

# Improvement of User Interfaces and Reporting Systems for Classcard

The screenshot displays the Classcard website's landing page. At the top, there is a navigation bar with the Classcard logo, links for 'Features', 'Solutions', 'Pricing', 'Login', and a 'Sign up free' button. The main content area features a large heading: 'Organize and sell classes online. Effortlessly.' Below this, a sub-headline reads: 'The fastest way to manage class schedules, drive sales online, and collaborate with staff and students.' Two buttons are present: 'Sign up free' and 'Request a demo'. A central image shows a woman taking a photo, overlaid with a screenshot of the Classcard dashboard. The dashboard includes a 'Hello, Vedant!' greeting, a summary table for 'Today' (Classes scheduled: 14, Bookings received: 11, Revenue: 0.00, New leads: 0), an 'Occupancy' gauge at 94%, and a 'Photography Masterclass' listing with a 'Book Now' button. A calendar view for July 2021 is also visible. At the bottom, a white banner lists '3,250+ class providers trust Classcard' and features logos for ICCA, BARCA Academy, Hackberry, Malhaar, Forward Thinking Tutors, and Archibald Sports Academy.

<https://www.classcardapp.com/>

By

AMAN BURMAN

Grade 10 - Dubai College

Date – 1<sup>st</sup> Of July 2021 to 31<sup>st</sup> of August 2021

## 1. What is ClassCard ?

Classcard is a lightweight replacement for spreadsheets to organize, automate and collaborate with staff and students. The system is primarily used by educational institutes for the management of schedules, booking, attendance. This drives student engagement via resource sharing, helps create course bundles, organize them sequentially to structure a course, publish them via online booking page. Classcard also helps customize grade scales for assessments, making feedbacks personal. Classcard also helps generate report cards and transcript using single click.

- **Main Features**

- i) **Maximize time, minimize chaos**

- Simple, flexible and powerful scheduling to organize entire team's schedule in one place.

- ii) **Online booking**

- Classcard provides a 24/7 personalized online booking page, decides which classes are bookable online and allows self booking to fill off-peak timings.

- iii) **Drag & drop scheduling**

- Classcard helps schedule classes for individuals or groups of students- schedule repeat classes daily, weekly, monthly or yearly. Administrators can drag and drop to reschedule classes and automatically notify students of changes.

- iv) **Attendance & Self Check-in**

- Classcard enables attendance or allow students to self check-in. Also, leave class comments and feedback for students.

- **Drive Student Engagement**

- i) **Resource Sharing**

- Share notes, video links, presentations and more with students and staff members. Organize them using tags.

- ii) **Course Bundles**

- Create course bundles from your resources. Organize them sequentially to structure a course. Share bundles with students and publish them to your online booking page.

### iii) **Grades & assessments**

Customize grade scales for assessments. Use photos and videos, while grading, to make feedback personal. Generate report cards and transcript in a single click.

## **2. Internship Objective**

Objective of the internship was following:

- Thoroughly analyzing the front end and back end of classcard's reporting system talking to senior software developers of the company.
- Develop understanding from the technology standpoint - front end and back end – PHP and Laravel Framework
- Understand the user interfaces, develop a thorough understanding of the internal and external stakeholders – students, teachers, management of the institutes.
- Recommend improvement in reporting systems that will be beneficial to various stakeholders using the system
- Ensure customer engagement increases that culminates into better revenue for the organization

In order to understand the system and customers' requirements, I spent a week interacting with various institutes that are using the system. I collated the customers' feedbacks and analyzed which part of the system customers are very happy with and that customers needed improvement on. I also interacted with end users – management, students and teachers and documented which reports to focus on and develop my priority list.

My objective was to come up with a document analyzing and prioritizing the changes needed to make classcard system more efficient, user friendly and report my findings to Classcard management. I had organized several meetings to discuss my findings, recommend an improvement plan for the various front office interface, reports and develop them.

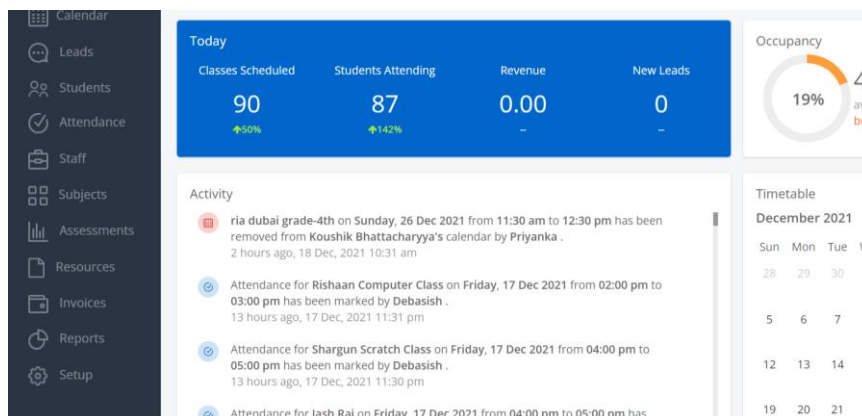
### 3. Technology used

Laravel PHP Framework to retrieve data , analyze and display them using html and css.

### 4. User Interface Design of Classcard

Classcard portal is segregated into following pages:

- Home Page – Provides summary of classes conducted, students attending, occupancy, popular services and popular staff etc.
- Dropdowns – I looked into the concept of customizable drop down menus where users of the website would be able to add their own values. For example, if the user of the app would like to add another platform that they are using for marketing such as facebook, I looked into the possibility of the user being able to add facebook into the list of all dropdown values for other users as well. Through research I found that the most common type was a static drop down with fixed elements for the user to choose from. There is a high probability of misuse of this function.

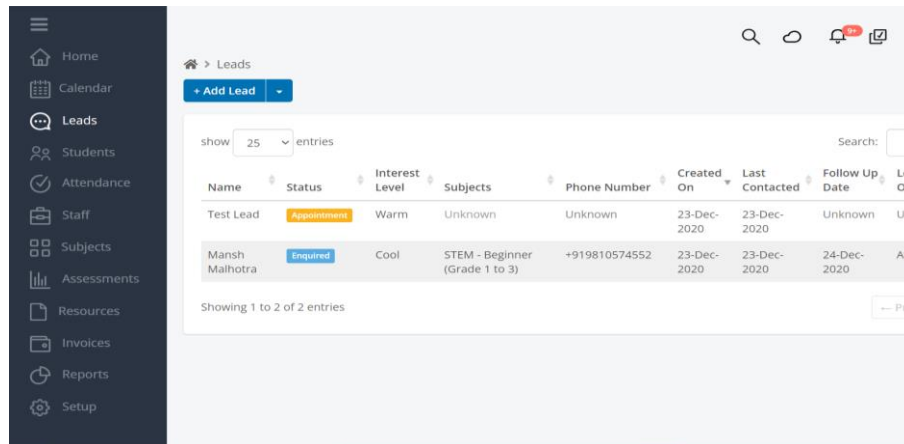


- Calendar – Displays instructor wise class schedules. The schedules can be repeated daily, weekly and monthly. Teachers can be assigned with specific students on this page. After speaking to many clients that make use of the ClassCard app, the feature that is most used is the calendar. I found that it is extremely important to see which instructor is available at what time. The layout of the calendar is also really nice with the sticky-note format. After going through it, I also realised that it is really well made and allows for direct access to see what an instructor is doing at a certain time. There may be an added benefit of also allowing students to book slots that are free for a particular

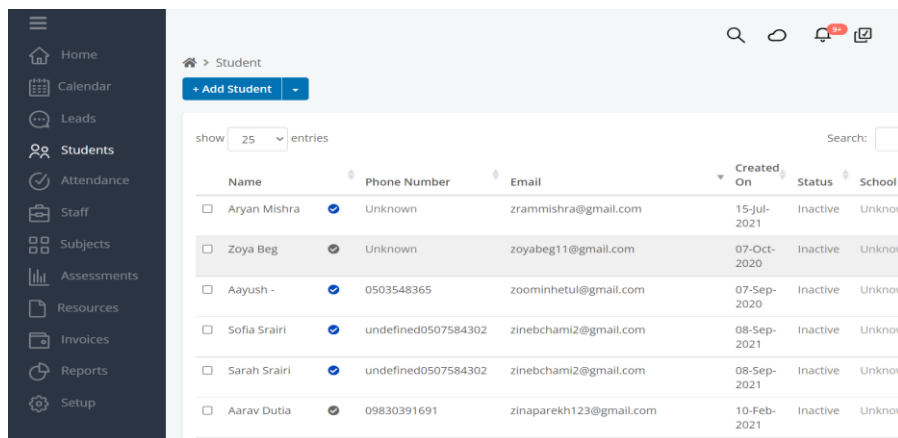
instructor from the data-management side as many of the clients call the company directly and occasionally, it has to manually be accommodated.

	Sun Dec 12	Mon Dec 13	Tue Dec 14	Wed Dec 15	Thu Dec 16	Fri Dec 17
1pm	Confirmed	Confirmed	Confirmed	Confirmed	Confirmed	Confirmed
2pm		01:30 pm - 02:30 pm Siddharth coding class () - Confirmed	01:30 pm - 02:30 pm Aarav Rastogi python grade-5th () - Confirmed	01:30 pm - 02:30 pm Siddharth coding class () - Confirmed	01:30 pm - 02:30 pm Aarav Rastogi python grade-5th () - Confirmed	01:30 pm - 02:30 pm Arduino Class of Parth and Krishna () - Confirmed
3pm			02:30 pm - 03:30 pm Python class of Varun () - Confirmed	02:30 pm - 03:30 pm Arduino Class of Parth and Krishna () - Confirmed	02:30 pm - 03:30 pm Python class of Varun () - Confirmed	
4pm	03:30 pm - 04:30 pm Coding class of Aarav (Aarav) - Confirmed	03:30 pm - 04:30 pm Coding class of Aarav (Aarav) - Confirmed	03:30 pm - 04:30 pm Abhijato and Anirudh coding class () - Confirmed	03:30 pm - 04:30 pm Python class of Prahaan (Prahaan) - Confirmed	03:30 pm - 04:30 pm Abhijato and Anirudh coding class () - Confirmed	
5pm			04:30 pm - 05:30 pm Krishnendu App development Class () - Confirmed		04:30 pm - 05:30 pm Krishnendu App development Class () - Confirmed	

- Leads – New customers details can be added on this page and the relevant feedbacks can be updated. After investigating all the functions, the leads section of the website was clearly the most important. Thinking from a management point of view, the reporting of new leads for a business is extremely important. Dealing with the leads is equally important as well. For example, people higher up in the business will want to ensure that the front office or whoever is in charge of connecting with the leads are doing the needful and that there aren't any leads that aren't being contacted. If this is not done, this might lead to potential clients and customers being wasted. I really liked the feature of the status of the leads as well: whether they have been won, lost or scheduled for an appointment. I think that clearly lets the owner, for example, know which ones have already been contacted. All the other information in the table such as phone number, interest level, subject and date created contacted are also all helpful.
- Using the referral source column on the table, I could collate this information and indicate which sources are bringing about the most leads. This can show management what is working and what is not working thus giving a better indication of what should be pursued as opposed to other mediums of marketing for example.

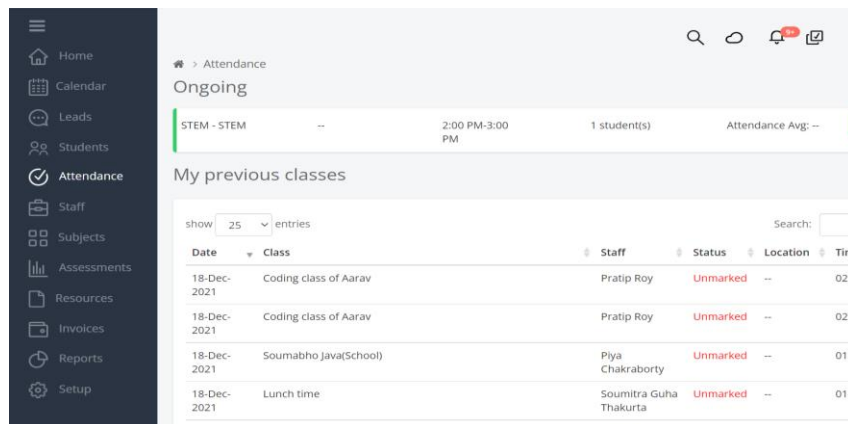


- **Students** – This page allows admin team to update student details. The unbilled session part of the student's section is also important. For each student, it gives the number of sessions not paid for and the total amount that is still due for the student. This is important for management so that they can contact these students and make sure that the due is paid. It would be quite beneficial if there was a way of identifying quickly what days the students attended lessons. Management can do that already by searching previous dates and checking when the student attended the class, but this would take a lot of time to do.



- **Attendance** – This page allows teachers to update attendance and mark present/absent. This page is very crucial in terms of generating payment reports, identifying when the payment is completing and organizing next invoice. The assessments function is also quite useful. Although it might not be used as regularly as the other functions, I think it is important to keep it in the report so that there is a clear indication about the results of the students. This might be more helpful for standardized tests like SAT. However, there might be a cluster of information due to the frequency of tests that students have.

Instead, maybe only the end-of-year report card is published on there. Could help with identifying which teacher is teaching the best.



Attendance

Ongoing

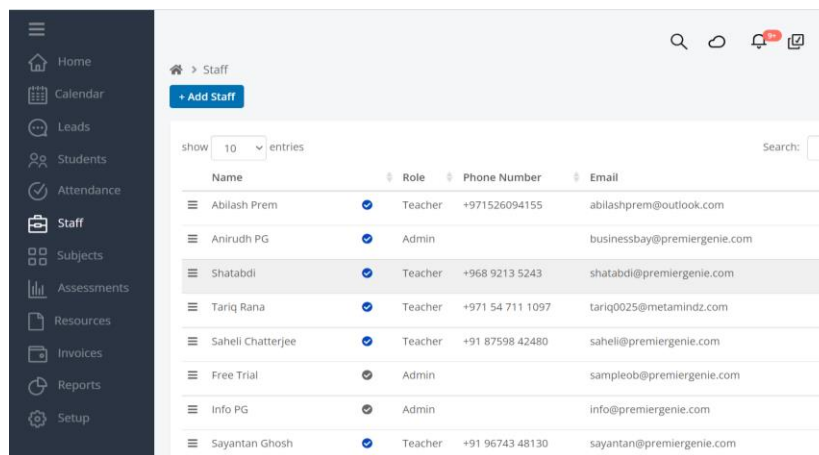
STEM - STEM -- 2:00 PM-3:00 PM 1 student(s) Attendance Avg: --

My previous classes

show 25 entries Search:

Date	Class	Staff	Status	Location	Tim
18-Dec-2021	Coding class of Aarav	Pratip Roy	Unmarked	--	02:0
18-Dec-2021	Coding class of Aarav	Pratip Roy	Unmarked	--	02:0
18-Dec-2021	Soumabho Java(School)	Piya Chakraborty	Unmarked	--	01:3
18-Dec-2021	Lunch time	Soumitra Guha Thakurta	Unmarked	--	01:3

- Staff – This page contains staff details.



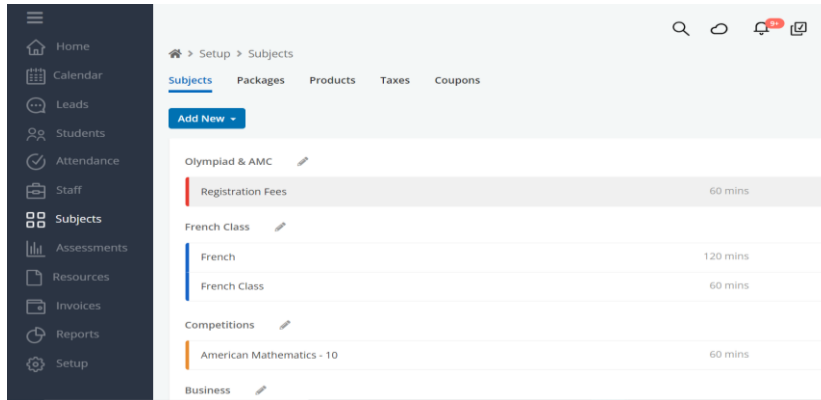
Staff

+ Add Staff

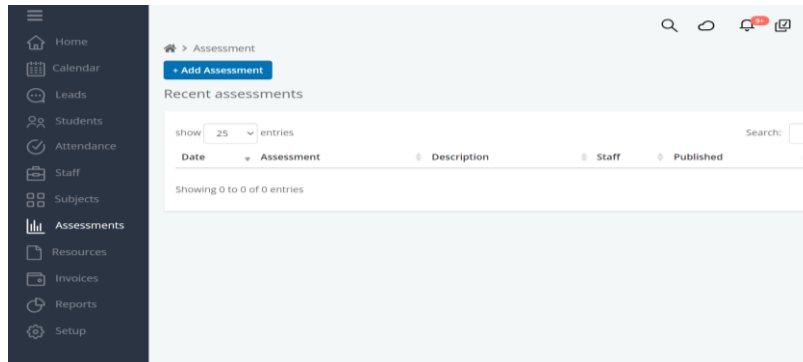
show 10 entries Search:

Name	Role	Phone Number	Email
Abilash Prem	Teacher	+971526094155	abilashprem@outlook.com
Anirudh PG	Admin		businessbay@premiergenie.com
Shatabdi	Teacher	+968 9213 5243	shatabdi@premiergenie.com
Tariq Rana	Teacher	+971 54 711 1097	tariq0025@metamindz.com
Saheli Chatterjee	Teacher	+91 87598 42480	saheli@premiergenie.com
Free Trial	Admin		sampleob@premiergenie.com
Info PG	Admin		info@premiergenie.com
Sayantan Ghosh	Teacher	+91 96743 48130	sayantan@premiergenie.com

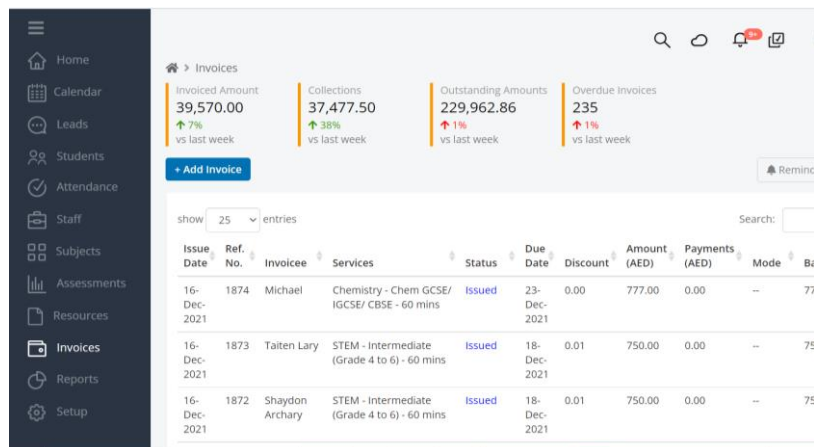
- Subjects – This page contains various courses offered at the institute, class duration and course fees.



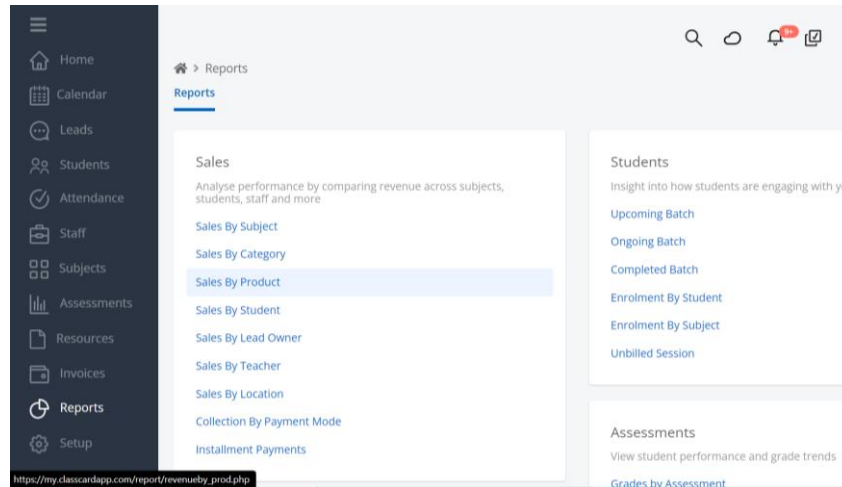
- Assessment – Allows to create assessment.



- Invoices – Helps admin to generate invoice and send to the customer.



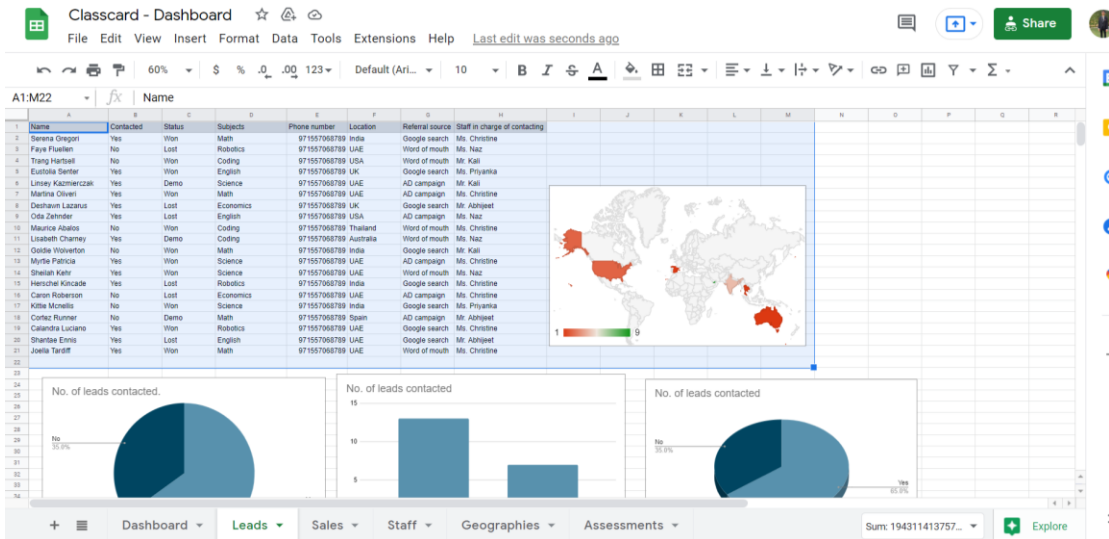
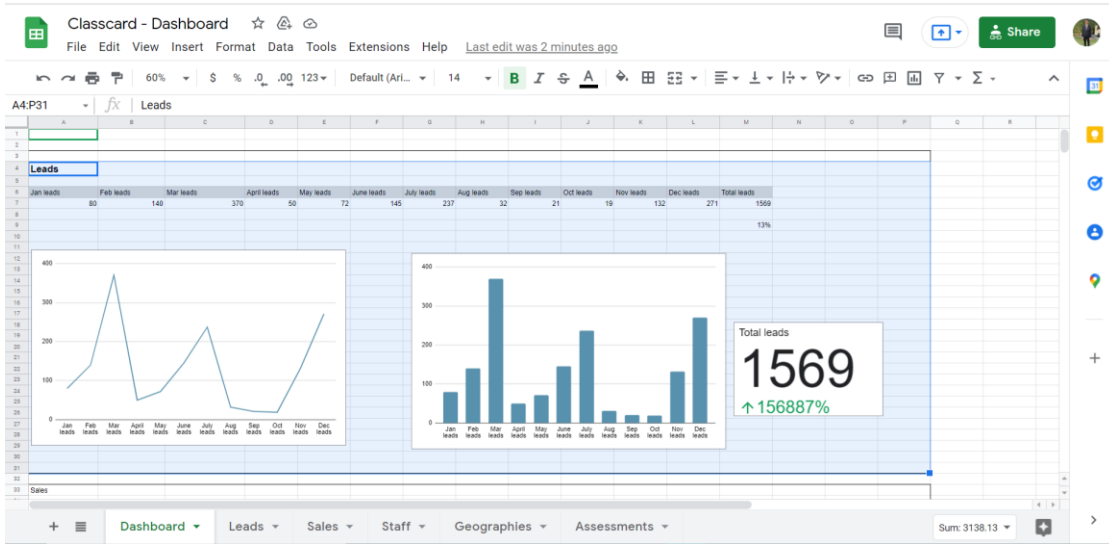
- Reports – Various reports that are very important for admin, management and other internal stakeholders to understand business performance, course popularity, instructors’ performance, enrolment statistics etc.

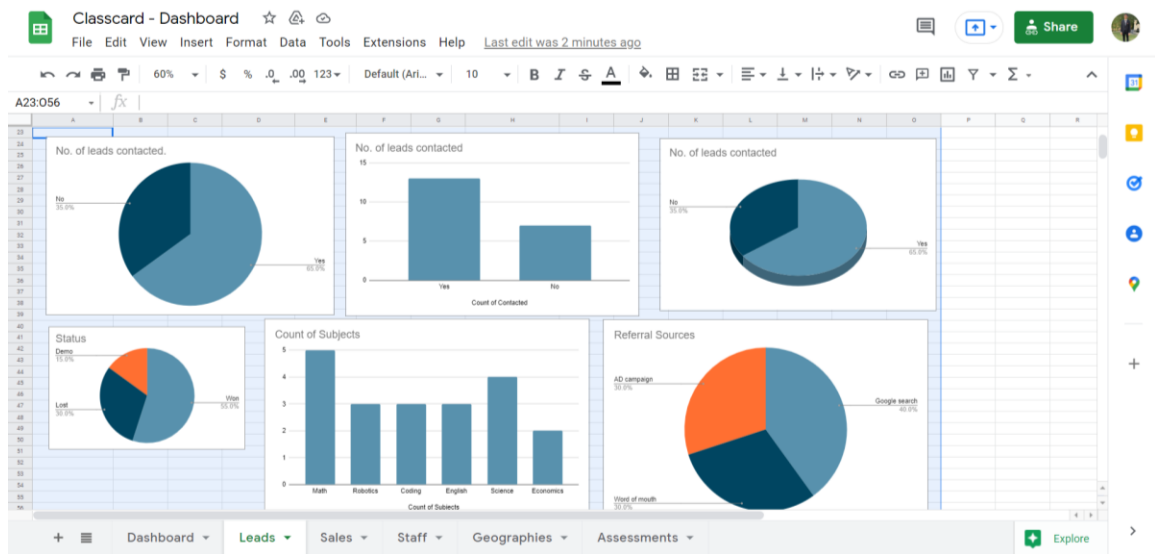


## 5. Recommended Reports and redesigning of the reports based on customer feedbacks

I interviewed management of various institutes, students and instructors and based on my discussion with them, I came up with new user interface design and additional reports that would help management to track customers, understand the market dynamics better and increase their sales. The new design of user interface would help admin to effectively use leads and teachers to use the system, mark attendance efficiently.

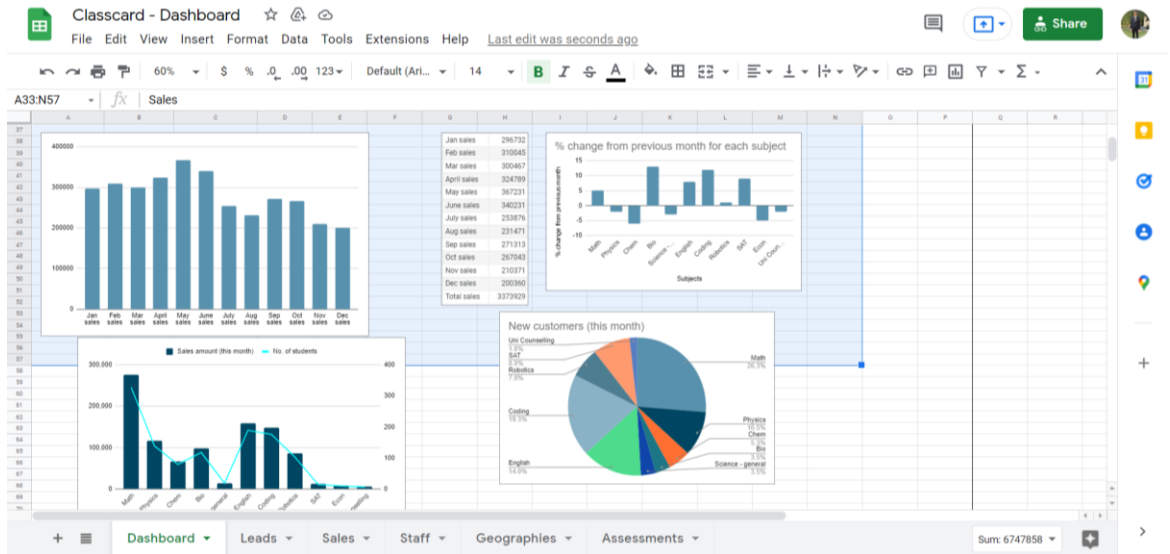
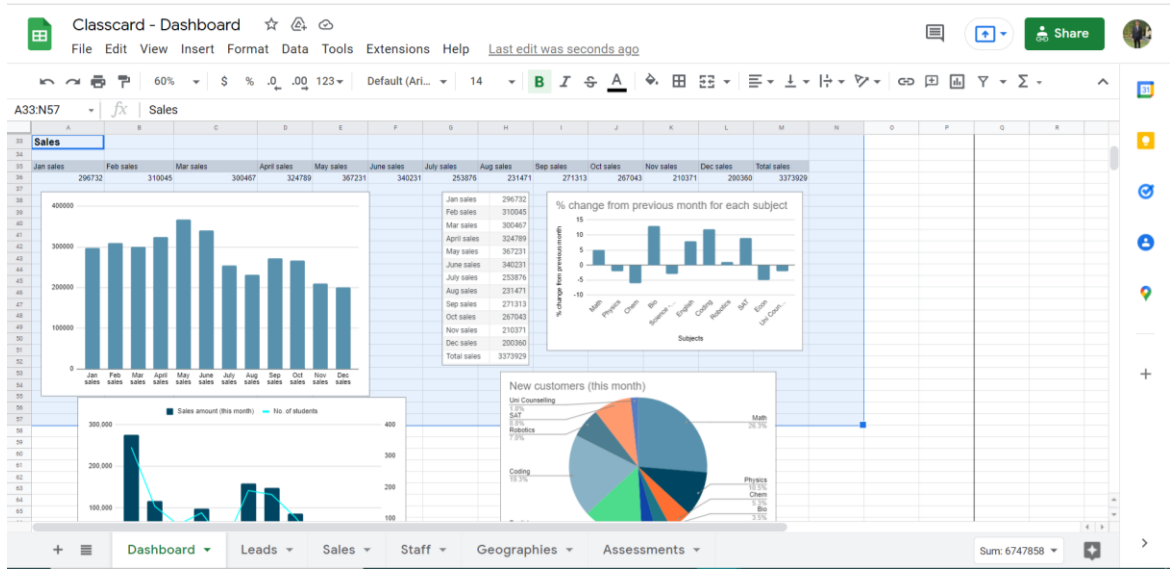
# Redesigned Dashboard: Leads Report





- The data generally is currently present on the website is organised mainly in a table and at times it is difficult for the user to clearly understand trends and relationships in the values for example. Therefore, I re-designed the leads tab to make it more visual and easier to see the difference in the leads accumulated between months. This would show the user where they are lacking and identify months where there is a down period and also establish a reason for this such as during holiday months there will be less leads due to users being out of the country.
- I started off by creating graphs from dummy data in the leads section of the spreadsheet. After assessing what I had created, by conferring with the developers of ClassCard, I chose certain graphs that I had created to put on the main dashboard. I chose the graphs based on how clear they were and based on which ones gave a good summary of the number of leads.

# Redesigned Reports



Classcard - Dashboard ☆ 📄 🗄️

File Edit View Insert Format Data Tools Extensions Help Last edit was seconds ago

60% \$ % .0 .00 123v Default (ArL... 10 B I G A

A1:J31

Sales by Students				Sales by Courses				
Name	Invoices	Amount received (in total)		Subjects	No. of students	Sales amount (this month)	% change from previous month	New customers (this month)
Berena Gregori	37	25,900		Math	328	275,520	5	15
Faye Fluelen	5	4,200		Physics	138	115,920	-2	6
Trang Hartzell	19	12920		Chem	79	66,360	-6	3
Eustida Sertel	2	1554		Bio	117	92,280	13	2
Linsley Kaczmarek	1	777		Science - general	18	13,986	-3	2
Marina Olivas	10	14,000		English	189	158,760	8	8
Desthann Lazarus	12	10,800		Coding	176	147,840	12	11
Olaf Zehnder	0	0		Robotics	103	86,520	1	4
Maurice Abalos	7	5,600		SAT	14	11,760	9	5
Lisabeth Charney	4	3,108		Econ	9	7,560	-5	0
Godde Viviverton	3	2,160		Uni Counseling	6	5,040	-2	1
Mylke Pincak	9	6,120						
Shelah Kehr	20	22,000						
Herishah Kincaide	18	13,500						
Caron Robinson	32	36,962						
Katie Monells	23	17,871						
Corlacz Rumar	14	22,400						
Cassandra Luciano	2	2,150						
Shanika Enes	11	8,947						
Joella Tardiff	4	3,360						

Name	Invoices	Gross amount (current month)	Amount received (current month)	Payment remaining
Berena Gregori	37	840	0	840
Faye Fluelen	5	1570	777	793
Trang Hartzell	19	840	0	840
Eustida Sertel	2	840	840	0
Linsley Kaczmarek	1	1570	840	730
Marina Olivas	10	777	0	777
Desthann Lazarus	12	777	777	0
Olaf Zehnder	0	840	500	340
Maurice Abalos	7	1570	1570	0

Subjects	No. of students	Sales amount (this month)
Math	328	275,520
Physics	138	115,920
Chem	79	66,360
Bio	117	92,280
Science - general	18	13,986
English	189	158,760
Coding	176	147,840
Robotics	103	86,520
SAT	14	11,760
Econ	9	7,560
Uni Counseling	6	5,040

Name	No. of students	Sales amount (this month)	% change from previous month	Demos taken
Vedant Gudka	11	9240	3	6
Suraj Taleja	26	21840	-4	0
Anuj Chhabra	6	6720	6	3
Rishi Khansani	17	14280	1	0
Nitin Handvani	22	18480	2	4
Michael Scottboo	20	16800	0	1
Shreya Classcard Staff	19	15960	-5	2
Aman Burman	4	3360	10	0
Mary Burman	16	13440	-6	0
Tarun Kumar	26	21840	2	4
Shama Mohamed	23	19320	-4	16
Tariq Rana	32	26880	2	9
Anirudh Gaddamanugu	13	10920	-1	0
Joanne Wierman	28	23520	7	13
Fariad Malik	19	15960	0	5
Zayham Zafar	23	19320	0	3

No. of students for each Subject

Sales amount for Subjects

Demos taken vs. Name

Sum: 1217516

Classcard - Dashboard ☆ 📄 🗄️

File Edit View Insert Format Data Tools Extensions Help Last edit was 2 minutes ago

60% \$ % .0 .00 123v Default (ArL... 10 B I G A

F1:R35

Sales by Courses				Sales by Staff					
Subjects	No. of students	Sales amount (this month)	% change from previous month	New customers (this month)	Name	No. of students	Sales amount (this month)	% change from previous month	Demos taken
Math	328	275,520	5	15	Vedant Gudka	11	9240	3	6
Physics	138	115,920	-2	6	Suraj Taleja	26	21840	-4	0
Chem	79	66,360	-6	3	Anuj Chhabra	6	6720	6	3
Bio	117	92,280	13	2	Rishi Khansani	17	14280	1	0
Science - general	18	13,986	-3	2	Nitin Handvani	22	18480	2	4
English	189	158,760	8	8	Michael Scottboo	20	16800	0	1
Coding	176	147,840	12	11	Shreya Classcard Staff	19	15960	-5	2
Robotics	103	86,520	1	4	Aman Burman	4	3360	10	0
SAT	14	11,760	9	5	Mary Burman	16	13440	-6	0
Econ	9	7,560	-5	0	Tarun Kumar	26	21840	2	4
Uni Counseling	6	5,040	-2	1	Shama Mohamed	23	19320	-4	16
					Tariq Rana	32	26880	2	9
					Anirudh Gaddamanugu	13	10920	-1	0
					Joanne Wierman	28	23520	7	13
					Fariad Malik	19	15960	0	5
					Zayham Zafar	23	19320	0	3

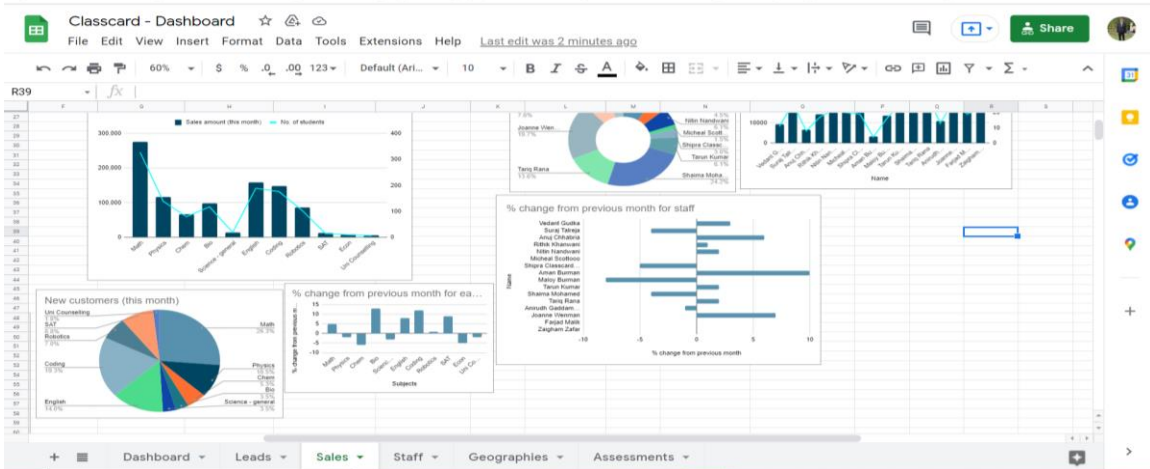
No. of students for each Subject

Sales amount for Subjects

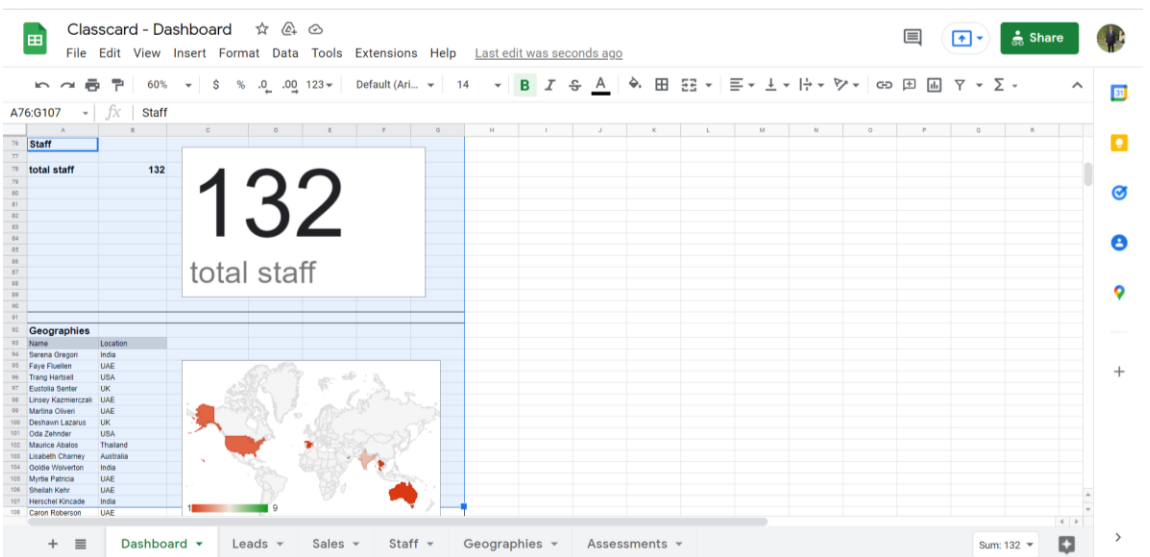
Demos taken vs. Name

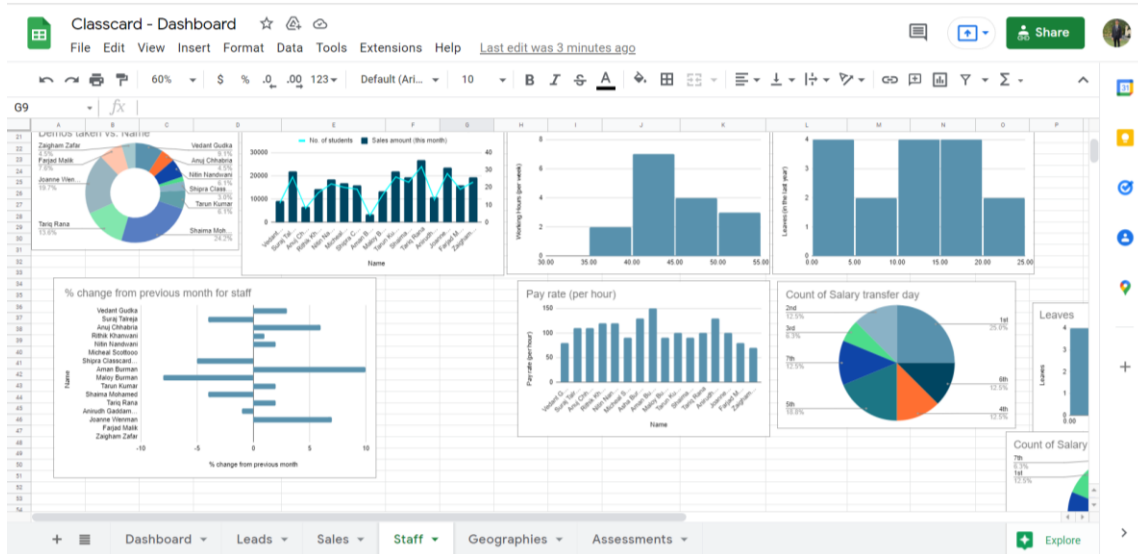
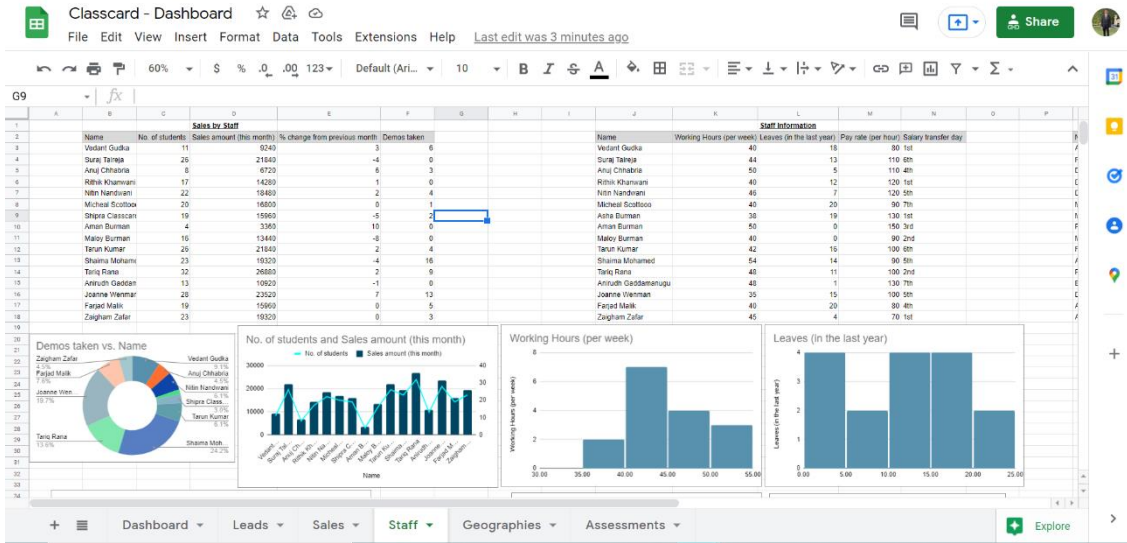
No. of students and Sales amount (this month)

Sum: 1247074



- As can be seen from the data and the graphs for the sales section, I implemented a similar method for my re-design of the leads section of the website but with sales. I created a lot of data and tried to represent them in an efficient way and then put some on the dashboard which would give a rough indication of the main data for users for sales which they would need.
- Data such as demos taken for each of the instructors also indicates the productivity of each of the staff. Additionally, by displaying the new customers for each subject, it also shows which subjects are performing best and bringing in more customers compared to others.





Classcard - Dashboard ☆ 📄 ☁

File Edit View Insert Format Data Tools Extensions Help Last edit was 4 minutes ago

50% \$ % .0\_ .00 123 ▾ Default (Ari... 10 ▾ B I G A ▾

Name	Completed	Status	Subjects	Phone number	Location	Referal source	Staff in charge of contacting
Shiralee Grayson	Yes	Won	Math	87155708789	India	Google search	Ms. Christine
Faye Flugten	No	Lost	Robotics	87155708789	USA	Word of mouth	Ms. Yael
Tang Marshall	No	Won	Coating	87155708789	USA	Word of mouth	Ms. Yael
Bunelle Barber	Yes	Won	English	87155708789	UK	Google search	Ms. Prayanka
Lindsay Kammern	Yes	Demo	Science	87155708789	USA	AD campaign	Mr. Paul
Martina Oliver	Yes	Won	Math	87155708789	USA	AD campaign	Ms. Christine
Debraun Lakin	Yes	Lost	Economics	87155708789	UK	Google search	Mr. Alimjast
Clay Denison	Yes	Lost	English	87155708789	USA	AD campaign	Ms. Yael
Maurice Abalos	No	Won	Coating	87155708789	Thailand	Word of mouth	Ms. Christine
Lizbeth Charne	Yes	Demo	Coating	87155708789	Australia	Word of mouth	Ms. Yael
Debra Warrick	No	Won	Math	87155708789	India	Google search	Mr. Yael
Myrtle Patricia	Yes	Won	Science	87155708789	USA	AD campaign	Ms. Christine
Sharon Agui	Yes	Won	Science	87155708789	USA	Word of mouth	Ms. Yael
Hershel Khandel	Yes	Lost	Robotics	87155708789	India	Google search	Ms. Christine
Caron Robinson	No	Lost	Economics	87155708789	USA	AD campaign	Ms. Christine
India Nolasco	No	Won	Science	87155708789	India	Google search	Ms. Prayanka
Conce Runner	No	Demo	Math	87155708789	Spain	AD campaign	Mr. Alimjast
Carolina Lujan	Yes	Won	Robotics	87155708789	USA	Google search	Ms. Christine
Shiralee Erms	Yes	Lost	English	87155708789	USA	Google search	Mr. Alimjast
Jodie Tardiff	Yes	Won	Math	87155708789	USA	Word of mouth	Ms. Christine

Dashboard ▾ Leads ▾ Sales ▾ Staff ▾ Geographies ▾ Assessments ▾ Explore >

- Staff is a very important aspect of the website as well. It is important to see how many new students and the total number of students each staff member is managing along with ensuring quality of the lessons are preserved. Are the students from that teacher attracting more students through word of mouth.
- Other data such as leaves, the day of salary often gets mixed up and is hard to track especially when there are a lot of employees working for a company. This can be consolidated on the website and general data for this will be displayed on the staff page on the website as well as the main dashboard.
- I also came up with a new concept that assesses the geographies where leads and students are from. This applies mainly for international countries and not local businesses of course. This would give an indication of which countries the product is working better in and maybe gives an indication for a company to target that specific area and if one country is reducing in numbers or is not attracting more people, more marketing and advertising could be done in those specific areas. Each area on the map is highlighted and assigned a colour depending on the numbers coming from that part.

Classcard - Dashboard ☆ 📄 🌐

File Edit View Insert Format Data Tools Extensions Help [Last edit was 4 minutes ago](#)

50% \$ % .0 .00 123 Default (Ari... 10 B I A

Name	Subject	Mark	Grade Percentage	Grade	Staff	Teacher rating (out of 10)
1						
2	Seena Chagan	Math	88/100	88 B+	Taru Rana	8
3	Faya Fakhri	Physics	88/100	88 C+	Aniuth Gaddamangudi	8
4	Tung Marshall	Biology	82/100	82 B-	Shrey	8
5	Estelle Sampa	English	75/100	75 C	Neelika Laxmiah	7
6	Linyay Raamessak	Math	87/100	87 A+	Taru Kumar	10
7	Martina Olivet	Coding	77/100	77 C+	Shama Mohamed	7
8	Debraan Labana	English	81/100	81 B-	Josanna Werman	8
9	Osia Zainoor	Esian	72/100	72 C-	Mahesh Meaud	7
10	Maurice Akiane	Physics	88/100	88 F	Taru Rana	4
11	Lisabeth Chamey	Business	100/100	100 A+	Fajar Malik	10
12	Ozma Wotwaton	Coding	88/100	88 B	Fajar Malik	8
13	Maria Patricia	Math	88/100	88 A	Mateo Burman	8
14	Shahin Kahn	SAT	1820	88 A	Ozma Ozma	10
15	Hesahel Anasak	SAT	1470	82 A-	Mateo Burman	8
16	Caron Roberson	English	84/100	84 A	Josanna Werman	10
17	Kibba Monella	Coding	72/100	72 C-	Shama Mohamed	7
18	Corina Bunker	Business	84/100	84 B	Zakaria Zaki	8
19	Cassandra Luciano	Physics	88/100	88 A	Aniuth Gaddamangudi	10
20	Shantia Somp	Math	100/100	100 A+	Mateo Burman	10
21	Jocita Tapp	Chemistry	88/100	88 B+	Taru Kumar	8
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						

Teacher rating (out of 10) vs. Staff

Grade Percentage

Dashboard Leads Sales Staff Geographies Assessments Explore

## 6. Coding using PHP and Laravel Framework (Codes Developed to access data using apis)

### [api.php](#)

```
<?php
```

```
use Illuminate\Http\Request;
```

```
use Illuminate\Support\Facades\Route;
```

```
use App\Http\Controllers\InvoiceController;
```

```
/*
```

```
|-----  
| API Routes
```

```
|-----  
|
```

| Here is where you can register API routes for your application. These

| routes are loaded by the RouteServiceProvider within a group which

| is assigned the "api" middleware group.

```
|
```

```
*/
```

```
Route::middleware('auth:api')->get('/user', function (Request $request) {
```

```
    return $request->user();
```

```
});
```

```
Route::get('/Invoices',[InvoiceController::class, 'index']);
```

- In api.php, the API routes were made. For example, I fetched the data from the user function and displayed it with the page slug /user.

### channels.php

```
<?php
```

```
use Illuminate\Support\Facades\Broadcast;
```

```
/*
```

```
|-----|
```

```
| Broadcast Channels
```

```
|-----|
```

```
|
```

```
| Here you may register all of the event broadcasting channels that your  
| application supports. The given channel authorization callbacks are  
| used to check if an authenticated user can listen to the channel.
```

```
|
```

```
*/
```

```
Broadcast::channel('App.Models.User.{id}', function ($user, $id) {  
    return (int) $user->id === (int) $id;
```

```
});
```

- channels.php is a broadcasting route which essentially acts as a guard that will check a data point before allowing a private connection. Users must be authorized before connecting to private channels. Channel routes like the one in the example above specifically check if an authorized user can listen to a channel by returning the status of a user.

### web.php

```
<?php
```

```
use Illuminate\Support\Facades\Route;
```

```
/*
```

```

|-----
| Web Routes
|-----
|
| Here is where you can register web routes for your application. These
| routes are loaded by the RouteServiceProvider within a group which
| contains the "web" middleware group. Now create something great!
|
*/

Route::get('/', function () {
    return view('welcome');
});

```

- web.php establishes the route to the home/welcome page. Of the website. The page slug is / indicating that there is no additional page slug apart from the main website URL.

### Invoices.blade.php

```

<h1>Invoices</h1>
<table border="1">
  <tr>
    <td> Student First name </td>
    <td> Student Surname </td>
    <td> Total Invoiced Amount </td>
    <td> Total Discounts </td>
    <td> Total VAT </td>
  </tr>
  @foreach($Users as $row)
  <tr>
    <td> {{ $row->firstName }}</td>
    <td> {{ $row->surname }}</td>
    <td> {{ $row->amount }}</td>
    <td> {{ $row->discount_amt }}</td>
    <td> {{ $row->tax_amt }}</td>
  </tr>
  @endforeach

```

```

        </tr>

        @endforeach
    </table>
    <span>
        {{{$Users->links()}}
    </span>

```

- Invoices.blade.php is the html aspect of the code. I have created a table here with a user's first name surname, total invoiced amount, total discounts and total VAT. I get each of the users from the phpMyAdmin database with all the dummy data and return it and display it on to the website.

### User.php

```

<?php
namespace App\Models;

use Illuminate\Contracts\Auth\MustVerifyEmail;
use Illuminate\Database\Eloquent\Factories\HasFactory;
use Illuminate\Foundation\Auth\User as Authenticatable;
use Illuminate\Notifications\Notifiable;

class User extends Authenticatable
{
    use HasFactory, Notifiable;

    /**
     * The attributes that are mass assignable.
     *
     * @var array
     */
    protected $fillable = [
        'name',
        'email',
        'password',
    ];

    /**

```

```

* The attributes that should be hidden for arrays.
*
* @var array
*/
protected $hidden = [
    'password',
    'remember_token',
];
/**
* The attributes that should be cast to native types.
*
* @var array
*/
protected $casts = [
    'email_verified_at' => 'datetime',
];
}

```

- User.php is a Laravel model relationship. In the most simple sense, a model is the way you decide to store/structure your data. The extends authenticable is essentially the same as extends model just with additional traits such as resetting password.

```

user\_details.php
<?php
namespace App\Models;
use Illuminate\Database\Eloquent\Factories\HasFactory;
use Illuminate\Database\Eloquent\Model;
class user_details extends Model
{
    protected $table='user_details';
}

```

- user\_details also has a model relationship. Here, I retrieve all the values in the user\_details table in the database which I use in the Invoices.blade.php file to display the users.

### InvoiceController.php

```
<?php
namespace App\Http\Controllers;
use Illuminate\Http\Request;
use App\Models\user_details;
class InvoiceController extends Controller
{
    //
    function index()
    {
        $data = user_details::join('rcInstitution', 'rcInstitution.rcInstitutionID', '=',
            82)
            ->get(['user_details.firstName', 'user_details.surname',
                'rcInstitution.amount', 'rcInstitution.discount_amt', 'rcInstitution.tax_amt']);
        $data = user_details::paginate(15);
        return view('Invoices', ['Users' => $data]);
    }
}
```

- InvoiceController.php is a controller. I display the first 15 items from the table onto each page. Additionally, I have created a function which retrieves all the data of the user based on the InstitutionID for the datapoint that I want to retrieve.

## **7. Recommendation for increased sales and customer retention using Artificial Intelligence and Machine Learning:**

**Supervised Machine Learning to reduce customer churn using KNN, Decision Tree Classifier, Random Forest Classifier models.**

Making use of artificial intelligence and machine learning would improve certain aspects such as users being able to identify customers' needs increasing sales, retaining leads and reducing losses for a company. By accessing sales conversation and implementing machine learning, an algorithm could be created to assess the customer which would indicate to the company the paying capacity of the customer. Based on this, the company could judge how much to charge the customer. Often new customers are thrown off by

the asking price and if it is too high for their budget, they will not choose the product. A differential pricing algorithm or product/course optimization according to customers' needs and paying capacity might result in better outcomes for the institutes. I think the auto deep learning would help achieve this.

The algorithm can also help teams by providing useful insights into what the team is doing well and how they can sequentially tighten their processes to optimize efficiency and revenue. Feedback can be provided to the sales team based on where they can improve when talking to customers.

I have recommended some standard algorithms - Decision tree classifiers to establish trends and patterns between data that would help the institutes to retain customers and improve sales. Another algorithm which I have studied and can be implemented to reduce customer churn is **Supervised Machine Learning Algorithm** and can be implemented using standard python libraries – numpy,scipy,pandas and matplotlib. Supervised Machine Learning Algorithm is about learning a function that maps an input to an output based on input-output pairs. A supervised machine learning algorithm analyzes the training data and produces an inferred function, which can be used for mapping new examples. The steps to predict customer churn using this algorithm are:

- Data Preprocessing – Import the dataset using traditional python libraries and apis (numpy, scipy, pandas and matplotlib)
- Data Evaluation – This process involves explore and visualize the data set by doing distribution of independent variables to better understand the patterns in the data and form hypothesis. The process involves – plotting histogram, analyze and distribution of variables, distribution of payment methods, course details, analyze the churn rate by categorical variables, churn rate based on courses/subjects, churn rate based on payment method, monthly charges vs quarterly charges, parents' age and profession. The process involves finding positive and negative correlation between variables and plot them. This step also involves creating training and test data set and decoupling them from master data set.
- Model Selection – Model classification algorithm over the training dataset, evaluate accuracy and standard deviation scores. Standard models such as K Neighbors Classifiers, Gaussian NB, Decision Tree Classifier or Random Forest Classifier evaluate the results. We can sort the result based on Mean AUC value. Compare the baseline classification algorithms and select the right model between Logistic regression, Vector Machine Classifier , K-Nearest Neighbors, Kernel SVM, Naïve Byes, Decision Tree and Random Forest.
- Model Evaluation – Train and evaluate chosen model

- Model Improvement – This process involves choosing the best parameters for the machine learning model. There are two sets of parameters – first type is what model learns and the second one is hyperparameter – a asset of configurable values external to the model that can't be determined by the data. Parameter Tuning techniques such as Random Search or Grid Search can be used for that.
- Future Predictions – Compare predictions against the test set and build a propensity score besides a predicted outcome. Every customer can get a propensity score that would showcase their percentage of probability to take the target action.
- Model Deployment – Deploy the final model to a server and run the model on any new dataset to predict the probability of a customer to churn in the coming weeks or months.