

## **DECLARATION**

I CHARLES N. KINGA declare that the work contained in this document is my own effort and has never been represented to this or any other institution. It is my final project documentation concerning online actual private teachers booking services. The document will be submitted to the **School of Science** under information sciences and computing department.

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SIGN: .....

## **DEDICATION**

I dedicate this piece of work to my Guardian who through their overwhelming support has made me accomplish most of my goals in life. Also I warmly dedicate the success of this work to my senior brother Dr. Wallace Macharia Kinga who is the director of education at Nyeri County. In addition to his dear wife Mrs. Catherine Muthoni who is a Maths/Physics teacher at Bishop Ngandu girls in Nyeri County. May God the almighty always protect them and give them good health for their kindness and unending support and care.

I also dedicate this work to my close and dearly friend MISS. TRIZAH WAMBUI who is undergraduate arts teacher at Kenyatta University and to MR. M.J Igogo the principle of Njabini Boys High school. That is, my former high school located in Nyandarua county. Finally vote of thanks to my colleagues who stood by me and supported me throughout this period. May God shower you with his blessings abundantly.

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Special acknowledgement also to special members of IT department at the company who are system analysts, software engineers and designers experts with whom I closely worked with.

Lastly, I thank everyone especially my Maasai Mara lecturers who up to now have made my computer science degree studies development a success as well as my dear family members and friends for all the support they accorded me all the time. I am so lucky to have you all in my life. I pray to God to continue granting you with more life opportunities to continue guiding and assisting others. May our living God bless and favor you all.

## **ABSTRACT**

King's Teachers Booking system is currently new online platform aimed to provide a modern user friendly, secured, available, reliable and 'open market place' where students and private schools will choose private teachers based on merit and relevance to their tuition or academic needs. Hence, the system is meant to offer an online booking of private teachers. The system is expected to simplify the method of finding an actual offline private teachers (Not Online learning) at any time and location, make private studies more understandable to Kenyans and of course create more confidence on the teaching services promised to be delivered by teachers from this new system. By validating the system will ensure that only genuine teachers are registered with the system. For instance, through making sure teachers on the platform are registered with legal government boards like the Teachers Service Commission (TSC) for primary and secondary teachers. Hence, their TSC Number will be used for security purpose to proof them fit and genuine teachers. Also Kings Teachers Booking System is meant to make students who are core target here focus better on their needs. With all laid plans for this new system in Kenya, there will be no more stress on how to access the right actual private teachers of any level and category. Students will be equipped with all the assurance they really need and desire to trust this new system. Hence, more attention and confidence towards this online teachers booking system. The system will also cater for the issue of locations in the country. All private teachers and schools will have various teaching classrooms at different locations within their region. No one will no longer be limited to teachers just in their local areas. The system will offer some of the best teachers and private learning institutions from across the country. As stated above, teachers to be provided on Kings Teachers Booking System will be from various areas and with different levels of experience. Hence, different teaching methodologies with new type of interactions. Hence, students will be much comfortable and feel much at easy to rely on the system services which is committed to connecting them with top private teachers capable of providing an outstanding services with a comprehensive satisfaction guarantee. Transparency is the key in this system. You will read teachers' reviews from past students and schools. The system is expected to present high standards and vet all new teachers. This will be proved from Kings Teacher's policy requirement document. Finally, the system believes that quality will never be an accident at any given time. Hence teachers will be allowed to set their own prices depending on their experience, level of studies, time and location of their classrooms due to travelling issue. This simply means that any one will get the best for their own money.

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## **INTRODUCTION**

### **1.1 BACKGROUND**

Education has been widely considered as one of the important determinants of an individual's productivity and economic growth of countries. Theodore W. Schultz (1961) claimed in his article, Investment in Human Capital, that education is one of the major activities that increase human capital, which is tightly linked to individuals' earnings and growth of economy. In order to find evidence of the link connecting education to individual's productivity and economic growth, researchers have focused largely on formal education, i.e., primary, secondary, and tertiary schools in both public and private sectors. There is a breadth of studies that explore how increases in both quantity and quality of schooling are related to students' academic achievement and labor market outcomes as well as economic development. However, there is a lack of studies that investigate the effect of private tutoring, a form of supplementary education where students can acquire more skills and knowledge to increase their human capital. This is an important area in education as private tutoring becomes a growing phenomenon in many countries (Dang and Rogers, 2008). The private tutoring sector has been expanding in many countries, so much so that it can be considered the third emerging education sector in addition to public and private school sectors (Dang and Rogers, 2008).

Several studies have revealed time and again that a student-centered approach to learning is far more superior to any other method of instruction. Personal factors significantly influence how learners retain information, interact with fellow learners, solve problems and apply knowledge. Taking a teacher-centered or a general class content-centered approach while ignoring students is a surefire recipe for failure. Obviously, information is important and critical to learning. But I understand information is only part of the formula. A reliable private studies, the so called private tuition studies that include an actual teacher rather than an online tutoring teachers causes need to put the learners at the center. Hence, an easy and reliable method to have a quick access to an actual private teachers is really the main issue here. That is what forced my creativity and desire to develop a reliable and secure online private teachers booking system.



## **1.2 PROBLEM STATEMENT**

There are a slew of hassles that can come with hiring a tutor/teacher. Coordinating schedules, matching personality types and finding a convenient location are just a few of the struggles. To avoid these difficulties, students, families and private institutions who are seeking any academic assistance can turn to online teachers booking services. An online teachers' platform that will offer booking to fit you or your child's unique needs. You will easily find a qualified teacher that is reasonably priced and can give you the academic help you're looking for. In order to find the best private teachers' booking services online, one is only needed to make sure that he/she know what to look for. In making your decision, it's important to factor in qualified and screened teachers, a pricing plan that works for you and the right curriculum for the student. The following are the list of some of this challenges;

Assurance of finding and selecting the right teacher with a lot and enough of experiences. Users will have a privilege of choosing a teacher they wish from one of the best teachers' platform offered in the country. The system will offer actual private teachers and schools offering private studies from across the country, who will be available to be contacted for their work 24/7.

Provide an easy employment platform for private teachers across the country to both parents and private schools. Currently, a teacher looking for a job from private institutions have to do it manually by dropping his/her academic documents manually at their locations. With this new system, private schools in need of any actual teacher will just have to go online to this new system and search for the type of teacher in need off. Whether by category, location and level of education and if that teacher is available in the system, will communicate through given address for further negotiation and in touch. Hence a new easy method of getting a job vacancy to all teachers in the country.

Guarantee meeting the incredibly offline genuine teachers at any time anywhere. Since the system will advocate for a full registration of teachers, all students and parents will be assured of getting the right and genuine teacher from the system. This will eliminate the fear of getting under qualified teachers who has lied to be or even an irrelevant one for teaching a student in what he/she is not qualified just for the sake of tuition cash. The system will use teachers TSC numbers to prove them to be genuine and hence avoid the issue of insecurity.

Create an availability of the actual private teachers committed to offer full tuition services and ready to work with integrity. We believe every child, fundamentally, has the capacity for great things. That is, teachers with the positive mind of giving the student the right direction, mentoring and yes, education, they have the capability to achieve. The one-to-one online environment of availability of private tutors means their capabilities can be nourished, developed and grown outside of the manual difficulties of getting a private teacher nearby and their full potential can be realized.

Meeting teachers will be absolutely free and easy method: The Kings teachers booking system will help users, that is, students, schools and teachers meet each other for free. This will be a great chance for students and especially private learning institutions to experience the power of this interactive online bridge, connecting them to teachers of their heart desires. Users will just have to click on 'Contact/Book' on a teacher's profile and get in touch to relevant teachers details that will join them together.

Create new kind of communication and relationship between students, parents, private schools and private teachers: Former way of finding for a private actual teacher had caused for a lot of intimidations and embarrassment to both hired teachers and to parents' efforts towards their children. That is, in term of wastage of resources and time despite parents' efforts to boost their children studies privately. This new system will be of much secure from all this drawbacks and hence hoped to favor all users at all of their needs as far as private teacher is concerned.

Private teachers will be able to schedule and reschedule all times for their services delivery since they will be the managers of their own time. Kings Teachers booking System is there to bridge the students with the right teachers who fits the amount of time they are in need of due to wide selection of several teachers to be offered online. Hence, no time and resources wastage.

Easy access to personal teacher of interest: The old means of hiring a private teacher for a student is really difficult and full of challenges. Kings Teachers System will provide large number of willing private teachers from diverse background and parts of the country. Hence, the choice of the student will give the precise decision on that.

### **1.3 AIMS**

To come up with a modern user friendly, available, reliable, cheap, convenient, secured and ‘open marketplace’ where students and private schools will choose private teachers based on merit and relevance to their tuition needs. Hence, majorly the system is a private teachers booking system. This will make the private tuition process understandable, easy and simple to access and will create more confidence on the tuition services promised to be delivered by teachers from this new system.

### **1.4 PROJECT OBJECTIVES**

- Coming up with an available and reliable online private teachers booking system.
- Reviewing the existing manual methods of accessing actual private teachers by any individual.
- Implementing an automated private Teachers booking platform for all teachers’ categories at all levels of education in Kenya.
- Provide a moderate commercial private teachers booking platform that fits all type of students’ desires by ensuring both side benefits from the system.
- To provide a quick and reliable online connection platform among the teachers, students, parents and learning institutions.

### **1.5 RESEARCH QUESTIONS**

This Kings teachers’ booking system addresses the impact of private tutoring on three aspects: students’ academic outcomes, formal schooling, and educational inequality. With respect to each aspect, this documentation attempts to answer the following three major questions.

#### **(1) The impact on students’ academic achievement:**

Does private tutoring have a causal impact on students’ academic achievement?

Does this online platform of booking for actual private teachers simple and reliable to use?

What are the short- and long-term effects of private tutoring on students’ academic achievement?

If in future you will need any academic assistance from an actual private teacher, will you prefer to use the online system or the manual process to access your new teacher?

Does the teachers registered with this system through the security mechanism specified are well approved to be really genuine and hence secure to rely on their services?

Does this online system save you time of accessing the right, genuine and available private teacher?

How much do you feel secure and in control while using this system to book for private teacher by trusting all the registered teachers within the system?

## **(2) The impact on formal schooling addressed to teachers**

Do you support this implementation of online booking of actual private teachers?

Does private tutoring influence students' behavior in schools that affect the learning environment in schools?

In particular, how is participation in private tutoring associated with students' attention to lessons in schools?

With an implementation of an online private teachers booking system, do you think it will be possible to cater for all education categories and especially to students with special needs in the entire country unlike before?

Will online booking process of private teacher ease and improve your private academic assistance as a teacher?

How much do you feel secure to use the online system freely without the fear of interacting with con and fake students risking your time and resources?

Does this online booking of private teachers balanced to benefit both you as the teacher and students side without oppressing one side in any way?

## **(3) The impact on educational inequality:**

Does private tutoring exacerbate educational inequality?

Are there heterogeneous effects of private tutoring on student academic achievement?

For whom are private tutoring effects significant, and how large might they be?

Do you agree that this system of booking private teachers online is simple and cheap enough to use to most of the students and teachers in their main aim of achieving academic assistance?

### **1.5 SCOPE OF THE STUDY**

The project is focused on the ways of getting access to the right actual private teachers, studying the existing methods of getting a private teacher for tuition services and a private teacher getting students to teach privately and ways of setting up remedial tuition classes to give a reliable and helpful teaching practice from private teachers at all levels of studies. This also will produce:

- Less effort and less labor intensive, as the primary cost focus primarily on creating, managing, and running a secure web for Teachers availability portal.
- Increasing number of genuine, reliable, all time available and ready private teachers and hence high integrity and confidence on teachers provided. This shall result to improved mindset towards private teachers and high confidence on their work due to positive attitude and willing spirit of study and teaching among the students and teachers respectively.
- Have high admirable skills in providing academic assistance to assigned students individually and in private learning institutions.
- Hands on experience in creating and implementing individual and actual student based learning tuition programs in the country.
- To be in depth knowledge of the procedures necessary to provide students and learning institution with a better understanding of all subject areas and at all levels of study.
- To be able to design and implement effective and modern education models for academic excellence.

## **1.6 JUSTIFICATION**

The Kings Teachers system for online actual private teachers booking shall reduce the following: the time spent by students looking for the right actual private teacher, a private teacher looking for willing students to hold private studies and time for parents looking for private teachers to assist their children, inadequate knowledge on whether the teacher is genuine or not and solve the issue of how and where the private classes will be held. This is because the system will provide private teachers online who are qualified, professional and dedicated in their prospective level of study. Hence the ultimate aim of maintaining their individual trust and integrity in their private teaching work. Cases of fake private teachers and bad attitudes due to poor interrelation between the students will be eliminated since both parties will have a common mind of a willing spirit to learn and to deliver private teaching services competitively. Also the performance level of the private teachers will be visible online since at the backend of this system resides a well-developed database using MYSQL that can provide students and parents comments about the teacher, that's feedback responses, teachers full academic records including qualifications and level of experiences, and mostly the individual teacher's rates rated from customers comments and feedback recommendations record of his/her work and on competitive demand on his recommending good work. Since the system will provide a platform with a variety of teachers on all categories and from different places, students can learn from any location, any moment and will have ample time to decide when and who to teach them.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.0 INTRODUCTION**

This chapter introduces three theories that are necessary to understand the private tutoring phenomenon: 1) human capital theory, 2) the standard microeconomic theory of supply and demand, and 3) educational production function. The next section summarizes the existing literature on the topic of private tutoring. Many studies have explored the micro and macro determinants of purchasing private tutoring and its impact on several student-related outcomes. After a critical overview of the literature, I will explain the gap in the existing literature, which this documentation partially fills.

### **2.1 Theoretical Background**

#### **2.1.1 Human Capital Theory**

The demand for private tutoring can be interpreted as a form of human decision making with the aim of increasing knowledge and skills motivated by the desire to build human capital that yields higher future earnings and success based on the theory of human capital. In order to understand the underlying context of private tutoring, understanding human capital theory is basic.

Treating human beings as capital goods was controversial among economists until the mid-20th century even though a few economists had started viewing human beings as a capital of nations<sup>2</sup> (Schultz, 1961). Due to more humanistic conceptions of human beings, the concept of human capital had to endure criticisms against it (Schultz, 1961). However, Theodore W. Schultz who was an economist in the 20th century undertook to criticize the classical notion of labor as simplistic in his article *Investment in Human Capital*. The classical notion is that labor should be considered as a capacity to do manual work requiring little knowledge and skill. Also, he argued that human beings should be treated as a form of capital of the country because of their important economic role. The improvement in the quality of human capital increases the productivity of workers, which is linked to real earnings as well as the economic growth of nations (Shultz, 1961; Becker, 1962; Lucas, 1988; Mankiw, Romer & Weil, 1992). Due to these important roles of human capital, Schultz (1961) believed that human capital should be promoted by investing in people through five important activities such as health services, on-the-job training, formal education, adult education, and migration of individuals and families.

In addition to on-the-job training, other activities could also increase human capital. Becker (1962) defined a school as an institution specializing in the production of training. Through schooling, people absorb skills and knowledge (either general or specific) that they would need in the labor market. Therefore, schooling would have the same kind of implications as on-the-job training. Moreover, apart from the knowledge and skills that people could learn from training or schooling, other information such as economic, political, or social systems could help people choose patterns of consumption, employment, or allegiance to political parties, which could significantly raise real incomes of workers (Becker, 1962). Activities that promote emotional and physical health are other ways to improve human capital that have a significant influence on earnings.

Within the category of investment in human capital, private tutoring can be considered as one of the activities that help raise the quality of human capital. Similar to schooling, private tutoring aims to provide the necessary knowledge and skills that are required to succeed in formal schooling and the labor market in the future. In addition, students with access to private tutoring institutions often benefit from receiving other information about external academic resources, universities or future careers that are often provided by tutors or private tutoring institutions. These resources could strengthen the human capital of students, which is believed to have a strong connection with their success in the future labor market. Therefore, the theory of investment in human capital provides a critical background to explain the demand for private tutoring.

### **2.1.2 The Standard Microeconomic Theory of Supply and Demand**

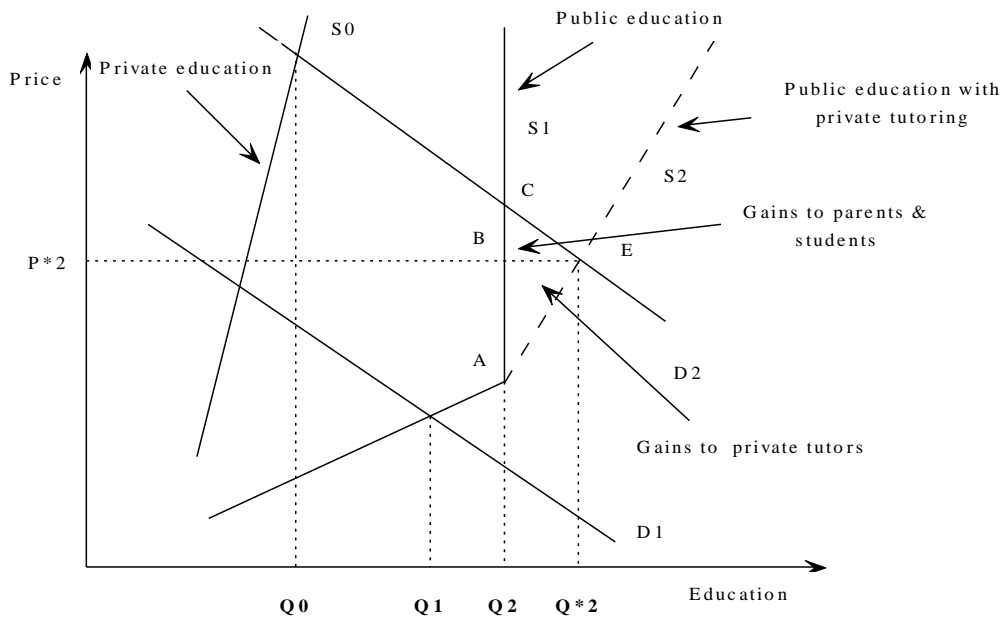
The standard microeconomic theory of supply and demand can be used to interpret the private tutoring phenomenon. This theory explains how the quantity of education, including private tutoring, is determined by the interaction between supply and demand for education in the market. Dang and Rogers (2008) presented the supply and demand for education for a typical household in the case where private tutoring is available as shown in Figure 1.

In Figure 1, there are three supply curves that represent the different types of education provided. The three supply curves  $S_0$ ,  $S_1$ , and  $S_2$  represent 1) private education, 2) public education, and 3) public education with private tutoring, respectively.  $S_0$  is placed farther up in the left corner compared to  $S_1$  and  $S_2$  because of the high costs of private education.  $S_0$  is also more inelastic in



price because parents who send a child to a private school are less sensitive to the price of education and more sensitive to the quality of education.  $S_1$  shows an upward sloping curve ending at point A, and the line becomes vertical rising from point A (perfectly inelastic supply). The vertical slope of  $S_1$  means, regardless of consumer demand, after a certain point, public schools may reach their capacity limit, preventing them from offering as much education—in terms of both quantity and quality—as parents or students want<sup>6</sup>.  $S_2$  shares a common solid upward-sloping curve with  $S_1$ , but it includes a dashed diagonal line starting from point A. This dashed line is less steep than the vertical curve of  $S_1$ , implying that private tutoring can meet students’ and parents’ demand for education as opposed to public education. In addition, this dashed line is steeper than the solid part of  $S_2$ , indicating that the cost of private tutoring is higher than the cost of public education.

**Figure 1. Demand and supply of education with private tutoring**



The household demand for education is represented by either the demand curve  $D_1$  or  $D_2$ . Even though schooling is provided free of tuition, a household always bears certain costs to send a child to school, such as school fees or foregone earnings by being at school instead of working (opportunity costs). With these costs of education,  $D_1$  is the demand curve for a representative household, and  $D_2$  represents another household that is assumed to have either a higher income, stronger preferences in education, or higher expectations about a child’s returns to education.

Due to these differences, at each price, a household in D2 would spend more on education than a household in D1.

The quantity of education is determined by the intersection between the supply and demand curves (equilibrium). If the representative household's demand for education is represented by the demand curve D2, the amount of private education the household consumes is  $Q_0$ , and the amount of public education consumed is  $Q_2$ . In the presence of private tutoring, the same household can consume  $Q^*$ , which is a larger amount of education than  $Q_2$ .

This standard framework explains a household's different behaviors in different settings of education. Availability of private tutoring promotes households to consume more education than when they have formal education only. However, this framework fails to explain several other aspects of private tutoring. For example, as Figure 1 shows, parents and students face different prices in each setting ( $S_0$ ,  $S_1$ , and  $S_2$ ). The price that a household shoulders in the setting of public education with private tutoring ( $P^*$ ) is lower than the price that a household takes on when only public education is available to them, which may not be true in many cases. In addition, this framework fails to explain the demand of private tutoring by students in private schools.

The failure of capturing all aspects of private tutoring using this framework may be due to certain assumptions that this framework incorporates (Dang & Rogers, 2008). This framework assumes that 1) the market for private tutoring is perfectly competitive, 2) public education reaches a strict capacity constraint after a certain point, and 3) an increase in education 20 units through private tutoring increases students' human capital. However, these assumptions may not always be valid in practice and may differ from setting to setting within a country and among different countries. The market for private tutoring is not always perfectly competitive because of teacher corruption. In a perfectly competitive market of private tutoring, households independently make decisions on whether to spend money on private tutoring for their children. However, in many developing countries, it is often the case that public school teachers offer private tutoring for their students after regular classroom hours and they make it mandatory by providing a part of curriculum during tutoring hours (Dang & Rogers, 2008; Buchmann, 1999; Silova & Bray, 2006).

Lastly, private tutoring may aim for test preparation instead of accumulation of human capital. Even though this framework has several limitations that do not allow us to explain every aspect of private tutoring, it delivers a broad picture of an education market with private tutoring and explains how its introduction in the market can increase households' consumption of this type of education.

### **2.1.3 Educational Production Function**

In order to estimate the effect of private tutoring on various student outcomes, this system employs an educational production function approach. An educational production function is analogous with industry production functions in economics, which explain the relationship between the inputs, such as labor and capital, into the production process using existing technology and the resulting output of firms including goods and services (Pindyck & Rubinfeld, 2000). In education, test scores, graduation rates, or dropout rates are used as outputs, and inputs are typically factors like students, family, and school. The statistical relation between these inputs and outputs is mathematically represented as follows (Hanushek, 1986).

$$(2.1) A_t = f(F_t, T_t, O_{St})$$

$A_t$  represents the achievement of a student at period  $t$ ;  $F_t$  represents the family inputs, such as parental education, income, race, and home language, that affect student achievement;  $T_t$  represents teacher inputs for a student such as the education level of teachers, teaching experience, and other teacher qualifications; and  $O_{St}$  represents other school inputs such as class size, location of schools, library, curriculum and so on.

## **2.2 Determinants of Private Tutoring**

### **2.2.1 Micro factors**

There are several studies that explored the determinants or drivers of private tutoring. Based on related studies, Dang and Rogers (2008) accumulated the results in existing studies regarding what kinds of micro and macro factors influence the demand for private tutoring. In terms of micro factors, many studies show a consensus that the most influential micro factors are household income, parental education, and urban location (Assaad & El-Badawy, 2004; 22 Stevenson & Baker, 1992; Tansel & Bircan, 2006; Dang, 2007b). Specifically, students whose parents live in an urban area with higher income and education levels have a higher probability of receiving private tutoring than their peers who live in a rural area with parents with lower

income and education levels. Similar patterns have been found in Kenya and other African countries (Choi et al., 2003; Kim, 2004; Kim & Lee, 2010; Lee, 2003; Won, 2001; Yun, 1997). In addition, a student's grade level and household size explain the pattern of demand for private tutoring in some countries. In Egypt and Vietnam, students in higher grade levels, especially the ones in the last grade of their current school level or in diploma-granting years, showed a higher demand for private tutoring (Assaad & El-Badawy, 2004; Dang, 2007b). And in Korea, Turkey, and Vietnam, the number of children in households showed a negative relationship with private tutoring expenditures (Kim & Lee, 2010; Tansel & Bircan, 2006; Dang, 2007b). However, this factor plays out differently in different countries. For example, using data from the Third International Mathematics and Science Study (TIMSS) in 1995 for 41 countries, Baker et al. (2001) showed that in three-fourths of these countries, low-performing students spent more money on private tutoring, whereas one-fourth of them exhibited an opposite pattern. This implies that some countries use private tutoring as a remedial strategy, while other countries consider it as an enrichment strategy (Baker et al, 2001; Won, 2001).

Stevenson and Baker (1992) used a logistic regression equation to find the determinants of the shadow education in Japan. In addition to the micro factors mentioned above, student's gender, student curriculum track (academic track vs. vocational track), and high school reputation seem to explain the pattern of students' shadow education in Japan. They found that male students, students in the academic track, and students in high schools that have a higher reputation spent more money on shadow education than their counterparts.

### **2.2.2 Macro factors**

In addition to micro factors, the literature on private tutoring has cited several macro factors that seem to foster the demand for private tutoring. First, Bray (1999) argued that as some of underdeveloped countries have transitioned to a market economy, the demand and supply of private tutoring have substantially increased. As the economy improves, increasing the real income of households, households would start spending more money on their children's education and other goods, an income effect in economics. Bray (1999) used cases in China, Vietnam, and Eastern Europe to show the emergence of supplementary tutoring, which previously did not exist in these countries.

Stevenson and Baker (1992) introduced another macro factor that would affect people's decisions on private tutoring. If there is a tight linkage between education and future success in labor market, they argued that this linkage would stimulate the competition for more education, and thus private tutoring. Given this tight linkage, the existence of high-stakes formal examination, a prerequisite to acquire more education in higher education institutions, increases the demand for education even more (Stevenson & Baker, 1992; Bray, 1999). In the case of Taiwan, the view is pervasive that students participate in shadow education to prepare for university entrance examinations because getting into prestigious universities determines their success in the labor market (Lin, 1983).

Cultural values are also emphasized to explain the pattern of private tutoring in many countries. Bray (1999) argued that supplementary tutoring is especially prevalent in cultures that stress effort. Many Asian cultures, which show a high demand for tutoring, are influenced by Confucian traditions that stress effort as a factor for future success, whereas a person's ability is more emphasized in European and North-American cultures (Rohlen & LeTendre, 1996). In addition, "many Asian cultures value disciplined study and are both competitive and status-conscious," which influence people's need for private tutoring (Bray, 1999).

The ineffectiveness of the public education system is found as one of the determinants of private tutoring (Kim & Lee, 2010; Buchmann, 1999; Silova & Bray, 2006). In Kenya, the public education system is regulated strictly by the government especially after the introduction of the free education in Primary school. Due to this rigidity, it is completely insulated from the market forces and local parents' demand for education (Kim & Lee, 2010). To meet this high demand, parents and students who are not satisfied with education provided by the public school system find other ways to meet their needs by participating in the private tutoring sector or by studying abroad (Chun et al., 2003; Kim, 2004). Several Kenyan researchers have conducted studies to analyze whether the Free Primary school education is one of the factors fanning the increasing demand for private tutoring, and they argued that this policy has played a significant role (Lee & Hong, 2001; Kim et al., 2003; Kim et al., 2003). Buchmann (1999) and Silova and Bray (2006) expressed concerns that low pay levels and weak monitoring of teachers in the public system may create a private tutoring market for teachers who wish to reap more rewards from teaching outside the public schools. Private supplementary tutoring may become more necessary in

systems that are teacher-centered rather than child-centered, and are intolerant of slow learners (Bray, 1999). However, most of these studies are speculative and anecdotal and do not indicate the causal link between the nature of education systems and demand for private tutoring.

As explained above, many researchers have introduced these macro factors that may determine the demand for private tutoring. However, there is little formal empirical research to test the above-described hypotheses, so it is still uncertain whether there are causal relationships between these macro factors and the prevalence of private tutoring.

### **2.3 Empirical Literature on the Effect of Private Tutoring on Outcomes**

Empirical studies have found positive effects of private tutoring on students' educational outcomes. Stevenson and Baker (1992) investigated whether the participation in high school shadow education increased the likelihood of university attendance in Japan. Overall, they found that students who reported that they have participated in certain types of shadow education during high school years showed a higher probability of attending universities in their first year following graduation from high school. For students in the first year out of high school, practice examinations and correspondence courses improved the probability of entering college by 16 percent and 25 percent, respectively, whereas having a private tutor significantly reduced this probability, which reflects the remedial character of this form of private tutoring in Japan. In addition, after-school classes (juku) had only a small and insignificant effect on attendance, probably because students in better high schools who tend to be high-performing use their high school's after-school program instead of juku. For students in the second year out of high school, attending special tutoring school increased the probability of entering college by 80 percent. However, using the logistic regression, Stevenson and Baker (1992) failed to remove the bias caused by selectivity of private tutoring participants. In addition, the student academic performance variable used in all regression models is problematic because it is likely to be endogenous, which means that it is correlated with unobserved student innate ability or motivation.

Buchmann (2002) also found positive impacts of private tutoring on student academic performance in Kenya. For 13- and 19-year-old students, private tutoring reduced the chance of grade repetition and increased student academic performance. Similarly, Briggs (2001) looked at commercial private tutoring courses in the United States and tried to measure its effectiveness

using the OLS method. He found that coaching increased SAT math scores by 14-15 points, SAT verbal scores by 6-8 points, and ACT math and English scores by 0-0.6 points, but decreased ACT reading scores by 0.6-0.7 points. Park, Park, and Kim (2001) and Yang and Kim (2003) also argued that private tutoring contributed to the improvement of the math and science scores in TIMSS 1999 using Hierarchical Linear Modeling (HLM). Using the multiple regression, Lee (2001) claimed that private tutoring is one of the important factors for academic achievement. Using path analysis, Kulpo (1998) and Polydorides (1986) also found the positive correlations between private tutoring and academic achievement in Mauritius and Greece, respectively. However, significant caveats of these studies are that either they do not control for school characteristics, which may bias the estimation results, or they do not use an appropriate method to observe the causal relationship.

Cheo and Quah (2005) and Ha and Harpham (2005) also found insignificant effects of tutoring on student achievement. Cheo and Quah (2005) conducted an analysis using multiple regression with students in grade 8 in three schools in Singapore and found negative and insignificant effects of having a paid home tutor. Although the authors controlled for many confounding factors, such as region, household wealth, parents' education, household size, child ethnicity, and mental health, they did not control for school characteristics, which are important confounding factors.

All studies introduced so far have mixed evidence on the effect of private tutoring on student academic performance. However, the results from these studies should be received with caution because they are not successful in controlling for endogeneity of private tutoring. By contrast, there are many studies that have tried to control for endogeneity of private tutoring in some credible ways as follows.

The ideal setting of the study in order to control for endogeneity is the Randomized Control Trial (RTC). Banerjee et al. (2007) used a randomized experiment of a remedial education program called the Balsakhi Program conducted in schools in urban India. This program provided government schools with a teacher to work with third and fourth graders who have been identified as falling behind their peers. Typically, a teacher meets with a group of these students (15-20 students) and holds a class for two hours a day. The participating schools were randomly

divided into two groups. Schools in group A provided remedial education only to third graders, whereas schools in group B provided it to fourth graders, and vice versa in the following year.

Kenyan researchers have also put in much effort to uncover the effect of private tutoring in various ways. In the effort to uncover a causal relationship between private tutoring and academic achievement, Kang (2007) and Choi (2007) applied the instrumental variable method to correct for endogeneity. Using the birth order as the exogenous instrumental variable of the expenditures of private tutoring, they claimed that the effect of private tutoring was not statistically significant on academic achievement and college attendance. Kang (2007) claimed that being a first-born significantly and positively affected private tutoring expenditures for a student; parents spend 30 percent more money on private tutoring for first-born children than for later-born children. In addition, he argued that being a first-born has no direct association with students' academic performance. However, as mentioned earlier, there is a lack of Korean studies that used causal inference methods; therefore, the true effect of private tutoring is still unknown.



## **CHAPTER THREE: DEVELOPMENT METHODOLOGY**

Systems are created to solve problems that we encounter on daily basis around us, at work or other areas. Systems development methodology is an organized way of solving a problem. In software development, there are several methodologies that are used in solving problems. These methodologies are also referred to as software engineering models. The models are;

### **3.1.1 CODE AND FIX**

"Code and fix" development is a model that is neither well formulated nor well controlled, it lacks formal planning, a specification and design phases. Without much of a design in the way, programmers immediately begin producing code. At some point, testing begins (often late in the development cycle), and the unavoidable bugs must then be fixed before the product can be shipped.

### **3.1.2 RAPID PROTOTYPE**

Prototyping is a technique for providing a reduced functionality or a limited performance version of a software system early in its stage. The "planning" of software developed using Rapid prototyping is interleaved with writing the software itself. The lack of extensive pre-planning generally allows software to be written much faster, and makes it easier to change requirements. It has four phases: Requirement planning phase, User design phase, Construction phase and Cutover phase.

### **3.1.3 SPIRAL DEVELOPMENT**

The key characteristic of a Spiral model is risk management at regular stages in the development cycle. The Spiral is visualized as a process passing through some number of iterations, with the four quadrant diagram representative of the following activities:

**Formulate plans to:** identify software targets, implement the program, and clarify the project development restriction

**Risk analysis:** an analytical assessment of selected programs, to consider how to identify and eliminate risk

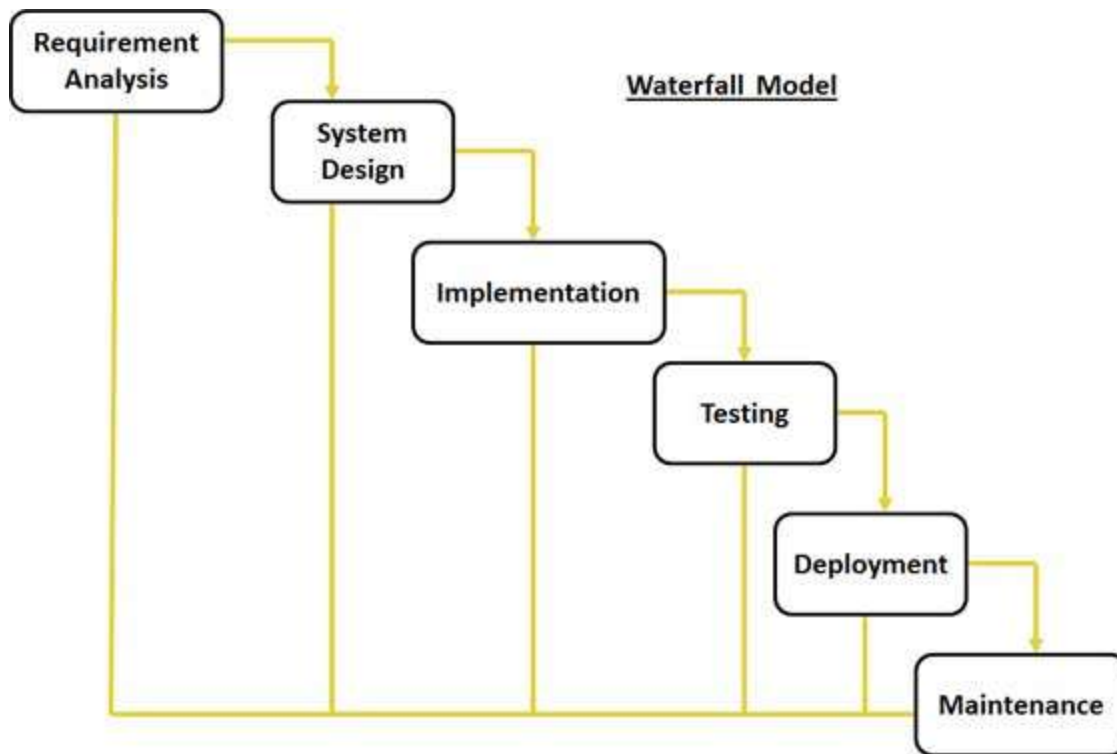
**Implementation of the project:** the implementation of software development and verification

### 3.1.4 WATERFALL METHOD

It consists of stages that are processed in a linear fashion. It is better to manage and more rigid. The waterfall method was the first software development life cycle to be used.

The outcome of one phase acts as the input for the next phase sequentially;

**Figure 1: Waterfall Model**



Following is a diagrammatic representation of different phases of waterfall model. All these phases are cascaded to each other in which progress is seen as flowing steadily downwards (like a waterfall) through the phases. The next phase is started only after the defined set of goals are achieved for previous phase and it is signed off, so the name "Waterfall Model". In this model phases do not overlap.

#### **Advantages of waterfall model:**

- Simple and easy to understand, use and works well for smaller projects due to its simplicity.
- Easy to manage due to the rigidity of the model – each phase has specific deliverables and a review process.
- Phases are processed and completed one at a time.
- Works well for smaller projects where requirements are very well understood.

Because of the above advantages I will adopt the waterfall method for my system development.

- **Integration and Testing:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Teachers' integration to the entire system is tested for any faults and failures.
- **Deployment of system:** Once I do the functional and non-functional testing with a sample of students and teachers, the working system will be provided to some expert programmers, graphics designers and system analysts at Borasoft company for more system reviews in order for final system improvement.
- **Maintenance:** I plan to train and use a few teachers from various institutions on the system so that they can be assisting me in the system maintenance and functional improvement since the system will be deployed in the whole country afterward as soon as possible. That is together with assistance from Borasoft Company that will help in database and general system maintenance on its operational services.

### 3.2 EVALUATION METHODOLOGY

I will evaluate the system using function points:

Function points were developed by Albrecht. Function Point Analysis (FPA), is the method of sizing software in terms of its function and expressed in Function Points . It is interesting to note that FPA came about, not because a new measure of system size was requested, but because productivity was becoming increasingly important; it was out of the need to measure productivity that FPA was conceived.

FPA aims to provide a consistent measure of system size that:

- is independent of the development technology
- is simple to apply
- can be estimated (reasonably well) from the requirements specification
- is meaningful to the end user.

### 3.2 SCHEDULE AND RESOURCES REQUIRED

#### 3.2.1 PROJECT GANTT CHART

TASK	FROM	TO	DECEMBER		JANUARY		FEB		MURCH		APRIL		MAY	
			1-15	16-28	1-15	16-31	1-15	16-30	1-15	16-30	1-15	16-30	1-15	16-31
SYSTEM PLANNING AND SELECTION	2/11/15	10/12/15												
PROPOSAL WRITTING	15/12/15	20/01/16												
SYSTEMS ANALYSIS AND DESIGN	1/02/16	15/02/16												
SYSTEMS IMPLEMENTATION	16/02/16	15/04/16												
DOCUMENTATION	11/4/16	12/05/16												
DELIVERY	16/05/16	18/05/16												

Figure 2: Project schedule chart

### 3.2.2 BUDGET

NAME	ESTIMATED COST
Nokia mobile phone/smart phone	Ksh.8,000
HP laptop Intel Core i3, 500 gb hard disk, 4 gb RAM	Ksh. 40,000
TOTAL	Ksh.48,000

**Figure 3: Budget table**

## **CHAPTER FOUR: SYSTEM ANALYSIS AND REQUIREMENT MODELLING.**

### **4.1 INTRODUCTION**

At this stage the client and the developer agree on exactly what the problems are and what the new system is to do. If the developer has the wrong idea then all the subsequent work will be wrong and a waste of time and energy.

### **4.2. CURRENT PHYSICAL MODEL.**

Facts rarely come up in an ordered fashion. Most system developers will find a mass of detailed, incomprehensible and sometimes conflicting information which has to be sorted out, organized and documented. The system developer must then discuss with the client to confirm that the developer has understood the problems and the requirements, resolve any conflicts and in case of any gaps fill them.

Sometimes a system administrator will not document the physical details, this depends on the circumstances: If the project is complicated with many interrelated procedures, or if the system developer feels it is important to get the right detailed workings of the system, or if there are different users with many different and conflicting versions of how the system works. Normally users will respond well to this type of model because it shows the system as it currently operates, displaying the physical details that the users can recognize and relate to.

### **4.3 CURRENT LOGICAL MODEL**

From the detail of how the existing system works, the developer needs to extract what the existing system does because the new system must incorporate most of the features, solve current known problems and meet any other client requirements. This model is known as current logical model.

### **4.4 DESCRIPTION OF THE EXISTING MANUAL ACCESS TO A PRIVATE TEACHERS.**

The present private teachers' access is based on a very manual process. That is, offline access to an actual private teacher. Any given student or a parent in need of an assistance from a private teacher has to undergo the actual access process manually. This is confined on the fact that the teacher on the target must be locally available and known by the student or the parent since both are just in the same locality. Teachers consulted for this services are mainly those ones known to be teaching from a nearby schools. Also students and parents go ahead to seek teaching services

from anyone around believed to have any knowledge on a given subjects. That is, seeking help from form four leavers who may have passed or failed in their fourth year level of high school study. Also, many parents seek this private teaching services mostly from under graduate students from university whose home area is within that locality. All this is done due to desperation of the best way of finding not only a professional and knowledgeable teacher in that sector of study but also a willing teacher who not only work for the fee but with objective mind of helping that particular student fix out that problem and improve in their study excellently.

For instance, many parents and students are convinced that private tuition can be offered by almost anybody provided he/she is willing to do so! Which is not the case. Some parents and students believes so much on teaching qualification from under graduate students just because they themselves made it to the next level. Hence can help the students in need to improve in their study. This is a naïve decision as finally few or none of the student improve in their studies and to make it worse many of them tend to fail more than was expected. This is due to various challenges in offering this private tuition services. For example lack of that full knowledge to teach what one is good at and instead this teachers avail themselves to teach anything they are consulted about. Also, lack of proper qualification to teach on that particular subject or sector.

If we not only understand but consider the requirement of Kenyan education curriculum at every sector, that is, at every category, no given teacher is assumed to have the full qualification of teaching every given subject. A teacher is just professional and qualified to teach for a maximum of two subjects only if he/she is a teacher from a secondary category unless has undergone extra study to teach on any other subject. For example a math/physics teacher is expected to teach on only those subjects and not on others he/she is not professional and qualified with like the same teacher teaching an English or a history subject. This is one of the drawback that is faced by students on a manual teachers booking process.

Also many students seek their private study assistance from teachers who teach them in their classrooms. This is a big challenge to their aim since most of the teachers seems not to be in that willingness of teaching private classes. Again the overall study is interfered with the fact that the same teacher who teach them in classwork is expected to teach the same students in their personal areas of weakness. This is hard to solve out positively since the teacher use the same

methodology of teaching, same teaching spirit and with the same materials of teaching hence giving no big change to the expected result of that private tuition to students.

#### **4.5 DATA FLOW DIAGRAMS (DFDs)**

A data flow diagram is a graphical representation of how information flows and is transformed as data moves from input to output. A DFD can be used to represent a software or system at any degree of abstraction. Data flow diagrams identify the system boundary, the external identities, the data stores, and the data or information flows into and out of the system. The data flow diagrams are process based.

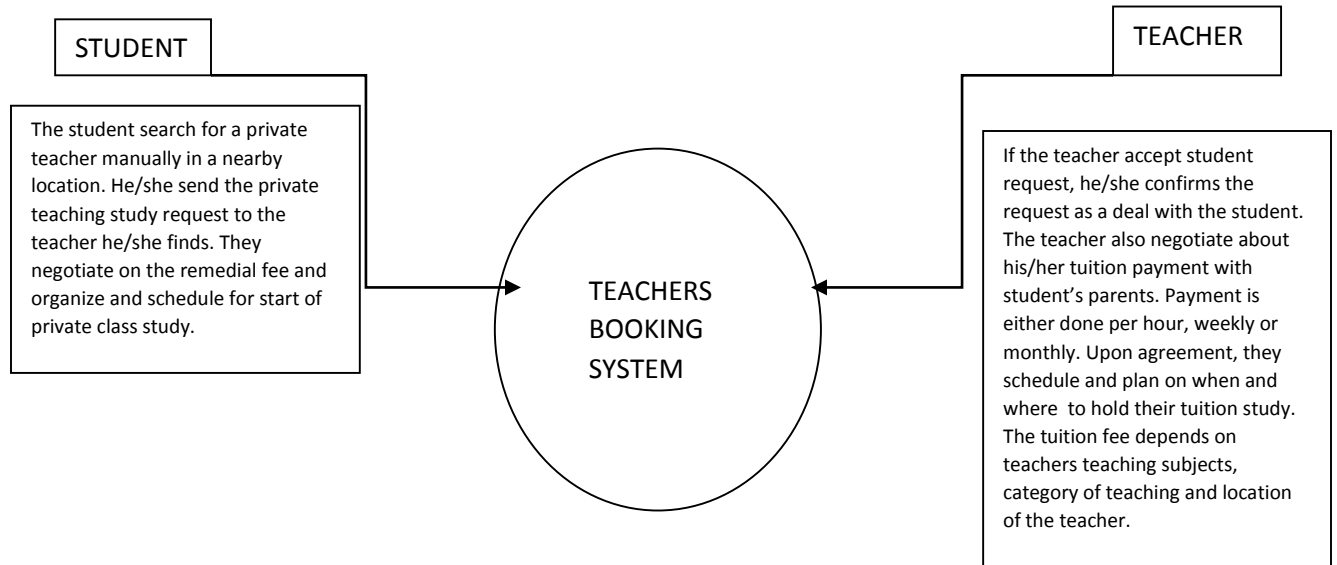
DFDs may be partitioned into levels that represent increasing information flow and functional detail. The top level diagram, level 0, is known as the context diagram. It is the highest level in a DFD and contains a single process which is a representation of the whole system. It models the whole system as a single process box whose sides represent the boundary of the system. By defining the boundary of the system, the context diagram delineates the area of study so as to define areas of activity to be included and those which should not. In the context diagram all external entities are shown and also the major data flow to and from them. The context level DFD uses only three symbols: rectangle with rounded corners, a square with two shaded edges and an arrow. The context-level DFD has no data stores and therefore it is simple to create.

##### **4.5.1 THE CONTEXT DIAGRAM FOR THE CURRENT SYSTEM.**

This diagram is a general one and its main purpose is to assist the system analyst to understand the basic data flow. The context diagram consists of the manual private teachers' booking access techniques, private and public schools to which every teacher registered must be attached with one, the registered students, parents, commercial dealers and teachers' teaching centers. The registered teaching institution is the schools registered with the system allowing teachers from their school to be registered with the system for security purpose. Also allow their teachers to register their teaching centers which are available classes they use to teach their tuition studies. Finally, the admin of the system who is entitled with confirmation of all registrations stated above. The admin approves the registration process by managing any kind of sign on that is made to the system like a teacher or a school registration. That is, upon submission of any registration form.



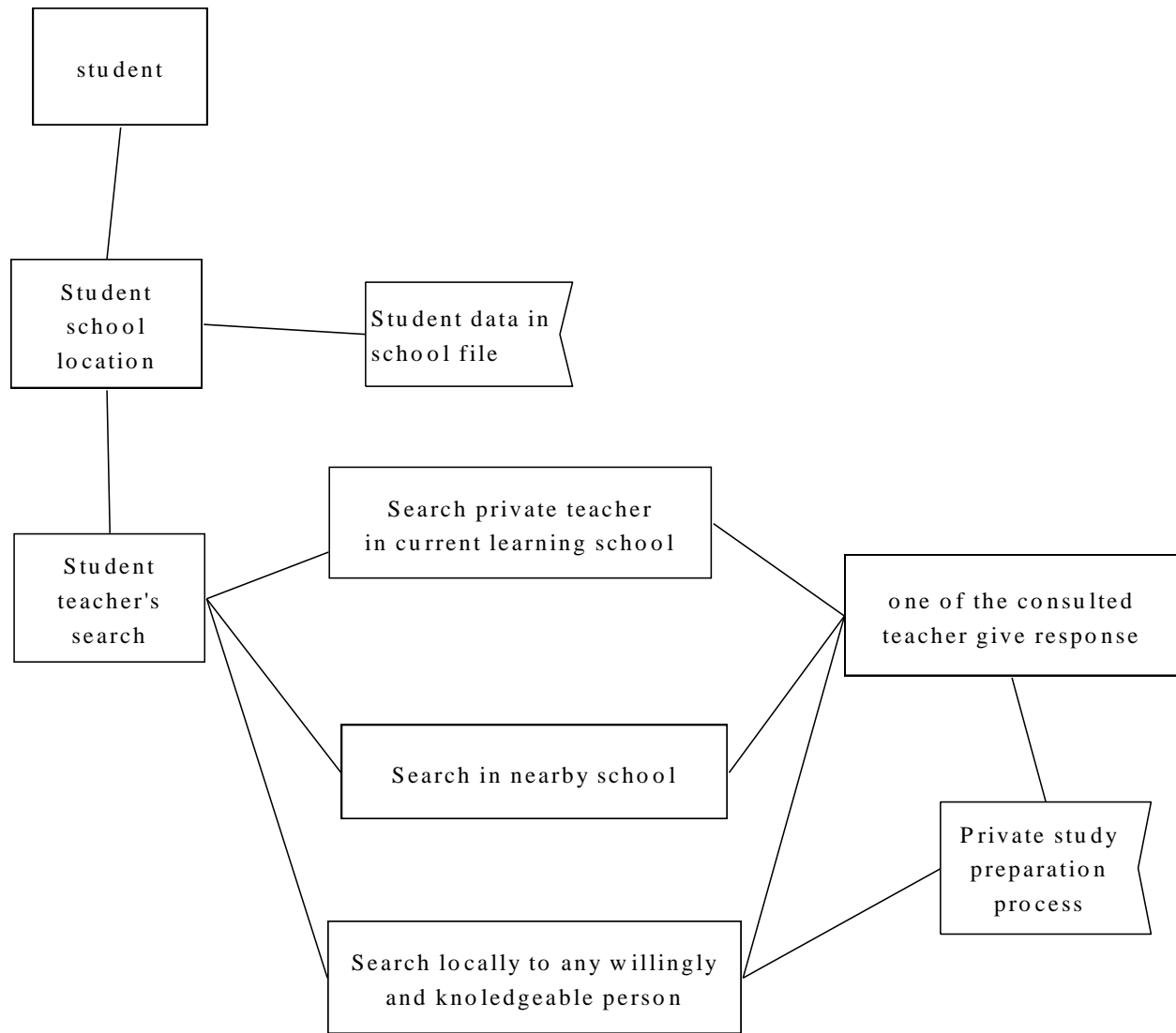
**Figure 5. Context diagram for the current system/manual system**



**4.5.2 LEVEL ONE: DATA FLOW DIAGRAM (DFDs) FOR THE CURRENT SYSTEM**

The level one DFD comes from the context diagram. The context diagram is expanded to get the processes inside, data stores and new lower level data flows. Below is the level 1 DFD for the private teachers booking access process.

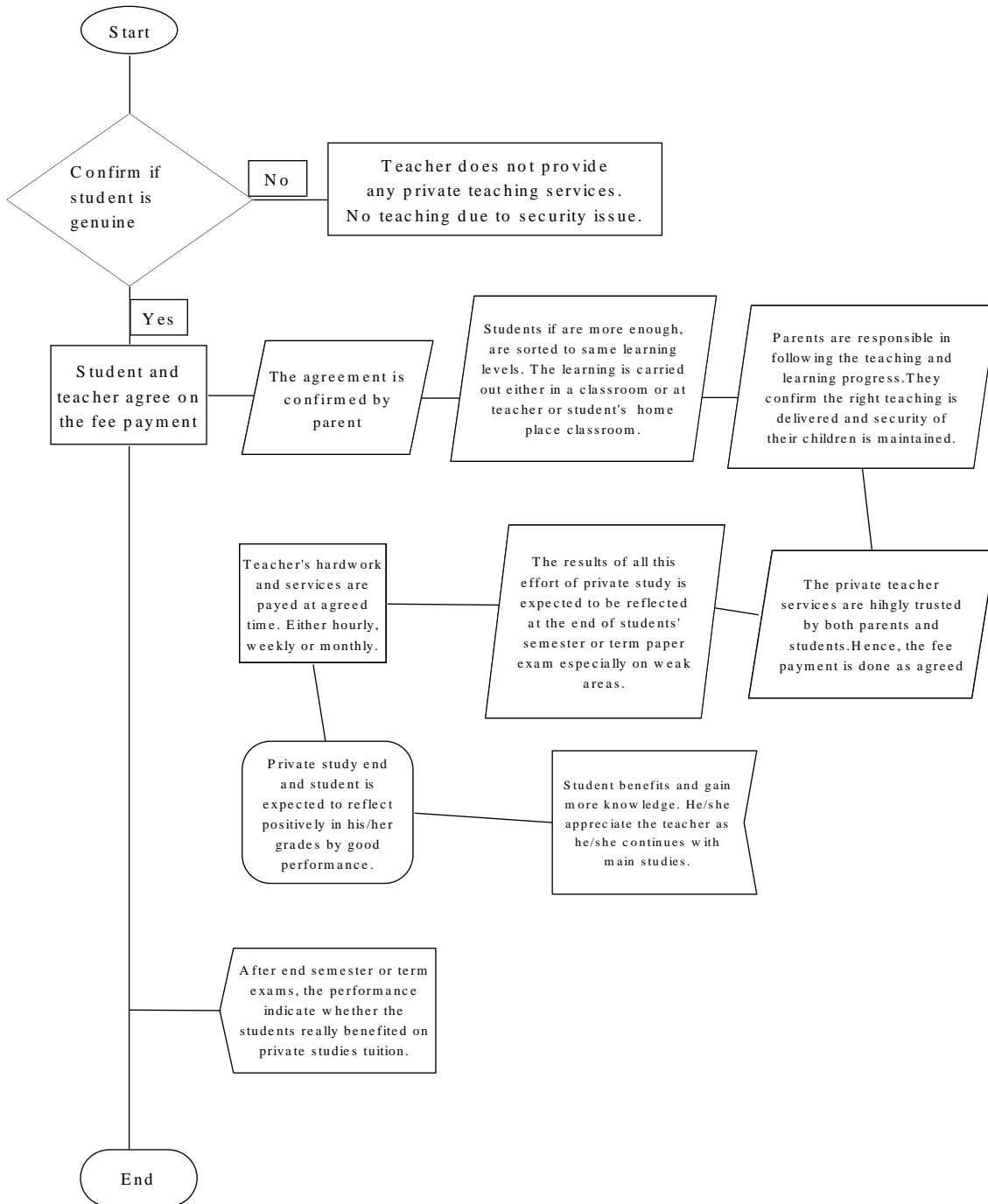
**Figure 6. Level one; Data flow diagram for the current system.**



#### **4.6 A FLOW CHART FOR THE CURRENT SYSTEM**

A flow chart is a diagram that shows the flow of data through the information processing systems. It represents an algorithm, process or workflow. The representation is in a diagrammatic form which is an illustration of the solution to the problem. A flowchart is used to provide people with common language or point of reference when working on a project. They use basic geometric symbols and arrows to show relationships.

**Figure 7: Flow chart for the current manual system**



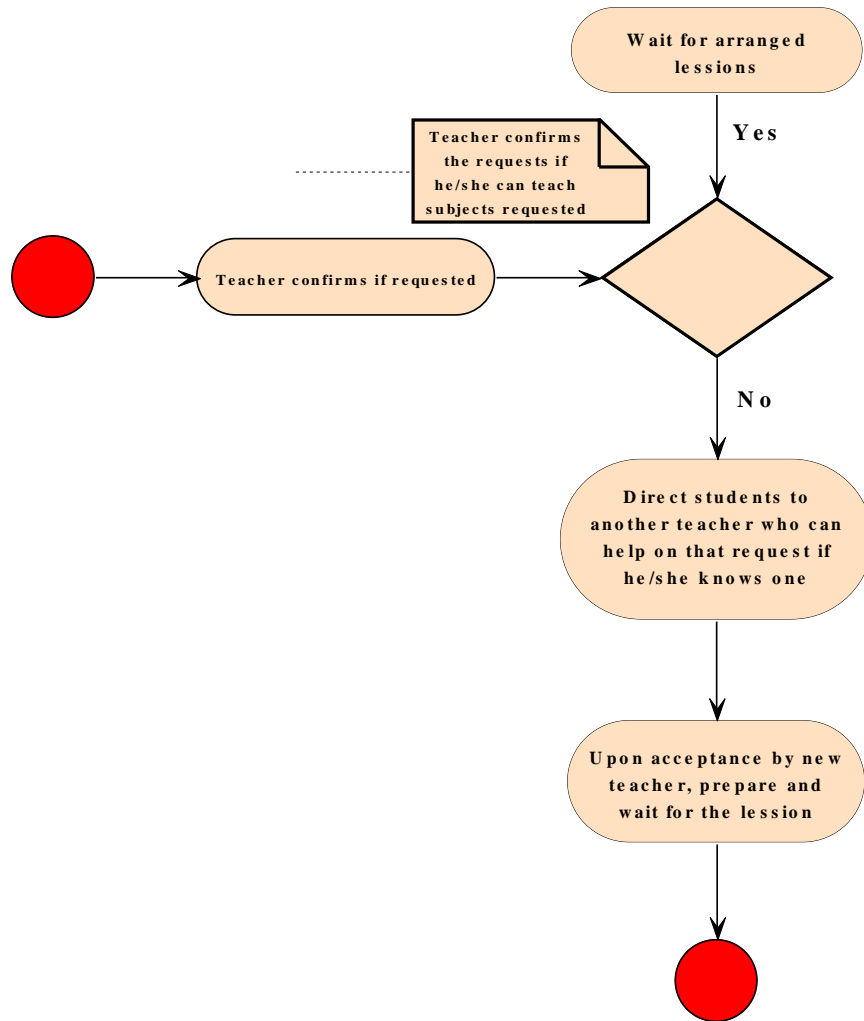
## **4.7 UML DIAGRAMS**

UML is a diagramming notation that is used to represent and discuss program designs. It is a language used to construct, visualize, specify and document the software system objects. It deals with particular set of objects and attributes. Object diagrams are used to visualize one instance at a time and the data that is in the system at that time. Below are some of the Unified Modeling Language diagrams that have been used.

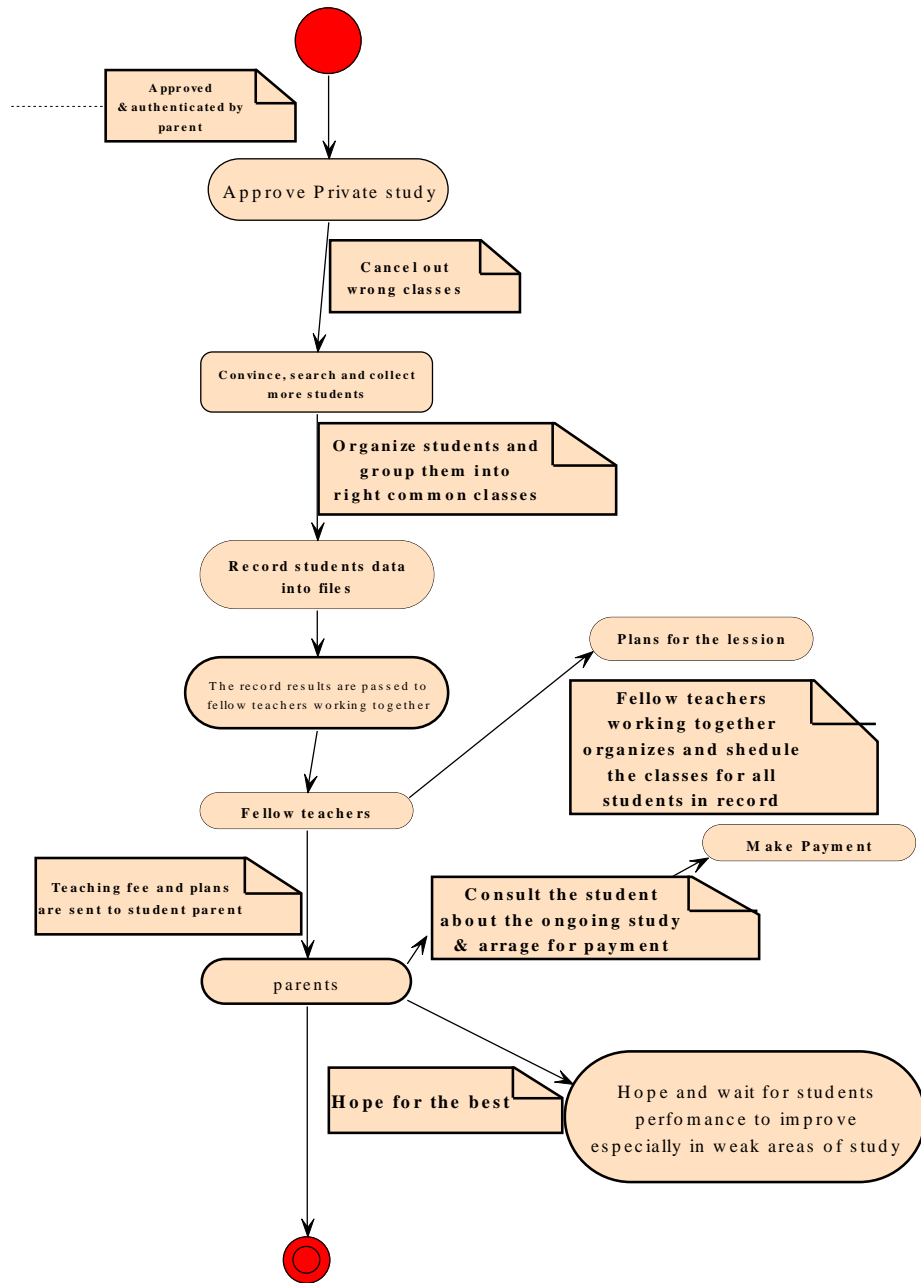
### **4.7.1 Activity diagrams for the current system**

An activity diagram is a graphical representation of workflow in a system. It can be used to show the workflow of any component in the system. In our case, we will use the Student component and the Kings Teachers' administrator component.

**Figure 8: Student activity diagram for the current system**



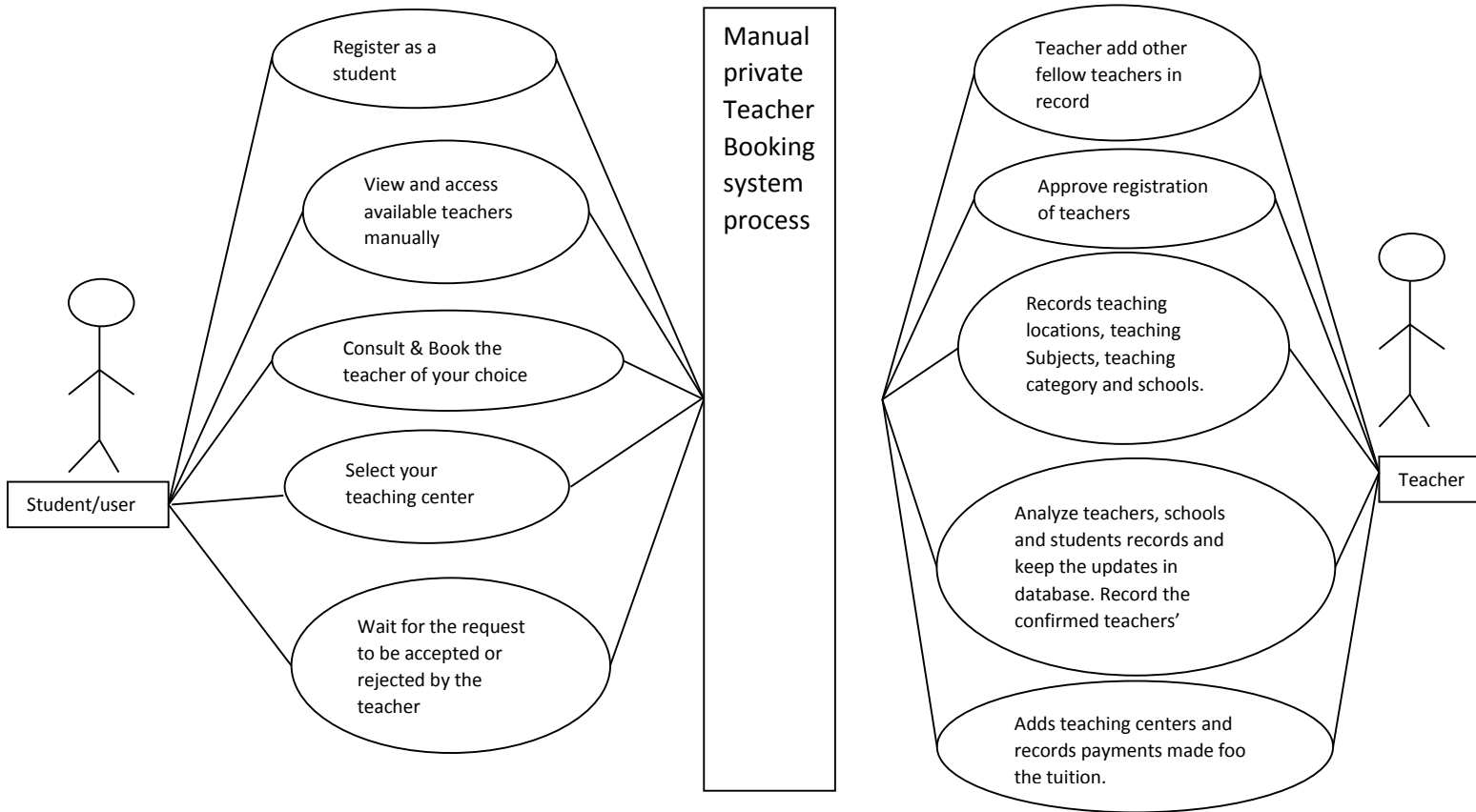
**Figure 9: Administrator diagram for the current system.**



### 4.7.2 USER CASE DIAGRAM FOR THE CURRENT SYSTEM

User case diagram show the interaction between the user and the system.

Figure 10: User case diagram for the current system



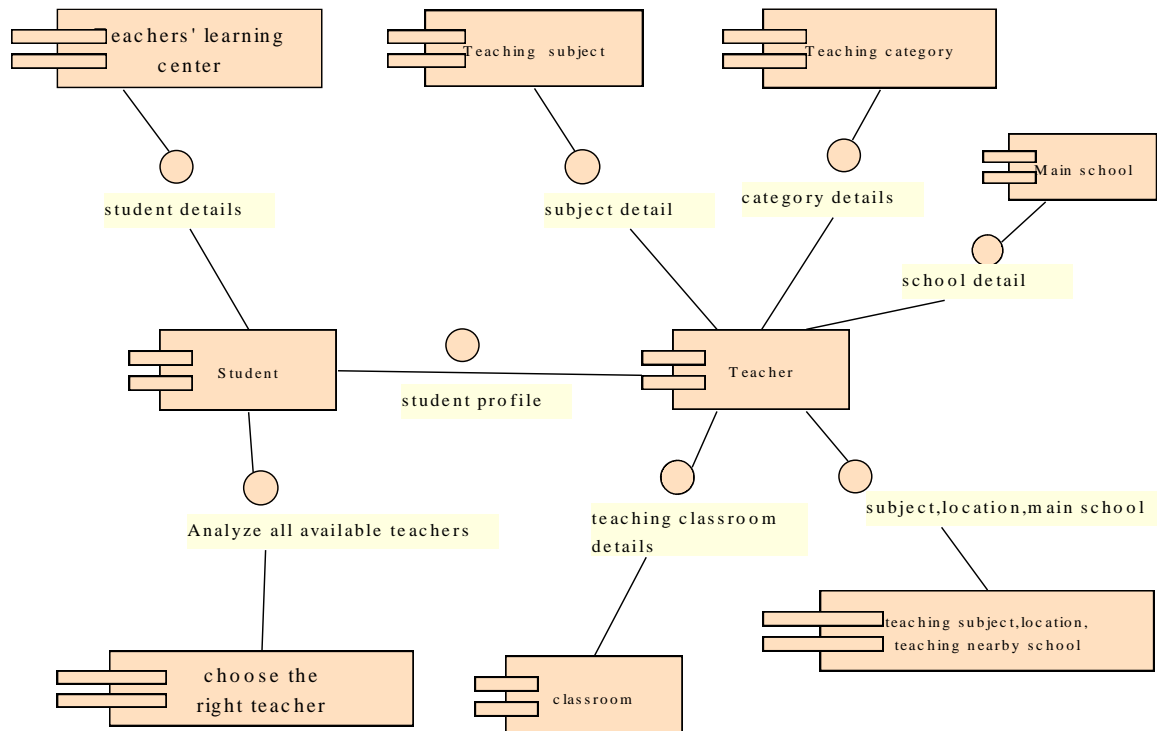
### 4.7.3 COMPONENT DIAGRAM FOR THE CURRENT SYSTEM

A component diagram shows how small components interconnect to form large components which are more complex. The components communicate with one another through interfaces.

The components in the Kings Teachers Booking manual system include:

- a) A teacher/Tutor
- b) The school
- c) The Kings Teachers System administrator
- d) Learning center
- e) Teaching locations (building apartment location, town, County).
- f) Teaching Subject
- g) Teaching category
- h) Private schools
- i) Advertisement images

**Figure 11: Component diagram for the current system.**





## **4.8 FACTS AND DATA GATHERING**

To complete this study, information was gathered from the TSC website, private tutors' website and newspapers. Primary data was collected from the private teachers, tuition organizers in both private and public schools and students at various levels of study. The three were interviewed. The data was compiled in a form that was easy to interpret and follow. A lot of secondary data was gotten from books, government educational reports, civil society reports and the internet.

### **4.8.1 INTERVIEWS**

An interview is a talk between people where the interviewer asks the interviewee questions in order to extract certain information. In order to collect valuable information it is important to identify an expert in the domain of interest and prepare him/her before the time of interview. An interview should be conducted in a relaxed environment to get good results. When an interview is conducted correctly, it is the best method of collecting valuable data. In order to accomplish many objectives of a study it is important to interview people who are well conversed with the subject of the study. Interviews can be conducted face to face or electronically (online/telephonic) Four interviews were conducted in this study which were:

- i. Students at all levels of study
- ii. Teachers at all levels teaching
- iii. DQUASO(District quality assurance)
- iv. County Education Commissioners.

### **4.8.2 PURPOSE OF INTERVIEWS**

The purpose of the interviews was to know the challenges that the private teachers and students face during the process of trying to access and interconnect to each other for sharing of academic knowledge. This is from students' registration to actual access and interconnection to private teacher. We wanted to identify challenges ranging from availability of skilled and genuine academic resources and services, teaching methodologies and availability of private tutors anywhere at any given time. We wanted also to know whether students have any challenges in the process of accessing actual private teachers so that we can address them in the system development. The interview was also done to get suggestions from the stake holders who in this case are the students, private teachers and private schools on what kind of system they would

want in order to become more available, reliable, efficient, accurate, fast and effective in the process of accessing, interconnecting and helping each other academically.

#### **4.8.3 SELECTION OF INTERVIEW SUBJECTS**

In order to conduct the interview effectively it was necessary to select interviewee who could provide the best information. We got an informed teacher who is a former high school teacher and currently director of education in Nyeri education center and whose wife is currently a public high school teacher and private tutor at her place in Nyeri town. She also serve as a chairlady of all private tuition offers in Nyeri town working under one union at various places.

#### **4.8.4 INTERVIEWING**

The interviews were organized for a student, Private teachers, education directors and commissioner and private schools. The interviewee gave their convenient time and place. We briefed each interviewee about our study and gave them time to prepare. Each interviewee was interviewed face to face and given time to respond. We allocated one hour for each of them. In case any of them requested for more time, we gave them. The interviews were conducted on different days.

#### **4.9 DISADVANTAGES OF THE EXISTING ACTUAL PRIVATE TEACHERS ACCESS METHOD**

The following are the disadvantages of the old method of accessing an actual private teachers based on the manual process;

1. It's time consuming- The manual process of trying to access to an actual private teacher is really expensive in terms of time. A lot of time is taken while trying to track for the genuine private teacher and is still hard to get one who is skilled and qualified in that particular field.
2. Locally limited to a few number of teachers-the old process of getting an academic assistance through a private study is limited within a given biological area.
3. Its expensive- Since students are just confined to seek assistance from teachers who are just located within their area, it is indeed very expensive. The student mostly find himself/herself alone in that teaching request and has to cater for full fee alone without sharing.

4. Lack of diverse teachers for various fields- Manual old way limit the students from locating and accessing teachers from diverse fields who are qualified and specialized at specific fields. For example, is hard to get a programming teacher in rural areas.

5. Lack of proper learning centers- There are few or no learning centers available for most local tuitions offered due to lack of commitment and large number of students willing to have the private studies.

6. There are cases of students getting teaching assistance from unqualified and under qualified teachers. This is because of lack of proper assurance on the ways to approve whether the teacher is fit for that task or not.

#### **4.10 ADVANTAGES OF THE PROPOSED SYSTEM.**

1. The web and mobile based system is cheaper and faster to access any category of teacher at anytime and anywhere in the country.

2. **Price-** Teachers will set their own prices depending on their experience, time and location of classrooms. Hence the diversity of teachers in teaching subjects. This means you will get the best for your money.

3. A new platform that provide and improve the chances of getting employment opportunity for any teacher. Both private and public schools in need of a teacher can simply search and find one online with Kings Teachers booking website.

4. Offers unlimited online booking. Unlike manual booking of a private teachers which locally limit an individual from making his/her booking just locally, the new system offers unlimited booking of teachers to any given individual.

5. Help find great, qualified and reliable private teachers with available class rooms. The new system will allow teachers to register their private teaching classrooms they use to deliver their teaching services. Hence, the students will chose their comfort and nearest classrooms in term of distance and time.

6. Disabled students will book their private teachers at their convenience. The online teachers booking system will benefit disabled students by allowing them to search and book for their special teachers who are most convenient and qualified to their needs and desires.

7. **Transparency**- You will read the tutor's or teacher's reviews from past students and schools. Kings tutors system is expected to present high standards and vet all new teachers. You will proof this from Kings Tutor's policy and teacher/tutors requirement document.

#### **4.11 REQUIRED LOGICAL MODEL**

The requirement modeling stage moves from the logic of the current system to required system. The objective is to spell-out what needs to be done to meet the requirements in the problem definition and how to solve them. The end product of this stage is a model of the required system and the specification of requirements outlining what the system is supposed to do but not how it will be implemented.

#### **4.11 CONCLUSION**

The proposed Kings Teachers Booking web and mobile phone based teachers' booking system is easy to use and learn. It has high levels of availability, reliability and security and therefore students will not have any fear and anxiety of losing their time and resources on fake, under-qualified and unprofessional teachers. The student will access any kind of teacher anywhere at convenience time and get private studies anytime. Student will interact and change his/her private teacher at his/her own will due to availability of unlimited qualified teachers registered with this system. The student can have his/her teaching in the nearest and comfortable class as near as possible saving on distance and time. There is no room for poor delivery of promised services and or intimidation of students' personal life since all teachers records are within our database and in case of any, tough measures will be taken with immediate effect. Also many teachers especially newly graduate teachers will benefit on this site after registering as a result of getting employment chances from private students teaching and schools' employment. This is before they hit their lack day of being employed permanently by TSC. The system uses basic computers and smart phones which have become cheap over time. The Kenya Government through its educational boards should adopt and support the system. This is in order to assist many students at all levels of study improve in their studies by getting a good and right cover to their long life studies of academic excellence.

## **CHAPTER FIVE: SYSTEM DESIGN**

### **5.1 INTRODUCTION**

Design is the process of applying various principles and techniques in order to define a process or a system in adequate detail for it to be physically realized. There are certain items such as modules, relationship among modules, data structures, relationship between the data structures and algorithms for implementation that must be designed in this phase. During system development, design is the first step into the development phase.

The design stage is expected to deliver outlines of different technical answers that meet the expectations of system analysis and requirement modeling stage.

These solutions include:

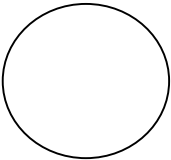
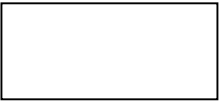
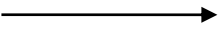
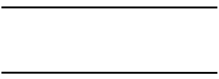
1. A minimum-cost solution. This just does the job and nothing more.
2. A medium –cost solution. This is convenient to users and does the job well. It may have additional features which the client did not ask for but the developer thinks they will be needed from experience.
3. A high- cost solution. This includes anything that the client needs.

In our design phase we did the following:

- ✓ Organized the system into modules
- ✓ Organized sub-modules for each module
- ✓ Allocated tasks to processors
- ✓ Choose an approach to manage data store
- ✓ Handled access to global resources
- ✓ Choose implemented logic

## 5.2 DATA FLOW DIAGRAMS

**Table: Data flow diagram components' descriptions.**

NOTATION	COMPONENT	DESCRIPTION
	Process	An oval represents a process or transform that is applied to data or control and changes it in some way.
	External Entity	A rectangle is used to represent an external entity, that is, a system element that produces information for transformation by the software or receives information produced by the software.
	Data Flows	An arrow represents one or more data items or data objects.
	Data Store	The open box represents data store-stored information that is used by the software.

A Data Flow Diagram (DFD) is a graphical representation of the "flow" of data through an Information System. A data flow diagram can also be used for the visualization of Data Processing. It is common practice for a designer to draw a context-level DFD first which shows the interaction between the system and outside entities. This context-level DFD is then "exploded" to show more detail of the system being model.

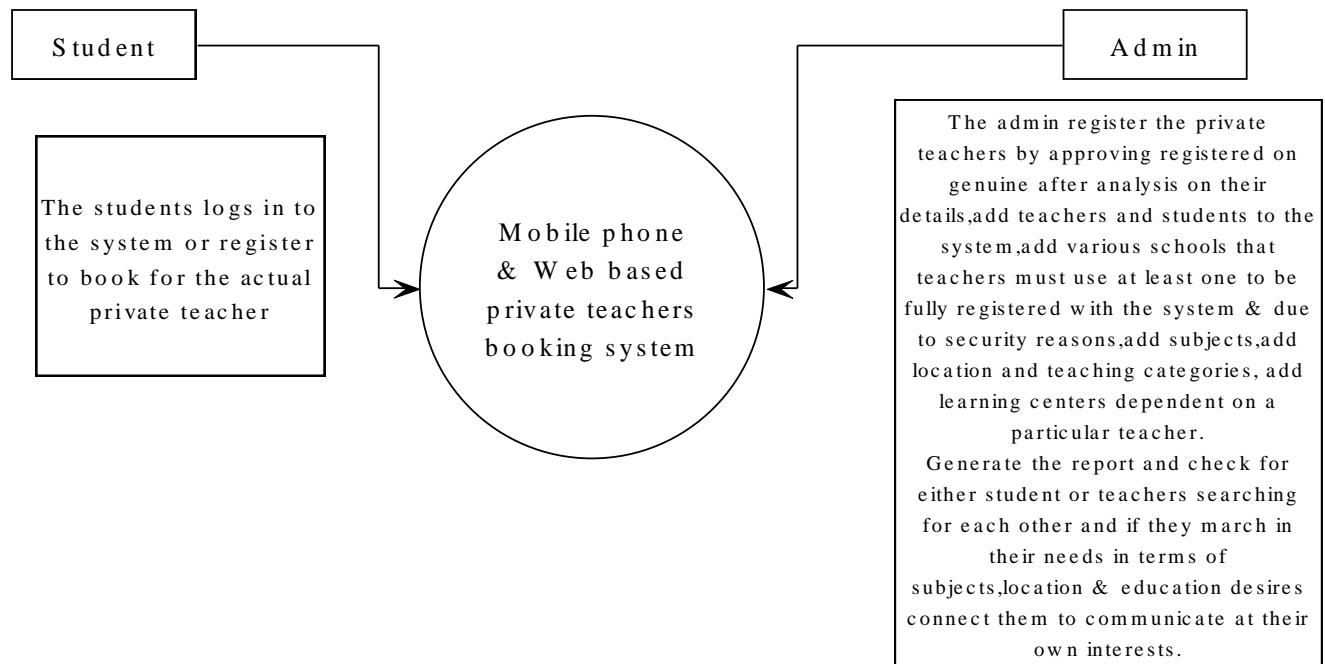
A DFD represents flow of data through a system. Data flow diagrams are commonly used during problem analysis. It views a system as a function that transforms the input into desired output. A DFD shows movement of data through the different transformations or processes in the system.

Dataflow diagrams can be used to provide the end user with a physical idea of where the data they input ultimately has an effect upon the structure of the whole system from order to dispatch to restock how any system is developed can be determined through a dataflow diagram. The appropriate register saved in database and maintained by appropriate authorities.

### 5.2.1 CONTEXT DIAGRAM FOR THE PROPOSED SYSTEM

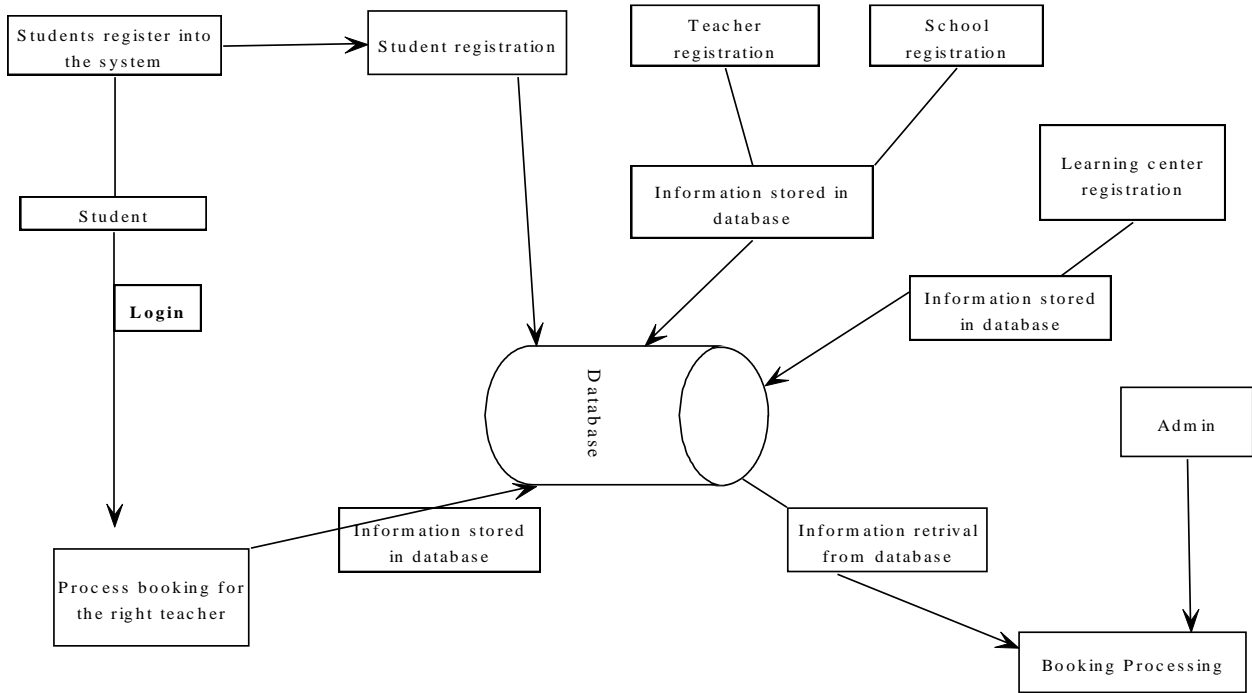
A context diagram is a data flow diagram that subsumes everything inside the scope of the system. It should just be an overview basically showing how the system will receive and send information to the entities external to the system. It includes inputs, the system in general and outputs. It is a bird’s eye view of the data movement and widest conceptualization possible of the system. It answers the question, ‘who needs to use this system?’

**Figure 12 context diagram for the proposed system.**



## 5.2.2 LEVEL 1 DATA FLOW DIAGRAM FOR THE PROPOSED SYSTEM

Figure 13: Level 1. Data flow diagram for the proposed system

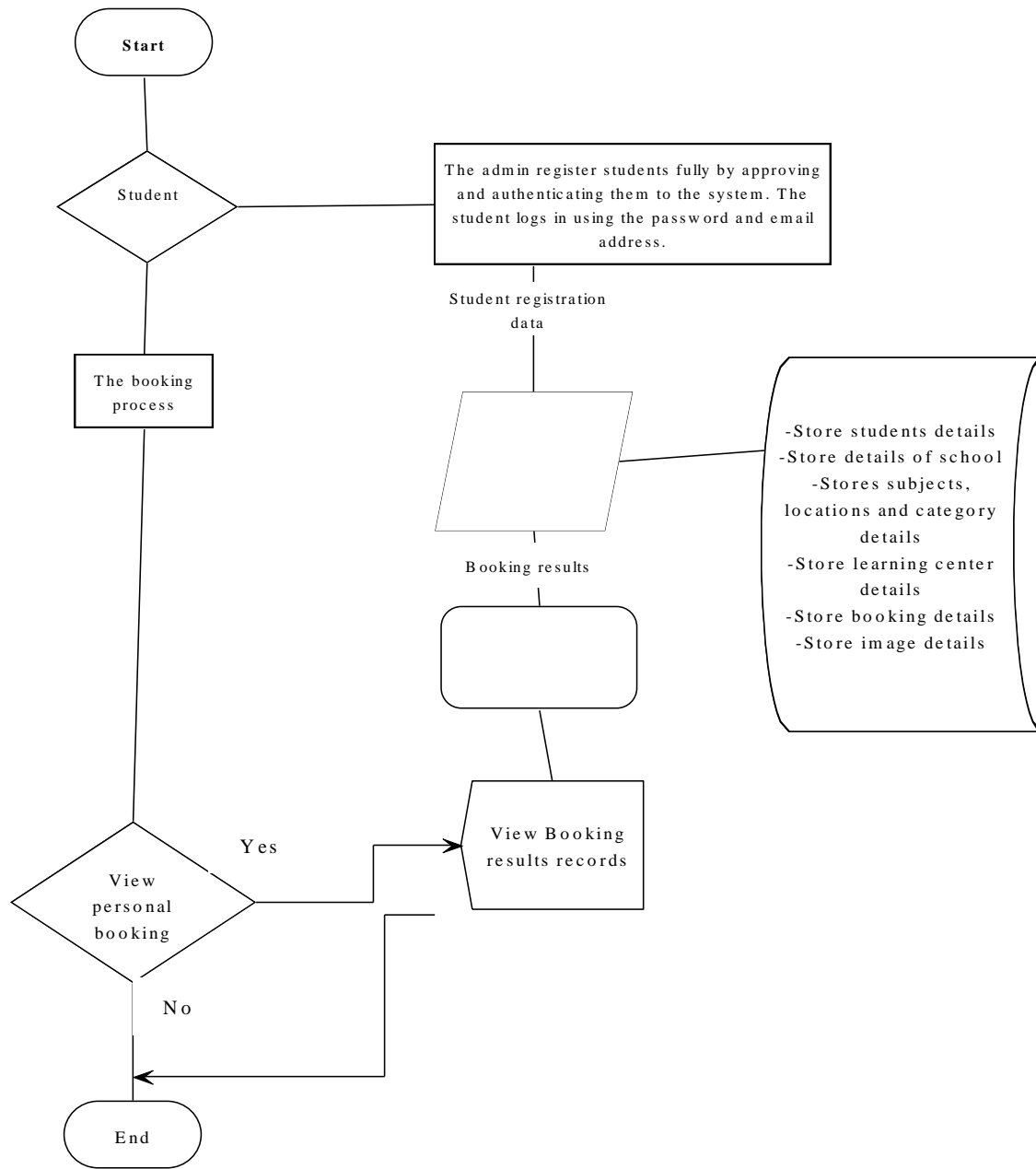




### 5.3 FLOW CHART FOR THE PROPOSED SYSTEM

A flow chart is a diagram that represents a process or an algorithm. The steps are represented by boxes connected using arrows.

**Figure 14: Flow chart for the proposed system**

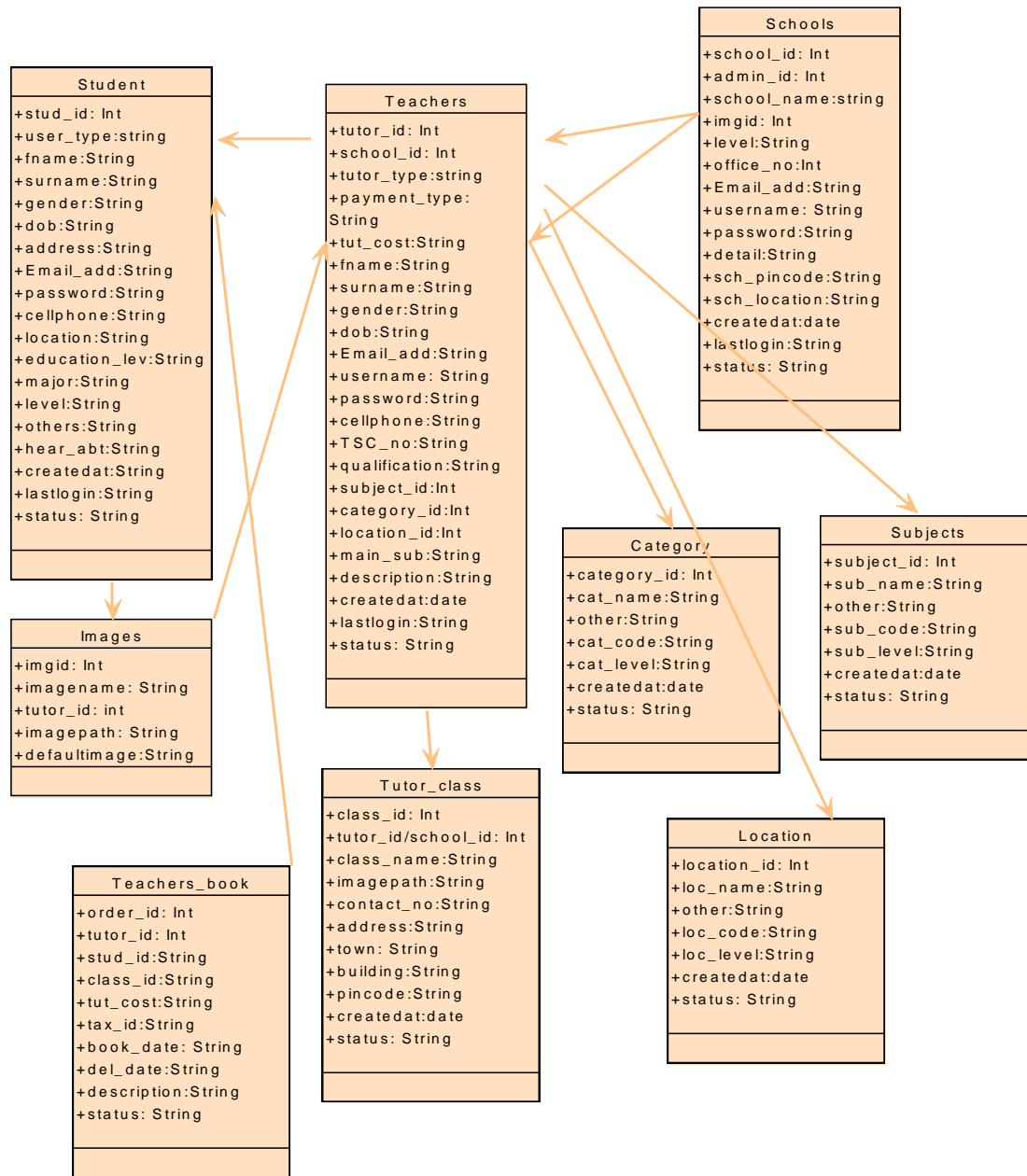


## 5.4 UNIFIED MODELING LANGUAGE (UML) DIAGRAMS FOR THE PROPOSED SYSTEM.

### 5.4.1 CLASS DIAGRAM FOR THE PROPOSED SYSTEM

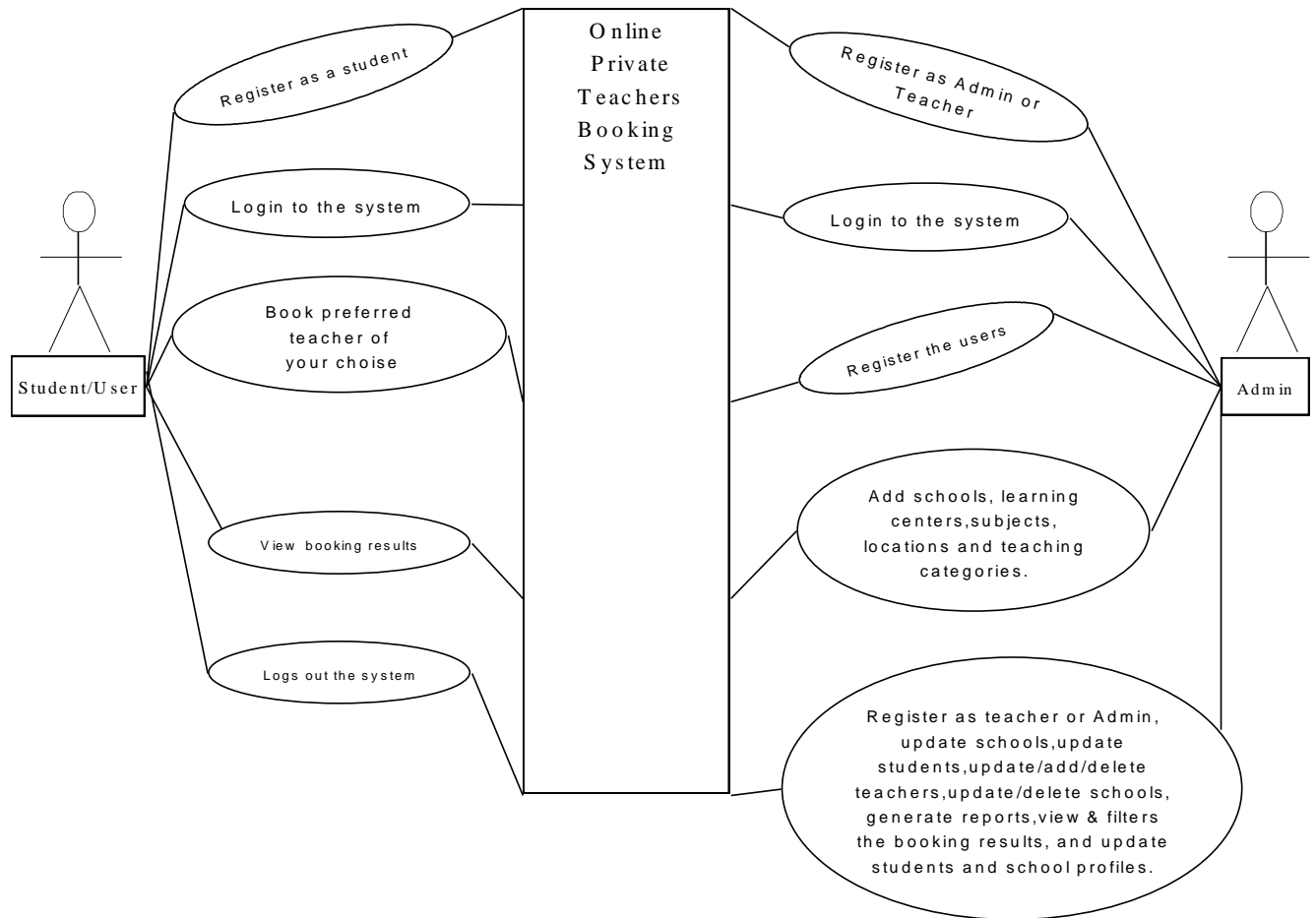
This is the major building block of object oriented modeling. It is a description of different types of objects existing in the system and the types of static relationships among them. It summarizes the target system.

**Figure 15: Class diagram for the proposed system**



## 5.4.2 USER CASE DIAGRAM FOR THE PROPOSED SYSTEM

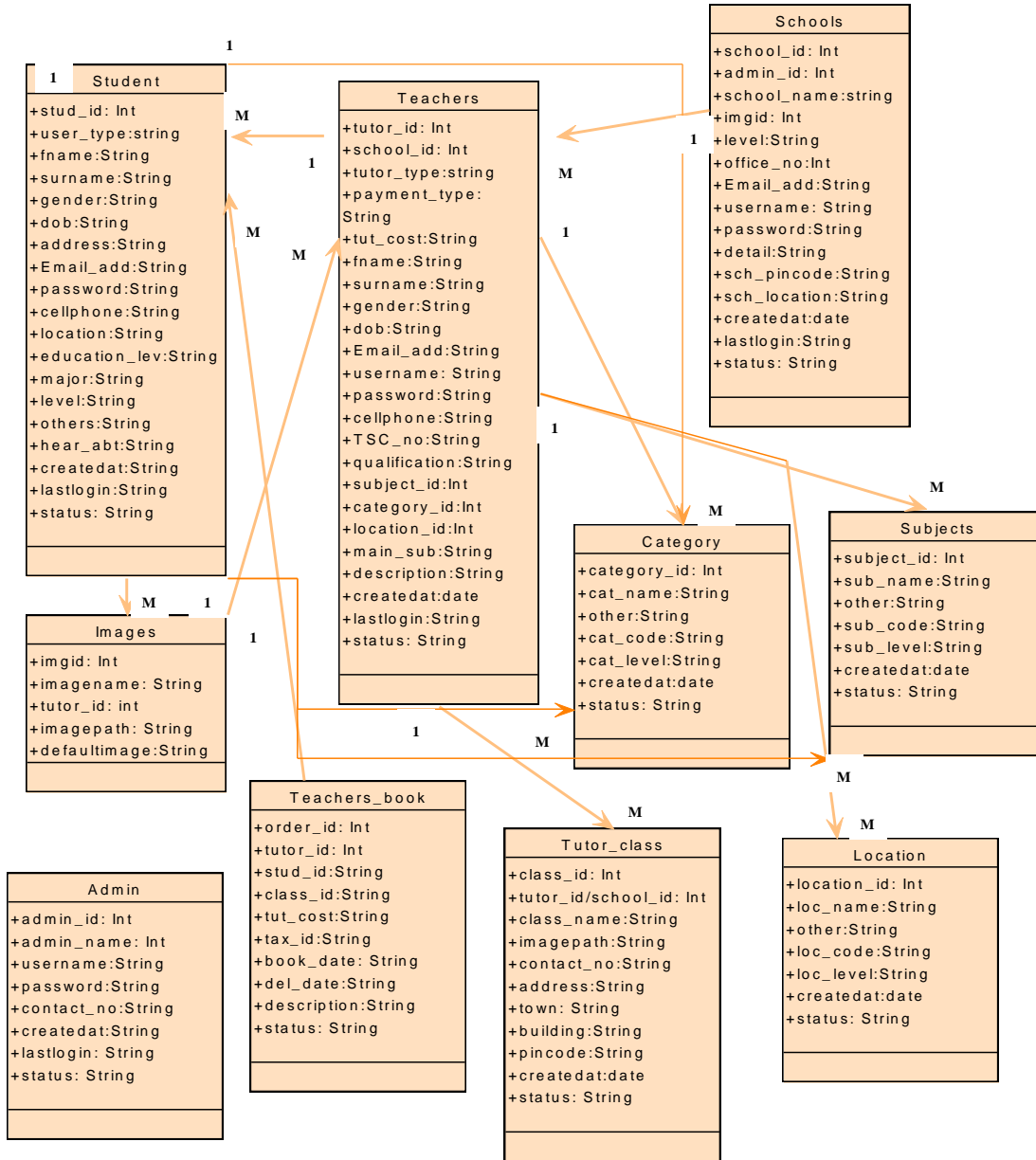
Figure 16: use case diagram for the proposed system



### 5.4.3 OBJECT DIAGRAM FOR THE PROPOSED SYSTEM

The object diagram shows the relationship between objects. It is close to a class diagram. It shows how an object looks like at a particular time.

Figure 17: Object diagram for the proposed system



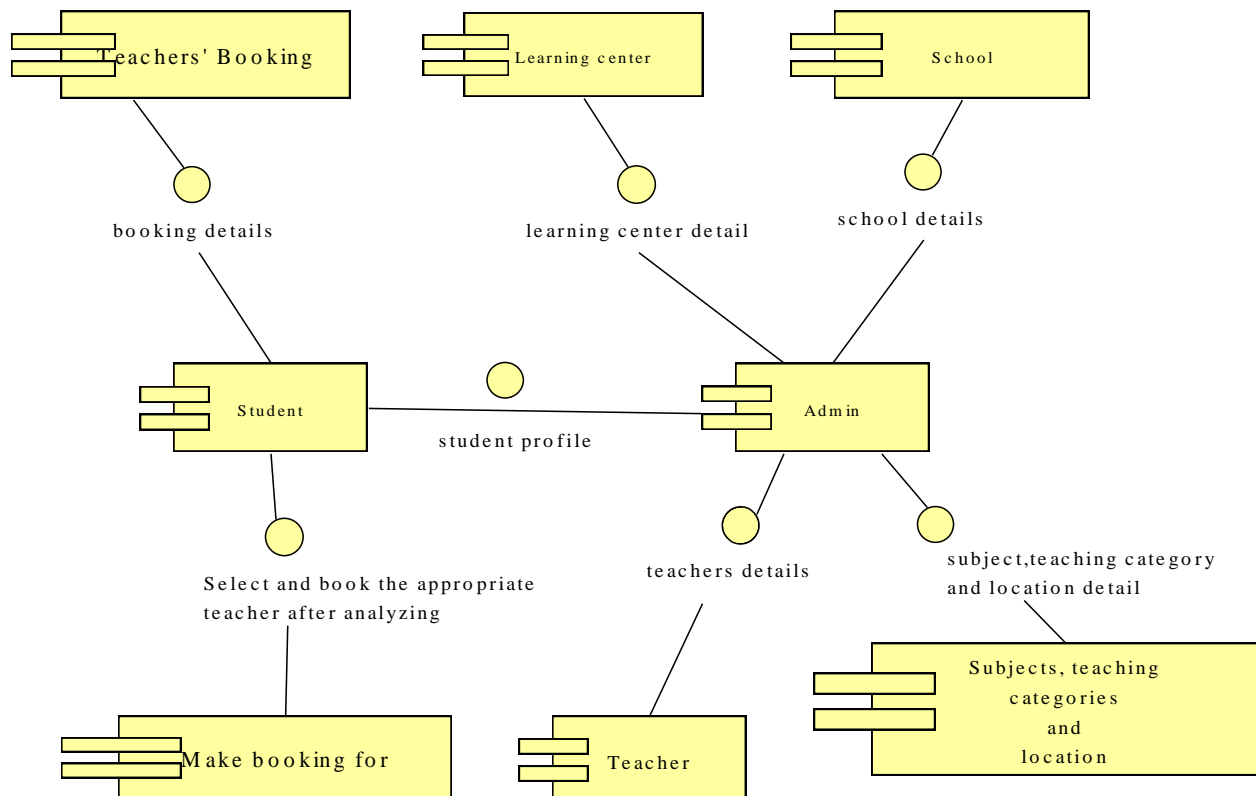
### 5.4.4 COMPONENT DIAGRAM FOR THE PROPOSED SYSTEM

The component diagram shows how small components interconnect to form large components which are more complex. The components communicate with one another through interfaces.

The components in our KINGS TEACHERS manual booking system include:-

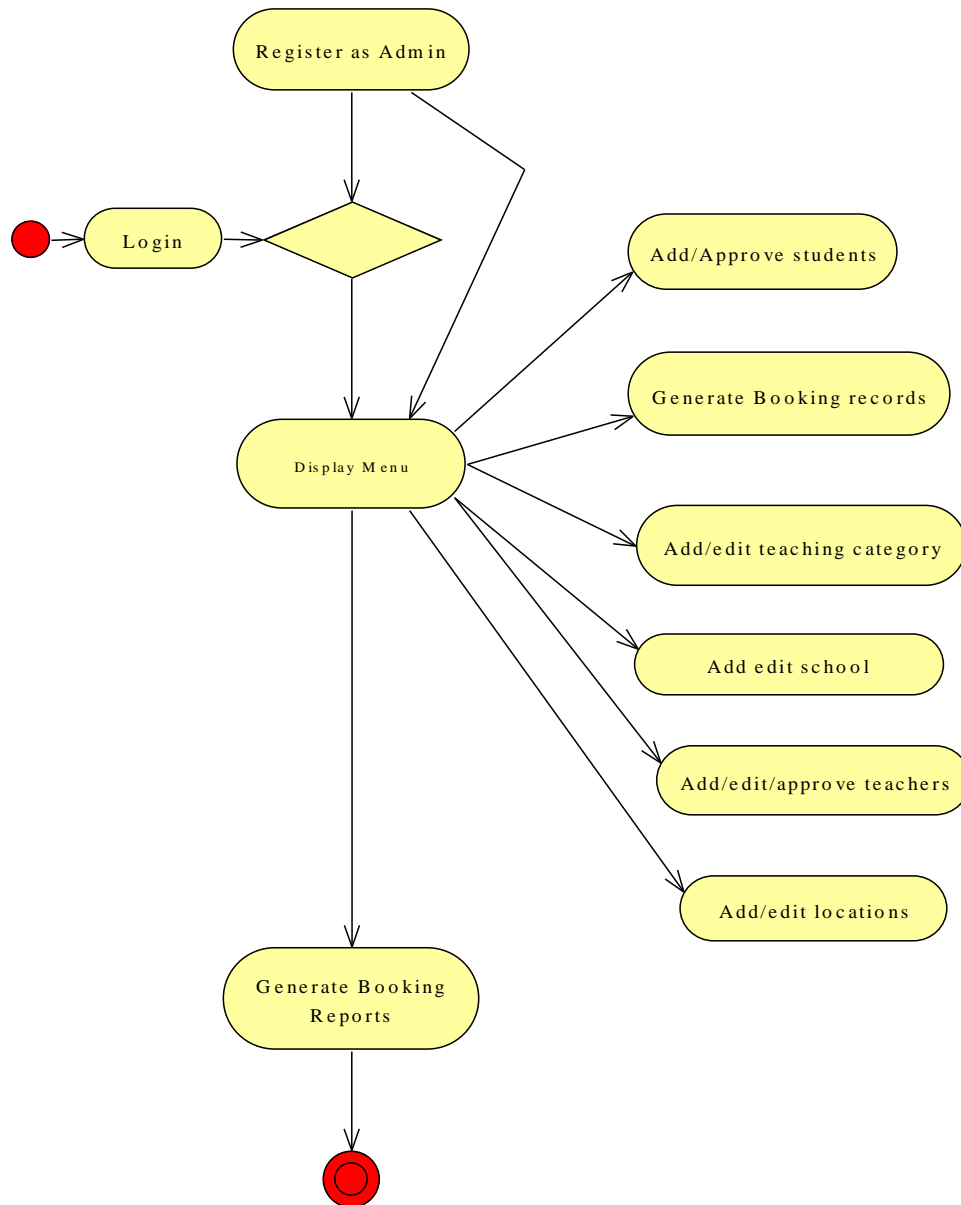
- a) Book for
- b) The student
- c) The Kings Teachers system administrator
- d) Teacher
- e) Teaching location
- f) Teaching subjects
- g) Teaching category(Education level of teaching i.e Secondary school level)
- h) The school
- i) Teachers and schools learning centers
- j) Images

**Figure 18: Component diagram for the proposed system**

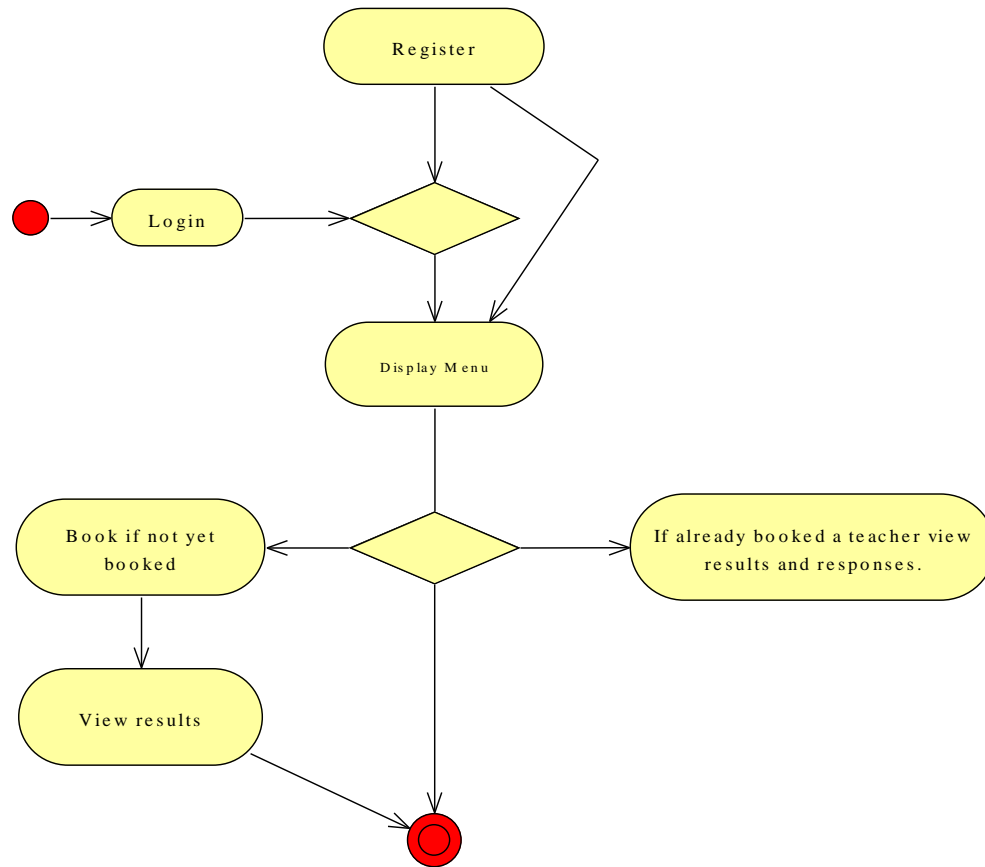


### 5.4.5 ACTIVITY DIAGRAMS FOR THE PROPOSED SYSTEM

**Figure 19: Activity diagram for the administrator in the proposed system.**



**Figure 20: Activity diagram for the student in the proposed system**

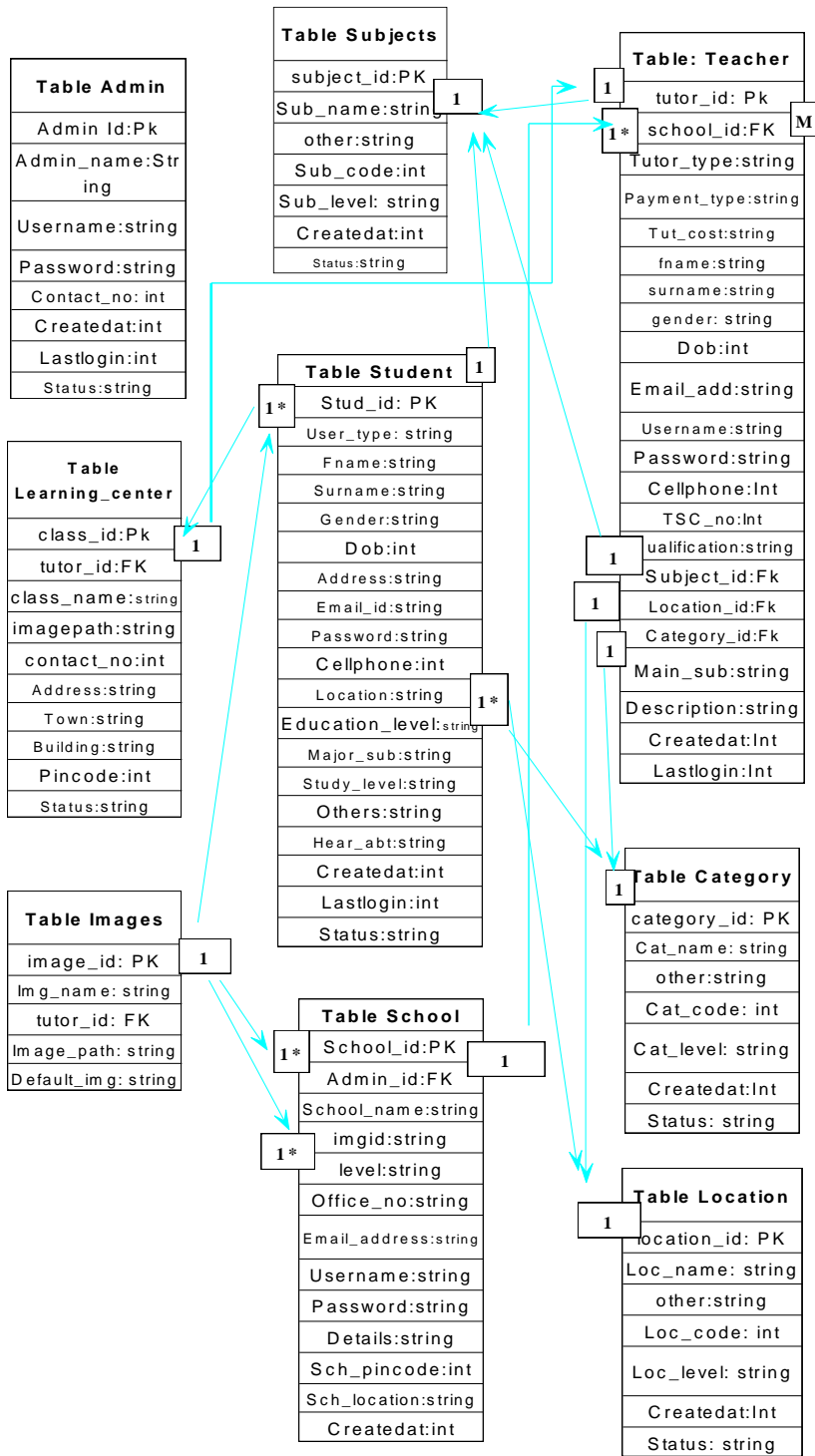


### 5.5 LOGICAL DATABASE DESIGN

This is a set of table schemas. A table schema is also known as a relation schema. A logical database design shows all entities and relationships among them.

**Figure 21: Logical database design**

Database Kings Teachers Online Booking system:-



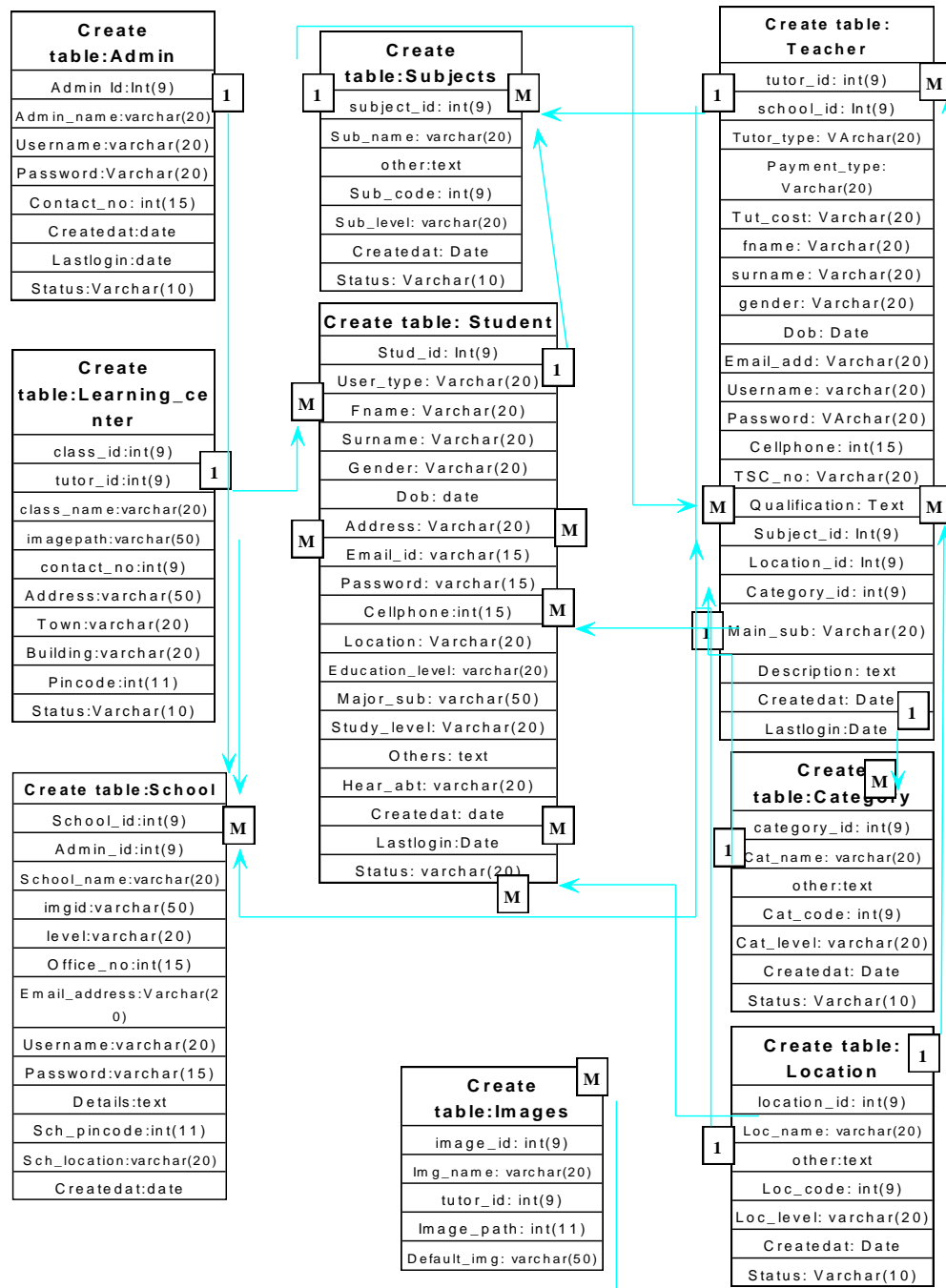


## 5.6 PHYSICAL DATABASE DESIGN

The physical database design is done using SQL clauses. It is a representation of the model in the database. It shows all the table structures and specifies all the tables and columns.

**Figure 22: physical database design**

Database KTOBS:-

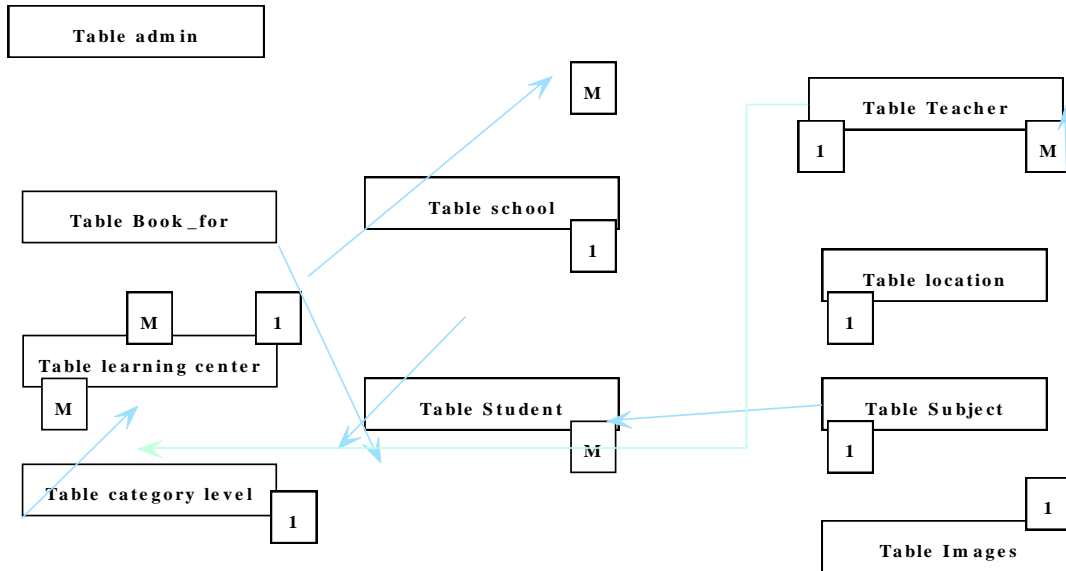


## 5.7 CONCEPTUAL DATABASE DESIGN

The conceptual database design is the highest level data model. It shows the main entities and how they relate with one another. No attribute or primary key is specified. It is commonly represented using entity relationship diagrams.

**Figure 23: conceptual database design**

Database KTOBS:-



## 5.8 ENTITY RELATIONSHIP DIAGRAMS


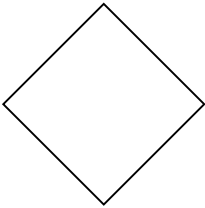
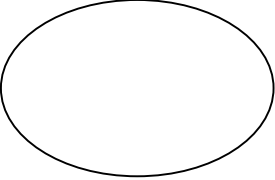
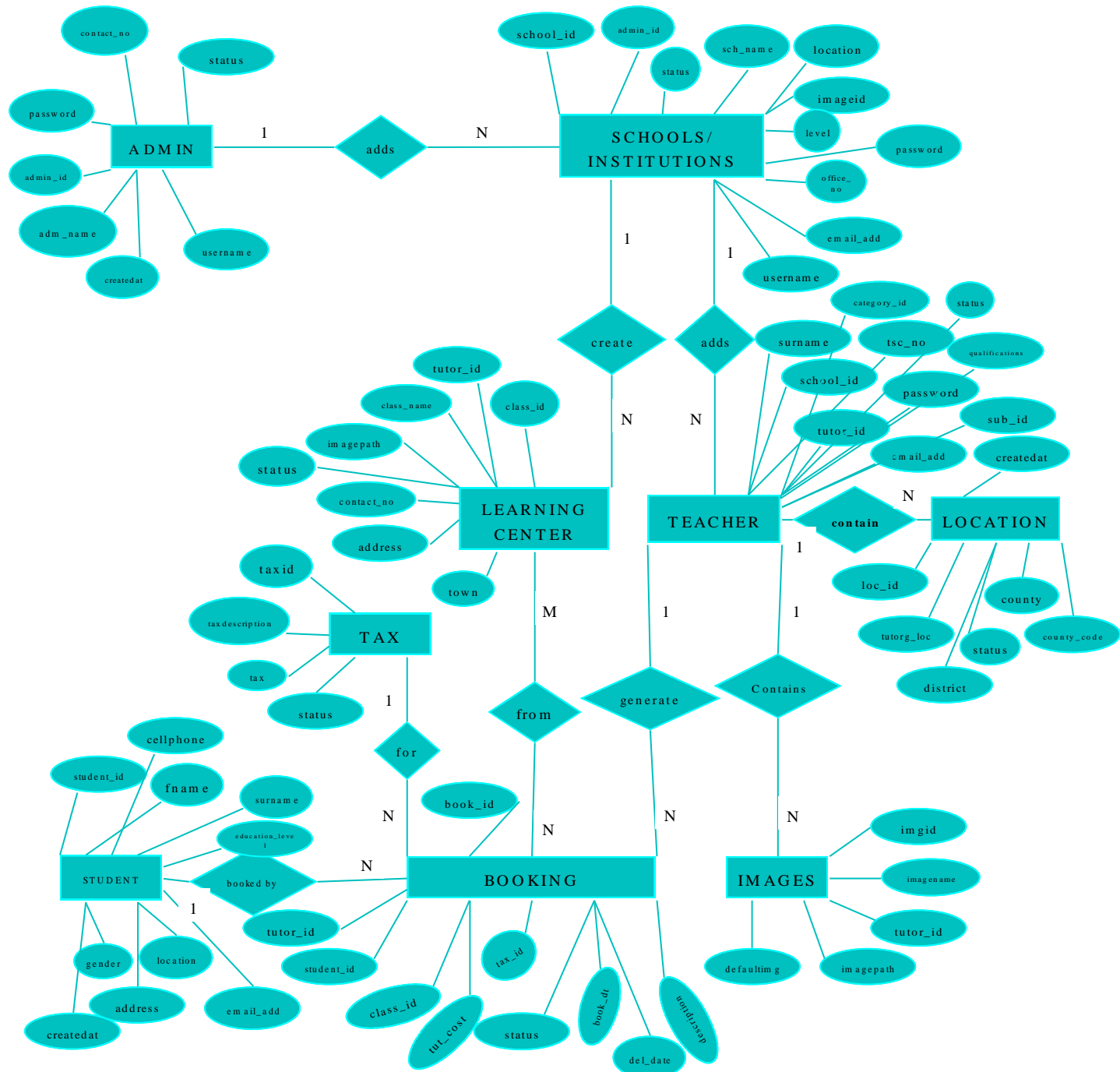
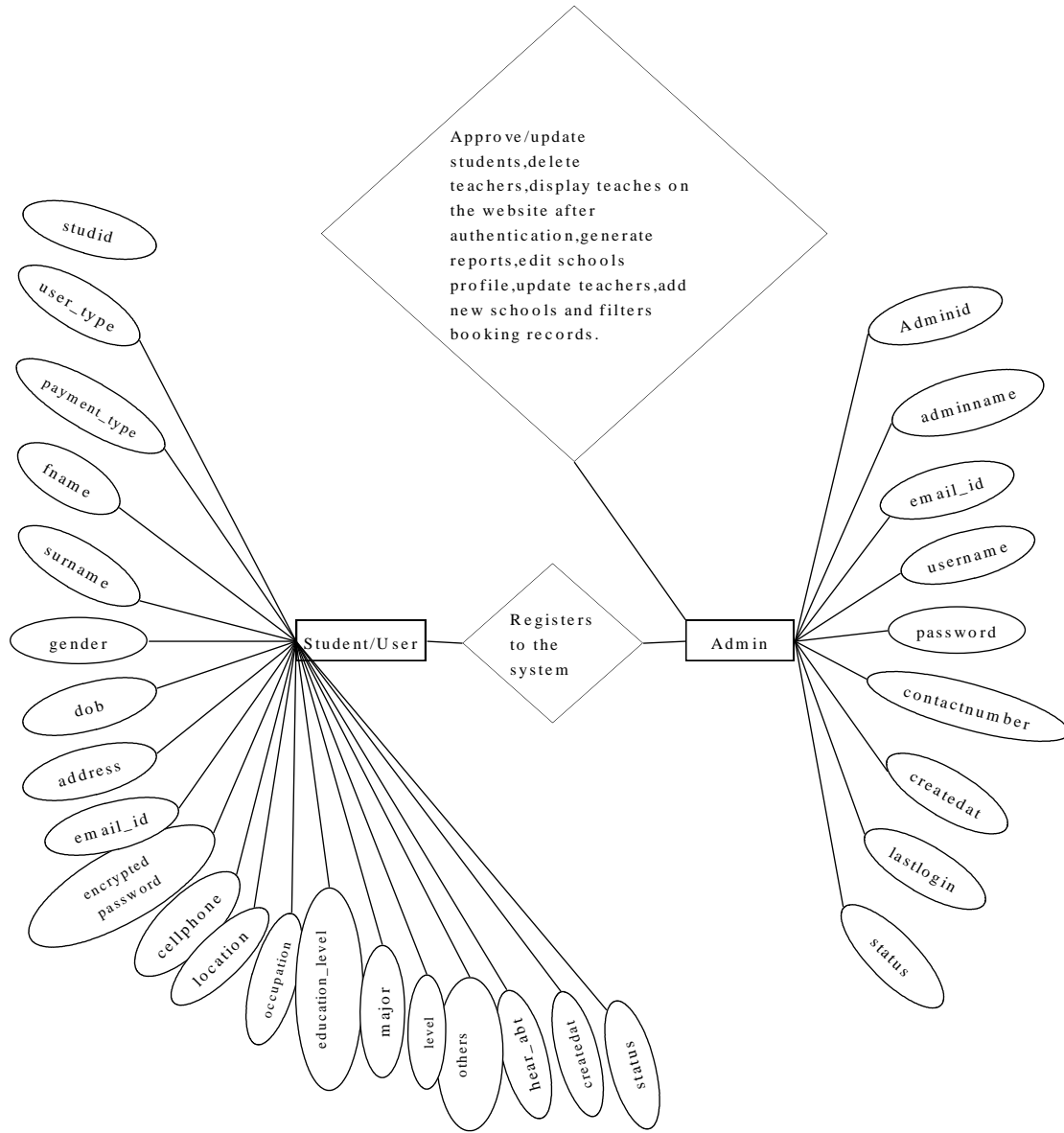
Name	Notation	Description
<b>Entity</b>		<p>An entity is a single object about which data can be stored. It is subjected of by a table. Entity and their relationships are modelled through the use of the entity relationships diagram.</p>
<b>Relationship</b>		<p>A relationship is named connection or association between entities or used to relate two or more entities with common attributes or meaningful interaction between objects.</p>
<b>Attributes</b>		<p>Attributes are the properties of the entities and the relationships are the descriptions of the entity. Attributes are elementary pieces of information attached to an entity.</p>

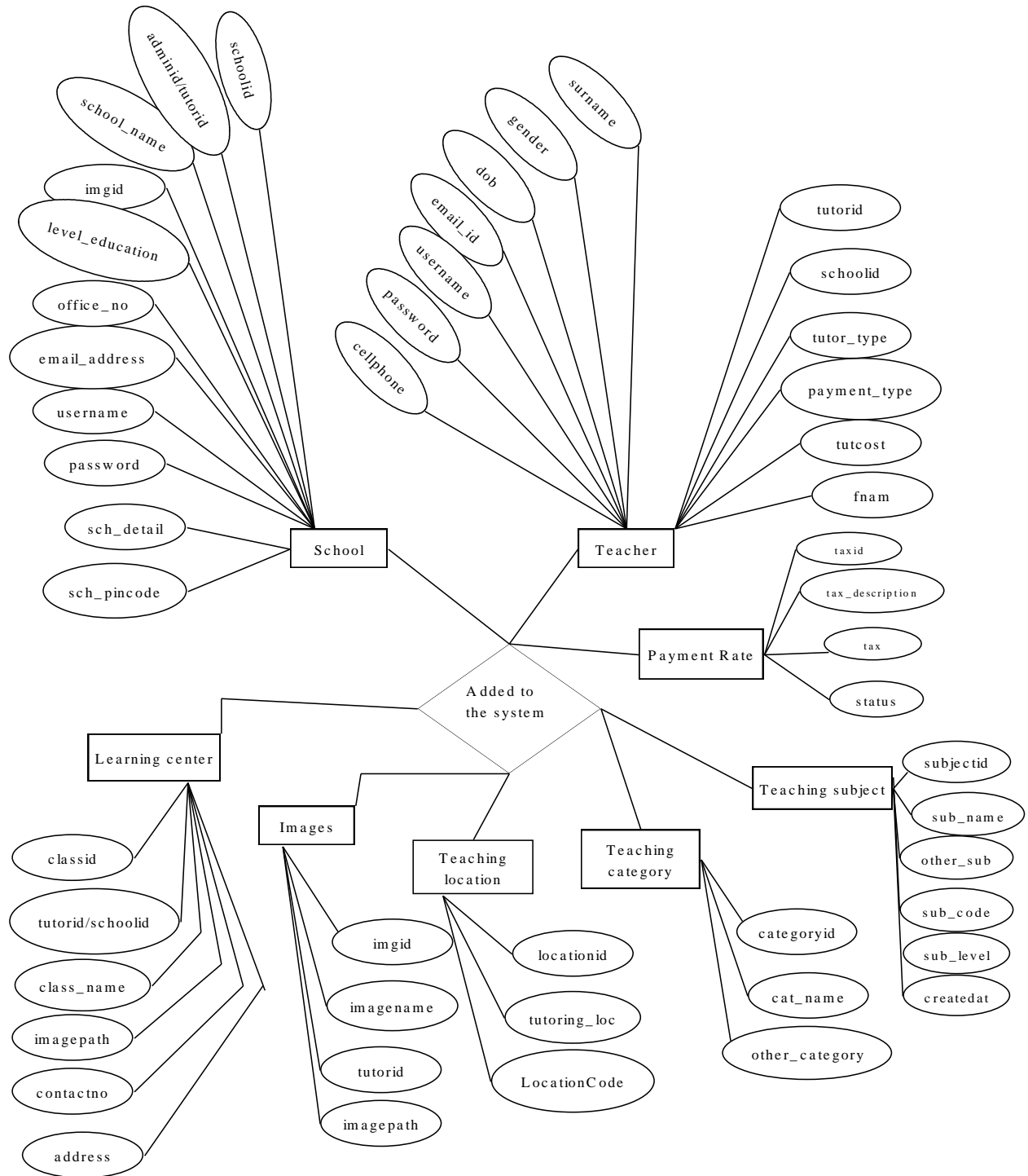
Figure 24: Entity relationship diagram for all main components



**Figure 25: Entity relationship diagram for the student registration**



**Figure 26: Entity relationship diagram for teacher registration**





## 5.9 DATABASE TABLES

The project used the following tables:

- Admin
- Advertisement
- Business\_user
- Category
- Contact\_msgs
- Feedback
- Images
- Location
- Parents
- School
- Students
- Subjects
- Subscription
- Subscription tariff
- Tax
- Teacher\_learningcenter
- School\_learningcenter
- Tutor
- Tutors orders



**Table 1: ADMIN TABLE**

S1.no	Attribute	Datatype	Description	Constraints
1	admin_id	Int(9)	Administrator id	Primary Key(Auto increment)
2	admin_name	Varchar(20)	Admin name	
3	username	Varchar(20)	username	Unique name
4	password	Varchar(20)	Password of administrator	unique
5	Contact_number	Int(15)	Phone number	
6	createdat	date	Date registered	
7	lastlogin	datetime	Last login date	
8	status	Varchar(20)	Authorization status	

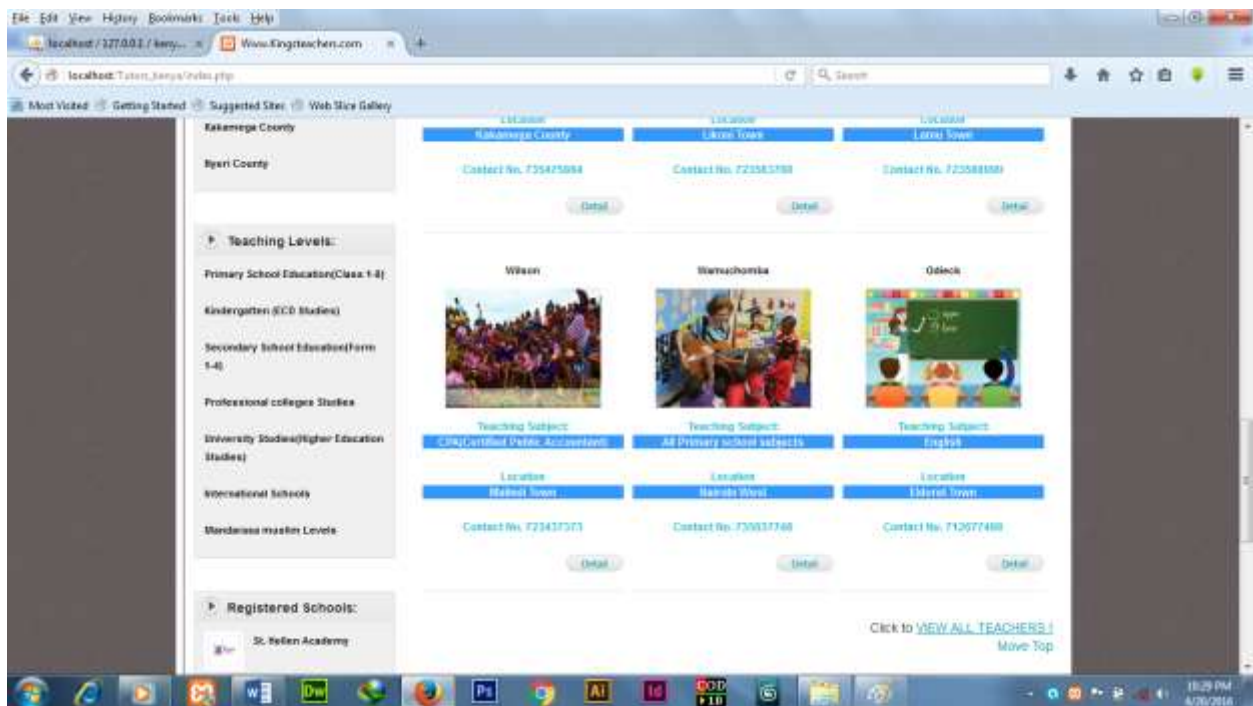
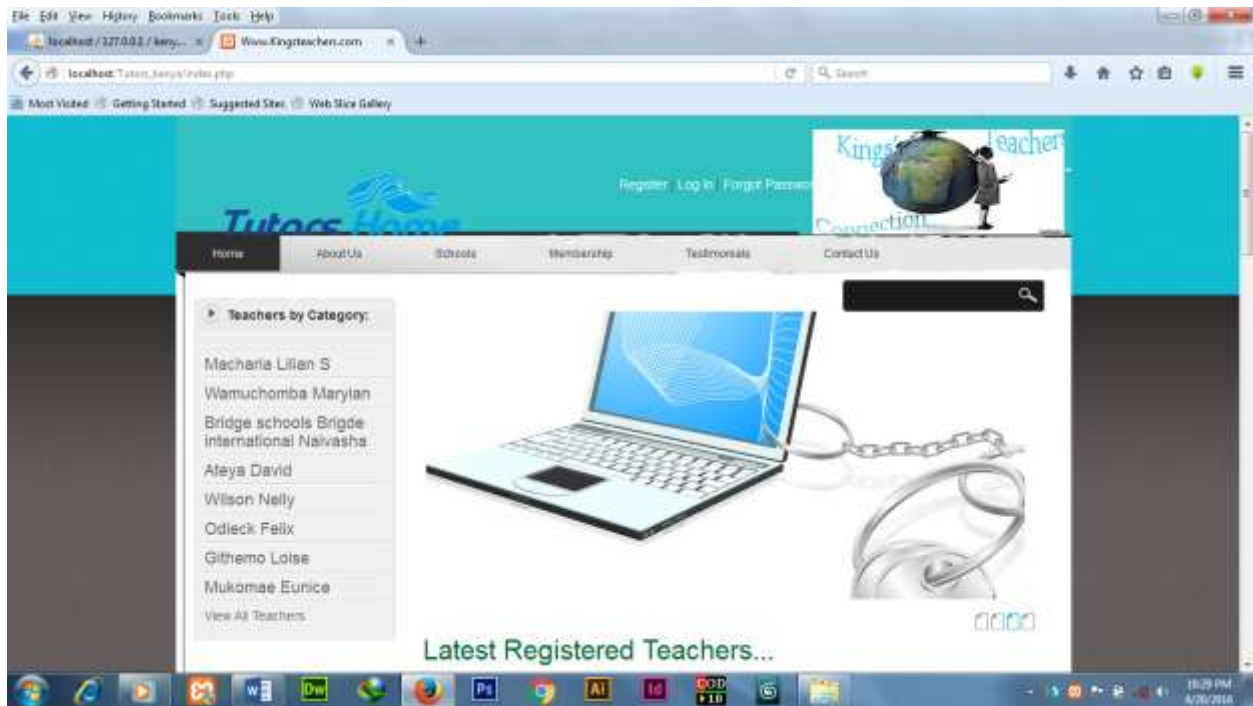
**Table 2: TEACHER TABLE**

S1.no	Attribute	Data Type	Description	Constraints
1	Tutor_id	Int(9)	Teachers id	Primary key
2	schoolid	Int(9)	School id	Foreign key
3	Tutor_type	Varchar(20)	Type of teacher	
4	Payment_type	Varchar(20)	Type of payment	
5	tutcost	Varchar(20)	Cost of teaching	
6	fname	Varchar(20)	First name	
7	surname	Varchar(20)	surname	
8	gender	Varchar(20)	Gender type	
9	dob	Varchar(20)	Date of birth	
10	Email_id	Varchar(20)	Email address	
11	username	Varchar(20)	username	
12	password	Varchar(20)	password	

13	cellphone	Varchar(20)	cellphone	
14	tsc_no	Varchar(20)	TSC number	
15	qualification	Varchar(20)	qualifications	
16	subjectid	Int(9)	Subject id	Foreign key
17	locationid	Int(9)	Location id	Foreign key
18	categoryid	Int(9)	Category id	Foreign key
19	main_sub	text	Main subject	
20	description	text	details	
21	createdat	date	Registered date	
22	lastlogin	datetime	Last login date	
23	status	Varchar(20)	Registration status	

## 5.10 INTERFACE DESIGN

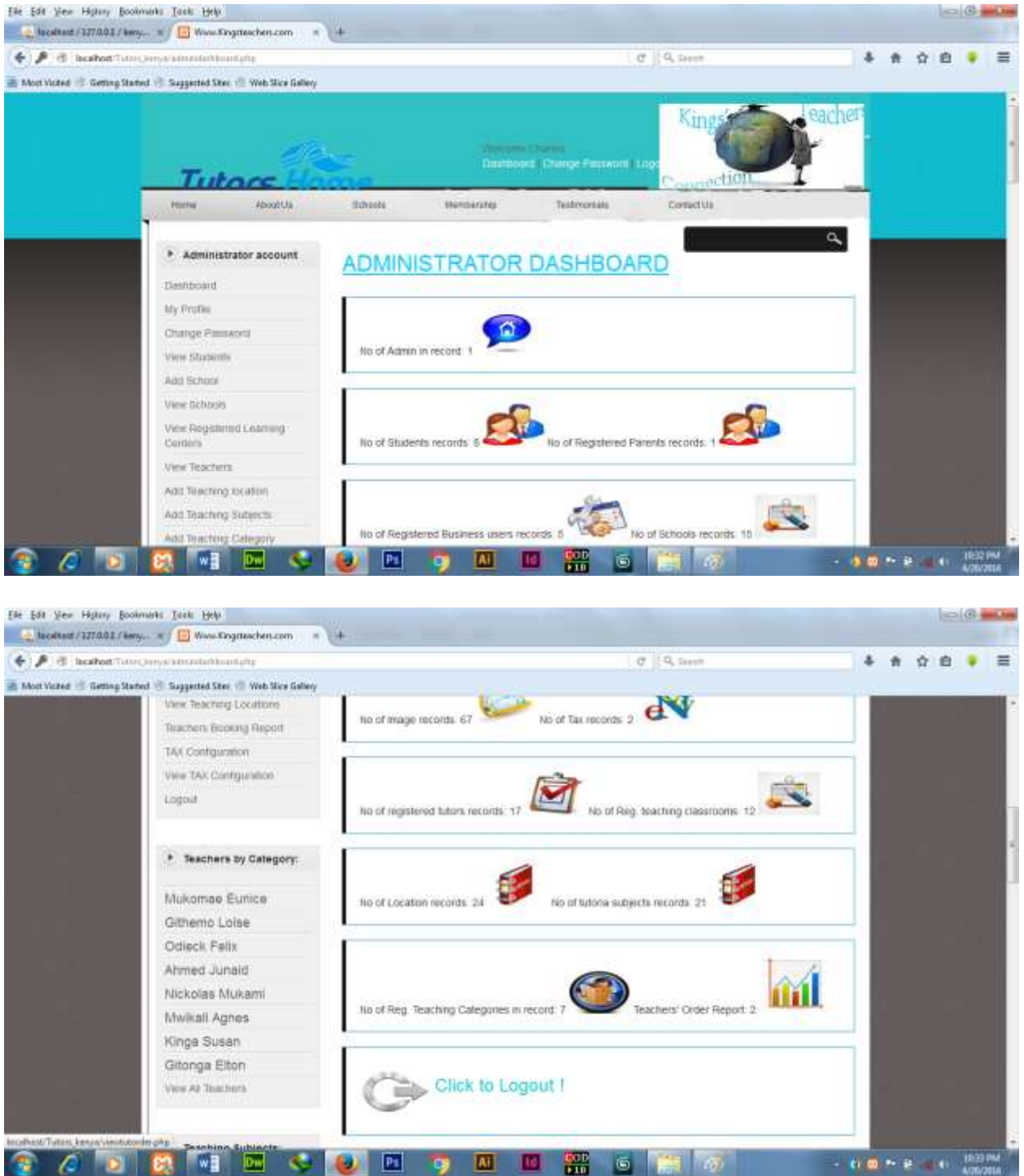
Figure 27: System user interface



## 5.11 INPUT DESIGN

This shows how the forms have been designed for the entry of data by the user of the system. The system has four users; teacher, the student, the schools and the system administrator.

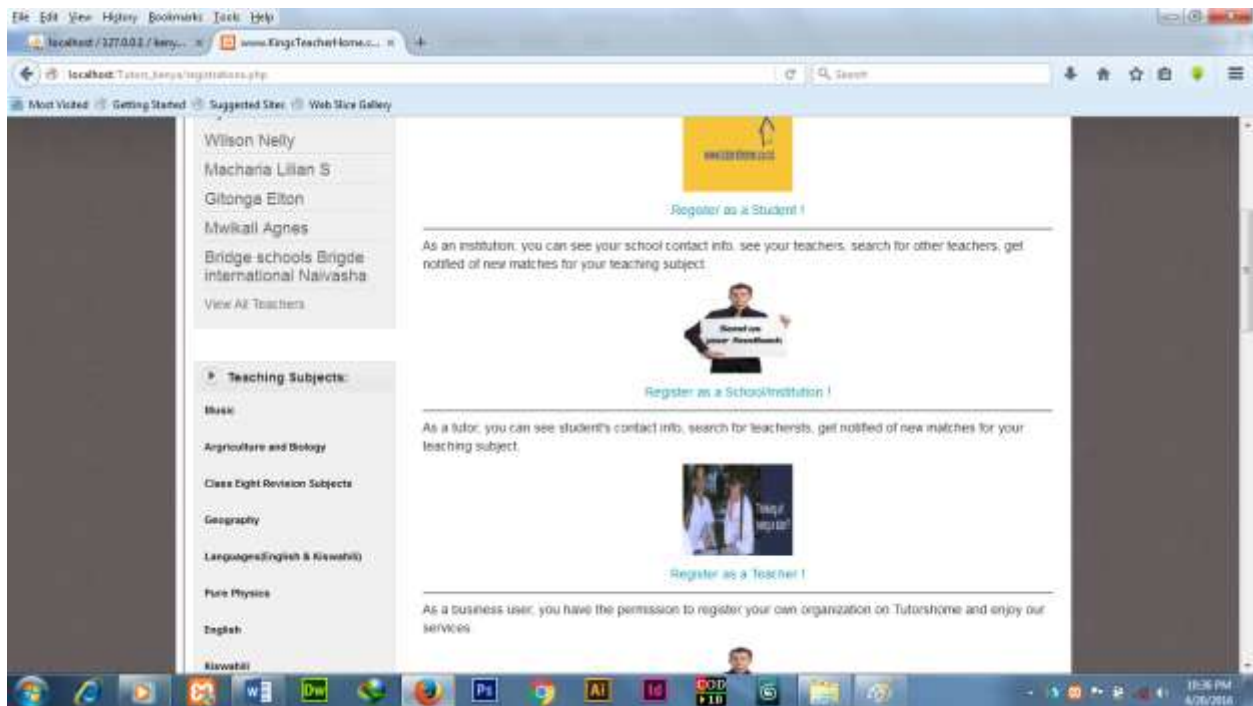
**Figure 28: Administrator interface**



The administrator interface has the following menu

- i. **Home** –This shows the main system interface/
- ii. **View teachers**-This shows the teachers registered in the system.
- iii. **Register teachers**-This shows the form for registering teachers.
- iv. **View schools**-This shows the schools registered in the system.
- v. **Register schools**- This shows the form for registering schools.
- vi. **View learning centers**- This shows the learning centers registered by schools and teachers in the system.
- vii. **View subjects**- This shows all the subjects registered in the system.
- viii. **View learning category**- This shows all learning categories or levels registered in the system.
- ix. **View learning location**- This shows all the teachers teaching locations registered in the system.
- x. **Logout**-This is for the administrator to log out.

**Figure 29: The teacher registration**



Once the teacher is registered he/she is given a password which he/she uses to login and register learning centers and some specific subjects if not yet registered.

Before the student logs into the system to book for the teacher, he/she must be registered in the system and must select one of the teacher's learning center in order to book for that teacher. When the student is registered he/she is sent a password to his/her email address. The student will use his email address and the password to login into the system. However the student does not need to login to view the registered teachers and their corresponding schools since is a web based system, the approved teachers and schools can be viewed online at any given time. That is, as they are displayed on the website. A teacher who wants to be displayed online as a private teacher must be registered and approved by the administrator in the system. Also, a teacher to be registered have to be in one of the registered institutions or submit his/her education qualifications to any of the institutions which is approved by our administrators and then registered with the system.

For the student to register he/she must have a support from the parents especially for the case of students in the lower level of study, that is, from high school level and below. The student will book and communicate with several teachers up to maximum of five for more convenient plan to get the right teacher he/she is looking for.

Also for the school to be registered must be approved to be genuine by administrator. These registered learning institutions are the most important component since they are used as reference points by all teachers in order to be registered as private teacher in the system. Hence, every registered teacher will be referenced to one of the registered institution for him/her to be fully approved to use advanced features of the system. This is taken as one of the security measure in the system. Hence any private teacher in the system holds a reference learning institution to be registered to avoid cases of registering fake and unqualified teachers. Finally, the teacher logs in to his/her account and register his/her individual classrooms, new locations, new teaching subjects and new teaching category levels.

Figure 30: The student registration form

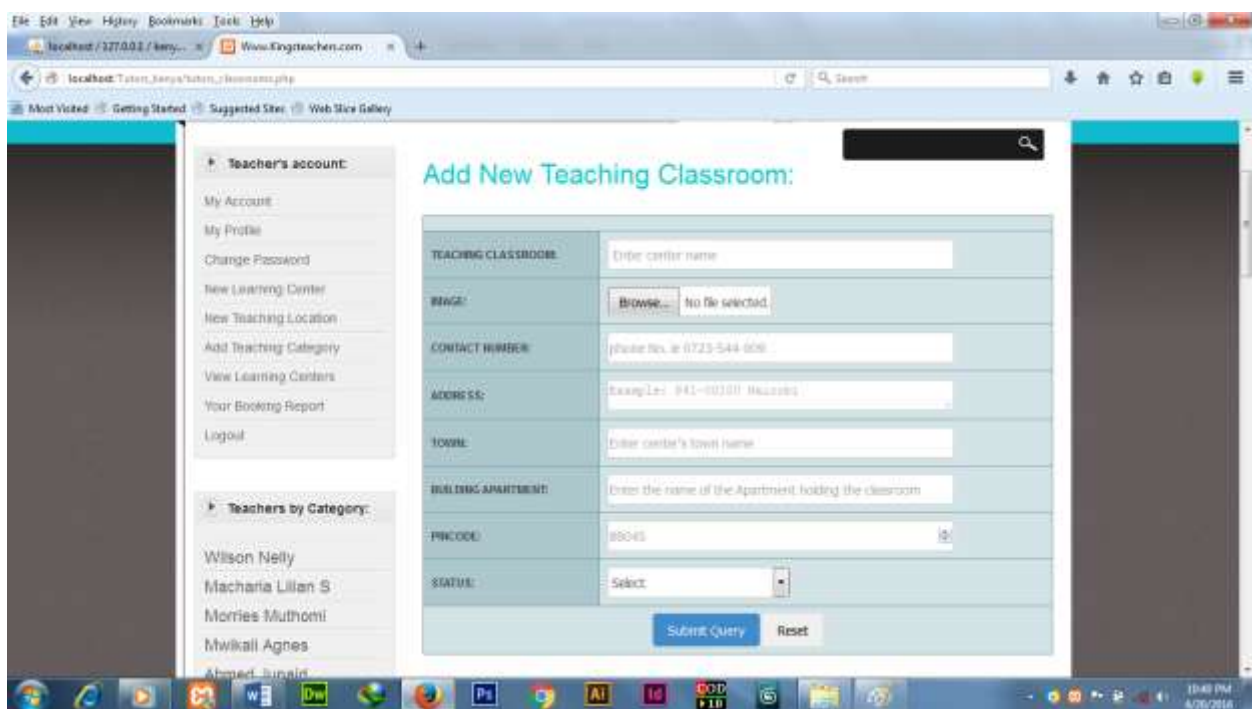
The image shows two screenshots of a web browser displaying a registration form for 'Students and Parents Registration Form'. The browser address bar shows 'localhost:327002/ksky...' and the website is 'www.kingsteachers.com'. The page title is 'Students and Parents Registration Form'. The form is divided into several sections:

- Left Sidebar:** Lists teachers (Wilson Nelly, Mwikali Agnes, Mukomae Eunice, Kinga Susan, Kogen kipkoech, Gitonga Eiton, Wamuchomba Maryian, Mwandia Josphat) and 'Teaching Subjects' (Chemistry, Agriculture and Geography, Farm Four Revision, Business, CNA(Certified Public Accountant)).
- Registration Form Fields:**
  - User Type:** Radio buttons for 'Basic User' (selected) and 'Premier User'.
  - LOCATION:** Text input field.
  - PAYMENT TYPE:** Dropdown menu.
  - OCCUPATION:** Dropdown menu.
  - FIRST NAME:** Text input field (placeholder: 'Enter first name').
  - LEVEL OF YOUR STUDY:(e Secondary school):** Text input field (placeholder: 'Level of study').
  - SURNAME:** Text input field (placeholder: 'Enter Surname').
  - MAJOR SUBJECTS:(e Maths and Physics):** Text input field (placeholder: 'Your Favourite Subjects').
  - Gender:** Radio buttons for 'Male' (selected) and 'Female'.
  - CLASS TO LEARN:(e Form 4 All Sciences):** Text input field (placeholder: 'Enter class to learn').
  - Date Of Birth:** Text input field.
  - if Others please specify to us...:** Text input field (placeholder: 'Please specify any other subject/ lesson').
  - ADDRESS:** Text input field.
- Bottom Section:**
  - ADDRESS:** Text input field (placeholder: 'Enter Street and Box Address').
  - EMAIL ADDRESS:** Text input field.
  - PASSWORD:** Text input field (placeholder: 'New password').
  - CONFIRM PASSWORD:** Text input field (placeholder: 'Confirm password').
  - CELLPHONE:** Text input field (placeholder: 'Enter your phone number').
  - How you heard about us:** Dropdown menu.
  - Terms and Conditions:** A checkbox labeled 'I accept the terms of use of this website'.
  - Register:** A button.

The student register with Kings Teachers booking system by entering his/her personal details. They include; student's user type, first name, surname, gender, date of birth, initial password, phone number, location, subjects, level of study plus other personal detail information. The system

will register the student with initial password but will generate another simple and unique password to every student and send it to student's email address. The new password is generated by the system after authentication from administrator approves the student is genuine as his/her details states. The student uses the surname and password generated to login to the system and book for the appropriate private teacher among many on the web site. After being registered, the student can login to the system and book the right and perfect teacher who fits for his/her needs at any time and from anywhere provided there is internet connection.

**Figure 31: The Teachers teaching classrooms registration.**



Every teacher who is approved to be on the system is responsible in registering personal classrooms that he/she uses in offering the private study. The classrooms registered belongs to that particular teacher only and are used by students to book and access that teacher at the most nearby and convenient place of access based on time and distance. Hence, this classrooms gives the actual access points for the teacher in his/her private teachings in terms of time and location. They appear as the final selection in booking process.



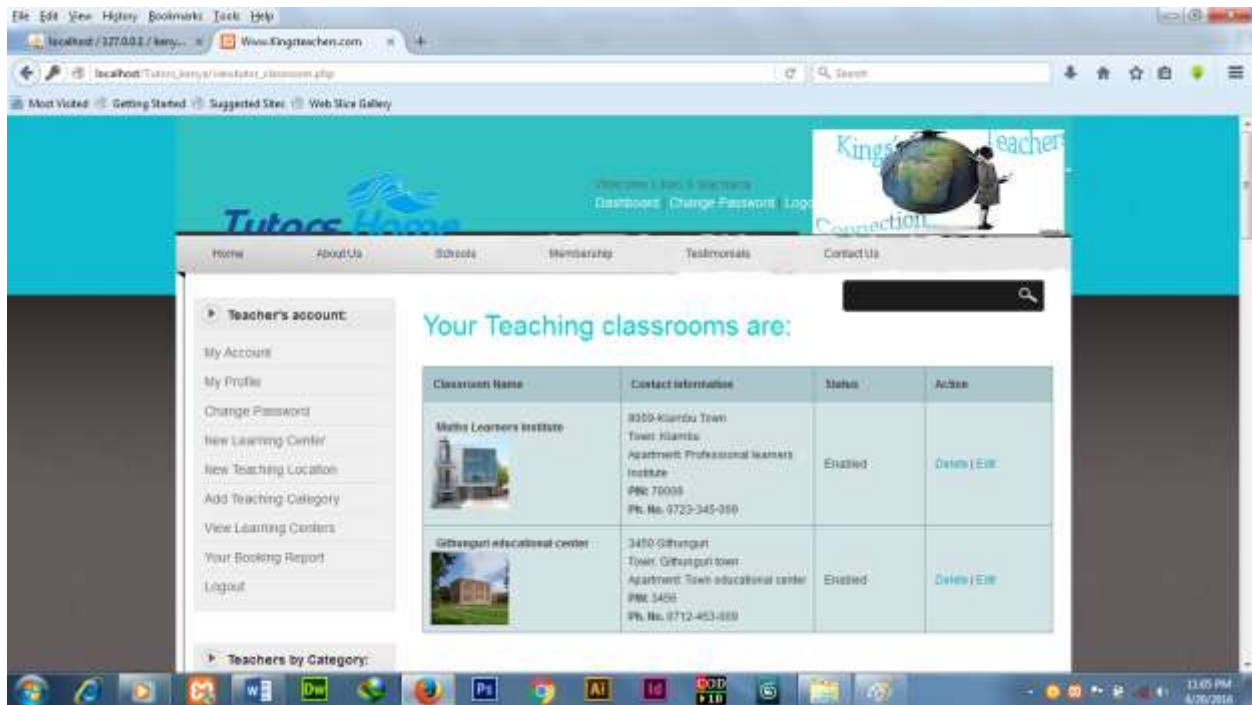
## 5.12 OUTPUT DESIGN

There are several objectives that the system analyst tries to attain when designing an output (Kendall et al., 2007). These objectives are as follows:

- i. Designing output to serve a specific purpose.
- ii. Making output meaningful to the user.
- iii. Producing the required output.
- iv. Providing appropriate output distribution.
- v. Delivering the outline before deadlines.
- vi. Selecting the most effective way of delivering the output.

In designing the output interface we worked towards achieving the above objectives. The output is in form of reports. The system has the following reports.

**Figure 32: Registered teachers report**



The registered teachers/tutors can be viewed based on location, subjects and category level. The report can be viewed in two formats: the form display or the printable display. To view the report in a printable display, one must be logged in as an Administrator. This is because an ordinary user is not allowed to print any report. The report above shows teacher's report detail at the admin panel.

after approval of his/her registration. All education details concerning the teacher, that is qualifications, experience levels, locations, teaching categories and subjects plus TSC numbers are displayed by the system in an alphabetical order. The arrows above for Next and Previous are used to move from one group of teachers to the next until the last group.

The display above shows the report of one of the registered teachers. The menu for the report is included. This allows the administrator to view report in a bit analyzed format in a form display format. Under the menu for reports admin can view;

1. Registered teachers' countrywide report.
2. The teacher's assigned learning center/institution used for registration report.
3. The teacher's personal classrooms report.
4. The teacher's teaching categories and their details report.
5. Teacher's location details report.
6. The teacher's teaching subjects and their details report.
7. The teacher's security keys like the TSC number report.
8. Teacher's booking report.

**Figure 37: Registered schools/Institutions for each county**

The administrator can select the county to view registered teachers for that particular county. Suppose Nairobi county is chosen. The display will be as shown in figure 33 below;

Figure 33;

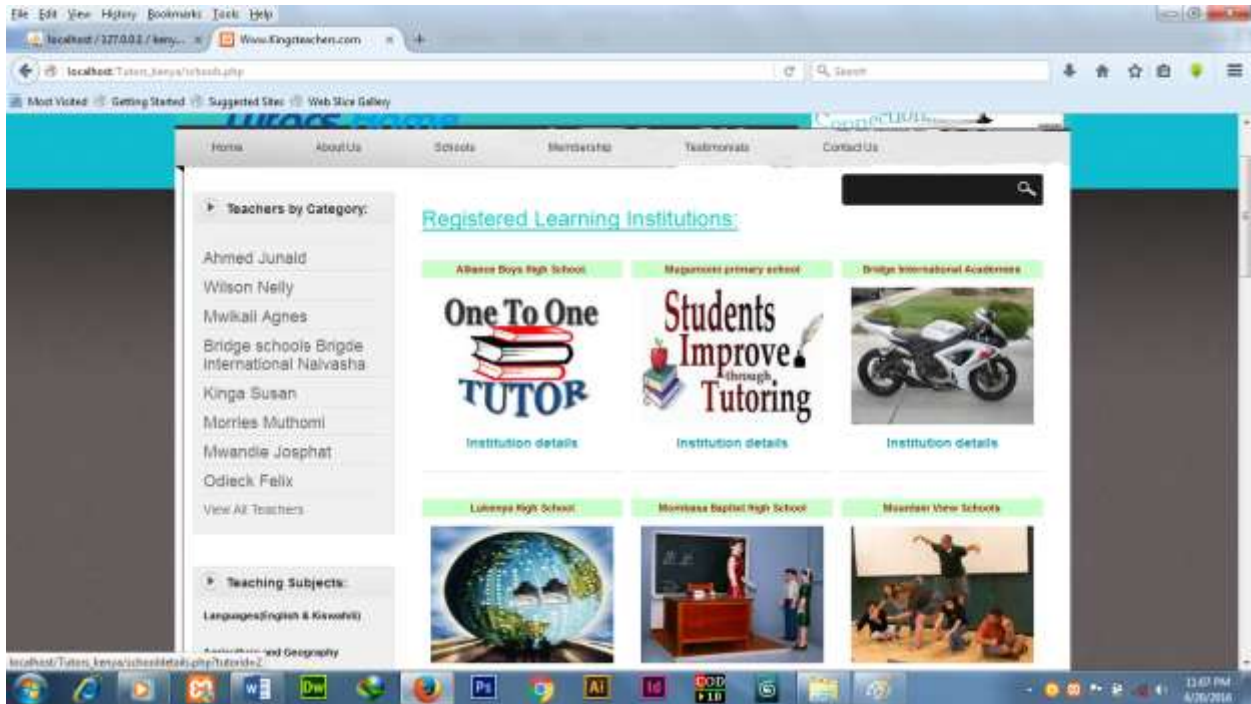
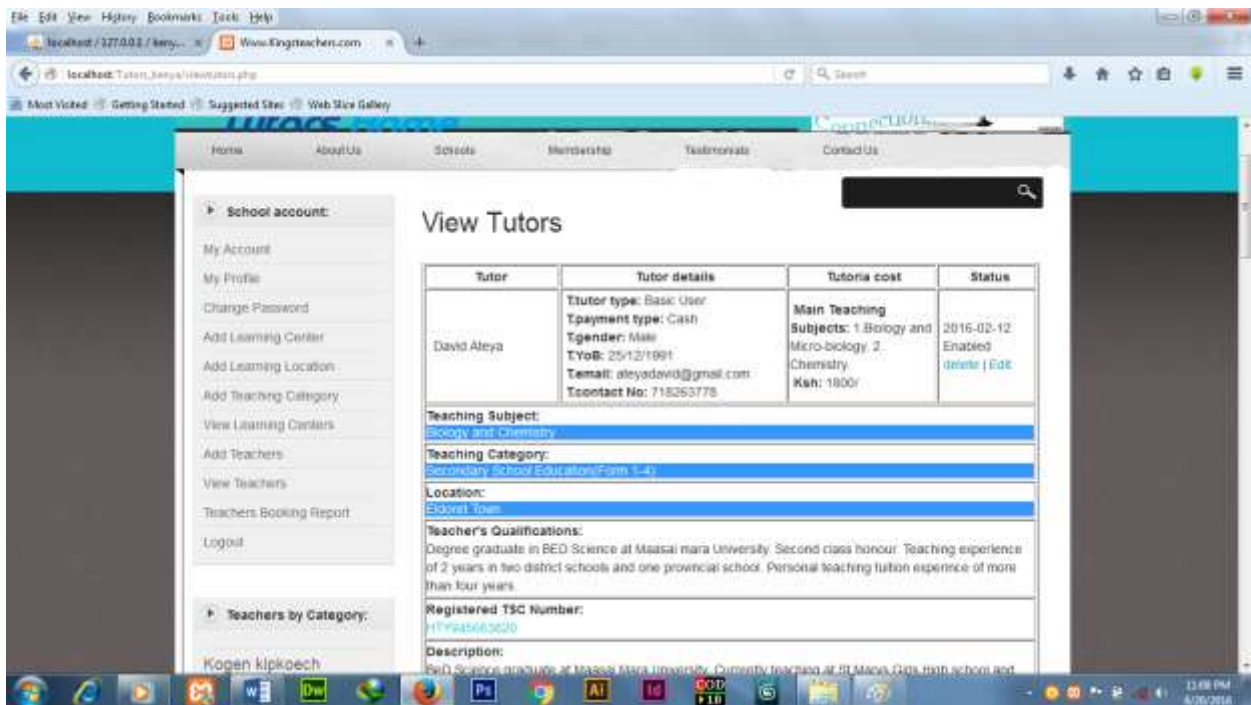


Figure 34: The learning institutions report.



The registered learning institutions report can be viewed by administrator and institution itself. The user needs to login to the system to see detailed report using the account assigned. But for other users like students does not need to log in to view some of the report. For example a student Kamau does not need to login to the system to see teachers registered under Alliance Boys Center High school. The institution report display its details which cut across location detail and institution level of study. The institution reports include;

1. Institution details report
2. Number of registered teachers using that institution report.
3. Location report
4. Level of learning report.
5. Other sub institutions registered in the name of that institution as the host report.

### **5.13 THE BOOKING RESPONSE REPORT**

To view the booking report, the user must login to his/her account given is a student, teacher or administrator. After login to the system as a teacher, one can see the booking orders made to him/her by students or parents. He/she is expected to view the full booking report for each booking attempt and give a reply to the request indicating his/her decision on the booking made. Hence, when the student and admin logs in to their account, they will see this report as whether the booking request have been communicated or is still pending.

The admin can view the booking report for each teacher from any location or by analyzing using subjects registered. Suppose Narok County is selected, the booked teachers in Narok county at all category levels and for all subjects will be viewed from the system in a form display format.

## **CHAPTER SIX: IMPLEMENTATION OF THE SYSTEM**

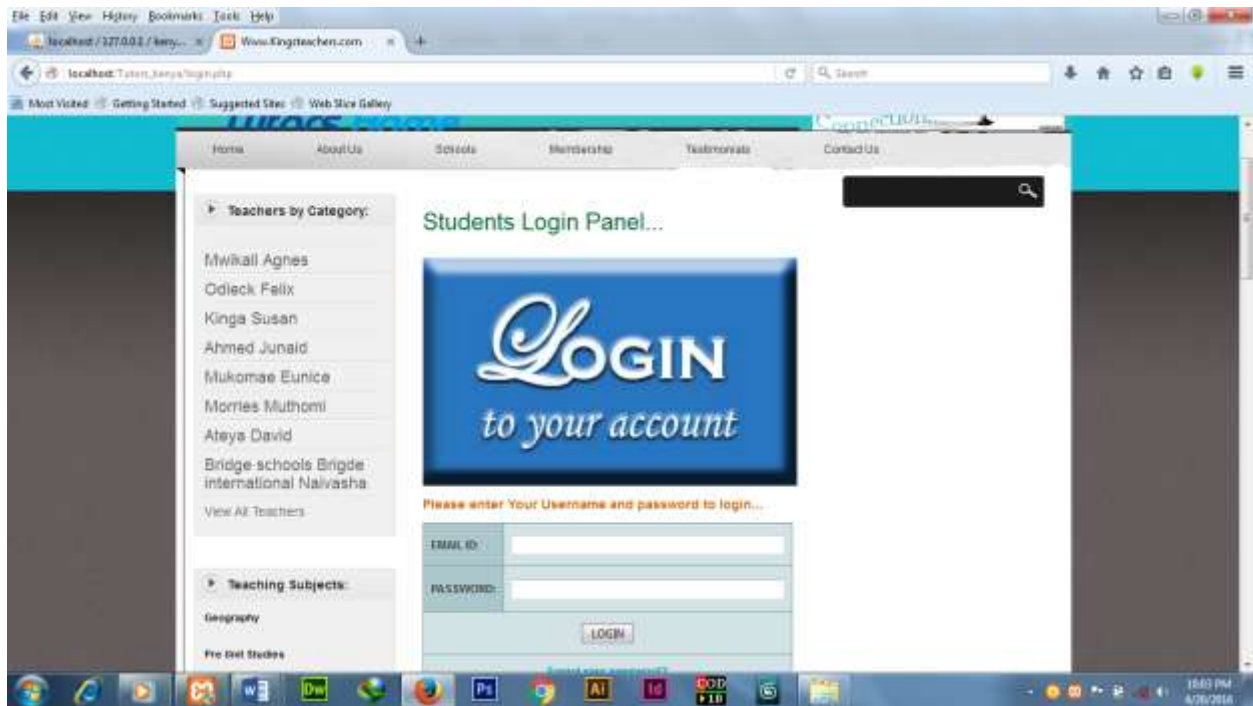
This is the stage where different modules of the software are coded and integrated together. In this chapter testing of the system and the changeover are discussed. The different methods of testing that were carried are discussed in depth and how the system is expected to be implemented. Reasons are also given for the method of changeover adopted.

The chapter explains how users navigate through the system in order to use it easily and effectively.

### **6.1 FORM INPUT DESIGN**

The users interact with this system through a web browser. Users accessing the system through a mobile phone interact with the system through a mobile application. The tools used to create the interface were HTML and CSS .PHP was used to fetch and send data to the database. On the mobile phone C sharp was used to build the application. The mobile application interacts with the database through internet information server (ISS).The user interacts with the system through a web browser to access the server. The system can be accessed using Mozilla Firefox, internet explorer, opera, Google chrome, torch and other current browsers. Because of the size of the screen of a mobile phone we built a mobile application so that the system doesn't have to load the interface every time. This reduces the time to access the interface and book and makes the booking much faster. After students registration the following are the steps of booking a private teacher.

**Figure 35: Login form for a student**



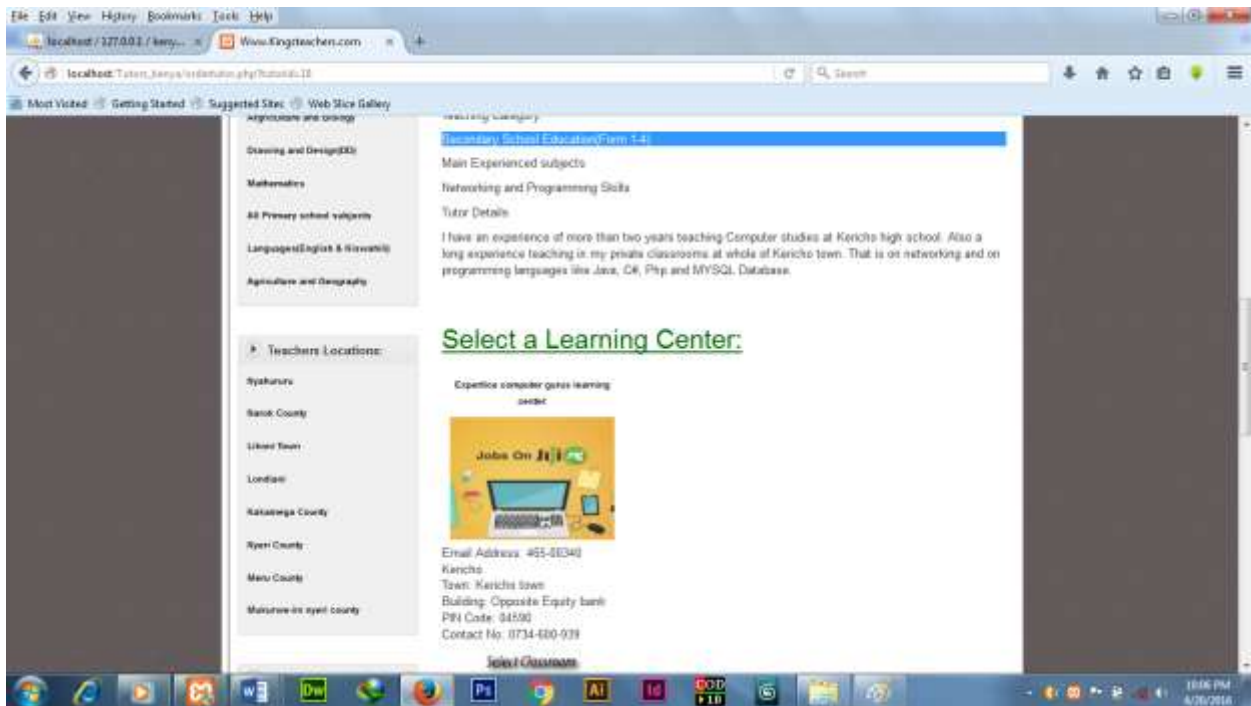
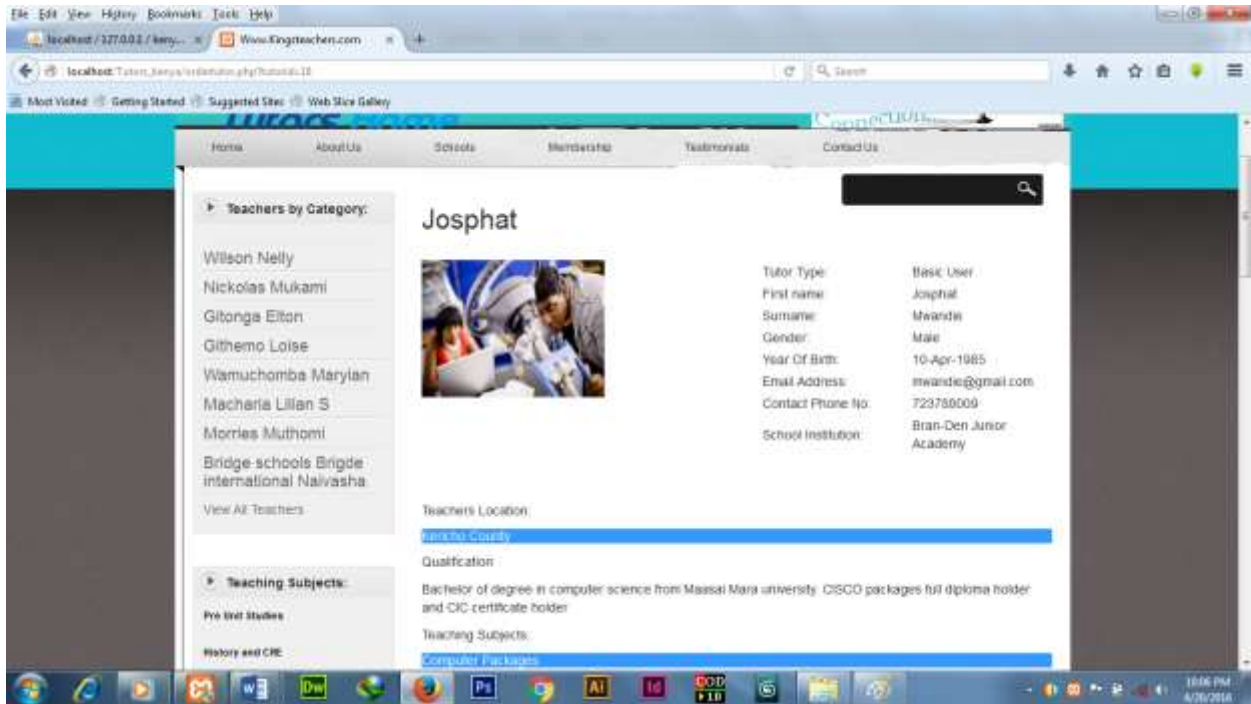
### **First Step: The Login page**

The first step of the online private teachers booking system is the login page. This step is after the registration of the student with Kings Teachers Booking system. It is not possible to login before registration with this software. The login procedure is made in the simplest way possible. The login interface has fields: Email address and the password given to the student after registration.

### **Second Step: Booking for the preferred private teacher**

The second step is personal booking for the preferred private teacher .Figure 36 shows the interface for booking of preferred private teacher.

Figure 36: Booking for preferred teacher



## **6.2 TOOLS USED FOR CODING**

The system has two parts: the main system running on the computer and the mobile phone application

### **Main system on the computer**

The interface was coded using html, cascaded style sheet (CSS).

Jquery was used to run queries.

The database used was MYSQL.

PHP was used for interaction between the database and the web server.

The system runs on Apache web server.

### **Mobile phone application**

This part is still under coding and implementation process. Its implemented using the following tools;

Mono for Android and Xamarin are being used for the mobile application.

The coding is done using C sharp.

The mobile application interacts with the database through internet information service (IIS).

## **6.3 TESTING PLAN**

Testing is done to evaluate the capability of software and to determine whether it produces the correct results. Software testing is done for the following purposes.

1. For reliability estimation
2. To improve quality
3. For verification and validation

A software is tested to check for correctness, reliability, usability, integrity, efficiency, flexibility, reusability, maintainability among others.

We used black box testing to test our system. The method was chosen because it focuses on all the system functionalities. In order to carry out this testing it is important to understand the relationships between different modules.

Under the black box testing we carried out the following :



1. **Function Testing:** in this case we requested Administrator who is director of education at Nyeri county and his dearly wife who is a Maths and Physics teacher at Ngandu Girls High school to give us a view of the system to know what the user's view of the system was.

2. **System Testing:** Here we focused on the whole system and its environment. The main objective was to find any discrepancies the product has from the requirements and its documentation. We checked whether we built the right product. This was done by inputting all the 47 counties in Kenya, all the education category levels and all offered subjects in the country in order to cater for all from lowest to highest level of education in Kenyan education curriculum. We populated the system with over 500 teachers, over 200 learning institutions and over 400 students. We then registered teachers for various categories, subjects and from various locations of the country. Teachers were registered under certain learning institution which is one of the approved and authorized institution for that task in that location. The students were allowed to book and then we checked whether the results were as expected. We also checked whether a student can book more than three times and whether unregistered person can book. Also we checked whether a teacher can be registered in the system without his/her reference learning institutions and whether unqualified institutions can be registered in the system.

We tested the turnaround time for responding to queries in the database and made sure it was short. The results from this testing helped us to identify problems, such as bottlenecks in the network, hardware and database structure. The system performed as expected.

3. **Performance Testing:** This is to check whether the system can perform its task within the required time. We approximated that a student should take a maximum of five minutes to register because he/she needs an email message with the password regenerated and given by the system. We approximated that the booking process should take a maximum of ten minutes because there are other student details that are expected to be given and explained well while registering and sometimes the network can be slow. The system was able to meet our expectations.

4. **Stress Testing:** This is done to know whether the system can handle large amounts of data. We did this test by inputting large volumes of teachers' data, learning institutions and students into the system and the system performed as expected.

5. **User Testing:** The user is given the system and documentation. The user is not a programmer and therefore he/she doesn't check for any programming errors. We find out what the user says about the system. This was done using a student from a rural day school who doesn't have much

exposure to online systems education. The student found the system easy to use and helpful in booking any private teacher.

### **6.3.1 TESTING STRATEGY ADOPTED**

The testing strategy adopted in our system is the Top-Down strategy. This is because having the skeleton we can start testing the main functions in the early stages of the development process. This is an incremental approach where one module is tested after the other. This can be done either in breadth or depth. We used breadth approach where we tested the modules from top going to the next level. We also tested the interfaces for any errors. We used the breadth approach because our system is huge and it would have taken longer time if we used the depth approach. The errors that were in the system were identified and removed.

### **6.3.2 TOOLS USED FOR TESTING**

- i. Astra Quickest for website testing
- ii. Astra Load Test for testing web-based system
- iii. Aardvark for tracking web based bugs.

### **6.4 TESTING USERS**

After building the system it is important to train the users of the system. The first step involves identifying whom to train. Because of the large number of students and teachers we shall train the administrators who most of them are teachers and the administrators will have sessions with various teachers of various schools who will finally have sessions with various students to train them on how to use the system.

To train the administrators and learning institutions we shall develop objectives. The objectives in this case are to have the administrators use the system effectively and efficiently with minimum effort. We shall also train these administrators on how to train teachers to use the system who will finally train the teachers at various category levels on how to train students to use the system. We shall train the learning institutions' principles, private and public school teachers and some schools for the sake of students. We shall also provide the user manual for the system to the administrators and some senior teachers in those registered learning institution

## **6.5 PROPOSED CHANGEOVER**

We intend to use parallel conversion for a changeover. In this strategy we run the old system together with the new system at the same time. The choice of this system is the sensitive of accessing the right teacher who is genuine, qualified and reliable perfect private teacher.

The issue of fake, conmen, unqualified and underqualified private teachers who claim to be qualified and fit for the delivering of certain education services is common and rampant in our country Kenya. Hence not many people would easily trust the new system at first.

It will take some time before people build confidence in the system. We will run the manual method of accessing the actual private teacher for a particular subject and level of study at the same time with the new web and mobile phone based system.

## **CHAPTER SEVEN: LIMITATIONS, CONCLUSIONS AND RECOMMENDATIONS**

### **7.1 LIMITATIONS OF THE SYSTEM**

The kings Teachers web based private teachers booking system has the following challenges;

1. The education sector of this country does not have enough money and resources to implement the system in full.
2. The private teaching institutions feels they will be intimidated and monitored in a way as formerly they hired undergraduates and under qualified private teachers. But, as a result of new system they will be forced to hire teachers accessed from the system who are known to be qualified and knowledgeable.
3. Over 50 percent of students are from rural areas which means they have little access to a computer and smart phone devices. Also the same students are illiterate with computer knowledge hence becomes a hindrance to implementation of the system to all people in the country.
4. If students gives wrong personal information that can raise security alarm, the students will not be authenticated to be able to book any teacher and instead his/her account will be deactivated.
5. Many of the parents in the country cannot afford the fee that most and best private teachers will be demanding due to their high rating rate. Hence not all students will benefit from this best teachers in the system as expected. This will also force some to maintain their old means of searching for locally and under qualified teachers.
6. Not many people in Kenya have Smartphones and so they will still have to go to nearby teachers for help or borrow the phones from their friends.
7. The web and mobile phone based system does not have any human touch. Hence low emergency help services.

## **7.2 CONCLUSION AND FUTURE WORK**

The aim of this research was to come up with a web and mobile phone based system that would reduce the time students and parents take to access an actual private teacher, request and book and the time taken to get all the plan for class scheduled and maximally utilized. The system is also supposed to eliminate use of manual search, paper records and analysis, cutting the cost of accessing an actual private teacher. Since the system is web based it can be accessed from anywhere provided the internet is available. To achieve that, we built the system using the waterfall method because it was the most appropriate for our case. We identified the user requirements and developed the system based on those requirements. The system runs on XAMPP server which has MYSQL database and Apache server. PHP was used to write scripts that interact with the database, HTML and CSS were used to build the interface. To meet our first objective we reviewed the current manual teacher's access system method and identified its weaknesses. We found that it is highly prone to errors, risky, loss of resources and time wastage. We met our second, third and fourth objectives by developing the required system and testing it thoroughly to a certain that it was free from errors, insecurities and it met the user requirements. It cannot allow multiple registrations or multiple booking. The system gives results in real time and so it does not create room for anxiety or suspicion. The system registers a student and sends his/her login credentials to his/her email address which is provided during registration. The student uses his /her email address and the password to login into the system. Once the student books he/she can view the booking order report, wait for the response from that teacher or directly communicate with the teacher through the phone call or email. He/she cannot view book report for any other student. He/she can also view various schools institutions and teaching classrooms for various teachers where he/she is registered. The results are displayed as request responses whether response is pending or communicated by that particular teacher.

The objectives of my research were well attained to my satisfaction. With the support of senior education directors, schools heads of various institutions and also support from teachers, students and parents we can implement the system.

Developing the Web and mobile phone based system was a big task for me bearing in mind the short time I had and the fact that I work, not mentioning that I had other courses going on. I took the challenge positively and put my time into it. I have learned how to develop web based

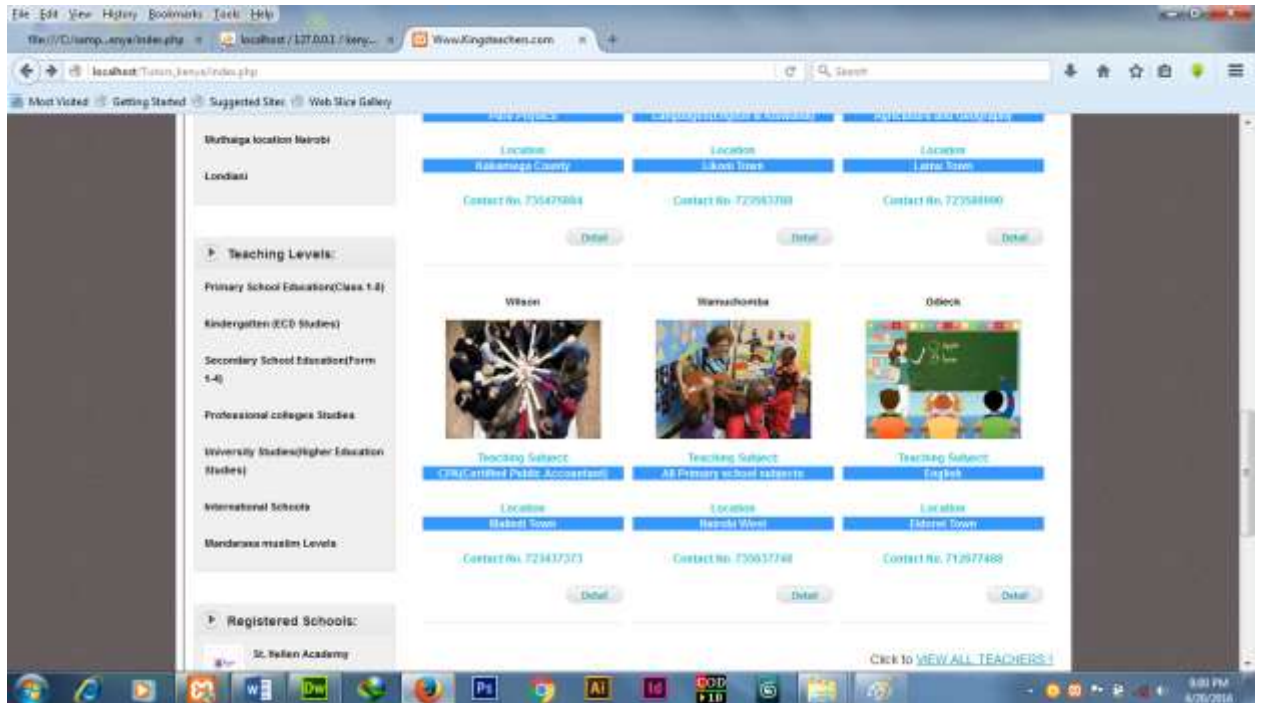
applications and how to do academic writing with citation and referencing .I have learned to consult others when I am needed to help and to assist others when they need help.

### **7.3RECOMMENDATIONS**

1. The government and mostly its education boards like the Teachers service Commission should put its attention and effort in this new system of booking teachers. This is by supporting it academically and financially in order to build a simple and reliable pool of secured, genuine and qualified teachers who can easily be accessed for personal help any time anywhere in the country.
2. Teachers who are holding private studies both in public and private institutions at all levels should adopt this new system. This is in order to build a centralized system of academic triangle where only best and qualified teacher can be obtained for help.
3. The students at all levels of study and parents should make use of this new system in access of actual private teachers. This will ensure that no more time and resources are wasted on fake and under qualified teachers and instead the right teachers are accessed.
4. The private institutions in the country should embrace and adopt to the power of the new system. This is by finding and employing teachers mostly from Kings Teachers system which gather and register only qualified and committed teachers. This will win them trust from students and parents and hence quality education at all levels.
5. The government should expand the internet infrastructure so that it is available in the whole country. This will allow more students, parents and private schools especially in remote areas to access the online system and book their teachers there with no much struggles.

# APPENDIX 1: USER MANUAL

## (i) User interface

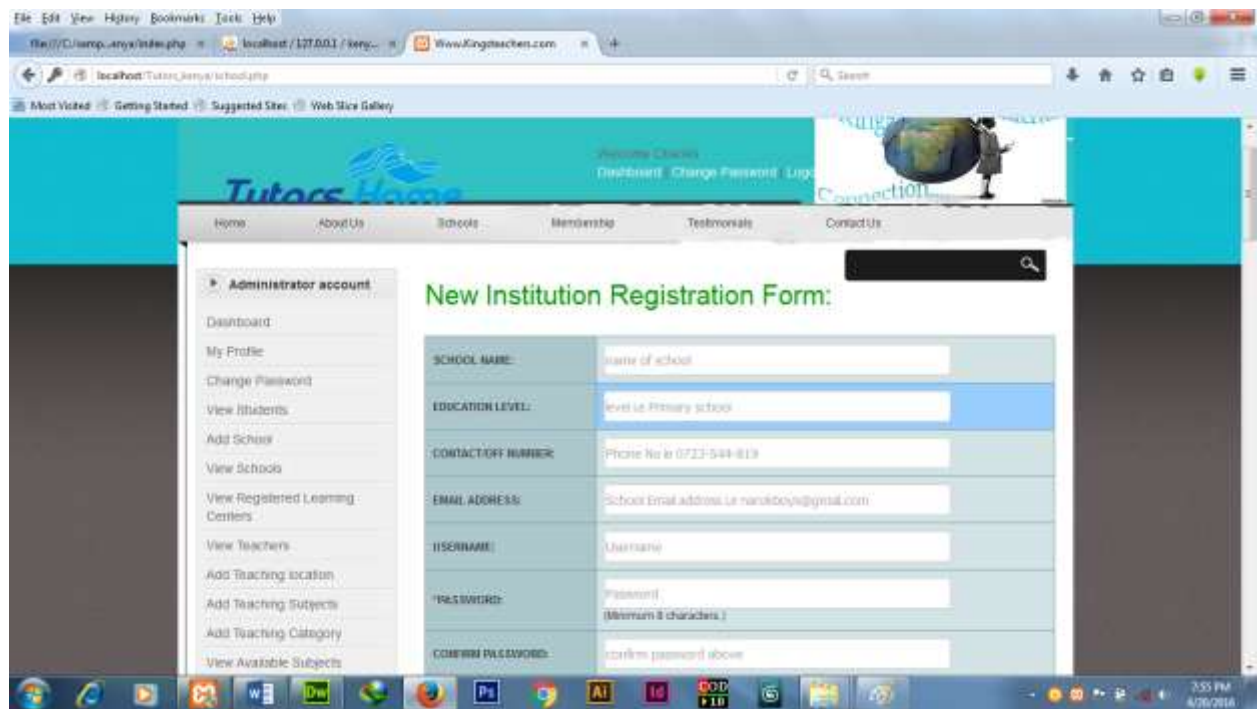


The main interface has;

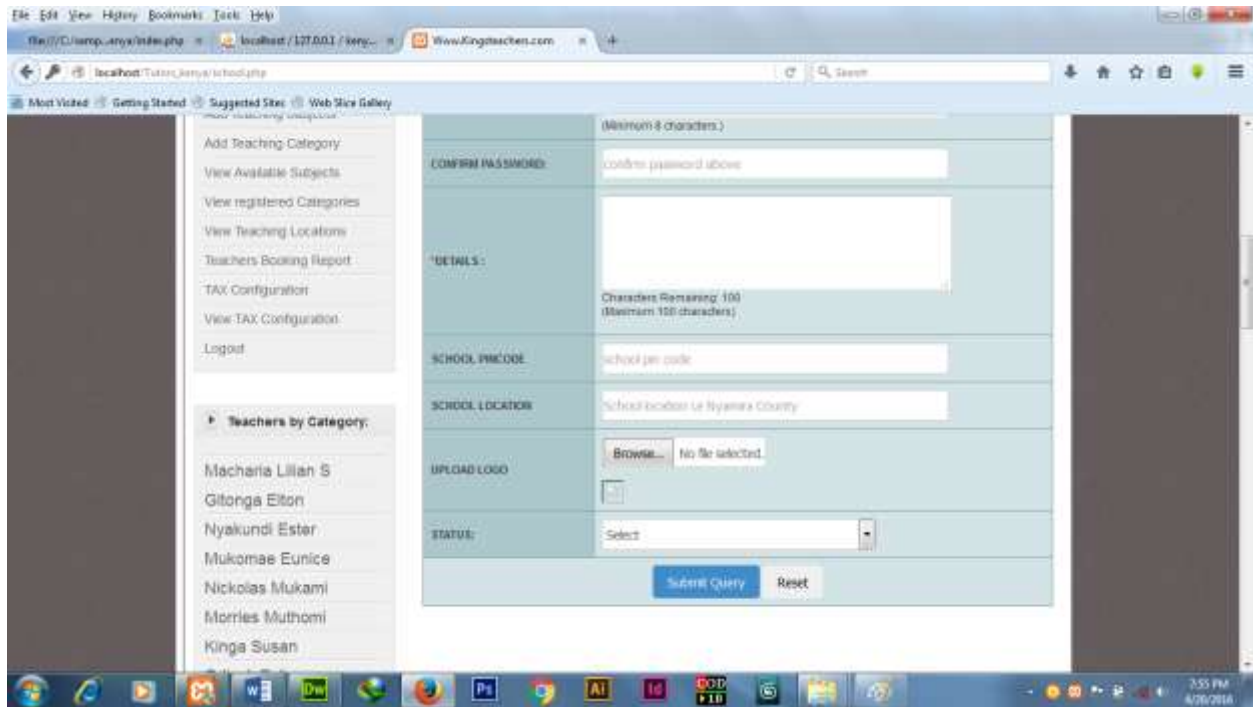
- (i) **Home**- this gives the interface shown above which is the main interface.
- (ii) **About us**- This gives a description of the Kings Teachers booking system.
- (iii) **Schools**- This display the list of all registered learning institutions plus their login interface.
- (iv) **Membership**- This display the login and registration interface for all teachers, students and parents. Also display the list of all registered teachers.
- (v) **Testimonials**- This display the feedback messages plus FAQ and the answers.
- (vi) **Contact Us**- This display the contact addresses which include box address, email and map for giving direction on how the main physical office can be accessed.
- (vii) **Search**- This input box is used to search for teachers and schools in the database to know whether he/she is registered or not.

The administrator logs in and register learning institutions from different parts of the country which will be used to authenticate teachers in their registration who will still register their personal learning centers as teaching classrooms.

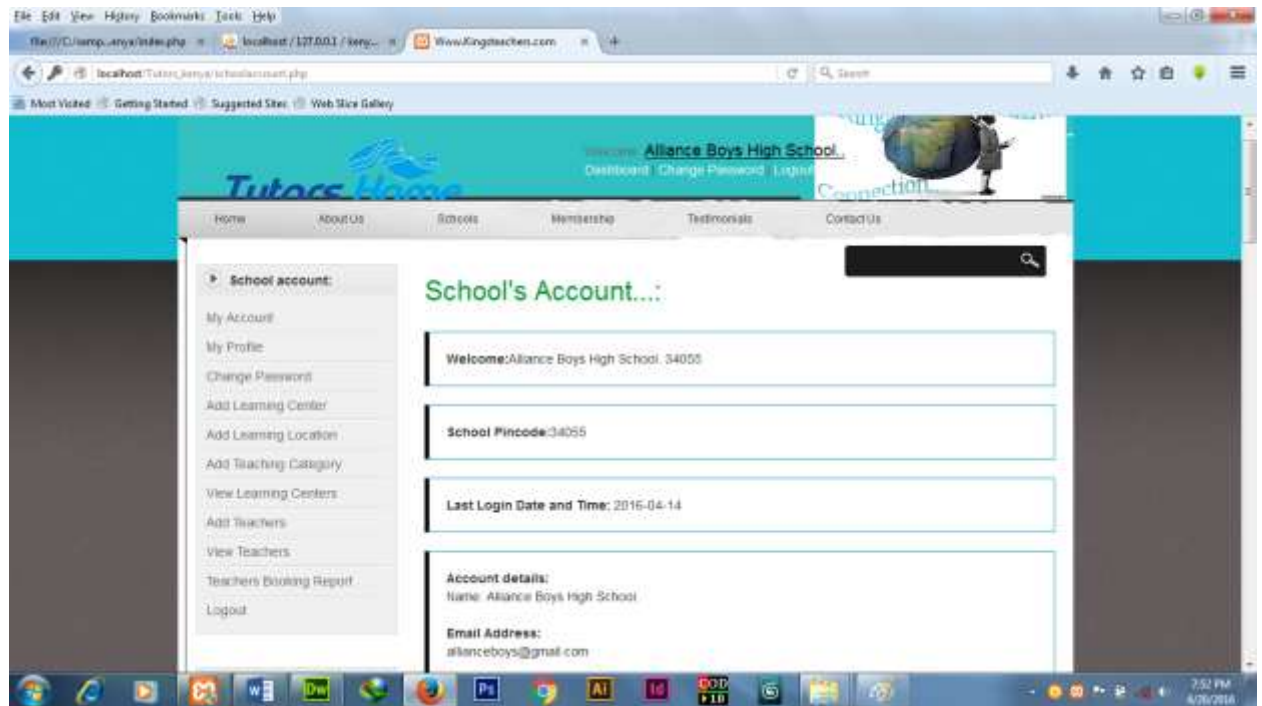
(ii) **The administrator register a learning institution**



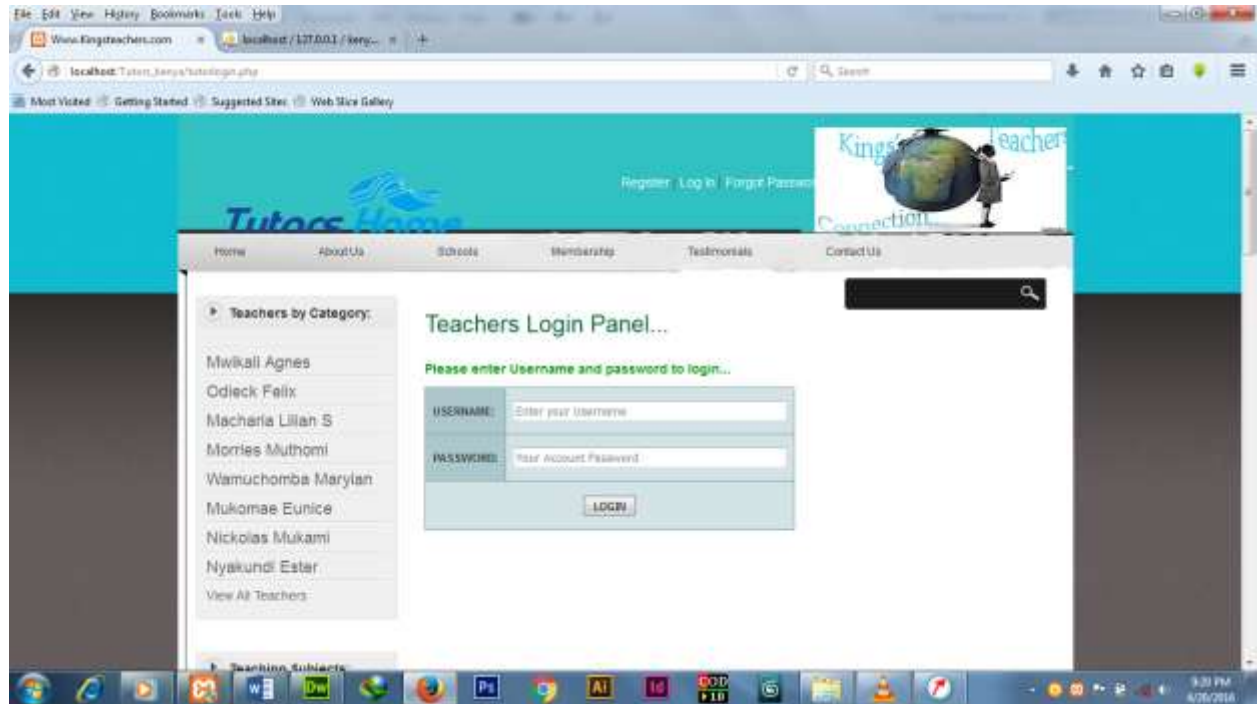




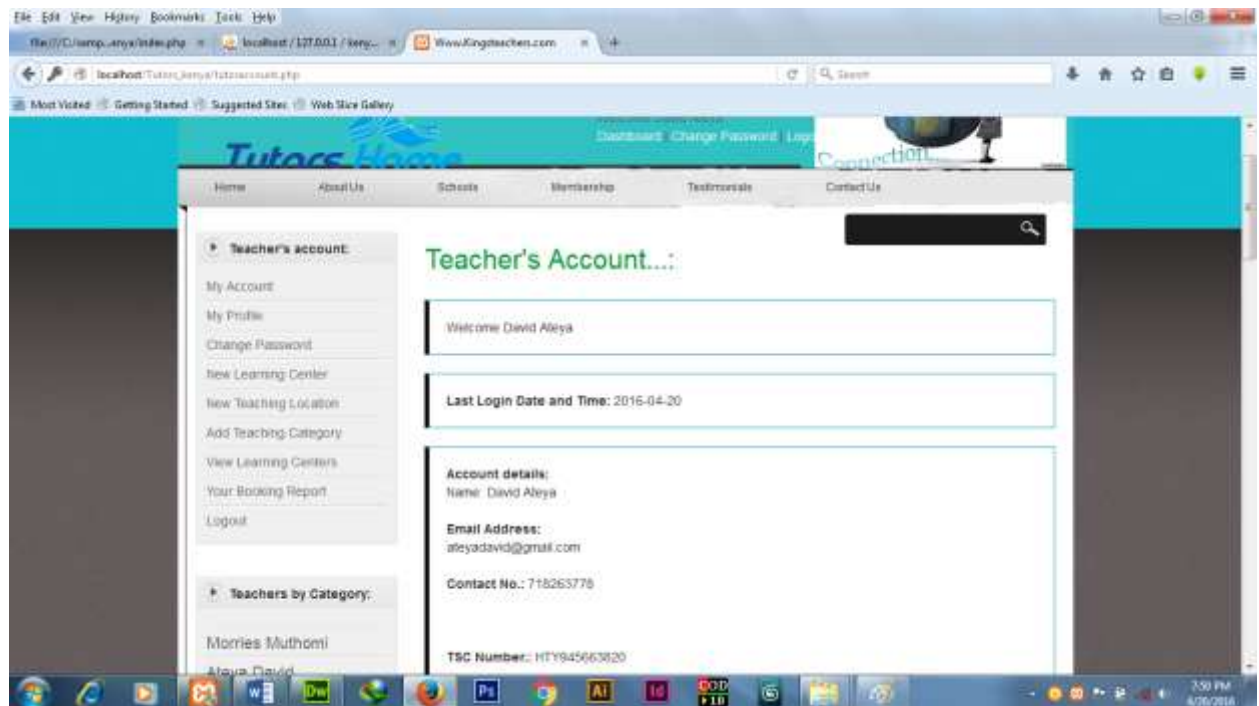
- (iii) The learning institution logs in to the system to update its profile while approving and registering private teachers under its name.



(iv) The registered teacher logs into the system. The login interface is as below;



(v) The teacher's interface.



On the teacher's interface there is:

- a) **My account-** This is the main interface where the teacher can view all his/her details in the account.
- b) **My profile-** This is the profile interface where the teacher click to update his/her profile account and add or remove his/her web site images.
- c) **Change password-** This is the functionality that allow the teacher to change his/her password if has lost or can't remember.
- d) **Register learning center-** This is where the teacher can register his/her personal teaching classrooms that he/she uses to deliver the teaching. Can register more than one provided all are equally functional and available.
- e) **Register learning location-** This is where the teacher can register a new learning location under the county level where he/she can be accessed. Can be home residence or work place.
- f) **New teaching subject-** This is where the teacher is given the functionality of registering new teaching subjects provided his/her new subject is not yet registered with the system.
- g) **View learning centers-** This is where the teacher can view and edit all his/her registered teaching classrooms.
- h) **Reports-** This is where the teacher is able to view the booking report countrywide, the registered students in his/her county, the registered learning institutions in that county, the feedback messages from students and parents, advertisements and update records and registered teaching categories and subjects countywide. The reports are in printable form.
- i) **Logout-** This is for logging out of the system.

iii) The student registration: the student is registered in and under specific county, district and village. The student enter all his location details and the education levels and subjects of study.

Suppose we are registering a new student, the following form will be used;

The screenshot shows a web browser displaying the 'Students and Parents Registration Form' on the King's Teacher website. The page has a blue header with the site logo and navigation links. A sidebar on the left lists 'Teachers by Category' with names like Ateya David, Kinga Susan, and Morries Muthomi. The main content area contains the registration form with the following fields:

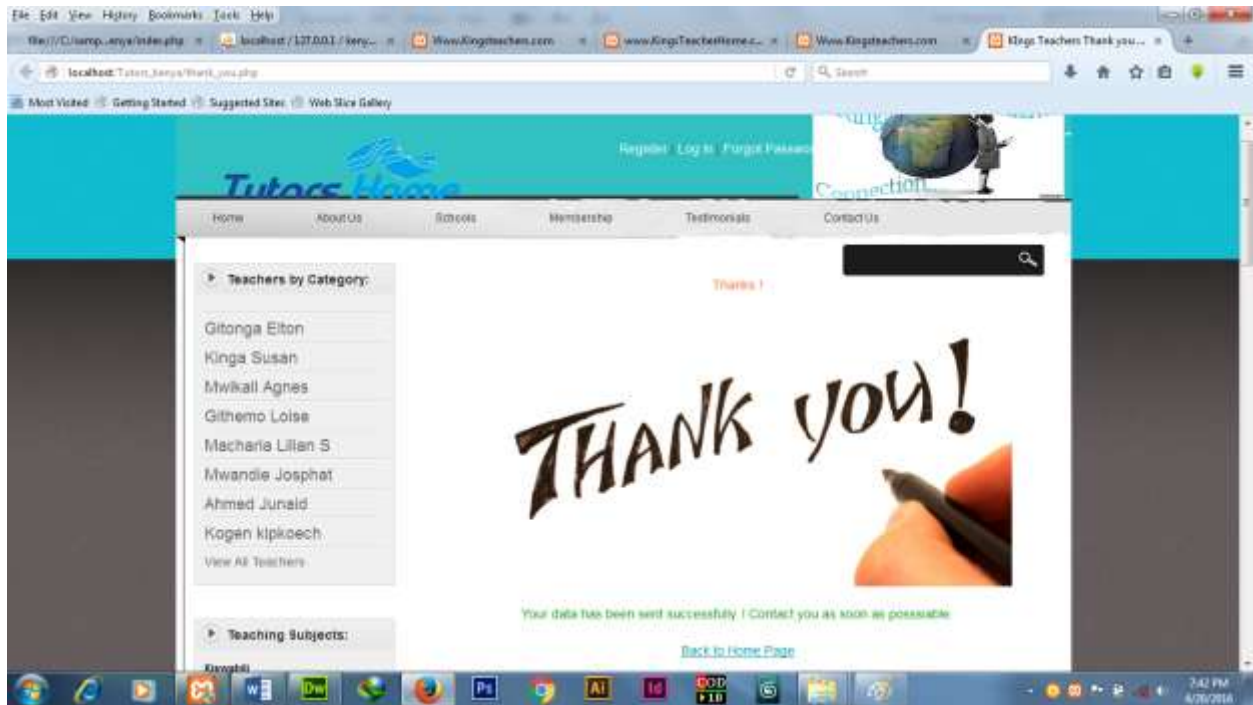
- User Type:** Radio buttons for 'Basic User' (selected) and 'Premier User'.
- LOCATION:** A dropdown menu.
- PAYMENT TYPE:** A dropdown menu.
- OCCUPATION:** A dropdown menu.
- FIRST NAME:** Text input with placeholder 'Enter first name'.
- LEVEL OF YOUR STUDY(i.e Secondary school):** Text input with placeholder 'Level of study'.
- SURNAME:** Text input.
- MAJOR SUBJECTS(i.e Maths and Physics):** Text input.

This screenshot shows the lower portion of the registration form. The left sidebar includes 'General Basic Studies', 'Geography', 'CPA(Certified Public Accountant)', and 'Teachers Locations:' with a list of locations including 'Muthiga location Nairobi', 'Kakamega County', 'Nairobi Kenya', 'Nairobi West', 'Burnt Forest', 'Likoni town', 'Kiambu Town', and 'Narok County'. The main form area includes:

- ADDRESS:** Text input with placeholder 'Enter Street and Box Address'.
- EMAIL ADDRESS:** Text input.
- PASSWORD:** Text input with placeholder 'New password'.
- CONFIRM PASSWORD:** Text input with placeholder 'Confirm password'.
- CELLPHONE:** Text input with placeholder 'Enter your phone number'.
- How you heard about us:** A dropdown menu.
- Terms and Conditions:** A checkbox labeled 'I accept the terms of use of this website...'.
- Register:** A button.

After the student registers he/she is sent the login password to his/her email address. The student uses his email address and new password generated to login to the system.

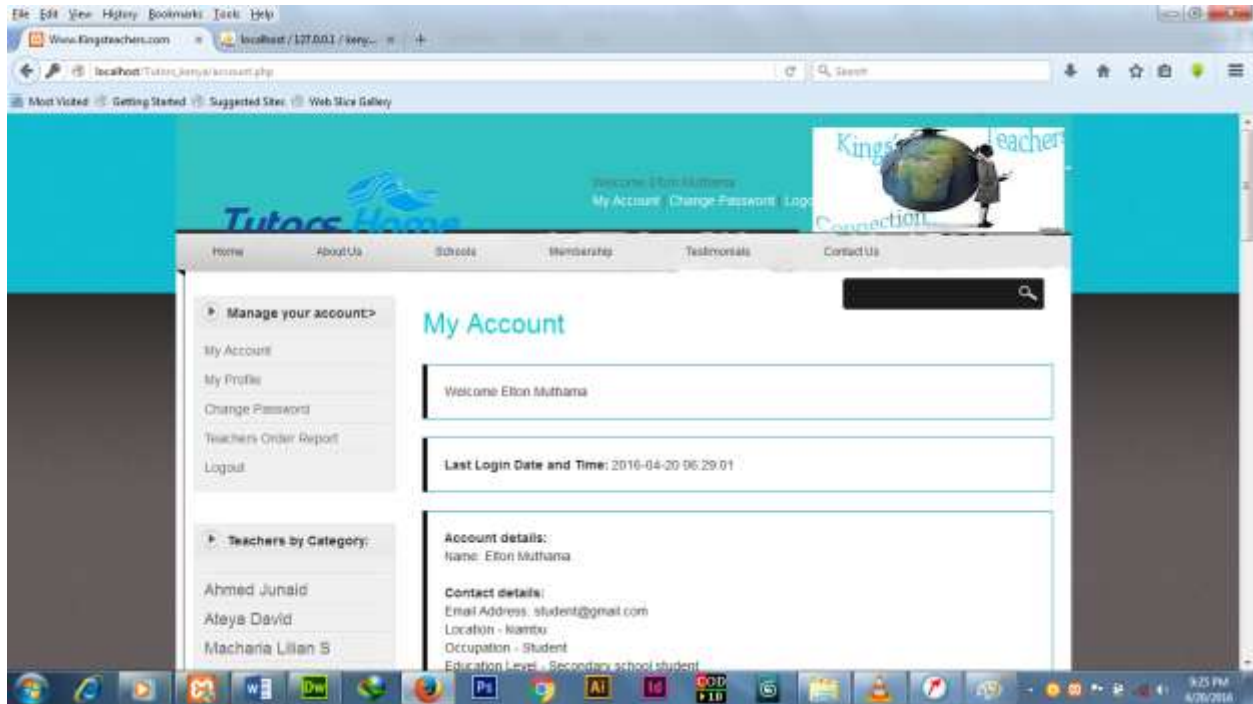
#### iv) Student successfully registered.



#### v) Student booking

The student logs in using his/her password and email address. The teacher select the appropriate and right teacher based on his/her subjects to learn, category level and location of the teacher which is available and accessible. After this before clicking on the book icon, the student must select one of the teaching classrooms where he/she would like to be attending the classes. The classrooms indicate the exact location and time of classes scheduled for that specific classroom. After classroom selection the student book that particular teacher and wait for the reply from the teacher. The reply can be emailed to students email account, communicated directly through a phone call or replied on booking reply box on what to do next and on how they can physically access each other from that point.

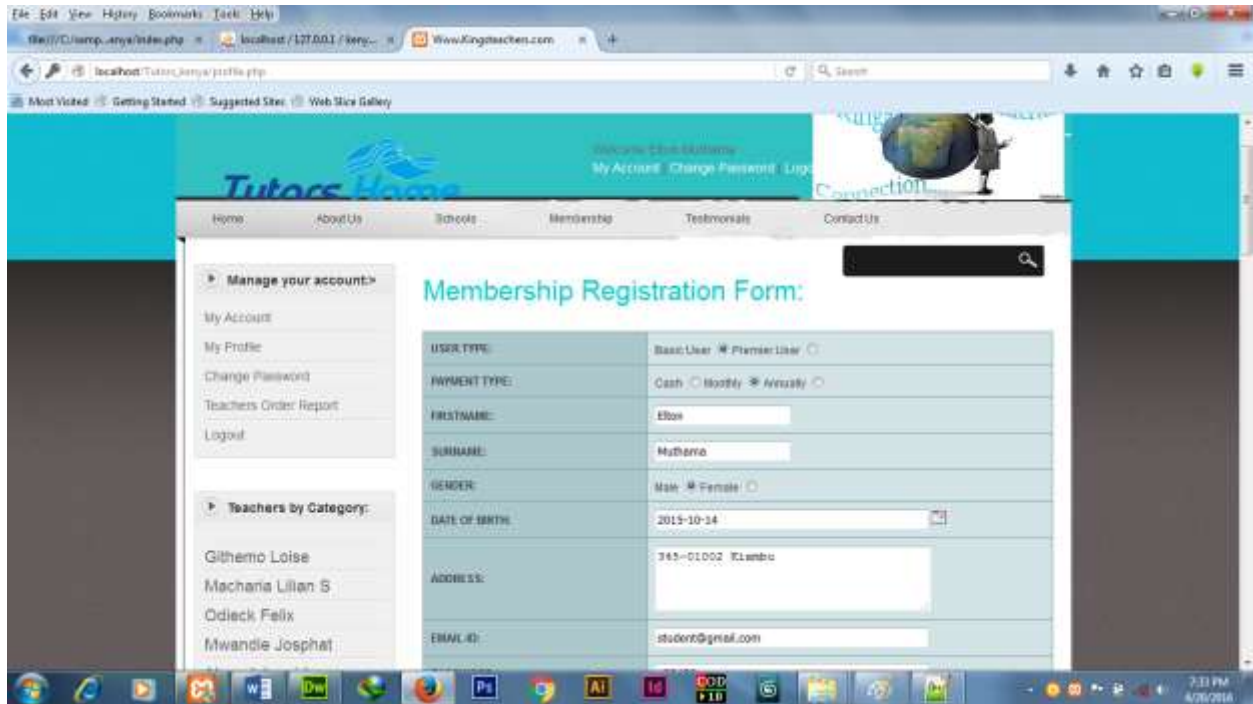
## vi) The student profile



The student interface has an extra menu called my profile. This is used by the student to edit his/her account profile. Also in student profile there is functionality that allow the student to change password in case he/she can't remember the actual password.

The student profile account also holds the report for his/her booking as for the booking request he/she has made. This will include requested teacher's responses concerning the booking. Also the student will have the report for registered teachers in that county location showing their education category level and teaching subjects.

vii) My profile.



## APPENDIX 2: SAMPLE CODE SAMPLE CODE FOR HOME PAGE.

```

1 <?php
2 //session_start();
3 $_SESSION['PHP_SELF'] = $_PHP_SELF;
4 ?>
5 <?php
6 include("header.php");
7 include("dbconnection.php");
8
9 if ($_GET['page'] == 'home') {
10     if (isset($_POST)) {
11         foreach ($_POST as $key => $value) {
12             $_POST[$key] = trim(addslashes($value));
13         }
14     }
15
16     if (isset($_GET)) {
17         foreach ($_GET as $key => $value) {
18             $_GET[$key] = trim(addslashes($value));
19         }
20     }
21 }
22 ?>
23
24 <div id="template_main">
25 <div id="sidebar" class="float_l">
26 <?php
27 include("navigation.php");
28 ?>
29 </div>
30 <div id="content" class="float_r">
31 <div id="slider-wrapper">
32 <div id="slider" class="nivoSlider">
33 
34 <a href="#"><img alt="images/slider/car2.jpg" alt="" title="Best in Class and Most Knowledgeable Teachers" /></a>
35 <img alt="images/slider/car3.jpg" alt="" />
36 <img alt="images/slider/car4.jpg" alt="" title="Httalcaption" />
37 </div>
38 <div id="htmlcaption" class="html-caption">
39 <strong>Get Easter connection to your private teacher from us...</strong>
40 </div>

```

```

41 </div>
42 </div>
43 <script type="text/javascript" src="js/jquery-1.4.3.min.js"></script>
44 <script type="text/javascript" src="js/jquery.nivo.slider.pack.js"></script>
45 <script type="text/javascript">
46 $(window).load(function() {
47     $('#slider').nivoSlider();
48 });
49 </script>
50 <div style="font-size: 12px; text-align: center; color: #006633;>Latest Registered Teachers...</div></div>
51
52 <?php
53 $sql = "SELECT * FROM tutor order by tutorid desc LIMIT 0 , 8 ";
54 $result = mysqli_query($conn, $sql);
55 $count = 1;
56 while($row = mysqli_fetch_array($result))
57 {
58     $sql1 = "SELECT * FROM images where tutorid='".$row['tutorid']."' order by tutorid limit 1";
59     $result1 = mysqli_query($conn, $sql1);
60     $row1 = mysqli_fetch_array($result1);
61
62     if($count == 1 || $count == 2)
63     {
64         echo "<div class='product_box'>";
65     }
66     else
67     {
68         echo "<div class='product_box no_margin_right'>";
69     }
70     $count++;
71 }
72
73 <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;>
74 <a href="intodetail.php?tutorid=<?php echo $row['tutorid'];>">
75 <?php
76 if(mysqli_num_rows($result) == 1)
77 {
78     echo "<img alt='imgupload/'.$row1['imagepath']."' alt='".$row1['imagename']."' width='170' height='150' />";
79 }
80 else
81 {
82 }
83 }

```



```
78
79
80     echo "<img src='images/vehicle.jpg' alt='<?php $test($expense); ?>' width='100' height='100' />";
81
82     ?>
83 </div>
84
85     <p class="product_price">Teaching Subject:
86     <?php
87 $sqllocation = "select * from subjects where subjectid=?&($subjectid)";
88 $sqlquerylocation = mysql_query($sqllocation);
89 while($rows = mysql_fetch_array($sqlquerylocation))
90 {
91     if($rows[subjectid] == $subjectid)
92     {
93         echo "<option value='".$rows[subjectid]."' selected='".$rows[sub_name]</option>";
94     }
95     else
96     {
97         echo "<option value='".$rows[subjectid]."'>".$rows[sub_name]</option>";
98     }
99 }
100 </p>
101
102     </p>
103
104     <p class="product_price">Location
105     <?php
106 $sqllocation = "select * from location where locationid=?&($locationid)";
107 $sqlquerylocation = mysql_query($sqllocation);
108 while($rows = mysql_fetch_array($sqlquerylocation))
109 {
110     if($rows[locationid] == $locationid)
111     {
112         echo "<option value='".$rows[locationid]."' selected='".$rows[tutoring_loc]</option>";
113     }
114     else
115     {
116         echo "<option value='".$rows[locationid]."'>".$rows[tutoring_loc]</option>";
117     }
118 }
119
120 ?>
```

```
121
122 if($rows[locationid] == $locationid)
123 {
124     echo "<option value='".$rows[locationid]."' selected='".$rows[tutoring_loc]</option>";
125 }
126 else
127 {
128     echo "<option value='".$rows[locationid]."'>".$rows[tutoring_loc]</option>";
129 }
130 }
131 </p>
132
133     <p class="product_price">Contact No. <?php echo $res[telephone]; </p>
134     <?php
135     /*
136     *a href="update tutor.php?userid"<?php echo $res[userid];?>" class="addtocart"></a>
137     */
138     <a href="tutorDetail.php?userid"<?php echo $res[userid];?>" class="detail"></a>
139     </div>
140 </p>
141
142     <div align="right"><blink>Click to </blink><a href="tutor.php"></a>VIEW ALL TEACHERS </div></div>
143 <div align="right"><a href="more-top">Move Top</a>
144 <div class="clear"></div>
145 </div>
146 <div class="clear"></div>
147 </div> <!-- END of template_main -->
148
149 </p>
150
151 include("Contact.php");
152 ?>
```

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[www.growingstars.com/tutors](http://www.growingstars.com/tutors)

[www.e-learningcentre.co.uk/](http://www.e-learningcentre.co.uk/)

[www.gigaom-offline-tutoring.com](http://www.gigaom-offline-tutoring.com)

