were found as invalid or double answers coming from multiple submissions. Thus the final count sets us at 72 participants. The survey in question can be found in the annexes.

A drawback of this survey is that it does not include the other clubs' members. We consider this acceptable because our members are the most frequent buyers and are those who need to be satisfied most. Doing this, we do however miss out on information concerning the visiting teams' players. For example, they might want to buy things to take with them on the road which we do not necessarily offer.

2.3.2 Results

Getting to know the customer

The categorization of the 84.7% of people who buy from the minibar is as follows: players:

67% and parents: 25% (surprisingly never both), others are members of the committee, and we have an age distribution in Figure 6 in annex.

Why do people not buy from the minibar?

Very few responses received to this question so answers are not significant but reasons cited were diversity, price or organised not to buy (food in tupperware or ate well before coming).

What about people who buy?

For most people buying from the minibar is occasional and often depends on the product, it is mostly food rather than drinks, see Figure 7 in annex. Combining Figure 7 with Figure 8 in annex we get that more than half the people who buy croissants, arguably for breakfast, usually buy coffee or tea with it while most people who buy coffee or tea rarely buy a croissant with it, we theorize this is because coffee is not morning specific like croissants. We also note the similar shapes of demand for hot dogs, crepes and the combination with soda. Many people buying food will often buy a drink with it but not the other way around.

How much would people be willing to pay for different menus we proposed?

The morning menu (coffee/tea/water+croissant/pain au chocolat) separately costs 4 CHF with a croissant and 5 CHF with a pain au chocolat. Which is the price most people would be willing to pay, see Figure 9 in annex, why don't they? As for the lunch menu (soda/water+crepe/hot dog), the price most people are willing to pay is at the edge of the 7 CHF to 7.50 CHF price tag when paid for separately (depending on the type of crepe), see Figure 10 in annex, but there is a fair share of people for whom this is too expensive.

We then asked people to submit a few ideas to better our list of products. The options we proposed that stood out, more than 30% of participants voted for, are: french fries, sandwiches, pizza slices and ham croissants. As for the suggestions coming from the participants, we retain pastry and fruits as viable options.

Could we get more customers by arranging the space better?

Right now consumption of food is prohibited in the stands and apparently this is a real decision factor and constraint for many people, see Figure 11 in annex. A feasible solution would be to arrange tables for people to enjoy their meal but it would not change much as per Figure 12 in annex. This is understandable because the people surveyed know that from where the tables could be, the view is actually easily blocked by a solid fence that is there for people not to fall on the field as shown by Figure 1.

What about the boutique?

The club also runs its little boutique of sportswear and equipment that can be ordered and collected at the minibar or online (<https://lvc-handball.sumup.link/>). From the 72 people polled, members of the club, 24% said they didn't know it was possible to place orders from the minibar and 15% didn't even know such a boutique even existed. Other reasons for not buying are split between those who find the items too expensive or dislike the products (5%) and those who simply don't need what is offered (5%). Around 30% of the people bought something and cited the customisation with their initials as their main reasons for buying, 5% bought something as a gift and another 5% simply wanted to support the club. Only 5% bought their items online directly.

Open suggestions

We then had a round of open suggestions to improve the minibar. The main comments can be summarised as follows:

- Improve visibility of the minibar.
- Diversify the choices.
- Try to lower the prices, even if that is through fidelity vouchers.
- Setup high tables to put the food on and eat standing while watching the match.

An interesting point raised was to find ways to ease the service behind the counter but it meant someone else would have to do the work before the other person came for his/her shift which makes no sense in itself. It is however a suggestion to take into account and maybe we can suggest something here.

3 Price optimization

One of the ideas we had to increase the revenue of the minibar was to offer the products in menus. This has been done randomly from time to time but is not permanently proposed for some unknown reason. Therefore, it seemed interesting for us to evaluate the idea and propose two menus: one for breakfast consisting of a croissant or pain au chocolat with coffee, tea or water, and the other for lunch consisted of a hot dog or crepe with a soda or water.

To be able to implement that, we need an attractive price for these menus, one that maximizes profit and customer satisfaction at the same time. Thus this price must be lower than the total price of the menu items sold separately and high enough to cover the costs with a significant profit margin for all possible combinations. The cost and price of products offered is shown in Annex in Table 8 and the resulting bounds can be seen below in Table 1. For the reasons cited in the introduction, we assume we have a monopoly and compute the optimal price by equalling marginal cost and marginal revenue.

	Breakfast menu	Lunch menu
Min [CHF]	1.78	3.00
Max [CHF]	4.00	6.50

Table 1: Acceptable price bounds for the morning and afternoon menus.

In our survey, we asked the participants to give us the maximal price they are willing to pay for each menu. This allows us to estimate the demand as a function of price through regression. The resulting plots are shown in Figure 2. The breakfast and lunch menus' demand curves follow equations (1) and (2), respectively.

$$D_1(p) = -16.5p^2 + 131p - 221.37 \quad (1)$$

$$D_2(p) = -4.6667p^3 + 78.5p^2 - 419.83p + 725.87 \quad (2)$$

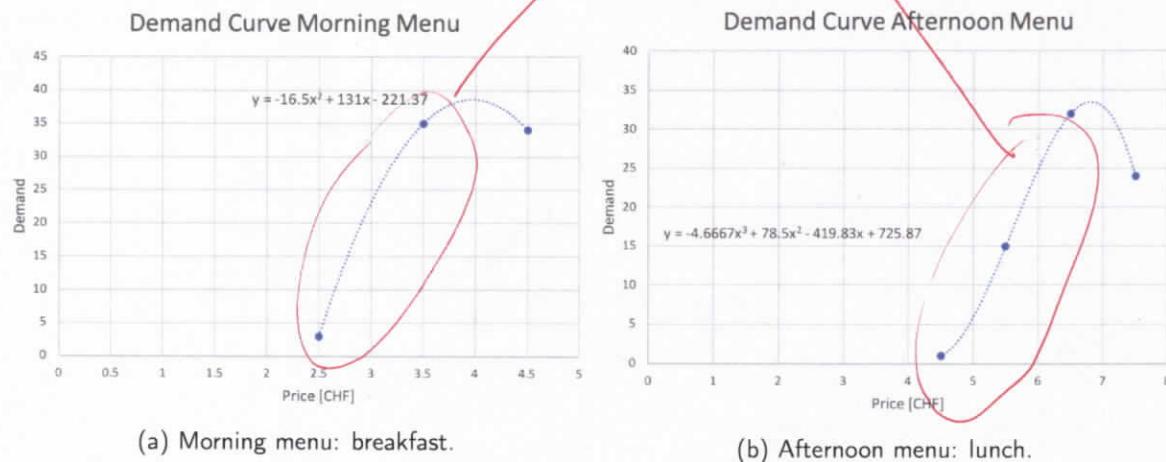


Figure 2: Demand curves for the breakfast (a) and lunch (b) menus.

We also need to estimate the cost of function of the menus. Let's consider the sample year 2019-2020, for which we have most data, during which the minibar was open from September to April. This year counted approximately 20 scheduled events, which the minibar's manager assured us was a reasonable average to consider.

Firstly, let's examine the fixed costs. For every organized event, 50 CHF are paid to the city to be allowed to open the minibar. We then account for refrigeration costs of the minibar's two fridges. The average power consumption of a fridge is 300 kWh/year and the electricity costs in Lausanne are around 25.3 cents/kWh. Considering that the minibar is up and running for 8 months a year (September to April), the refrigeration cost per fridge is $\frac{8}{12} \times 300 \times 0.253 = 50.6$ CHF per season, which for two fridges sums up to 50.6 CHF per event. We can therefore assume that the fixed costs are 55.06 CHF per event.

We need to split this total fixed cost between the different products. Looking at our data, the items in the morning and afternoon menu account for 31.6% and 44.5% of the total revenue per event, respectively. For the sake of simplicity and supposing that the creation of these menus will increase the sales of these items, we round those percentages up to 35% and 50% respectively and split the fixed costs accordingly in equations (3) and (4).

Secondly, we calculate the approximate cost of each menu. Using the data in Table 8, qualitatively taking into account people's preferences for some options over the others, we estimate the average cost of the morning menu at 1.35 CHF and the average cost of the afternoon menu at 2.10 CHF.

Finally, the total cost functions for the breakfast and lunch menus are expressed in equations (3) and (4), respectively.

$$\begin{aligned} C_1(D_1(p)) &= 1.35 \times D_1(p) + 35\% \times 55.06 \\ &= 1.35 \times D_1(p) + 19.271 \end{aligned} \tag{3}$$

$$\begin{aligned} C_2(D_2(p)) &= 2.10 \times D_2(p) + 50\% \times 55.06 \\ &= 2.10 \times D_2(p) + 27.53 \end{aligned} \tag{4}$$

* The explanation of altniom in your presentation also does not make sense!

We now proceed to the price optimization using profit maximization. Profit can be expressed as in equation (5) and the optimal price p^* can be found by solving equation (6) and verifying that the profit at price p^* corresponds to a maximum.

$$\Pi_i(p) = D_i(p) \times p - C_i(D_i(p)) \quad (5)$$

$$\frac{d\Pi_i(p)}{dp} = 0 \quad (6)$$

Solving the price optimization problem for each menu we get the results in Table 2.

	Breakfast menu	Lunch menu
$p^* [\text{CHF}]$	4.339	6.997
$\Pi^* [\text{CHF}]$	89.513	133.921

Table 2: Optimal menu price p^* and profit per event Π^* at price p^* for each menu.

As we can see the prices found in Table 2 are triple the estimated average costs and thus provide a hefty profit margin for both menus. These prices, as per our survey, are similar to the average maximal price customers are willing to pay for such menus (see Figure 9 and Figure 10), both in annex, in both cases lower or equal to the prices of the products sold separately.

This is great news as our proposition seems valid. However, one thing that we can note is that both prices in Table 2 are higher than the maximal price found in Table 1 that considers the cheapest products sold separately as the upper bound and not the average of products sold which happens to be slightly above the optimal price. This is also due to the fact that in the survey we sent, costumers seemed to be willing to pay more on these items than the sum of the price of each product sold separately.

Therefore, we do propose some additional tweaks and suggestions to try and satisfy as many people as possible, all of which we can afford. The operations of the minibar are not purely profit driven as in an ideal monopoly and the hefty profit margin allows for some movement. Keep in mind that we try to keep the prices to ± 0.50 CHF marks because all payments are done in cash.

1. Sell the breakfast menu for the sub-optimal price of 4 CHF.
 - (a) This is the average maximal price people are willing to pay.
 - (b) By choosing the menu, the costumer never pays more than if he buys both items of the menu separately.
 - (c) Although the price seems right, people do not buy their coffee and croissant together, the existence of this menu might be the little push they need.
 - (d) It makes sense to have a breakfast menu if there is a lunch menu.
2. Sell the lunch menu for the sub-optimal price of 6.50 CHF.
 - (a) This is the average maximal price people are willing to pay.
 - (b) By choosing the menu, the costumer never pays more than if he buys both items of the menu separately.

- (c) Consider adding in a snack bar for an extra 1 CHF instead of 1.50 CHF (barely enough to cover the costs but incite people to buy more). It might be enough for the people willing to pay max. 6 CHF to give in.

Alternatively, we could increase the prices of the individual items sold alone. Indeed, it seems that customers are willing to pay more for the items to support the club. Therefore, by selling the croissant at 2 CHF and all the crepes at 4.5 CHF, we can sell the morning menu at 4.5 CHF and the afternoon menu at 7 CHF, always guaranteeing that by choosing the menu, the customer will never pay more than if he buys both items of the menu separately. That's a play on a 0.50 CHF difference that might be worth looking into.

4 Inventory Management

One of the major aspects that could be optimized in this project is the inventory management. Stocks have to be filled every Friday evening before the weekend games are held. The person in charge has to make sure that there are enough supplies for the two days to avoid stock-outs and lose on potential sales. On the other hand, he also has to make sure that there are no expired products. This exercise of making sure there is enough, but not too many products is called inventory management.

We have to keep in mind that the person in charge of the replenishment is not paid and this is done on a voluntary basis.

Nowadays, the manager of the minibar makes the big shopping approximately every month, but still buys some products every week. With some experience he has been able to set some fixed order quantities that he buys from the supermarket every month. Still, as these quantities haven't been precisely computed but more with a qualitative approach, some products may sometimes be out of stock. In order to find an optimal order quantity we are going to make an analysis with two different approaches, using two different models, and we will compare both results. In the first part we are going to calculate the Economic Order Quantity, the optimal order quantity, in order to reduce costs, notably holding and ordering costs. In the second part we are going to use the Newsvendor model.

4.1 Distribution of the data

With the collaboration of Yann Delacombaz, the manager of the minibar, we have had access to the sales of each one of the products in the last year. This precise data is from last year, from mid-September 2019 to beginning of March 2020 before the COVID-19 pandemic started. In this period of time, 6 months, the minibar has been open for 10 days. In regular times, the snack bar would be open during 8 months and in a total of 20 days. Due to the COVID-19 pandemic the season had to be cut short.

In order to simplify the inventory replenishment study, we have divided the products into five different categories:

- Beer
- Drinks
- Fresh Products (Crêpes, Hot Dogs)
- Snacks (Croissant, *Pain au chocolat*, all chocolate bars)
- Utensils (Knife/Fork, cup, plate, napkin)

We will find the optimal ordering quantity for each of these categories.

4.2 Economic Order Quantity

In this model we are going to compute the Economic order Quantity Q^* with the formula in equation (7) where K is the ordering cost, D the demand and h the holding cost but we first have to figure out these parameters and make some assumptions.

$$Q^* = \sqrt{\frac{2K \cdot D}{h}} \quad (7)$$

Holding Cost h

For every day that the minibar is used there is a 50 CHF rental fee. We have assumed that, as there is no explicit holding cost for the inventory there is on site, 25% of the renting price would be dedicated to the holding cost. For simplicity, this would include refrigeration costs for the *Fresh Products* category. For the ten days of service in a 6-month period we had a total cost of 500 CHF, which results in 83.33 CHF per month. We then take 25% of this cost in order to obtain the holding cost per month and then per day as shown in equation (8).

$$\begin{aligned} h_{total} &= 0.25 \times 83.33 = 20.83 \text{ CHF/month} \\ &= 20.83/30.5 = 0.68 \text{ CHF/day} \end{aligned} \quad (8)$$

Now that we have the total holding cost, we have to set a percentage of this holding cost to each of the categories. This is where our assumptions play an important role. In order to quantify the importance of each category in h_{total} , we have considered that the size and the freshness, which would also include refrigeration cost, of the products impact the holding cost.

Product	% of h_{total} per month	Holding Cost h_i in CHF per month
Beer	20%	4.17
Drinks	25%	5.21
Fresh Products	35%	7.29
Snacks	15%	3.13
Utensils	5%	1.04

Table 3: Holding costs per month for different product categories.

As shown in Table 3 we have put the highest percentage of holding cost on fresh products because these have a reduced shelf life compared to other products like drinks or snacks, and also they have an additional refrigeration cost. Then, the second criteria was size, so drinks and beers have a higher holding cost than utensils and snacks as they take much more space.

Demand D

As we do not know the future demand and theoretically we do not have a constant demand. We have assumed that the monthly demand is the average monthly demand from the 6-months span of data we have in order to be able to compute Q^* . With the data provided by Yann Delacombaz we have the following results for the demand:

Product	Total Demand	Monthly Demand
Beers	232	38.67
Drinks	617	102.83
Fresh Products	333	55.5
Snacks	192	32
Utensils	1139	189.83

Table 4: Monthly demand for each product category.

Ordering Cost K

Finally we have to compute the ordering cost. As in this case, reordering means to go and shop at the supermarket we have assumed that the ordering cost would be split in two: first the approximation of the cost of time for the person that goes shopping; and second the price of the gas.

It was told to us that the person in charge shops predominantly at *Aligro*, in order to have deals for big quantities. After some research we have found that the ride from the sports hall to the supermarket is about 5.5 km which takes approximately 15 minutes to go. Therefore, we can say that the total time of shopping is 2 hours and a half with 30 minutes of transportation, 1 hour and 20 minutes of shopping and finally 40 minutes to put the products away. We have assumed that every hour of service should cost 20 CHF. Indeed this is typically the price that is paid per hour for students.

For the gas consumption, we have found that 1L of gas costs 1.62 CHF in Lausanne [1], and that a typical car consumes 9L of gas per 100km [2]. Therefore we can compute the total reordering cost:

$$K = 2.5 \times 20 + \frac{9}{11} \times 1.62 = 51.32 \text{ CHF} \quad (9)$$

Computing the Economic Order Quantity Q^*

Finally, we can compute the Economic Order Quantity Q^* and the Economic Order Interval T^* which computes the ideal time to replenish calculated with the demand rate d . We have $T^* = Q^*/d$. Using the results we just computed and equation (7) we have the results in Table 5.

Product	Q^* (units)	Demand rate d (units/day)	T^* (days)
Beer	30.86	1.29	23.94
Drinks	45.01	3.43	13.13
Fresh Products	27.95	1.85	15.11
Snacks	32.41	1.07	30.39
Utensils	136.74	6.33	21.61

Table 5: EOQ and EOI for each product category.

In Table 5 we have the optimal order quantity that we can use in order to replenish stocks. We observe that drinks and fresh products have to be replenished every two weeks approximately, the utensils and the beers every three weeks, and the snacks every month. We have to keep in mind that these quantities and times are set with a reordering fee K for each category. In order to reduce at most the total cost we should take into account that several product reordering

could be done simultaneously in order to minimize the reordering cost K . The product grouping for reordering as suggested above could work well and cut the reordering cost to its half. We also have to keep in mind that we have done a lot of assumptions, some of them very approximate, and therefore that this model may not be the appropriate one for this situation.

4.3 Newsvendor Model

In this section we are going to use the Newsvendor model in order to compute the optimal order quantity to maximize the expected profit. In order to do so, we have the formula in equation (10).

$$Q^* = \mu + z\sigma \quad (10)$$

We find the z -value for the normal distribution of the critical ratio CR , $z = F^{-1}(CR)$ using the table in Figure 14 in annex, where CR is defined as in equation (11) with C_u the sales opportunity and C_o the lost sale cost, p the price of a unit and c the cost of a unit. We assume that there is no salvage cost as, other than fresh products, the rest can be stored in the inventory for the next weeks. For fresh products we assume lost sales.

$$CR = \frac{C_u}{C_u + C_o} = \frac{p - c}{p} \quad (11)$$

In equation (10) μ is equal to the mean of the demand from the 6-months span we analyzed and σ is the standard deviation. We have done this calculation for all the product categories except the *Utensils* category as we do not sell them. For the price p and cost c of the different product categories, we have added all the subprices of the different items that belong to a single category. After doing the calculations for each product category we have the results in Table 6.

Product	Total Demand	μ	σ	Price p	Cost c	$p-c$	$(p-c)/p$	z
Beers	232	38.67	17.89	3.50	1.07	2.43	0.69	0.51
Drinks	617	102.83	27.25	28	8.01	20	0.71	0.57
Fresh Products	333	55.50	8.79	20	3.47	16.53	0.83	0.94
Snacks	192	32	17.52	8.50	2.79	5.71	0.67	0.45

Table 6: Parameters for the Newsvendor model.

Product	Q^*	d	T^*
Beers	47.79	1.29	37.08
Drinks	118.23	3.43	34.49
Fresh Products	63.77	1.85	34.47
Snacks	39.80	1.07	37.31

Table 7: Final Results for the Newsvendor model.

Finally, we can see in Table 7 the optimal reordering quantities Q^* in order to maximize profit. Using the demand rate we have also computed the optimal replenishment time, and we can see that for all products we have a similar replenishment cycle of around 35 days. This way we can replenish all categories at the same time and minimize the time used and costs for the replenishment.

4.4 Comparison of models

After comparing the results that we have obtained for both models and analyzing how we obtained them we can conclude that the Economic Order Quantity model doesn't really fit in this situation. Indeed, we have made a lot of assumptions on several key parameters of the model that could, in the end, approximate too much our results. We actually do not know the demand, which is not really constant, we actually do not have any holding cost as it is considered in the fixed cost we pay for operating the minibar, and finally we approximated as well the reordering cost.

The fact that there is no holding cost defeats the purpose of the EOQ model where the holding cost represents a big part of the total cost. The approximation we did could be correct but still, it remains an assumption.

On the other hand, the Newsvendor model seems to be more adapted to the situation. We have the cost and the price of each of the categories, and can compute the mean demand and the standard deviation.

The only aspect that is not taken into account in this model is the short shelf life of the fresh products that are perishable. Having said this, we could replenish our inventory of fresh products every two weeks, or if really needed every week, and divide the optimal order quantity per replenishment. In this case it would be better to buy the small quantity of fresh products during one's personal shopping in one go and do the big refills once a month.

We also have to keep in mind that we did the analysis for product categories and not product items. In order to have a precise and quality analysis on all items we should have more data and an efficient way to collect this data.

5 Continuous Improvement and Next Steps

People often underrate the potential of a good survey. In business, the best way to know your clients demands and requirement is actually... by asking them directly! In order to see potential improvements that could be made in the management of the minibar we made a survey that we presented in Section 2.3. Part of the survey was used to see if some of the ideas that we had were feasible and could make sense in the eyes of the customer, these are detailed in the following sections.

5.1 Changing the Layout and inventory management

5.1.1 Rearranging the closet

At the sports hall there is a closet where we can store the minibar's supplies free of charge. Kevin Cibran told us this closet is not arranged correctly, and that it is quite easy to miss some product that one is searching for and end up buying way too much, leading to over-inventory. Organizing and making sure that every item can be seen at first glance is very important in this case. Indeed, in addition to the calculations we made in Section 4, another way to see if we need inventory replenishment is by actually looking at the inventory instead of the numbers. As the demand is not very important compared with big companies in business, it is possible to verify the inventory level just having a look at the contents in the closet. To improve that, a Lean mentality can be adopted, and Lean tools like the 5S can be used.

Arranging the shelves in the closet in order to have at reach the products that are required

most, like drinks and beers, and having everything well sorted can increase efficiency when some products are needed at the minibar. This method can be complemented by other methods, like *Kanban*, that shows information about the inventory level at first glimpse.

One system that could be applied here is the Two-bin inventory control system [4]. This system consists in having two crates, or recipients, where products are stored, this way when one is empty the other can still be used and the empty one signals it's time for a refill. It is a more qualitative method than both models used in Section 4 but could be perfectly valid for these quantities. It could also help easily see if the refill periods computed with the Newsvendor model match reality by filling the crates with the optimal refill quantity.



Figure 3: The 5S method
[3]

5.1.2 Digitalization and data collection

Nowadays it is known how valuable data can be in order to make a business go to another level. In our case, improving the data collection could facilitate the reordering decision. Indeed, this could make data analytics much more efficient and it could help the person in charge of the minibar know exactly what products have been sold and how much inventory is left. As quantities sold are usually relatively low, it is actually possible to have the data of each weekend's sales. The trick is to find the correct tool for the task because if it's not easy enough, data will be missing and volunteers will refuse to use it. For example, we could use a program, typically Excel, which is easy to use and accessible, for this kind of task but it involves having a computer up and running in what is basically a kitchen, not necessarily the best idea... but transcribing data from paper as was done to collect the data Yann Delacombaz gave us for this study works well to although data was obviously missing sometimes.

This way we could even have a visualization of the inventory on the computer and we could also determine, other than with visual presence on the shelf, the right time to replenish inventory.

We could use the (S,s) method in this case. Every time the inventory level of a product has reached a minimum s which represents the safety stock we have an ordering of this product at a level S as we can see in Figure 4.

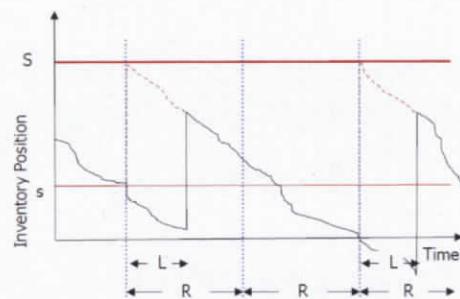


Figure 4: (S,S) Inventory Policy [5]

5.1.3 Table Layout

In the sports hall where the games take place there are some bleachers to watch the games from but unfortunately, it is forbidden to consume any kind of food there. This is a major problem for the minibar as people coming to the games are there in order to watch the game and not to eat.

Therefore, it is necessary to have a space with some tables for people to eat comfortably from

where they can still watch the game. A lot of opportunities could be arranged afterwards, like organizing some special meals for teams to enjoy together and have fun while cheering for their club.

In our survey we asked the people if the possibility of having such tables would be appealing to them and the results didn't disappoint. In Figure 12 43.1% clearly mention they would buy more if such tables were put in place. Unfortunately this is not a great solution as from where the tables could be, the view is easily blocked (refer to Figure 1) by the wooden fences that prevent people from falling several meters down on the playing field. It does however remain an option for longer days such as tournaments when people plan to stay longer and can spare some time to eat without missing out on too much of the action. In the future, when renovations are made, the installation of transparent fence should be suggested to the city to win over those people who might have considered it but still prefer to watch the matches. In the meantime, quite a few suggestions were made to at least setup standing tables to support the food, thus partly solving the issue.

5.2 New Opportunities

In this part we are going to take a look at new opportunities that could increase the overall profit of the minibar.

5.2.1 New Products

The first opportunity could be to seek for new products in the menu in order to have more diversity, which was one of the aspects that had to be improved according to the people who filled the survey. In our survey we asked people for their suggestions on several potential new items that could attract new customers. We can see the result of this question on Figure 5.

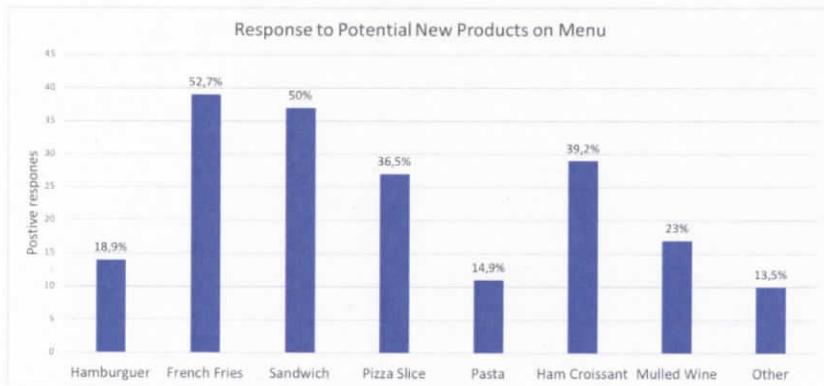


Figure 5: Response from survey to potential new products on menu

We can see that four items that we suggested had a positive response for more than 35% of the people, and two of those have even more than half of the people responding positively to this potential addition to the menu. These two products are *French Fries* and *Sandwiches*, and the two others are the *Ham croissant* and the *Pizza Slices*. This information can tell us that it could be worth it to invest in a fryer in order to make french fries available to consumers. Sandwiches could be a real option other than hot dogs, maybe a healthier option that could attract younger players' parents that want to make sure their kids eat right and replenish their energy after a game. Up to now, Kevin Cibran has been quite reluctant to implement these.

Every time he wanted to propose sandwiches, the question of logistics came into play and the idea was shut down. The fryer would be even worse as it needs thorough cleaning.

It is not enough to make some changes now and stop though. As trends change, it is important to keep up with the customer needs and demands by asking quite regularly their opinion on potential new products.

5.2.2 Opportunity to Improve from within

In order to maximize the potential of sales and opportunities it is important to have commitment within the players and members of the club that are assigned to hold the minibar during game days. The minibar is held every week by different teams from the club. They are responsible for installing the equipment, running the minibar and finally tidying up everything at the end of the day. It is important to be organized and have a clear schedule as to which team is meant to supervise and be sure that they are committed to do so. Indeed, if there is no one at the minibar, there could be a lot of lost sales.

In addition to being responsible for the minibar, the players can also be a valuable asset for its improvement. As they are the ones in charge, they know what are the recurrent problems, what products seems to be selling the most, how customers react to the design and look of the minibar's layout and many other aspects. It can be very interesting to ask for feedback and potential ideas to the players themselves in order to solve some issues they might have experienced. Using the knowledge of the people that work on the field is one of the best ways in order to find bottlenecks and issues the business needs to solve.

5.2.3 The Club Boutique

Finally, as a new opportunity there is the club's shop. From sweaters, to mugs and now face masks, this could represent a big opportunity to make money for the club. The market is rather small as probably its members would purchase items but as the club grows, so will the market. The club has a plan to become one of the main clubs of the canton in future years, precisely from 2025 upwards. With the expansion of the club would come more recognition, more fans, more people enrolled in the club as players, coaches or members, and this would increase the potential of a club shop.

Furthermore, Handball is not a well-known sport. It is not as easy to find Handball equipment as it is for football. This increases the boutique's chances of success. This boutique could not only be the place where members of the club buy t-shirts or sweaters , customized with the logo and name of the club they play for or support, but it could also be a place where these players can buy their next handball shoes, protections and even their brand new ball for training. Using the uniqueness and niche market of the Handball community to make the LVC Handball Club boutique the place to shop for handball gear.

5.2.4 Special events: M13 Tournament

Finally there are a lot of opportunities that could be taken advantage of. These opportunities could be the days with playoff games, the days with Swiss-German teams and many others come to play in Lausanne. Use marketing strategies to promote some particular games where people could be very interested to come and therefore consume at the bar. These games, like playoff games, are indeed very popular among fans, parents, players from other teams.

But one of the most important ones is the M13 junior tournament that takes place once a year. In 2018-2019, in a single weekend during the M13 tournament the minibar generated a profit

of 2100 CHF, which represents almost 25% of the annual profit, which was around 8500 CHF. This expresses the potential to make profit out of similar organized events. Having more tables installed, a special menu for the occasion and other activities planned for the kids could bring even more popularity to the event, to the club and even to the sport.

Other than maximizing the profits made during the event, it would be interesting to organize more of them, maybe one every month or two if possible. This would be positive for the club in terms of revenue, but also in terms of recognition and satisfaction among players, especially the kids and their parents. Satisfaction of the customer can only bring positive things, and knowing that some parents may have some business contacts or else this could lead to a potential sponsorship from a company or even donations from the parents to support the club financially.

5.3 Other considerations

Before beginning this project we had planned to conduct an analysis of the supply chain but as we got more into it we realized this was a little far fetched given the little bargaining power we have to negotiate better prices for our products and that buying from the supermarkets was actually is our best option. The best recommendation we can make here is thus to avoid Migros and Coop and make use of sales when possible.

We also examined the risks the minibar is subject to. It doesn't truly make sense to detail those it this project but we will mention that maintaining good relations with the janitor and the city is absolutely essential in many aspects, not only for us to operate the minibar but also to train in the best conditions.

6 Conclusion

Having a friendly environment where everyone can feel being part of the club and have a good time is very important. Having special activities, tournaments, dinners, events and more can make the team bond, and in the kids' case their parents bond and get to know the club better. With these kinds of efforts the club will gain recognition in the region and will grow. And as the club grows, the market for the minibar and profits will increase as well. But for this, the minibar has to improve on many levels, from inventory management, to layout of facilities, to data analytics, demand analysis and marketing opportunities. There is a lot of room for improvement, but these changes should be implemented little by little and progressively.

The minibar has had a notable increase in revenues in the last years, but with the ambition of becoming the most important club in the region it cannot stop here. Constant seek for improvements and customer satisfaction needs to be applied in order to fulfill the potential that the minibar of the LVC Handball Club has.

Finally, we would like to thank Kevin Cibran, vice-president of the club and ex-manager of the minibar, whom we had the opportunity to interview for this project; Yann Delacombaz, current manager of the minibar, that gave us the necessary data for this project; the entirety of the LVC committee and finally the LVC community, players, coaches or parents, that helped us make this analysis by answering to our survey.

You report is well-written and solid

(except for your
demand curve)

Annex

excellent!

Some interesting results of the survey

Quelle est votre tranche d'âge?

72 responses

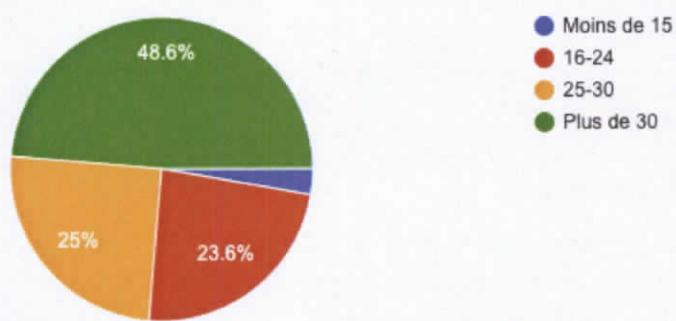


Figure 6: Survey participants' age distribution.

Est-ce qu'il vous arrive d'acheter les produits suivants:

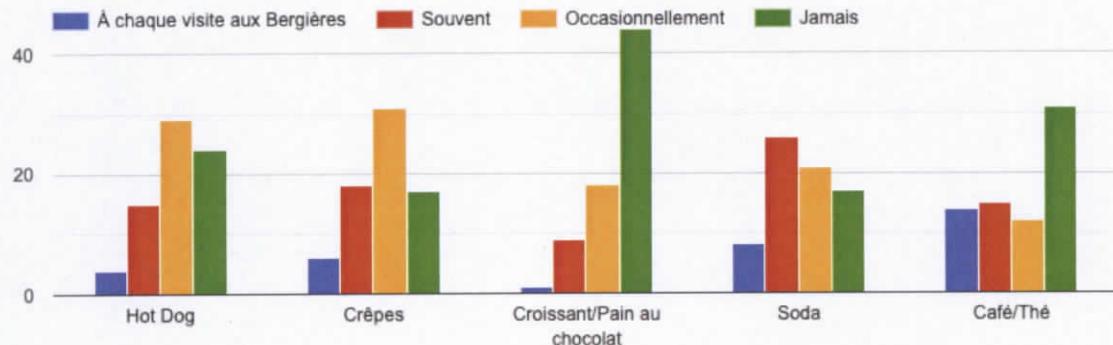


Figure 7: How often and what people consume at the minibar.

Combinez-vous ces produits?

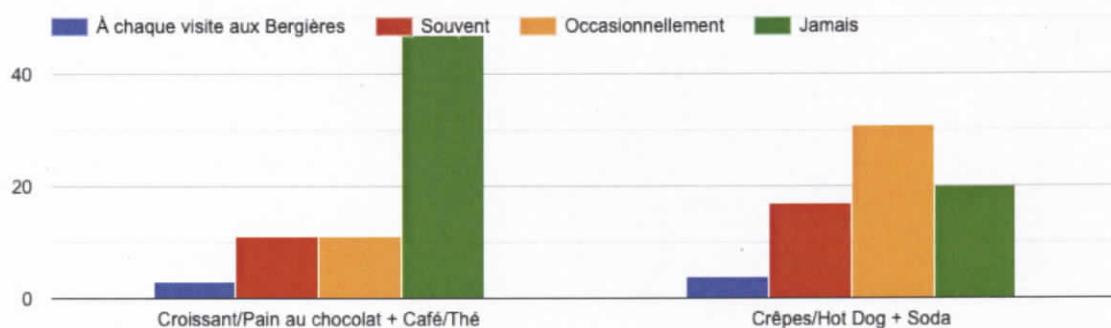


Figure 8: How people combine the different products.

Combien au maximum seriez-vous prêt-e à payer pour un menu "Matin: Croissant/Pain au chocolat + Thé/Café"?

72 responses

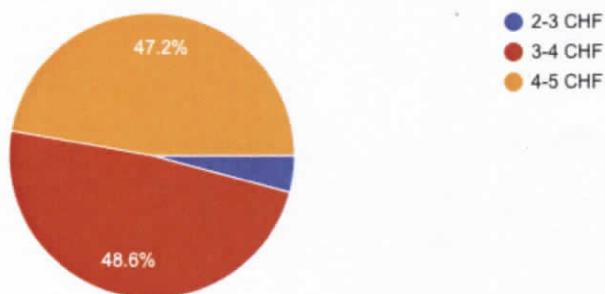


Figure 9: How much people are willing to pay for a breakfast menu. Average at 4 CHF.

Combien au maximum seriez-vous prêt-e à payer pour un menu "Midi: Crêpes/Hot Dog + Soda"?

72 responses

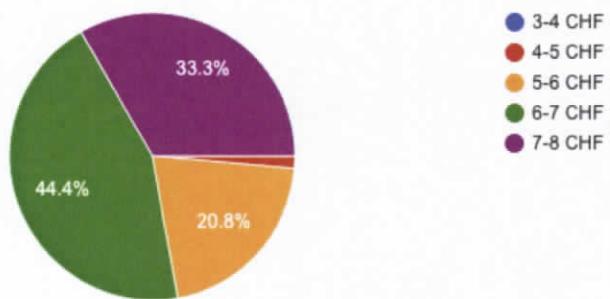


Figure 10: How much people are willing to pay for a lunch menu. Average at 6.50 CHF.

Si la consommation de nourriture dans les gradins était permise, sachant qu'elle ne l'est pas, consommeriez vous plus régulièrement à la buvette?

72 responses

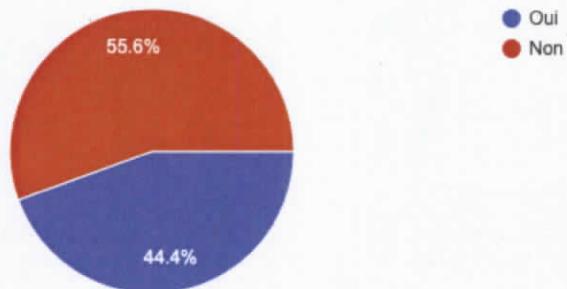


Figure 11: People would like to be allowed to eat in the stands.

Si un espace avec des tables était aménagé pour la consommation de nourriture/boissons permettant de suivre correctement les matchs consommeriez vous plus régulièrement à la buvette?

72 responses

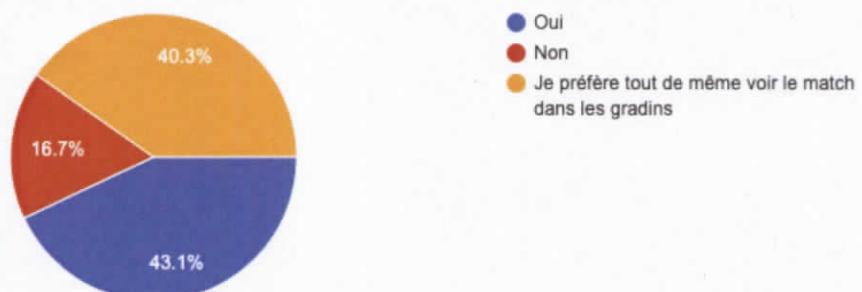


Figure 12: People wouldn't settle for tables instead of permission to eat in the stands.

Useful documents

Drinks	Cost (CHF)	Price (CHF)	Food	Cost (CHF)	Price (CHF)
Coffee	0,38	2,50	Croissant	0,80	1,50
Tea	0,13	2,50	Pain au chocolat	1,40	2,50
Coca	1,13	3,00	Hot dog	1,79	4,50
Coca Zero	1,13	3,00	Crepe w/ ham and cheese	0,42	4,50
Nestea lemon	1,13	3,00	Crepe w/ jam	0,42	4,00
Nestea peach	1,13	3,00	Crepe w/ nutella	0,42	4,50
Sprite	1,21	3,00	Crepe w/ sugar-cinnamon	0,42	4,00
Fanta orange	1,21	3,00			
Henniez verte	0,56	3,00	Snickers	1,03	1,50
Henniez bleue	0,34	2,50	Mars	0,99	1,50
Boxer beer	1,07	3,50	Kinder Bueno	0,77	1,50

Table 8: Product costs and prices.

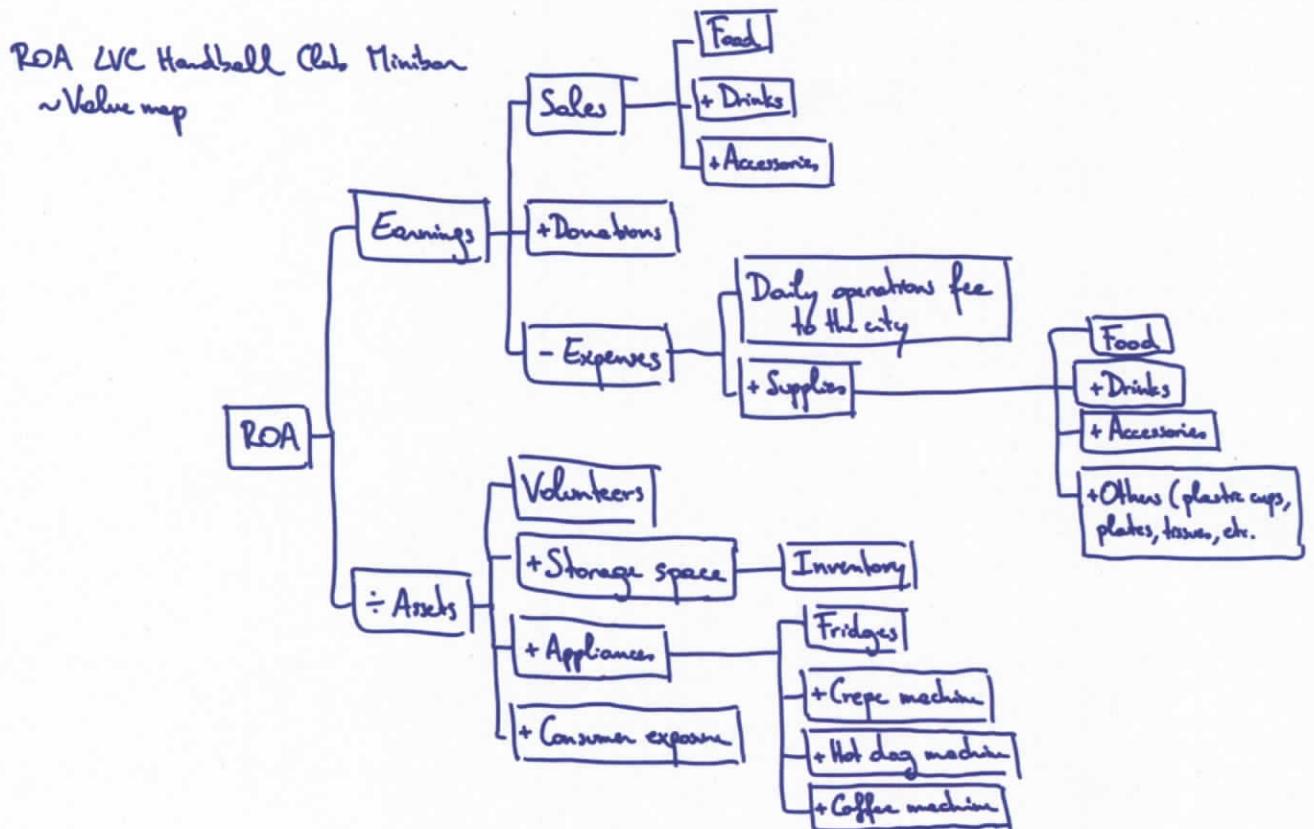


Figure 13: Value Map.

Z	F(z)	L(z)	Z	F(z)	L(z)	Z	F(z)	L(z)	Z	F(z)	L(z)
-3.00	0.0013	3.000	-1.48	0.0694	1.511	0.04	0.5160	0.379	1.56	0.9406	0.026
-2.96	0.0015	2.960	-1.44	0.0749	1.474	0.08	0.5319	0.360	1.60	0.9452	0.023
-2.92	0.0018	2.921	-1.40	0.0808	1.437	0.12	0.5478	0.342	1.64	0.9495	0.021
-2.88	0.0020	2.881	-1.36	0.0869	1.400	0.16	0.5636	0.324	1.68	0.9535	0.019
-2.84	0.0023	2.841	-1.32	0.0934	1.364	0.20	0.5793	0.307	1.72	0.9573	0.017
-2.80	0.0026	2.801	-1.28	0.1003	1.327	0.24	0.5948	0.290	1.76	0.9608	0.016
-2.76	0.0029	2.761	-1.24	0.1075	1.292	0.28	0.6103	0.274	1.80	0.9641	0.014
-2.72	0.0033	2.721	-1.20	0.1151	1.256	0.32	0.6255	0.259	1.84	0.9671	0.013
-2.68	0.0037	2.681	-1.16	0.1230	1.221	0.36	0.6406	0.245	1.88	0.9699	0.012
-2.64	0.0041	2.641	-1.12	0.1314	1.186	0.40	0.6554	0.230	1.92	0.9726	0.010
-2.60	0.0047	2.601	-1.08	0.1401	1.151	0.44	0.6700	0.217	1.96	0.9750	0.009
-2.56	0.0052	2.562	-1.04	0.1492	1.117	0.48	0.6844	0.204	2.00	0.9772	0.008
-2.52	0.0059	2.522	-1.00	0.1587	1.083	0.52	0.6985	0.192	2.04	0.9793	0.008
-2.48	0.0066	2.482	-0.96	0.1685	1.050	0.56	0.7123	0.180	2.08	0.9812	0.007
-2.44	0.0073	2.442	-0.92	0.1788	1.017	0.60	0.7257	0.169	2.12	0.9830	0.006
-2.40	0.0082	2.403	-0.88	0.1894	0.984	0.64	0.7389	0.158	2.16	0.9846	0.005
-2.36	0.0091	2.363	-0.84	0.2005	0.952	0.68	0.7517	0.148	2.20	0.9861	0.005
-2.32	0.0102	2.323	-0.80	0.2119	0.920	0.72	0.7642	0.138	2.24	0.9875	0.004
-2.28	0.0113	2.284	-0.76	0.2236	0.889	0.76	0.7764	0.129	2.28	0.9887	0.004
-2.24	0.0125	2.244	-0.72	0.2358	0.858	0.80	0.7881	0.120	2.32	0.9898	0.003
-2.20	0.0139	2.205	-0.68	0.2483	0.828	0.84	0.7995	0.112	2.36	0.9909	0.003
-2.16	0.0154	2.165	-0.64	0.2611	0.798	0.88	0.8106	0.104	2.40	0.9918	0.003
-2.12	0.0170	2.126	-0.60	0.2743	0.769	0.92	0.8212	0.097	2.44	0.9927	0.002
-2.08	0.0188	2.087	-0.56	0.2877	0.740	0.96	0.8315	0.090	2.48	0.9934	0.002
-2.04	0.0207	2.048	-0.52	0.3015	0.712	1.00	0.8413	0.083	2.52	0.9941	0.002
-2.00	0.0228	2.008	-0.48	0.3156	0.684	1.04	0.8508	0.077	2.56	0.9948	0.002
-1.96	0.0250	1.969	-0.44	0.3300	0.657	1.08	0.8599	0.071	2.60	0.9953	0.001
-1.92	0.0274	1.930	-0.40	0.3446	0.630	1.12	0.8686	0.066	2.64	0.9959	0.001
-1.88	0.0301	1.892	-0.36	0.3594	0.605	1.16	0.8770	0.061	2.68	0.9963	0.001
-1.84	0.0329	1.853	-0.32	0.3745	0.579	1.20	0.8849	0.056	2.72	0.9967	0.001
-1.80	0.0359	1.814	-0.28	0.3897	0.554	1.24	0.8925	0.052	2.76	0.9971	0.001
-1.76	0.0392	1.776	-0.24	0.4052	0.530	1.28	0.8997	0.047	2.80	0.9974	0.001
-1.72	0.0427	1.737	-0.20	0.4207	0.507	1.32	0.9066	0.044	2.84	0.9977	0.001
-1.68	0.0465	1.699	-0.16	0.4364	0.484	1.36	0.9131	0.040	2.88	0.9980	0.001
-1.64	0.0505	1.661	-0.12	0.4522	0.462	1.40	0.9192	0.037	2.92	0.9982	0.001
-1.60	0.0548	1.623	-0.08	0.4681	0.440	1.44	0.9251	0.034	2.96	0.9985	0.000
-1.56	0.0594	1.586	-0.04	0.4840	0.419	1.48	0.9306	0.031	3.00	0.9987	0.000
-1.52	0.0643	1.548	0.00	0.5000	0.399	1.52	0.9357	0.028			

Figure 14: z, F(z) and L(z) values for Normal Distribution

References

- [1] Expatistan, 2020.
- [2] Natural Resources Canada. Fuel consumption guide, 2020.
- [3] 5S Today. What is 5s?
- [4] Daniel Liberto. Two-bin inventory control, 2019.
- [5] Kumar Singh. A summary of commonly used inventory policies, 2016.



Buvette LVC

Preguntas Respuestas 75

75 respuestas



No se aceptan más respuestas



Mensaje para los encuestados

Ya no se aceptan respuestas en este formulario

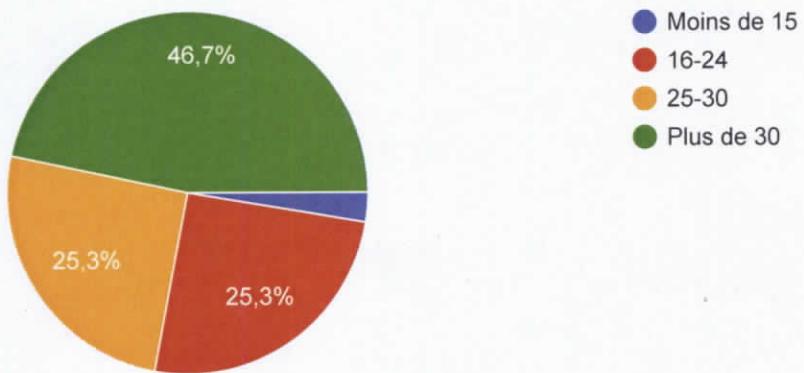
Resumen

Pregunta

Individual

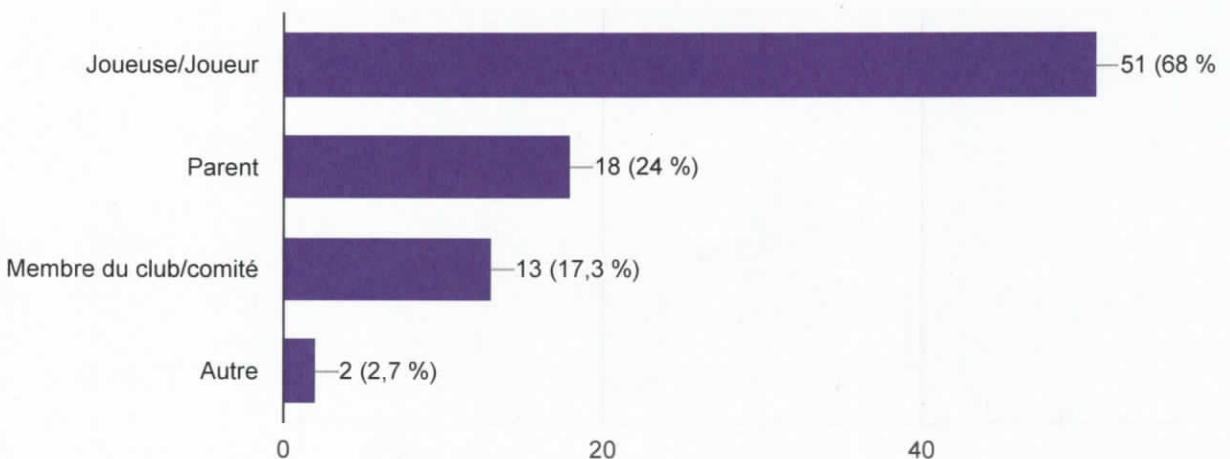
Quelle est votre tranche d'âge?

75 respuestas



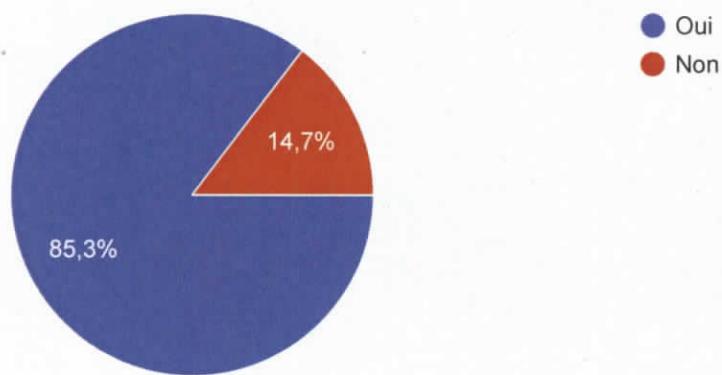
Comment vous définiriez-vous?

75 respuestas



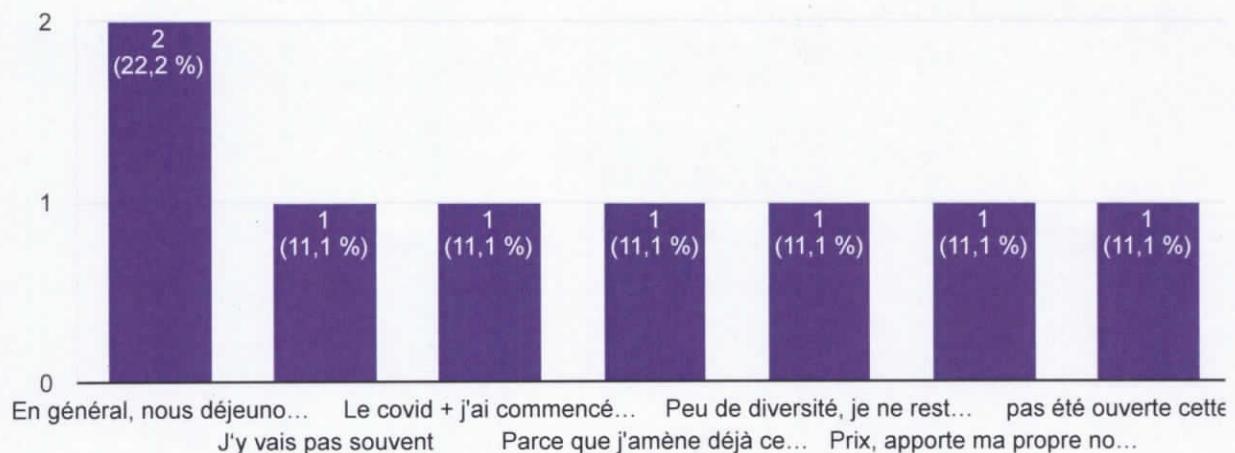
Achetez-vous souvent des produits à la buvette pendant les journées de matchs?

75 respuestas

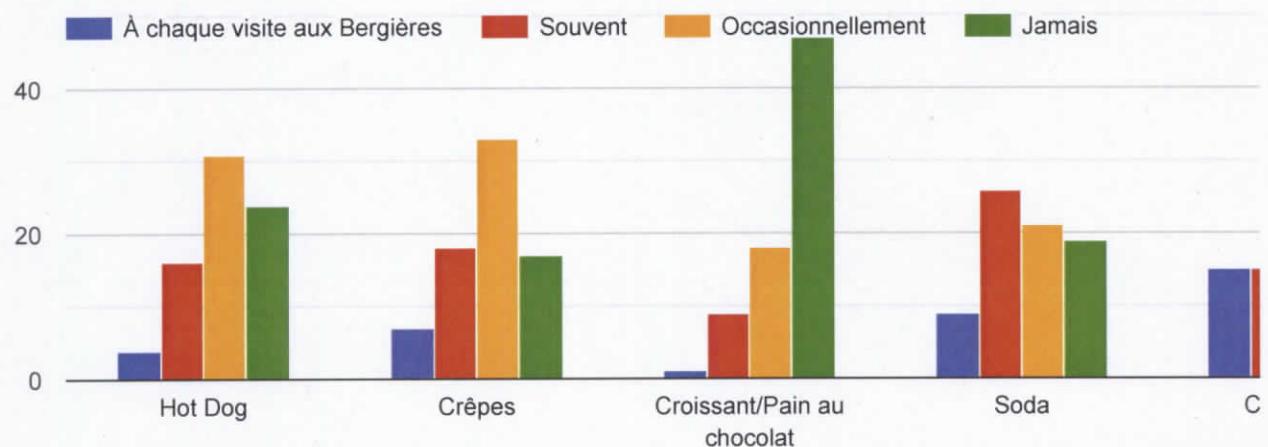


Si non, y a-t-il une raison particulière?

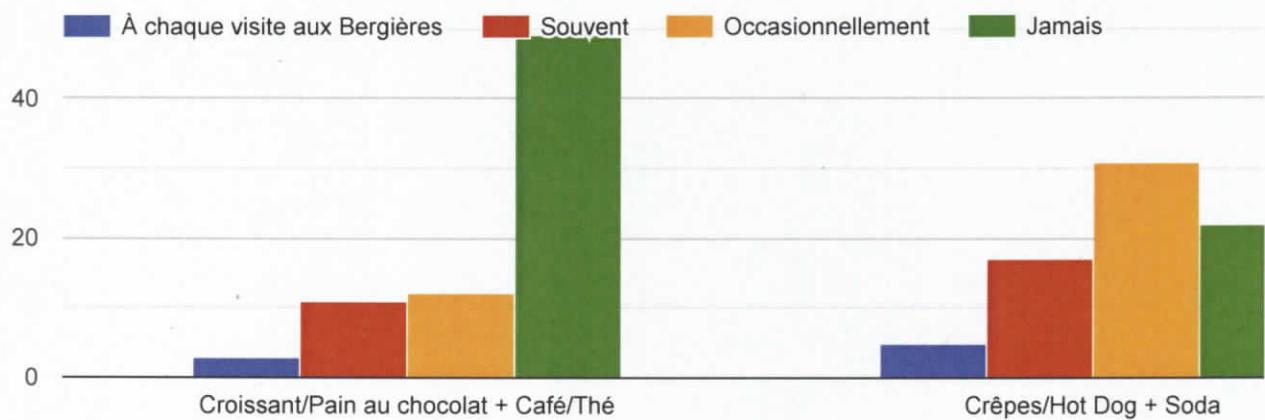
9 respuestas



Est-ce qu'il vous arrive d'acheter les produits suivants:

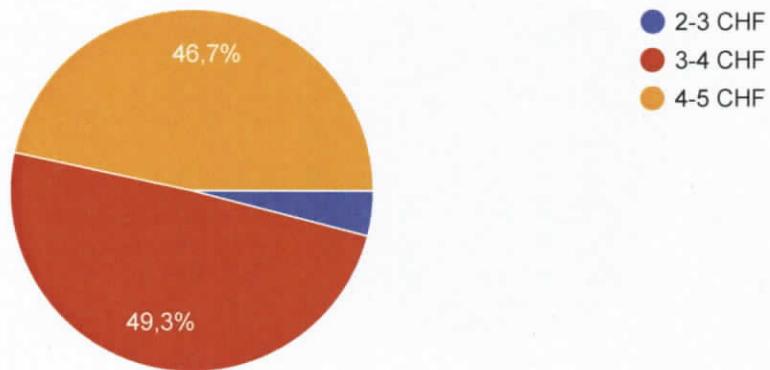


Combinez-vous ces produits?



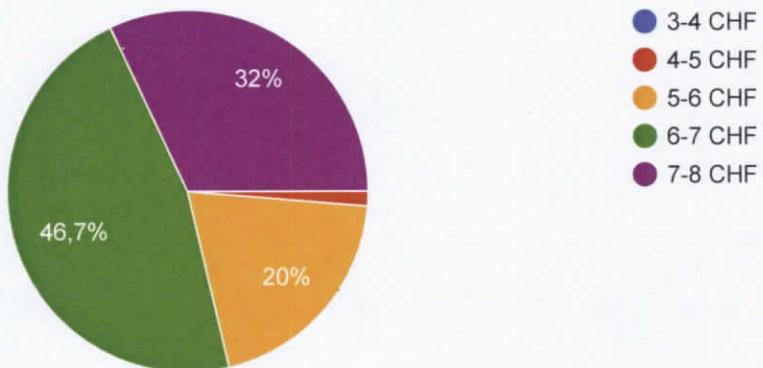
Combien au maximum seriez-vous prêt-e à payer pour un menu "Matin":
Croissant/Pain au chocolat + Thé/Café"?

75 respuestas



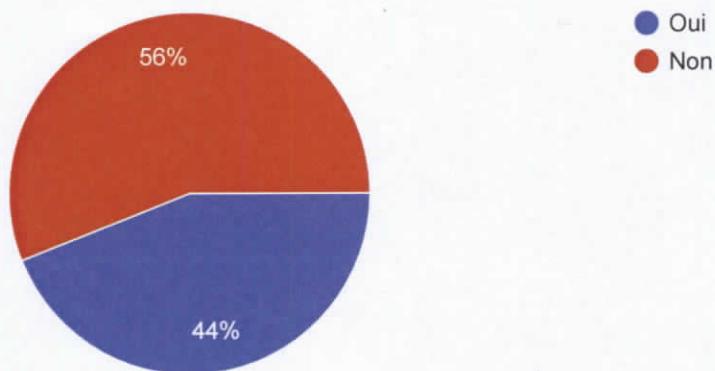
Combien au maximum seriez-vous prêt-e à payer pour un menu "Midi:
Crêpes/Hot Dog + Soda"?

75 respuestas



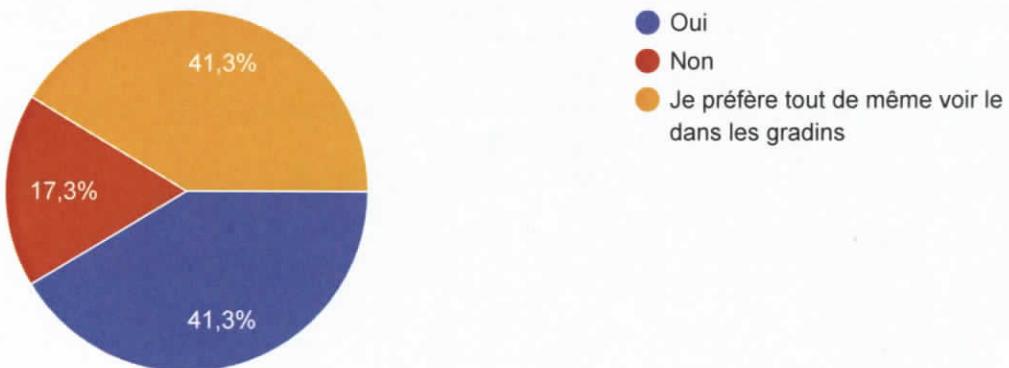
Si la consommation de nourriture dans les gradins était permise, sachant qu'elle ne l'est pas, consommeriez vous plus régulièrement à la buvette?

75 respuestas



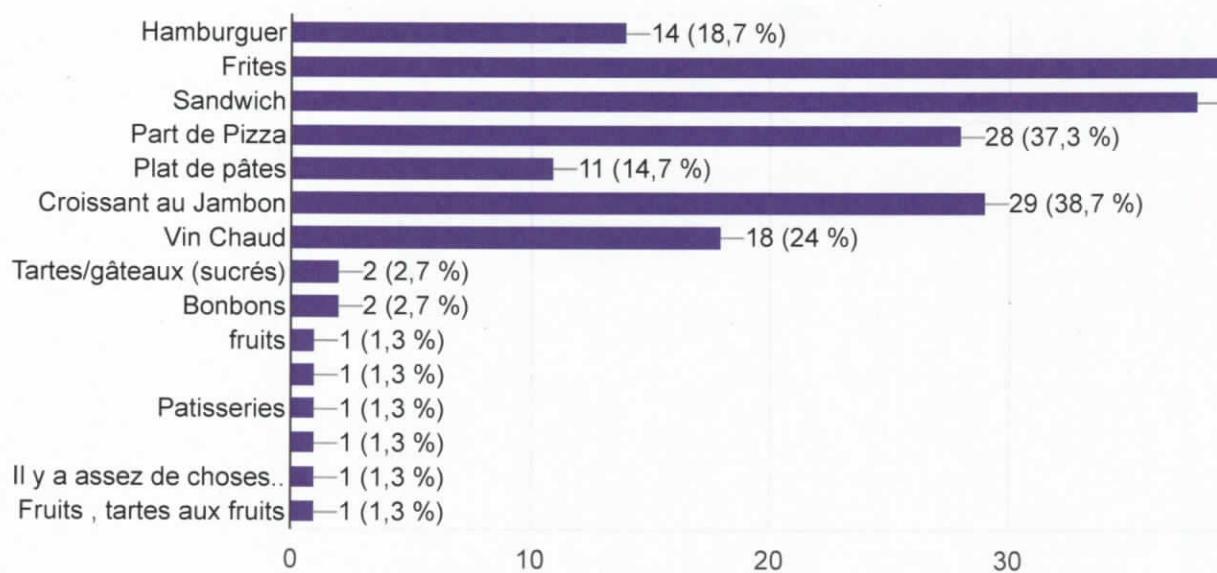
Si un espace avec des tables était aménagé pour la consommation de nourriture/boissons permettant de suivre correctement les matchs consommeriez vous plus régulièrement à la buvette?

75 respuestas



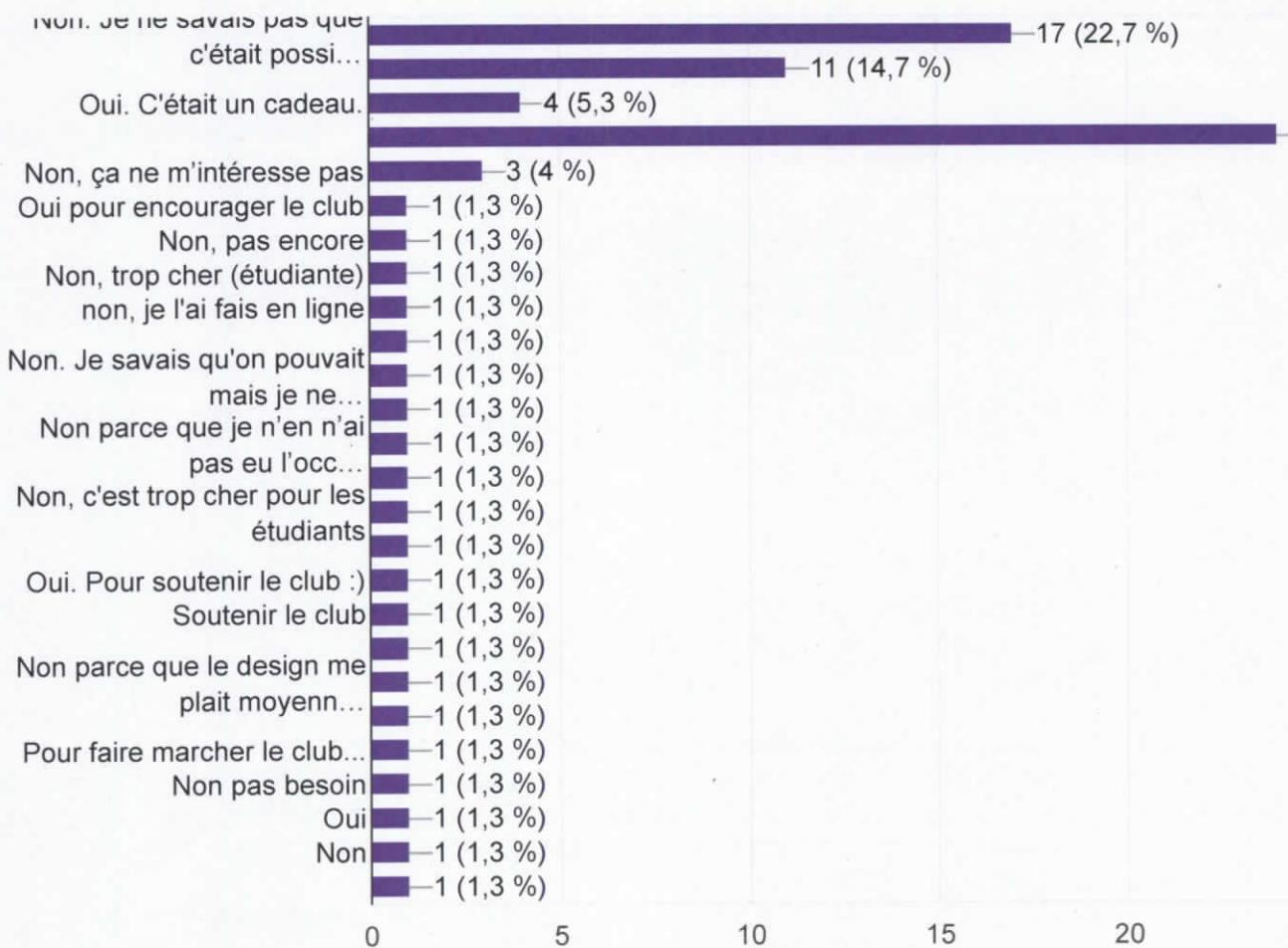
Est-ce que si de nouveaux éléments sont ajoutés vous consommez plus régulièrement à la buvette? Si oui, lesquels?

75 respuestas



Est-ce que vous avez déjà acheté quelque chose de la boutique du club (vêtements, sacs,... et même masques) à la buvette ? Si oui, quel était l'état d'esprit/le but de l'achat ? Si non, pourquoi pas ?

75 respuestas



Finalement, auriez-vous des suggestions afin d'améliorer la buvette du club?

21 respuestas

Que les équipes via leur cadres prennent le temps de voir les autres équipes du club jouer et donc aient un esprit club, plutôt qu'une focalisation sur sa propre équipe

Faire des cartes fidélités (sur les boissons ou pour tout achat dès un certain montant par exemple dès 10.- d'achats) et au bout de 10 ou 20 tampons sur la carte, offrir quelque chose de la buvette à choix ou défini ou faire une réduction.

Proposer un dessert maison comme à Yverdon Leon Michaud (une tuerie 🍪)

Des bonbons, des pop corn, réd bull, et des supers menus avec de super table !!!! Et pourquoi pas, des formules repas après les matchs ou pendant la journée. En le programmant à l'avance

Plus de visibilité

Ras

Elle paraît vide. Peut-être la rendre plus visible et plus accueillante. Penser à d'autres produits à vendre (pizza, chips,...)