

# “ICT-Based Integrated Higher Education Management System Of Private Universities Of Bangladesh Incorporates Unique ID In The Context Of 4IR”

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## Abstract

**Purpose**– In order to meet the challenges of fourth industrial revolution (4IR) in 21<sup>st</sup> century’s the significant role player of Bangladesh private universities are facing huge trouble in education unique Id management system. The main purpose of this paper is to focus on conceptualizing the origin of legitimacy of unique ID, the justified process and its trustworthiness toward the people, regulators, society and stakeholders. In achieving the purpose of the study, an inclusive research gap concerning the roles of the ICT based integrated higher education management and unique ID management system in the development and formation of Unique ID based management system would also be addressed.

**Design/methodology/approach**– The paper implements an analytical approach to investigate the current education management process of Bangladesh private universities and the impact of ICT based management system its presence, significance, as well as credibility to the stakeholders.

**Findings** – After the study a proposal of additional unit of UGC to legitimacy, namely, Unique ID regulatory authority, along with regulators, professionals and people is given. These could be derived from the internal mechanism of Education management system in Bangladesh. Integrated Unique ID system would not just help the UGC to track down students, but would make academic life far easier for the students as they would not have to submit multiple documents each time they want to avail it e.g. new public, private, govt. agencies or higher studies in home and abroad.

**Research limitations/implications**– The rational argument shows that lack of Unique ID creating a lot of problems for the students, university authorities, regulatory authorities and the stakeholders. It is more apposite because it has substantial validity, dominance, recognition and acceptability.

**Originality/value**– This system will contain student personal details like name, father’s name, mother’s name, photo, finger print, gender, marital status, present and permanent address, degree, CGPA, date of degree awarded etc. All private universities should be added in to central UGC database. The unique ID may be in the formed of 16 digits number as per the guide line of the UGC and this number to provide more authentic and reliability to helps to manage student needs in his/her whole life of span by using this.

MoE and UGC can easily find out the number of admitted and graduate students list university wise/Faculty/Program/Major/CGPA wise etc. Finally, it will create more transparency and accountability among the private universities and MoE & UGC. More so, MoE & UGC can focus on more diversified educational sector and produce graduates accordingly. This research shows Unique ID based approach can effectively eliminate corruption from every level of services and hence widen the track for the prolongation of e-Government with a nice pointer.

**Keywords**- 4IR, MoE, UGC, Unique Student ID Management, e-Government, e-Services, ICT

## 1. Statement of the Problem.

In order to meet the Fourth Industrial Revolution (4IR) and globalization challenges private university graduates are fulfilling the market demand as well as contributions a lot. But lack of full automation system of record management it is creating different kinds of problem which are main hindrance for the development higher education.

- a. Unable to publish UGC report on time;
- b. No proper record of university wise Seat capacity & admitted student list;
- c. No proper record of university wise graduated student list;
- d. No proper record of university wise program approval list;
- e. Lack of credit transfer students’ records;
- f. Lack of certificate & transcript issued data;
- g. No proper records which field graduates are required for next few years in the world;

- h. Lack of proper research grants and research information etc.

Challenge for integrated and unique Id management project creating a central database with demographic and academic information on every students of private universities. With such a centralized structure, concerns about a single point of failure and possible misuse from within the central authority arise.

## 2. Aims and Objectives.

Every private universities have own website and most of them are using ERP/SIMS/UMIS etc. system. But there is no centralized monitoring system by the UGC. For the private university accountability and transparency, it is the demand of time to incorporate it with the UGC central ERP/SIMS/UMIS system or may develop newly platform which are relating to existing ERP/SIMS/UMIS system. A UGC team will take care of it: The following objectives must be satisfied:

- Recording information about university, approval, program details, admission details, graduates details etc.;
- Recording information about the students payment history;
- Recording information related to examinations and result details;
- Keeping information about issuing transcript/certificates;
- Keeping information about student personal info;
- Keeping information as an 'ALUMNI'.

## 3. Scope of the Project:

- Information about student, programs, university is done by just writing the student Id & name, age, and gender, program information. Whenever the student comes up his information is stored.
- Bills are generated by recording price of credits/course for each recorded on the document, which contains student information. It is destroyed after some time periods to decrease the paper load on in the office also reduce cost.
- Easily we can find university wise program approval list and their seat capacity; accordingly admitted and graduate student list.
- Certificate and Transcript issued records of students are maintained in pre-formatted sheets, which are kept in database.
- All this work is done manually by the official authorized operational staff and lot of papers are needed to be handled and taken care of.

## 4. Justification for the Topic.

The number of public universities in the country is not enough to meet the growing demand for higher education in the 21st century. To meet this demand, the Government of Bangladesh enacted the Private University Act, 1992 (as amended in 1996) to establish private universities in the country. However, the law has failed to ensure quality education, transparency, accountability, dynamism and, above all, good governance in the face of growing challenges. In view of this, the Private University Act, 2010 was passed in the National Assembly.

At present, there are a total of 108 private universities in the country, including 52 in Dhaka and 56 in other places [11]. The government has emphasized on setting up at least one private university in each district of the country. This step has been taken to provide higher education, research and related facilities to the rural people. It is to be noted that out of 32 lakh students of the country in higher education, about 4 lakh students are studying in private universities[12].

All the work related to the management of academic, administrative and financial matters of the private universities is done by the private university department. The main functions of this department are as follows:

- Inspect the physical infrastructure and facilities of the proposed universities and submit a report thereon to the Government;
- Approving the curriculum and syllabus of the proposed programs;
- Make occasional and regular visits to private universities;
- Maintain liaison with the Ministry of Education and other ministries;
- Nominating syndicate members in private universities and giving directions regarding syndicates;
- Provide rules and guidelines for teacher recruitment, promotion, student admission, etc. in the university;
- Oversee uniform grading system in private universities;
- Providing guidelines for the preparation of standard curricula for various programs;
- Giving directions to ensure quality of education;
- Take necessary action against illegal activities;
- Updating information on all activities related to private universities on the Commission's website.

In order to meet Fourth Industrial Revolution (4IR) challenge it is very important to establish Integrated Higher Education and Unique Id Management System for the Private Universities in Bangladesh. It will create transparency and accountability in this sector. UGC can monitor and supervise it efficiently [1].

## 5. Research Methodology.

A primarily qualitative approach to the collection of data was carried out throughout the project. This was considered to be the most appropriate approach, given the nature of the quarry and the circumstances of the research, which was limited both in terms of small size of the sample of university stake holder, faculty members, ICT manager, System Analyst, and students, and of the time available (Bell, 1999). Triangulation was required to promote the objectivity of the research (Cohen et al, 2002). As a researcher with a background in educational management, I was aware of my own cultural baggage and ability to be entirely objective. I tried to be aware of the possible positional power issues that might arise within the research process, where perceived power differences might affect data collection or the way it was analyzed.

## 6. Ethical Aspects of the Study.

- a) Respondents are going to participate in the survey voluntarily;
- b) Questionnaire/Interview/Focus group questions are not going to contain offensive, discriminatory, or other unacceptable language;
- c) Privacy and anonymity of sample group members are going to be maintained etc;
- d) The author will attempt to maintain high levels of objectivity in discussions and analyses throughout the research.

In studies that do not involve primary data collection, on the other hand, ethical issues are going to be limited to the points c) and d) above.

## 7. Related Works

The related works which have been done towards the implementation of e-Government in Bangladesh are relatively insignificant. Many researchers have been done in the context of Bangladesh. Sanaul has studied the respondents' awareness about Public Websites and appearance of E-Government Websites in Bangladesh [2]. Jahangir has worked on present problems of e-Government and gave some possible suggestions for future development [3]. Zohurul et al. suggest that e-Government or Digital Bangladesh can be implemented at the grass root level government offices by practicing strategic human resource management, increasing IT infrastructure, minimizing the resource constraint and trained IT person [4]. Rokon focuses on the Policy and Regulatory Framework by Government Officials and not to duplicate e-governance endeavors by the private organizations [5]. Rizwan emphasizes on the role of Government and private initiatives as well as NGOs to implement e-Government policy and regulatory framework [6]. Noor recommends following the role model countries like Singapore, USA, EU countries etc to establish e-Government in Bangladesh [7]. While some other researchers have pointed out different challenges and demerits towards the adoption of e-Government in Bangladesh. Farhad concluded in his work that the accessibility of the e-Government can be confined to the minor portion of the city dwellers if the e-Government cannot be spread widely [8]. Some attempts are also taken in Bangladesh among which Electronic Voting Machine (EVM), Machine Readable Passport (MRP), Mobile Based Transaction, Online based Job Application, exemption of tax on Computer items, Computer education in schools, Computerization of government offices, Launching of websites of government offices, (e.g. gov.bd), Use of Computers at the sub-district level etc. are remarkable. The major IT projects those have been taken by the government are briefly discussed below-

Electronic Government Procurement (e-GP): conduct entire public procurement activity undertaken by the government online which was a partially successful project.

Electronic Voting Machine (EVM) : carry out the entire voting procedure electronically Successful

Bangladesh Bank computerized a number of internal processes and launched an information-rich, dynamic website which was a successful project.

Machine Readable Passport: Transformed the passport into machine readable layout which was a successful project.

Ministry of Religious Affairs: launched a collaborative website for Hajis that comprehends services for searching Hajis & respective flight and for sending and receiving messages or death bulletins which was a successful project.

Department of Roads and Highways: launched website that includes topographies such as regional operations, related contact information, searchable database of suppliers, tenders, and schedule of rates which was a successful project.

Rajshahi City Corporation: launched an Electronic Birth Registration System conveying with health and schooling services provided by the city which was a partially successful project.

Election Commission Secretariat: bring out a national project to produce a computer-based ID card for each registered voter which almost failed.

Ministry of Foreign Affairs (MOFA) : launched website that comprehends searchable databases of Bangladeshi missions abroad and foreign embassies and missions in Bangladesh which was a partially successful project.

Ministry of Science and ICT (MOSICT): deputized to provide vision, direction and facilitation to ICT-related events in the country which was partially successful attempt. Parliament Secretariat: digitalized various important bills & ordinances, computerized Parliament Library, and created computer centers for Parliament which was partially successful.

### 8.1 Management:

At present higher education in private sector of Bangladesh has not only developed & expanded but also created a new window. Bangladesh Government has setup a Fourth Industrial Revolution (4IR) where private universities could play a significant role to meet the 21<sup>st</sup> century challenge. This Integrated Higher Education and Unique ID Management system is to provide central database system for transparency and also a unique ID to each and every student of private universities after admission. Students will get a password to access this site. There is a option for every student to change their password. Once student enter or log on the Integrated system they can pay their tuition fees, others fees, view the transaction history, view the result, apply for certificate & transcript, and other documents as and when required.

MoE, UGC and stake holders can view the university wise admitted student and graduate student summary along with their result of faculty wise, verify the result etc. Authorized officials can verify student details from the database e.g. certificate/transcripts etc.

The Unique Identity Authority (UIA) is the integrated higher education and Unique ID Management System may be formed under the state law of Bangladesh. The project name is UIM which is planning, execution and supervised by the UGC separate team as per the formation of its law and statutes.

8.2 Integrated higher education and Unique ID Management is expected to provide a link across diverse identities as a student, so that once one has it, the UGC or

Govt. needs nothing more from one because it can find the links on its own.

### 8.3 Applications of Integrated higher education and Unique ID Management

It assurance of uniqueness and centralized online identity verification would be the basis of building multiple services and applications-

- It will open the transparency door for the admitted and graduated students that will create easily identification of higher education students' and monitoring efficiently.
- It is easy to manage and count yearly admitted and graduated student without any mistake and take a control university admission.
- It will provide support in providing proper identification to the student and this UID will be linked with a each university ERP database and all student information will be checked trough database.

### 8.4 Risks in implementation of integrated higher education and Unique ID Management

Risks that arise from this centralization include possible errors in the collection of information, recording of inaccurate data, corruption of data from anonymous sources, and unauthorized access to or disclosure of student's personal information.

The centralized nature of data collection also heightens the risk of misuse of student personal information and therefore potentially violates privacy rights. The creation of a centralized database of personal information, it is imperative that such program not be established without the proper mechanism to ensure the security of each student's privacy rights.

### 8.5 Integrated higher education and Unique ID Management System

The integrated higher education and Unique ID Management System is to develop integrated platform fro education and unique-id management that creates unique identification number to particular student of each private university. As well as management of perspective data, information of that student. It is also provide some special facilities which are try to help student to decrease their information gap. Basically this system will handled by MoE/UGC/ and they can play a moderator role in connection with the different private universities. This system can be accessed by the MoE/UGC/ Moderator/ University Admin or user part, student and different user group is associated with this system. The interface, security, dataflow must be in user friendly system.

#### Proposed Model System

Our model system can be described from following view point:

- 1) Profile Creation
- 2) Profile Update
- 3) E-Services using integrated database
- 4) Admin Module (UGC)
- 5) User Module (Student)
- 6) University Module
- 7) Admin Module (University)
- 8) System Analysis and Design
- 9) Requirements Analysis

The above proposed model result framework of the overall activities shown in following figure.

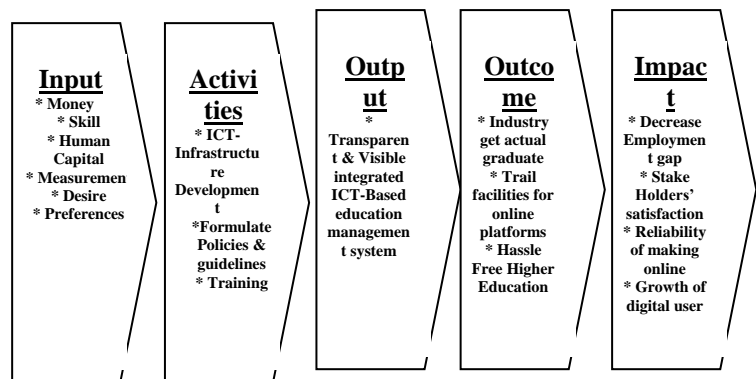


Figure 1: Result Framework

### 8.6 Design and Architecture

We explain the Algorithm, which is used to make clear how the system is going to work. i.e. the process logic behind it, the flowchart, which represents the pictorial representation of the process logic and finally the Data Flow Diagram(Context Level) of the integrated higher education and Unique ID Management System.

#### 8.6.1 Algorithm

Security system of integrated higher education and Unique ID Management project – two factor user id verification methods may be followed by using User OTP system. For implementing this, two different processes have to followed, the first one being the recording process and the second one – the authentication process.

##### Recording process:

In the first process, the UIM builds up a centralized database consisting of UID, biometric record and different other details of the student. The UID allocates a unique 16 digit numeric number to every private university admitted student which is generated by the university admission officer. This biometric data is tagged to the student's unique 16 digit number (UID). The UID tagged to the biometric record of a student is later used in the authentication process.

##### Authentication Process:

In the second process, whenever a student has been identified whether he/she is a genuine one, an OTP is generated and send it to the user registered mobile number within 5(minutes) needs to bed logged on it otherwise new OTP required. If relevant match is found then the student is designated to be a genuine student.

#### 8.6.2 Flow Chart

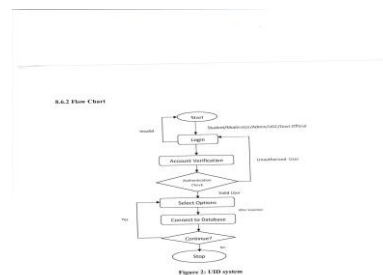


Figure 2: UIM system

The above diagram as shown gives some basic description regarding the flow of the system. It will not show the operations performed in detail but just access the operation and where it goes the operation has been performed.

It shows the different conditions like ("if else") if one condition is not true than where the flow will return and from where will it start again or where will the flow terminate after some operation has been performed.

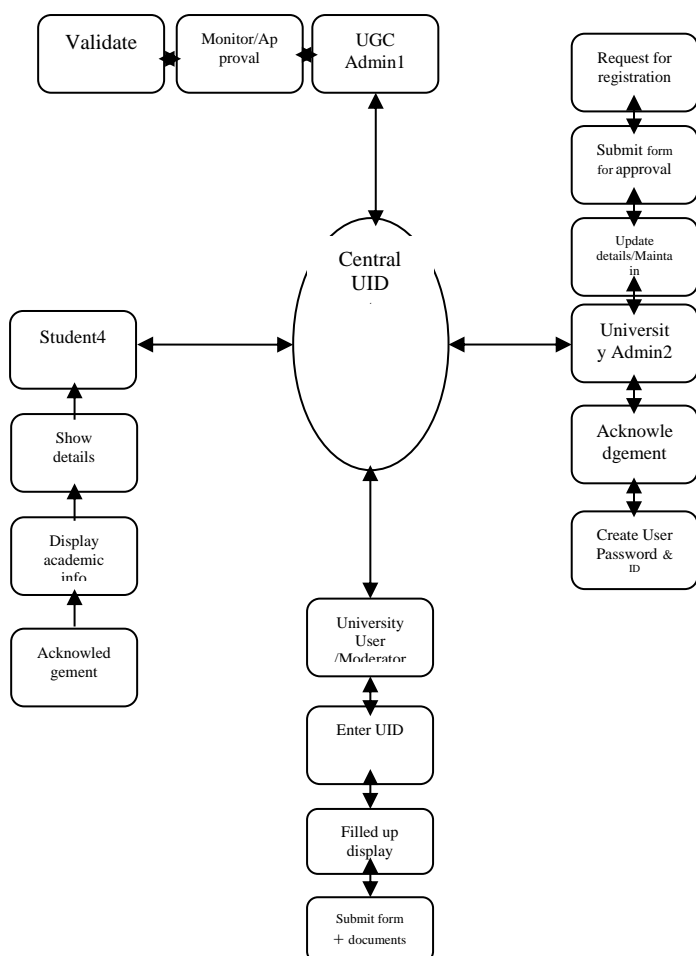


Figure 3: UID Data Flow Diagram

### 8.6.3 Benefits of this system:

Easily can manage all the details related to the university wise program details, admission seat capacity, admitted student records, graduated student records, research and publication data etc. in one database.

A 16 digit unique number is being used therefore reduces manual labour and enhance efficiency as every detail is available on the one click and reducing the efforts in maintain different databases. It also reduces duplication, an attempt to make fake documents.

The purpose of this Unique ID system is to provide one unique number to all the admitted students to meet the future higher graduate demand and also verification process by introducing authentication technology, and thus identifying illegal program and fake certificates. This will be useful for embassy, employment, higher studies, immigration and other officials as and when required to do so.

### 8.6.4 Implementation Challenge of this system:

Security is the most vital task in this system as each and every possible security measures will have to be taken. Due slow connections of network facilities it may be cause of access quandary. Due to poor IT infrastructure and Internet access & cost, lots of people in our countries do not have access to information and communications technologies. The Digital Divide is ever present, and there is a large gap between the educated elite who can afford technology, and the uneducated poor who cannot [9]. Jaeger asserted that an e-Government system would fail if the government did not take an active role in educating citizens about the value of e-service [10]. This ICT-Based central unique id project would also miss the mark if the students did not have the skill to use the technology to support access of convenient information and services. Another crucial factor for the failure of this type of project is the budget failure or the political instability and the discontinuity. The life span of the projects also ends with the alteration of the political power that is solely responsible for the failure of any development policy. This kind of project needs to central synchronizing and monitoring body to regulate the superiority of the Unique ID projects persisted as a challenge in Bangladesh.

### 8.6.5 Link with Birth Registration Certificate/ Passport Data/National Identity Database:

It is very much deliberate to link with unique id data with Birth Registration Certificate/Passport Data/ National identity Number for better verification of nationality authenticity.

### 8.6.6 Biometric:

If student has National Id Card no need to take Biometric finger print; it will works on it by using NID number database link.

### 8.6.6 Execution process of this system:

The system have different User group which are role based some features controlled by the UGC and some features controlled by the University admin/moderator, authorized user and student himself. The system having user name and Password option on the front page, as per the user name and Password the system will know whether user is Admin/Moderator/ Authorized Official or registered student of the university.

### 9.1 Snapshot of this system

#### Snapshot A: Student

Once a student will enter the user- name and password, they are guided to its homepage where he/she would be able to view their profile and avail to apply for few facilities (i.e. transcript, certificate, Testimonial, Degree Application etc.). He/she will be provided with discussion forum and help section (if require).

#### Snapshot B: UGC Official

The UGC officials will be able to do the same operations as the regular students are able to do. Furthermore, UGC officials have few special privilege and rights so that they will be able to see University program/admission/graduate/research details as in if they want to monitor or approved it.

#### Snapshot C: Moderator (University Portion)

Moderator is the person who has been given rights by the Administrator to look at the whole system and maintain it.

#### Snapshot D: Administrator

Administrator A for UGC and Administrator B for University portion in both are the head of all the system and looks after the whole system sitting at the top of the tree of this integrated unique id system. They will appoint Moderator and give them the rights for changes.

## 9.2 Student Unique ID

This unique id student can use for different purposes.

#### What if Unique Id is not working or lost?

If the UID is not working or lost of any students he/she will have go the concern university and provide the details so that the moderator can search and check the details again and issue the existing UID.

#### What if any change requires to UID?

If there are any changes in the details then the changes can be done through at the concern university, provided the student to go to the university center, prove his/her identities and ask for the changes to be done.

## 9.3 Testing of Integrated Unique Id Management

System performance depends on the testing process and phases outputs, the following testing phases may followed:

1. The primary user groups of this system are UGC and Admin few portion, University Admin/Moderator in few porting which are role based. Whenever it is the new user must be registered in this system and if the user is already registered with UID system, then he/she simply enters his/her UID no \$ logins to view his/her account details. The student user is restricted to Updated/delete or creates any account of information.
2. If the user is new to UID system, he/she has to first fill the form by hand regarding all the information of his/her respective different fields and submits it to registrar to be at a later stage. This stage is an internal process and will not be shown anywhere in the interface [1].
3. After the authentication by the online registration the data form is given to the admin. Admin approve UID no for the user who register validate and acknowledgements.
4. Each user like Admin/Moderator has its own user registration ID no. and Password so that no one can access it. Also they have maintained their own details in the database. After login admin can see the dashboard options are create vies, delete, update etc.

5. The format of the Unique ID Number is generated as per the UGC guidelines which looks like this:  
Example: A student has admitted University of South Asia, Banani, and Dhaka in the Year 2021 Spring Semester in BBA honors program. There is no residence facility in this university. His roll no. 027

University Code	Year of Adm	ADM Semester Code	Hall Code	Program Code	Student's Roll No
040	21	1	00	04081	027
So, Unique Identity Number of A is: <b>0402110004081027</b>					

6. The internal process is that the student or user information is retrieved from the database, with the UID number serving as the primary key in each record as an attribute, as well as a foreign key in other tables.

## 10. Conclusions

We presented the ICT-based Integrated Higher Education & Unique ID Management, promoting understanding of a wide range of approaches and planning plans in the process. It is, however, a relatively new study planetary. As a result, its stages, definitions, and prerequisites are still up for debate. Each country has its unique set of circumstances that reflect its environment, as well as economic, political, cultural, and social aspects that may influence the adoption of such kind of model in the country needed. By way of a persuasive investigation, this report helped to fill in some gaps by providing understandings into the feeling of e-Government from the standpoint of a third-world country, Bangladesh. Following the identification of the underlying constraints, the government must develop a policy to adopt comprehensive solutions to meet these pressing demands.

*This system's goal is to create a unique identification number (UID) that can be validated and certified online in a cost-effective manner while also being robust enough to prevent duplicate and fraudulent certificates.*

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