E-GOVERNANCE INITIATIVE IN TECHNICAL INSTITUTE – A CASE STUDY OF DR.B.R.AMBEDKAR INSTITUTE OF TECHNOLOGY, ANDAMAN & NICOBAR ISLANDS (INDIA)

UTPAL SHARMA
Principal
Dr. B.R. Ambedkar Institute of Technology
Andaman and Nicobar Islands

SUNIL KUMAR CHAKRABORTY
Faculty Member, Department of Computer Science
Dr. B.R. Ambedkar Institute of Technology
Andaman and Nicobar Islands

ABSTRACT
The process transformation and e-governance in technical institutes is one of the important components for improving the efficiency. This also improves the student's satisfaction index apart from making them more IT savvy. This paper deals with the case study showing how e-Governance initiative with in-house capacity has transformed the institute process without incurring any expenditure.

1.   INTRODUCTION

Higher education in general and technical education in particular continues to expand in response to changing student's demand to meet the needs of diversity of markets. It is a widely accepted fact that technical education is a driver for our country's emergence as a key force in global economy. In other words, improvement in the process and governance of technical institutes will have direct bearing on the quality of the student rolled out, thereby giving impetuous to the market, which is likely to absorb them.

Process Improvement Approach In Management Of Technical Institute

It is well accepted fact that administrators of most of the technical institute spend maximum time in attending routine matters apart from concentrating on expansion of academic activities of the institute. Considerably less time is spent on structured process mapping, identification of redundant & critical processes, process re-engineering followed by process transformation. There is a distinct difference between a manufacturing process and the process of academic institute, since the measurement criteria of process parameter is well defined in the former and its effect on quality can also be quantified. While the measurement of academic process parameter and quantifying its effect on the product quality is a difficult task.

The approach suggested for process improvement of an educational institute can be seen in Figure 1.

Preparation of Flow Chart of each Process

↓

Identification of Redundant Element in the Process

↓

Identification of Parameter Critical to Quality

↓

Process Simplification/Re-Engineering

↓

Implementation of Revised Process on Trial Basis

↓

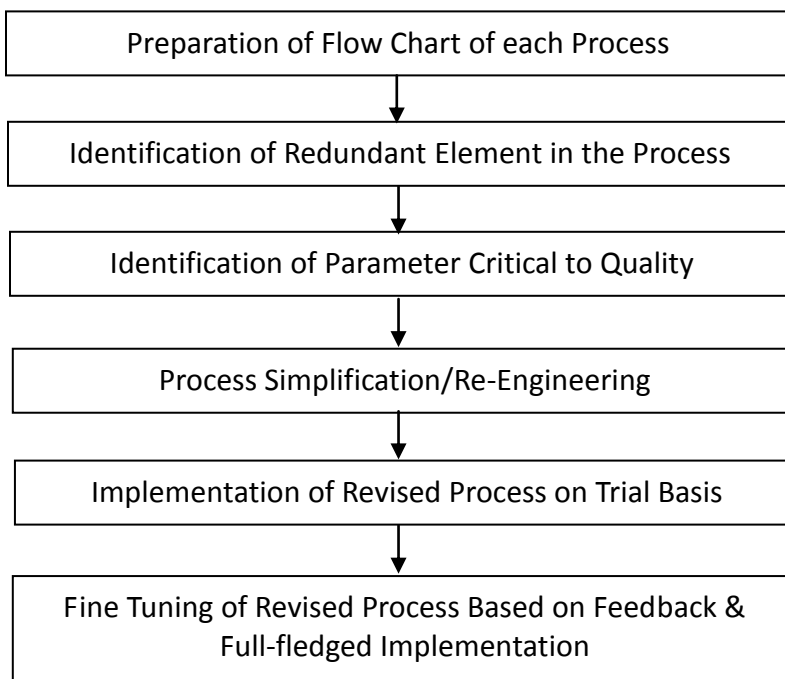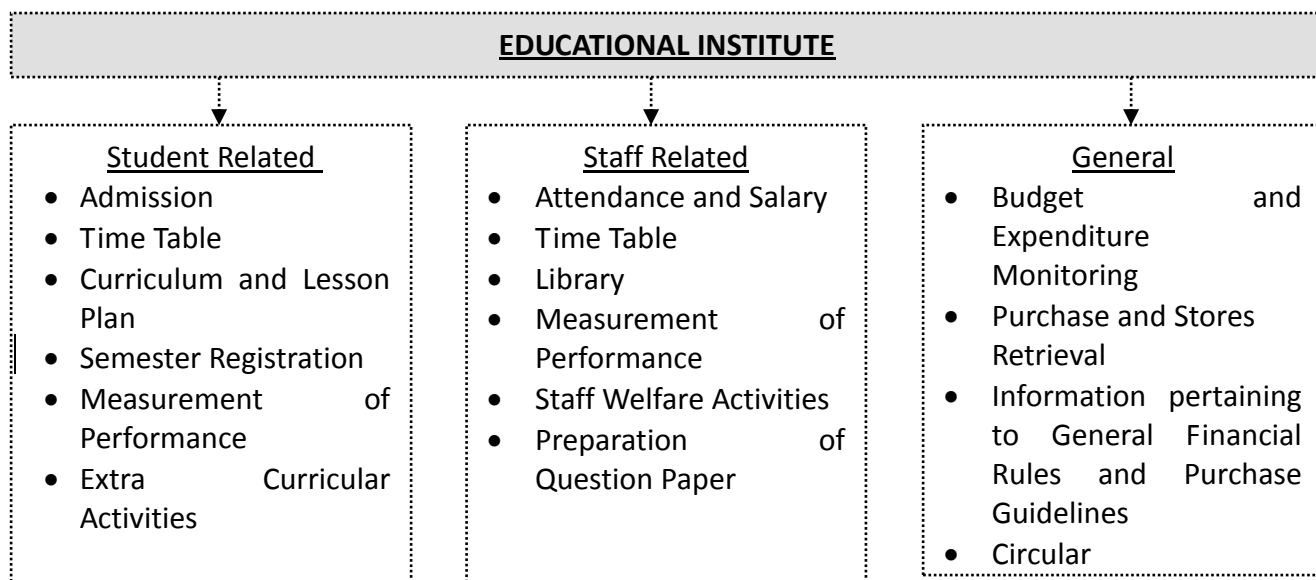| Fine Tuning of Revised Process Based on Feedback & Full-fledged Implementation |
|---|

Figure 1: Approach for Process Improvement

The process of educational institute can be broadly divided into three major components viz. student related, staff related and General as mentioned in Figure 2.
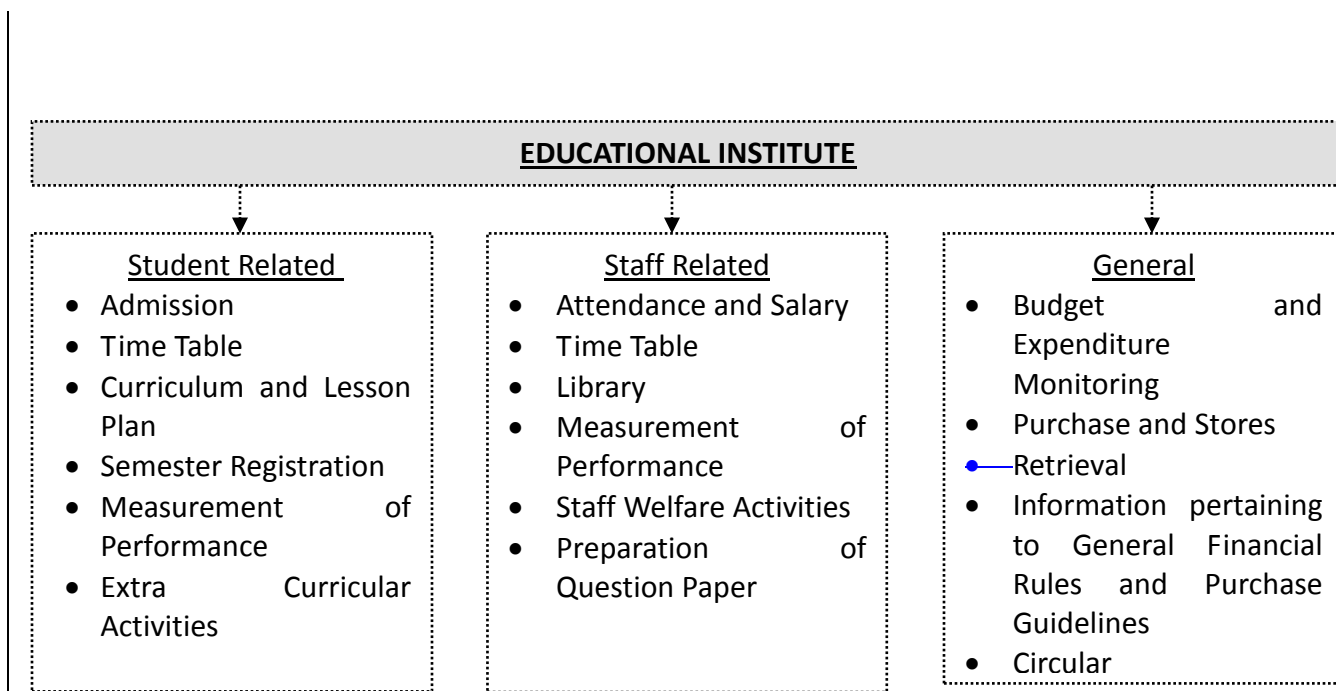
EDUCATIONAL INSTITUTE

Student Related
- Admission
- Time Table
- Curriculum and Lesson Plan
- Semester Registration
- Measurement of Performance
- Extra Curricular Activities

Staff Related
- Attendance and Salary
- Time Table
- Library
- Measurement of Performance
- Staff Welfare Activities
- Preparation of Question Paper

General
- Budget and Expenditure Monitoring
- Purchase and Stores Retrieval
- Information pertaining to General Financial Rules and Purchase Guidelines
- Circular

EDUCATIONAL INSTITUTE

Student Related
- Admission
- Time Table
- Curriculum and Lesson Plan
- Semester Registration
- Measurement of Performance
- Extra Curricular Activities

Staff Related
- Attendance and Salary
- Time Table
- Library
- Measurement of Performance
- Staff Welfare Activities
- Preparation of Question Paper

General
- Budget and Expenditure Monitoring
- Purchase and Stores Retrieval
- Information pertaining to General Financial Rules and Purchase Guidelines
- Circular

Figure 2: Major Process of Educational Institute

Most of the progressive institutes have gone for e-Gov initiatives by computerization of most of the above processes. The general model followed for computerization is outsourcing the development of applications including its maintenance, while some institutes have developed some of the applications in-house and implemented the same. It has been observed that the second option though time consuming and tedious, but helps in the long run to sustain and improve, apart from facilitating in-house capacity building

2. **DR. B.R. AMBEDKAR INSTITUTE OF TECHNOLOGY – A BRIEF**
Dr. B.R. Ambedkar Institute of Technology (BRAIT) earlier known as Dr. B.R. Ambedkar Govt. Polytechnic was established in 1984 at Port Blair (Andaman and Nicobar Islands) by A & N Administration. In 1999, the institute has been accredited with ISO 9000 and is perhaps one of the first technical institute in Govt. sector to get ISO 9000 accreditation. In 2009, the institute has been upgraded to Engineering College offering Engineering Degree Programmes in addition to Diploma Programmes. In last 10 years, the various department of the institute have taken up real time projects. The contribution of Computer Science Department of the institute is relatively higher as various applications developed for different departments of A & N Administration have been successfully implemented.

The model followed for development of the application by Department of Computer Science, BRAIT is as under –

- Identification of platform as per market demand.
- Imparting training to the staff and students on the selected platform by the industry experts.
- Taking up real time projects of different departments of Administration.
- Issuance of certificates, linked with the successful trial and client approval.
- Making the guide (faculty member) responsible for supporting the application on continuous basis

Some of the applications developed for various departments of A & N Administration by Computer Science Department of BRAIT in last 10 years are given below in Table 1.

S.No.	Name of the Project	Platform Used	Client Department	Year
1	Electricity Consumer Billing	Visual FoxPro	Electricity Department	2000
2	Vehicle Registration &	Oracle Developer 2000 &	Andaman & Nicobar Police	2001

S.No.	Name of the Project	Platform Used	Client Department	Year
	Issuance of License	Oracle 8i		
3	Loan Monitoring System of DIC & Khadi & Village Industry Board	Ms-Access	Directorate of Industries	2001
4	Inventory Management of Sagarika Emporium	Ms-Access	Directorate of Industries	2001
5	Account Management System	MS Access & SQL Server 2000	All Department of A & N Administration	2003
6	Production Disposal of Sawn Timber	ASP.Net 2.0 & SQL Server 2000	Forest Department	2004
7	Biometric Finger Print Attendance System	VB6.0 & SQL Server 2000	Directorate of Industries & ITI	2004
8	Employment Exchange Registration and Renewal System	ASP.Net 2.0 & SQL Server 2000	Employment Exchange, Port Blair	2005
9	Library Management System	Ms-Access & SQL Server 2000	State Library	2005
10	Material Management System	ASP.Net 2.0 & SQL Server 2000	Directorate of Shipping Service	2008
11	Store and Vehicle Management System	ASP.Net 2.0 & SQL Server 2000	Police Motor Transport	2010

Table 1: Various Application Developed by BRAIT

2.1   e – GOV INITIATIVES IN DR. B.R. AMBEDKAR INSTITUTE OF TECHNOLOGY

The Computer Science department of the institute has developed a portal which provides a link to various applications which have been developed in various platforms such as VB6.0, ASP.NET 2.0, JSP, and PHP as front end and SQL Server 2000, Oracle 8i as back end. Different platforms have deliberately been selected to improve the faculty skill set in handling different packages. The portal is available in Local Area Network (LAN) and is deployed in the institute server with proper security. The screen shot of the portal can be seen in Figure 3

Figure 3: Institute Intra Portal

STUDENT RELATED

- **Admission**
  - The complete admission process right from the submission of application, scrutiny and preparation of merit list is carried out using this package. The statutory guidelines for admission issued by CBSE and A & N Administration are followed while admitting the students and counseling is carried out in online mode bringing greater transparency in the admission process. The package has a provision to generate a report on the preference of seat for different discipline by the students which is compared with the previous year data for assessment of trend. The personal and academic data of the student admitted is migrated through a different package (Student Information System) for further analysis.

- **Student Information System**
  - Student Information System (SIS) is a comprehensive application developed to capture all the inputs of the student's right from its admission to his monthly/semester performance for the complete academic period of their association with the institute. Some of the modules of SIS is as under in Table 2:

Module	Features	User
Semester Registration (Multiple Point Entry & Credit System)	Captures Subject Registered by the student for the semester and generate Bar-coded Challan form for payment of semester fee	Students with the guidance of Academic Member of Department
Attendance	Captures student attendance for the month	Concerned Subject Teacher, access given only for three working days of succeeding month
Marks	Captures student marks (Internal/External)	**Internal:** Subject Teacher, access given only for nine working days after the conduction of last examination **External:** Academic Member of Concerned Department
Examination Registration (Regular/Backlog)	Captures Exam Registered by the student for the semester and generate Bar-coded Challan form for payment of semester fee	Students with the guidance of Academic Member of Department
Curriculum	Provides access to curriculum	Student and Staff
Lesson Plan	Provides Lesson Plan of all the subject along with the week map and learning resource used	Staff and Student, (Concerned Subject Teacher uploads the lesson plan)
Skill Map	Captures the skill set of student and make a matrix for identifying the grey area	Student in consultation with Academic Member
Student Notes	Hand written notes on various topics/subjects are made available	Student and Staff (Students are motivated to upload the notes)
Question Paper	Board/University Question Paper of various subjects are made available	Staff and Student
*Co-Curricular	Captures option of various students for participation in various co-curricular activities	• **Students**: For selecting option for participation. • **Student Secretary:** For preparation of report for conduction of programme. • **Cultural Convenor:** For identifying the student who have not shown interest in

Module	Features	User
	any events	

* Trial Stage

Table 2: Modules in Student Information System

The above application is developed in ASP.Net 2.0 as Front End and Oracle 8i as Back End and has been designed to generate various reports which are used to monitor student performance, class performance, the academic performance of the same student throughout the study in the institute, the trend of the class till final year, etc. The students have access to the relevant reports using smart card/enrollment number. The data is also used to carry out result analysis for finding out the root cause of poor result. It also generates reports which are required to be sending to various Govt. Agency, University and Board. The details of some of the reports are as under:

- Compilation of Attendance & Marks and Generation of Defaulter followed by Letter to Parents
- Internal Marks Statement as per University/Board Format
- GPA and CGPA Calculation based on Final Results Sheet
- Result Analysis Report for the Semester, Staff, Subject, Subject Type(Analytical/Descriptive) and Marks Range to identify probable cause of poor results.
- Individual Student/Class Trend
- Component wise fees compilation for transfer into different account heads.

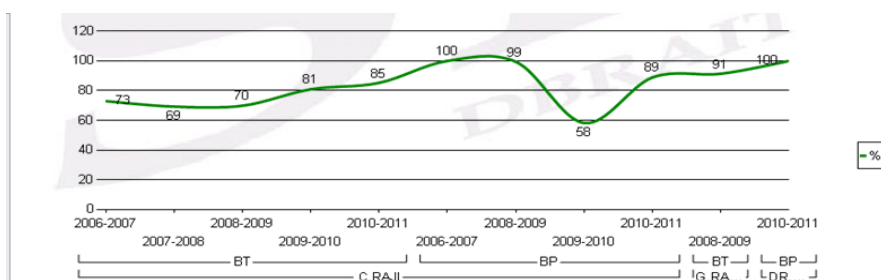Screen shot of few reports generated is as under in Figure 4 (a) & 4 (b):
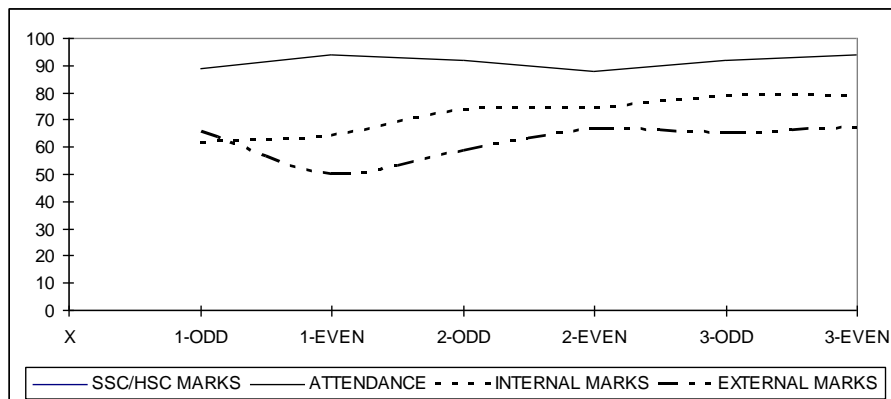

Figure 4 (a): Subject Wise Result Analysis

RESULT ANALYSIS OF INDIVIDUAL STUDENT

Enroll No. *08050004*   Name of the Student *P.KARTHICK*

Deptt. *DCE*

Attendance/Marks	X	1-ODD	1-EVEN	2-ODD	2-EVEN	3-ODD	3-EVEN
SSC/HSC MARKS	47.06						
ATTENDANCE		89.00	94.00	92.00	88.00	92.00	94.00
INTERNAL MARKS		61.56	63.93	73.59	74.38	78.64	78.82
EXTERNAL MARKS		65.53	50.21	58.75	66.60	65.31	67.00

- **Examination Time Table**

o The Examination Timetable package is developed in ASP.Net 2.0 as Front End and Oracle 8i as Back End. The main objective of this package is to prepare a timetable both for internal examination and for external examination based on the Subject Registration of the student (Regular/Arrears) paper. The students have an option to use the package and give the choice of the subject where holiday is required before the examination.

2.2 STAFF RELATED

- **Attendance & Pay Roll**

  This module captures Biometric Finger Print of all the staff for daily attendance and the reports generated showing the monthly attendance both incoming and outgoing time is used for preparation of salary. The application also has a provision to capture incoming and outgoing during the working hours. The application also updates the leave; the software is being further modified for applying various types of leave. The screen shot for monthly attendance statement is as under in Figure 5:

DR.B.R.AMBEDKAR INSTITUTE OF TECHNOLOGY
PAHARGAON, PORT BLAIR

STATEMENT OF MONTHLY ATTENDANCE FOR THE MONTH OF : October- November 2011

DEPARTMENT: A.V.CELL

S.No.	Name	Designation	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	01	02	03	04	05	06	07	08	09
1	Sanjeeb Roy	Phy Edn Instructor	0727	0729	0731	0701	0729	0701	S	0727	0722	0707	0707	0709	SAT	S	0727	0715	H	0737	0708	0711	S	0712	0711	0726	CL	0706	0722	S	H	0702	0651
			1618	1533	1542	1553	1534	1718	S	1535	1611	1534	1538	1540	SAT	S	1535	1526	H	1538	1535	1611	S	1539	1530	1526		1544		S	H	1524	1554
2	Pal Swamy	Reprography Attd	0736	EL	EL	EL	EL	EL	S	1023	0746	0747	0822	0726	SAT	S	0736	CL	H	RH	0741	0727	S	0731	0725	0727	0729	0805	0807	S	H	0735	0729
			1532	1528					S	1529	1528	1529	1529	1528	SAT	S	1526		H		1530	1526	S	1531	1528	1528	1527	1527	1527	S	H	1531	1620

Figure 5: Monthly Attendance Statement

- **Time Table**

  The portal also has the linkage with the timetable software which has been developed by the external agency and used by the institute to finalize the semester timetable. The package has built in feature to avoid clash of classroom/lab and teachers. Various reports are generated to get the loading of individual teacher/labs. The screen shot of timetable application is given in Figure 6.

Figure 6: Screenshot of Timetable Application

- **Question Paper Generation**

  One of the most time consuming activities of teaching learning process is preparation of question papers and evaluation of answer script. In order to reduce the time in preparation of question paper and maintain required confidentiality, an application has been developed in JSP as Front End and Oracle 8i as Back End, which picks up questions on random basis from the question bank and generates question paper as per the desired format specifying number of questions with 02, 04, 06, 08 marks. The software also supports various figures such as circuit diagram, symbols, mathematical expression, network models, etc. The screen shot of specification table used to select number of question of different marks and for finalizing the format is shown in Figure 7. The question banks are

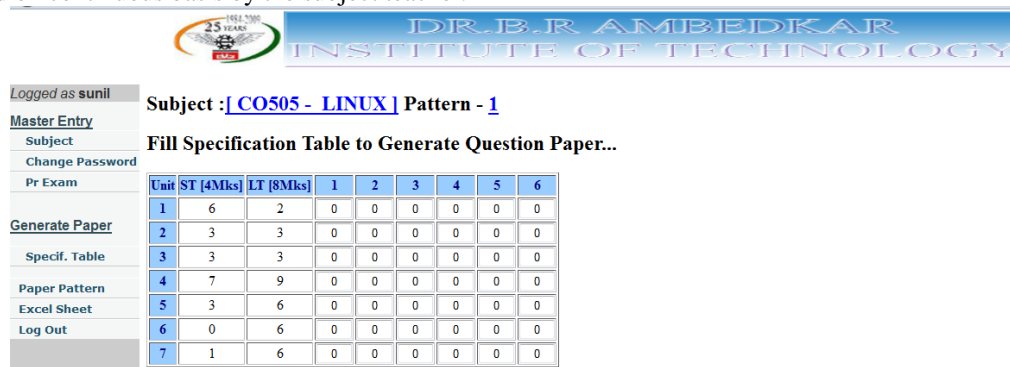updated on continuous basis by the subject teacher.

Figure 7: Specification Table Format

- **Staff Welfare Fund**

   In order to provide financial support to the supporting staff, all the staff of institute joined together and started contributing fixed amount per month which is now accumulated to Rs. 25 Lakhs. A package has been developed to facilitate the processing of loan request including disbursement of loan. It also monitors the recovery and generates MIS.

2.2   GENERAL

All Government Institutes are required to follow certain rules and regulations as laid down by Central/State Government. There are procedures for purchase of goods, service rules governing the service conditions of employees. Similarly private institutes have also framed certain business rules which are followed by the institute. Timely retrieval of important document is also one of the major factor required in decision making by the administrators. This module addresses all these issues.

- **Budget & Expenditure Monitoring**

   This application was developed by Computer Science & Engineering Department for A & N Administration way back in 2003. After detailed system study the package was developed to prepare all the bills which are sent to Pay & Accounts Office (Govt. Treasury). This has been implemented by all the DDO's (Drawing & Disbursing Officer) of A & N Islands except Forest Department and APWD since they follow different accounting system. It captures all input data to generate following bills:

   a.   Salary Bill
   b.   LTC/TA/Leave Salary Advance Bills
   c.   Children Education Subsidy/Stipend Bill
   d.   Fully Vouched Contingent Bills (All Purchase Bills)

   The application developed has a provision to block the fund for which the bill is under process   and   post the expenditure head wise, scheme wise for all the departments of A & N ———Administration. It also generates an MIS to keep track on the number of days the bills were   held-up at various stages thereby bringing the sense of accountability and transparency. The ——expenditure report of the institute as on 18th of Nov, 2011 may be seen in Table 3.

2203———— Technical Education

**00105———— Polytechnics
NON PLAN**

	Budget Estimate	Blocked	%	Balance (1-2)	Expenditure	Balance (1-4)	Target Achieved	Bill Process

07.00.01	Salaries	28000000	23184646	**82.80**	4815354	19797997	8202003	**70.71**	%	3386649
07.00.03	OTA	50000	19654	**39.31**	30346	17753	32247	**35.51**	%	1901
07.00.06	Medical Treatment	50000	17810	**35.62**	32190	6697	43303	**13.39**	%	11113
07.00.11	Domestic Travel Expenses	200000	204790	**102.40**	-4790	189290	10710	**94.65**	%	15500
07.00.13	Office Expenses	700000	99744	**14.25**	600256	99744	600256	**14.25**	%	0
		29000000	**23526644**	**81.13**	**5473356**	**20111481**	**8888519**	**69.35**	**%**	**3415163**

PLAN

		Budget Estimate	Blocked	%	Balance (1-2)	Expenditure	Balance (1-4)	Target Achieved		Bill Process
07.00.01	Salaries	36150000	29653537	**82.03**	6496463	26043109	10106891	**72.04**	%	3610428
07.00.02	Wages	7000000	5065750	**72.37**	1934250	5060012	1939988	**72.29**	%	5738
07.00.03	OTA	150000	125297	**83.53**	24703	123797	26203	**82.53**	%	1500
07.00.06	Medical Treatment	400000	375030	**93.76**	24970	273558	126442	**68.39**	%	101472
07.00.11	Domestic Travel Expenses	600000	315059	**52.51**	284941	191375	408625	**31.90**	%	123684
07.00.13	Office Expenses	10000000	4608291	**46.08**	5391709	3697674	6302326	**36.98**	%	910617
07.00.20	Other ~~Admn~~Admin. ~~istration~~. Expenses	1500000	1156439	**77.10**	343561	727213	772787	**48.48**	%	429226
07.00.28	Professional Services	10000000	6258363	**62.58**	3741637	6258363	3741637	**62.58**	%	0
07.00.31	Grant - in - Aid	100000	0	**0.00**	100000	0	100000	**0.00**	%	0
07.00.34	Scholarship/ Stipends	2300000	1596099	**69.40**	703901	1266127	1033873	**55.05**	%	329972
07.00.50	Other Charges	1400000	949792	**67.84**	450208	806532	593468	**57.61**	%	143260
		69600000	**50103657**	**71.99**	**19496343**	**44447760**	**25152240**	**63.86**	**%**	**5655897**

4202 ——— Technical Education

02.104——— Polytechnics

PLAN

04.00.52	Machinery & Equipments	17000000	7639739	**44.94**	9360261	6610781	10389219	**38.89**	%	1028958
		17000000	**7639739**	**44.94**	**9360261**	**6610781**	**10389219**	**38.89**	**%**	**1028958**

TOTAL		**115600000**	**81270040**	**70.30**	**34329960**	**71170022**	**44429978**	**61.57**	**%**	**10100018**

Table 3: Expenditure Report of the Institute

- **Purchase and Stores**

This module facilitates the indenting department to enter their requirement in a format (Purchase Requisition Form-PRS) giving detailed specification and approximate rate. The other columns of PRS such as date and quantity of last drawn, Stock Reference are filled from the database. The indenting department submits the hard copy which is signed by all other members and sent to purchase section. Purchase section uses the information available in the soft format and processes further. The software generates Tender Notice by incorporating enlisted vendors if it is a limited tender. In case of Open Tender, the notice is generated in a different format. After receiving a tender, the name of the firm, the rates and other details are fed into the system to generate Techno Commercial Evaluation (TCE) Report. After the scrutiny by the purchase team, system generated purchase order is issued to the vendor. After the goods are received further processing is done in Expenditure Monitoring Module

- **Important Document Finder**
  A module has been developed to facilitate the decision maker to retrieve required document using a search engine. The search engine is flexible and it responds to one of the criteria such as a keyword, subject, date etc. The document comprises of .pdf, .doc, or .txt format.

- **e-Circular**
  In order to ensure timely communication to all the team members, a module has been developed which has a provision of uploading all the circulars/inter departmental notes. This is accessed by the concerned; there is a provision of searching a circular from the archive using keyword, date, subject or circular number.

3. CONCLUSION

The process of e-Governance in BRAIT was started 10 years ago following a structured approach of process mapping, process re-engineering followed by computerization. The package has undergone continuous revision with respect to platform as well as features. The benefits accrued by the above e-Governance initiatives are as under: -

- Improving the work culture of the institute and self discipline among the staffs
- Capacity building of staffs
- Institute became a resource centre for supporting IT initiatives of A & N Administration
- Enhanced employment opportunities for the students due to better skill sets
- System driven with no scope for adhoc decisions in routine academic matters

Andaman & Nicobar Islands being geographically isolated from mainland India posses a challenge in adopting best practices which is otherwise prevalent in other institutes of our country. The BRAIT team has successfully transformed the challenge into opportunity and implemented the e-GOV initiatives in the institute with no additional expenditure.