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AN INFORMATION ARCHITECTURE SUPPORTING VISUAL ANALYTICS OF STUDENT DATA

Wisam Al-Doroubi

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**AN INFORMATION ARCHITECTURE SUPPORTING
VISUAL ANALYTICS OF STUDENT DATA**

By

WISAM QUAIS AL-DOROUBI

B.S. BAGHDAD UNIVERSITY 2006

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

**Master of Science
Computer Engineering**

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Albuquerque, New Mexico

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DEDICATION

This work is dedicated to my family especially to my mother and my father, the best parents in the world. Thank you for believing in me.

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I would like to acknowledge and thank my advisor Dr. Heileman for his continuous and amazing support. Without his help this work would not have been done.

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M.S. COMPUTER ENGINEERING, UNIVERSITY OF NEW MEXICO
2014

Abstract

The topic of this thesis is student data analytics. The ability to analyze and understand student data is of utmost importance to universities as it facilitates the tracking of student progress, along with the ability to assess the effectiveness of program improvements. The ability to process and comprehend this data in order to determine the meaning and trends behind it was the goal of this work. This involved building a service that is easy to use and understand, while at the same time flexible enough to be used in a variety of settings, including the visual analytics application described in this thesis. Using specific software frameworks (e.g., Sinatra and JavaScript) supported the ability to build this project with minimal code without sacrificing the needed functionality. The challenges faced included the accuracy of the data that was supplied and the novel analysis techniques applied to it. The student data used in this project was supplied from enterprise UNM student data systems.

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Chapter 1

Introduction

The need to analyze and understand data has become an increasingly important part of the improvement processes of many enterprises. The ability to read data and analyze large data sets is necessary in order to assess current performance and plan appropriate improvements. Large amounts of data related to student performance are now routinely collected by universities. A typical university admits a large number of students each year and it is now common to track their progress in order to better determine those facing difficulties that could be addressed. University of New Mexico (UNM) enrolled 28,644 students in fall semester 2013 [1]. UNM administrators are seeking better techniques for tracking student progress and better tools for predicting how many of them will graduate each term, and for assessing the problems that may lead to delays in progress. Thus, this thesis is concerned with techniques developed at UNM to analyze student data and the specific algorithms created to compute student progress. All student data used in this thesis were retrieved from UNM databases. In order to provide an easy-to-use interface for UNM staff to gain access to this data, we began by building a web-based interface. Dashboards were then created that use this interface to read student data, analyze it, and provide visual results for assessing student performance. Data visualization is a rapidly growing field aimed at addressing the ability to analyze and interpret the massive amounts of data now being collected. The difficulty in doing this

involves reading, processing, and analyzing the data in ways that can lead to meaningful insights.

Dashboards are now commonly used to represent data to the viewer after analysis in order to make it clearer for the purposes of decision making. Dashboards are often used by companies to provide snapshots of performance that are easy to comprehend. In the case of this thesis, the goal was to provide dashboards useful for better understanding the progress of various student cohorts. The dashboard interface extracts student data from UNM data systems, and then uses JavaScript libraries to draw and visualize the data. These dashboards were planned to be very simple, without any complicated pieces that would make it difficult to integrate in the future with other systems.

Chapter 2

Background

2.1 Visual Analytics

Visual analytics is an emerging and fast-developing field that combines the strengths of graphical visualization with the power of analytical reasoning [2]. A difficult problem that many decision-makers face these days is the increasing amount of data that is being generated. For example, in some homes there are sensors for temperature, humidity, lighting, etc. Most of these sensors gather data and send it using Wi-Fi or Bluetooth technologies to be analyzed and decisions are made to accommodate changes or to keep a pre-set setting. There are many other examples of systems that gather information and apply analytics to it for various purposes. For instance, an emerging field that is producing large amounts of data is social media. Facebook for example has more than 1.3 billion monthly active users [3] and every image shared, user post, like, poke, etc. is being stored in their data centers. Furthermore, sophisticated analytics are now routinely applied to this information to learn more about Facebook users and their behaviors.

This problem is known as “Big Data”. A whopping 90% of the data available today has been generated in the last three years only [4]. This increase of data availability makes it harder for analysts to read and organize the data to find clues and come up with actionable strategies. Representing data in tables and spreadsheets was very efficient for a

long time but not anymore given the sheer volume of data now collected. There has to be a solution for this problem and this is one of the reasons behind the emergence of a new field known as visual analytics.

Visual analytics divides the analytics problem into three layers: data management, visualization and analytics. Data management is a very important part in visual analytics and data visualization as it provides access to the data needed for analysis and visualization. Traditional SQL databases are very efficient, scalable and fast but they are transactional databases and they expect the user to pull a certain set of data at a time. This is not usually the case when trying to visualize a large set of data. The introduction of NoSQL databases improved the ability to perform data visualization because they relaxed SQL's strict ACID properties (atomicity, consistency, isolation and durability) but to a certain extent only [5]. New features helped as well like aggregation queries that return running approximations for the user. One good example is Google's Dremel NoSQL query engine. Dremel is a scalable, interactive ad-hoc query system for analysis of read-only nested data. By combining multi-level execution trees and columnar data layout, it is capable of running aggregation queries over trillion-row tables in seconds [6].

Analyzing the data provided from the data management tier explained above is another important part of visual analytics. There are many different ways to analyze a data set. Most traditional information visualization toolkits model visual structures as black-box components that manage their state internally and map views (rendering) directly to a window. This monolithic component model contrasts with the polyolithic model, which represents visual structures as regular tables with a specific schema in which each data item has a geometry (or shape), an identifier, and a set of graphic attributes (fill color,

transparency, stroke color, and so on). Although there is no consensus on a preferred model type, one strong advantage of the polyolithic model is its scalability; it is easy to implement on top of standard databases. Monolithic approaches suffer from the so called impedance mismatch—the difficulty of converting their object-oriented structure into a database structure [6].

2.2 Student Data

UNM enrolls around 28,500 students enrollment every year (five year average from 2009 to 2013 fall semester [1]) which are distributed across approximately 550 programs. This large amount of student data over so many academic programs leads to challenges related to student success that can be informed through better analytics. Specifically, the ability to analyze student data relative to programs may provide insights that allow the university to improve programs and services that enhance student success.

Keeping track of students and their progress at UNM requires the ability to access data related to student performance and analyze it. Student data needs to be checked against specific computed values to make sure they are on track and not falling behind. For instance, student progress needs to be tracked to insure they are not missing an important course that will delay their graduation. Also, analysis of student progress allows us to apply analytics to institutional features. For instance, this can be used to detect those courses that have high failure rates or other courses that are highly critical for student success.

UNM student information is stored in UNM databases (student Data Mart, ODS and Banner). The ability to access these databases provides the ability to access students data and hence the ability to analyze it. The need to track student graduation rates each year and compare them to base values is one goal of this project. Two different algorithms are used to calculate the base values, the first one is created by the Higher Education Research Institute [7] that is used by universities all over the US, and the other was developed locally at UNM [18]. These algorithms are used to compare graduation rate predictions against actual graduation rates to show if students are on track or not. This is useful for showing how students are progressing and for providing an overview of graduation rates for a range of years.

Another use of this student data is to display the gender and ethnic distributions for various student cohorts. This can be used to easily compare the characteristics of different student cohorts.

2.3 Examples

The ability to access and analyze student data provides the ability to create data visualization for different student cohorts. Student cohorts are defined according to characteristics related to students, e.g., the year a group of students entered as freshman. In this project a cohort management application was created that accesses student data from the UNM Student Data Mart for analysis purposes. The application calculates the total number of graduates against the total number of students enrolled in UNM in a

specific semester. One example of this cohort management system is the first-time full-time freshman cohorts (FTFT). The total number of FTFT freshman students enrolled in UNM from 2006 through 2014 is calculated then the graduation rates for each cohort year are calculated based on their semester of graduation. These graduation rates are compared against pre-computed projections in the dashboard.

Another example of student data analysis is to represent their progress throughout their years at UNM. Starting by the first semester they spent at UNM, showing students' progress and percentage that remained in same college or program they started in. Using JavaScript libraries (e.g. D3 and jQuery) to visualize this by using Sankey diagrams. Sankey diagrams are a specific type of flow diagram, in which the width of the arrows is shown proportionally to the flow quantity [8]. These diagrams are very useful and provide a lot of information of students' progress through UNM.

Using same techniques many other examples can be created and discussed, one other important example is degree audit. This application uses student data and compares the progress against the student's program requirement. Comparing the courses the student already took and how many are remaining allows this application to show if the student is on track or not. This gives an edge for UNM faculty to make sure no students are falling behind and have unnecessary delays to their graduation.

Chapter 3

Design and Implementation

3.1 High Level Information Architecture

To provide the software service required for this project, it was necessary to connect client requests to information provided from UNM databases. Thus, it was important to carefully design this interface. A read-only access to the Student Data Mart (which has all needed information regarding students and their records) was provided and used to acquire the data required. The next step involved architecting the system and considering how to best provide the visual analytic services. The best solution was to use a direct link from the database to a web application that serves as a REST interface. Representational state transfer (REST) is an abstraction of the architecture of the World Wide Web. More precisely, REST is an architectural style consisting of a coordinated set of architectural constraints applied to components, connectors, and data elements, within a distributed hypermedia system [15].

This web application designed to accept requests in the form of URLs (REST/HTTP GET requests), process these requests and then decides on the needed actions to service them and return data in a format that is understandable by as many services as possible. After considering the different formats available, along with their benefits and features, the decision was made to use JavaScript Object Notation (JSON). JSON is a lightweight, user-friendly, language independent format that is very easy to read and write. These

benefits supported the decision to choose JSON as it is not anticipated there will be significant changes needed to existing systems that will need to pull data from the Student Data Mart. All systems are intended to be configured to accept and parse JSON data.

Considering the functionality that is provided by this web application that it is only able to connect to the database and return JSON data, there was no need to implement a local database or any sort of ORM (Object-Relational Mapping - used to map relational databases like SQL with objects in object-oriented programming languages like Ruby or Java) interface. These requirements led to the selection of a software framework that was used to write the web application. As there are so many different frameworks available and each has its own advantages and disadvantages, the requirements of this project were considered and the decision was made to use Sinatra. Sinatra is an open source software web application library and domain-specific language written in Ruby. It is an alternative to other Ruby web application frameworks such as Ruby on Rails, Merb, Nitro and Camping. Sinatra is dependent on the Rack middleware framework. It is small and flexible. It does not follow the typical model-view-controller pattern used in other frameworks, such as Ruby on Rails. Instead, Sinatra focuses on quickly creating web-applications in Ruby with minimal effort [9].

The main purpose of the cohort management web application is to provide access for analytics purposes to the students' records in UNM databases (Student Data Mart). To provide this ability, a driver or an interface is needed to facilitate the communication between the application and the database. The Student Data Mart is an Oracle database and therefore a driver was needed in order to access the database. This was provided by

an Oracle driver for Ruby called Ruby-OCI8. The Ruby OCI8 driver provides connectivity to Oracle versions 8 through 10 via standard Oracle Client software. OCI8 is a Ruby wrapper written around native C code which does the actual interaction [10].

To provide necessary security, authentication is used between the database and the client web application. Each request between the web application and the database has to be authenticated first before returning any data.

To this point the discussion has been related to how to deliver the data to the requesting services. The important capability that was built onto of the data access services were the dashboards. The purpose of these dashboards is to visualize the data pulled from the database in an easy way that will be clear for the viewers to understand. This dashboard will be used to analyze and calculate data to represent some specific results to the users in an easier way than the typical tables and spreadsheets. The requirements and features of the proposed dashboard interface were considered and the same process was in determining the architecture of the dashboard application. Sinatra framework was also chosen for this application because of its lightweight implementation. This web application will basically wait for users to request a URL from it, then it determines what data is needed to serve this request, and then requests it via the REST interface (and hence from the Student Data Mart), processes the returned data, and finally visualizes the results. The dashboard will then render the views (HTML pages) and uses JavaScript libraries (e.g., D3 and jQuery) to render the data and will return the required page with all data analyzed and processed for the user.

The overall system layout is shown in Figure 3.1 below:

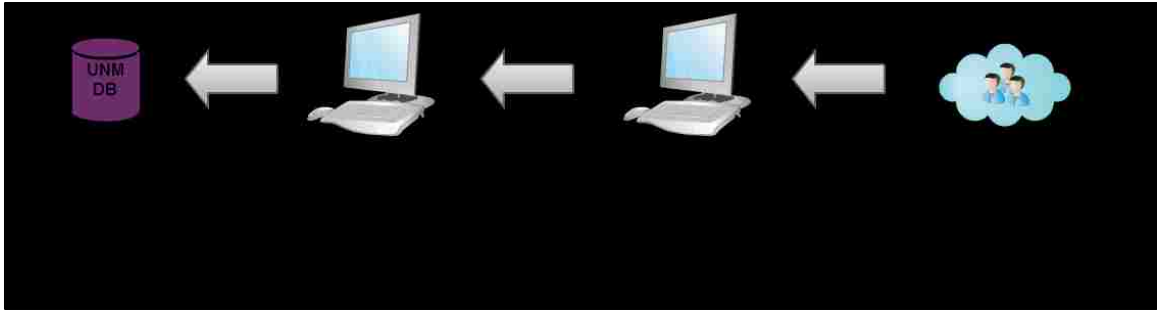


Figure 3.1 - Dashboard and REST interface layout

3.2 Detailed Design

There was more than one option to implement the application explained in Section 3.1, one is to implement it using cloud resources (e.g., Heroku, Amazon Web Services, etc.) which is very convenient since most cloud service vendors provide some services for free (for a limited processing capacity or limited storage). Also, these cloud service providers generally guarantee a high level of service and are considered very reliable. These companies usually provide a support to manage patches installation and security updates. However, using this option means deploying the code and data in the cloud service provider's data center. Usually this does not pose a problem; however, the implementation is different because the data requested by the users when accessing the dashboard will be pulled from the REST interface, i.e. from the Student Data Mart. This means there will be some sensitive data pulled from UNM student data stores that initially we did not want to put on a cloud service provider network. Usually these providers guarantee a certain level of security and privacy, and future versions may therefore store this data in the cloud. Another problem with the cloud service provider option is that any data needed by users/services must be pulled from the UNM data center

all the way to the provider's data center. Considering available network bandwidth, this should not be an issue; however, in some cases the amount of data pulled is significant and it will take much longer to transfer it to remote data centers rather than having a local machine in the UNM data center. The other option was to implement this project locally in the UNM data center. Thus, with help the UNM IT department two virtual machines (VMs) were provided for this implementation. These VMs are located in the UNM data center and are administered by UNM IT which effectively resolved all concerns mentioned above. The VMs were supplied with the Red Hat Linux operating system installed, and each has 2GB of RAM, 1 CPU and are connected to the UNM network using 10Gbps LAN connections which are considered enough for the implementations in this project. Each VM is secured behind UNM firewalls and for security reasons access was restricted to SSH. Each VM is designed to hold one architecture part of this project. The first VM is used to implement the REST interface and the second one for the dashboard as shown in Figure 3.1.

One VM was configured with the REST interface described previously, and is responsible for connecting to the database and providing data back in response to requests. So connectivity is very important and there should be no issue in connecting to the database using the Oracle driver (Ruby-OCI8 explained earlier). Another important aspect is the connectivity with the second VM that hosts the dashboard. This connection uses port TCP/8080 to communicate data between the two VMs. The second VM needs to provide access to users requesting to access the dashboard. This access is provided using port TCP/4567. Figure 3.2 shows a high-level architectural view of the project.

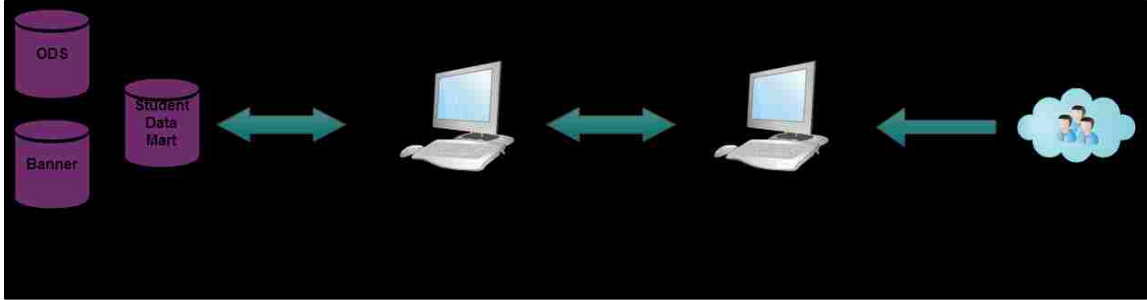


Figure 3.2 – Detailed Design

3.3 Implementation

In this section we first describe the implementation of the REST interface. The required software language and supported libraries required for our work (Ruby Gems are packages for Ruby programming language that provides a standard format for distributing Ruby programs and libraries [11]) were installed.

To build the REST interface a folder was created to hold all code required to run the web application, and it was structured to be as simple as possible (and following general programming structures) as shown in Figure 3.3.

Sinatra is a very lightweight framework that does require minimal installation effort, so for Sinatra to start working only one Ruby file must be installed, and it will act as the server. So the Ruby file *Server.rb* file was created that holds the entire configuration for this web application. Figure A.1 in Appendix A shows the contents of this file. As shown in this figure, the first step involves initializing Sinatra using (require “Sinatra”) command, the next step instructs the application to use the Ruby gems that are needed.

Also, the code specifically instructs the server to use a JSON gem (to parse and render JSON data) and to use the Ruby-OCI8 driver (for the database connection).



Figure 3.3 - REST interface Folder Structure

As shown in Figure A.1 in Appendix A, the next step involves defining the routes to be used to serve data back to the requesting service. Sinatra use a very straight forward way to do this, by specifying the type of request that will provide the service (one of the HTTP methods - GET, PUT, POST, UPDATE, etc.) and then the route that Sinatra will monitors and match. Since all connections in this project will be to serve read-only access to the database, HTTP GET routes only are implemented. To provide the services that will be needed from this REST interface, a number of routes are structured to service requests. There is always the ability to edit these routes at a later date and to add as many

routes as needed. Figure 3.4, shows a route that supports pulling all students enrolled in a specific college during a specific period.

```

get '/college/:college/:start/:end' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @college = params["college"]
  @start_date = params["start"]
  @end_date = params["end"]

  query = []
  connection.exec("select p.college_code_desc, a.student_id, c.academic_period from
  unm_oia_student.course_dim p,unm_oia_student.student_enrollment_fact a,
  unm_oia_student.academic_calendar_dim c where (p.college_code_desc = '#{@college}' AND
  a.time_key = c.time_key AND a.course_key = p.course_key AND c.academic_period >=
  '#{@start_date}' AND c.academic_period <= '#{@end_date}')" do |r| query << r;end

  a = ["College Name", "Student ID", "Academic Period"]
  string = query.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end

```

Figure 3.4 – Example Route

This route monitors the requests for HTTP GET request, and waiting for a URL that starts with the word “college”. This route is constructed to provide all students enrolled in UNM in a specific college. After the first parameter in the URL (`/college/`), Sinatra will look for the second parameter in the URL (`:college`) which will be used as a name parameter. This provides the ability for a user to specify the college he wants to pull all students records for. Continuing in the same manner by using name parameters for the start and end dates (specific terms) for this request. Using this powerful feature in Sinatra, three Ruby objects are created to hold these specific parameters. Then these objects are

used to construct the appropriate SQL query that will be sent to the Students Data Mart database.

For this SQL query to be sent to the database, a connection must be established, which is accomplished in the first line inside the route definition action in the file. A new OCI8 connection is created by specifying three parameters, the first two are the username and password needed to authenticate to the database, and the third parameter is the name of the database (the IP address) with the specific port number that the application will be connecting to. To provide a more secure system, a separate YAML file (YAML Ain't Markup Language) is used to hold this secret data (username/password) which separates critical data from the code. Then Sinatra is directed to access these parameters locally from the YAML file.

Now that the database connectivity has been explained, let us consider how it will be queried. The application monitors the returned data and parses it inside an array (query [] in this example). Then, basic manipulation is applied to this array in order to change it to a JSON formatted form (JSON have a key-value pair structure so another static array is used to hold the keys of the final JSON file and then the data returned from the database is merged with the static array to generate a final JSON file as needed). The final step involves sending the generated JSON data back to the requesting user.

The next part of the implementation involves creating the dashboard. First, all prerequisites were installed and then a folder was created and structured the application inside it in the same way the REST interface was configured as shown in Figure 3.5. This file starts with the same initialization steps; Sinatra is initialized first, then Ruby Gems,

etc. One difference shown here as compared to the REST interface is the initialization of rest-client gem [17]. This is a simple REST client for Ruby that supports the HTTP actions GET, POST, PUT, and DELETE (GET is only needed in this implementation). This Gem had to be added since it will be used to send requests to the REST interface that pulls data from the Student Data Mart.

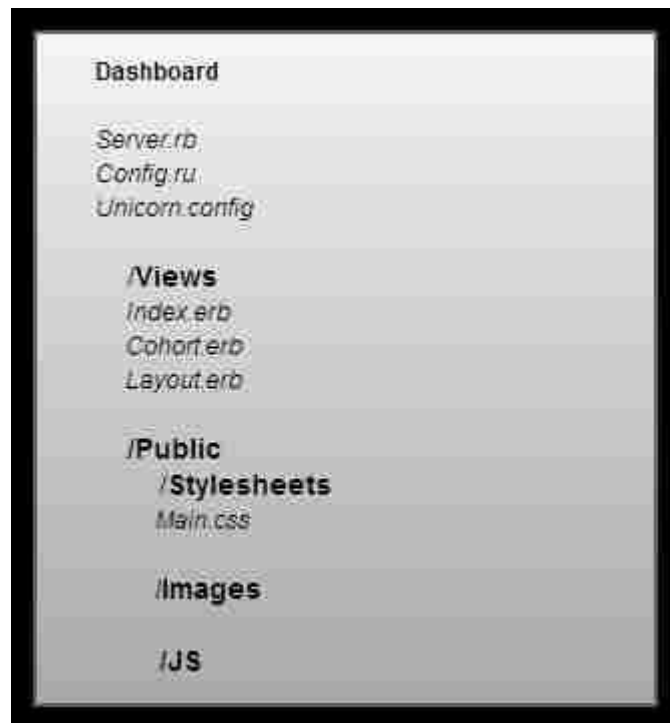


Figure 3.5 - Dashboard Folder Structure

Following the same processes used in the REST interface of defining routes and the required actions inside them the file shown in Figure A.2 in Appendix A is created.

An index page was defined to serve users in the future; they will be able to create their own specific diagrams by specifying cohorts. Also a main page route is defined to serve as the first page of the application. This page will contain explanations about the project and links to different cohort management views. The cohort management system route is

defined to route the users to the required page. This page will represent the cohort management view for all first-time full-time freshmen at UNM for the period from 2006 until the present. To pull the data required to build this cohort management page, the required data is requested from the Student Data Mart (through the REST interface). The `rest_client` gem is used to send HTTP GET requests and it expects JSON data to be returned from the REST interface. Since student data only updates after the end of each semester, which means during the semester student data requested from the Student Data Mart database will always be the same. To optimize the system and provide minimal delays, the need for a caching system arose. This caching system will have to cache students data returned from the database and use the cached version whenever requested to generate the cohort management page. After a certain time, the cache system needs to update the cached values to reflect the change in students data in the Student Data Mart database. After careful consideration, the choice was made to use the Redis NoSQL database as the caching system. Redis is an open source, BSD licensed, advanced key-value store. It is often referred to as a data structure server since keys can contain strings, hashes, lists, sets and sorted sets [14]. Redis is well-suited for this project implementation because it is an in-memory database [19] that uses the RAM to store and retrieve data, providing very rapid response. Using Redis significantly reduced the delays associated with retrieving student data.

The first time a user requests the cohort management page, Redis will check if the value is cached or not (it is not cached yet). Redis will instruct the server to request the data from the Student Data Mart (through the REST interface). After the requests have been sent, the application waits for the reply from the REST interface and as soon as it gets the

data it parses the returned JSON to create Ruby objects. At the same time, Redis will cache the returned data and store it in its in-memory database. The second request that comes from a user requesting the same data, Redis will check its cache store and will provide the cached values, so there is no need to pull the data again from the database. The Redis implementation can be seen in the Dashboard *Server.rb* file shown in Figure A.2 in Appendix A. Redis provides the capability to set an expiration on the cached data so it can delete the cached values after a certain amount of time.

The application proceeds in this manner until all data needed for the dashboards has been pulled and parsed. The next step involves data manipulation. The application starts manipulating the data it obtained from the REST interface to filter out the data needed as shown in the example in Figure 3.6 below.

```
@f200680 = @all200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ? memo+1 : memo }
@f200780 = @all200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ? memo+1 : memo }
@f200880 = @all200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ? memo+1 : memo }
@f200980 = @all200980.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ? memo+1 : memo }
@f201080 = @all201080.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ? memo+1 : memo }
@f201180 = @all201180.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ? memo+1 : memo }
@f201280 = @all201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ? memo+1 : memo }
@f201380 = @all201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ? memo+1 : memo }

@e1_200680=@all200680.map{|v|v.values}.map{|y|y[1]}.inject(0){|memo,e| e=="Hispanic" ? memo+1 : memo}
@e1_200780=@all200780.map{|v|v.values}.map{|y|y[1]}.inject(0){|memo,e| e=="Hispanic" ? memo+1 : memo}
@e1_200880=@all200880.map{|v|v.values}.map{|y|y[1]}.inject(0){|memo,e| e=="Hispanic" ? memo+1 : memo}
@e1_200980=@all200980.map{|v|v.values}.map{|y|y[1]}.inject(0){|memo,e| e=="Hispanic" ? memo+1 : memo}
@e1_201080=@all201080.map{|v|v.values}.map{|y|y[1]}.inject(0){|memo,e| e=="Hispanic" ? memo+1 : memo}
@e1_201180=@all201180.map{|v|v.values}.map{|y|y[1]}.inject(0){|memo,e| e=="Hispanic" ? memo+1 : memo}
@e1_201280=@all201280.map{|v|v.values}.map{|y|y[1]}.inject(0){|memo,e| e=="Hispanic" ? memo+1 : memo}
@e1_201380=@all201380.map{|v|v.values}.map{|y|y[1]}.inject(0){|memo,e| e=="Hispanic" ? memo+1 : memo}
```

Figure 3.6 – Example Data Manipulation

In the previous example there are two different example groups of data manipulation, one group to filter the data of all FTFT freshmen students and find out how many of them are females, the second group is used to filter the data determine student ethnicities.

Implementing these filters and manipulations provides the analysis of data and produces the calculation of percentages and values needed for the dashboards. These results are stored as Ruby objects and all are passed from the server (*Server.rb*) to the HTML views.

It should be mentioned that there are many templating systems used in Sinatra. In this project, Embedded Ruby (ERB) was used because of its popularity (it is the default templating system in Ruby on Rails framework). ERB makes it very easy to use any Ruby object inside an HTML view by just enclosing the object with the `<%= %>` tag. This made it very easy to use the objects being passed from the server to the HTML views in this project.

Using the previous code modules, all required data for the dashboards can be produced. Thus, let us consider the dashboard views. The first file created was *Layout.erb* which is used as a layout file wrapping all of the application HTML files (so there is no need to retype the same commands in all HTML view files, e.g., style sheet link tags, JavaScript link tags, etc.). The next step involves creating the other views needed, and in each view the objects passed from the server are then used to make them available to be displayed in a dashboard. The main tool that was used to represent the data in this Dashboard application is D3.js [12] which is a well-regarded JavaScript library due to its ability to visualize data in a clear and easy way. It is used for manipulating documents based on data. D3 helps you bring data to life using HTML, SVG and CSS. D3's emphasis on web

standards provides the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation [13].

Since D3 is a JavaScript library and uses the same concepts of DOM manipulation as JavaScript, this simplified the process of creating the visualizations required for the dashboards. All libraries are defined and accessed in the *layout.erb* file as show in Figure 3.7.

```
<html>
<head>
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
  <title>UNM Dashboard</title>
  <link rel="shortcut icon" href="https://webcore.unm.edu/v1/images/unm.ico" />
  <link rel="stylesheet" href="/stylesheets/main.css" type="text/css" charset="utf-8"/>

  <script src="//cdnjs.cloudflare.com/ajax/libs/d3/3.4.8/d3.min.js"></script>
  <script src="//cdnjs.cloudflare.com/ajax/libs/d3-tip/0.6.3/d3-tip.min.js"></script>
  <script src="//cdnjs.cloudflare.com/ajax/libs/jquery/2.1.1/jquery.min.js"></script>
  <link rel="stylesheet" href="//code.jquery.com/ui/1.10.4/themes/smoothness/jquery-
ui.css">
  <script src="//code.jquery.com/jquery-1.10.2.js"></script>
  <script src="//code.jquery.com/ui/1.10.4/jquery-ui.js"></script>
</head>
<body>
  <div class="container">
    <%= yield %>
  </div>
</body>
</html>
```

Figure 3.7 – Dashboard *Layout.erb* File

Chapter 4

Examples

4.1 First Time Full Time Freshman Cohorts

The cohort management system dashboard that was built in this application using the dashboard application is shown in Figure 4.1.

As described in Chapter 3, the REST interface is used to extract data from UNM databases and JavaScript libraries (D3 and jQuery) are used to implement the graphs shown in Figure 4.1. First the total number of FTFT freshman students enrolled at UNM each year is used to calculate and display the various ethnic distributions by cohort. This is organized on the top of the application dashboard page to make it easier to compare between different years and calculate differences in ethnicity groups enrolled each year.

Then, another set of requests are used to pull graduation rates for these students cohorts. For each year (from 2006 until present) the set of students (FTFT freshman students) who enrolled at UNM is gathered and their graduation rates are computed. This information is used to display the different percentages of students graduating from a given FTFT freshman cohort in a given year, as shown in Figure 4.2.

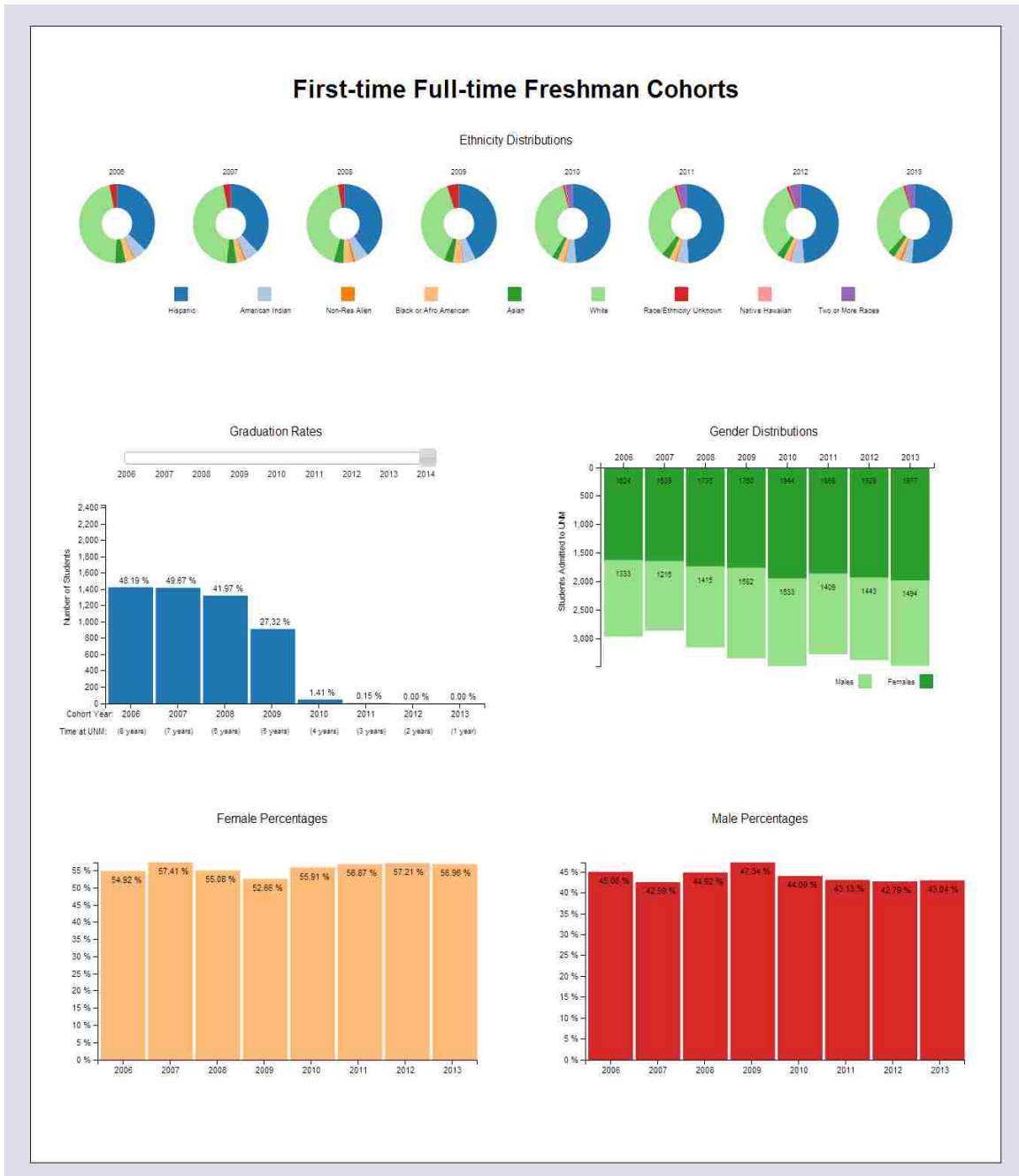


Figure 4.1 - Cohort Management for FTFT Freshman Students

By default the dashboard initially shows the total graduation rates for each cohort in the year 2014. The application also provide a slider bar so the viewer can scroll back in time and check cohort graduation rates at previous points in time.

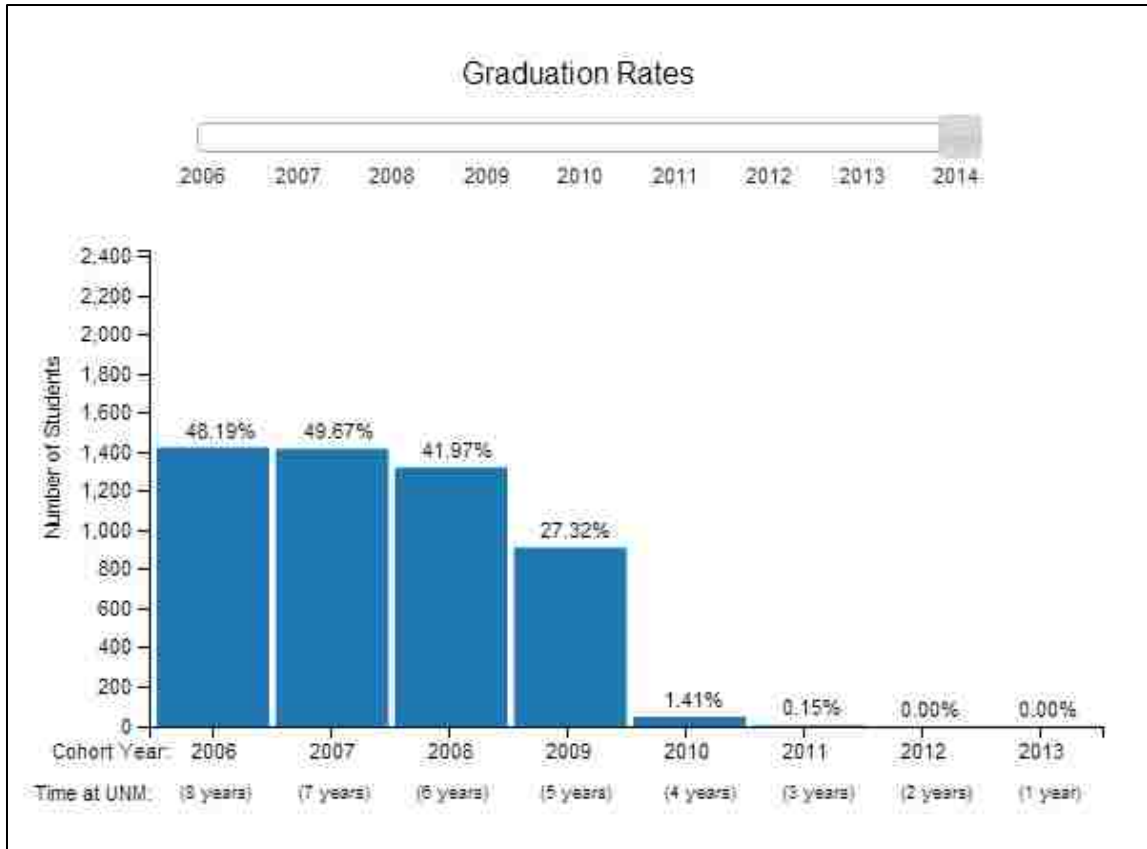


Figure 4.2 - FTFT Freshman Students Graduation Rates

This provides a very useful visualization as it allows one to track the performance of a given cohort through the years. This slider also allows one to compare the actual graduations rates with different models and see how many students are on track and how many may have delayed graduations. Below the graph there is the cohort year and how many years the student cohort have spent at UNM (Time at UNM), to make it easier for the viewer to see the 4,5, or 6 year graduation rates which are important to see the progress of students. On y-axis, the number of students is shown to provide a better view of how many of the total students graduated, and on the other hand, if the viewer hovers the mouse over the bar a message shows the exact number of students that graduated by

that year. In addition, the dashboard shows the percentages of each cohort that graduated in the current year chosen by the slider. In Figure 4.3, the difference in graduation rates can be seen as the slider is changed to select the year.

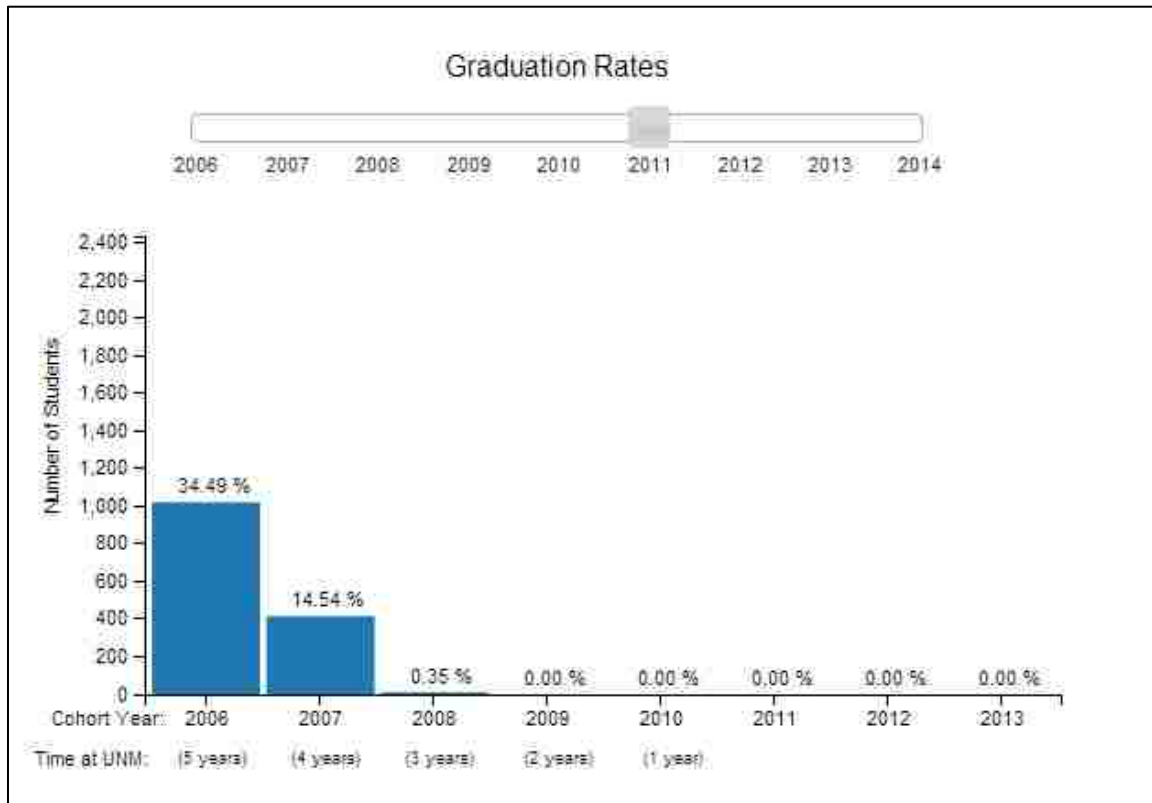


Figure 4.3 - FTFT Freshman Students Graduation Rates Until 2011

The same process was used to visualize the gender distributions by cohort. This helps in understanding the different graduation rates in each year. Figure 4.4 shows these gender distributions

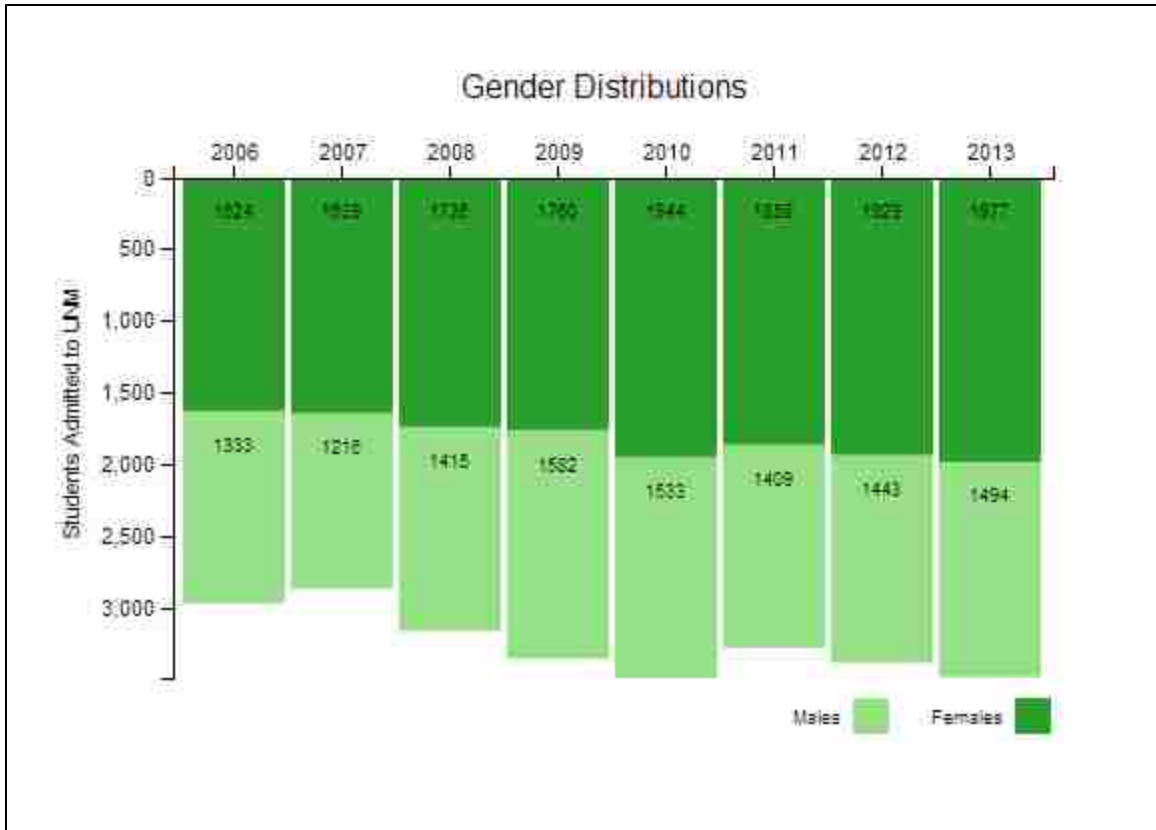


Figure 4.4 – FTFT Freshman Gender Distributions

For each year the gender distribution is shown and total number of each gender is written on each bar. Hovering over each bar will show the total number of students enrolled in that cohort.

4.2 Transfer Students Cohorts

This cohort management system view is similar to the FTFT freshman cohort management one explained in Section 4.1, but this application view uses transfer students. Following the same procedures explained in Section 4.1, first the total number

of transfer students is pulled from the database and used to compute the graduation rates. Next, the number of transfer students is pulled and the percentage that graduated is calculated using the total number of students as base value. Using the same algorithms used in the FTFT freshman cohorts to calculate the graduation rates and distribution of gender and ethnicity groups. Figure 4.5 shows all these measurements and calculations for this cohort management view.

As shown in the Figure 4.5, the dashboard processes data and presents it in the same manner and view shown in Figure 4.1, this gives the flexibility to implement as many different cohorts as needed by just changing the type of queries ran against the UNM databases. For example, if another cohort management view is needed, the only configuration needed is to add the new routes for in the REST interface to configure the appropriate SQL queries needed to pull the required data from the database. In addition, a new route is needed in the dashboard *Server.rb* file to instruct the dashboard interface to accept HTTP GET requests specifying this cohort view. Similar configurations of the route in the *Server.rb* file can be used to pull required data from the REST interface and then manipulate it to provide the needed calculations for data visualization. The last step is to create an ERB HTML view file that can use the data gathered and manipulated by the *Server.rb* file and generate the required graphs to visualize the data.

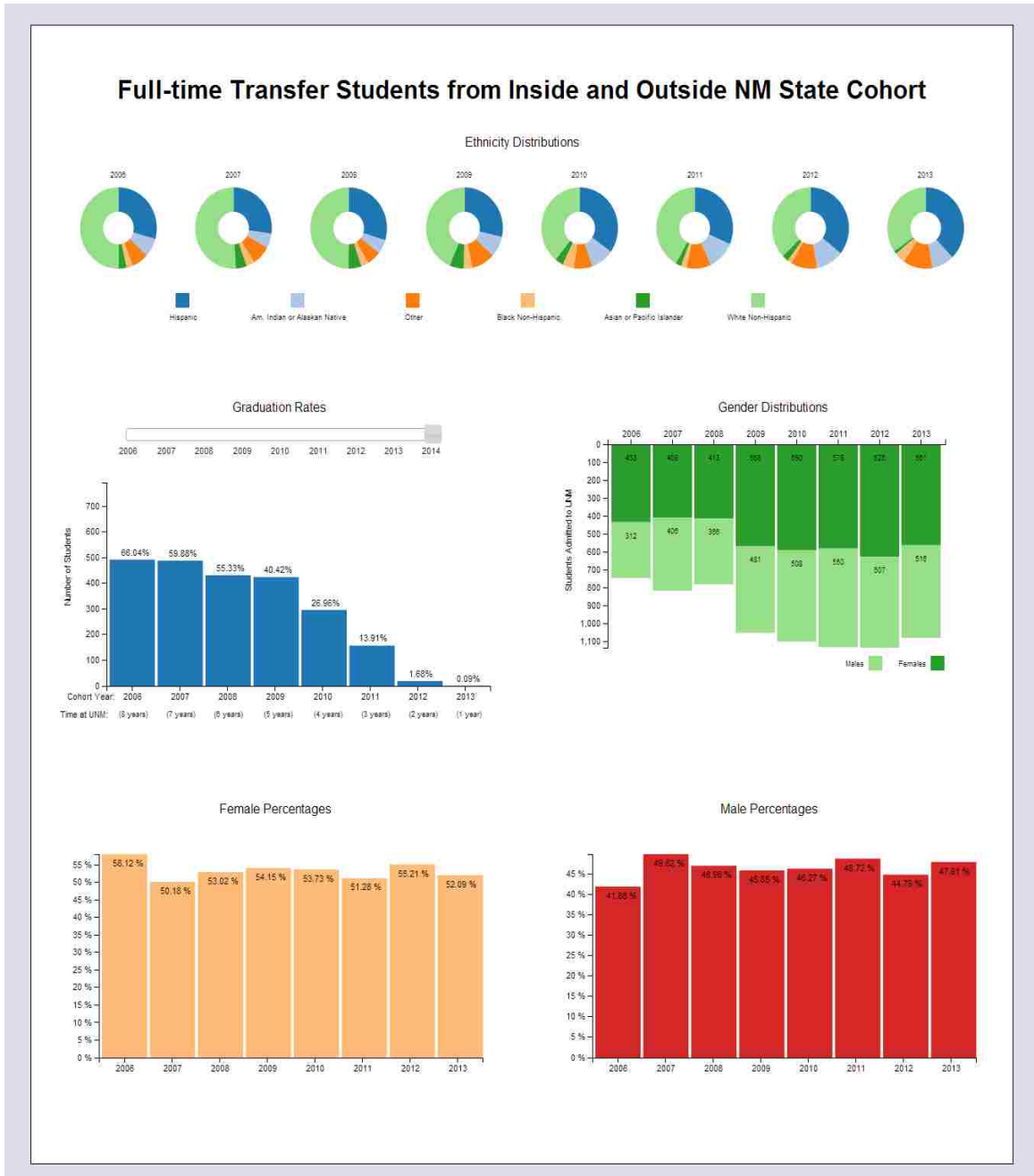


Figure 4.5 - Cohort Management for Transferred Students

Chapter 5

Discussion

5.1 Summary

The work done in this thesis aimed on the process of accessing student data and analyzing it, then using this data to provide visualization of the data and present students' performance in order to determine if they are facing difficulties or delays in their academic years. As a solution provided by this thesis, two web applications were built using Sinatra software framework and different JavaScript libraries. Two virtual machines were created and used in the UNM local data center. The first application was built to serve all REST requests from any user or service requiring access to UNM student data stores. This application (called REST interface) is used to establish a connection to UNM student data mart database and query the tables inside it to pull data as required. The data returned from the database is then parsed and rendered as JavaScript Object Notation (JSON) to be returned to the requesting service. The second application (called dashboard) was built to visualize the data returned from the REST interface in an easy way to provide better understanding of student data. This application was built using Sinatra web framework as well. This dashboard application was configured to accept specific URLs from users and process them. Depending on the requested URL, the required data is pulled from the student data mart database (using the REST interface). Next, the dashboard uses the returned data from the REST interface to analyze and compute the parameters needed to do the visualization. This application

relies on JavaScript libraries (e.g., D3 and jQuery) to do the visualization. The results of these computations are used to implement the graphs shown in Chapter 4.

5.2 Future Work

The architecture described in this thesis provides a foundation that many dashboard applications can be built on top of. For instance, we can use this framework to provide dashboards related to graduation rates per colleges, departments, and programs. Also, this framework can be used to process and analyze student data in order to obtain better understanding of student performance specific courses and terms. Furthermore, the students Sankey diagrams [16] can be integrated into this project to use live students data through the REST interface.

Another important future planned work is to integrate the work done in this thesis with other projects implemented at UNM to better understand data related to specific students. This will also provide a new tool for students to keep track of their progress and better plan for their academic years at UNM.

Finally, implementing graduation predictions in the graduation rates graph will be implemented in the future to better present the differences between the predicted rates and the actual graduation rates for all cohorts.

Appendix A

A.1 Figure A.1 - REST interface *Server.rb* file

```

require 'sinatra'
require 'rubygems'
require 'json'
require 'oci8'
require 'sinatra/config_file'

config_file 'config.yml'

set :port, 8080

get '/college/:college/:start/:end' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @college = params["college"]
  @start_date = params["start"]
  @end_date = params["end"]

  query = []
  connection.exec("select p.college_code_desc, a.student_id, c.academic_period from
unm_oia_student.course_dim p,unm_oia_student.student_enrollment_fact a,
unm_oia_student.academic_calendar_dim c where (p.college_code_desc = '#{@college}' AND
a.time_key = c.time_key AND a.course_key = p.course_key AND c.academic_period >=
 '#{@start_date}' AND c.academic_period <= '#{@end_date}'))" do |r| query << r;end

  a = ["College Name", "Student ID", "Academic Period"]
  string = query.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end

get '/college/:college' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @college = params["college"]

  query = []
  connection.exec("select p.college_code_desc, a.student_id from
unm_oia_student.course_dim p,unm_oia_student.student_enrollment_fact a where
(p.college_code_desc = '#{@college}' AND a.course_key = a.course_key AND ROWNUM <=
15)") do |r| query << r;end

  a = ["College Name", "Student ID"]
  string = query.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end

get '/dept/:college/:dept/:start/:end' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @college = params["college"]
  @dept = params["dept"]

```



```

    @start_date = params["start"]
    @end_date = params["end"]
end

get '/dept/:college/:dept' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @college = params["college"]
  @dept = params["dept"]
end

get '/program/:program/:start/:end' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @program = params["program"]
  @start_date = params["start"]
  @end_date = params["end"]

  query = []
  connection.exec("select p.program_code_desc, a.student_id, c.academic_period from
unm_oia_student.student_dim p,unm_oia_student.student_enrollment_fact a,
unm_oia_student.academic_calendar_dim c where (p.program_code_desc = '#{@program}' AND
p.student_key = a.student_key AND c.academic_period >= '#{@start_date}' AND
c.academic_period <= '#{@end_date}' AND ROWNUM <= 15)") do |r| query << r;end

  a = ["Program Name", "Student ID", "Academic Period"]
  string = query.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end

get '/program/:program' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @program = params["program"]

  query = []
  connection.exec("select p.program_code_desc, a.student_id from
unm_oia_student.student_dim p,unm_oia_student.student_enrollment_fact a where
(p.program_code_desc = '#{@program}' AND p.student_key = a.student_key AND ROWNUM <=
15)") do |r| query << r;end

  a = ["Program Name", "Student ID"]
  string = query.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end

get '/students/:start/:end' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @start_date = params["start"]
  @end_date = params["end"]
end

get '/student' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
end

get '/ftftfm/graduation/:period' do
  connection = OCI8.new(settings.username, settings.password, settings.database)
  @period = params["period"]
  q = []

```

```

    connection.exec("select b.academic_period_graduation
from unm_oia_student.begfresh_degr13 a,unm_oia_student.degreesawarded_fact b
where a.entrysem = #{@period} and
a.ftsem01 = 1 and
a.deceased_status = 'N' and
a.person_uid = b.person_uid and
b.status_code = 'AW' and
b.award_category = 24
") do |r| q << r;end
  a = ["graduation_period"]
  string = q.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end

get '/ftftfm/all/:period' do
connection = OCI8.new(settings.username, settings.password, settings.database)
  @period = params["period"]
  q = []
  connection.exec("select gender,ipeds_values_desc
from unm_oia_student.begfresh_degr13
where entrysem = #{@period} and
ftsem01 = 1
") do |r| q << r;end
  a = ["gender", "ethnicity"]
  string = q.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end

get '/transfer/ftftfm/graduation/:period' do
connection = OCI8.new(settings.username, settings.password, settings.database)
  @period = params["period"]
  q = []
  connection.exec("select academic_period_graduation from
unm_oia_student.degreesawarded_fact where student_id IN (
select distinct student_id
from unm_oia_student.student_dim
where ACADEMIC_PERIOD = #{@period} and STUDENT_POPULATION in ('T', 'U') and
current_time_status_code = 'FT' and
first_major_campus_code = 'ABQ' and enrolled_ind = 'Y' and registered_ind = 'Y'
)
and graduated_ind = 'Y'
") do |r| q << r;end
  a = ["graduation_period"]
  string = q.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end

get '/transfer/ftftfm/all/:period' do
connection = OCI8.new(settings.username, settings.password, settings.database)
  @period = params["period"]
  q = []
  connection.exec("select gender, PRIM_ETHNICITY_CATEGORY_DESC from
unm_oia_student.person_dim where person_id IN (
select distinct student_id
from unm_oia_student.student_dim

```

```
where ACADEMIC_PERIOD = #{@period} and STUDENT_POPULATION in ('T', 'U') and
current_time_status_code = 'FT' and
first_major_campus_code = 'ABQ' and enrolled_ind = 'Y' and registered_ind = 'Y'
)
") do |r| q << r;end
  a = ["gender", "ethnicity"]
  string = q.map{|q| Hash[ a.zip(q) ] }
  string.to_json
end
```

A.2 Figure A.2 - Dashboard interface *Server.rb* file

```
require 'rubygems'
require 'sinatra'
require 'json'
require 'oci8'
require 'rest_client'
require 'csv'
require 'redis'

set :port, 4567

get '/' do

  @colleges = ["College of Fine Arts",
"School of Engineering",
"College of Arts and Sciences",
"College of Education",
"School of Arch. and Planning",
"College of Nursing",
"School of Medicine",
"Anderson Schools of Management",
"School of Law",
"University College",
"Provost Academic/Admin",
"College of Pharmacy",
"Associate Degree",
"University Studies",
"Continuing Education"]

  erb :main
end

get '/index' do

  erb :index
end

get '/2014' do

  redis = Redis.new

@chk_q200680 = redis.get("q200680")
  if @chk_q200680
    t1 = redis.get("q200680")
    @q200680 = JSON.parse(t1)
  else
    response0 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/graduation/20063',
:accept => :json
    redis.set("q200680", response0)
#   redis.expire("q200680", 5259490)
    t1 = redis.get("q200680")
    @q200680 = JSON.parse(t1)
  end
end
```

```

@chk_q200780 = redis.get("q200780")
  if @chk_q200780
    t2 = redis.get("q200780")
    @q200780 = JSON.parse(t2)
  else
    response1 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/graduation/20073',
:accept => :json
    redis.set("q200780", response1)
#   redis.expire("q200780", 5259490)
    t2 = redis.get("q200780")
    @q200780 = JSON.parse(t2)
  end

@chk_q200880 = redis.get("q200880")
  if @chk_q200880
    t3 = redis.get("q200880")
    @q200880 = JSON.parse(t3)
  else
    response2 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/graduation/20083',
:accept => :json
    redis.set("q200880", response2)
#   redis.expire("q200880", 5259490)
    t3 = redis.get("q200880")
    @q200880 = JSON.parse(t3)
  end

@chk_q200980 = redis.get("q200980")
  if @chk_q200980
    t4 = redis.get("q200980")
    @q200980 = JSON.parse(t4)
  else
    response3 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/graduation/20093',
:accept => :json
    redis.set("q200980", response3)
#   redis.expire("q200980", 5259490)
    t4 = redis.get("q200980")
    @q200980 = JSON.parse(t4)
  end

@chk_q201080 = redis.get("q201080")
  if @chk_q201080
    t5 = redis.get("q201080")
    @q201080 = JSON.parse(t5)
  else
    response4 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/graduation/20103',
:accept => :json
    redis.set("q201080", response4)
#   redis.expire("q201080", 5259490)
    t5 = redis.get("q201080")
    @q201080 = JSON.parse(t5)
  end

@chk_q201180 = redis.get("q201180")
  if @chk_q201180
    t6 = redis.get("q201180")
    @q201180 = JSON.parse(t6)
  else
    response5 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/graduation/20113',
:accept => :json
    redis.set("q201180", response5)
#   redis.expire("q201180", 5259490)

```

```

    @q201180 = redis.get("q201180")
    @q201180 = JSON.parse(t6)
  end

@chk_q201280 = redis.get("q201280")
  if @chk_q201280
    t7 = redis.get("q201280")
    @q201280 = JSON.parse(t7)
  else
    response6 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/graduation/20123',
:accept => :json
    redis.set("q201280", response6)
#   redis.expire("q201280", 5259490)
    t7 = redis.get("q201280")
    @q201280 = JSON.parse(t7)
  end

@chk_q201380 = redis.get("q201380")
  if @chk_q201380
    t8 = redis.get("q201380")
    @q201380 = JSON.parse(t8)
  else
    response7 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/graduation/20133',
:accept => :json
    redis.set("q201380", response7)
#   redis.expire("q201380", 5259490)
    t8 = redis.get("q201380")
    @q201380 = JSON.parse(t8)
  end

@chk_all200680 = redis.get("all200680")
  if @chk_all200680
    t9 = redis.get("all200680")
    @all200680 = JSON.parse(t9)
  else
    response9 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/all/20063', :accept =>
:json
    redis.set("all200680", response9)
#   redis.expire("all200680", 5259490)
    t9 = redis.get("all200680")
    @all200680 = JSON.parse(t9)
  end

@chk_all200780 = redis.get("all200780")
  if @chk_all200780
    t10 = redis.get("all200780")
    @all200780 = JSON.parse(t10)
  else
    response10 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/all/20073', :accept =>
:json
    redis.set("all200780", response10)
#   redis.expire("all200780", 5259490)
    t10 = redis.get("all200780")
    @all200780 = JSON.parse(t10)
  end

@chk_all200880 = redis.get("all200880")
  if @chk_all200880
    t11 = redis.get("all200880")
    @all200880 = JSON.parse(t11)
  else

```

```

    response11 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/all/20083', :accept =>
:json
    redis.set("all200880", response11)
#   redis.expire("all200880", 5259490)
    t11 = redis.get("all200880")
    @all200880 = JSON.parse(t11)
  end

@chk_all200980 = redis.get("all200980")
  if @chk_all200980
    t12 = redis.get("all200980")
    @all200980 = JSON.parse(t12)
  else
    response12 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/all/20093', :accept =>
:json
    redis.set("all200980", response12)
#   redis.expire("all200980", 5259490)
    t12 = redis.get("all200980")
    @all200980 = JSON.parse(t12)
  end

@chk_all201080 = redis.get("all201080")
  if @chk_all201080
    t13 = redis.get("all201080")
    @all201080 = JSON.parse(t13)
  else
    response13 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/all/20103', :accept =>
:json
    redis.set("all201080", response13)
#   redis.expire("all201080", 5259490)
    t13 = redis.get("all201080")
    @all201080 = JSON.parse(t13)
  end

@chk_all201180 = redis.get("all201180")
  if @chk_all201180
    t14 = redis.get("all201180")
    @all201180 = JSON.parse(t14)
  else
    response14 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/all/20113', :accept =>
:json
    redis.set("all201180", response14)
#   redis.expire("all201180", 5259490)
    t14 = redis.get("all201180")
    @all201180 = JSON.parse(t14)
  end

@chk_all201280 = redis.get("all201280")
  if @chk_all201280
    t15 = redis.get("all201280")
    @all201280 = JSON.parse(t15)
  else
    response15 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/all/20123', :accept =>
:json
    redis.set("all201280", response15)
#   redis.expire("all201280", 5259490)
    t15 = redis.get("all201280")
    @all201280 = JSON.parse(t15)
  end

@chk_all201380 = redis.get("all201380")

```

```

if @chk_all201380
  t16 = redis.get("all201380")
  @all201380 = JSON.parse(t16)
else
  response16 = RestClient.get 'http://oias.unm.edu:8080/ftftfm/all/20133', :accept =>
:json
  redis.set("all201380", response16)
#   redis.expire("all201380", 5259490)
  t16 = redis.get("all201380")
  @all201380 = JSON.parse(t16)
end

  @q200680_grad200680 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200680" ? memo+1 : memo }
  @q200680_grad200780 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200780" ? memo+1 : memo }
  @q200680_grad200880 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200880" ? memo+1 : memo }
  @q200680_grad200980 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
  @q200680_grad201080 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
  @q200680_grad201180 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
  @q200680_grad201280 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
  @q200680_grad201380 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

  @q200780_grad200680 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200680" ? memo+1 : memo }
  @q200780_grad200780 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200780" ? memo+1 : memo }
  @q200780_grad200880 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200880" ? memo+1 : memo }
  @q200780_grad200980 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
  @q200780_grad201080 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
  @q200780_grad201180 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
  @q200780_grad201280 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
  @q200780_grad201380 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

  @q200880_grad200680 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200680" ? memo+1 : memo }
  @q200880_grad200780 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200780" ? memo+1 : memo }
  @q200880_grad200880 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200880" ? memo+1 : memo }
  @q200880_grad200980 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
  @q200880_grad201080 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
  @q200880_grad201180 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
  @q200880_grad201280 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }

```



```

    @q201280_grad200980 = @q201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
    @q201280_grad201080 = @q201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
    @q201280_grad201180 = @q201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
    @q201280_grad201280 = @q201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
    @q201280_grad201380 = @q201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

    @q201380_grad200680 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200680" ? memo+1 : memo }
    @q201380_grad200780 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200780" ? memo+1 : memo }
    @q201380_grad200880 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200880" ? memo+1 : memo }
    @q201380_grad200980 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
    @q201380_grad201080 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
    @q201380_grad201180 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
    @q201380_grad201280 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
    @q201380_grad201380 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

    @m200680 = @all200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m200780 = @all200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m200880 = @all200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m200980 = @all200980.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m201080 = @all201080.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m201180 = @all201180.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m201280 = @all201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m201380 = @all201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }

    @f200680 = @all200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f200780 = @all200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f200880 = @all200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f200980 = @all200980.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f201080 = @all201080.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f201180 = @all201180.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f201280 = @all201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }

```

```

    @f201380 = @all201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }

    @e1_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }

    @e2_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="American Indian" ? memo+1 : memo }
    @e2_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="American Indian" ? memo+1 : memo }
    @e2_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="American Indian" ? memo+1 : memo }
    @e2_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="American Indian" ? memo+1 : memo }
    @e2_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="American Indian" ? memo+1 : memo }
    @e2_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="American Indian" ? memo+1 : memo }
    @e2_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="American Indian" ? memo+1 : memo }
    @e2_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="American Indian" ? memo+1 : memo }

    @e3_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Non-
Res Alien" ? memo+1 : memo }
    @e3_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Non-
Res Alien" ? memo+1 : memo }
    @e3_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Non-
Res Alien" ? memo+1 : memo }
    @e3_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Non-
Res Alien" ? memo+1 : memo }
    @e3_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Non-
Res Alien" ? memo+1 : memo }
    @e3_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Non-
Res Alien" ? memo+1 : memo }
    @e3_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Non-
Res Alien" ? memo+1 : memo }
    @e3_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Non-
Res Alien" ? memo+1 : memo }

    @e4_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
or Afro American" ? memo+1 : memo }
    @e4_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
or Afro American" ? memo+1 : memo }
    @e4_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
or Afro American" ? memo+1 : memo }

```

```

    @e4_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
or Afro American" ? memo+1 : memo }
    @e4_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
or Afro American" ? memo+1 : memo }
    @e4_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
or Afro American" ? memo+1 : memo }
    @e4_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
or Afro American" ? memo+1 : memo }
    @e4_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
or Afro American" ? memo+1 : memo }

    @e5_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian"
? memo+1 : memo }
    @e5_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian"
? memo+1 : memo }
    @e5_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian"
? memo+1 : memo }
    @e5_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian"
? memo+1 : memo }
    @e5_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian"
? memo+1 : memo }
    @e5_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian"
? memo+1 : memo }
    @e5_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian"
? memo+1 : memo }
    @e5_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian"
? memo+1 : memo }

    @e6_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White"
? memo+1 : memo }
    @e6_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White"
? memo+1 : memo }
    @e6_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White"
? memo+1 : memo }
    @e6_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White"
? memo+1 : memo }
    @e6_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White"
? memo+1 : memo }
    @e6_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White"
? memo+1 : memo }
    @e6_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White"
? memo+1 : memo }
    @e6_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White"
? memo+1 : memo }

    @e7_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Race/Ethnicity Unknown" ? memo+1 : memo }
    @e7_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Race/Ethnicity Unknown" ? memo+1 : memo }
    @e7_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Race/Ethnicity Unknown" ? memo+1 : memo }
    @e7_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Race/Ethnicity Unknown" ? memo+1 : memo }
    @e7_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Race/Ethnicity Unknown" ? memo+1 : memo }
    @e7_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Race/Ethnicity Unknown" ? memo+1 : memo }
    @e7_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Race/Ethnicity Unknown" ? memo+1 : memo }
    @e7_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Race/Ethnicity Unknown" ? memo+1 : memo }

```

```

    @e8_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Native
Hawaiian" ? memo+1 : memo }
    @e8_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Native
Hawaiian" ? memo+1 : memo }
    @e8_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Native
Hawaiian" ? memo+1 : memo }
    @e8_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Native
Hawaiian" ? memo+1 : memo }
    @e8_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Native
Hawaiian" ? memo+1 : memo }
    @e8_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Native
Hawaiian" ? memo+1 : memo }
    @e8_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Native
Hawaiian" ? memo+1 : memo }
    @e8_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Native
Hawaiian" ? memo+1 : memo }

    @e9_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Two or
More Races" ? memo+1 : memo }
    @e9_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Two or
More Races" ? memo+1 : memo }
    @e9_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Two or
More Races" ? memo+1 : memo }
    @e9_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Two or
More Races" ? memo+1 : memo }
    @e9_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Two or
More Races" ? memo+1 : memo }
    @e9_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Two or
More Races" ? memo+1 : memo }
    @e9_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Two or
More Races" ? memo+1 : memo }
    @e9_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Two or
More Races" ? memo+1 : memo }

    erb :cohort
end

get '/transfer' do

  redis = Redis.new

  @chk_q200680 = redis.get("q_200680")
  if @chk_q200680
    t1 = redis.get("q_200680")
    @q200680 = JSON.parse(t1)
  else
    response0 = RestClient.get
'http://oias.unm.edu:8080/transfer/ftftfm/graduation/200680', :accept => :json
    redis.set("q_200680", response0)
#    redis.expire("q_200680", 5259490)
    t1 = redis.get("q_200680")
    @q200680 = JSON.parse(t1)
  end

  @chk_q200780 = redis.get("q_200780")
  if @chk_q200780
    t2 = redis.get("q_200780")
    @q200780 = JSON.parse(t2)
  end
end

```

```

else
  response1 = RestClient.get
'http://oias.unm.edu:8080/transfer/ftftfm/graduation/200780', :accept => :json
  redis.set("q_200780", response1)
#   redis.expire("q_200780", 5259490)
  t2 = redis.get("q_200780")
  @q200780 = JSON.parse(t2)
end

@chk_q200880 = redis.get("q_200880")
if @chk_q200880
  t3 = redis.get("q_200880")
  @q200880 = JSON.parse(t3)
else
  response2 = RestClient.get
'http://oias.unm.edu:8080/transfer/ftftfm/graduation/200880', :accept => :json
  redis.set("q_200880", response2)
#   redis.expire("q_200880", 5259490)
  t3 = redis.get("q_200880")
  @q200880 = JSON.parse(t3)
end

@chk_q200980 = redis.get("q_200980")
if @chk_q200980
  t4 = redis.get("q_200980")
  @q200980 = JSON.parse(t4)
else
  response3 = RestClient.get
'http://oias.unm.edu:8080/transfer/ftftfm/graduation/200980', :accept => :json
  redis.set("q_200980", response3)
#   redis.expire("q_200980", 5259490)
  t4 = redis.get("q_200980")
  @q200980 = JSON.parse(t4)
end

@chk_q201080 = redis.get("q_201080")
if @chk_q201080
  t5 = redis.get("q_201080")
  @q201080 = JSON.parse(t5)
else
  response4 = RestClient.get
'http://oias.unm.edu:8080/transfer/ftftfm/graduation/201080', :accept => :json
  redis.set("q_201080", response4)
#   redis.expire("q_201080", 5259490)
  t5 = redis.get("q_201080")
  @q201080 = JSON.parse(t5)
end

@chk_q201180 = redis.get("q_201180")
if @chk_q201180
  t6 = redis.get("q_201180")
  @q201180 = JSON.parse(t6)
else
  response5 = RestClient.get
'http://oias.unm.edu:8080/transfer/ftftfm/graduation/201180', :accept => :json
  redis.set("q_201180", response5)
#   redis.expire("q_201180", 5259490)
  @q201180 = redis.get("q_201180")
  @q201180 = JSON.parse(t6)
end
end

```

```

@chk_q201280 = redis.get("q_201280")
  if @chk_q201280
    t7 = redis.get("q_201280")
    @q201280 = JSON.parse(t7)
  else
    response6 = RestClient.get
'http://oias.unm.edu:8080/transfer/ftftfm/graduation/201280', :accept => :json
    redis.set("q_201280", response6)
#   redis.expire("q_201280", 5259490)
    t7 = redis.get("q_201280")
    @q201280 = JSON.parse(t7)
  end

@chk_q201380 = redis.get("q_201380")
  if @chk_q201380
    t8 = redis.get("q_201380")
    @q201380 = JSON.parse(t8)
  else
    response7 = RestClient.get
'http://oias.unm.edu:8080/transfer/ftftfm/graduation/201380', :accept => :json
    redis.set("q_201380", response7)
#   redis.expire("q_201380", 5259490)
    t8 = redis.get("q_201380")
    @q201380 = JSON.parse(t8)
  end

@chk_all200680 = redis.get("all_200680")
  if @chk_all200680
    t9 = redis.get("all_200680")
    @all200680 = JSON.parse(t9)
  else
    response9 = RestClient.get 'http://oias.unm.edu:8080/transfer/ftftfm/all/200680',
:accept => :json
    redis.set("all_200680", response9)
#   redis.expire("all_200680", 5259490)
    t9 = redis.get("all_200680")
    @all200680 = JSON.parse(t9)
  end

@chk_all200780 = redis.get("all_200780")
  if @chk_all200780
    t10 = redis.get("all_200780")
    @all200780 = JSON.parse(t10)
  else
    response10 = RestClient.get 'http://oias.unm.edu:8080/transfer/ftftfm/all/200780',
:accept => :json
    redis.set("all_200780", response10)
#   redis.expire("all_200780", 5259490)
    t10 = redis.get("all_200780")
    @all200780 = JSON.parse(t10)
  end

@chk_all200880 = redis.get("all_200880")
  if @chk_all200880
    t11 = redis.get("all_200880")
    @all200880 = JSON.parse(t11)
  else
    response11 = RestClient.get 'http://oias.unm.edu:8080/transfer/ftftfm/all/200880',
:accept => :json
    redis.set("all_200880", response11)
#   redis.expire("all_200880", 5259490)

```

```

    t11 = redis.get("all_200880")
    @all200880 = JSON.parse(t11)
  end

@chk_all200980 = redis.get("all_200980")
  if @chk_all200980
    t12 = redis.get("all_200980")
    @all200980 = JSON.parse(t12)
  else
    response12 = RestClient.get 'http://oias.unm.edu:8080/transfer/ftftfm/all/200980',
:accept => :json
    redis.set("all_200980", response12)
#   redis.expire("all_200980", 5259490)
    t12 = redis.get("all_200980")
    @all200980 = JSON.parse(t12)
  end

@chk_all201080 = redis.get("all_201080")
  if @chk_all201080
    t13 = redis.get("all_201080")
    @all201080 = JSON.parse(t13)
  else
    response13 = RestClient.get 'http://oias.unm.edu:8080/transfer/ftftfm/all/201080',
:accept => :json
    redis.set("all_201080", response13)
#   redis.expire("all_201080", 5259490)
    t13 = redis.get("all_201080")
    @all201080 = JSON.parse(t13)
  end

@chk_all201180 = redis.get("all_201180")
  if @chk_all201180
    t14 = redis.get("all_201180")
    @all201180 = JSON.parse(t14)
  else
    response14 = RestClient.get 'http://oias.unm.edu:8080/transfer/ftftfm/all/201180',
:accept => :json
    redis.set("all_201180", response14)
#   redis.expire("all_201180", 5259490)
    t14 = redis.get("all_201180")
    @all201180 = JSON.parse(t14)
  end

@chk_all201280 = redis.get("all_201280")
  if @chk_all201280
    t15 = redis.get("all_201280")
    @all201280 = JSON.parse(t15)
  else
    response15 = RestClient.get 'http://oias.unm.edu:8080/transfer/ftftfm/all/201280',
:accept => :json
    redis.set("all_201280", response15)
#   redis.expire("all_201280", 5259490)
    t15 = redis.get("all_201280")
    @all201280 = JSON.parse(t15)
  end

@chk_all201380 = redis.get("all_201380")
  if @chk_all201380
    t16 = redis.get("all_201380")
    @all201380 = JSON.parse(t16)
  else

```



```

response16 = RestClient.get 'http://oias.unm.edu:8080/transfer/ftftfm/all/201380',
:accept => :json
redis.set("all_201380", response16)
# redis.expire("all_201380", 5259490)
t16 = redis.get("all_201380")
@all201380 = JSON.parse(t16)
end

@q200680_grad200680 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200680" ? memo+1 : memo }
@q200680_grad200780 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200780" ? memo+1 : memo }
@q200680_grad200880 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200880" ? memo+1 : memo }
@q200680_grad200980 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
@q200680_grad201080 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
@q200680_grad201180 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
@q200680_grad201280 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
@q200680_grad201380 = @q200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

@q200780_grad200680 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200680" ? memo+1 : memo }
@q200780_grad200780 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200780" ? memo+1 : memo }
@q200780_grad200880 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200880" ? memo+1 : memo }
@q200780_grad200980 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
@q200780_grad201080 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
@q200780_grad201180 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
@q200780_grad201280 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
@q200780_grad201380 = @q200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

@q200880_grad200680 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200680" ? memo+1 : memo }
@q200880_grad200780 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200780" ? memo+1 : memo }
@q200880_grad200880 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200880" ? memo+1 : memo }
@q200880_grad200980 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
@q200880_grad201080 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
@q200880_grad201180 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
@q200880_grad201280 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
@q200880_grad201380 = @q200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

```



```

    @q201280_grad201180 = @q201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
    @q201280_grad201280 = @q201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
    @q201280_grad201380 = @q201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

    @q201380_grad200680 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200680" ? memo+1 : memo }
    @q201380_grad200780 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200780" ? memo+1 : memo }
    @q201380_grad200880 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200880" ? memo+1 : memo }
    @q201380_grad200980 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"200980" ? memo+1 : memo }
    @q201380_grad201080 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201080" ? memo+1 : memo }
    @q201380_grad201180 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201180" ? memo+1 : memo }
    @q201380_grad201280 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201280" ? memo+1 : memo }
    @q201380_grad201380 = @q201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e|
e<"201380" ? memo+1 : memo }

    @m200680 = @all200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m200780 = @all200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m200880 = @all200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m200980 = @all200980.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m201080 = @all201080.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m201180 = @all201180.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m201280 = @all201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }
    @m201380 = @all201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="M" ?
memo+1 : memo }

    @f200680 = @all200680.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f200780 = @all200780.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f200880 = @all200880.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f200980 = @all200980.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f201080 = @all201080.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f201180 = @all201180.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f201280 = @all201280.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }
    @f201380 = @all201380.map{|v| v.values}.map{|y| y[0]}.inject(0){|memo,e| e=="F" ?
memo+1 : memo }

```

```

    @e1_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }
    @e1_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e|
e=="Hispanic" ? memo+1 : memo }

    @e2_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Am.
Indian or Alaskan Native" ? memo+1 : memo }
    @e2_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Am.
Indian or Alaskan Native" ? memo+1 : memo }
    @e2_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Am.
Indian or Alaskan Native" ? memo+1 : memo }
    @e2_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Am.
Indian or Alaskan Native" ? memo+1 : memo }
    @e2_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Am.
Indian or Alaskan Native" ? memo+1 : memo }
    @e2_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Am.
Indian or Alaskan Native" ? memo+1 : memo }
    @e2_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Am.
Indian or Alaskan Native" ? memo+1 : memo }
    @e2_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Am.
Indian or Alaskan Native" ? memo+1 : memo }

    @e3_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Other"
? memo+1 : memo }
    @e3_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Other"
? memo+1 : memo }
    @e3_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Other"
? memo+1 : memo }
    @e3_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Other"
? memo+1 : memo }
    @e3_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Other"
? memo+1 : memo }
    @e3_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Other"
? memo+1 : memo }
    @e3_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Other"
? memo+1 : memo }
    @e3_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Other"
? memo+1 : memo }

    @e4_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
Non-Hispanic" ? memo+1 : memo }
    @e4_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
Non-Hispanic" ? memo+1 : memo }
    @e4_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
Non-Hispanic" ? memo+1 : memo }
    @e4_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
Non-Hispanic" ? memo+1 : memo }
    @e4_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
Non-Hispanic" ? memo+1 : memo }

```

```

    @e4_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
    Non-Hispanic" ? memo+1 : memo }
    @e4_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
    Non-Hispanic" ? memo+1 : memo }
    @e4_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Black
    Non-Hispanic" ? memo+1 : memo }

    @e5_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian
    or Pacific Islander" ? memo+1 : memo }
    @e5_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian
    or Pacific Islander" ? memo+1 : memo }
    @e5_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian
    or Pacific Islander" ? memo+1 : memo }
    @e5_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian
    or Pacific Islander" ? memo+1 : memo }
    @e5_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian
    or Pacific Islander" ? memo+1 : memo }
    @e5_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian
    or Pacific Islander" ? memo+1 : memo }
    @e5_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian
    or Pacific Islander" ? memo+1 : memo }
    @e5_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="Asian
    or Pacific Islander" ? memo+1 : memo }

    @e6_200680 = @all200680.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White
    Non-Hispanic" ? memo+1 : memo }
    @e6_200780 = @all200780.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White
    Non-Hispanic" ? memo+1 : memo }
    @e6_200880 = @all200880.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White
    Non-Hispanic" ? memo+1 : memo }
    @e6_200980 = @all200980.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White
    Non-Hispanic" ? memo+1 : memo }
    @e6_201080 = @all201080.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White
    Non-Hispanic" ? memo+1 : memo }
    @e6_201180 = @all201180.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White
    Non-Hispanic" ? memo+1 : memo }
    @e6_201280 = @all201280.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White
    Non-Hispanic" ? memo+1 : memo }
    @e6_201380 = @all201380.map{|v| v.values}.map{|y| y[1]}.inject(0){|memo,e| e=="White
    Non-Hispanic" ? memo+1 : memo }

    erb :transfer
end

```

A.3 Figure A.3 - Dashboard interface *Cohort.erb* file (FTFT Freshman Cohorts)

```

<h1> First-time Full-time Freshman Cohorts </h1>

<div class="upper"><p class="box-heading3"> Ethnicity Distributions </p>
  <div class="upper-box1"><p class="box-text">2006</p></div>
  <div class="upper-box2"><p class="box-text">2007</p></div>
  <div class="upper-box3"><p class="box-text">2008</p></div>
  <div class="upper-box4"><p class="box-text">2009</p></div>
  <div class="upper-box5"><p class="box-text">2010</p></div>
  <div class="upper-box6"><p class="box-text">2011</p></div>
  <div class="upper-box7"><p class="box-text">2012</p></div>
  <div class="upper-box8"><p class="box-text">2013</p></div>
<div class="clear"></div>
<div class="upper-legend"></div>
</div>

<div class="clear"></div>

<div class="top-left"><p class="box-heading">Graduation Rates</p> <div class="slider-
box"> <div id="slider"></div> </div> <div class="xaxis_label"> <div
class="xaxis_label_div">Time at UNM:</div> <pre class="xaxis_label_text"> </pre>
</div> </div>
<div class="top-right"><p class="box-heading2">Gender Distributions</p></div>
<div class="clear"></div>
<div class="bottom-left"><p class="box-heading">Female Percentages</p></div>
<div class="bottom-right"><p class="box-heading">Male Percentages</p></div>
<div class="clear"></div>

<style>
svg {
  font: 9px sans-serif;
}
</style>

<script type="text/javascript">

  //Width and height
  var w = 500, width = 141;
  var h = 300, height = 100;
  var radius = Math.min(width, height) / 2;

  var q1 = <%= @q200680.length %>;
  var q2 = <%= @q200780.length %>;
  var q3 = <%= @q200880.length %>;
  var q4 = <%= @q200980.length %>;
  var q5 = <%= @q201080.length %>;
  var q6 = <%= @q201180.length %>;
  var q7 = <%= @q201280.length %>;
  var q8 = <%= @q201380.length %>;

  var a1 = <%= @all200680.length %>;
  var a2 = <%= @all200780.length %>;

```

```

var a3 = <%= @all200880.length %>;
var a4 = <%= @all200980.length %>;
var a5 = <%= @all201080.length %>;
var a6 = <%= @all201180.length %>;
var a7 = <%= @all201280.length %>;
var a8 = <%= @all201380.length %>;

var p1 = d3.format(".2f")((q1/a1)*100);
var p2 = d3.format(".2f")((q2/a2)*100);
var p3 = d3.format(".2f")((q3/a3)*100);
var p4 = d3.format(".2f")((q4/a4)*100);
var p5 = d3.format(".2f")((q5/a5)*100);
var p6 = d3.format(".2f")((q6/a6)*100);
var p7 = d3.format(".2f")((q7/a7)*100);
var p8 = d3.format(".2f")((q8/a8)*100);

var f1 = <%= @f200680 %>;
var f2 = <%= @f200780 %>;
var f3 = <%= @f200880 %>;
var f4 = <%= @f200980 %>;
var f5 = <%= @f201080 %>;
var f6 = <%= @f201180 %>;
var f7 = <%= @f201280 %>;
var f8 = <%= @f201380 %>;

var m1 = <%= @m200680 %>;
var m2 = <%= @m200780 %>;
var m3 = <%= @m200880 %>;
var m4 = <%= @m200980 %>;
var m5 = <%= @m201080 %>;
var m6 = <%= @m201180 %>;
var m7 = <%= @m201280 %>;
var m8 = <%= @m201380 %>;

var pf1 = d3.format(".2f")((f1/a1)*100);
var pf2 = d3.format(".2f")((f2/a2)*100);
var pf3 = d3.format(".2f")((f3/a3)*100);
var pf4 = d3.format(".2f")((f4/a4)*100);
var pf5 = d3.format(".2f")((f5/a5)*100);
var pf6 = d3.format(".2f")((f6/a6)*100);
var pf7 = d3.format(".2f")((f7/a7)*100);
var pf8 = d3.format(".2f")((f8/a8)*100);

var pm1 = d3.format(".2f")((m1/a1)*100);
var pm2 = d3.format(".2f")((m2/a2)*100);
var pm3 = d3.format(".2f")((m3/a3)*100);
var pm4 = d3.format(".2f")((m4/a4)*100);
var pm5 = d3.format(".2f")((m5/a5)*100);
var pm6 = d3.format(".2f")((m6/a6)*100);
var pm7 = d3.format(".2f")((m7/a7)*100);
var pm8 = d3.format(".2f")((m8/a8)*100);

var q1_g06 = <%= @q200680_grad200680 %>;
var q1_g07 = <%= @q200680_grad200780 %>;
var q1_g08 = <%= @q200680_grad200880 %>;
var q1_g09 = <%= @q200680_grad200980 %>;
var q1_g10 = <%= @q200680_grad201080 %>;
var q1_g11 = <%= @q200680_grad201180 %>;
var q1_g12 = <%= @q200680_grad201280 %>;

```

```
var q1_g13 = <%= @q200680_grad201380 %>;

var q2_g06 = <%= @q200780_grad200680 %>;
var q2_g07 = <%= @q200780_grad200780 %>;
var q2_g08 = <%= @q200780_grad200880 %>;
var q2_g09 = <%= @q200780_grad200980 %>;
var q2_g10 = <%= @q200780_grad201080 %>;
var q2_g11 = <%= @q200780_grad201180 %>;
var q2_g12 = <%= @q200780_grad201280 %>;
var q2_g13 = <%= @q200780_grad201380 %>;

var q3_g06 = <%= @q200880_grad200680 %>;
var q3_g07 = <%= @q200880_grad200780 %>;
var q3_g08 = <%= @q200880_grad200880 %>;
var q3_g09 = <%= @q200880_grad200980 %>;
var q3_g10 = <%= @q200880_grad201080 %>;
var q3_g11 = <%= @q200880_grad201180 %>;
var q3_g12 = <%= @q200880_grad201280 %>;
var q3_g13 = <%= @q200880_grad201380 %>;

var q4_g06 = <%= @q200980_grad200680 %>;
var q4_g07 = <%= @q200980_grad200780 %>;
var q4_g08 = <%= @q200980_grad200880 %>;
var q4_g09 = <%= @q200980_grad200980 %>;
var q4_g10 = <%= @q200980_grad201080 %>;
var q4_g11 = <%= @q200980_grad201180 %>;
var q4_g12 = <%= @q200980_grad201280 %>;
var q4_g13 = <%= @q200980_grad201380 %>;

var q5_g06 = <%= @q201080_grad200680 %>;
var q5_g07 = <%= @q201080_grad200780 %>;
var q5_g08 = <%= @q201080_grad200880 %>;
var q5_g09 = <%= @q201080_grad200980 %>;
var q5_g10 = <%= @q201080_grad201080 %>;
var q5_g11 = <%= @q201080_grad201180 %>;
var q5_g12 = <%= @q201080_grad201280 %>;
var q5_g13 = <%= @q201080_grad201380 %>;

var q6_g06 = <%= @q201180_grad200680 %>;
var q6_g07 = <%= @q201180_grad200780 %>;
var q6_g08 = <%= @q201180_grad200880 %>;
var q6_g09 = <%= @q201180_grad200980 %>;
var q6_g10 = <%= @q201180_grad201080 %>;
var q6_g11 = <%= @q201180_grad201180 %>;
var q6_g12 = <%= @q201180_grad201280 %>;
var q6_g13 = <%= @q201180_grad201380 %>;

var q7_g06 = <%= @q201280_grad200680 %>;
var q7_g07 = <%= @q201280_grad200780 %>;
var q7_g08 = <%= @q201280_grad200880 %>;
var q7_g09 = <%= @q201280_grad200980 %>;
var q7_g10 = <%= @q201280_grad201080 %>;
var q7_g11 = <%= @q201280_grad201180 %>;
var q7_g12 = <%= @q201280_grad201280 %>;
var q7_g13 = <%= @q201280_grad201380 %>;

var q8_g06 = <%= @q201380_grad200680 %>;
var q8_g07 = <%= @q201380_grad200780 %>;
var q8_g08 = <%= @q201380_grad200880 %>;
var q8_g09 = <%= @q201380_grad200980 %>;
var q8_g10 = <%= @q201380_grad201080 %>;
```



```
var q8_g11 = <%= @q201380_grad201180 %>;
var q8_g12 = <%= @q201380_grad201280 %>;
var q8_g13 = <%= @q201380_grad201380 %>;

var p1_g06 = d3.format(".2f")((q1_g06/a1)*100);
var p2_g06 = d3.format(".2f")((q2_g06/a2)*100);
var p3_g06 = d3.format(".2f")((q3_g06/a3)*100);
var p4_g06 = d3.format(".2f")((q4_g06/a4)*100);
var p5_g06 = d3.format(".2f")((q5_g06/a5)*100);
var p6_g06 = d3.format(".2f")((q6_g06/a6)*100);
var p7_g06 = d3.format(".2f")((q7_g06/a7)*100);
var p8_g06 = d3.format(".2f")((q8_g06/a8)*100);

var p1_g07 = d3.format(".2f")((q1_g07/a1)*100);
var p2_g07 = d3.format(".2f")((q2_g07/a2)*100);
var p3_g07 = d3.format(".2f")((q3_g07/a3)*100);
var p4_g07 = d3.format(".2f")((q4_g07/a4)*100);
var p5_g07 = d3.format(".2f")((q5_g07/a5)*100);
var p6_g07 = d3.format(".2f")((q6_g07/a6)*100);
var p7_g07 = d3.format(".2f")((q7_g07/a7)*100);
var p8_g07 = d3.format(".2f")((q8_g07/a8)*100);

var p1_g08 = d3.format(".2f")((q1_g08/a1)*100);
var p2_g08 = d3.format(".2f")((q2_g08/a2)*100);
var p3_g08 = d3.format(".2f")((q3_g08/a3)*100);
var p4_g08 = d3.format(".2f")((q4_g08/a4)*100);
var p5_g08 = d3.format(".2f")((q5_g08/a5)*100);
var p6_g08 = d3.format(".2f")((q6_g08/a6)*100);
var p7_g08 = d3.format(".2f")((q7_g08/a7)*100);
var p8_g08 = d3.format(".2f")((q8_g08/a8)*100);

var p1_g09 = d3.format(".2f")((q1_g09/a1)*100);
var p2_g09 = d3.format(".2f")((q2_g09/a2)*100);
var p3_g09 = d3.format(".2f")((q3_g09/a3)*100);
var p4_g09 = d3.format(".2f")((q4_g09/a4)*100);
var p5_g09 = d3.format(".2f")((q5_g09/a5)*100);
var p6_g09 = d3.format(".2f")((q6_g09/a6)*100);
var p7_g09 = d3.format(".2f")((q7_g09/a7)*100);
var p8_g09 = d3.format(".2f")((q8_g09/a8)*100);

var p1_g10 = d3.format(".2f")((q1_g10/a1)*100);
var p2_g10 = d3.format(".2f")((q2_g10/a2)*100);
var p3_g10 = d3.format(".2f")((q3_g10/a3)*100);
var p4_g10 = d3.format(".2f")((q4_g10/a4)*100);
var p5_g10 = d3.format(".2f")((q5_g10/a5)*100);
var p6_g10 = d3.format(".2f")((q6_g10/a6)*100);
var p7_g10 = d3.format(".2f")((q7_g10/a7)*100);
var p8_g10 = d3.format(".2f")((q8_g10/a8)*100);

var p1_g11 = d3.format(".2f")((q1_g11/a1)*100);
var p2_g11 = d3.format(".2f")((q2_g11/a2)*100);
var p3_g11 = d3.format(".2f")((q3_g11/a3)*100);
var p4_g11 = d3.format(".2f")((q4_g11/a4)*100);
var p5_g11 = d3.format(".2f")((q5_g11/a5)*100);
var p6_g11 = d3.format(".2f")((q6_g11/a6)*100);
var p7_g11 = d3.format(".2f")((q7_g11/a7)*100);
var p8_g11 = d3.format(".2f")((q8_g11/a8)*100);

var p1_g12 = d3.format(".2f")((q1_g12/a1)*100);
var p2_g12 = d3.format(".2f")((q2_g12/a2)*100);
var p3_g12 = d3.format(".2f")((q3_g12/a3)*100);
```

```
var p4_g12 = d3.format(".2f")((q4_g12/a4)*100);
var p5_g12 = d3.format(".2f")((q5_g12/a5)*100);
var p6_g12 = d3.format(".2f")((q6_g12/a6)*100);
var p7_g12 = d3.format(".2f")((q7_g12/a7)*100);
var p8_g12 = d3.format(".2f")((q8_g12/a8)*100);

var p1_g13 = d3.format(".2f")((q1_g13/a1)*100);
var p2_g13 = d3.format(".2f")((q2_g13/a2)*100);
var p3_g13 = d3.format(".2f")((q3_g13/a3)*100);
var p4_g13 = d3.format(".2f")((q4_g13/a4)*100);
var p5_g13 = d3.format(".2f")((q5_g13/a5)*100);
var p6_g13 = d3.format(".2f")((q6_g13/a6)*100);
var p7_g13 = d3.format(".2f")((q7_g13/a7)*100);
var p8_g13 = d3.format(".2f")((q8_g13/a8)*100);

var e1_06 = <%= @e1_200680 %>;
var e1_07 = <%= @e1_200780 %>;
var e1_08 = <%= @e1_200880 %>;
var e1_09 = <%= @e1_200980 %>;
var e1_10 = <%= @e1_201080 %>;
var e1_11 = <%= @e1_201180 %>;
var e1_12 = <%= @e1_201280 %>;
var e1_13 = <%= @e1_201380 %>;

var e2_06 = <%= @e2_200680 %>;
var e2_07 = <%= @e2_200780 %>;
var e2_08 = <%= @e2_200880 %>;
var e2_09 = <%= @e2_200980 %>;
var e2_10 = <%= @e2_201080 %>;
var e2_11 = <%= @e2_201180 %>;
var e2_12 = <%= @e2_201280 %>;
var e2_13 = <%= @e2_201380 %>;

var e3_06 = <%= @e3_200680 %>;
var e3_07 = <%= @e3_200780 %>;
var e3_08 = <%= @e3_200880 %>;
var e3_09 = <%= @e3_200980 %>;
var e3_10 = <%= @e3_201080 %>;
var e3_11 = <%= @e3_201180 %>;
var e3_12 = <%= @e3_201280 %>;
var e3_13 = <%= @e3_201380 %>;

var e4_06 = <%= @e4_200680 %>;
var e4_07 = <%= @e4_200780 %>;
var e4_08 = <%= @e4_200880 %>;
var e4_09 = <%= @e4_200980 %>;
var e4_10 = <%= @e4_201080 %>;
var e4_11 = <%= @e4_201180 %>;
var e4_12 = <%= @e4_201280 %>;
var e4_13 = <%= @e4_201380 %>;

var e5_06 = <%= @e5_200680 %>;
var e5_07 = <%= @e5_200780 %>;
var e5_08 = <%= @e5_200880 %>;
var e5_09 = <%= @e5_200980 %>;
var e5_10 = <%= @e5_201080 %>;
var e5_11 = <%= @e5_201180 %>;
var e5_12 = <%= @e5_201280 %>;
var e5_13 = <%= @e5_201380 %>;

var e6_06 = <%= @e6_200680 %>;
```

```
var e6_07 = <%= @e6_200780 %>;
var e6_08 = <%= @e6_200880 %>;
var e6_09 = <%= @e6_200980 %>;
var e6_10 = <%= @e6_201080 %>;
var e6_11 = <%= @e6_201180 %>;
var e6_12 = <%= @e6_201280 %>;
var e6_13 = <%= @e6_201380 %>;

var e7_06 = <%= @e7_200680 %>;
var e7_07 = <%= @e7_200780 %>;
var e7_08 = <%= @e7_200880 %>;
var e7_09 = <%= @e7_200980 %>;
var e7_10 = <%= @e7_201080 %>;
var e7_11 = <%= @e7_201180 %>;
var e7_12 = <%= @e7_201280 %>;
var e7_13 = <%= @e7_201380 %>;

var e8_06 = <%= @e8_200680 %>;
var e8_07 = <%= @e8_200780 %>;
var e8_08 = <%= @e8_200880 %>;
var e8_09 = <%= @e8_200980 %>;
var e8_10 = <%= @e8_201080 %>;
var e8_11 = <%= @e8_201180 %>;
var e8_12 = <%= @e8_201280 %>;
var e8_13 = <%= @e8_201380 %>;

var e9_06 = <%= @e9_200680 %>;
var e9_07 = <%= @e9_200780 %>;
var e9_08 = <%= @e9_200880 %>;
var e9_09 = <%= @e9_200980 %>;
var e9_10 = <%= @e9_201080 %>;
var e9_11 = <%= @e9_201180 %>;
var e9_12 = <%= @e9_201280 %>;
var e9_13 = <%= @e9_201380 %>;

var pe1_06 = d3.format(".2f")((e1_06/a1)*100);
var pe2_06 = d3.format(".2f")((e2_06/a1)*100);
var pe3_06 = d3.format(".2f")((e3_06/a1)*100);
var pe4_06 = d3.format(".2f")((e4_06/a1)*100);
var pe5_06 = d3.format(".2f")((e5_06/a1)*100);
var pe6_06 = d3.format(".2f")((e6_06/a1)*100);
var pe7_06 = d3.format(".2f")((e7_06/a1)*100);
var pe8_06 = d3.format(".2f")((e8_06/a1)*100);
var pe9_06 = d3.format(".2f")((e9_06/a1)*100);

var pe1_07 = d3.format(".2f")((e1_07/a2)*100);
var pe2_07 = d3.format(".2f")((e2_07/a2)*100);
var pe3_07 = d3.format(".2f")((e3_07/a2)*100);
var pe4_07 = d3.format(".2f")((e4_07/a2)*100);
var pe5_07 = d3.format(".2f")((e5_07/a2)*100);
var pe6_07 = d3.format(".2f")((e6_07/a2)*100);
var pe7_07 = d3.format(".2f")((e7_07/a2)*100);
var pe8_07 = d3.format(".2f")((e8_07/a2)*100);
var pe9_07 = d3.format(".2f")((e9_07/a2)*100);

var pe1_08 = d3.format(".2f")((e1_08/a3)*100);
var pe2_08 = d3.format(".2f")((e2_08/a3)*100);
var pe3_08 = d3.format(".2f")((e3_08/a3)*100);
var pe4_08 = d3.format(".2f")((e4_08/a3)*100);
var pe5_08 = d3.format(".2f")((e5_08/a3)*100);
var pe6_08 = d3.format(".2f")((e6_08/a3)*100);
```

```

var pe7_08 = d3.format(".2f")((e7_08/a3)*100);
var pe8_08 = d3.format(".2f")((e8_08/a3)*100);
var pe9_08 = d3.format(".2f")((e9_08/a3)*100);

var pe1_09 = d3.format(".2f")((e1_09/a4)*100);
var pe2_09 = d3.format(".2f")((e2_09/a4)*100);
var pe3_09 = d3.format(".2f")((e3_09/a4)*100);
var pe4_09 = d3.format(".2f")((e4_09/a4)*100);
var pe5_09 = d3.format(".2f")((e5_09/a4)*100);
var pe6_09 = d3.format(".2f")((e6_09/a4)*100);
var pe7_09 = d3.format(".2f")((e7_09/a4)*100);
var pe8_09 = d3.format(".2f")((e8_09/a4)*100);
var pe9_09 = d3.format(".2f")((e9_09/a4)*100);

var pe1_10 = d3.format(".2f")((e1_10/a5)*100);
var pe2_10 = d3.format(".2f")((e2_10/a5)*100);
var pe3_10 = d3.format(".2f")((e3_10/a5)*100);
var pe4_10 = d3.format(".2f")((e4_10/a5)*100);
var pe5_10 = d3.format(".2f")((e5_10/a5)*100);
var pe6_10 = d3.format(".2f")((e6_10/a5)*100);
var pe7_10 = d3.format(".2f")((e7_10/a5)*100);
var pe8_10 = d3.format(".2f")((e8_10/a5)*100);
var pe9_10 = d3.format(".2f")((e9_10/a5)*100);

var pe1_11 = d3.format(".2f")((e1_11/a6)*100);
var pe2_11 = d3.format(".2f")((e2_11/a6)*100);
var pe3_11 = d3.format(".2f")((e3_11/a6)*100);
var pe4_11 = d3.format(".2f")((e4_11/a6)*100);
var pe5_11 = d3.format(".2f")((e5_11/a6)*100);
var pe6_11 = d3.format(".2f")((e6_11/a6)*100);
var pe7_11 = d3.format(".2f")((e7_11/a6)*100);
var pe8_11 = d3.format(".2f")((e8_11/a6)*100);
var pe9_11 = d3.format(".2f")((e9_11/a6)*100);

var pe1_12 = d3.format(".2f")((e1_12/a7)*100);
var pe2_12 = d3.format(".2f")((e2_12/a7)*100);
var pe3_12 = d3.format(".2f")((e3_12/a7)*100);
var pe4_12 = d3.format(".2f")((e4_12/a7)*100);
var pe5_12 = d3.format(".2f")((e5_12/a7)*100);
var pe6_12 = d3.format(".2f")((e6_12/a7)*100);
var pe7_12 = d3.format(".2f")((e7_12/a7)*100);
var pe8_12 = d3.format(".2f")((e8_12/a7)*100);
var pe9_12 = d3.format(".2f")((e9_12/a7)*100);

var pe1_13 = d3.format(".2f")((e1_13/a8)*100);
var pe2_13 = d3.format(".2f")((e2_13/a8)*100);
var pe3_13 = d3.format(".2f")((e3_13/a8)*100);
var pe4_13 = d3.format(".2f")((e4_13/a8)*100);
var pe5_13 = d3.format(".2f")((e5_13/a8)*100);
var pe6_13 = d3.format(".2f")((e6_13/a8)*100);
var pe7_13 = d3.format(".2f")((e7_13/a8)*100);
var pe8_13 = d3.format(".2f")((e8_13/a8)*100);
var pe9_13 = d3.format(".2f")((e9_13/a8)*100);

var color = d3.scale.category20();

var dataset = [ q1, q2, q3, q4, q5, q6, q7, q8 ];

var all = [ a1, a2, a3, a4, a5, a6, a7, a8 ];

var percentages = [ p1, p2, p3, p4, p5, p6, p7, p8 ];

```

```

    var perc_all = [ p1_g06, p2_g06, p3_g06, p4_g06, p5_g06, p6_g06, p7_g06,
p8_g06, p1_g07, p2_g07, p3_g07, p4_g07, p5_g07, p6_g07, p7_g07, p8_g07, p1_g08,
p2_g08, p3_g08, p4_g08, p5_g08, p6_g08, p7_g08, p8_g08, p1_g09, p2_g09, p3_g09, p4_g09,
p5_g09, p6_g09, p7_g09, p8_g09, p1_g10, p2_g10, p3_g10, p4_g10, p5_g10, p6_g10,
p7_g10, p8_g10, p1_g11, p2_g11, p3_g11, p4_g11, p5_g11, p6_g11, p7_g11, p8_g11, p1_g12,
p2_g12, p3_g12, p4_g12, p5_g12, p6_g12, p7_g12, p8_g12, p1_g13, p2_g13, p3_g13, p4_g13,
p5_g13, p6_g13, p7_g13, p8_g13, p1, p2, p3, p4, p5, p6, p7, p8 ];

    var all_grad = [ q1_g06, q2_g06, q3_g06, q4_g06, q5_g06, q6_g06, q7_g06,
q8_g06, q1_g07, q2_g07, q3_g07, q4_g07, q5_g07, q6_g07, q7_g07, q8_g07, q1_g08,
q2_g08, q3_g08, q4_g08, q5_g08, q6_g08, q7_g08, q8_g08, q1_g09, q2_g09, q3_g09, q4_g09,
q5_g09, q6_g09, q7_g09, q8_g09, q1_g10, q2_g10, q3_g10, q4_g10, q5_g10, q6_g10,
q7_g10, q8_g10, q1_g11, q2_g11, q3_g11, q4_g11, q5_g11, q6_g11, q7_g11, q8_g11, q1_g12,
q2_g12, q3_g12, q4_g12, q5_g12, q6_g12, q7_g12, q8_g12, q1_g13, q2_g13, q3_g13, q4_g13,
q5_g13, q6_g13, q7_g13, q8_g13, q1, q2, q3, q4, q5, q6, q7, q8 ];

    var males = [ m1, m2, m3, m4, m5, m6, m7, m8 ];

    var females = [ f1, f2, f3, f4, f5, f6, f7, f8 ];

    var perc_females = [ pf1, pf2, pf3, pf4, pf5, pf6, pf7, pf8 ];

    var perc_males = [ pm1, pm2, pm3, pm4, pm5, pm6, pm7, pm8 ];

    var eth_his = [ e1_06, e1_07, e1_08, e1_09, e1_10, e1_11, e1_12, e1_13 ];
    var eth_ami = [ e2_06, e2_07, e2_08, e2_09, e2_10, e2_11, e2_12, e2_13 ];
    var eth_oth = [ e3_06, e3_07, e3_08, e3_09, e3_10, e3_11, e3_12, e3_13 ];
    var eth_blc = [ e4_06, e4_07, e4_08, e4_09, e4_10, e4_11, e4_12, e4_13 ];
    var eth_asl = [ e5_06, e5_07, e5_08, e5_09, e5_10, e5_11, e5_12, e5_13 ];
    var eth_whi = [ e6_06, e6_07, e6_08, e6_09, e6_10, e6_11, e6_12, e6_13 ];

    var eth_2006 = [ e1_06, e2_06, e3_06, e4_06, e5_06, e6_06, e7_06, e8_06,
e9_06 ];
    var eth_2007 = [ e1_07, e2_07, e3_07, e4_07, e5_07, e6_07, e7_07, e8_07,
e9_07 ];
    var eth_2008 = [ e1_08, e2_08, e3_08, e4_08, e5_08, e6_08, e7_08, e8_08,
e9_08 ];
    var eth_2009 = [ e1_09, e2_09, e3_09, e4_09, e5_09, e6_09, e7_09, e8_09,
e9_09 ];
    var eth_2010 = [ e1_10, e2_10, e3_10, e4_10, e5_10, e6_10, e7_10, e8_10,
e9_10 ];
    var eth_2011 = [ e1_11, e2_11, e3_11, e4_11, e5_11, e6_11, e7_11, e8_11,
e9_11 ];
    var eth_2012 = [ e1_12, e2_12, e3_12, e4_12, e5_12, e6_12, e7_12, e8_12,
e9_12 ];
    var eth_2013 = [ e1_13, e2_13, e3_13, e4_13, e5_13, e6_13, e7_13, e8_13,
e9_13 ];

    var perc_eth_2006 = [ pe1_06, pe2_06, pe3_06, pe4_06, pe5_06, pe6_06,
pe7_06, pe8_06, pe9_06 ];
    var perc_eth_2007 = [ pe1_07, pe2_07, pe3_07, pe4_07, pe5_07, pe6_07,
pe7_07, pe8_07, pe9_07 ];
    var perc_eth_2008 = [ pe1_08, pe2_08, pe3_08, pe4_08, pe5_08, pe6_08,
pe7_08, pe8_08, pe9_08 ];
    var perc_eth_2009 = [ pe1_09, pe2_09, pe3_09, pe4_09, pe5_09, pe6_09,
pe7_09, pe8_09, pe9_09 ];
    var perc_eth_2010 = [ pe1_10, pe2_10, pe3_10, pe4_10, pe5_10, pe6_10,
pe7_10, pe8_10, pe9_10 ];

```

```

var perc_eth_2011 = [ pe1_11, pe2_11, pe3_11, pe4_11, pe5_11, pe6_11,
pe7_11, pe8_11, pe9_11 ];
var perc_eth_2012 = [ pe1_12, pe2_12, pe3_12, pe4_12, pe5_12, pe6_12,
pe7_12, pe8_12, pe9_12 ];
var perc_eth_2013 = [ pe1_13, pe2_13, pe3_13, pe4_13, pe5_13, pe6_13,
pe7_13, pe8_13, pe9_13 ];

var gender_stack = [ [
    { x: 0, y: <%= @f200680 %> },
    { x: 1, y: <%= @f200780 %> },
    { x: 2, y: <%= @f200880 %> },
    { x: 3, y: <%= @f200980 %> },
    { x: 4, y: <%= @f201080 %> },
    { x: 5, y: <%= @f201180 %> },
    { x: 6, y: <%= @f201280 %> },
    { x: 7, y: <%= @f201380 %> }
],
[
    { x: 0, y: <%= @m200680 %> },
    { x: 1, y: <%= @m200780 %> },
    { x: 2, y: <%= @m200880 %> },
    { x: 3, y: <%= @m200980 %> },
    { x: 4, y: <%= @m201080 %> },
    { x: 5, y: <%= @m201180 %> },
    { x: 6, y: <%= @m201280 %> },
    { x: 7, y: <%= @m201380 %> }
]];

var eth = [ "Hispanic", "American Indian", "Non-Res Alien", "Black or Afro
American", "Asian", "White", "Race/Ethnicity Unknown", "Native Hawaiian", "Two or More
Races" ];

var axis_label = [ 2007,2008,2009,2010,2011,2012 ];

var axis_label2 = [ 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013 ];

var xaxis_label = [ "
",
",
    (1 year)
",
",
    (2 years)          (1 year)
",
",
    (3 years)          (2 years)          (1 year)
",
",
    (4 years)          (3 years)          (2 years)          (1
year)
",
",
    (2 years)          (1 year)          (5 years)          (4 years)          (3 years)
",
",
    (3 years)          (2 years)          (6 years)          (5 years)          (4 years)
",
",
    (4 years)          (3 years)          (7 years)          (6 years)          (5 years)
",
",
    (5 years)          (4 years)          (8 years)          (7 years)          (6 years)
",
    (1 year)"] ];

var y_axis_label = [ 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 ];

```

```

    var eth_data = [ "eth_2006_slice", "eth_2007_slice", "eth_2008_slice",
"eth_2009_slice", "eth_2010_slice", "eth_2011_slice", "eth_2012_slice",
"eth_2013_slice" ];

    var perc_all_slice = perc_all.slice(64, 72);
    var all_grad_slice = all_grad.slice(64, 72);

    var gen = ["Females", "Males" ];

    var tip = d3.tip()
        .attr('class', 'd3-tip')
        .offset([-10, 0])
        .html(function(d, i) {
            return "<strong>Total Graduates:</strong> <span
style='color:red'>" + all_grad_slice[i] + "</span>";
        });

    var tip_stack = d3.tip()
        .attr('class', 'd3-tip')
        .offset([-10, 0])
        .html(function(d, i) {
            return "<strong>Total Students:</strong>
<span style='color:red'>" + all[i] + "</span>";
        });

    var tip_pie_2006 = d3.tip()
        .attr('class', 'd3-tip')
        .offset([-10, 0])
        .html(function(d, i) {
            return "<strong>" + eth[i] + ":%</strong> <span
style='color:red'>" + perc_eth_2006[i] + '%</span> ";
        });

    var tip_pie_2007 = d3.tip()
        .attr('class', 'd3-tip')
        .offset([-10, 0])
        .html(function(d, i) {
            return "<strong>" + eth[i] + ":%</strong> <span
style='color:red'>" + perc_eth_2007[i] + '%</span> ";
        });

    var tip_pie_2008 = d3.tip()
        .attr('class', 'd3-tip')
        .offset([-10, 0])
        .html(function(d, i) {
            return "<strong>" + eth[i] + ":%</strong> <span
style='color:red'>" + perc_eth_2008[i] + '%</span> ";
        });

    var tip_pie_2009 = d3.tip()
        .attr('class', 'd3-tip')
        .offset([-10, 0])
        .html(function(d, i) {
            return "<strong>" + eth[i] + ":%</strong> <span
style='color:red'>" + perc_eth_2009[i] + '%</span> ";
        });

```

```

        var tip_pie_2010 = d3.tip()
            .attr('class', 'd3-tip')
            .offset([-10, 0])
            .html(function(d, i) {
                return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + perc_eth_2010[i] + ' %' + "</span> ";
            });

        var tip_pie_2011 = d3.tip()
            .attr('class', 'd3-tip')
            .offset([-10, 0])
            .html(function(d, i) {
                return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + perc_eth_2011[i] + ' %' + "</span> ";
            });

        var tip_pie_2012 = d3.tip()
            .attr('class', 'd3-tip')
            .offset([-10, 0])
            .html(function(d, i) {
                return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + perc_eth_2012[i] + ' %' + "</span> ";
            });

        var tip_pie_2013 = d3.tip()
            .attr('class', 'd3-tip')
            .offset([-10, 0])
            .html(function(d, i) {
                return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + perc_eth_2013[i] + ' %' + "</span> ";
            });

        var stack = d3.layout.stack();
            stack(gender_stack);

        var xScale = d3.scale.ordinal()
            .domain(d3.range(percentages.length))
            .rangeRoundBands([0, w], 0.05);

        var xScale_females = d3.scale.ordinal()
            .domain(d3.range(females.length))
            .rangeRoundBands([0, w], 0.05);

        var xScale_males = d3.scale.ordinal()
            .domain(d3.range(males.length))
            .rangeRoundBands([0, w], 0.05);

        var xScale_stack = d3.scale.ordinal()
            .domain(d3.range(gender_stack[0].length))
            .rangeRoundBands([0, w - 60], 0.05);

        var yScale = d3.scale.linear()
            .domain([0, d3.max(all, function(d) { return d * 0.7;})])

```



```

        .range([0, h - 50]);

        var yScale_reverse = d3.scale.linear()
            .domain([0, d3.max(all, function(d) {
return d * 0.7;})])
            .range([h - 50, 0]);

        var yScale_females = d3.scale.linear()
            .domain([0, d3.max(perc_females,
function(d) { return d; })])
            .range([0, h - 50]);

        var yScale_females_reverse = d3.scale.linear()
            .domain([0, d3.max(perc_females,
function(d) { return d; })])
            .range([h - 50, 0]);

        var yScale_males = d3.scale.linear()
            .domain([0, d3.max(perc_males,
function(d) { return d; })])
            .range([0, h - 50]);

        var yScale_males_reverse = d3.scale.linear()
            .domain([0, d3.max(perc_males, function(d)
{ return d; })])
            .range([h - 50, 0]);

        var yScale_stack = d3.scale.linear()
            .domain([0, d3.max(gender_stack, function(d) {return
d3.max(d, function(d) {return d.y0 + d.y;});})])
            .range([0, h - 50]);

        var xAxis = d3.svg.axis()
            .scale(xScale)
            .tickFormat(function(d) { return axis_label2[d]; })
            .orient("bottom");

        var yAxis_reverse = d3.svg.axis()
            .scale(yScale_reverse)
            .orient("left");

        var yAxis_females_reverse = d3.svg.axis()
            .scale(yScale_females_reverse)
            .tickFormat(function(d) { return d + ' %';})
            .orient("left");

        var yAxis_males_reverse = d3.svg.axis()
            .scale(yScale_males_reverse)
            .tickFormat(function(d) { return d + ' %';})
            .orient("left");

        var xAxis_stack = d3.svg.axis()
            .scale(xScale_stack)
            .tickFormat(function(d) { return axis_label2[d]; })
            .orient("top");

```

```

var yAxis_stack = d3.svg.axis()
    .scale(yScale_stack)
    .orient("left");

//jQuery UI Slider function to change years range

$(".xaxis_label_text").text( xaxis_label[8] );
$(function() {
    var tt = 0;
    $( "#slider" ).slider({
        min: 0,
        max: 8,
        value: 8,
        animate: "fast",
        step: 1,
        slide: function( event, ui ) {
            tt = ui.value
        }
    })
    .each(function() {
        var opt = $(this).data().uiSlider.options;
        var label = [2006, 2007, 2008, 2009, 2010, 2011, 2012,
2013, 2014];
        for (var i = 0; i < label.length; i++) {
            var el =
$('<label>'+(label[i])+'</label>').css('left',(i*250/label[i]*100)+'%');
            $( "#slider" ).append(el);
        }
    });

////////////////////////////////////
////////////////////////////////////

// UPPER ETHNICITY FIELD

var arc = d3.svg.arc()
    .outerRadius(radius);

var pie = d3.layout.pie()
    .sort(null)
    .value(function(d) { return d; });

var upper_box1 = d3.select(".upper-box1")
    .append("svg")
    .attr("width", width)
    .attr("height", height)
    .append("g")
    .attr("transform", "translate(" + width / 2 + "," + height / 2
+ ")");
upper_box1.call(tip_pie_2006);
var upper_box1_g = upper_box1.selectAll(".arc")
    .data(pie(eth_2006))
    .enter().append("g")
    .attr("class", "arc");

    upper_box1_g.append("path")
    .attr("d", arc)

```

```

        .style("fill", function(d, i) { return color(i); })
        .on('mouseover', tip_pie_2006.show)
        .on('mouseout', tip_pie_2006.hide)
        .transition()
        .ease("bounce")
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50; })
        .duration(1000)
        .attrTween("d", tweenDonut)

function tweenPie(b) {
    b.innerRadius = 0;
    var i = d3.interpolate({startAngle: 0, endAngle: 0}, b);
    return function(t) { return arc(i(t)); };
}

function tweenDonut(b) {
    b.innerRadius = radius * .4;
    var i = d3.interpolate({innerRadius: 0}, b);
    return function(t) { return arc(i(t)); };
}

var upper_box2 = d3.select(".upper-box2")
    .append("svg")
    .attr("width", width)
    .attr("height", height)
    .append("g")
    .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box2.call(tip_pie_2007);
    var upper_box2_g = upper_box2.selectAll(".arc")
        .data(pie(eth_2007))
        .enter().append("g")
        .attr("class", "arc");

        upper_box2_g.append("path")
            .attr("d", arc)
            .style("fill", function(d, i) { return
color(i); })

            .on('mouseover', tip_pie_2007.show)
            .on('mouseout', tip_pie_2007.hide)
            .transition()
            .ease("bounce")

        .delay(500)

            .duration(2000)
            .attrTween("d", tweenPie)
            .transition()
            .ease("elastic")
            .delay(function(d, i) { return 2000 + i * 50;

        .delay(2500)

            .duration(2000)
            .attrTween("d", tweenDonut)

```

```

        var upper_box3 = d3.select(".upper-box3")
            .append("svg")
            .attr("width", width)
            .attr("height", height)
            .append("g")
            .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
        upper_box3.call(tip_pie_2008);
        var upper_box3_g = upper_box3.selectAll(".arc")
            .data(pie(eth_2008))
            .enter().append("g")
            .attr("class", "arc");

            upper_box3_g.append("path")
                .attr("d", arc)
                .style("fill", function(d, i) { return
color(i); })

                .on('mouseover', tip_pie_2008.show)
                .on('mouseout', tip_pie_2008.hide)
                .transition()
                .ease("bounce")
                .delay(1000)
                .duration(2000)
                .attrTween("d", tweenPie)
                .transition()
                .ease("elastic")
                .delay(function(d, i) { return 2000 + i * 50;
})

                .delay(3000)
                .duration(2000)
                .attrTween("d", tweenDonut)

        var upper_box4 = d3.select(".upper-box4")
            .append("svg")
            .attr("width", width)
            .attr("height", height)
            .append("g")
            .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
        upper_box4.call(tip_pie_2009);
        var upper_box4_g = upper_box4.selectAll(".arc")
            .data(pie(eth_2009))
            .enter().append("g")
            .attr("class", "arc");

            upper_box4_g.append("path")
                .attr("d", arc)
                .style("fill", function(d, i) { return
color(i); })

                .on('mouseover', tip_pie_2009.show)
                .on('mouseout', tip_pie_2009.hide)
                .transition()
                .ease("bounce")
                .delay(1500)
                .duration(2000)
                .attrTween("d", tweenPie)
                .transition()
                .ease("elastic")
                .delay(function(d, i) { return 2000 + i * 50;
})

```

```

        .delay(3500)
        .duration(2000)
        .attrTween("d", tweenDonut)

    var upper_box5 = d3.select(".upper-box5")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box5.call(tip_pie_2010);
    var upper_box5_g = upper_box5.selectAll(".arc")
        .data(pie(eth_2010))
        .enter().append("g")
        .attr("class", "arc");

    upper_box5_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2010.show)
        .on('mouseout', tip_pie_2010.hide)
        .transition()
        .ease("bounce")
        .delay(2000)
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
})

        .delay(4000)
        .duration(2000)
        .attrTween("d", tweenDonut)

    var upper_box6 = d3.select(".upper-box6")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box6.call(tip_pie_2011);
    var upper_box6_g = upper_box6.selectAll(".arc")
        .data(pie(eth_2011))
        .enter().append("g")
        .attr("class", "arc");

    upper_box6_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2011.show)
        .on('mouseout', tip_pie_2011.hide)
        .transition()
        .ease("bounce")
        .delay(2500)
        .duration(2000)

```

```

        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
    })

        .delay(4500)
        .duration(2000)
        .attrTween("d", tweenDonut)

    var upper_box7 = d3.select(".upper-box7")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box7.call(tip_pie_2012);
    var upper_box7_g = upper_box7.selectAll(".arc")
        .data(pie(eth_2012))
        .enter().append("g")
        .attr("class", "arc");

    upper_box7_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2012.show)
        .on('mouseout', tip_pie_2012.hide)
        .transition()
        .ease("bounce")
        .delay(3000)
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
    })

        .delay(5000)
        .duration(2000)
        .attrTween("d", tweenDonut)

    var upper_box8 = d3.select(".upper-box8")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box1.call(tip_pie_2013);
    var upper_box8_g = upper_box8.selectAll(".arc")
        .data(pie(eth_2013))
        .enter().append("g")
        .attr("class", "arc");

    upper_box8_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2013.show)

```

```

        .on('mouseout', tip_pie_2013.hide)
        .transition()
        .ease("bounce")
        .delay(3500)
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
    })

        .delay(5500)
        .duration(2000)
        .attrTween("d", tweenDonut)

// LEGEND

var upper_legend = d3.select(".upper-legend")
    .append("svg")
        .attr("width", w*2)
        .attr("height", 100);
var upper_legend_data = upper_legend.selectAll(".legend")
    .data(eth)
    .enter().append("g")
    .attr("class", "legend")
    .attr("transform", function(d, i) { return "translate("
+ (50 + (110 * i)) + "," + 30 + ")"; });

    upper_legend_data.append("rect")
        .attr("x", 0)
        .attr("y", 0)
        .attr("width", 18)
        .attr("height", 18)
        .style("fill", function (d, i) {return color(i)});

    upper_legend_data.append("text")
        .attr("x", 10)
        .attr("y", 30)
        .attr("dy", ".35em")
        .style("text-anchor", "middle")
        .text(function(d, i) { return eth[i] ; });

////////////////////////////////////
////////////////////////////////////

// TOP LEFT SIDE
var top_left = d3.select(".top-left")
    .append("svg")
        .attr("width", w+70)
        .attr("height", h);
top_left.call(tip);
top_left.selectAll("rect")
    .data(all_grad_slice)
    .enter()
    .append("rect")
    .attr("x", function(d, i) { return (i * (w /
percentages.length)) + 64; })
    .attr("y", function(d) { return h - yScale(d) - 20; })

```

```

        .attr("width", xScale.rangeBand())
        .attr("height", function(d) { return yScale(d) ; })
        .style("fill",function(d, i) { return color(0); })
        .on('mouseover', tip.show)
        .on('mouseout', tip.hide);
    top_left.selectAll("text")
        .data(all_grad_slice)
        .enter()
        .append("text")
        .text(function(d, i) { return perc_all_slice[i] + '%' ; })
        .attr("x", function(d, i) { return (xScale(i) +
xScale.rangeBand() / 2) + 64; })
        .attr("y", function (d) { return h - 25 - yScale(d) ; })
        .attr("font-family", "sans-serif")
        .attr("font-size", "11px")
        .attr("fill", "black")
        .style("text-anchor", "middle");
    var top_left_axis = top_left.append("g")
        .attr("class", "axis")
        .attr("transform", "translate(" + 60 + "," + (h - 20) +
")")

        .call(xAxis)
    .append("text")
        .attr("y", 9)
        .attr("x", 11)
        .attr("dy", ".71em")
        .style("text-anchor", "end")
        .text("Cohort Year:");
    top_left.append("g")
        .attr("class", "axis")
        .attr("transform", "translate(" + 60 + "," + 30 + ")")
        .call(yAxis_reverse)
    .append("text")
        .attr("transform", "rotate(-90)")
        .attr("y", -55)
        .attr("x", -55)
        .attr("dy", ".71em")
        .style("text-anchor", "end")
        .text("Number of Students");

// TOP RIGHT SIDE

    var top_right = d3.select(".top-right")
        .append("svg")
        .attr("width", w+50)
        .attr("height", h);
    top_right.call(tip_stack);
    var top_right_groups = top_right.selectAll("g")
        .data(gender_stack)
        .enter()
        .append("g")
        .style("fill", function(d, i) { return color(i+4); });
    var top_right_rects = top_right_groups.selectAll("rect")
        .data(function(d) { return d; })
        .enter()
        .append("rect")
        .attr("x", function(d, i) { return xScale_stack(i) + 60 ; })
        .attr("y", function(d) { return yScale_stack(d.y0)+20 ; })
        .attr("height", function(d) { return yScale_stack(d.y) ; })

```



```

        .attr("width", xScale_stack.rangeBand())
        .on('mouseover', tip_stack.show)
        .on('mouseout', tip_stack.hide);
top_right_groups.selectAll("text")
    .data(function(d) { return d; })
    .enter()
    .append("text")
    .attr("x", function(d, i) { return xScale_stack(i) + 85 ; })
    .attr("y", function(d) { return yScale_stack(d.y0) + 40
})

    .attr("fill", "black")
    .style("text-anchor", "middle")
    .text(function(d) { return d.y; });
var top_right_axis = top_right.append("g")
    .attr("class", "axis")
    .attr("transform", "translate(" + 60 + " ," + 20 + ")")
    .call(xAxis_stack);
top_right.append("g")
    .attr("class", "axis")
    .attr("transform", "translate(" + 60 + " ," + 20 + ")")
    .call(yAxis_stack)
    .append("text")
    .attr("transform", "rotate(-90)")
    .attr("y", -55)
    .attr("x", -55)
    .attr("dy", ".71em")
    .style("text-anchor", "end")
    .text("Students Admitted to UNM");
var top_right_legend = top_right.selectAll(".legend")
    .data(gen)
    .enter().append("g")
    .attr("class", "legend")
    .attr("transform", function(d, i) { return "translate(" + (Math.pow(-
80,i)) + " ," + 20 + ")"; });
top_right_legend.append("rect")
    .attr("x", w - 20)
    .attr("y", h - 40)
    .attr("width", 18)
    .attr("height", 18)
    .style("fill", function (d, i) {return color(i+4)});
top_right_legend.append("text")
    .attr("x", w - 26)
    .attr("y", h - 30)
    .attr("dy", ".35em")
    .style("text-anchor", "end")
    .text(function(d, i) { return gen[i] ; });

// BOTTOM LEFT SIDE

var bottom_left = d3.select(".bottom-left")
    .append("svg")
    .attr("width", w+60)
    .attr("height", h);
    bottom_left.selectAll("rect")
        .data(perc_females)
        .enter()
        .append("rect")
            .attr("x", function(d, i) { return i * (w /
perc_females.length) + 54; })

```

```

        .attr("y", function(d) { return h - yScale_females(d) - 20;
    })

    .attr("width", xScale_females.rangeBand())
    .attr("height", function(d) { return yScale_females(d) ; })
    .style("fill",function(d, i) { return color(3); });
    bottom_left.selectAll("text")
        .data(perc_females)
        .enter()
        .append("text")
        .text(function(d, i) {return d + ' %';})
        .attr("x", function(d, i) { return (xScale_females(i) +
xScale_females.rangeBand() / 2) + 54; })
        .attr("y", function (d) {return h - 5 - yScale_females(d)})
        .attr("font-family", "sans-serif")
        .attr("font-size", "11px")
        .attr("fill", "black")
        .style("text-anchor", "middle");
    var bottom_left_axis = bottom_left.append("g")
        .attr("class", "axis")
        .attr("transform", "translate(" + 50 + ", " + (h-20) + ")")
        .call(xAxis);
    bottom_left.append("g")
        .attr("class", "axis")
        .attr("transform", "translate(" + 50 + ", " + 30 + ")")
        .call(yAxis_females_reverse);

// BOTTOM RIGHT SIDE

    var bottom_right = d3.select(".bottom-right")
        .append("svg")
        .attr("width", w+60)
        .attr("height", h);
    bottom_right.selectAll("rect")
        .data(perc_males)
        .enter()
        .append("rect")
        .attr("x", function(d, i) { return i * (w /
perc_males.length) + 54; })
        .attr("y", function(d) { return h - yScale_males(d) - 20; })
        .attr("width", xScale_males.rangeBand())
        .attr("height", function(d) { return yScale_males(d) ; })
        .style("fill",function(d, i) { return color(6); });
    bottom_right.selectAll("text")
        .data(perc_males)
        .enter()
        .append("text")
        .text(function(d, i) {return d + ' %';})
        .attr("x", function(d, i) { return (xScale_males(i) +
xScale_males.rangeBand() / 2) + 54; })
        .attr("y", function (d) {return h - 5 - yScale_males(d)})
        .attr("font-family", "sans-serif")
        .attr("font-size", "11px")
        .attr("fill", "black")
        .style("text-anchor", "middle");
    var bottom_right_axis = bottom_right.append("g")
        .attr("class", "axis")
        .attr("transform", "translate(" + 50 + ", " + (h-20) + ")")
        .call(xAxis);
    bottom_right.append("g")
        .attr("class", "axis")

```

```

        .attr("transform", "translate(" + 50 + "," + 30 + ")")
        .call(yAxis_males_reverse);

// Update chart with slider change event
$( "#slider" ).slider({
    slide: function( event, ui ) {
        var tt = ui.value;

        $(".xaxis_label_text").text( xaxis_label[tt] );

        var perc_all_slice = perc_all.slice((tt*8), (tt*8)+8);
        var all_grad_slice = all_grad.slice((tt*8), (tt*8)+8);

//Top Left
        top_left.selectAll("rect")
            .data(all_grad_slice)
            .transition()
            .duration(500)
            .ease("linear")
            .attr("x", function(d, i) { return (i * (w /
percentages.length)) + 64; })
            .attr("y", function(d) { return h - yScale(d) - 20; })
            .attr("width", xScale.rangeBand())
            .attr("height", function(d) { return yScale(d) ; })
            .style("fill",function(d, i) { return color(0); });
        top_left.selectAll("text")
            .data(all_grad_slice)
            .transition()
            .duration(500)
            .ease("linear")
            .text(function(d, i) {return perc_all_slice[i] + ' %'})
            .attr("y", function (d) {return h - 25 - yScale(d)});

        top_left_axis.call(xAxis);

    }
});
</script>

```

A.4 Figure A.4 - Dashboard interface *Transfer.erb* file (Transferred Students Cohorts)

```

<h1> Full-time Transfer Students from Inside and Outside NM State Cohort </h1>

<div class="upper"><p class="box-heading3"> Ethnicity Distributions </p>
  <div class="upper-box1"><p class="box-text">2006</p></div>
  <div class="upper-box2"><p class="box-text">2007</p></div>
  <div class="upper-box3"><p class="box-text">2008</p></div>
  <div class="upper-box4"><p class="box-text">2009</p></div>
  <div class="upper-box5"><p class="box-text">2010</p></div>
  <div class="upper-box6"><p class="box-text">2011</p></div>
  <div class="upper-box7"><p class="box-text">2012</p></div>
  <div class="upper-box8"><p class="box-text">2013</p></div>
<div class="clear"></div>
<div class="upper-legend"></div>
</div>

<div class="clear"></div>

<div class="top-left"><p class="box-heading">Graduation Rates</p> <div class="slider-
box"> <div id="slider"></div> </div> <div class="xaxis_label"> <div
class="xaxis_label_div">Time at UNM:</div> <pre class="xaxis_label_text"> </pre>
</div> </div>
<div class="top-right"><p class="box-heading2">Gender Distributions</p></div>
<div class="clear"></div>
<div class="bottom-left"><p class="box-heading">Female Percentages</p></div>
<div class="bottom-right"><p class="box-heading">Male Percentages</p></div>
<div class="clear"></div>

<style>
svg {
  font: 9px sans-serif;
}
</style>

<script type="text/javascript">

  //Width and height
  var w = 500, width = 141;
  var h = 300, height = 100;
  var radius = Math.min(width, height) / 2;

  var q1 = <%= @q200680.length %>;
  var q2 = <%= @q200780.length %>;
  var q3 = <%= @q200880.length %>;
  var q4 = <%= @q200980.length %>;
  var q5 = <%= @q201080.length %>;
  var q6 = <%= @q201180.length %>;
  var q7 = <%= @q201280.length %>;
  var q8 = <%= @q201380.length %>;

  var a1 = <%= @all200680.length %>;
  var a2 = <%= @all200780.length %>;

```

```

var a3 = <%= @all200880.length %>;
var a4 = <%= @all200980.length %>;
var a5 = <%= @all201080.length %>;
var a6 = <%= @all201180.length %>;
var a7 = <%= @all201280.length %>;
var a8 = <%= @all201380.length %>;

var p1 = d3.format(".2f")((q1/a1)*100);
var p2 = d3.format(".2f")((q2/a2)*100);
var p3 = d3.format(".2f")((q3/a3)*100);
var p4 = d3.format(".2f")((q4/a4)*100);
var p5 = d3.format(".2f")((q5/a5)*100);
var p6 = d3.format(".2f")((q6/a6)*100);
var p7 = d3.format(".2f")((q7/a7)*100);
var p8 = d3.format(".2f")((q8/a8)*100);

var f1 = <%= @f200680 %>;
var f2 = <%= @f200780 %>;
var f3 = <%= @f200880 %>;
var f4 = <%= @f200980 %>;
var f5 = <%= @f201080 %>;
var f6 = <%= @f201180 %>;
var f7 = <%= @f201280 %>;
var f8 = <%= @f201380 %>;

var m1 = <%= @m200680 %>;
var m2 = <%= @m200780 %>;
var m3 = <%= @m200880 %>;
var m4 = <%= @m200980 %>;
var m5 = <%= @m201080 %>;
var m6 = <%= @m201180 %>;
var m7 = <%= @m201280 %>;
var m8 = <%= @m201380 %>;

var pf1 = d3.format(".2f")((f1/a1)*100);
var pf2 = d3.format(".2f")((f2/a2)*100);
var pf3 = d3.format(".2f")((f3/a3)*100);
var pf4 = d3.format(".2f")((f4/a4)*100);
var pf5 = d3.format(".2f")((f5/a5)*100);
var pf6 = d3.format(".2f")((f6/a6)*100);
var pf7 = d3.format(".2f")((f7/a7)*100);
var pf8 = d3.format(".2f")((f8/a8)*100);

var pm1 = d3.format(".2f")((m1/a1)*100);
var pm2 = d3.format(".2f")((m2/a2)*100);
var pm3 = d3.format(".2f")((m3/a3)*100);
var pm4 = d3.format(".2f")((m4/a4)*100);
var pm5 = d3.format(".2f")((m5/a5)*100);
var pm6 = d3.format(".2f")((m6/a6)*100);
var pm7 = d3.format(".2f")((m7/a7)*100);
var pm8 = d3.format(".2f")((m8/a8)*100);

var q1_g06 = <%= @q200680_grad200680 %>;
var q1_g07 = <%= @q200680_grad200780 %>;
var q1_g08 = <%= @q200680_grad200880 %>;
var q1_g09 = <%= @q200680_grad200980 %>;
var q1_g10 = <%= @q200680_grad201080 %>;
var q1_g11 = <%= @q200680_grad201180 %>;
var q1_g12 = <%= @q200680_grad201280 %>;

```

```
var q1_g13 = <%= @q200680_grad201380 %>;

var q2_g06 = <%= @q200780_grad200680 %>;
var q2_g07 = <%= @q200780_grad200780 %>;
var q2_g08 = <%= @q200780_grad200880 %>;
var q2_g09 = <%= @q200780_grad200980 %>;
var q2_g10 = <%= @q200780_grad201080 %>;
var q2_g11 = <%= @q200780_grad201180 %>;
var q2_g12 = <%= @q200780_grad201280 %>;
var q2_g13 = <%= @q200780_grad201380 %>;

var q3_g06 = <%= @q200880_grad200680 %>;
var q3_g07 = <%= @q200880_grad200780 %>;
var q3_g08 = <%= @q200880_grad200880 %>;
var q3_g09 = <%= @q200880_grad200980 %>;
var q3_g10 = <%= @q200880_grad201080 %>;
var q3_g11 = <%= @q200880_grad201180 %>;
var q3_g12 = <%= @q200880_grad201280 %>;
var q3_g13 = <%= @q200880_grad201380 %>;

var q4_g06 = <%= @q200980_grad200680 %>;
var q4_g07 = <%= @q200980_grad200780 %>;
var q4_g08 = <%= @q200980_grad200880 %>;
var q4_g09 = <%= @q200980_grad200980 %>;
var q4_g10 = <%= @q200980_grad201080 %>;
var q4_g11 = <%= @q200980_grad201180 %>;
var q4_g12 = <%= @q200980_grad201280 %>;
var q4_g13 = <%= @q200980_grad201380 %>;

var q5_g06 = <%= @q201080_grad200680 %>;
var q5_g07 = <%= @q201080_grad200780 %>;
var q5_g08 = <%= @q201080_grad200880 %>;
var q5_g09 = <%= @q201080_grad200980 %>;
var q5_g10 = <%= @q201080_grad201080 %>;
var q5_g11 = <%= @q201080_grad201180 %>;
var q5_g12 = <%= @q201080_grad201280 %>;
var q5_g13 = <%= @q201080_grad201380 %>;

var q6_g06 = <%= @q201180_grad200680 %>;
var q6_g07 = <%= @q201180_grad200780 %>;
var q6_g08 = <%= @q201180_grad200880 %>;
var q6_g09 = <%= @q201180_grad200980 %>;
var q6_g10 = <%= @q201180_grad201080 %>;
var q6_g11 = <%= @q201180_grad201180 %>;
var q6_g12 = <%= @q201180_grad201280 %>;
var q6_g13 = <%= @q201180_grad201380 %>;

var q7_g06 = <%= @q201280_grad200680 %>;
var q7_g07 = <%= @q201280_grad200780 %>;
var q7_g08 = <%= @q201280_grad200880 %>;
var q7_g09 = <%= @q201280_grad200980 %>;
var q7_g10 = <%= @q201280_grad201080 %>;
var q7_g11 = <%= @q201280_grad201180 %>;
var q7_g12 = <%= @q201280_grad201280 %>;
var q7_g13 = <%= @q201280_grad201380 %>;

var q8_g06 = <%= @q201380_grad200680 %>;
var q8_g07 = <%= @q201380_grad200780 %>;
var q8_g08 = <%= @q201380_grad200880 %>;
var q8_g09 = <%= @q201380_grad200980 %>;
var q8_g10 = <%= @q201380_grad201080 %>;
```

```
var q8_g11 = <%= @q201380_grad201180 %>;
var q8_g12 = <%= @q201380_grad201280 %>;
var q8_g13 = <%= @q201380_grad201380 %>;

var p1_g06 = d3.format(".2f")((q1_g06/a1)*100);
var p2_g06 = d3.format(".2f")((q2_g06/a2)*100);
var p3_g06 = d3.format(".2f")((q3_g06/a3)*100);
var p4_g06 = d3.format(".2f")((q4_g06/a4)*100);
var p5_g06 = d3.format(".2f")((q5_g06/a5)*100);
var p6_g06 = d3.format(".2f")((q6_g06/a6)*100);
var p7_g06 = d3.format(".2f")((q7_g06/a7)*100);
var p8_g06 = d3.format(".2f")((q8_g06/a8)*100);

var p1_g07 = d3.format(".2f")((q1_g07/a1)*100);
var p2_g07 = d3.format(".2f")((q2_g07/a2)*100);
var p3_g07 = d3.format(".2f")((q3_g07/a3)*100);
var p4_g07 = d3.format(".2f")((q4_g07/a4)*100);
var p5_g07 = d3.format(".2f")((q5_g07/a5)*100);
var p6_g07 = d3.format(".2f")((q6_g07/a6)*100);
var p7_g07 = d3.format(".2f")((q7_g07/a7)*100);
var p8_g07 = d3.format(".2f")((q8_g07/a8)*100);

var p1_g08 = d3.format(".2f")((q1_g08/a1)*100);
var p2_g08 = d3.format(".2f")((q2_g08/a2)*100);
var p3_g08 = d3.format(".2f")((q3_g08/a3)*100);
var p4_g08 = d3.format(".2f")((q4_g08/a4)*100);
var p5_g08 = d3.format(".2f")((q5_g08/a5)*100);
var p6_g08 = d3.format(".2f")((q6_g08/a6)*100);
var p7_g08 = d3.format(".2f")((q7_g08/a7)*100);
var p8_g08 = d3.format(".2f")((q8_g08/a8)*100);

var p1_g09 = d3.format(".2f")((q1_g09/a1)*100);
var p2_g09 = d3.format(".2f")((q2_g09/a2)*100);
var p3_g09 = d3.format(".2f")((q3_g09/a3)*100);
var p4_g09 = d3.format(".2f")((q4_g09/a4)*100);
var p5_g09 = d3.format(".2f")((q5_g09/a5)*100);
var p6_g09 = d3.format(".2f")((q6_g09/a6)*100);
var p7_g09 = d3.format(".2f")((q7_g09/a7)*100);
var p8_g09 = d3.format(".2f")((q8_g09/a8)*100);

var p1_g10 = d3.format(".2f")((q1_g10/a1)*100);
var p2_g10 = d3.format(".2f")((q2_g10/a2)*100);
var p3_g10 = d3.format(".2f")((q3_g10/a3)*100);
var p4_g10 = d3.format(".2f")((q4_g10/a4)*100);
var p5_g10 = d3.format(".2f")((q5_g10/a5)*100);
var p6_g10 = d3.format(".2f")((q6_g10/a6)*100);
var p7_g10 = d3.format(".2f")((q7_g10/a7)*100);
var p8_g10 = d3.format(".2f")((q8_g10/a8)*100);

var p1_g11 = d3.format(".2f")((q1_g11/a1)*100);
var p2_g11 = d3.format(".2f")((q2_g11/a2)*100);
var p3_g11 = d3.format(".2f")((q3_g11/a3)*100);
var p4_g11 = d3.format(".2f")((q4_g11/a4)*100);
var p5_g11 = d3.format(".2f")((q5_g11/a5)*100);
var p6_g11 = d3.format(".2f")((q6_g11/a6)*100);
var p7_g11 = d3.format(".2f")((q7_g11/a7)*100);
var p8_g11 = d3.format(".2f")((q8_g11/a8)*100);

var p1_g12 = d3.format(".2f")((q1_g12/a1)*100);
var p2_g12 = d3.format(".2f")((q2_g12/a2)*100);
var p3_g12 = d3.format(".2f")((q3_g12/a3)*100);
```

```

var p4_g12 = d3.format(".2f")((q4_g12/a4)*100);
var p5_g12 = d3.format(".2f")((q5_g12/a5)*100);
var p6_g12 = d3.format(".2f")((q6_g12/a6)*100);
var p7_g12 = d3.format(".2f")((q7_g12/a7)*100);
var p8_g12 = d3.format(".2f")((q8_g12/a8)*100);

var p1_g13 = d3.format(".2f")((q1_g13/a1)*100);
var p2_g13 = d3.format(".2f")((q2_g13/a2)*100);
var p3_g13 = d3.format(".2f")((q3_g13/a3)*100);
var p4_g13 = d3.format(".2f")((q4_g13/a4)*100);
var p5_g13 = d3.format(".2f")((q5_g13/a5)*100);
var p6_g13 = d3.format(".2f")((q6_g13/a6)*100);
var p7_g13 = d3.format(".2f")((q7_g13/a7)*100);
var p8_g13 = d3.format(".2f")((q8_g13/a8)*100);

var color = d3.scale.category20();

var dataset = [ q1, q2, q3, q4, q5, q6, q7, q8 ];

var all = [ a1, a2, a3, a4, a5, a6, a7, a8 ];

var percentages = [ p1, p2, p3, p4, p5, p6, p7, p8 ];

var perc_all = [ p1_g06, p2_g06, p3_g06, p4_g06, p5_g06, p6_g06, p7_g06,
p8_g06, p1_g07, p2_g07, p3_g07, p4_g07, p5_g07, p6_g07, p7_g07, p8_g07, p1_g08,
p2_g08, p3_g08, p4_g08, p5_g08, p6_g08, p7_g08, p8_g08, p1_g09, p2_g09, p3_g09, p4_g09,
p5_g09, p6_g09, p7_g09, p8_g09, p1_g10, p2_g10, p3_g10, p4_g10, p5_g10, p6_g10,
p7_g10, p8_g10, p1_g11, p2_g11, p3_g11, p4_g11, p5_g11, p6_g11, p7_g11, p8_g11, p1_g12,
p2_g12, p3_g12, p4_g12, p5_g12, p6_g12, p7_g12, p8_g12, p1_g13, p2_g13, p3_g13, p4_g13,
p5_g13, p6_g13, p7_g13, p8_g13, p1, p2, p3, p4, p5, p6, p7, p8 ];

var all_grad = [ q1_g06, q2_g06, q3_g06, q4_g06, q5_g06, q6_g06, q7_g06,
q8_g06, q1_g07, q2_g07, q3_g07, q4_g07, q5_g07, q6_g07, q7_g07, q8_g07, q1_g08,
q2_g08, q3_g08, q4_g08, q5_g08, q6_g08, q7_g08, q8_g08, q1_g09, q2_g09, q3_g09, q4_g09,
q5_g09, q6_g09, q7_g09, q8_g09, q1_g10, q2_g10, q3_g10, q4_g10, q5_g10, q6_g10,
q7_g10, q8_g10, q1_g11, q2_g11, q3_g11, q4_g11, q5_g11, q6_g11, q7_g11, q8_g11, q1_g12,
q2_g12, q3_g12, q4_g12, q5_g12, q6_g12, q7_g12, q8_g12, q1_g13, q2_g13, q3_g13, q4_g13,
q5_g13, q6_g13, q7_g13, q8_g13, q1, q2, q3, q4, q5, q6, q7, q8 ];

var males = [ m1, m2, m3, m4, m5, m6, m7, m8 ];

var females = [ f1, f2, f3, f4, f5, f6, f7, f8 ];

var perc_females = [ pf1, pf2, pf3, pf4, pf5, pf6, pf7, pf8 ];

var perc_males = [ pm1, pm2, pm3, pm4, pm5, pm6, pm7, pm8 ];

var eth_his = [ <%= @e1_200680 %>, <%= @e1_200780 %>, <%= @e1_200880 %>,
<%= @e1_200980 %>, <%= @e1_201080 %>, <%= @e1_201180 %>, <%= @e1_201280 %>, <%=
@e1_201380 %> ];
var eth_ami = [ <%= @e2_200680 %>, <%= @e2_200780 %>, <%= @e2_200880 %>,
<%= @e2_200980 %>, <%= @e2_201080 %>, <%= @e2_201180 %>, <%= @e2_201280 %>, <%=
@e2_201380 %> ];
var eth_oth = [ <%= @e3_200680 %>, <%= @e3_200780 %>, <%=
@e3_200880 %>, <%= @e3_200980 %>, <%= @e3_201080 %>, <%= @e3_201180 %>, <%= @e3_201280
%>, <%= @e3_201380 %> ];
var eth_blc = [ <%= @e4_200680 %>, <%= @e4_200780 %>, <%=
@e4_200880 %>, <%= @e4_200980 %>, <%= @e4_201080 %>, <%= @e4_201180 %>, <%= @e4_201280
%>, <%= @e4_201380 %> ];

```



```

var tip_pie_2008 = d3.tip()
    .attr('class', 'd3-tip')
    .offset([-10, 0])
    .html(function(d, i) {
        return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + ((eth_2008[i]/all[2])*100).toPrecision(4) + ' %' + "</span> ";
    });

var tip_pie_2009 = d3.tip()
    .attr('class', 'd3-tip')
    .offset([-10, 0])
    .html(function(d, i) {
        return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + ((eth_2009[i]/all[3])*100).toPrecision(4) + ' %' + "</span> ";
    });

var tip_pie_2010 = d3.tip()
    .attr('class', 'd3-tip')
    .offset([-10, 0])
    .html(function(d, i) {
        return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + ((eth_2010[i]/all[4])*100).toPrecision(4) + ' %' + "</span> ";
    });

var tip_pie_2011 = d3.tip()
    .attr('class', 'd3-tip')
    .offset([-10, 0])
    .html(function(d, i) {
        return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + ((eth_2011[i]/all[5])*100).toPrecision(4) + ' %' + "</span> ";
    });

var tip_pie_2012 = d3.tip()
    .attr('class', 'd3-tip')
    .offset([-10, 0])
    .html(function(d, i) {
        return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + ((eth_2012[i]/all[6])*100).toPrecision(4) + ' %' + "</span> ";
    });

var tip_pie_2013 = d3.tip()
    .attr('class', 'd3-tip')
    .offset([-10, 0])
    .html(function(d, i) {
        return "<strong>" + eth[i] + " :</strong> <span
style='color:red'>" + ((eth_2013[i]/all[7])*100).toPrecision(4) + ' %' + "</span> ";
    });

var stack = d3.layout.stack();
    stack(gender_stack);

var xScale = d3.scale.ordinal()

```

```

        .domain(d3.range(percentages.length))
        .rangeRoundBands([0, w], 0.05);

    var xScale_females = d3.scale.ordinal()
        .domain(d3.range(females.length))
        .rangeRoundBands([0, w], 0.05);

    var xScale_males = d3.scale.ordinal()
        .domain(d3.range(males.length))
        .rangeRoundBands([0, w], 0.05);

    var xScale_stack = d3.scale.ordinal()
        .domain(d3.range(gender_stack[0].length))
        .rangeRoundBands([0, w - 60], 0.05);

    var yScale = d3.scale.linear()
        .domain([0, d3.max(all, function(d) { return d * 0.7;})])
        .range([0, h - 50]);

    var yScale_reverse = d3.scale.linear()
        .domain([0, d3.max(all, function(d) {
return d * 0.7 ;})])
        .range([h - 50, 0]);

    var yScale_females = d3.scale.linear()
        .domain([0, d3.max(perc_females,
function(d) { return d; })])
        .range([0, h - 50]);

    var yScale_females_reverse = d3.scale.linear()
        .domain([0, d3.max(perc_females,
function(d) { return d; })])
        .range([h - 50, 0]);

    var yScale_males = d3.scale.linear()
        .domain([0, d3.max(perc_males,
function(d) { return d; })])
        .range([0, h - 50]);

    var yScale_males_reverse = d3.scale.linear()
        .domain([0, d3.max(perc_males, function(d)
{ return d; })])
        .range([h - 50, 0]);

    var yScale_stack = d3.scale.linear()
        .domain([0, d3.max(gender_stack, function(d) {return
d3.max(d, function(d) {return d.y0 + d.y;});})])
        .range([0, h - 50]);

    var xAxis = d3.svg.axis()
        .scale(xScale)
        .tickFormat(function(d) { return axis_label2[d]; })
        .orient("bottom");

    var yAxis_reverse = d3.svg.axis()
        .scale(yScale_reverse)

```

```

65, 70]) // .tickValues([0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60,
// .ticks([15])
// .tickFormat(function(d) { return d + ' %';})
// .orient("left");

var yAxis_females_reverse = d3.svg.axis()
    .scale(yScale_females_reverse)
    .tickFormat(function(d) { return d + ' %';})
    .orient("left");

var yAxis_males_reverse = d3.svg.axis()
    .scale(yScale_males_reverse)
    .tickFormat(function(d) { return d + ' %';})
    .orient("left");

var xAxis_stack = d3.svg.axis()
    .scale(xScale_stack)
    .tickFormat(function(d) { return axis_label2[d]; })
    .orient("top");

var yAxis_stack = d3.svg.axis()
    .scale(yScale_stack)
    .orient("left");

//jQuery UI Slider function to change years range

    $(".xaxis_label_text").text( xaxis_label[8] );
    $(function() {
        var tt = 0;
        $( "#slider" ).slider({
            min: 0,
            max: 8,
            value: 8,
            animate: "fast",
            step: 1,
            slide: function( event, ui ) {
                tt = ui.value
            }
        })
        .each(function() {
            var opt = $(this).data().uiSlider.options;
            var label = [2006, 2007, 2008, 2009, 2010, 2011, 2012,
2013, 2014];
            for (var i = 0; i < label.length; i++) {
                var el =
$( '<label>'+(label[i])+'</label>' ).css('left',(i*250/label[i]*100)+'%');
                $( "#slider" ).append(el);
            }
        });

////////////////////////////////////
////////////////////////////////////

// UPPER ETHNICITY FIELD

var arc = d3.svg.arc()

```

```

        .outerRadius(radius);

var pie = d3.layout.pie()
    .sort(null)
    .value(function(d) { return d; });

var upper_box1 = d3.select(".upper-box1")
    .append("svg")
    .attr("width", width)
    .attr("height", height)
    .append("g")
    .attr("transform", "translate(" + width / 2 + "," + height / 2
+ ")");
upper_box1.call(tip_pie_2006);
var upper_box1_g = upper_box1.selectAll(".arc")
    .data(pie(eth_2006))
    .enter().append("g")
    .attr("class", "arc");

upper_box1_g.append("path")
    .attr("d", arc)
    .style("fill", function(d, i) { return color(i); })
    .on('mouseover', tip_pie_2006.show)
    .on('mouseout', tip_pie_2006.hide)
    .transition()
    .ease("bounce")
    .duration(2000)
    .attrTween("d", tweenPie)
    .transition()
    .ease("elastic")
    .delay(function(d, i) { return 2000 + i * 50; })
    .duration(1000)
    .attrTween("d", tweenDonut)

function tweenPie(b) {
    b.innerRadius = 0;
    var i = d3.interpolate({startAngle: 0, endAngle: 0}, b);
    return function(t) { return arc(i(t)); };
}

function tweenDonut(b) {
    b.innerRadius = radius * .4;
    var i = d3.interpolate({innerRadius: 0}, b);
    return function(t) { return arc(i(t)); };
}

var upper_box2 = d3.select(".upper-box2")
    .append("svg")
    .attr("width", width)
    .attr("height", height)
    .append("g")
    .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box2.call(tip_pie_2007);
    var upper_box2_g = upper_box2.selectAll(".arc")
        .data(pie(eth_2007))
        .enter().append("g")
        .attr("class", "arc");

```

```

        upper_box2_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2007.show)
        .on('mouseout', tip_pie_2007.hide)
        .transition()
        .ease("bounce")

        .delay(500)

        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
})

        .delay(2500)

        .duration(2000)
        .attrTween("d", tweenDonut)

        var upper_box3 = d3.select(".upper-box3")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
        upper_box3.call(tip_pie_2008);
        var upper_box3_g = upper_box3.selectAll(".arc")
        .data(pie(eth_2008))
        .enter().append("g")
        .attr("class", "arc");

        upper_box3_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2008.show)
        .on('mouseout', tip_pie_2008.hide)
        .transition()
        .ease("bounce")
        .delay(1000)
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
})

        .delay(3000)
        .duration(2000)
        .attrTween("d", tweenDonut)

        var upper_box4 = d3.select(".upper-box4")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");

```

```

upper_box4.call(tip_pie_2009);
var upper_box4_g = upper_box4.selectAll(".arc")
    .data(pie(eth_2009))
    .enter().append("g")
    .attr("class", "arc");

    upper_box4_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2009.show)
        .on('mouseout', tip_pie_2009.hide)
        .transition()
        .ease("bounce")
        .delay(1500)
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
})

        .delay(3500)
        .duration(2000)
        .attrTween("d", tweenDonut)

    var upper_box5 = d3.select(".upper-box5")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box5.call(tip_pie_2010);
    var upper_box5_g = upper_box5.selectAll(".arc")
        .data(pie(eth_2010))
        .enter().append("g")
        .attr("class", "arc");

        upper_box5_g.append("path")
            .attr("d", arc)
            .style("fill", function(d, i) { return
color(i); })

            .on('mouseover', tip_pie_2010.show)
            .on('mouseout', tip_pie_2010.hide)
            .transition()
            .ease("bounce")
            .delay(2000)
            .duration(2000)
            .attrTween("d", tweenPie)
            .transition()
            .ease("elastic")
            .delay(function(d, i) { return 2000 + i * 50;
})

            .delay(4000)
            .duration(2000)
            .attrTween("d", tweenDonut)

    var upper_box6 = d3.select(".upper-box6")
        .append("svg")

```



```

        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box6.call(tip_pie_2011);
    var upper_box6_g = upper_box6.selectAll(".arc")
        .data(pie(eth_2011))
        .enter().append("g")
        .attr("class", "arc");

    upper_box6_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2011.show)
        .on('mouseout', tip_pie_2011.hide)
        .transition()
        .ease("bounce")
        .delay(2500)
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
})

        .delay(4500)
        .duration(2000)
        .attrTween("d", tweenDonut)

    var upper_box7 = d3.select(".upper-box7")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box7.call(tip_pie_2012);
    var upper_box7_g = upper_box7.selectAll(".arc")
        .data(pie(eth_2012))
        .enter().append("g")
        .attr("class", "arc");

    upper_box7_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2012.show)
        .on('mouseout', tip_pie_2012.hide)
        .transition()
        .ease("bounce")
        .delay(3000)
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
})

        .delay(5000)
        .duration(2000)

```

```

        .attrTween("d", tweenDonut)

    var upper_box8 = d3.select(".upper-box8")
        .append("svg")
        .attr("width", width)
        .attr("height", height)
        .append("g")
        .attr("transform", "translate(" + width / 2 +
", " + height / 2 + ")");
    upper_box1.call(tip_pie_2013);
    var upper_box8_g = upper_box8.selectAll(".arc")
        .data(pie(eth_2013))
        .enter().append("g")
        .attr("class", "arc");

    upper_box8_g.append("path")
        .attr("d", arc)
        .style("fill", function(d, i) { return
color(i); })

        .on('mouseover', tip_pie_2013.show)
        .on('mouseout', tip_pie_2013.hide)
        .transition()
        .ease("bounce")
        .delay(3500)
        .duration(2000)
        .attrTween("d", tweenPie)
        .transition()
        .ease("elastic")
        .delay(function(d, i) { return 2000 + i * 50;
})

        .delay(5500)
        .duration(2000)
        .attrTween("d", tweenDonut)

// LEGEND

    var upper_legend = d3.select(".upper-legend")
        .append("svg")
            .attr("width", w*3)
            .attr("height", 100);
    var upper_legend_data = upper_legend.selectAll(".legend")
        .data(eth)
        .enter().append("g")
        .attr("class", "legend")
        .attr("transform", function(d, i) { return "translate("
+ (150 + (150 * i)) + "," + 30 + ")"; });

    upper_legend_data.append("rect")
        .attr("x", 0)
        .attr("y", 0)
        .attr("width", 18)
        .attr("height", 18)
        .style("fill", function(d, i) {return color(i)});

    upper_legend_data.append("text")
        .attr("x", 10)
        .attr("y", 30)
        .attr("dy", ".35em")
        .style("text-anchor", "middle")
        .text(function(d, i) { return eth[i] ; });

```

```

////////////////////////////////////
////////////////////////////////////

// TOP LEFT SIDE
var top_left = d3.select(".top-left")
    .append("svg")
    .attr("width", w+70)
    .attr("height", h);
top_left.call(tip);
top_left.selectAll("rect")
    .data(all_grad_slice)
    .enter()
    .append("rect")
    .attr("x", function(d, i) { return (i * (w /
percentages.length)) + 64; })
    .attr("y", function(d) { return h - yScale(d) - 20; })
    .attr("width", xScale.rangeBand())
    .attr("height", function(d) { return yScale(d); })
    .style("fill",function(d, i) { return color(0); })
    .on('mouseover', tip.show)
    .on('mouseout', tip.hide);
top_left.selectAll("text")
    .data(all_grad_slice)
    .enter()
    .append("text")
    .text(function(d, i) { return perc_all_slice[i] + '%' })
    .attr("x", function(d, i) { return (xScale(i) +
xScale.rangeBand() / 2) + 64; })
    .attr("y", function (d) { return h - 25 - yScale(d) })
    .attr("font-family", "sans-serif")
    .attr("font-size", "11px")
    .attr("fill", "black")
    .style("text-anchor", "middle");
var top_left_axis = top_left.append("g")
    .attr("class", "axis")
    .attr("transform", "translate(" + 60 + "," + (h - 20) +
)")")
    .call(xAxis)
    .append("text")
    .attr("y", 9)
    .attr("x", 11)
    .attr("dy", ".71em")
    .style("text-anchor", "end")
    .text("Cohort Year:");
top_left.append("g")
    .attr("class", "axis")
    .attr("transform", "translate(" + 60 + "," + 30 + ")")
    .call(yAxis_reverse)
    .append("text")
    .attr("transform", "rotate(-90)")
    .attr("y", -55)
    .attr("x", -55)
    .attr("dy", ".71em")
    .style("text-anchor", "end")
    .text("Number of Students");

// TOP RIGHT SIDE

```

```

var top_right = d3.select(".top-right")
    .append("svg")
    .attr("width", w+50)
    .attr("height", h);
top_right.call(tip_stack);
var top_right_groups = top_right.selectAll("g")
    .data(gender_stack)
    .enter()
    .append("g")
    .style("fill", function(d, i) { return color(i+4); });
var top_right_rects = top_right_groups.selectAll("rect")
    .data(function(d) { return d; })
    .enter()
    .append("rect")
    .attr("x", function(d, i) { return xScale_stack(i) + 60 ; })
    .attr("y", function(d) { return yScale_stack(d.y0)+20 ; })
    .attr("height", function(d) { return yScale_stack(d.y) ; })
    .attr("width", xScale_stack.rangeBand())
    .on('mouseover', tip_stack.show)
    .on('mouseout', tip_stack.hide);
top_right_groups.selectAll("text")
    .data(function(d) { return d; })
    .enter()
    .append("text")
    .attr("x", function(d, i) { return xScale_stack(i) + 85 ; })
    .attr("y", function(d) { return yScale_stack(d.y0) + 40
})

    .attr("fill", "black")
    .style("text-anchor", "middle")
    .text(function(d) { return d.y; });
var top_right_axis = top_right.append("g")
    .attr("class", "axis")
    .attr("transform", "translate(" + 60 + " ," + 20 + ")")
    .call(xAxis_stack);
top_right.append("g")
    .attr("class", "axis")
    .attr("transform", "translate(" + 60 + " ," + 20 + ")")
    .call(yAxis_stack)
    .append("text")
    .attr("transform", "rotate(-90)")
    .attr("y", -55)
    .attr("x", -55)
    .attr("dy", ".71em")
    .style("text-anchor", "end")
    .text("Students Admitted to UNM");
var top_right_legend = top_right.selectAll(".legend")
    .data(gen)
    .enter().append("g")
    .attr("class", "legend")
    .attr("transform", function(d, i) { return "translate(" + (Math.pow(-
80,i)) + " ," + 20 + ")"; });
top_right_legend.append("rect")
    .attr("x", w - 20)
    .attr("y", h - 40)
    .attr("width", 18)
    .attr("height", 18)
    .style("fill", function (d, i) {return color(i+4)});
top_right_legend.append("text")
    .attr("x", w - 26)

```

```

        .attr("y", h - 30)
        .attr("dy", ".35em")
        .style("text-anchor", "end")
        .text(function(d, i) { return gen[i] ; });

// BOTTOM LEFT SIDE

    var bottom_left = d3.select(".bottom-left")
        .append("svg")
        .attr("width", w+60)
        .attr("height", h);
    bottom_left.selectAll("rect")
        .data(perc_females)
        .enter()
        .append("rect")
        .attr("x", function(d, i) { return i * (w /
perc_females.length) + 54; })
        .attr("y", function(d) { return h - yScale_females(d) - 20;
})

        .attr("width", xScale_females.rangeBand())
        .attr("height", function(d) { return yScale_females(d) ; })
        .style("fill",function(d, i) { return color(3); });
    bottom_left.selectAll("text")
        .data(perc_females)
        .enter()
        .append("text")
        .text(function(d, i) {return d + ' %';})
        .attr("x", function(d, i) { return (xScale_females(i) +
xScale_females.rangeBand() / 2) + 54; })
        .attr("y", function (d) {return h - 5 - yScale_females(d)})
        .attr("font-family", "sans-serif")
        .attr("font-size", "11px")
        .attr("fill", "black")
        .style("text-anchor", "middle");
    var bottom_left_axis = bottom_left.append("g")
        .attr("class", "axis")
        .attr("transform", "translate(" + 50 + ", " + (h-20) + ")")
        .call(xAxis);
    bottom_left.append("g")
        .attr("class", "axis")
        .attr("transform", "translate(" + 50 + ", " + 30 + ")")
        .call(yAxis_females_reverse);

// BOTTOM RIGHT SIDE

    var bottom_right = d3.select(".bottom-right")
        .append("svg")
        .attr("width", w+60)
        .attr("height", h);
    bottom_right.selectAll("rect")
        .data(perc_males)
        .enter()
        .append("rect")
        .attr("x", function(d, i) { return i * (w /
perc_males.length) + 54; })
        .attr("y", function(d) { return h - yScale_males(d) - 20; })
        .attr("width", xScale_males.rangeBand())
        .attr("height", function(d) { return yScale_males(d) ; })
        .style("fill",function(d, i) { return color(6); });

```

```

        bottom_right.selectAll("text")
            .data(perc_males)
            .enter()
            .append("text")
            .text(function(d, i) {return d + ' %'})
            .attr("x", function(d, i) { return (xScale_males(i) +
xScale_males.rangeBand() / 2) + 54; })
            .attr("y", function (d) {return h - 5 - yScale_males(d)})
            .attr("font-family", "sans-serif")
            .attr("font-size", "11px")
            .attr("fill", "black")
            .style("text-anchor", "middle");
        var bottom_right_axis = bottom_right.append("g")
            .attr("class", "axis")
            .attr("transform", "translate(" + 50 + "," + (h-20) + ")")
            .call(xAxis);
        bottom_right.append("g")
            .attr("class", "axis")
            .attr("transform", "translate(" + 50 + "," + 30 + ")")
            .call(yAxis_males_reverse);

// Update chart with slider change event
$( "#slider" ).slider({
    slide: function( event, ui ) {
        var tt = ui.value;

        $(".xaxis_label_text").text( xaxis_label[tt] );

        var perc_all_slice = perc_all.slice((tt*8), (tt*8)+8);
        var all_grad_slice = all_grad.slice((tt*8), (tt*8)+8);

//Top Left

        top_left.selectAll("rect")
            .data(all_grad_slice)
            .transition()
            .duration(500)
            .ease("linear")
            .attr("x", function(d, i) { return (i * (w /
percentages.length)) + 64; })
            .attr("y", function(d) { return h - yScale(d) - 20; })
            .attr("width", xScale.rangeBand())
            .attr("height", function(d) { return yScale(d) ; })
            .style("fill",function(d, i) { return color(0); });
        top_left.selectAll("text")
            .data(all_grad_slice)
            .transition()
            .duration(500)
            .ease("linear")
            .text(function(d, i) {return perc_all_slice[i] + ' %'})
            .attr("y", function (d) {return h - 25 - yScale(d)});

        top_left_axis.call(xAxis);

    }
});
});
</script>

```

A.5 Figure A.5 - Dashboard interface *Layout.erb* file

```
<html>
<head>
  <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
  <title>UNM Dashboard</title>
  <link rel="shortcut icon" href="https://webcore.unm.edu/v1/images/unm.ico"
/>
  <link rel="stylesheet" href="/stylesheets/main.css" type="text/css"
charset="utf-8" />

  <script
src="//cdnjs.cloudflare.com/ajax/libs/d3/3.4.8/d3.min.js"></script>
  <script src="//cdnjs.cloudflare.com/ajax/libs/d3-tip/0.6.3/d3-
tip.min.js"></script>
  <script
src="//cdnjs.cloudflare.com/ajax/libs/jquery/2.1.1/jquery.min.js"></script>
  <link rel="stylesheet"
href="//code.jquery.com/ui/1.10.4/themes/smoothness/jquery-ui.css">
  <script src="//code.jquery.com/jquery-1.10.2.js"></script>
  <script src="//code.jquery.com/ui/1.10.4/jquery-ui.js"></script>
</head>
<body>
  <div class="container">
    <%= yield %>
  </div>
</body>
</html>
```

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