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Leicester Public Schools Information and Data Portal: Research and Recommendations

Yue Cen
Clark University, ycen@clarku.edu

Natalie Bonetti
Clark University, nbonetti@clarku.edu

Rashida Buchanan
Clark University, rbuchanan@clarku.edu

Sathark Jain
Clark University, sjain@clarku.edu

Yuwei Wong
Clark University, ywong@clarku.edu

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Praburam Balakrishnan, Natalie Bonetti, Rashida Buchanan,

Yue Cen, Sathark Jain, Yuwei Wang

School of Professional Studies

Clark University

Abstract

The purpose of this project is to develop a strategy for the creation of a multifaceted portal to help with the organization and dissemination of information about the Leicester public school district. The functionality of this portal is to provide comparative financial, demographic, and academic data to other relative school districts in the area, both for the parents' and for the city's reference. It will be an examination into the best practices for creating a portal, both technological and aesthetic recommendations, as well as research into the value the publication of this data would provide for the parents of current and prospective students as well as the district and the greater town. As for a basic overview, this project will examine four comparable Massachusetts districts' data, Milbury, Abington, Avon, and Uxbridge, and construct some visual representations of comparable statistics. The key areas to be compared are: for financial, the total budget, per pupil expenditure, and Chapter 70 money; for academic, MCAS percentage proficient and advanced, SAT scores, and number of AP tests taken; and for demographic, graduation rate, attendance rate, and dropout rate. The secondary part of the project is a best practices recommendation which will be comprised of two parts: technological tools and aesthetics/usability, which will be supported with a discussion about the value this type of portal would have for a school district.

Keywords: educational database, student research, Massachusetts schools

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Executive Summary

This project is a final semester component for the graduates of the Clark University School of Professional Studies. The team members involved come from each of the three

programs of study: Masters of Professional Communication, Masters of Public Administration, and Masters of Information and Technology. Each group project is in partnership with an assigned client, in the case of this project, the Leicester Public School District, who come up with a set of deliverables for their teams to work on for a semester and report back on. The educational purpose of this project was to serve as a real world example of the kind of teamwork that might need to be done in the public sector in order to prepare students for life after completion of the graduate program.

Originally, when the team met with the client, the project deliverable was intended to be a populated student data portal that would include current school data for three fields: academic performance, financial budgeting, and demographic statistics. However, due to constraints on time and resources, the team worked with our client representative and our advisor to create a list of deliverables that would provide value to the client, while at the same time, a learning opportunity for the team. As a result, the new parameters of the project consisted of a basic search into the current issues relating to student data and school websites to provide general background information, a survey of the current IT tools available to build the sort of portal that Leicester was intending, a comparative look at four other schools' websites to provide aesthetic recommendations to improve the look of the Leicester Public Schools' website, and finally an analysis of Leicester's data incorporative of the three fields mentioned in comparison to four other schools to help advise on Leicester's comparative strengths and weaknesses as a district.

An account of the general findings of the report are as follows. When conducting research on current topics regarding student data, there were two main areas examined: the first was the federal laws in place to protect children's privacy and the second was parent's reactions toward schools posting this information in order to compare schools' performance. When

researching school websites, there were two main findings, both in reference to people with disabilities: the first was that websites that use font sizes or color combinations that are hard to read can be found as discriminatory and the second was that disability should be considered in school demographic research as a facet of diversity. For IT recommendations, it was found that for the user interface, the best programs to use are HTML, AngularJS, CSS, and JavaScript. For the application itself, Apache tomcat is best suited for the application server and Java is best for the application layer. The database should be created with MySQL.

When comparing Leicester to other schools, finding were grouped into two areas: website aesthetic recommendations for the website and comparative research of Leicester's performance. The team made aesthetic website recommendations for five main areas, the homepage, the dropdown menu, hyperlinks, sliders, and the main content of the pages. These recommendations were based on the Milbury, Abington and Avon webpages' success and usability. For performance data, there were areas of both positive trends and areas for improvement. Comparatively, Leicester performed well in the SAT, but needs improvement in overall MCAS performance and helping disadvantaged students perform at a similar level to the rest of the students. This could be improved through a closer teacher to student ratio (which has been declining over the past five years).

As a final recommendation, the team hopes that the research provided here can be of use in several aspects of the creation of a portal for the Leicester Public School District. Aside from the list of IT recommendations that have already been stated and the aesthetic areas already pointed out as target spots for improvement, the team did create a short list of possible recommendations based on the school performance data analysis: since Avon and Uxbridge have demonstrated strengths to contrast areas where Leicester has weaknesses, the team suggests that

Leicester partner with them in the area of helping their disadvantaged students' achievement and the student to teacher ratios and since female students did not perform as well as males on the math SAT, the team advises that Leicester administer the SMARS test to determine if the students have math anxiety.

Leicester Public Schools Information and Data Portal:

Research and Recommendations

Nestled between Worcester, Paxton, Spencer, and Auburn, the town of Leicester boasts of a population of 11,000 people, 1,900 of those being school age children (Town of Leicester, (n.d)). The town has a close connection with its rich industrial past, made evident by an historic district. It prides itself on being the perfect location for families who work in Worcester or other nearby cities to raise their families. Because of this, Leicester understands how the value of a competitive school district can aid in creating a multifaceted hometown well-suited to serving its residents in the ways that they need. Its mission statement reflects this view: "Recognized by the

community as its greatest asset, the Leicester schools engage every child in rigorous and student-centered learning in a safe and technology-rich environment" (Leicester Public Schools, (n.d.)). There are four schools that make up the school district: two elementary schools, Leicester Memorial Elementary School and Leicester Primary School; Leicester Middle School; and Leicester High School.

In order to measure community viewpoints about school-related topics, director of technology for the school department and vice chairman of the Middle School Building Committee Jeff Berthiuame created a "thought exchange" poll (the second of which was conducted this past year) and published the results (Gonsalves, Nov. 2017). Based on the study, the participants felt most strongly about future planning, technology, and learning facility, expressing the belief that "schoolchildren deserve upgraded, modern facilities for learning at a time when the town is getting a renovated library and new fire station" (Gonsalves, Nov. 2017). Based on the results of this study, the residents of Leicester value the school system for what it can do for the town as a whole and take great stock in the belief that through helping future generations enhance their education a town can provide long term benefits for future generations to experience.

The school district has been experiencing recent changes over the past few years in an effort to make some targeted performance improvements. In 2017, Leicester implemented a three year action plan to improve the district performance. The five identified areas for improvement are: targeted reading proficiency by grade three, enhanced tech literacy, greater success in algebra, zero suspensions, and increased graduation rates. The three strategies through which the district plans to implement to achieve their goals are by "engaging instruction and effective interventions grounded in rigorous curriculum, develop[ing] staff skills through effective

feedback and training, [and] improv[ing] infrastructure and resources" (Leicester Public Schools, 2017, p. 3). The district's plan to create a portal featuring such information as demographic, academic, and financial data would directly tie in with this project because some of these areas would see improvement if success was achieved. For example, high school graduation statistics are already slated for display in the portal, but the number of suspensions might also be considered for publishing in this section as well. As one of the three strategies being implemented, the district asserts that they plan to improve infrastructure and resources; the publishing of this portal would help with proving "sufficient allocation of financial resources" through improving ease of access to financial budgeting information (Leicester Public Schools, 2017, p. 3). Therefore, the creation of a school information portal would support this existing plan for achievement that the district has recently put forth.

Additionally, in terms of change, the district is also in the process of renovating their middle school. The original probe into alternative options for the 1961 middle school began under former superintendent of schools Judy Paolucci (Gonsalves, May 2017). The Massachusetts School Building Authority (MSBA) approved the project in December (O'Connell, 2017), making it eligible for state reimbursement of roughly 59% of the total project cost (Gonsalves, May 2017). In fact, up to $750,000 of the $28.7 million operating budget for fiscal year 2018 was appropriated for a feasibility study for future middle school construction and renovations (Gonsalves, May 2017).

The final change the district experienced in recent years was a high turnover in superintendents. Former Superintendent Paolucci left Leicester after four and a half years. Marilyn Tencza, former director of curriculum in Leicester for several years and superintendent of schools in North Brookfield took over for Michael Wood, director of student services, who

was serving as acting superintendent until the beginning of the 2017-2018 academic year (Semon, 2017). This ongoing transience in authority provides the perfect chance for Leicester to implement new change in its school system. The proposed portal can help track those changes and provide transparency for parents and the city.

Leicester Public Schools was already in the process of creating a dynamic portal with which the intention was to post the most current statistical data for the general viewership of the Leicester community. The intended areas of focus include academic, financial, and demographic data. The key statistics within those genres to be compared are: for financial, the total budget, per pupil expenditure, and Chapter 70 money; for academic, MCAS percentage proficient and advanced, SAT scores, and number of AP tests taken; and for demographic, graduation rate, attendance rate, and dropout rate.

While the portal was originally created, due to changes in staffing and employee contingency, a new framework must be created. Originally, this group was approached with the task of creating a new portal or information database for the school district. However, due to feasibility concerns, primarily time and access to resources, this team engaged in discussions with the client to adapt the project parameters. As a result, this team was tasked with helping to compare Leicester's district performance with other relative Massachusetts districts and provide general recommendations for future website development.

The negotiated purpose of this project is to provide research for the Leicester Schools to aid in the presentation of their relative competitiveness to other schools in Massachusetts. This project is composed of two primary parts: the first is to research trends in the industry and provide recommendations for aesthetic and technological tools to create a portal that is easy for parents and community members to engage with and navigate through. The second part of the

project is to analyze provided raw data of Leicester's academic, financial, and demographic information to four other Massachusetts schools: Avon, Abington, Uxbridge, and Millbury.

Recommendations provided in this report will be evaluated for feasibility and considered when Leicester conducts the final development of their student portal. The data analysis provided in this report will help the district evaluate areas of comparative strength and weakness in comparison to other districts. The publishing of information that makes the school look competitive in the area can help with the perception of the school's viability and even the more general attractiveness of the town for prospective residents.

Literature Review

This section will explore various topics related to the proposed project in an effort to create a background of research for this project's recommendations. When first conducting research for this project, our team decided to look at what information was available regarding schools that were publishing big data like Leicester was planning to do. Three areas were specifically focused on: what IT tools Leicester should consider when creating their portal, what other schools are posting in terms of types of data and aesthetics, and the value of the research itself.

IT Tools.

HTML5 and CSS. The system will be designed and hosted on a website built with Hypertext Mark-up Language (HTML) and styled using Cascading Style Sheet (CSS). HTML will enable the user interface become usable and working. The look and feel of the website will be improved using the CSS.

HTML5 Adoption Rate Improving. The HTML5 standard has been in development since 2008. Various industry groups worked on finalizing the standard, which finally became

official in October of last year. Despite its relatively recent "official" release date, most popular web browsers and many well-known websites have supported its major features over the past few years.

As HTML5 enters the technology mainstream, more developers are building apps using the technology. Its support for cross-platform browser-based deployment means HTML5 apps can be run on the desktop browser, smartphone, and also the smart TV or Blu-ray players. YouTube recently deployed its own HTML5 desktop video player, and Netflix began transitioning its player to HTML5 two years ago, with a noticeable improvement in performance as a result.

New features of HTML5.

Semantics. It is essentially a set of new tag which makes html code more meaningful. Web development typically involves various tag div. where div is frequently used. New tags such as header, nav, footer tags makes HTML more meaningful.

With this addition of semantics describing the tags is lot more easier. Examples of non-semantic elements: and – Tells nothing about its content. Examples of semantic elements: <form>, <table>, and <img>

Offline and storage. This allows creation of a web application that runs without an Internet Connection. This is particularly important especially on mobile where the HTML5 experience can be created and still be able to use and reach that experience when Internet networks are unavailable. It also allows saving to local databases as well as caching data offline. Helpful features:

- Application cache
- Local Storage

- Web SQL & indexed database
- Online / Offline events

Device Access. It is now possible to use features such as geolocation API for making application location aware and also be able to access different sensors on devices. Its give an awesome facility of drag and drop from desktop to the browser and including audio or video input access to cameras and microphones.

Connectivity. More efficient and faster Real time chats, faster games and better communication is now possible with the help of websockets and server {-sent -events} are reasons to make the communication between the server side and the client side. Real-Time Communication, allows connecting to other people and controlling video conferencing directly in the browser, without the need for a plugin or an external application.

Multimedia. This is the ability to incorporate audio and video directly into the browser without need of plugin like – Flash or Silverlight. Earlier in html to show the video along the webpage in the browser there was no way to integrate naturally into HTML.

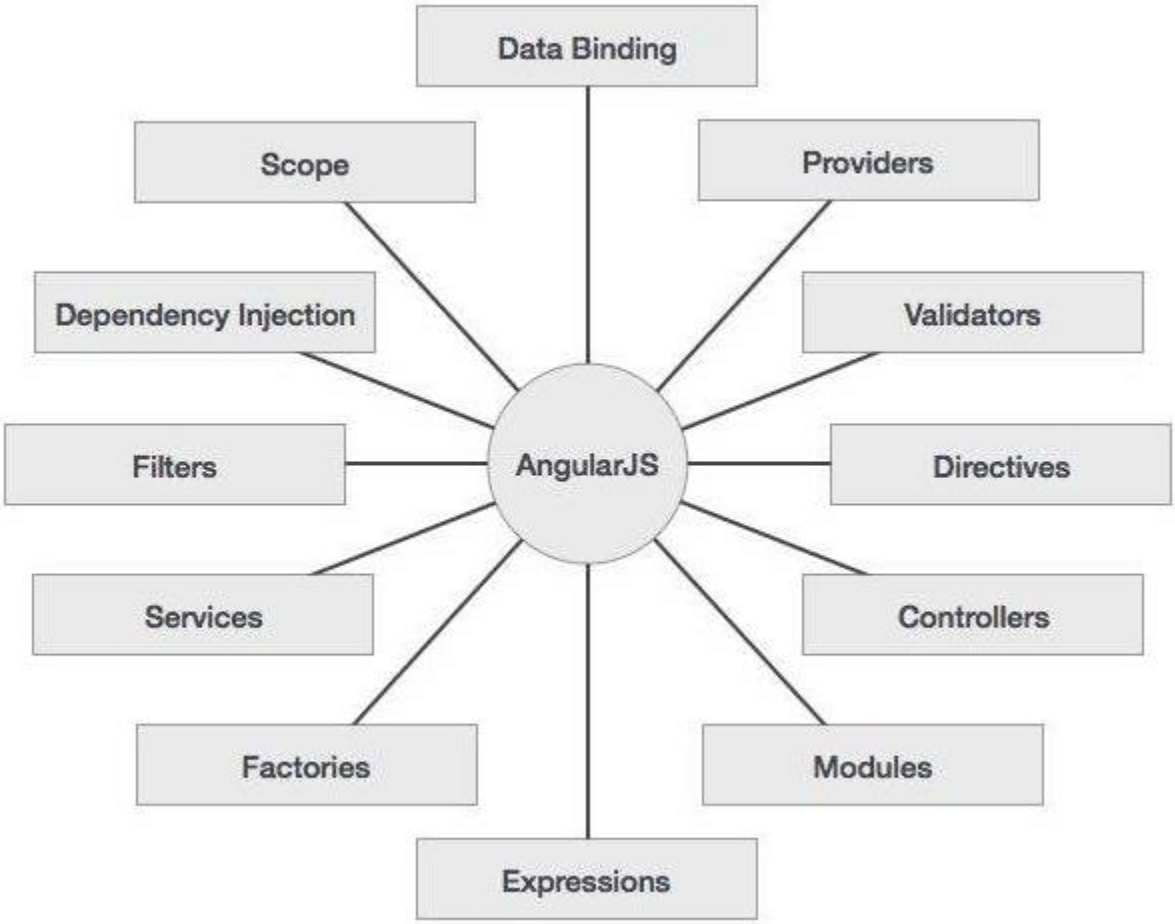
JavaScript. JavaScript will be used in combination with HTML in the design and implementation of dynamic buttons and HTML. This will greatly enhance the usability of the website and allows for interesting buttons and drop-down menus to be created.

Angular JS. AngularJS is a structural framework for dynamic web apps. It allows usage of HTML as template language and also allows extension of HTML's syntax to express the application's components clearly and succinctly. AngularJS's data binding and dependency injection eliminate much of the code that would otherwise have to be written. All this happens within the browser, making it an ideal partner with any server technology.

Despite the increasing interest on AngularJS, there are few studies about the performance

of the applications constructed with the framework, including the recurrent performance problems faced by AngularJS users, and the possible causes and solutions to them. To contribute with a set of best practices to deal with performance problems in AngularJS, this paper reports the results of a survey about this specific aspect of the framework.

Features of AngularJS



Application Layer

JAVA. Java is a programming language and computing platform first released by Sun Microsystems in 1995. There are lots of applications and websites that will not work unless Java is installed, and more are created every day. Java is fast, secure, and reliable. From laptops to

datacenters, game consoles to scientific supercomputers, cell phones to the Internet, Java is everywhere!

Advantages of Java. Java is easy to learn and it is designed to be easy to use and is therefore easy to write, compile, debug, and learn than other programming languages. Java is object-oriented this allows the creation of modular programs and reusable code. It isalso platform-independent. One of the most significant advantages of Java is its ability to move easily from one computer system to another. The ability to run the same program on many different systems is crucial to World Wide Web software, and Java succeeds at this by being platform-independent at both the source and binary levels.

Web Server

Apache Tomcat, often referred to as Tomcat Server, is an open-source Java Servlet Container developed by the Apache Software Foundation (ASF). Tomcat implements several Java EE specifications including Java Servlet, JavaServer Pages (JSP), Java EL, and WebSocket, and provides a "pure Java" HTTP web server environment in which Java code can run. Tomcat is developed and maintained by an open community of developers under the auspices of the Apache Software Foundation, released under the Apache License 2.0 license, and is open-source software.

Database

MySQL. My recommendation is MySQL, which is one best for small web portal development. MySQL Enterprise Edition includes the most comprehensive set of advanced features, management tools and technical support to achieve the highest levels of MySQL scalability, security, reliability, and uptime. It reduces the risk, cost, and complexity in

developing, deploying, and managing business-critical MySQL applications. Development Tool (Integrated Development Enrollment): Eclipse, Netbean, Microsoft Visual Studio

Advantages Of Using MySQL

Ease of Use. MySQL is very easy to install, and thanks to a bevy of third-party tools that can be added to the database, setting up an implementation is a relatively simple task. In addition, it's also an easy database to work with. As long as the programming language is understood, problems should be easily traversed.

Support Readily Available. Although Oracle's history of supporting its customers can be spotty at best, the nature of MySQL – which got its start as an open-source platform – means that there's a large and thriving community of developers and enthusiasts to which one can turn for help. This is due in large part to the popularity of the solution, the end result of which is no shortage of experts.

Open-Sourced. Oracle's purchase of Sun Microsystems (and by association, MySQL) was met with some contention from the development community. The general fear was that Oracle would transform the tool into a closed, proprietary ecosystem. Thankfully, though Oracle has tightened its grip on MySQL somewhat, it can still be considered an open-source database option, as the code is still available for free online.

Inexpensive. MySQL implementation could range in price from free to > $10,000. It's significantly less expensive than most other database options on the market (save for MySQL's open-source competitors).

Popular and at an Industry Standard. Although MySQL's popularity has waned somewhat in recent years, it remains one of the most-used database systems in the world. It's

compatible with virtually every operating system, and is more or less an industry standard. This is, of course, in spite of all the folks who say it's on the way out.

Research Complementing Data Analysis. Research was gathered in support of the data analysis in conjunction with addressing issues determined throughout this study. Studies found particularly focusing on Mathematics anxiety in relationship to student gender and teacher participation in white majority and white minority schools were looked at for Leicester's usage.

Math Anxiety and the SAT. Anis et. al (2016) discuss the relationship among mathematics anxiety, gender, and SAT. Mathematics anxiety is characterized by apprehension toward educational activities that require computation. This study analyzes SAT results in each of the disciplines in order to determine the impact of math anxiety across genders. Furthermore, the study looks at whether there is a statistically significant correlation between having math anxiety and SAT scores.

Addressing Teacher Shortage in Student-Teacher Ratios. Cheema & Hamilton (2017) discuss the relationship between principal perception on institutional activity in relation to teacher perspectives of reality at those institutions. Notable findings relevant to this study are that teachers are less likely to be active participants in the wake of teacher shortage (higher student-teacher ratios) and are also more likely to leave such institutions. The study controls for racial dynamics as is represented across the various district representations.

Issues Relating to Education Data/School Websites

In a more general survey of existing research about posting student data, there were two main topics in which most of the research in this area seemed to be categorized: the first was regarding big data and the second was about ease of access to the information. While it was clear

that many of the sources consulted believe that there is a great value to the big data that can be collected by students and published for the school and the parents to use, there was a lot of concern about balancing this data with the student's privacy concerns. One source in particular, "Big Data in Education: Balancing the benefits of educational research and student privacy," a summary of a workshop sponsored by the National Academy of Education (NAE), was so motivated by this issue that they provided a list of recommendations for schools to practice when considering posting student information for educational research purposes (2017).

The NAE explains how while big data in the abstract sense poses no threat to student privacy, interactive technologies that can record individual performance and then link it to administrative data, while promising much more in reference to improving policies and student learning and teaching, can have a much higher chance of putting students and families at risk when it comes to privacy (2017). The source provides greater detail about different kinds of student research and how different combinations can be very valuable. The NAE defines administrative data as "demographic, behavioral, and achievement data collected through schools, governmental agencies, and their contractors. Administrative data may consist of attendance records, test scores, transcripts, and surveys" (2017, p. 4). Therefore, educational administrative data would include examples such as National Assessment of Educational Progress data, international test scores, state standardized test scores, and behavioral data (like those collected for the U.S. Department of Education's Civil Rights Data Collection) (2017). Contrastingly, learning process data is defined as "data collected in online assessments and courses (including massive open online courses [MOOCs]) or keystrokes and time latencies collected for interactive technologies for K-12 students in a school year" (NAE, 2017, p. 4).

In terms of student privacy, much of the concerns center on the idea that student data could be captured and used for nefarious purposes by a third party. There are federal laws in place currently that help protect student privacy. The Family Educational Rights and Privacy Act (FERPA) prohibits all schools receiving federal funding to disclose personally identifiable information from educational records, making exception for organizations conducting studies on behalf of the school (NAE, 2017). The Children's Online Privacy Protection Act (COPPA) places parents and guardians in control of what information is collected from their children online (NAE, 2017). The Protection of Pupil Rights Amendment (PPRA) provides guidelines for schools administering surveys, analyses, or evaluations to students that include eight areas of special protection including political affiliations or beliefs, mental or psychological problems, sex behavior or attitudes, religious practices, and income (NAE, 2017).

The NAE writes, "High-quality research provides the evidence for practitioners and policy makers to make educational choices to help all children succeed. Big data allow researchers to identify interventions most promising for individual students, including those in high-risk populations. Education research is used for all types of classroom interventions as well as to support larger initiatives such as school lunch programs and early childhood education" (NAE 2017, p. 7). To help ensure that this valuable data can be collected, the NAE "recommends that the research community (1) adopt common terminology, (2) communicate the importance of educational research more effectively, (3) build strong partnerships and models to ensure the sharing of data, and (4) better educate researchers and universities on privacy issues" (2017, p. 1). This will help minimize parents' fears by providing clarity and transparency.

Another source, "Reporting the 'education revolution': MySchool.edu.au in the print media," an international study conducted by Nicole Mockler about a new website which

compared schools based on their standardized literacy and numeracy tests, provided information on the perceived value of this broader performance data. The site groups data from student performance on the National Assessment Program Literacy and Numeracy (NAPLAN), which students take in years 3, 5, 7 and 9, with other "statistically similar" schools (Mockler, 2013, p. 1). The study examined frames that editorials written within a year after the site went live used. There were three main narratives that were identified within the research: the narrative of distrust, the narrative of choice, and the narrative of performance.

The narrative of distrust includes articles that express aggression and arguments against self-interested and tenacious teachers, principals, and bureaucrats who speak out against the comparison of this data among schools, referred to in the report as "league tables," through fear that it will "cement and reproduce social and cultural disadvantage (Mockler, 2013, p. 6). The narrative of distrust also includes those authors expressing the opinion that the league tables being published provide a way to put pressure on the government and hold them accountable for education, thereby praising the media as "the protectors and crusaders for the Public Good, against the lazy and self-interested likes of teachers, unions, and governments (Mockler, 2013, p. 7).

The narrative of choice includes those article which describe MySchool as a way for parents to get information that they cannot get anywhere else to help them make the most informed choice when it comes to their children's educations (Mockler, 2013). These articles place complete trust in the site as a crucial source, one that is infinitely more reliable than the hearsay that parents had to rely on previously and the obtainment of this information allows parents to advocate for their children to teachers, schools, and governments (Mockler, 2013). It is significant however, that "the narrative of choice posits that all parents want, need and (now,

thanks to MySchool) have choice, and that class and race barriers that might otherwise be seen to perhaps limit or mitigate one's capacity to choose are completely absent from the discussion." (Mockler, 2013, p. 8).

The final frame, the narrative of performance, contains articles that are written from the viewpoint that the NAPLAN data and thus the league table process as the best way to measure school performance and therefore are centered on "the assumption that competition is desirable, that a market-type force can operate within education whereby pressure to improve test scores pushes student 'performance' up." (Mockler, 2013, p. 10). Essentially, the publication of this data ensures that schools will use any means necessary to improve their standings in the tables and thus schools will achieve improvement. This frame directly opposes beliefs that MySchool highlights disadvantage (Mockler, 2013).

In conclusion, the author cautions that all three of the frames tend to focus on MySchool as a part of the education revolution, but fail to consider that while easy to measure, the kinds of data being collected for the league tables in very basic and not really indicative of greater performance standards (Mockler, 2013).

The second main topic that came up within this area of research was concerned with the ease of access to specific data. There were a number of articles relating to disability, but included here are two that highlight major themes in the research. The first article, "Costly Violations for Inaccessible Websites," discusses four school districts and six education organizations that are in violation with section 504 of the Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act of 1990 (Buckman, 2017).

In one district's case, there was an issue with the website using color combinations that made text difficult or impossible for people with low vision to read (Buckman, 2017). In

response to the suit, the district settled the case by agreeing to "(1) adopt (subject to OCR approval) new policies and procedures that required adherence to an objective website accessibility standard; (2) hire an expert outside auditor to examine all website content and functionality; (3) submit a corrective action plan to address any accessibility problems identified by the audit; and (4) provide annual website accessibility training to all appropriate personnel (including anyone in the district responsible for developing content)" (Buckman, 2017).

The second source was a study "Disability and Diversity on CSU Websites: A Critical Discourse Study," conducted on California State Universities' (CSU) web pages to gather information about how easy it was to get to disability resources pages and provided a commentary about how where a school places this information, whether in the academic sections or the student services sections of the website can make a statement about how the school view disability (as diversity for the school or as a personal problem that the student is responsible for rectifying). For background information, the study explained that according to the U.S. Department of Education, 10.9% of students in post-secondary education are disabled, in comparison to 12% to 14% of students enrolled in four-year higher education institutions are African American and 9% to 13% are Hispanic (Gabel, Reid, Pearson, Ruiz, & Hume-Dawson, 2016). While most students don't self-identify as disabled (going to the disability office), the authors assert that since the percentages of other diverse groups are similar to those with disabilities and disabled people can be found across all social groups, universities should have a "similar stake in recruiting and meeting the needs of students across multiple social categories" (Gabel et al. 2016, p. 67).

The findings of the study revealed that 21 of the 23 CSU homepages associated disability with student services and not academic affairs. This was considered a preferred result because

"associating disability support services with academic affairs and phrases, like "enhance my studies," suggests that disability supports are academic in nature and that disabled people are active agents in their own success." (Gabel et al., 2016, p. 73). By placing disability services in student services, it could feel supportive and provide a personal touch as opposed to perpetuating an association of disability with needing to be helped, which can be damaging to a person with a disability who in turn feels passive and dependent on the good intentions of others and creates a vulnerable power relationship between helper and recipient (Gabel et al., 2016).

Interestingly enough, there was no visual images of disability on the website, which for example could include a white cane or wheelchair user, a person with hearing aids, a person using crutches, etc. The authors, knowing that there are many disabilities that don't have a visual representation, made a search for words associated with images that would indicate such an invisible disability (Gabel et al., 2016). This research poses an interesting critique of the inclusion of disability in schools as a type diversity and the ways that schools chose to portray this information can make a larger commentary on how they view diversity at their institution.

Method

The data analysis approach of this study's research was primarily taken from government issued state data for the state of Massachusetts on school and district profiles. Leicester Public schools district was compared with the districts Avon, Abington, Uxbridge, and Millbury on various categories: MCAS (Massachusetts Comprehensive Assessment System) assessment and student performance, SAT performance trends over time, student teacher ratio trends over time, gender comparisons, financial assessments, graduation rates, composite assessments, and dropout percentages. Relevant categories were compared with statewide data, so as to give a ballpark average of comparison of the schools with each other as well as the state.

Racial and ethnic data was omitted from some of the original data presented from the source due to lack of data representation from not having representation for categories with fewer than ten participants. The same lack of representation was found in disadvantaged student categories—only the presented data was able to be represented in this study.

In synthesizing the data for cohesive analysis, the raw data was uploaded into data reading systems Microsoft Excel and Tableau and adjusted for inclusion or omission of relevant categories. After this, the data was organized in order to product relevant results in the different systems as well as in production of the various graphs, charts, and maps.

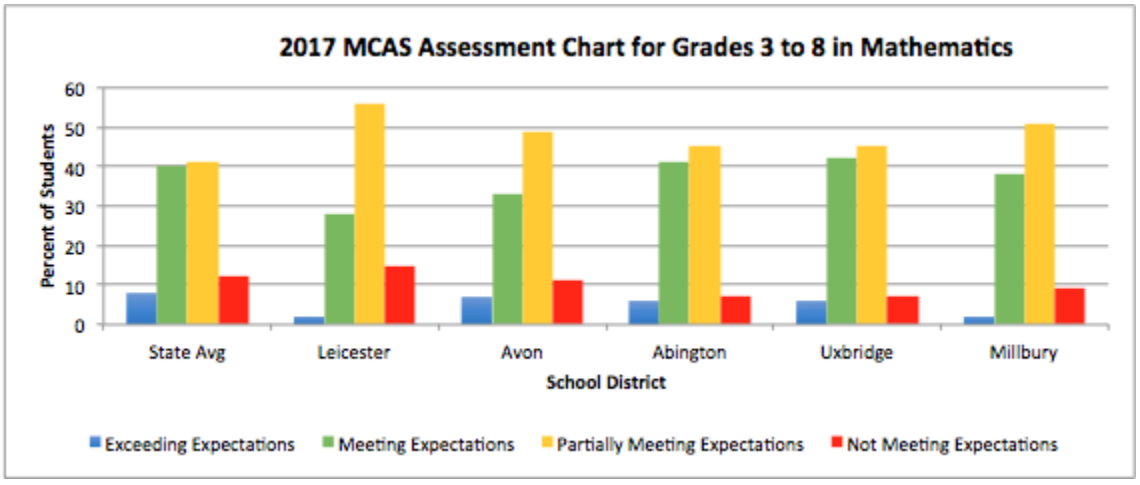
Aesthetics. The research was done by comparing Leicester Public School website with websites from Abington, Avon, Uxbridge and Millbury districts. All the research's details can be found on the according webpages. Comparisons were made between these schools in similar districts and recommendations given for LPS to make the best improvement on their website.

Results

Academic performance.

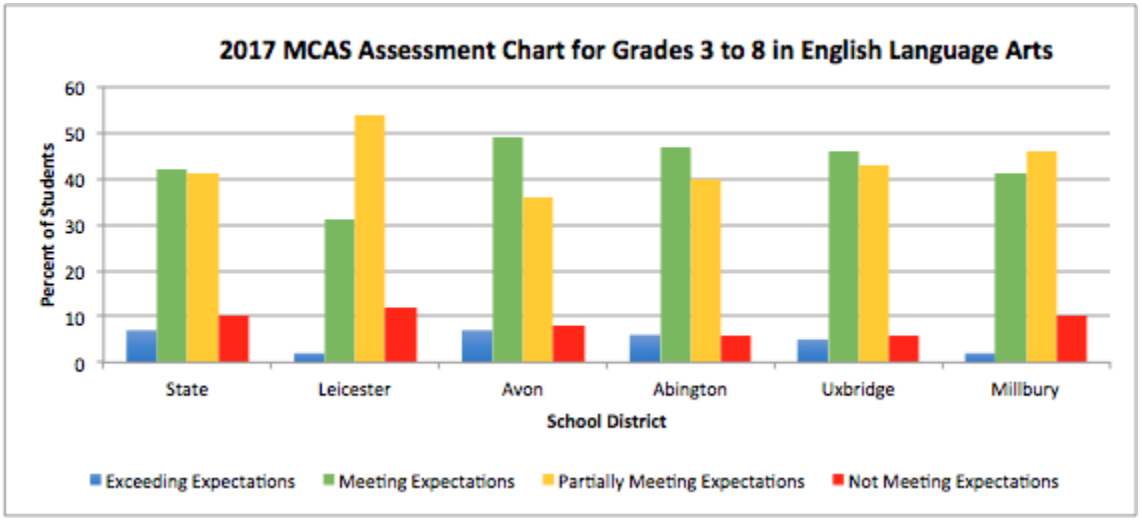
2017 MCAS for grades 3 through 8. For figure 1.1, The most recent year of the MCAS was also assessed for grades 3 through 8 and compared with State averages. In Mathematics, it can be observed that Leicester has the lowest percent of students Exceeding Expectations along with Millbury, including a lower percent of students than the State average. Furthermore, Leicester also has the Lowest percentage of students Meeting Expectations (28%)—lower than all the districts and the State average (40%). The highest ranking Leicester has in the category of Mathematics is in the percentage of students Partially Meeting Expectations at 56%. Leicester continues to follow this trend in Mathematics with the highest percentage of students Not Meeting Expectations at 15% in comparison to the State average at 12%.

Figure 1.1



Similar trends continue in Figure 1.2 for Leicester with MCAS assessment of students in the English Language Arts. Leicester again has the highest percentage of students Partially Meeting Expectations at 54% in comparison to the State average at 41%. Leicester also has the lowest percentage of students Exceeding Expectations at 2% in comparison to the State average of 7%, and has the highest percentage of students Not Meeting Expectations at 12% in comparison to a State average of 10%.

Figure 1.2



SAT. The figure 2.1, figure 2.2 and figure 2.3 represent the academic performance of five town students from 2013 to 2017. Among them, the SAT results were the most obvious. Although there are slight fluctuations in scores, scores generally show an upward trend. Scores in 2013 and 2017 were higher than those in other years. First of all, Uxbridge's reading scores are all above 500. However, the writing score is about 480. The math score is about 510. The fluctuations in the past 5 years have been small. The town's data reveal to us that the overall level of students is high, but the writing part needs to be improved. From the statistical chart, the three parts of Avon's reading, writing and mathematics are almost at a level from 2013 to 2017. However, the overall level is around 480. There is no particularly prominent in these three sections and there is no big fluctuation in 5 years. The town data reveals to us that the level of students is very average. But the overall level of improvement is very large. In the past 5 years, Millbury has fluctuated in three sectors. The annual difference is close to 15. The weaker part of Millbury is the writing section, which is at a relatively low level compared with other towns. From the statistical chart, Leicester's academic performance is very good in 5 years. Except for 2013, the average score of the three sections is above 500 in the other four years. And the volatility is small. In 2013 and 2017, Abington's score is higher than 500. However, the scores in 2014 and 2015 were lower. The fluctuation between 5 years is great. The academic performance of the students is not stable.

Figure 2.1

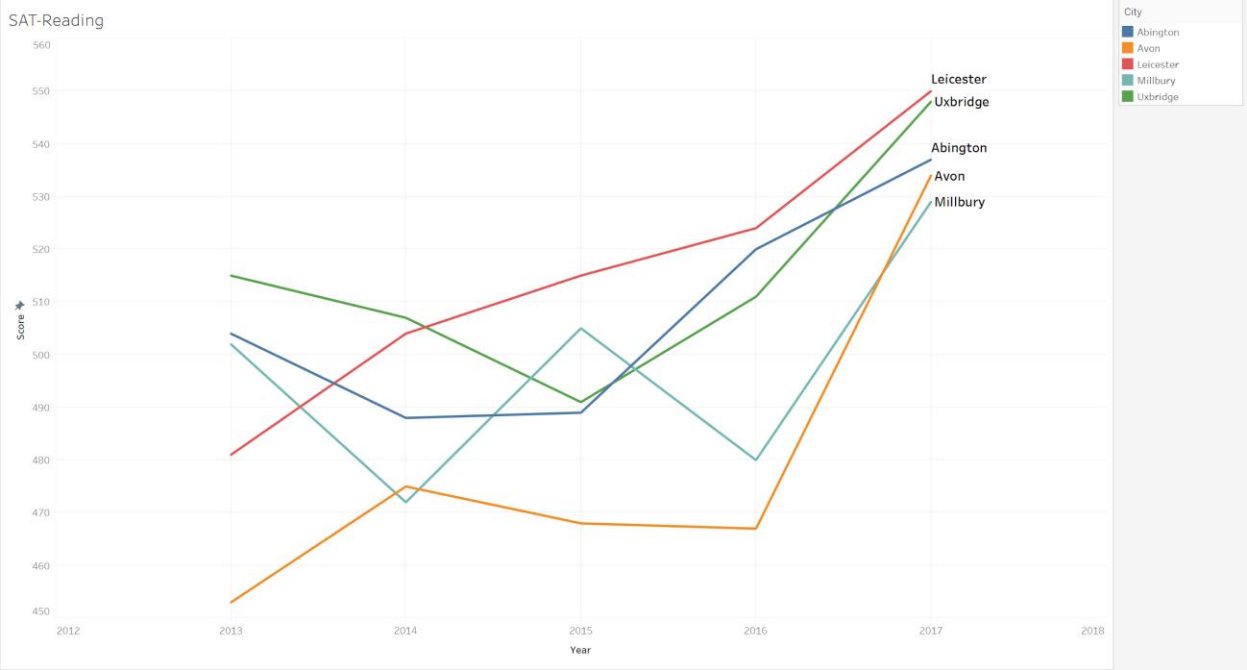
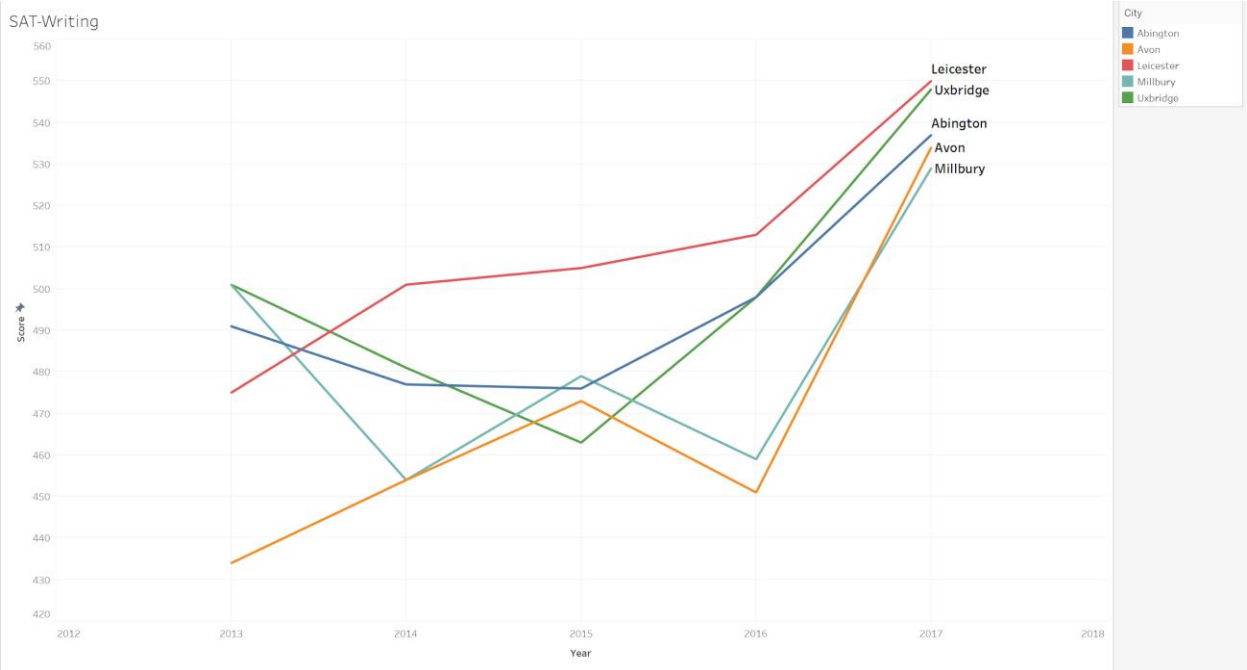

SAT-Reading
City
Abington
Avon
Leicester
Millbury
Uxbridge
Leicester
Uxbridge
Abington
Avon
Millbury
Score
Year
560
550
540
530
520
510
500
490
480
470
460
450
2012
2013
2014
2015
2016
2017
2018

Figure 2.2


SAT-Writing
City
Abington
Avon
Leicester
Millbury
Uxbridge
Leicester
Uxbridge
Abington
Avon
Millbury
Score
Year
560
550
540
530
520
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470
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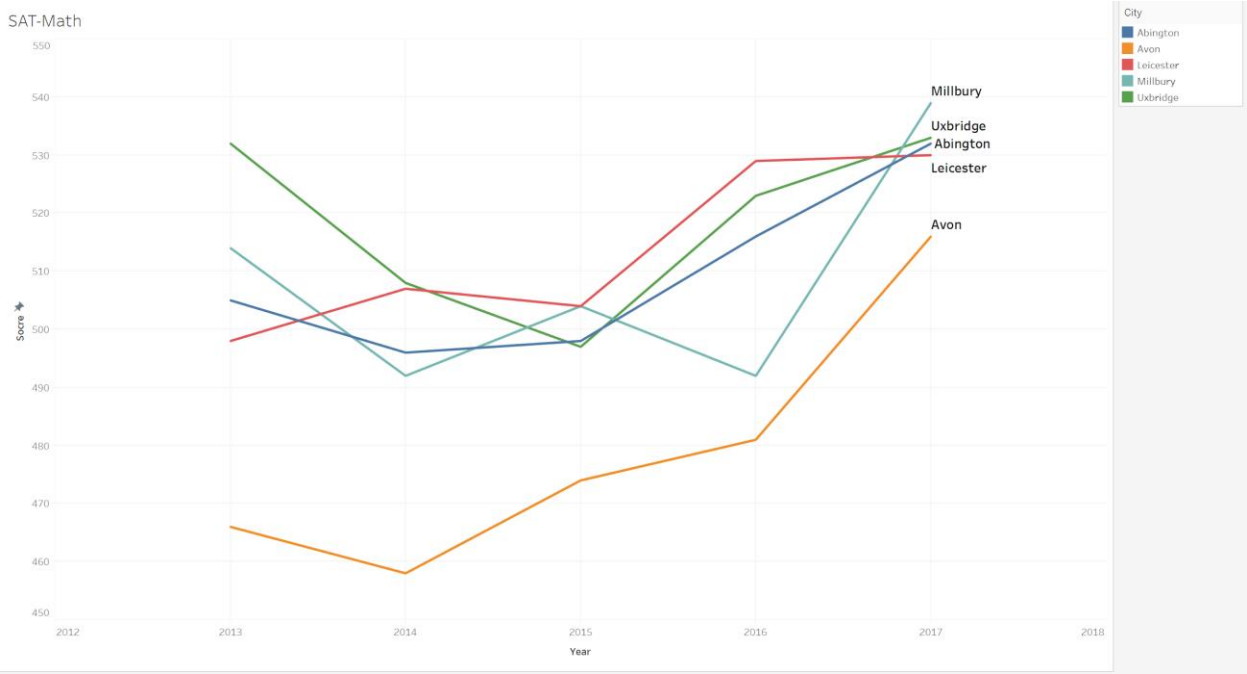
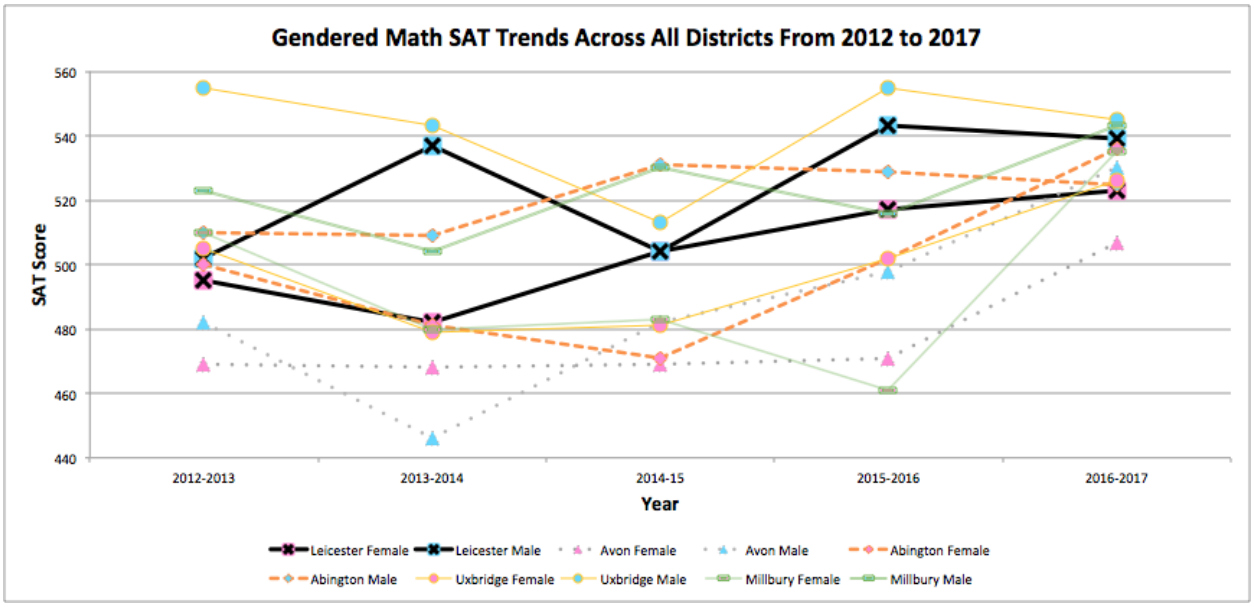
440
430
420
2012
2013
2014
2015
2016
2017
2018

Figure 2.3



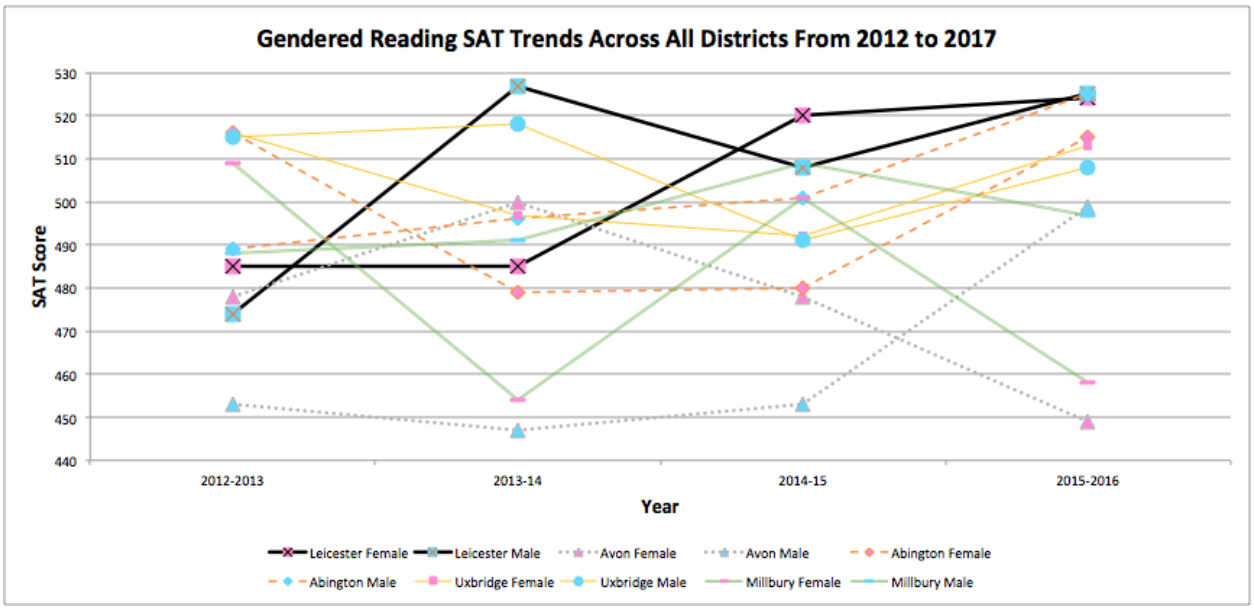
Gendered SAT. The graph (figure 3.1) represents SAT Math results across a five year period as separated by gender. The various districts are recognizable by similarity in color and symbol type, with Leicester being represented by solid black lines. All districts have gender separated according to pink for females and blue for males. Uxbridge males were the most consistently top performing district with the exception of the 2014-2015 academic year.

Figure 3.1



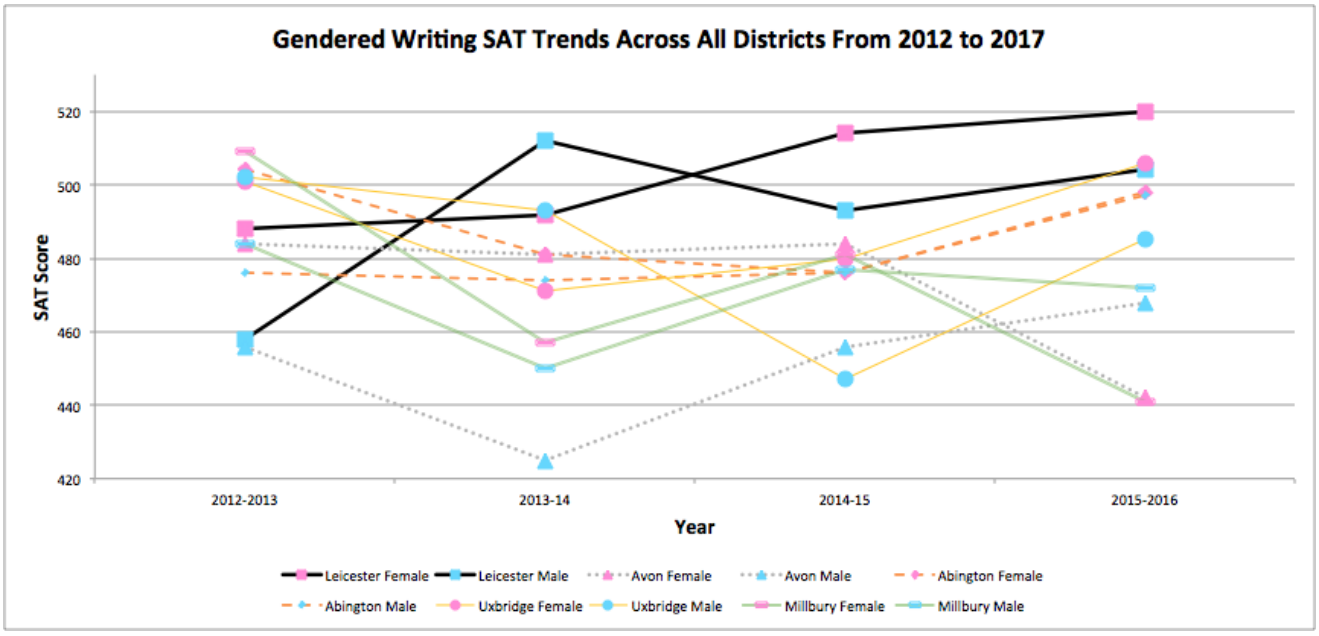
The graph (figure 3.2) continues to show the gendered relationship between male and females for Reading SAT scores. The graph shows less of a gendered distinction in achievement of scores, with male and female performance relatively averaging out.

Figure 3.2



This graph (figure 3.3) shows a greater distinction of female performance in achieving slightly better results than male counterparts but the distinction is not definitive. This therefore shows a gendered distinction between male and female performance in English categories as opposed to math, where females perform at the same level or slightly better for English categories and males perform distinctly better for Mathematics categories.

Figure 3.3



SAT Disadvantaged Students. The SAT scores for disadvantaged students was also assessed. Racial and ethnic specific scores were attempted for assessment; however, a lack of data prevented such analysis. Instead, the SAT results for disadvantaged students across all districts was assessed on the categories of Economic Disadvantage and High Needs in comparison with the total student averages at those districts. These results may further be compared with statewide results for disadvantaged students and statewide total averages for all students.

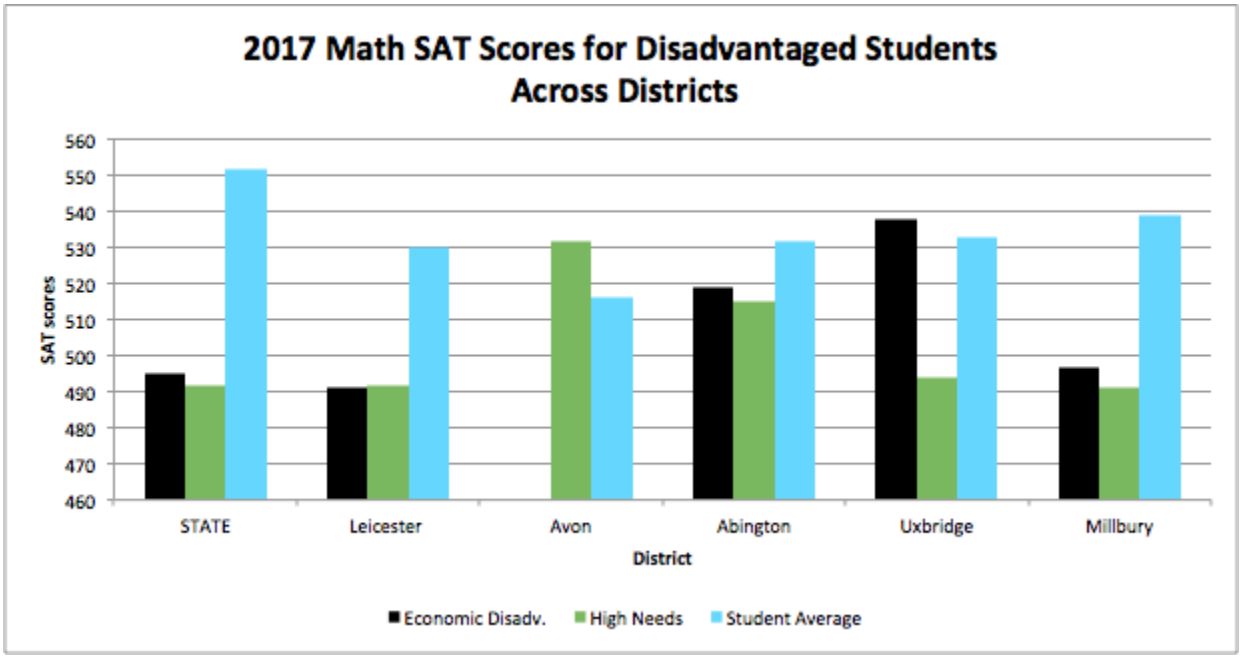
For Leicester in SAT Mathematics (figure 4.1), it was found that both represented categories of disadvantaged students had significantly lower SAT scores than the total average SAT score of all students. Economically Disadvantaged at Leicester and High Needs students had an average Math SAT score of 491 and 492 respectively, which is 39 and 38 points lower than the Leicester student average at 530. However, High Needs students at Leicester have the same scores as the State average shows (492), though the Leicester's average for Economically Disadvantaged students is lower than the State average (495). Leicester's Economically Disadvantaged students also prove to have the lowest SAT scores of any other district (results not obtained for Avon), having a difference as high as 47 score points (Uxbridge) and a difference as low as 6 score points (Millbury) not including State results. Uxbridge's Economically Disadvantaged students were particularly notable for having the highest SAT scores of all other categories at a score of 538 points with the exception of the State total average and falling only 1 point below Millbury student averages.

High Needs. On the category of High Needs student SAT scores, other districts—including the State—proved to have similar difficulties, having similar Math SAT scores around the 494 - 491 range. Avon, however, proved particularly successful in catering to their High

Needs Students as they had a student SAT average that surpassed Leicester's Student Average as well as their own population's Student Average. On the grounds of SAT Student Averages across all districts, all districts had SAT scores below the State average. Leicester, however had comparable SAT student averages to all the other districts, with only a 9 point difference from the highest scoring compared district—Millbury.

Equity. The district with the greatest amount of equity amongst its Disadvantaged students as was Abington, where amongst itself, had a score difference of 17 points between its High Needs students and total student averages. The State averages showed the highest amount of inequity between its highest and lowest categories, with a 60 point difference between total Student Averages and high needs students. This was followed by the Millbury district which has a 48 point difference between its student averages and High Needs students. Leicester follows with a 39 point difference between High Needs students and Student Averages mentioned previously.

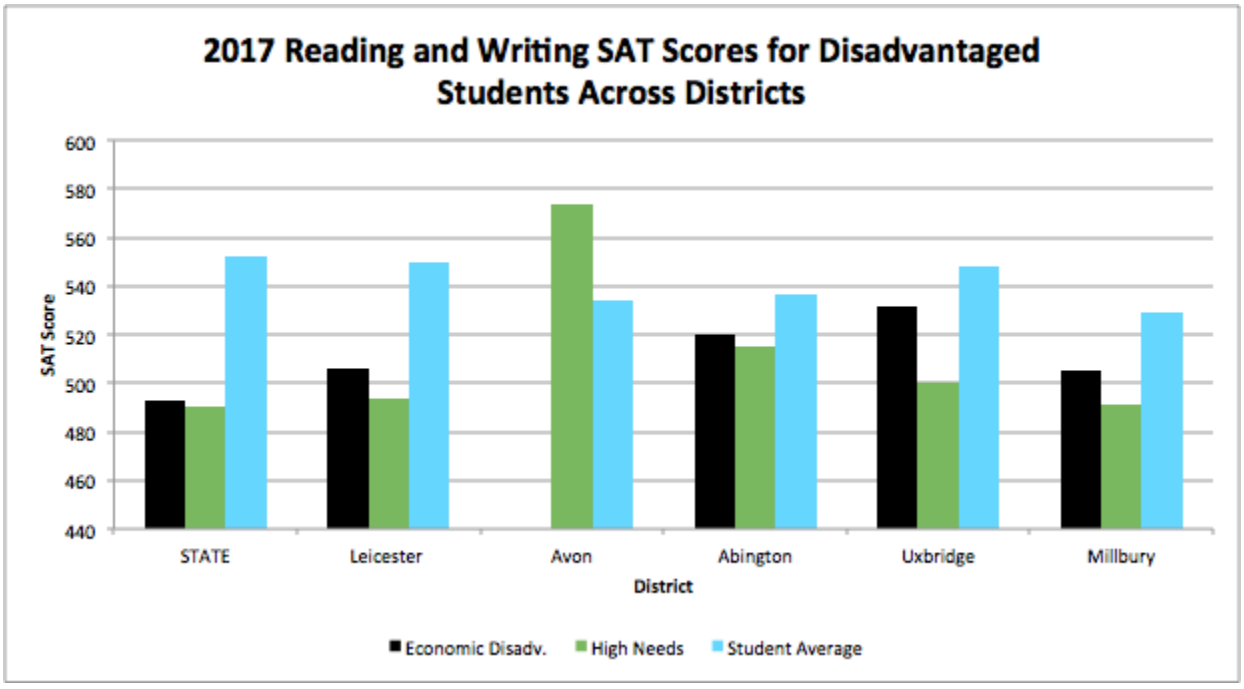
Figure 4.1



General. In figure 4.2, for Leicester in SAT Reading and Writing, it was similarly found that disadvantaged students had significantly lower scores than the Leicester total Student Average, however an increase in SAT reading and writing scores above the 500 mark for Economically Disadvantaged students was found. Both categories of disadvantage were also found to be higher than the State student averages for disadvantaged students, and the total student average for Leicester was found to be higher than all other districts at 550 and only 2 points below the State average.

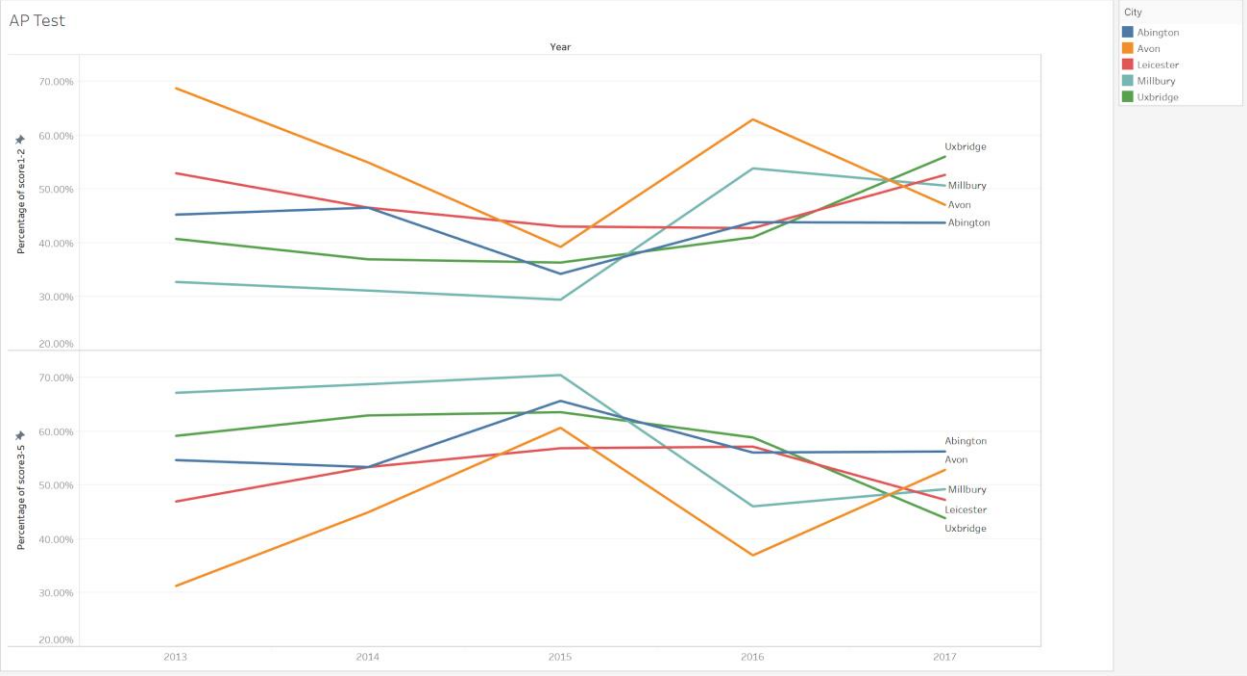
Equity and High Needs. Avon and Abington continued to show similar trends of Equity and exceptional performance, where Avon High Needs students performed above the level of all other districts including performing better than all other district Student Averages as well as all other State Averages. This further includes having scores far higher than high needs students in all other districts, having a difference of 84 points above the State High Needs student category.

Figure 4.2



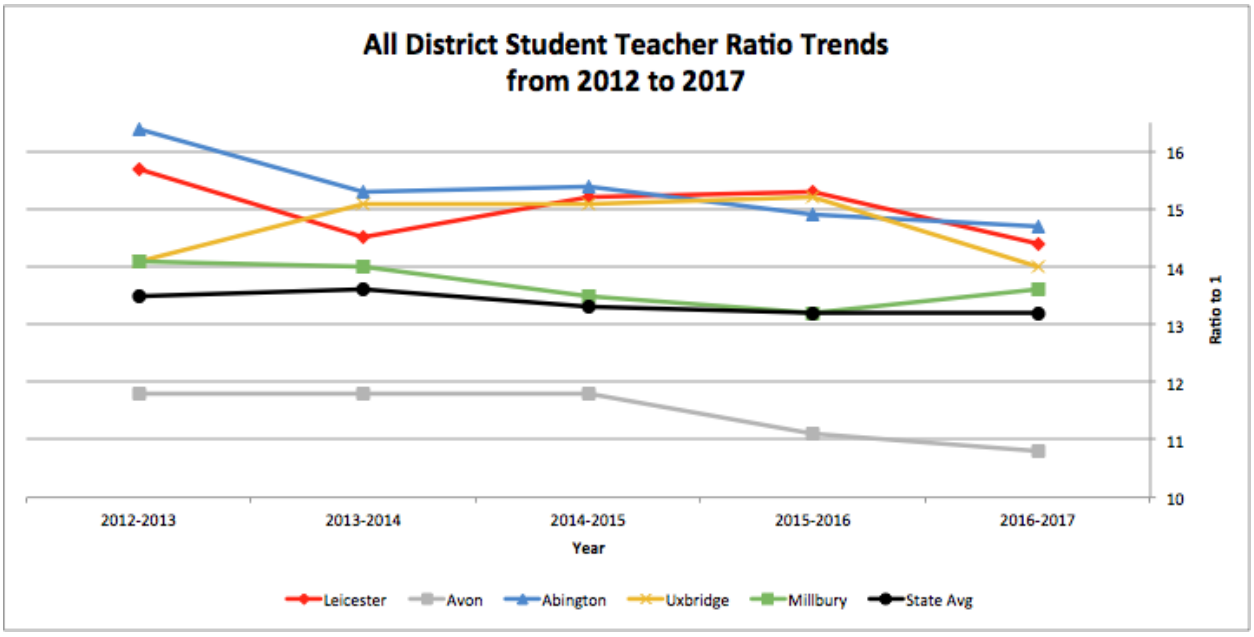
AP test. The advanced placement test is composed of four types of tests. The statistical chart(figure 5.1)shows us the percentage of all subjects' exam results. The statistics show the data of 5 towns for nearly five years. On the whole, the percentage of most town the score of 3-5 is greater than the percentage of the score of 1-2. And the percentage of score of 3-5 is obviously greater than that in 1-2. As can be seen from the statistical chart, in addition to 2017, the percentage of Uxbridge's score of 3-5 is far greater than the percentage of score of 1-2. And there is a state of stability. The fluctuation of the results is small. Although the percentage of 2017's score of 1-2 is greater than that in 3-5, there is little difference. From the statistical chart, it can be seen that Avon's performance fluctuates greatly. In 2013, the percentage of score of 1-2 is 68.8%. And in 2016, the percentage of score of 1-2 is 63%. However, the two scores in the rest of the year are more average. As shown in the figure, Millbury percentage in two parts is quite different from 2013 to 2015. The percentage of score of 1-2 is far less than the percentage of score of 3-5. However, in 2016 and 2017, the percentages of the two score changed a lot. The percentage of the score of 1-2 is higher than that in score of 3-5. From the graph, it can be seen that Millbury has fluctuated greatly in recent five years. Statistical map shows that the two part of Leicester has an average distribution. In the past five years, the percentages of the score of 1-2 and 3-5 have accounted for almost half. The results have been less volatile over the past 5 years. The academic performance of the students is more average. There is little change in Abington. Except for the two score in 2015, the gap is large. The rest of the year is more balanced.

Figure 5.1



Student Teacher Ratios. This section (figure 6.1) highlights the varying level of student teacher ratios across the districts. The black trend line indicates the State Average for student teacher ratios, where all districts with the exception of Avon are seen to have student teacher averages above the State average.

Figure 6.1



Financial budget. The chart(figure 7.1, figure 7.2 and figure 7.3) describe the expenditure of 5 towns in education during 2012 to 2016. On the whole, the expenditure per pupil is proportional to the total expenditure of all towns. From 2012 to 2016, the expenditure of all towns is increasing. At the same time, the growth trend of expenditure is slow. From the statistical chart, it can be seen that the total budget of Uxbridge is the largest in 5 towns. And the per pupil expenditure is relatively low. The percentage of chapter 70 money is less than that of total budget, which is about ten percent of the total budget. Therefore, it may be drawn from the data that the proportion of chapter 70 money on education in the town is large. It can be seen from statistics that although Avon's total budget on education is lower in 5 towns, the town's per pupil expenditure is relatively high. The percentage of chapter 70 money is less than that of total budget, which is about twenty percent of the total budget. The data can be understood that the proportion of government expenditure on education in the town is small. From the table, it is

obvious that the total budget and per pupil expenditure of Millbury are very high. The percentage of chapter 70 money is less than that of total budget, which is about fifteen percent of the total budget. Therefore, a conclusion may be drawn that the proportion of government expenditure on education in the town is moderate. However, statistics show that the total budget of Leicester is above the average level, and the per pupil expenditure is low. The percentage of chapter 70 money is less than that of total budget, which is about twenty percent of the total budget. The proportion of government expenditure on education is relatively small. From the statistical chart, it may be seen that the total budget of Abington is very high, but the per pupil expenditure is very low. The percentage of chapter 70 money is less than that of total budget, which is about fifteen percent of the total budget. The proportion of education expenditure to the town is roughly the same as that of Millbury.

Figure 7.1

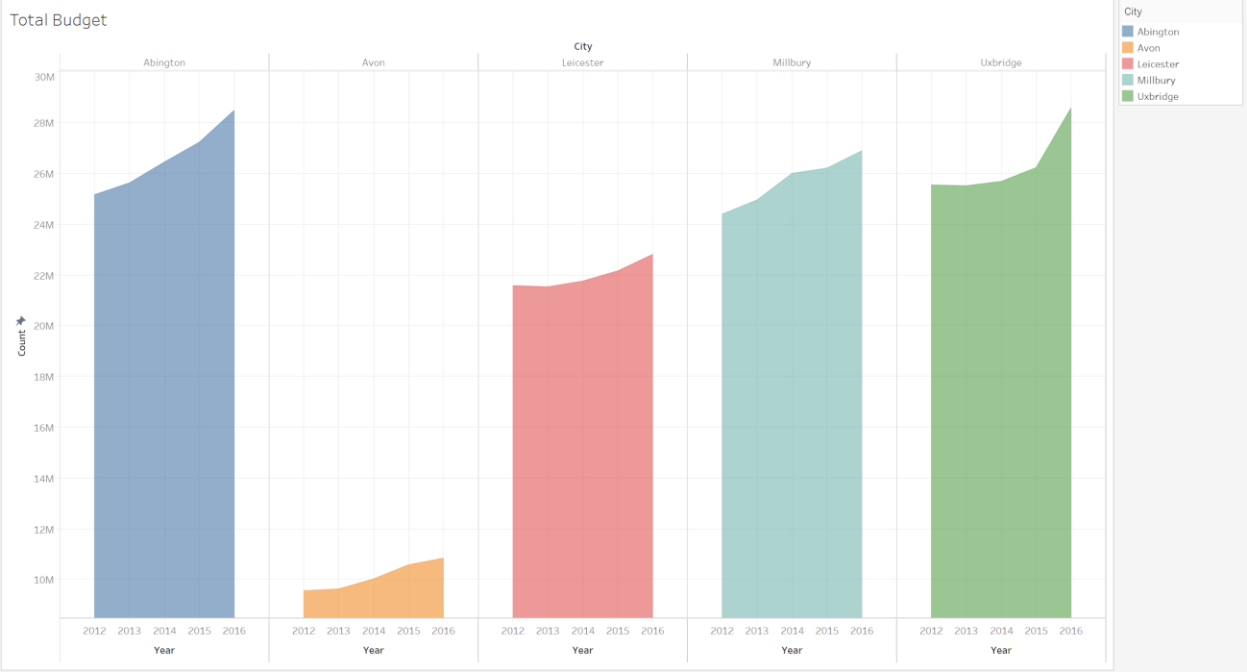


Figure 7.2

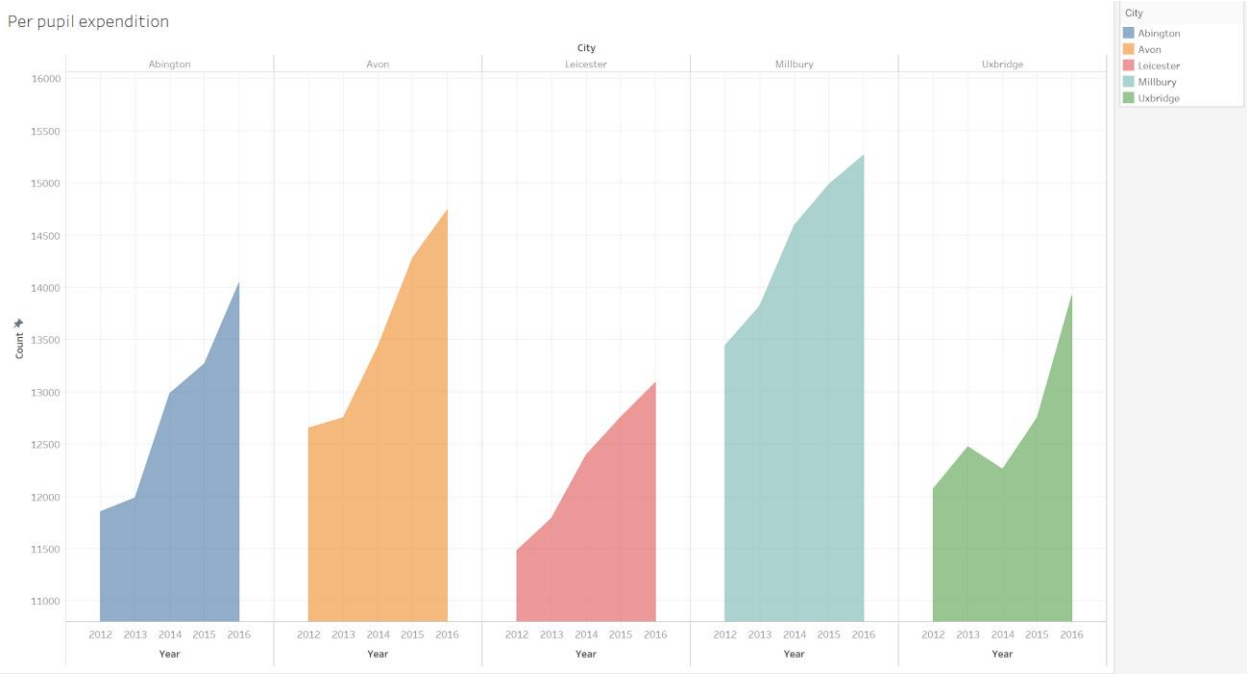
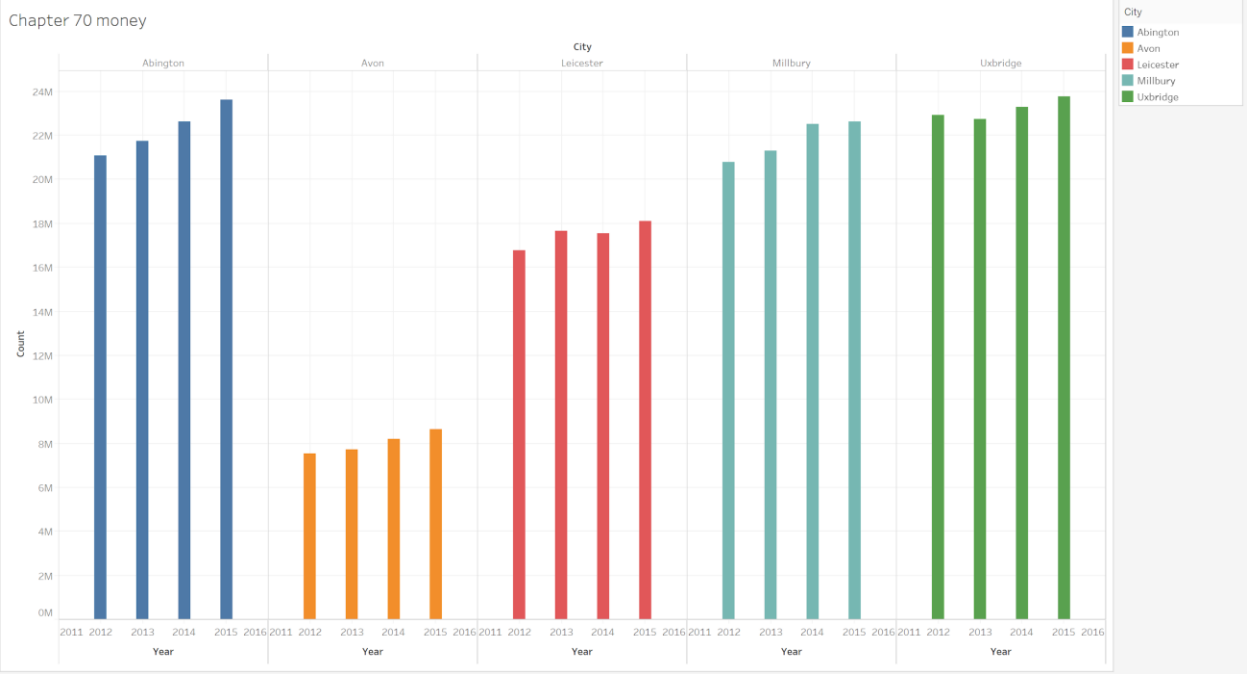


Figure 7.3



Demographic scores. These graphs(figure 8.1, figure 8.2, figure 8.3, figure 8.4 and figure 8.5) describe the population analysis of 5 towns from 2013 to 2017. On the whole, the

attendance rate of 5 towns is one hundred percent. This shows the popularity of education. From the statistical table, it can be seen that from 2013 to 2017, the graduation rate of Uxbridge is around eighty percent. The dropout rate was lower in 2013 and in 2014. However, the dropout rate between 2015 and 2017 is over three percent. Compared with the other four towns, the graduation rate is below average, while the dropout rate is higher than the average level. From statistical chart, it can be seen that Avon's graduation rate and dropout rate fluctuate greatly. From 2014 to 2016, graduation rate remained unchanged. It can be clearly seen from the chart that Millbury has the highest graduation rate compared with other towns. And the dropout rate is relatively low. The graduation rate of Leicester is at a high level, and the dropout rate is low. The fluctuation between five years is small. The difference is not great. At the same time, the statistical chart also describes the graduation rate and dropout rate of Abington. The town's graduation rate is at a relatively stable level. The dropout rate has been reduced year by year. Under the same attendance rate, the graduation rate of Millbury and Abington is relatively high, while the dropout rate is relatively low. The situation in Uxbridge is a little worse than that in other towns. However, all the towns were relatively stable in the three years from 2014 to 2017.

Figure 8.1

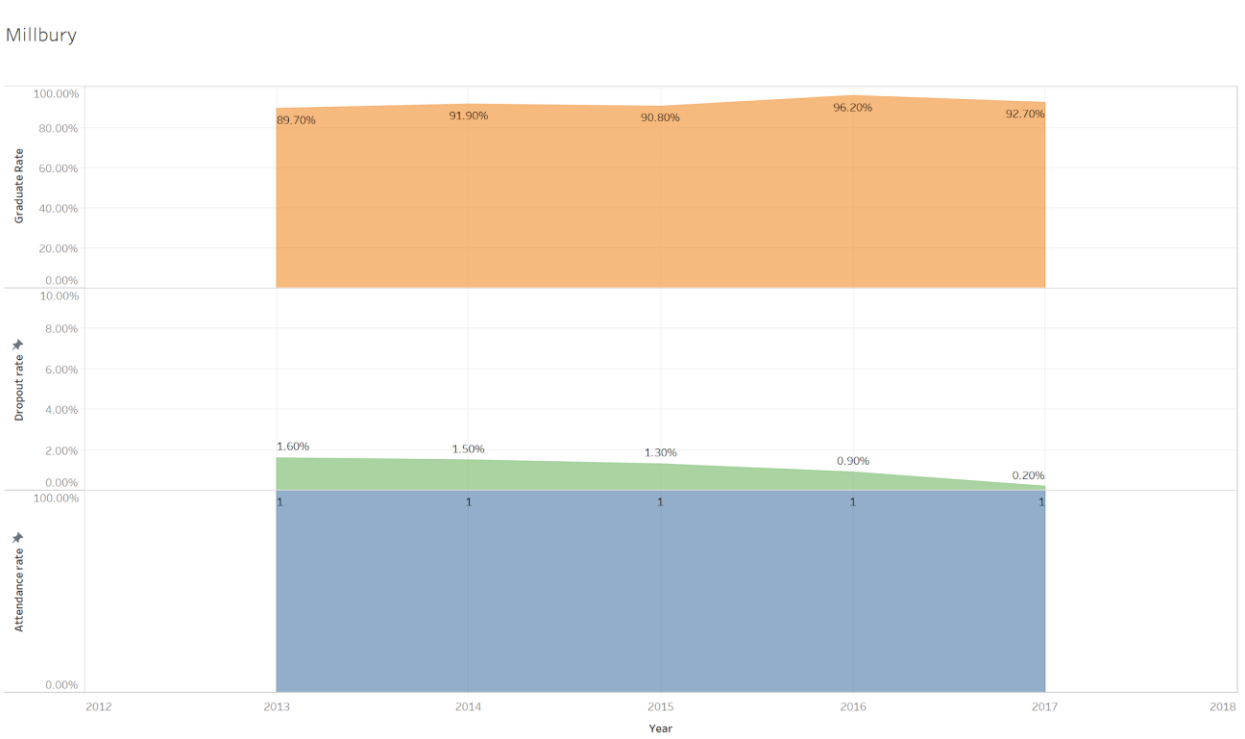


Figure 8.2

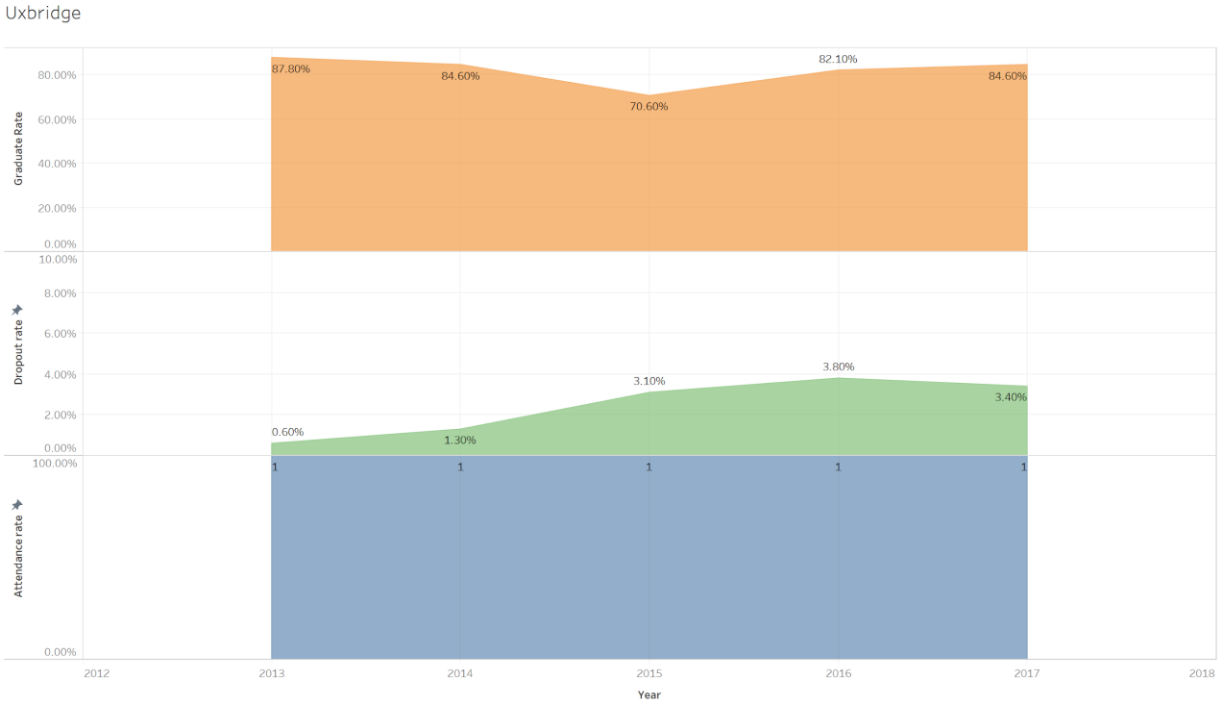


Figure 8.3

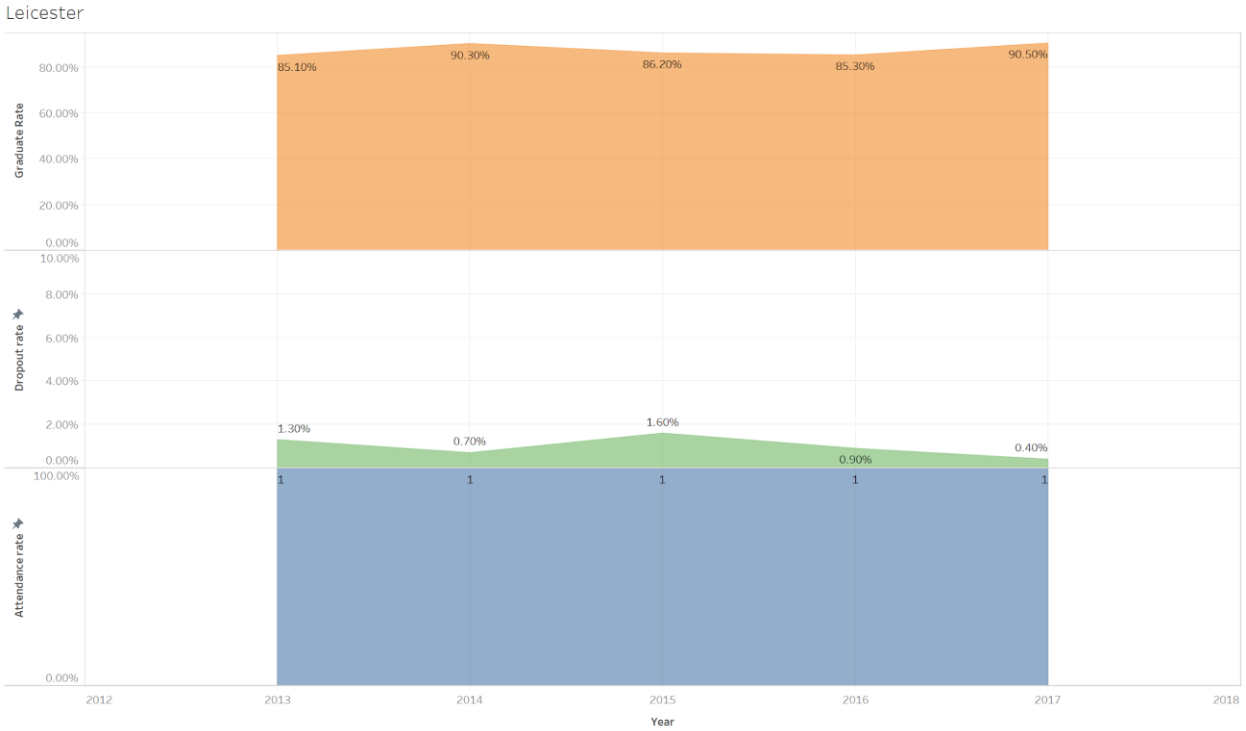


Figure 8.4

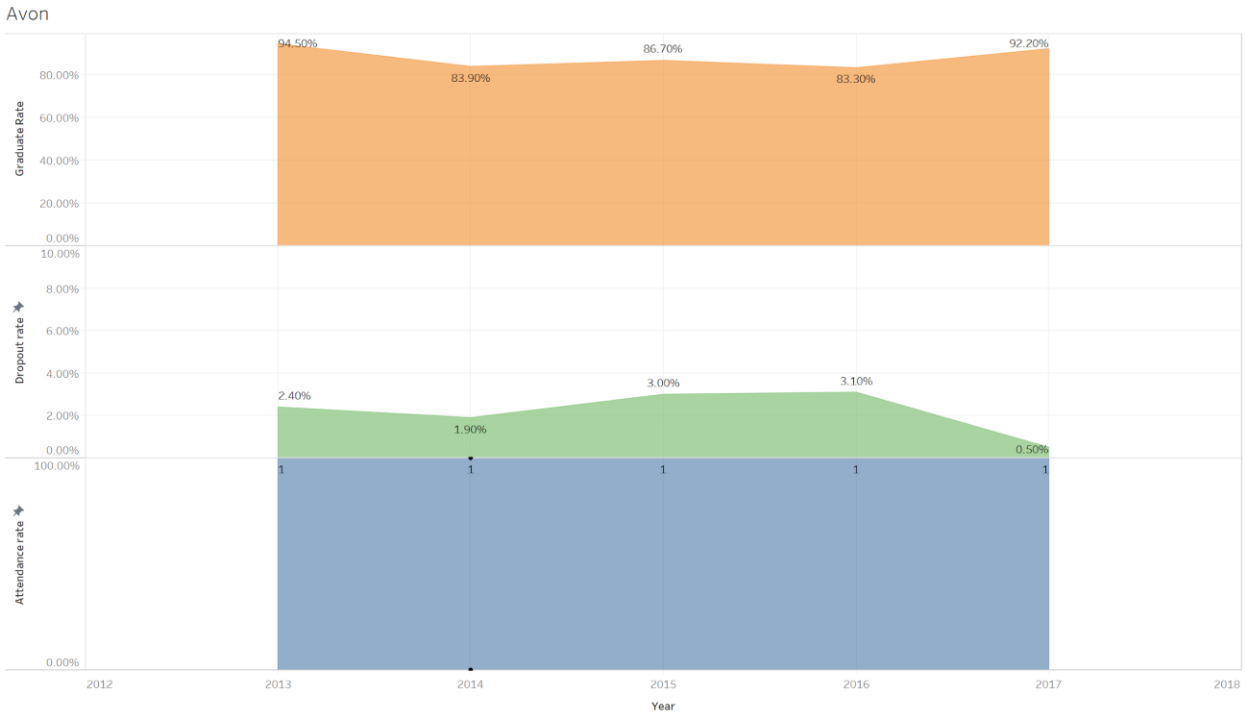
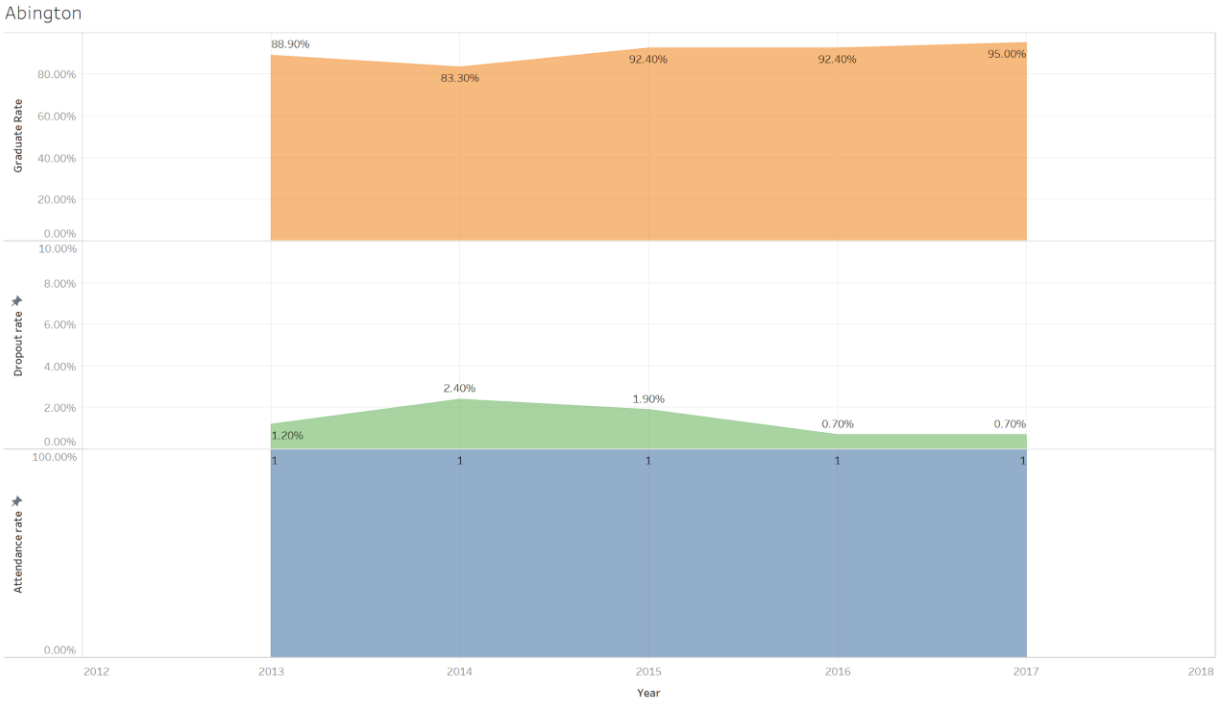


Figure 8.5



Discussion

Data Analysis

Through comparative analysis, many problems were also found. From the data, it may be seen that the academic level in Leicester is in the upper middle level. Students have higher grades. And the result is more stable. The performance of the 5 towns is outstanding. From the data after graduation, it may be seen that the students who attend higher education are still at the forefront of the five towns. At the same time, the trend of development is good. The number of students taking part in higher education is increasing year by year.

In terms of academic performance, studied three test data were studied. SAT, Advanced Placement test and MCAS tests. By comparing Leicester with other towns, the following conclusions may be drawn: First, in the SAT, the overall level of Leicester students is relatively high. High achievements have been achieved in the last five years. Among them, mathematics

achievement is higher than reading and writing. In terms of reading and writing, girls' performance is generally higher than that of boys. However, in mathematics, boys' performance is higher than that of girls. The number of people taking part in SAT examination increased year by year, which also reflected the improvement of education level in Leicester.

On the grounds of Gendered SAT results, most of the districts performed similarly. In SAT Mathematics all of the districts had a particular gendered split with males scoring higher than females. Studies like Anis et. al (2016), however, indicates there is no statistically significant difference between men and women. Comparison of mathematics anxiety levels on the grounds of gender were also not found to be significant, however on the level of students with low mathematics anxiety levels, males were found to score statistically significantly higher on the Mathematics SAT than females. However, there was a evident negative correlation found between having mathematics anxiety and having lower SAT scores. Furthermore, participants with higher math anxiety scored lower on the math SAT than did participants who reported having lower mathematics anxiety. Though these results don't distinguish participants on the level of gender, a study mentioned by Anis et. al (2016) noted that higher mathematics anxiety amongst female teachers significantly affected the mathematics anxiety of their female students.

As such, Leicester should consider administering the same Short Mathematics Anxiety Rating Scale (SMARS) assessment quiz to both their female teacher populations as well as their students to determine their levels of mathematics anxiety in determining how best to approach the effects of such anxiety across their female population.

For Disadvantaged Students in the SAT it was found that the majority of districts performed similarly to the State level or slightly above, with the exception of Avon, which had exceptional results for their high needs students. Similarly, Uxbridge had the least amount of

disparity between their Student Average and their Disadvantaged Students--Leicester would be served well in developing programs to improve upon their own programs by partnering with these districts.

Second, in Advanced placement test, related findings were also found. There are four main subjects in this examination. From the data, it can be seen that the students' ability in English language art is very high, usually can get 3-5 points, however, history and social science, mathematics and computer science, students' ability is general, basically at 1-2 points. For science and technology, the distribution of students' scores is relatively average. Generally speaking, students need further improvement in this examination ability.

Third, for the MCAS exam, related findings were also found. Students in Grade 8 and grade 10 perform best. In all grades, except for grade 3, the rest of the grades performed very well in English tests. And grade 3 did well in the math test. In comparison across other districts and the State in the MCAS, however, it was found that there is an exceedingly high percentage of students Partially Meeting Expectations and Leicester also had the highest percentage of students Not Meeting Expectations in both subjects of Mathematics and English Language Arts (Figures 1.1 & 1.2) therefore denoting that the students are getting by but not excelling, including in comparison with state averages.

The final academic category was on the grounds of Student Teacher ratios (Fig 6.1), where it was found that all the schools except Avon had student teacher ratios higher than the state level. This can provide only some rationale as to any subpar performances within the different academic sections, however, Avon as an institution showed particularly exceptional results for their high needs students on the SATs, even scoring above the State Average in Reading and Writing (2017 academic year). They continued with a trend of high performance in

the math SAT, though did not perform above the math SAT State Average. Such high performance may be as a result of their low student to teacher ratio--signifying that institutions with greater individual attention allotted to their students have increases in academic performance. A study by Cheema & Hamilton (2017) shows that teachers are less likely to voice their concerns about having a shortage of teachers when that shortage is evident and that school principals are often unaware of teacher shortages due to this inverse effect. Conversely, institutions with higher student teacher ratios have higher teacher participation--more involved in decision-making processes involving students. Leicester may take note of these results by encouraging greater teacher participation and querying teachers about their needs at a higher rate in order to serve students at a more effective rate.

In terms of fiscal expenditure, three kinds of data were studied. It was found that Leicester has a large expenditure on education. However, Leicester's expenditure on per pupil expenditure is lower than that of other towns. At the same time, the difference between government subsidies and total budget is large. That is to say, most of Leicester's education expenditure is not from government funding.

Some problems were also found in demographic analysis. The rate of attendance in Leicester is the same as that of other towns. It's all one hundred percent. In all towns, the graduation rate in Leicester is the highest, showing an increasing trend year by year. Dropout rate is the lowest and presents a decreasing trend year by year. A conclusion may be drawn that the government of Leicester has invested a lot in education. Therefore, Leicester has achieved such a good result.

Aesthetics

Nowadays, websites serve as a primary portal for knowledge sharing at schools. The web presence of schools impacts the knowledge interactions between teachers, from teachers to students, from students to teachers and between students.Throughout a school year, important information must be communicated between schools and families of students. Despite communication via newsletters, emails, and flyers, some information is lost in the transition from the classroom to home. A school website allows parents to access important, current information about their child's school. While comparing Leicester Public School website with other district schools, it was found that there is little scope of improvements in their website aesthetics.

Firstly, Leicester Public School's overall design of the home page looks kind of old style." The design is not neat and not well-organized as compared to other school websites. The main homepage should also have some content about the schools and what they do for their students and district.

Secondly, Sliders, also called rotating images are a nice visual way to keep parents updated on new, and important school events. Right now images do not rotate on the website. Most school put the photos simply about the how schools look like but not all the schools put some activities photos to show more about their education concept like the relationship with students, their regular activities for student. The pictures of LPS is just a simple photo of school. However, the photos of Abington and Avon are all pictures' flow, which directly shows the in and out of the school and the recent event and athletics of school. The images are the most direct way to show to parents and visitors about the schools and their event for students and families. LPS should change the current single pictures into pictures flow about the looks outside and inside, the event and sport games they hold recently. However, do not allow the slider to dominate the homepage.

Thirdly, the hyperlinks on LPS are just “upcoming events’ and “News” where as Abington put “Calendar, Committee, Food Service, Staff Directories and other popular links”; Avon put “News and Announcements, specific calendar”. So, LPS should consider re-organizing the hyperlinks on the page.

Fourthly, currently the main context is just the simple news instead the content of the home page should be enriched. Abington and Avon put “detailed news” and long letter about “message from the Superintendent”. The letter or message from the superintendent can be an excellent choice that most school put on their webpages. When parents or visitors open the page, reading the message from superintendent can make them feel more engaged to the school.

Lastly, the main categories of drop-down menu in Leicester public site are too simple. Some schools feature their highlights like “Athletics” part to emphasize on the key strengths. LPS should simplify and feature the drop-down menu, making it more clear, featured and easy to use.

Final Recommendations

Data Analysis

SAT. Leicester should look to partner with Avon’s school system on the grounds of determining programs for the success of their High Needs Students in taking the Math SAT examination. Leicester can also look to Uxbridge’s programs for their practices and programs surrounding their Economically Disadvantaged students in determining ways to increase their SAT scores in preparation for colleges. Leicester should also strongly consider administering the SMARS math anxiety survey to their both their female teachers as well as their students in an attempt to determine the relationship between student math anxiety and SAT results. This is also in accordance with serving for more equitable scoring between male and female students.

Student teacher ratio. Leicester may look to actively improve teacher participation by encouraging their teachers to speak up about institutional problems--including teacher shortages. If institutions are not aware of the shortages on their campuses as well a teacher perspectives on student decision-making, progress will be hindered due to lack of administration-level understanding of student problems. Leicester may get ahead of the other districts by encouraging active teacher perspectives on student needs.

MCAS. Leicester should pay greater attention to expectation categorization as they had the highest percentage of students only Partially Meeting Expectations. By incentivizing students in this category towards increasing their work efforts, they may see growth in percentage of students Meeting and Exceeding Expectations.

Aesthetics

It is strongly suggested that LPS should rearrange and improve the design aesthetic of their portal and websites. The current outlook for the homepage needs to be changed and the template needs to be improved. The main categories in the drop-down menu should be simplified and add some button like “athletic” to diversify the content. As well as the other hyperlinks should be enriched, adding more information about food service, escort schedule, calendar and so on. The main text content can have several options like putting “the letter from superintendent” as other public schools did or putting recent school announcement. Finally, LPS should change their stationary pictures into picture flows to directly show how the school looks like and what kinds of activities LPS held recently.

IT

HTML5. As HTML5 enters the technology mainstream, more developers are building apps using the technology. Its support for cross-platform browser-based deployment means that

HTML5 apps can be run on desktop browser, smartphone, and even smart TV or Blu-ray player. YouTube recently deployed its own HTML5 desktop video player, and Netflix began transitioning its player to HTML5 two years ago, with a noticeable improvement in performance as a result.

AngularJS. is a structural framework for dynamic web apps. It lets you use HTML as the template language and lets extend HTML's syntax to express your application's components clearly and succinctly. AngularJS's data binding and dependency injection eliminate much of the code you would otherwise have to write. And it all happens within the browser, making it an ideal partner with any server technology.

JAVA. Java is easy to learn and it is designed to be easy to use and is therefore easy to write, compile, debug, and learn than other programming languages. Java is object-oriented this allows you to create modular programs and reusable code as well it is platform-independent. One of the most significant advantages of Java is its ability to move easily from one computer system to another. The ability to run the same program on many different systems is crucial to World Wide Web software, and Java succeeds at this by being platform-independent at both the source and binary

MySQL. The primary recommendation is MySQL, which is best for small web portal development. MySQL Enterprise Edition includes the most comprehensive set of advanced features, management tools and technical support to achieve the highest levels of MySQL scalability, security, reliability, and uptime. It reduces the risk, cost, and complexity in developing, deploying, and managing business-critical MySQL applications.

Apache Tomcat. The greatest benefit of Tomcat is that it is Open source and very simple application server which is easy to install. Deployment of our web applications using Tomcat is

achieved very efficiently. Apache tomcat is also very fast in starting and stopping of web servers. Since most of our apps are Java based, tomcat is used as it meets all Java 8 run-time needs without any overhead. It also integrates efficiently with micro-service frameworks such as Spring & Spring Boot.

Reflection

Over the course of completing this project, the team was faced with real world problem-solving and in depth research across many disciplines. Each having different educational backgrounds, the team members each drew on their own prior experience and coursework to create one unified project with multiple deliverables. Success in the completion of this project was due to frequent and effective communication between team members and clear understanding of the required deliverables. The final project is a multidimensional resource that our client, the Leicester Public Schools District, can reference when updating their website and creating the data portal.

Conclusion

In conclusion, the team has provided foundational, in-depth research regarding current topics in student data and school websites as well as research regarding current IT tools for the creation of informational portals/databases to help Leicester Public Schools with updating their website and designing their informational portal. As a secondary part of the project, the team created a set of analysis data comparing the Leicester Public School District and four other Massachusetts cities and towns in academic performance, some with demographic considerations, and fiscal expenditures to help advise Leicester on where the strengths in relation to other districts lie.

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Appendix

Best Practices

Tools (IT perspective)

Aesthetics. Nowadays, websites serve as a primary portal for knowledge sharing at schools. The web presence of schools impacts the knowledge interactions between teachers, from teachers to students, from students to teachers and between students. Due to poorly designed websites with problems such as ineffective navigation, misleading web content etc., low website user satisfaction has been reported.

Useful' homepage. By useful, we mean get visitors to that next click, quickly and cleanly without a lot of scrolling and maneuvering. Sure, a good homepage should look great and be appealing and by creating a useful school homepage, you can ensure website visitors get off on a good foot.

Keep it simple. Often the best design is simple design. One of the common mistakes many schools make is trying to cram too much content on their homepage. The best homepages are easy to read, quickly guiding you to relevant information.

Quick links. Quick links can cut through the clutter, saving readers' time by getting them where they want to go, fast.

News and Calendar of Events pages. The school calendar is the workhorse of school communications, so make sure it is prominent and always current. School and district news should be fresh. If visitors see stale news, they will not come back.

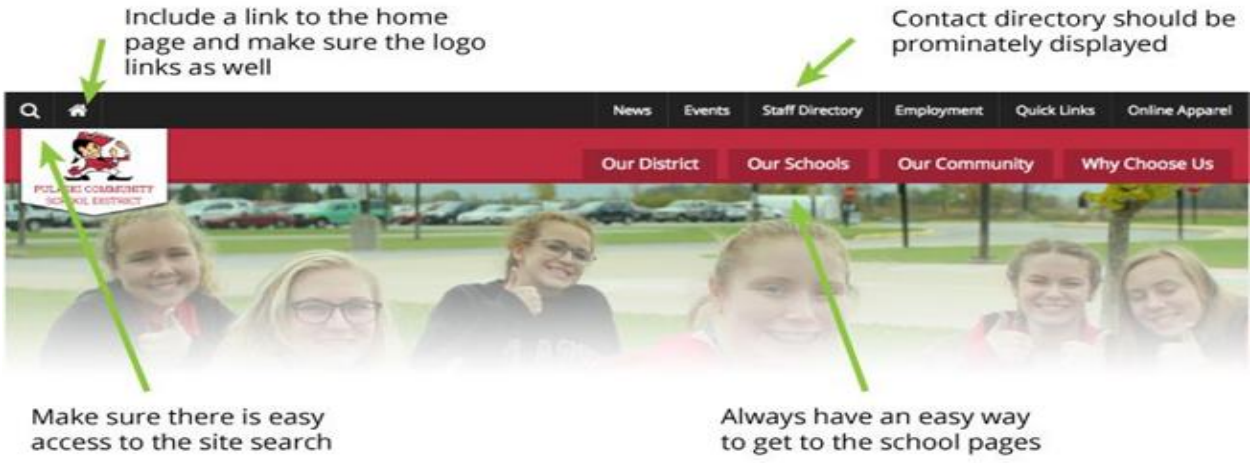
Images. Rotating images, also called a slider are a nice visual way to keep parents updated on new, important school events. But don't allow the slider to dominate the homepage.

Responsive design. Responsive design, i.e., device friendly is a crucial element of modern school website design. It means the website can be accessed by a wide variety of mobile devices. Good responsive design assures each web page is readable and usable on a desktop computer, a laptop, a tablet or a smartphone. It automatically resizes and reformats your pages to eliminate that annoying and time-consuming zooming and dragging that serve as barriers to the viewer.

A school website that incorporates responsive design can be shared and viewed through email links, or social media sites like Twitter and Facebook, which more than half of users now access through mobile applications.

It is important to make sure that the website features responsive design. Otherwise, if the school website is not set up for mobile users, they won't be visiting it, much less using it as a regular way to communicate with your school.

Well-organized navigation. Intuitive, organized navigation is well-designed navigation. It's key to a school website's usability. Studies show people are most likely to make a decision when they have seven links or fewer to choose from. Anything more can be overwhelming.



Streamlined popular pages. In addition to the ever-popular school calendar, pay extra attention to the popular pages on your site. You can easily determine those through a quick analytics review using Google analytics. Generally, we've found these content areas are the top pages on any school website.

Calendar. Make sure your school calendar is readily accessible, contains accurate, current info, and is easy-to-use.

Contact directory. Make it easy for anyone to find contact information for everyone at your school. A contact directory buried in the website is a common, easily remedied frustration on many school websites. Make sure it's current too. If staff members leave or assume new responsibilities, update it.

School pages. Make it simple for parents and students to easily get to their individual

school page. This can be accomplished through some high-level navigation.

Teacher pages. Parents and students should not have to struggle to find their teacher pages. A link to teacher pages should prominently be displayed on the navigation and home page.

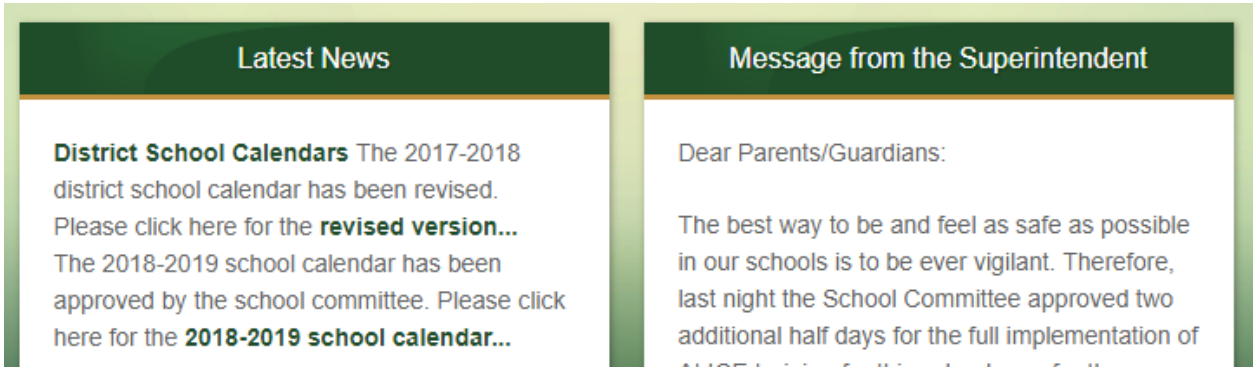
Abington Public School.

i. School pictures listed in the central

i. The basic categories include:

i. Other hyperlinks include:

i. Main content paragraphs are about “Latest News” and “Message from the Superintendent”



The part of message from the superintendent for parents is a good part for school to

communicate with parents. Showing parents about latest update give parents more direct access to know more about school. This part is pretty humanizing.

Avon Public School.

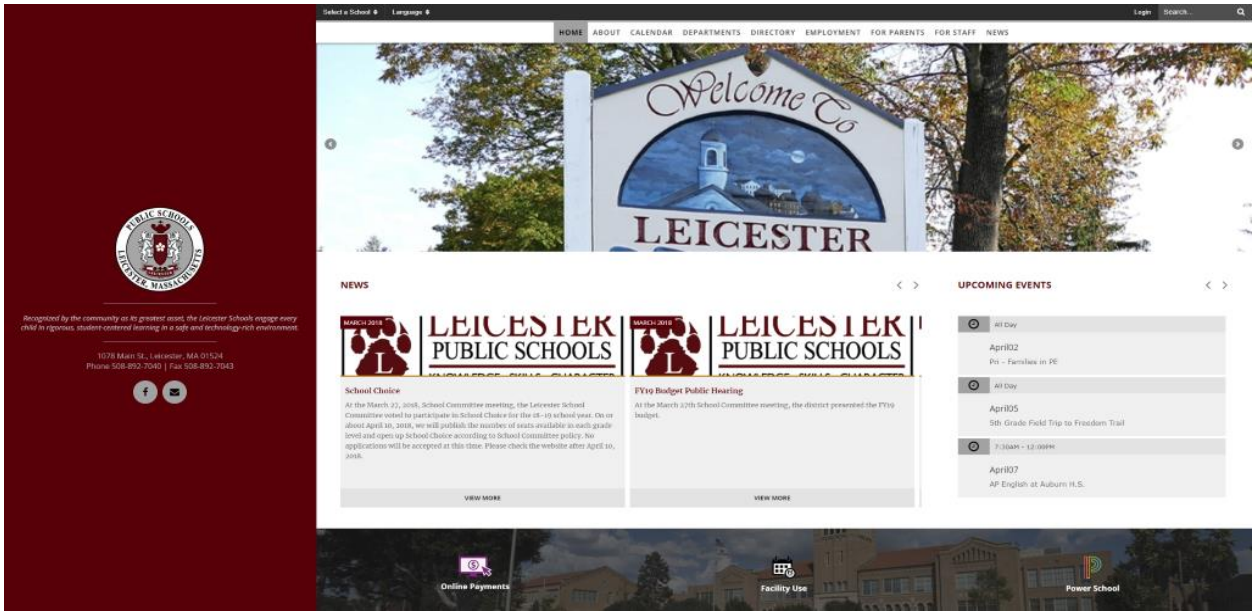
i. Pictures about school activities list is the central of page

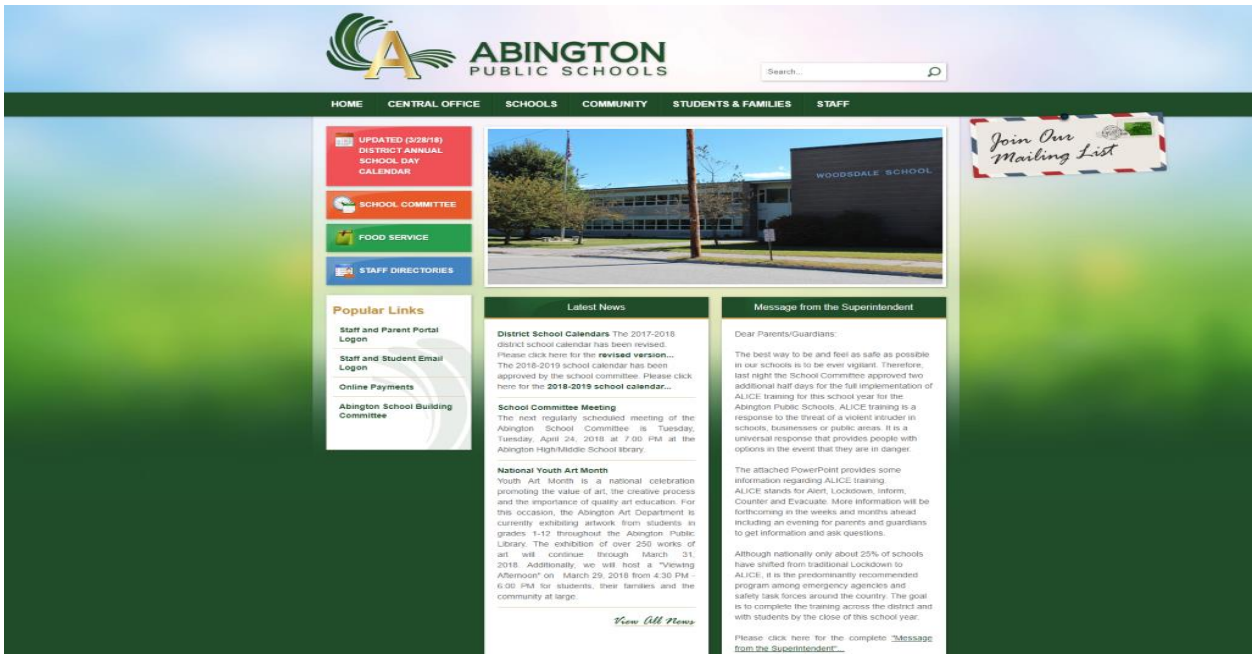
Most school put the photos simply about the how schools look like. But seldomly did schools like Avon PS put some activities' photos to show more about their educational concept like the relationship with students, their regular activities for student. Avon did good on this.

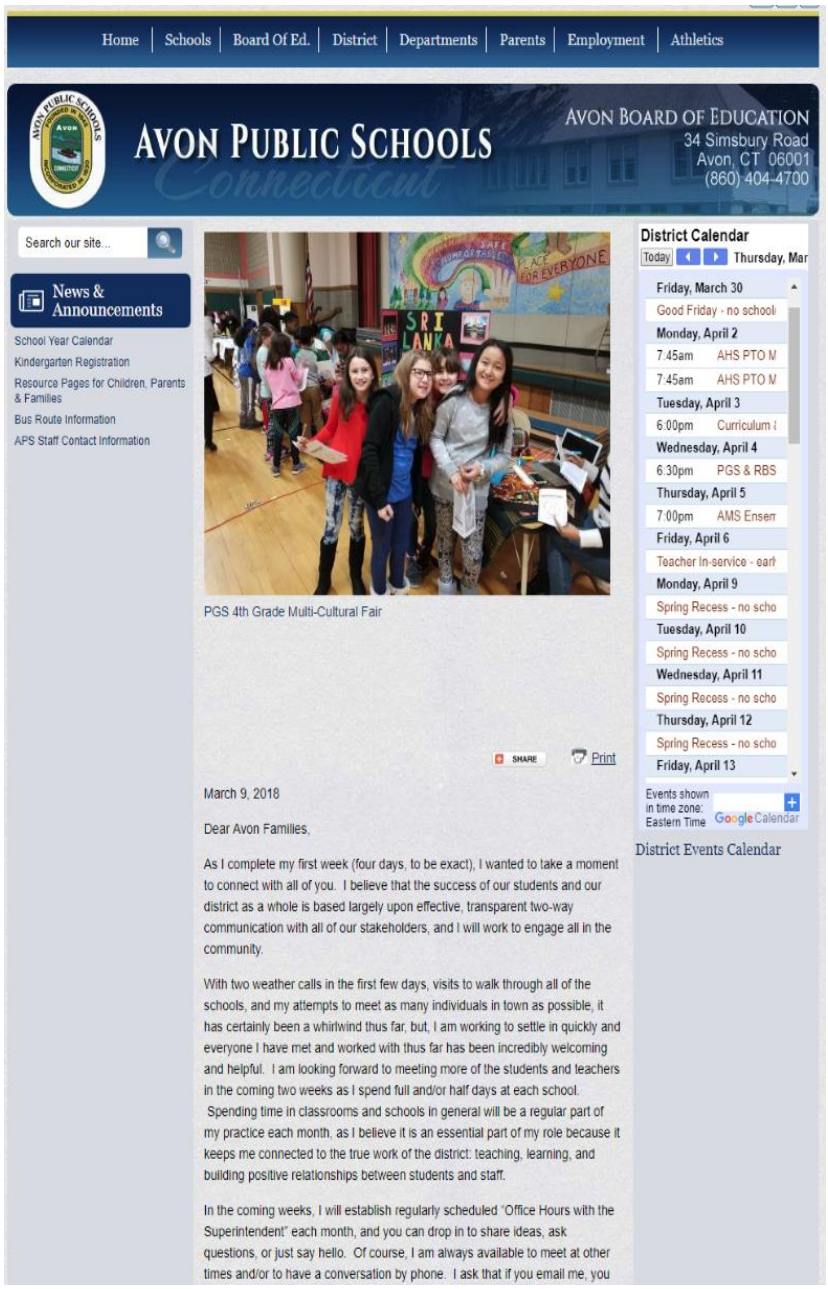
i. Basic categories are:

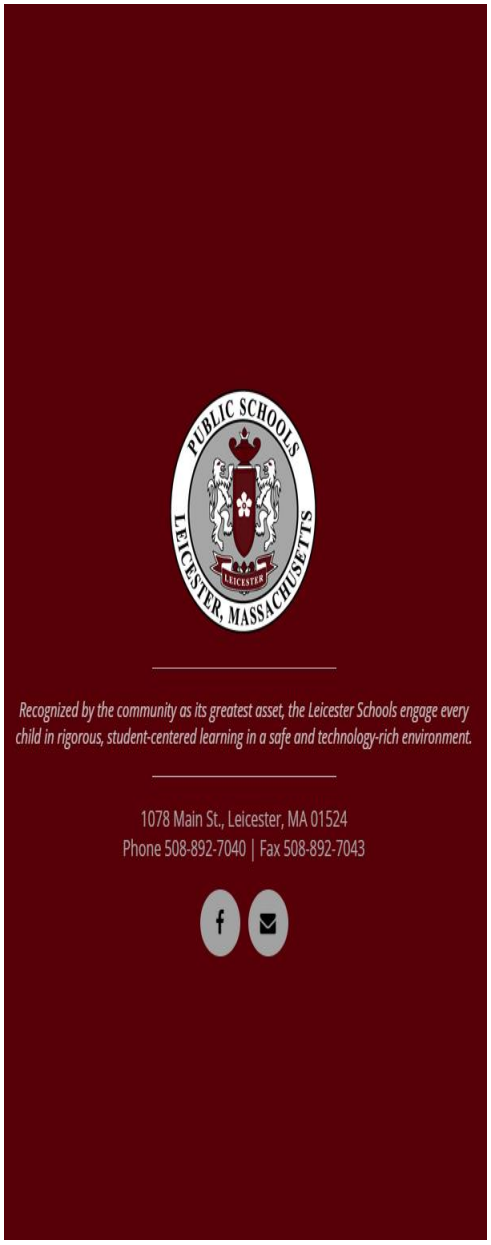
Uxbridge Schools.

Comparatively, needs more picture on Leicester Public School website of their schools and their children.


Recognized by the community as its greatest asset, the Leicester Schools engage every child in rigorous, student-centered learning in a safe and technology-rich environment.
1078 Main St., Leicester, MA 01524
Phone 508-892-7040 | Fax 508-892-7043
HOME ABOUT CALENDAR DEPARTMENTS DIRECTORY EMPLOYMENT FOR PARENTS FOR STAFF NEWS
Welcome To
LEICESTER
NEWS
LEICESTER PUBLIC SCHOOLS
School Choice
FY19 Budget Public Hearing
VIEW MORE
UPCOMING EVENTS
April02
April05
5th Grade Field Trip to Freedom Trail
April07
AP English at Auburn H.S.
Online Payments
Facility Use
Power School


ABINGTON
PUBLIC SCHOOLS
HOME CENTRAL OFFICE SCHOOLS COMMUNITY STUDENTS & FAMILIES STAFF
UPDATED (3/28/18) DISTRICT ANNUAL SCHOOL DAY CALENDAR
SCHOOL COMMITTEE
FOOD SERVICE
STAFF DIRECTORIES
WOODSDALE SCHOOL
Join Our Mailing List
Popular Links
Staff and Parent Portal Logon
Staff and Student Email Logon
Online Payments
Abington School Building Committee
Latest News
District School Calendars
School Committee Meeting
National Youth Art Month
View All News
Message from the Superintendent
Dear Parents/Guardians:


Home | Schools | Board Of Ed. | District | Departments | Parents | Employment | Athletics
AVON PUBLIC SCHOOLS
AVON BOARD OF EDUCATION
34 Simsbury Road
Avon, CT 06001
(860) 404-4700
Search our site...
News & Announcements
School Year Calendar
Kindergarten Registration
Resource Pages for Children, Parents & Families
Bus Route Information
APS Staff Contact Information
PLACE FOR EVERYONE
SRI LANKA
PGS 4th Grade Multi-Cultural Fair
SHARE
Print
March 9, 2018
Dear Avon Families,
As I complete my first week (four days, to be exact), I wanted to take a moment to connect with all of you. I believe that the success of our students and our district as a whole is based largely upon effective, transparent two-way communication with all of our stakeholders, and I will work to engage all in the community.
With two weather calls in the first few days, visits to walk through all of the schools, and my attempts to meet as many individuals in town as possible, it has certainly been a whirlwind thus far, but, I am working to settle in quickly and everyone I have met and worked with thus far has been incredibly welcoming and helpful. I am looking forward to meeting more of the students and teachers in the coming two weeks as I spend full and/or half days at each school. Spending time in classrooms and schools in general will be a regular part of my practice each month, as I believe it is an essential part of my role because it keeps me connected to the true work of the district: teaching, learning, and building positive relationships between students and staff.
In the coming weeks, I will establish regularly scheduled "Office Hours with the Superintendent" each month, and you can drop in to share ideas, ask questions, or just say hello. Of course, I am always available to meet at other times and/or to have a conversation by phone. I ask that if you email me, you
District Calendar
Today
Thursday, Mar
Friday, March 30
Good Friday - no school
Monday, April 2
7:45am AHS PTO M
7:45am AHS PTO M
Tuesday, April 3
6:00pm Curriculum
Wednesday, April 4
6:30pm PGS & RBS
Thursday, April 5
7:00pm AMS Ensem
Friday, April 6
Teacher In-service - earl
Monday, April 9
Spring Recess - no scho
Tuesday, April 10
Spring Recess - no scho
Wednesday, April 11
Spring Recess - no scho
Thursday, April 12
Spring Recess - no scho
Friday, April 13
Events shown in time zone: Eastern Time
Google Calendar
District Events Calendar


PUBLIC SCHOOLS
LEICESTER, MASSACHUSETTS
LEICESTER
Recognized by the community as its greatest asset, the Leicester Schools engage every child in rigorous, student-centered learning in a safe and technology-rich environment.
1078 Main St., Leicester, MA 01524
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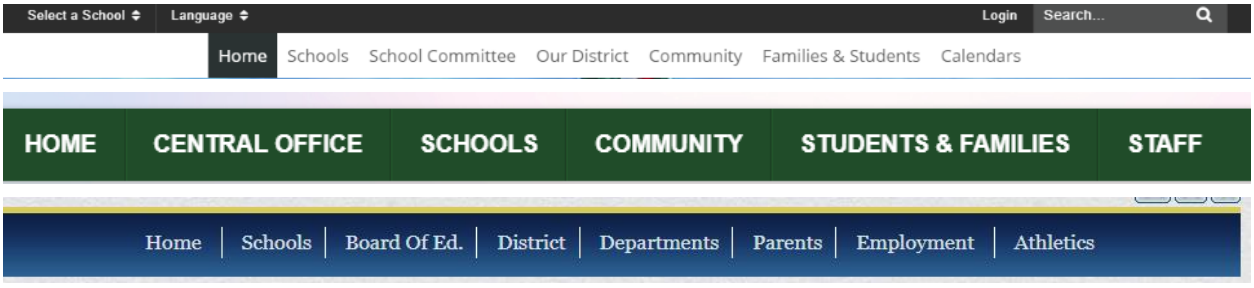
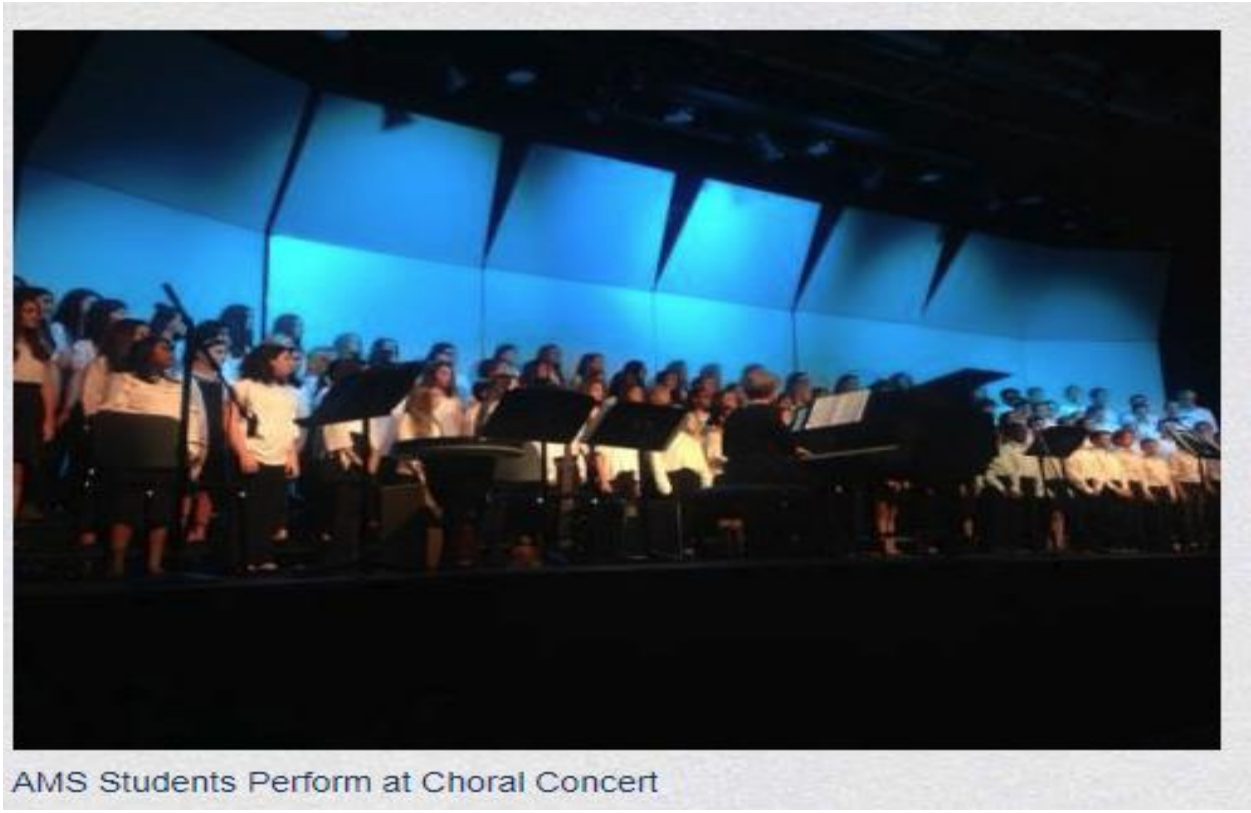

Select a School
Language
Login
Search...
Home
Schools
School Committee
Our District
Community
Families & Students
Calendars
HOME
CENTRAL OFFICE
SCHOOLS
COMMUNITY
STUDENTS & FAMILIES
STAFF
Home
Schools
Board Of Ed.
District
Departments
Parents
Employment
Athletics


Welcome To
LEICESTER



AMS Students Perform at Choral Concert

UPCOMING EVENTS

All Day

April02

Pri - Families in PE

All Day

April05

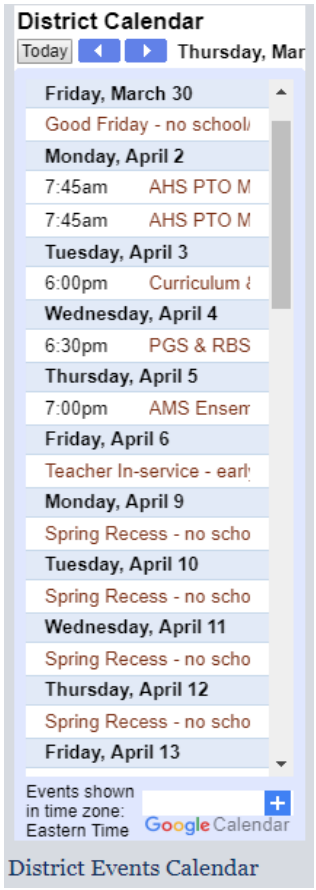
5th Grade Field Trip to Freedom Trail

7:30AM - 12:00PM

April07

AP English at Auburn H.S.


UPDATED (3/28/18) DISTRICT ANNUAL SCHOOL DAY CALENDAR
SCHOOL COMMITTEE
FOOD SERVICE
STAFF DIRECTORIES
Popular Links
Staff and Parent Portal Logon
Staff and Student Email Logon
Online Payments
Abington School Building Committee
Search our site...
News & Announcements
School Year Calendar
Kindergarten Registration
Resource Pages for Children, Parents & Families
Bus Route Information
APS Staff Contact Information



1. Value to the Community
    a. Value to parents/students
        i. Information on day to day education of children
            1. Keep up with children's homework assignments and grades
            2. A neutral platform for teachers to communicate with parents
        ii. Information on how child's performance compares to other children in the school
        iii. How the school district compares to other districts

b. Value to school
    i. Can help identify trends that would be useful for developing targeting programs
    ii. Can help them point to improvements
        1. Can help show progress on their proposed action plan
        2. Highlight their strengths
c. Value to district/city
    i. Financial information is critically important
        1. Help with budgeting
            a. Target programs
        2. Help with state and federal grants
            a. Having hard data to point to when applying for grants is key
    ii. High school performance can help make the city a more desirable living location (higher real estate value)
        1. Having the public know that the schools stack up against others in the area is key for disseminating this info to neighboring cities
d. Literature/Realms of this topic that Leicester might want to consider
    i. Benefits/costs of big data

1. If Leicester was to consider posting more individual data in comparison to the larger school and district data for the benefit of parents (and researchers)
2. This is a trend that is becoming more popular now, even as specific as testing patterns that kids have
3. Privacy is a huge issue here, how to protect the rights of individual kids without sacrificing the data that they provide

ii. Accessibility of the websites

1. What information is prominent and what is hard to find
2. There are some schools getting media and legal attention for what they have made prominent on their website and what they have chosen to avoid publishing

1. **Data analysis**

MCAS

Figure 1.1

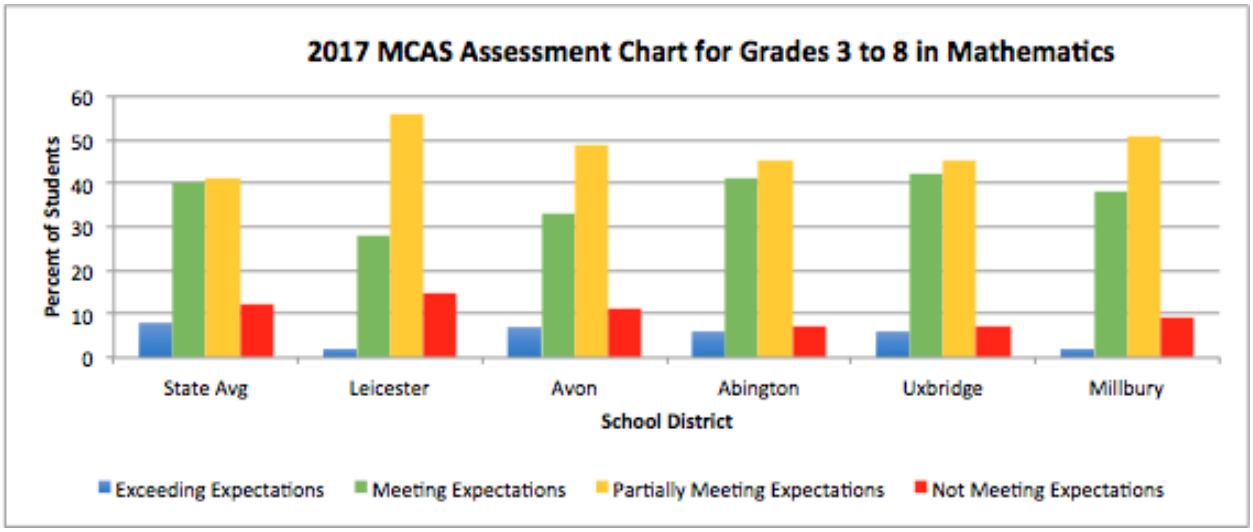


Table for Figure 1.1

2017 MCAS Assessment Chart for Grades 3 to 8 in Mathematics				
	Exceeding Expectations	Meeting Expectations	Partially Meeting Expectations	Not Meeting Expectations
State Avg	8	40	41	12
Leicester	2	28	56	15
Avon	7	33	49	11
Abington	6	41	45	7
Uxbridge	6	42	45	7
Millbury	2	38	51	9

Figure 1.2

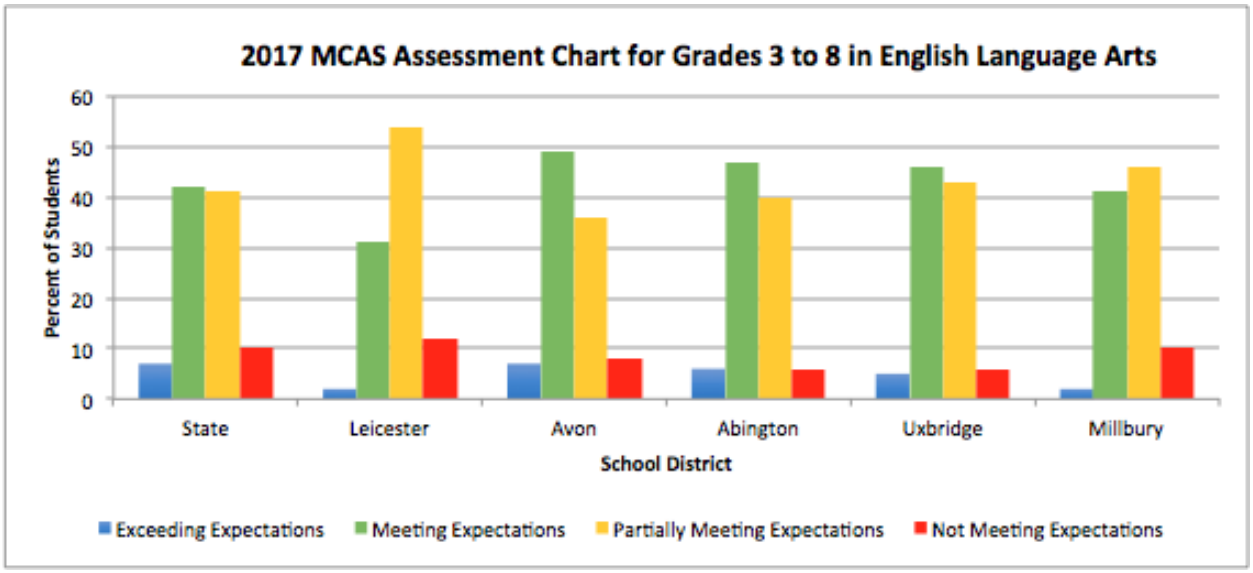


Table for Figure 1.2

2017 MCAS Assessment Chart for Grades 3 to 8 in English Language Arts				
	Exceeding Expectations	Meeting Expectations	Partially Meeting Expectations	Not Meeting Expectations
State	7	42	41	10
Leicester	2	31	54	12
Avon	7	49	36	8
Abington	6	47	40	6
Uxbridge	5	46	43	6

Millbury	2	41	46	10

Figure 3.1

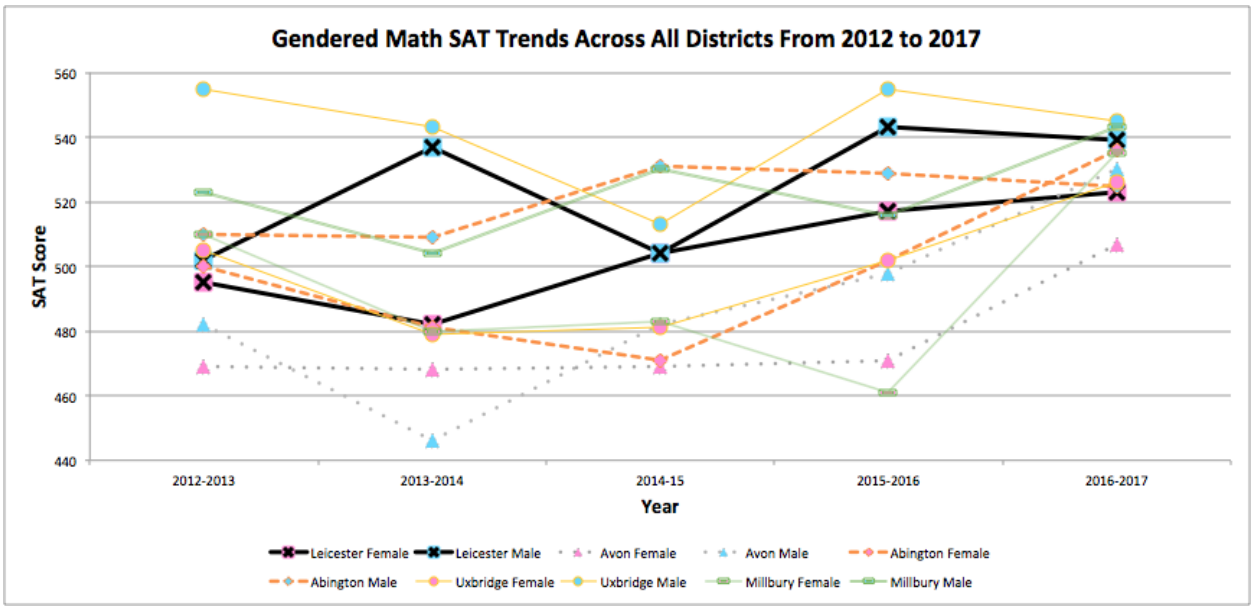


Table for Figure 3.1

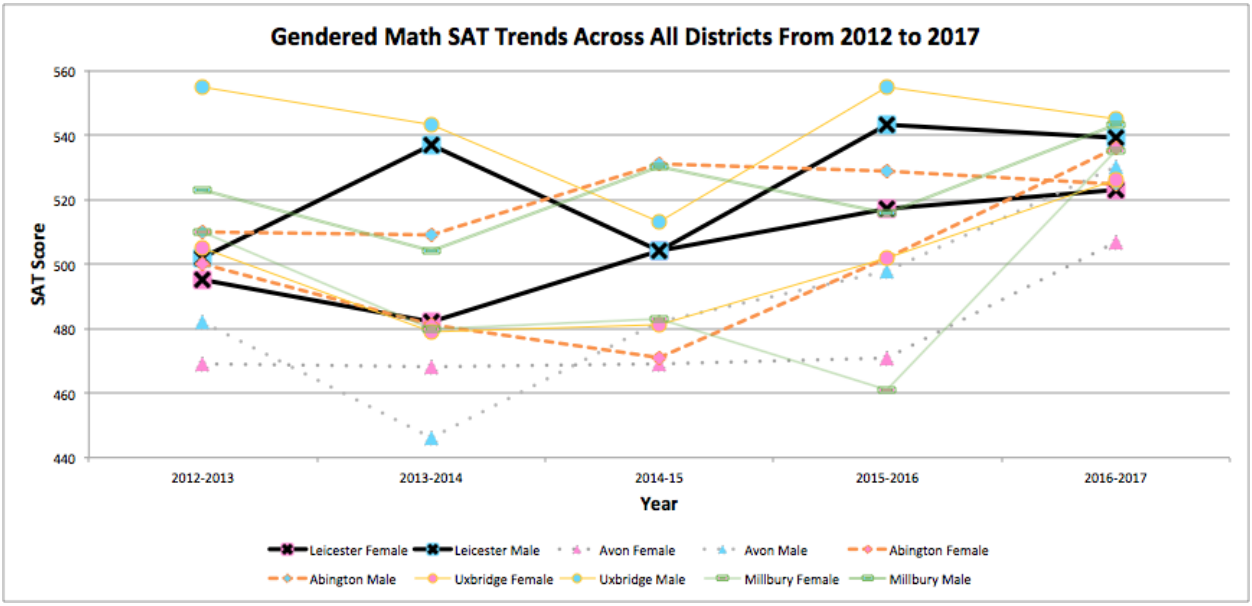


Table for Figure 3.1

Gendered Math SAT Trends Across All Districts From 2012 to 2017										
	Leicester		Avon		Abington		Uxbridge		Millbury	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
2012-2013	495	502	469	482	500	510	505	555	510	523
2013-2014	482	537	468	446	481	509	479	543	480	504
2014-15	504	504	469	482	471	531	481	513	483	530
2015-2016	517	543	471	498	502	529	502	555	461	516

2016-2017	**523**	**539**	**507**	**530**	**536**	**525**	**526**	**545**	**535**	**543**

Figure 3.2

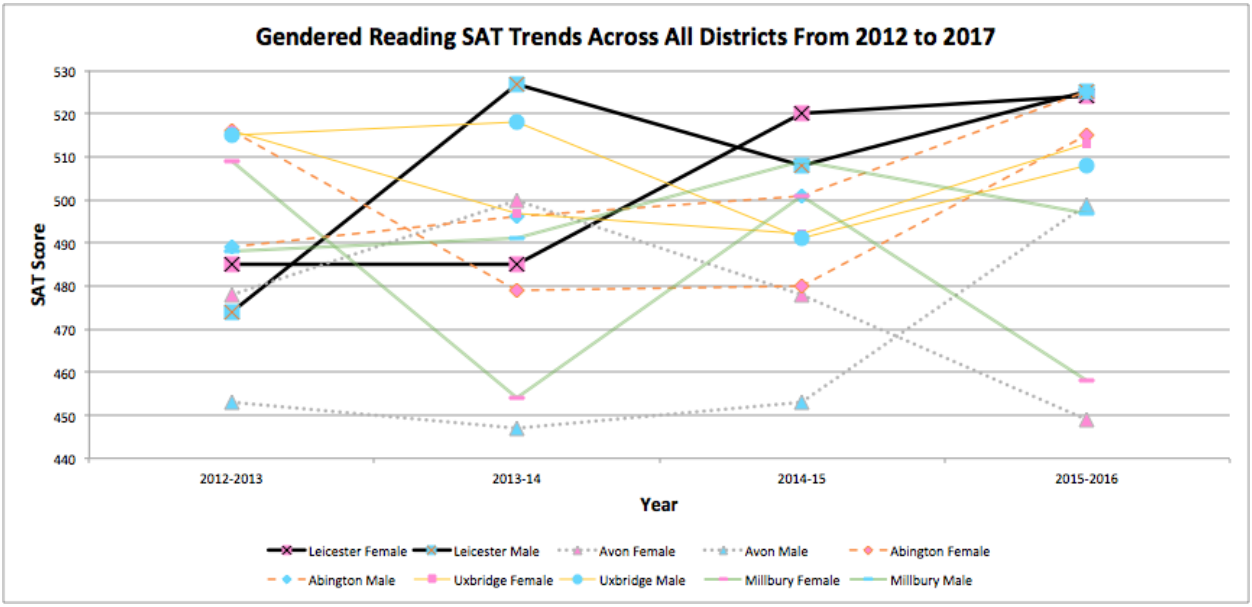


Table for Figure 3.2

Gendered Reading SAT Trends Across All Districts From 2012 to 2017										
	Leicester		Avon		Abington		Uxbridge		Millbury	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
2012-2013	485	474	478	453	516	489	516	515	509	488
2013-14	485	527	500	447	479	496	497	518	454	491
2014-15	520	508	478	453	480	501	492	491	501	509
2015-2016	524	525	449	499	515	525	513	508	458	497

Figure 3.3

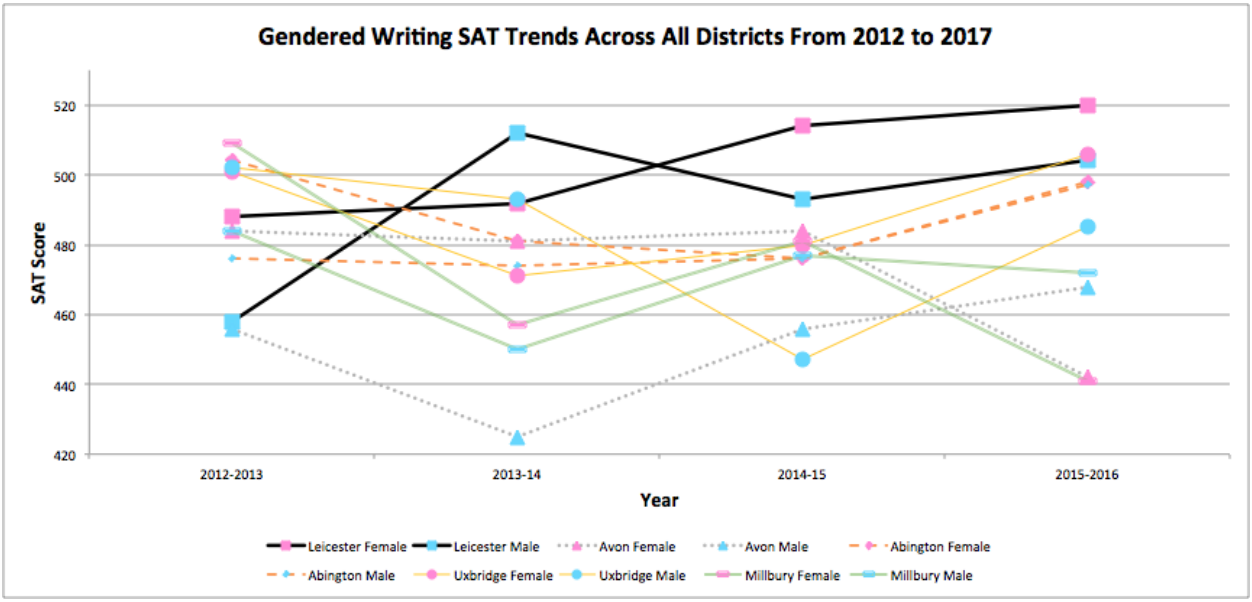


Table for figure 3.3

Gendered Writing SAT Trends Across All Districts From 2012 to 2017										
	Leicester		Avon		Abington		Uxbridge		Millbury	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
2012-2013	488	458	484	456	504	476	501	502	509	484
2013-14	492	512	481	425	481	474	471	493	457	450
2014-15	514	493	484	456	476	476	480	447	481	477
2015-2016	520	504	442	468	498	497	506	485	441	472

Figure 4.1

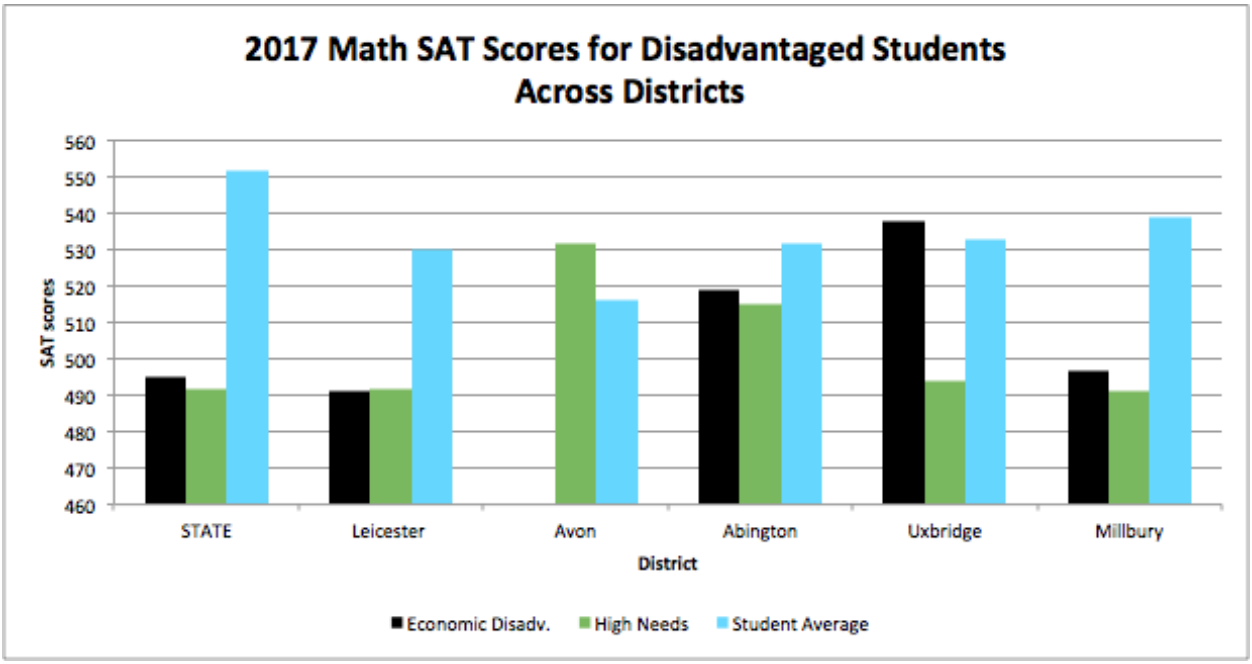


Table for Figure 4.1

2017 Math SAT Scores for Disadvantaged Students Across Districts						
	STATE	Leicester	Avon	Abington	Uxbridge	Millbury
Economic Disadv.	495	491		519	538	497
High Needs	492	492	532	515	494	491
Student Average	552	530	516	532	533	539

Figure 4.2

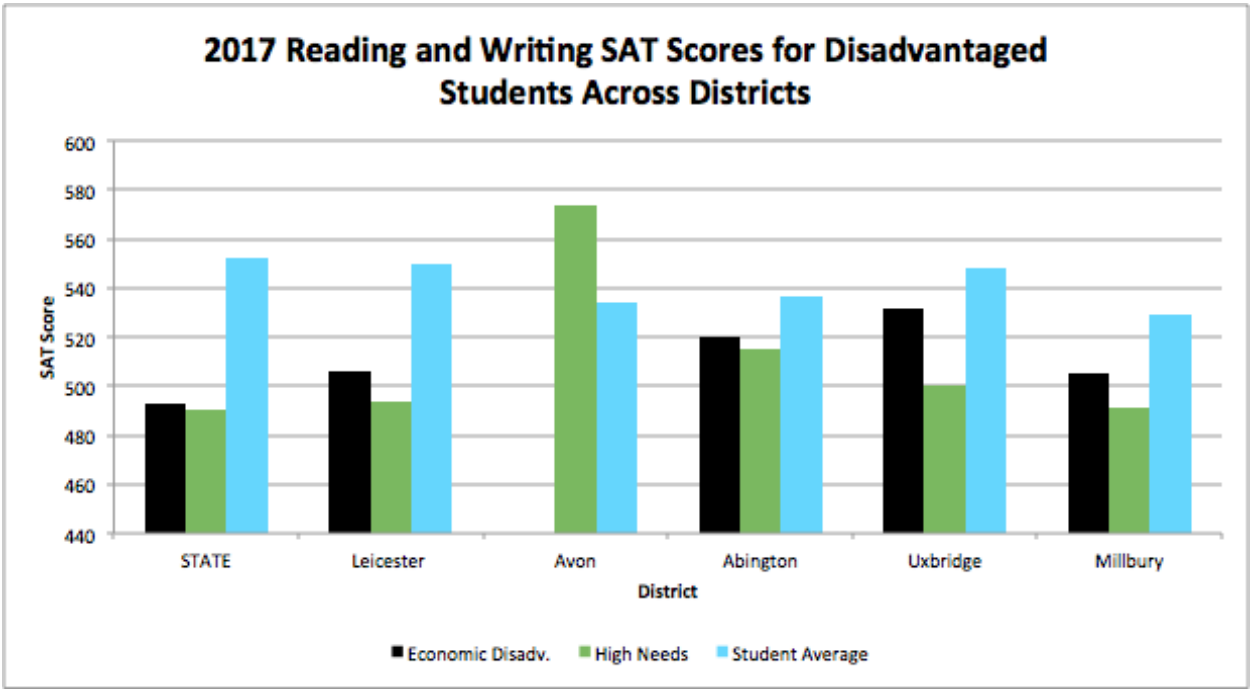


Table for Figure 4.2

2017 Reading and Writing SAT Scores for Disadvantaged Students Across Districts						
	STATE	**Leicester**	**Avon**	**Abington**	**Uxbridge**	**Millbury**
Economic Disadv.	**493**	**506**		**520**	**532**	**505**
High Needs	**490**	**494**	**574**	**515**	**500**	**491**
Student Average	**552**	**550**	**534**	**537**	**548**	**529**

Figure 6.1

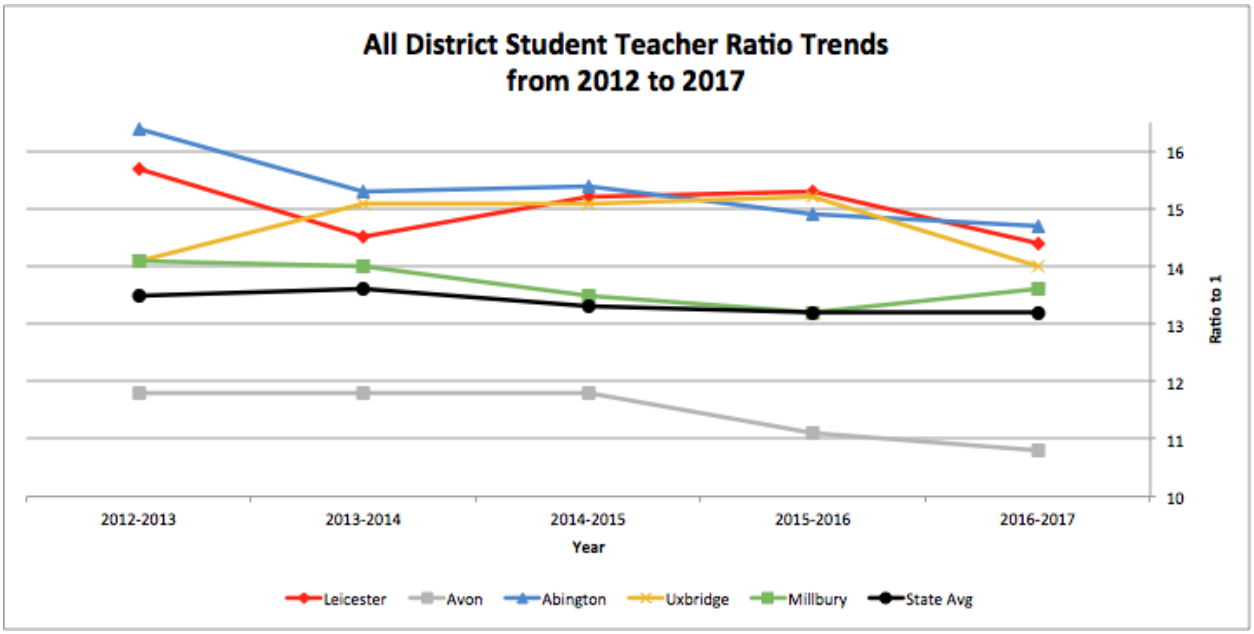


Table for Figure 4.2

All District Student Teacher Ratio Trends from 2012 to 2017						
	Leicester	**Avon**	**Abington**	**Uxbridge**	**Millbury**	**State Avg**
2016-2017	**14.4**	**10.8**	**14.7**	**14**	**13.6**	**13.2**
2015-2016	**15.3**	**11.1**	**14.9**	**15.2**	**13.2**	**13.2**
2014-2015	**15.2**	**11.8**	**15.4**	**15.1**	**13.5**	**13.3**
2013-2014	**14.5**	**11.8**	**15.3**	**15.1**	**14**	**13.6**
2012-2013	**15.7**	**11.8**	**16.4**	**14.1**	**14.1**	**13.5**