IJORAS

# Establishing requirements for an automated interface design for student-parent interaction in secondary boarding schools in Rachuonyo South Sub-County, Kenya

**Mary Akeyo Juma, James Abila & Lamek Rono**
*Department of Informatics and Information Science,
Rongo University
Email: jumamary87@gmail.com*

## ABSTRACT

This paper sought to establish requirement for an automated interface design for student-parent interaction while in secondary boarding school. The study was confined to public boarding secondary schools in Rachuonyo South Sub-County, in Kenya. A survey methodology and stratified sampling technique with sample size of 330 students, 178 parents and 8 teaching staff were used to come up with appropriate data for research. Cochran equation formula was used to determine the sample size. The data collected were descriptively and inferentially analysed using SPSS and ms-excel applications. The findings from the data analysis and interpretation showed that bigger percentage of students use mobile phones to interact with their parents despite the ministry's ban. Students' problems were categorized into three as per the research findings. The categories were social, academic and financial problems. Each category had a list of problems designed as a dropdown menu. This paper incorporated the ideas of the proponents of Gestalt theoretical grid.

*Keywords: Automated interface design, computers, ministry of education, Rachuonyo District, student-parent interaction, teachers*

IJORAS

## 1.0 Introduction

Poor performance of students in boarding schools is attributed to inability by parents to supervise them. This has also led to indiscipline cases witnessed in schools in Rachuonyo South (Ayal, 2017). In the year 2016 Dudi girls' secondary school were on rampage protesting against the tight rules imposed on them by school administration and in 2017 Siany mixed secondary school also protested against the strict administration. WHO (2009) suggests that depressed children, are more likely to engage in indiscipline cases, the study showed that youth reporting higher levels of impaired interaction and lower levels of parental monitoring were more likely to anticipate future risk behaviour. When young people feel unconnected to home, they may be involved in activities that put their health at risk. However, when parents affirm the value of their children, the youths more often develop positive and healthy attitudes about themselves this help them make healthy decisions in life (Lawrence, 2004). Parents are not able to supervise their children in secondary boarding schools because there seems to be lack of a suitable student-parent interaction platform, the current interaction interfaces like E-home book system, classroom webpage and mobile phones used in secondary boarding schools are only suitable for teacher-parent interaction. The mobile phones may be suitable for student-parent interaction but they expose the children to destructive information as it is very hard to monitor whom the children are interacting with and the kind of information exchanged between the two. The mobile phones also have limited control feature such that one student may use it too frequently and for a longer period denying other children the chance to use it. E-mail and letters are not efficient because the feedback is not immediate.

## 2.0 Literature review

### 2.1 Students' Requirement

This paper sought to understand some of the requirements for a suitable student-parent interaction platform. Issues that needed to be addressed by the automated interface design for student parent interaction were information filtering, privacy, control, availability, and cost effectiveness. The responses highlighted the weakness of the current student-parent interaction platform. 93.3% of the students noted that in one or two occasions, they had received stubbing information from parents, siblings and friends through mobile phones provided by school. These kinds of information destructs and may negatively affect their academic performance and general discipline. A student explained that the Ministry of Education was right in banning mobile phones in schools as the few who are able to sneak into school with them use them to promote immorality and serious indiscipline cases. 100% of the students who were exposed the student-parent interaction interface mentioned something on information filtering.

Some pieces of information they are exposed to include; problems at home: 90.1% of the respondent mentioned that sometimes their parents share with them information on domestic problems. The students also get information about their boyfreinds and lovers, this was mentioned by 79.4%. According to 62.5% of teachers interviewed, going by some of the indiscipline cases handled in schools, though there is restriction, students still maneuver ways and use mobile phone to communicate to their lovers. Information they receive from them are destructive and may lead to withdrawal and even sneaking out of school. Information from arsonists as mentioned by 88.4% of the students and 75.0% of the teachers is very destructive. Based on the findings, students sometimes use mobile phones and other methods of interaction to contact arsonists. Arsonists help them burn their school by giving them money to buy fuel or sometimes buying for them.A student mentioned that students organised for burning of a dormitory through a mobile phone that was provided by the school. The information from drug dealers facilitates access to drug by the students in secondary boarding schools. 48.7% of the students lamented over this issue and according to them, current interaction platforms expose them as they could easily order for drugs through the cell phones availed in school. 37.5% of teachers also had the same observation and recommended a platform that would filter information.

A suitable student-parent interaction interface should promote a safe environment at school and help students make good decisions (Ochad, 2013). There is evidence that the current interaction platforms are not suitable as they expose the schools to a lot of problems like students unrest, academic failure, sneaking out of school and stress. Some of the effects of destructive information to the secondary school students as mentioned by 100% of the respondents (teachers) are; student unrest, this according to teachers, sometimes is triggered by outsiders by interacting to students through mobile phones. 80.6% of the students mentioned the same problem. Other problems include academic failure as mentioned by 100% of the respondents (teachers), and 88.8% of the student, sneaking out of school was mentioned by 75.0 % of the respondent (teachers) and by 85.5% of the students. 100% of the respondents (teachers) mentioned stress as one of the effects of destructive information in public secondary boarding schools. 91.5% of the students had the same opinion. As mentioned by 96.7% of students and 100% teachers, destructive information may also lead to burning of schools. The community around the school may have reasons to burn the school or may support the students in burning their school through mobile phone interaction. Other than their parents students have interacted with their siblings and friends using mobile phones provided by schools. Some students (73.43%) revealed that they use mobile phone to interact with people who are neither their parents nor guardians. They were concerned about the kind of information they are exposed to when they use mobile phones. A

suitable interface in their opinion should filter pieces of destructive information and bar the students from interacting with strangers. 48.2% of students proposed a platform that promotes private student-parent interaction. Some of their problems, as they put it, were serious private issues and would get seriously affected if they were made public. 50% of the teachers interviewed said that students were not allowed to privately use mobile phone, but would do so in the presence of a teacher or the person in charge. This according to the respondents was a way of controlling type of information passed to the recipient from the students but not from recipient to the students and students would still get access to destruct information. After being exposed to the proposed automated interface design for student-parent interaction, 100% recipient recommended a platform that is able to filter information from and to the students so that with this in place, students can be allowed to interact privately with their parents.

The mobile phones used by students in school are kept by individuals. Most of the students (98.6%) get mobile phones from their teachers, 0.93% from the support staff and 0.47% of students get mobile phones from their fellow students. Students are not able to access mobile phones when these particular individuals are absent. Availability of the interaction platform was of great concern and was mentioned by 91.9% of students and 75% of teachers. Teachers and other individuals charged with responsibility of facilitating student-parent interaction may not be available and the student may not be able to communicate with their parents at that particular time despite the urgency of the matter.  100% of respondent who interacted with the proposed automated interface design for student-parent interaction recommended a platform that would be in a strategic place which remained open on the stipulated time for student-parent interaction. In their view, Student-Parent interaction platforms in secondary boarding schools should be user friendly, efficient, reliable, possess features that enable system control and have the ability to filter destructive information. 95.65% of the students were displeased with administrators' inability to control the student-parent interaction process as one student would use the cell phone interface as many times as they needed to do so denying their colleagues the opportunity to interact with their parents. A suitable student-parent interaction interface should inclusively provide the administrators with tools for controlling the interaction process. It should be able to control the number of times a student logs in into the interface and should control the duration taken when using the interface. The research established that the students pay much money for the interaction services offered to them. 94.20% of the students complained of the charges. To them, a suitable automated student-parent interaction interface should not be expensive to maintain so that the students are not charged a lot of money for using the interface.

According to the findings, 88.41% of the students required a reliable interaction interface. The current interfaces, especially the letters, were unreliable as they did not reach the parents in time, hence delaying the feedback, or in some cases they would not reach the parents at all. The e-mail interface was also unreliable as some parents took too long to check their mails and so the feedback was not immediate. The automated interface enables the students to send short messages to their parents' phones. The messages reach the parents as soon as they are sent and they respond by acting on their children's request or by calling the schools administrators. Question was posed to the students on what extent they wanted their parents to be involved in the school matters, 62.5% strongly agreed, 26.8% agreed, 5.4% were undecided, 1.3% disagreed and 1.3% strongly disagreed. The respondents were again asked to rate the current interaction methods if indeed they were suitable, 2.2% strongly agreed, 4.5% agreed, and 4.9% were undecided, 29% disagreed and 61.1% strongly disagreed. Researcher inquired if there was need for a replacement of the current interaction method with suitable interaction interface, 80.3% strongly agreed, 9.8% agreed, 4.9% were undecided, 2.7% disagreed and 2.2% strongly disagreed. The majority (86%) of the students who expressed need for parents' interaction on school matters were those who had already been exposed to student parent interaction interface design and had used it to interact with their parents. The researcher inquired from the parents if they were okay being involved in solving their children issues while in school. Most of them were for the idea, 56% of the parents said yes and 44% said no. The students want their parents to address their problems. The problems are categorised into financial, academic and social. The interface designs a list of students' likely problems as per the findings based on the three categories. The student operates the system by selecting their problems from the menu and sending it as a short message to their parents. The student (84.54%) needed an interface which is fast. This design will enable many students to use the system within a short duration as it will be easy and fast to operate.

## 2.2 Head Teachers and Deputy Head Teachers' Requirement

The school administrator mainly required an interface that would not interfere with the normal running of the school. According to them a speedy interface would help to serve the large number of students very fast within the short time available in the school schedule. They were also particular about the type of information the students pass to and receive from their parents. It meant, therefore, that the interface had to be able to filter information from either side so as to discard irrelevant information. The design took into account all these requirements by incorporating features that make the interface fast, user friendly and be able to filter information.

## 2.3 Parents Requirement

In the table 4.10, the researcher inquired from the parents some of the issues they discussed over the phone with their children in boarding secondary schools whenever they call from school. They mentioned academics (99.3%), social problems (88.5%) and financial problems (90.9%). The parents and the students discuss academic problems like poor performance, need for revision materials and text books among others. Some parents, having acknowledged that domestic problems' information is destructive to their children still discuss them with them while in school. The parents interviewed during this study also had some contributions on the features of a good student-parent interaction platform. The parents (71%) mentioned that their children complained that they hardly get the chance to use the interaction platform partly because sometimes the individual charged with the responsibility may not be in school, or the other students are using it too frequently and for too long denying others chance of using it. The parents (73%) therefore suggested that there should be some control in order to serve all the students. Parents were also worried about whom their daughters may contact using the mobile phones provided in school, and what type of information they would get accessed to. Good number, 56% recommended a platform that filters information to enable their children get access to the right information. Parents (57%) advised that a suitable platform should not be too expensive to maintain as the students may not be able to afford to use it.

## 3.0 Requirement for Developing Student-Parent Interaction Interface

The interface should have an account for each student. A student logging in for the first time uses registration number as the user name and creates a password that can be changed thereafter for privacy and confidentiality. The interface requires a menu containing a list of students' likely problems as derived from the research findings. Problem menus restrict the students to constructive interaction as they only need to select their problems from the menu and the interface automatically sends it to their parents' phone numbers. This feature enables the interface to work fast enough to be used by the large students' population in most boarding secondary schools. This feature will also help meet the school administrators' requirements. According to the finding, 100% of the administrators require an interface which filters information and blocks destructive information from reaching neither the students nor the parents. The interface needs to limit the student-parent interaction to just selecting an item from a menu. There is a need for a good students' database with accurate information on parents' cell phone numbers to help limit chances of interaction with any stranger. For control, the interface limits the number of log in to ten times in three months, and interaction duration to only one minute, after which the system is to automatically be switched back to the homepage. The students can use the

interface again only after one hour. The interface administrator should be able to log in and register new students, deregister absent students and update the problem menu.

## 3.1 Prototype Design

Design is the creation of a model for the construction of a system. Modelling is one of the first steps that were undertaken during the process of system design. A model is a simplification of reality or a simplified representation used to demonstrate the working of the actual system. According to Boch et al., (1998), a model provides a blueprint of the intended system. The purpose of this section is to outline the steps and decisions taken by the researcher in the development of the interface design to address the requirements of automated interface design for students-parents interaction in boarding schools.

## 3.2 Interface Design

According to Rolf (1984), Interface Design is the development of a clear structure of the interface based on the requirement specification. The interface structure should provide a logical view of the actual system. The designer was guided by the following experimental design principles during the design stage. The users are the teachers (system administrators), parents (recipients) and students (senders). The researcher established the students' population per school. (50%) of the schools visited had over 800 students, (25%) had between 500 to 800 students and the rest had a population that was slightly less than 500. According to the findings, (95%) of the student population are between the age of thirteen and eighteen. This age group, according to Unified Theory of Acceptance and Usage of Technology (UTAUT) easily accept and embrace new technology (Ayman, 2014). The administrator will register new students, deregister absent students and update the problem menus. The menus contain a list of likely problems faced by the students as derived from research findings. The problems are classified into three categories which are, academic, social and financial. The student's task is to log to the system by keying in the correct password and user name, and then selects an item from the problem menu and send it by clicking the "OK" button. The parents' task is to retrieve the message and act on it. The researcher used object oriented analysis and design

## 3.3 Object Oriented Design

The designer studied two different principles widely used in interface design; the object oriented design and structured design. Object oriented design was preferred to structured design because of its suitability for sustaining huge instance interaction software. Borrowing from Boehm (1999), the design process was divided into five stages: abstract descriptions of the problem, designs stage, coding, testing and finally

deployment. The automated interface design for student-parent interaction in boarding schools passed through all the five stages of object oriented development. The goal of the analysis phase was to create a functional model of the interface regardless of constraints such as appropriate technology. This was done via the following set of graphical system models: interface illustration model, sequence diagram model, use case model, data flow diagram, class model diagram and flow diagram for the front page. Structural models of software were used to display the organization of the student-parent interaction interface in terms of the components that make up that system. Emphasis was laid on describing the various objects, their data, behaviour and interactions.

## 4.0 Theoretical framework
### Gestalt theory for User experience Design: Principle of Proximity

Along with Kohler and Koffka, Max Wertheimer was one of the principal proponents of Gestalt theory in 1912 which was later revised by Johan Wagemans in 2012. An experiment was done where a white strip was placed on a dark background in each slit, where the rotation speed of the tachistoscope wheel was adjusted to vary the time required for the light to pass from one slit to the next. Above a specific threshold value, observers saw two lines in succession. With much faster rotation, the two lines flashed simultaneously. At the optimal stage, they were able to observe a distinct motion that could not be distinguished from real motion. When the time interval was decreased slightly, after repeated exposures, observers saw motion without a moving object. The characteristic phenomena appeared in every case unequivocally, spontaneously, and compellingly. After confirming observation that apparent motion produces negative after images in the same way as real motion, Wertheimer proposed a physiological model based on some kind of physiological short circuit, and a flooding back of the current flow, creating a unitary continuous whole-process. He then extended this to the psychology of pure simultaneity and of pure succession. This extension was the emergence of the Gestalt theory.

Gestalt Theory User experience design is the process of enhancing user satisfaction with a product by improving the usability, accessibility and pleasure provided in the interaction with the product. Human brain is an amazing data processor whose broad capacity still has not been explored at full. Knowledge of cognitive abilities and mechanisms is highly helpful in creating a user friendly product. The researcher borrowed ideas like, when people perceive the complex objects consisting of many elements; they apply conscious or subconscious methods of arranging the parts into a whole organised system instead of just the set of simple objects. One of the principles in this theory is the principle of proximity for UX design. This principle is based on the cognitive tendency to perceive the objects close to each other as related especially in comparison with those which are placed

farther. The researcher borrowed this idea and organized the interaction interface such that the related objects were close to each other as the students would group them this way automatically. Research established that proximity was more powerful than other distinctive features such as colour or shape. People tend to see elements as related if they are close to each other in comparison to other objects even if other features differ, decide what will appear or function as a whole and as parts.

## 4.1 Principles of User Interface Design

According to Rand (2012), design is much more than simply to order, to assemble, or even to edit. It is to add meaning and value, to modify, to illuminate, to simplify, to dignify, to clarify, to dramatize, to persuade, and perhaps even to amuse. The attributes of a good user design include: Clarity which is fundamental in interface design. Students must be able to recognize what the interface is all about, have the urge to use, and understand that the interface is helping them interact with their parents, and even predict what will happen when they use it, and then successfully interact with it. There can be room for mystery and delayed gratification in interfaces, but not for confusion. Clarity inspires confidence of the students which may lead to further use. One thousand clear screens are preferable to a single congested one. Interfaces should enable easy interaction by clarifying, illuminating, and showing relationships. It should bring students and parents together, manage their expectations, and give them access to services. Interfaces should do a good job as their effectiveness can be measured. The best interfaces can inspire, mystify, evoke, and intensify relationship with the world.

Attention is precious and to conserve it, the designer should not litter the applications with distractible material. The interface should keep users in control. Uncontrollable software takes away the comfort of the students by exposing them into confusing pathways, unplanned interactions and surprising outcomes. The students should be kept in control by regularly giving insight into what to expect at every step. Direct manipulation is always recommended. Ideally, the interface is so slight that the user has a feeling of direct manipulation with the object of their focus. Every screen should be designed to support a single action as this makes it easier to use, easier to learn, and easier to modify. A screen becomes confusing when it supports many actions. The designer should provide natural next step by anticipating what the next interaction should be and develop a design that supports it. Appearance follows behaviour. Humans create a good relationship with things that behave the way they expect. The *designed elements should look like how they behave*. This means that a student should be able to predict how an interface element will behave by just looking at it. Inconsistency matters - only same screen elements should behave consistently with each other and should appear consistent. On the other hand, screen elements which are different should behave differently from each

other. It is as important for unlike elements to appear unlike just as it is for like elements to appear consistent. Consistency is achieved when there is a clear viewing order of the visual elements on a screen. Smart organization of screen elements can *make the many elements appear as though few (*Okello, 2000).

## 4.2 Usability Heuristics for User Interface design theory

The study was based on Usability Heuristics for User Interface design. This theory was proposed by Nielsen (2013). He proposed the ten general principles for interaction design. Heuristics theory does not have specific or accurate interaction interface design principles but it is an easily applied standard based on practical experience. According to Siba (2016), an interaction interface should be interactive to enable the students understand what is going on. It should adapt the language which is familiar to the student so that pieces of information appear in a natural and logical order. The interface should encourage student control and freedom because they may choose an interface's functions by mistake and may need a clearly marked emergency state without having to go through an extended dialogue. According to Wambogo (2014), the designer should save the students from cramming by making objects, actions, and options visible. The interface Instructions should be easily retrievable whenever appropriate. Liability and efficiency of use should always be observed. This is because accelerators may quicken the interaction for the expert student so that the interface caters for both inexperienced and experienced students. The interface should always express an error message in plain language, precisely indicating the problem, and whenever possible suggesting a solution. The interaction interface should not have any irrelevant information. The extra pieces of information in a dialogue contend emulously with the relevant pieces of information and lessen their relative visibility (Siba, 2016). According to Nielsen (2003) a careful design is better than good error message as it prevents a problem from occurring during the use of the interface by excluding error-prone conditions and checking for the errors and presenting them before they commit to the action. The design borrows two major ideas from Nielsen to help design a timely, reliable and accurate student-parent interaction interface, error prevention and minimalist design.

## 4.3 Error Prevention

An error is a situation where the interactions interface fails to perform its specified duty or where it produces unexpected result. An error can also occur as a result of student's mistake committed when using the interaction interface (Brocode, 2004). According to Promila (2007), there are two classifications of user errors. These are slips and mistakes. The students my slip when they perform wrong actions. This error should be eliminated by employing an object's **signifier which** indicates how it is used. For example, students may be familiar with clickable button which may show

that they have a small amount of shadow on the outside. This causes the button to look like it is moving upwards out of the page. Conversely, form fields should also be made of a rectangle, with small amount of shadow inside indicating that they're empty and can be filled in. Students may make **mistakes** when they have <u>mental model</u> of the interface different from the real one and forms a goal that does not suit the situation. Such mistakes are minimised by use of conventions which students are familiar with. For security purposes, all pieces of information deemed irrelevant to the students and parents are treated as error such that error prevention is also geared towards filtering any irrelevant information from either side not to reach the intended destination. For such error prevention method, research was carried out on use of attribute selection drop down menu. According to Matt (2009), drop-down menu is a woggle menu that enables the students to select an item from a list. It displays a single value when it is inactive, and a list of values from which the user may select one when activated. Control reverts to its inactive state, displaying the selected value whenever the user selects a new value. The drop-down menu is common in the graphical user interface design. Drop-down menus help one to cut down on data entry errors (Mark and Nielsen, 2015).

The students' database should be protected to maintain its integrity hence eliminating errors. Wrong records in the database may result to confusion as a student's message may be delivered to a wrong person or it may fail to be delivered altogether. There are many threats to data security and several opportunities along the path of directory information delivery for an illegal access to data Intruders can modify or tamper with the database (Sun, 2009). A database is rendered useless if the information can no longer be trusted by clients, or if the database itself cannot trust the modifications and queries it receives from clients. If a database cannot detect interference, an attacker could interfere with a client's request to the server by cancelling the request, or changing the server's response to the client. The Secure Socket Layer (SSL) protocol and other related technologies can solve this problem by signing information at either ends of the connection (Perry, 2012). The following access control practices by Kayarkar (2012) were incorporated into the database design to ensure security and data integrity: The usage of administrator and other powerful accounts are limited. There is enforced strict access criteria through user accounts, auditing of the interface and user events and actions, reports are reviewed periodically and audit logs protected.

## 5.0 Research Design

To gain an in-depth understanding of the study, the researcher adopted mixed method design by concurrently collecting both quantitative and qualitative data in the same phase of the research process, weighed the methods equally, analyzed the two components independently then interpreted the results together. Phenomenological

research design was used to collect qualitative data. This research method attempts to set aside biases and preconceived assumptions about human experience, feelings and responses to a particular situation (Creswell, 2007). The research was conducted through observation and use of in-depth interviews of head teachers and their deputies. Through phenomenological research design, the researcher was able to understand some of the challenges faced by secondary boarding schools and their causes. Quantitative data was collected using experimental research design. These methods were adopted in order to enable the researcher understand the attitude, opinions, behaviours and characteristics of the secondary school children and their parents on issues pertaining to student-parent interaction in secondary schools in Rachuonyo South Sub County. Experimental research was appropriate in this case because it enabled researcher draw accurate conclusions, regarding student's attitude on an automated student-parent interaction interface. The researcher was able to establish whether or not interacting with the interface caused a change in the outcome.

## 6.0 Target Population
According to Stauner (2014), the target population refers to the entire group of individuals to which the researcher is interested in generalizing the conclusion for the study. Rachuonyo South Sub County only has 4 pure secondary boarding schools, the rest fall under category of mixed day and boarding schools and day schools. The target population for this study was 4 secondary boarding schools in Rachuonyo South Sub County. The four schools had a population of 2320 students (Rachuonyo South Sub-County Educational office, 2016). There were total of 127 teachers in these schools and they were all targeted. Derived from students' sample size a total of 330 parents were targeted. The Sub-County was purposely chosen because of recent spates of student unrest in the secondary boarding schools in Rachuonyo South Sub-County.

## 7.0 Sample Size
Cochran equation formula was used to determine the sample size. (Amugune, 2014) suggests that sample size should be small to allow in depth exploration and understanding of phenomena under investigation. The researcher determined the desired confidence level, the margin error as well as the number of students that make up the target population and arrived at a sample size of 330 students. The desired confidence level was 95%, this is because a higher confidence level is likely to produce a broader confidence interval. The researcher's intention was to collect data from the total number of parents whose children had been selected to participate in the survey, therefore 330 parents were targeted. Using Cochran equation formula, the sample size was arrived at as 178 parents. Two teachers were purposely chosen

from the four schools resulting into a sample size of 8. The following Cochran equation formula was used to determine the sample size for parents and students.

$$n_0 = \frac{Z^2 pq}{e^2}$$

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where n is the sample size,

$Z^2$ is the abscissa of the normal curve that cuts off an area **α** at the tail;

$(1 - \alpha)$ equals the desired confidence level, e.g., 95%);

**e** is the desired level of precision,

**p** is the estimated proportion of an attribute that is present in the population, and q is 1-p.

The value for Z is found in statistical tables which contain the area under the normal curve. e.g. Z = 1.96 for 95 % level of confidence.

N is the target population size

**Table 3.1 Sample size**

The sample size for students, teachers and parents are tabulated in the table 3.1.

| Population cluster | Target population | Sample size |
|---|---|---|
| Schools | 8 | 4 |
| Students | 2320 | 330 |
| Parent | 330 | 178 |
| Head  Teachers | 62 | 8 |
| Deputy Head Teachers | 62 | 8 |

**Source: Rachuonyo South Sub-County Education Office October 2015**

## 7.1 Sampling Procedures

The study used both probability sampling and non-probability sampling techniques by adopting stratified sampling and purposive sampling methods. There were 44 secondary schools in Rachuonyo South Sub-County. 4 were pure girls boarding schools, 4 were pure boys' boarding schools and 36 were mixed secondary school. The sample sizes were 4 boarding secondary schools in Rachuonyo South Sub-County. The 4 schools were arrived at using stratified random sampling because the researcher wanted to highlight gender and categories of the schools. The schools were grouped according to Strata of Extra County schools and County schools, then according to girls' schools and boys' schools. The 4 schools were then randomly sampled from the strata. According to Republic of Kenya (2016), Rachuonyo South Sub-County education report 2016, the total population in the four schools were 2320. Researcher used stratified random sampling to group the students into strata according to their form level. There were form one, form two, form three and form four strata. 20 or 21 students were randomly sampled from each form using the form registers provided by the schools. Thus, the researcher ended up with total of (330) students. The head teachers and deputy head teachers were purposely chosen to participate in this study as they had vital information about the challenges they face in their school and this would help the researcher to gain more knowledge on student-parent interaction in secondary boarding schools. Researcher used stratified random sampling to group the parents according to their regions. The regions were farther grouped according to geographical location of the sampled schools such that a total of 44 or 45 parents were interviewed from a given area. The researcher interviewed 178 parents.

## 8.0 Data Collection Procedures

Permission was sought from the National Council of Science, technology and Innovations (NACOSTI), through Rongo University. The research permit is annexed in the appendices page, appendix 4. The researcher then visited the Rachuonyo South Sub-County director of education's office to explain the purpose of the research. Appointments were then arranged with schools through the head teachers. The researcher then visited each of the schools to personally administer the questionnaires for students. Half of the sampled students were exposed to the proposed student parent interaction interface and another half was the control group. Both groups filled and returned the questionnaires. The head teachers and deputy head teachers were visited into their offices and were interviewed guided by structured interview guides. Parents were also interviewed by interview guide, areas around the sampled schools were visited especially on market days and averagely, a total of 178 parents were participated in this exercise.

IJORAS

## 9.0 Data Analysis

Data was collected coded and analysed using SPSS Version 25. This section was split into two phases in phase one data was analysed by adopting descriptive statistics comparison. In the second phase the researcher developed a prototype to illustrate Student - parent Interaction Interface.

## 10. Recommendations

Based on the findings and conclusion of study, the following recommendations were made in order to promote efficient student-parent interaction process in secondary boarding schools in Kenya.

i.   The Ministry of Education, the school head teachers and stake holders should embrace the automated interface design for student-parent interaction in secondary boarding school by availing all the necessary resources for its full development and implementation.

ii.  The Ministry of Education and the school head teachers to allocate funds for provision of a special room in schools equipped with adequate computers. Each computer to be installed with interaction interface and the number should be enough to enable each student get an opportunity to interact with their parents.

iii. A teacher on duty should be charged with additional responsibility of guarding the room and supervising student-parent interaction process.

## References

Amugune, B. K. (2014). *Sample Size Determination and Sampling Technique*. Maanzoni Press

Ayman, A. A. (2014). *Unified Theory of Acceptance and Usage of Technology*. Berlin: Springer

Booch, T., Graschew, A., Roelofs, S., Rakowsky, M., Schlag, J., Cars, S. (1998) Prototype Design. Center For Tele-Communication Technical University of Denmark

Boehm, A. (1999). Object oriented analysis and design Database Design for Mere Mortals: Hand-On Guide to Relational Databse Design (3rd ed.). Addition-Wesley Profressional

Brocode, G. (2004). Types of Errors. IEEE Internet Computing, 10(3), 5865.

Creswell, k. (2007). Questionnaires. New Age International Publishers

Matt, C. (2009). Welcoming and informative introductions in Web Design.smashingMagazine. Com Netlify

Matt.C. (2009). Designing Drop Down Menus: examples and best practices. *System Analysis and Design* (2nd Ed.). Prentice Hall: New Jersey

Mark.O. & Nielsen.T. (2015). Drop Down Menu. Retrieved from Wikipedia the NextWeb, Inc.BootstrapCreators

Nielson, J. (2003). Coordinating User Interface for Consistency. Technical University of Denmark in Copenhagen

Okello, J. (2000). *Software Engineering: A Simple Guide to Five Norma Forms in Relational Database.*

Promila, P. (2007).Classification of Interface Errors.Mogan Kaufmann Press. ISBN 0-12 685352-5, 2005. - 3th.

Perry, C. (2003). Models in Cognitive Psychology. American psychological association 108(1) Jan 2003, 204-256.

Republic of Kenya (2016) Rachuonyo South Sub-County, (2016).The Rachuonyo South Sub County Population

Rolf, M. (1984). *Software and Hardware (8th ed.).* Addison-Wesley: Longman

Rand, P. (2012). Human Computer Interaction. Retrieved from https://www.Rand.Org. Rand. People

Siba N. (2016) Network Interface Controller. UX Design Glossary

Sun, K. (2009) database integrity. datainsider digital guardian

Wambogo, E. (2014). Computer Interface Future Generation Computer Systems, 25(4)

Republic of Kenya (2013). Rachunyo south cluster ESIA study report, August (2013). The Rachuonyo South Sub County