INSTRUMENT FOR MEANS TESTING FOR EQUITABLE TARGETING OF NEEDY STUDENTS THROUGH AN ONLINE COMPUTER APPLICATION

Patent name: *ODEMMUSTA*

By

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PATENT DESCRIPTION

Title: Instrument for Means Testing for Equitable Targeting of Needy Students through an Online Computer Application

Technical Field

The present invention relates to higher education loans to students, and more particularly to an instrument for means testing equitable targeting of needy students through an online computer application.

BACKGROUND ART

Developing countries have witnessed budgetary constraints and hence they have established some cost recovery measures in higher education which include students' loans, pay as you eat system among others.

However, the cost recovery measures emphasize that deserving students must be protected through provision of loans to finance their studies.

The provision of students loans continues to be a challenge world over. Stakeholders have continued to raise concerns over poor targeting of the needy students hence pointing to un-effective means testing tool. There has also been concern that there is delay in the means testing, identification of the needy and disbursement of the funds.

The reasons for the delay could be because of the amount of data and paper work involved in the means testing and accurate discrimination of the levels of need and final allocation of funds. Many studies, Odebero, 2008, Odebero, et al, 2007, Odebero 2010 established that HELB loan financing of bursaries and loans to the recipients was inequitable and regressive hence access to university education in Kenya is dominated by students from medium and high socio-economic status.

Empirical background and Justification of the innovation

The innovated model and application online software which we seek to patent is a result of intense empirical data and analysis of the existing framework of HELB loan financing as follows:

i)   Loan Allocation and Students Backgrounds

I carried out a statistical test and found that the t-test results for equality of means showed that no statistically significant difference existed between HELB loan allocation and students

gender (t=717, p> 0.05), and between HELB Loan allocation and the location of university (t=1.748, p>0.05. However, there was a statistically significant difference in means for type of university (p<0.05) in favour of private universities. This results were reinforced by the multiple regression model for supply of HELB loans in year 2 which showed that a significant linear relationship existed between HELB loan supply and type of university (p<0.05) in favour of private universities. This implied that HELB loan disbursements were the same for male and female recipients and for recipients in urban and rural universities, but differed by type of university in favour of private universities. This showed that gender was not captured in the means testing tool to impact on the amount of loan allocated. However, the tools.

had a higher regard for type of university a students was enrolled in because of the tendency to charge more fees at private universities. The proposed model seeks to correct this imbalance.

ii) *Programme of study*

The anlysis carried out showed that the analysis of variance (ANOVA) between HELB loan allocation and the programme of study showed a statistically significant difference in means (p<0.05). The Scheffe's multiple comparison tests results for the composite year 1-4 confirmed that there existed a statistically significant difference in loan allocation between the arts based programmes and the rest of the programmes such as Agriculture, Engineering, Bussiness and Science related programmes in favour of Arts related programmes (p<0.05). Paradoxically, arts based programme are cheaper than technological, medical and law, and engineering related courses. The model seeks to correct this imbalance.

iii) socio-economic status

Examination of data for the results for multiple comparisons tests in the and composite year 1-4 showed that there existed a statistically significant difference in loan allocation between students' socio-economic status in favour of Low SES (p<0.05). However, results showed that the mean difference between medium SES and high SES were not significant for all the years studied (p>0.05).

This means that the MTI was only able to identify the students according to Low socio-economic status while medium/high income groups were lumped together. The proposed model will correct this and ensure that at least three income groups are identified at the very minimum.

iv)Access to Programmes of Study by Socio-Economic Status

The study showed that apart from Educational and Arts based courses, which attracted students from across the board, other programmes had an inclination towards one's social class. Such courses included Medicine which attracted 75 percent of its students from hSES with no student (0%) from LSES and only 25 percent of the registered students came from mSES. Similarly, Commercial/Business related courses had over 80 percent of its registered students drawn from mSES and the rest from hSES. Technology related courses also had all its registered students drawn from mSES (66.7%) and hSES (33.3%) only. This again means that in determining the MTI, cognizance must be taken on the decision to fund such programes. In funding applicants, proper means testing must be done which the proposed model seeks to correct.

EMPIRICAL FINDINGS ON THE WEAKNESSES IN THE EXISTING MEANS TESTING TOOL AS A DETERMINANT OF HELB LOAN SUPPLY

I conducted multiple regression analysis for the determinants of HELB loan supply (year 1-4) which produced negative but significant beta coefficient for the variables students SES, ToU , and PRGT (a,d,g,c). A negative relationship in the programmes of study dummy variables meant that it is the programmes coded 0, which were in the 'other programmes' category that predicted more on loan supply (year 1-4). A negative relationship on socio-economic status variable meant that the lower the socio-economic status, the more the recipient was likely to predict on HELB loan supply. Other regression models also produced significant values for programme type in favour of Arts (year1, 2 3), ToU in favour of private, and LoU in favour of rural universities. This meant that students SES, Arts based programmes, rural universities, and private universities predicted more on HELB loan supply. Clearly, the MTI turns out to be faulty in allocating more money to Arts based programmes, rural universities, and private universities and there is need for an intervention which the new innovated model has proposed.

Using the Determinants of HELB Loan Demand to develop an equitable and effective model

The multiple regression analysis for the determinants of HELB loan demand (year 1-4) produced significant beta coefficients for the variables gender in favour of female, ToU in

favour of public, and location of university in favour of rural. Other regression models also produced significant values for programme type in favour of Engineering (year 4), and students SES in favour of low SES (year 1, 2, 3). The implication is that students SES, Engineering and technology based programmes, rural universities, and public universities predicted more on HELB loan demand.

Demand for and Supply for HELB Loans

Analysis for determinants of demand for and supply of HELB loans showed that there was a relationship between the determinants of demand for and supply of HELB loans for some years during the four years of study. However, for most years, the determinants of HELB loan demand were evidently different from the determinants of HELB loan supply. Such determinants included type of university (Y3), location of university (Y4), engineering and technology related programmes (Y4), and gender (Y1-4). This implies that the Board's effectiveness in equitably disbursing HELB loans is hampered by inability to address most of the expectations within the demand factors. This means that the means that the MTI has failed to address the critical demand facts which the new innovative model has addressed.

Equity in HELB Loan Disbursements

Results for the Gini Coefficients generated from the Lorenz curves for the years show that inequalities in the distribution of loans existed with an index of 0.26, 0.33, 0.19 and 0.16. The overall Gini coefficient for the composite HELB loan disbursement was 0.26. Thus, although HELB loan disbursements for the years studied was generally inequitable, the inequalities were not wide. However, a comparison of the top and bottom quintiles for HELB loan allocations showed that there were greater inequity in HELB loan allocations. Results for the composite four year period for example shows that 20.1 percent of the recipients in the top quintile got 39 percent of the total loan during the year compared to 19.9 percent of the recipients in the bottom quintile who received only 9.1 percent of the total loan during the four year period. This implies that each recipient in the bottom quintile got only 0.5 percent of the total loan awarded during the year compared to recipients in the top quintile where each recipient in the quintile got 1.9 percent of the total loans for the period. Thus on average, recipients in the top quintile got 1.5 % more loans than recipients in the bottom quintile. Consequently, a comparison of HELB loan allocations between the top and bottom quintile allocations shows that those in top quintile tended to receive more loans than what was deserved to them while those in lower quintiles

got less loans than what they merited. If the proposed innovative model is used, this problem will be fixed.

The Problem Being Solved

i)   A model for wider and accurate means testing Instrument (MTI) to target needy students

ii)   An Accurate means testing tool capable of discriminating the needy students by their levels of need for loan allocation

iii)   An online loan application App for efficient and effective means testing and disbursement

iv)   Time saved by instantaneous Means Testing Instrument for needy students using the online application

v)   Reduced costs in loan application, means testing and determination of amount to be awarded

vi)   Convenience that enables application easy and friendly to customers in need of loan

vii)   Fairness is enhanced

viii) Openness in the award criteria

Objects of the Invention

i)   To develop a scientific model to be imputed in the MTI for accurate targeting of needy students.

ii)   To develop an enhanced accurate means testing tool based on many variables capable of discriminating the needy students by their levels of need for loan allocation

iii)   To innovate an online loan application App for efficient and effective means testing and disbursement

Brief Description of Figures

Figure 1 is a working diagram of instrument for means testing for equitable targeting of needy students through an online computer application

DETAILED DESCRIPTION OF THE INVENTION

In the following description of preferred embodiments, reference is made to the accompanying figures which form a part hereof, and in which are shown by way of illustration specific embodiments in which the invention may be practiced. It is to be understood that other

embodiments may be utilized and structural changes may be made without departing from the scope of the preferred embodiments of the present invention. Although the following description is directed primarily to an instrument for means testing equitable targeting of needy students through an online computer application, it is to be understood that embodiments of the present invention may be adapted to any device for protection of the sink cabinets.

The disclosed sink and cabinets guards will become better understood through a review of the following detailed description in conjunction with the figures. The detailed description and figures provide merely examples of the various embodiments described herein. Those skilled in the art will understand that the disclosed examples may be varied, modified, and altered and not depart from the scope of the embodiments described herein. Many variations are contemplated for different applications and design considerations; however, for the sake of brevity, the contemplated variations may not be individually described in the following detailed description.

Throughout the following detailed description, examples of various disclosed sink and cabinets guards are provided. Related features in the examples may be identical, similar, or dissimilar in different examples. For the sake of brevity, related features will not be redundantly explained in multiple examples. Instead, the use of related feature names will cue the reader that the feature with a related feature name may be similar to the related feature in an example explained previously. Features specific to a given example will be described in that particular example. The reader is to understand that a given feature need not be the same or similar to the specific portrayal of a related feature in any given figure or example.

The enhanced model for MTI

Generally, the present invention discloses an instrument for means testing equitable targeting of needy students through an online computer application in form of a model that is formulated as follows:

LAC=f C1+ C2+C3+C4+C5…Cn

Where LAC is the output variable variable, and $C1, C2………C_n$ represented the specific inputs to lead to the output. This means that LAC is a function of the variables $C_1, C_2...up$ to Cn.

Specifically, the innovated model is of the form:

LA= sSES+ PrC+Gndr+ ToU+ LoU+….n

Where:

    i)   LA= Loan Allocation in Ksh

    ii)   sSES= Socio-Economic Status which is classified as either Low, Medium or High

    iii)   PrC= Programme Cluster which is (Law, medicine, medical science, dentistry, dental services, and veterinary science[1]);(Mathematics, computing, other health sciences, Nursing, Agriculture, architecture, sciences, Engineering/ processing[2]); (Education, Arts, humanities, social studies/ behavioural sciences, , visual performing Arts, administration, business & economics[3])

    iv)   Gndr=Gnder which is either Male or Female

    v)   ToU= Type of University which could either be public or private

    vi)   LoU= Location of University which could be Rural or Urban

    vii)   n= denotes any other variable of interest as agreed upon by the awarding agency.

In this Model;

LAC=f C1+ C2+C3+C4+C5…Cn

Hence LAC= Loan Allocation Ceiling while C1 to Cn refers to coefficents assigned to various means testing criteria (MTC) which is differentiated.

LAC= is therefore the ceiling of possible loan allocation for the year in question.

C1= 0.3 (sSES) where $LSES_{0.3}$, $MSES_{0.2}$, $LHSE_{0.1}$;$HSES_{0.0}$

C2=0.3 (Programme cluster) $PrC1_{0.3}$$PrC2_{0.2}$, $PrC3_{0.1}$

C3= 0.2(Gender) $M_{0.1}$ $F_{0.2}$

C4= 0.1 (ToU) $Public_{0.05}$ $Private_{0.1}$

C5=0.1(LoU) $Urban_{0.1}$ $Rural_{0.05}$

Thus the subscript numbers represent the coefficients to determine the means testing criteria for loan allocation.

INDUSTRIAL APPLICATION

Advantages in the Industry

i)   A model captures a wide range of criteria hence the MTI is more acceptable to the users

ii)   The model if used in the MTI it leads to more accuracy in discriminating the needy students by their levels of need for loan allocation

iii) The Model will be inputted in an online loan application App for efficient and effective means testing and disbursement

iv)   Time saved by instantaneous Means Testing Instrument for needy students using the online application

v)   Reduced costs in loan application, means testing and determination of amount to be awarded online through an app

vi)   Convenience and customer friendly to deserving cases as they can access the loans at the comfort of their rooms

vii) Fairness is enhanced as the app is online for all to see and verify the criteria

viii) The Online App can be used to market other products by the users and bring in revenue

ix)   The app can be a source of revenue to loans financing companies/organisations and banks an even mobile companies as the users are charged a modest user fee

x)   The Model and the app will lead to further inventions in the education financing and banking industry.

CLAIMS

1. An instrument for means testing equitable targeting of needy students through an online computer application, comprising a model, an application and central server.

2. The instrument as in claim 1, wherein the model is of the form:

LAC=f C1+ C2+C3+C4+C5…Cn

where LAC is the output variable variable, and *C1, C2……… Cn* represented the specific inputs to lead to the output.

3. The instrument as in claim 2, wherein the LAC is a function of the variables C1, C2…up to Cn.

4. The instrument as in claim 3, wherein specifically, the innovated model is of the form:

LA= sSES+ PrC+Gndr+ ToU+ LoU+….n

wherein:

i) LA= Loan Allocation in Ksh

ii) sSES= Socio-Economic Status which is classified as either Low, Medium or High

iii) PrC= Programme Cluster which is (Law, medicine, medical science, dentistry, dental services, and veterinary science[1]);(Mathematics, computing, other health sciences, Nursing, Agriculture, architecture, sciences, Engineering/ processing[2]); (Education, Arts, humanities, social studies/ behavioural sciences, , visual performing Arts, administration, business & economics[3])

iv) Gndr=Gnder which is either Male or Female

v) ToU= Type of University which could either be public or private

vi) LoU= Location of University which could be Rural or Urban

vii) n= denotes any other variable of interest as agreed upon by the awarding agency.

3. The instrument as in claim 2, wherein in this Model;

LAC=f C1+ C2+C3+C4+C5…Cn

hence LAC= Loan Allocation Ceiling while C1 to Cn refers to coefficients assigned to various means testing criteria (MTC) which is differentiated.

LAC= is therefore the ceiling of possible loan allocation for the year in question.

C1= 0.3 (sSES) where LSES $_{0.3}$, MSES$_{0.2}$,HSES$_{0.0}$

C2=0.3 (Programme cluster) PrC1$_{0.3}$PrC2$_{0.2}$, PrC3$_{0.1}$

C3= 0.2(Gender) M$_{0.1}$ F$_{0.2}$

C4= 0.1 (ToU) Public$_{0.1}$ Private $_{0.05}$

5   C5=0.1(LoU) Urban$_{0.05}$ Rural$_{0.1}$

thus the subscript numbers represent the coefficients to determine the means testing criteria for loan allocation

4. The instrument as in claim 1, wherein the loan application online app and means testing App with clear:

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   a. (sign-up/login credentials,
   b. Overview of information by applicants.
   c. services available by the app, information/forms to be captured).
   d. Automated evaluation of their differentiated levels of need
   e. Automated response of amount qualified for or rejected application
15
   f. The app is Upload to playstore or Android or any other portal or USD code by safaricom
   g. App can be used to market other products by the user

FIGURES

FIG. 1
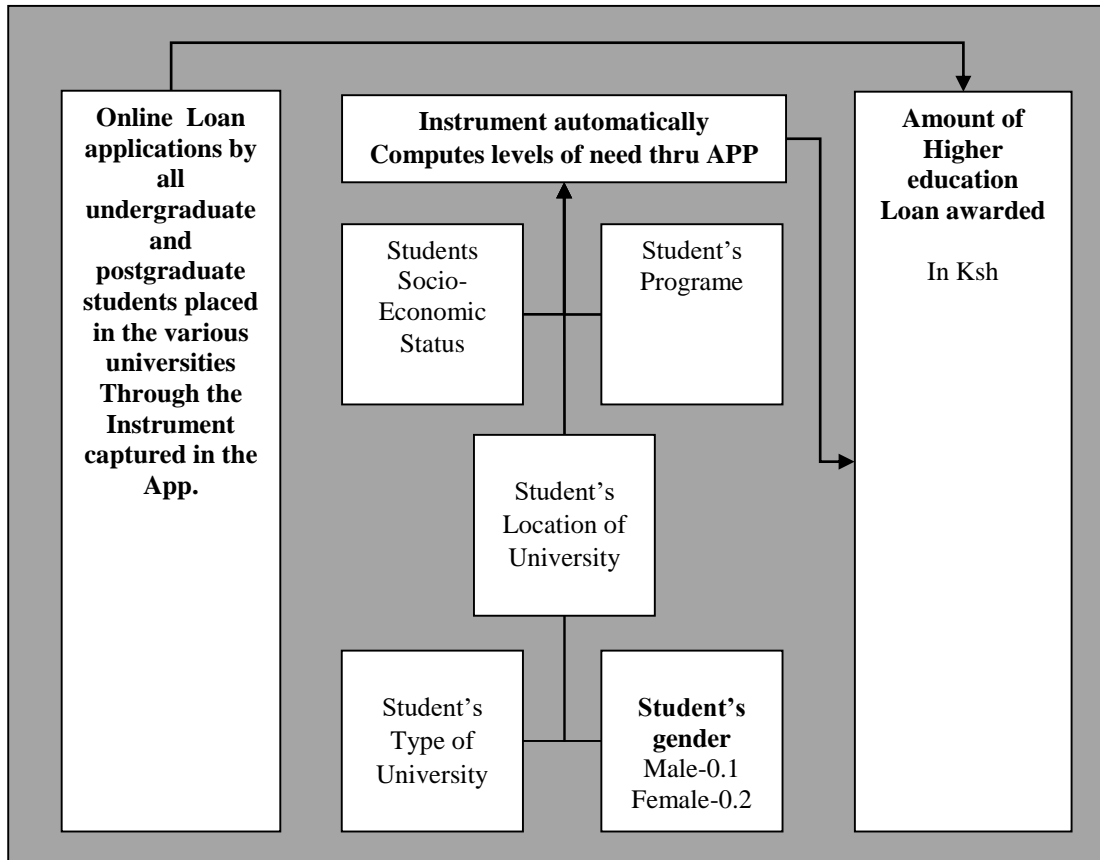
ABSTRACT

Title: Instrument for Means Testing for Equitable Targeting of Needy Students through an Online Computer Application

5   The present invention discloses an instrument for equitable targeting of needy students through an online computer application. The instrument comprises a loan application online app and means testing App with clear sign-up/login credentials, overview of information by applicants and services available by the app The said information/forms are captured, automated evaluation of their differentiated levels of need. The automated response of amount qualified

10   for or rejected application. The app is uploaded to play store or Android or any other portal or USD code by service providers. The App can be used to market other products by the user.