

Best practice I

Title: Smart Campus With Enhanced Teaching Learning and Research Facilities.

1. **Introduction:** The campus is situated at a rural and backward area but, different ICT based social welfare programmes and outreach activities have been taken and the University campus has been converted to smart campus where each of the stakeholders including students, faculty and researchers are largely benefitted.
2. **Objective:** The basic objectives of the best practices are as follows:
 - (i) In addition to the wired LAN, The whole campus to be made Wi-Fi enabled with highest level security in place. Students, faculty and researchers should access internet from their departments, hostels and residence with high availability on 365*24 basis.
 - (ii) Teaching Learning process may be conducted through the use of smart/virtual class room with online courses for students and user friendly “Chatrabandhu” Mobile Apps for online transmission of information, (iii) Student -Teacher interaction should be enhanced live and online. (iv) Smart Card based Attendance and access may be added to the campus for easy and immediate access to various information.

Context: Our University situated in rural area and our students’ mostly first generation learner, where the teachers and students were following classroom teaching with conventional chalk-duster without much use of ICT devices. Only a few LCD Projectors. The information to students were transmitted through Notice Board and partly through Website. No digital/Online financial transaction in the campus. All students could not access internet due to non-availability of devices class hours. Whole campus could not be made secured through use of manual security. Our target is to overcome all the above problems and become a smart campus by resolving all the above requirements including security surveillance systems and motivate and train all the stakeholders in using the Smart Campus Components effectively.

The Practice: As a result of converting the campus to smart campus, we have adopted a number. of unique practice during its implementation.

- a. In implementing Wi-Fi, we have adopted a unique policy for security and user category and time based access control has been deployed.
 - b. In Higher –Education for research facility (24 hours access) is necessary and it has been implemented.
 - c. Campus security is an important access which has been implemented through introduction of smart class and IP_CCTV based Surveillance system in the campus. Though the campus is very large but almost all locations are covered in Wi-Fi and surveillance system.
 - d. With the inception of “Chatrabandhu” Mobile Apps, student-teacher interaction enhanced and teaching-learning process has now become live and Mobile Apps based student attendance has been proposed.
- (i) Evidence of success:** As a result of evidence of success, the observations are in following—

- a. Use of internet bandwidth has grown up from 100 MBPs to 600 MBPs as because each of the stake holders is using Wi-Fi facility 24*365 basis.
- b. Because of CCTV-Surveillance and deployment of smart class facility, campus inclusion has been detected and minimized.
- c. Because of VOIP and VIDEO conferring installation, communication and remote meeting has been enhanced.
- d. Teaching learning process has been enhanced through smart class room and faculty and students are highly satisfied in using technology which is reflected through their performance.
- e. Student teacher interaction has significantly enhanced.
- f. Students information are instantly transferred.
- g. Different ICT based social welfare and outreach activities have been taken (Training on Cashless Economy through NSS Volunteer, Demonetization and public awareness on Blue Whale Threat)

(ii) Problem encountered and resources required:

- a. Motivating the all stake holders in their rural area in using the facility was a real problem to the authority which has been overcome.
- b. To deploy the facility the following resources were required –
 - i. Wi-Fi Controller
 - ii. Security Server
 - iii. Wi-Fi Access point
 - iv. Smart card
 - v. Various kind of PoE & non PoE Switches.
 - vi. Smart class access devices (various components) and necessary softwares.
 - vii. Security doors
 - viii. IP camera with VMS and storage.

Best practice II

Title: Use of Solar light in the campus of Vidyasagar University for Saving Energy.

1. Objective of the practice

The main consideration in the present field technologies are Automation, power consumption and cost effectiveness. Automation is intended to reduce man power with the help of such intelligent system. Power savings is the main consideration as the conventional source like thermal, hydropower etc. are getting diminished due to various reasons.

The main aim of the practice is automatic street light power saving system to save the power consumption of the university. We want to save power automatically instead of doing manual. So it is easy to make cost effectiveness.

Hence, we introduced such intelligent systems for the usage of street lights.

2. The context

This project aims in designing and implementing the advanced development in embedded systems for energy saving of street lights. The conventional power required

is zero in this practice as the CFL lamp of rating 11 watt are used and powered by solar energy through rechargeable battery in this practice. The system has been introduced to automatically switch ON at dusk, operate throughout the night and automatically switch OFF at the dawn. In this practice the actual timings of these street lights to be switched on when there is suitable darkness. Hence we can save man power as well as to eliminate the wastage of power.

3. The Practice

The lamp used in this practice is of compact fluorescent lamp (CFL), 2 pin type with a rating of 11 W and the output from the lamp is around 900+5% lumens. The lamp is housed in a weather proof assembled cover for outdoor use with a reflector on its back. Electrolyte based positive tubular plate, lead acid rechargeable battery is installed. The batteries have a rating of 12 V, 75 Ah discharge rate.

The PV modules contain crystalline silicon solar coils have been installed. The output of the module is 37 watt for each lamp. The system has protection against battery overcharge and deep discharge conditions. Fuses also provided to protect against short circuit conditions.

The poles of mild steel pipe with height of 4 mtrs above the ground level have been installed. The poles hold the water proof lamp housing and PV module on its top and metallic box for housing the battery on man height.

About 34 numbers of such types of solar street lights have been introduced in the campus of Vidyasagar University, specifically at the road from boys' hostel to gate no-3 and at the residential campus

However there are certain limitations in this practice as stated below.

Solar street lights require higher initial investment compare to conventional street lights. Rechargeable batteries must be replaced a few times within the lifetime of fixtures. This adds up to the total lifetime of such solar street light system. Just like other components, rechargeable batteries also get exhausted frequently.

Dust and moisture can easily accumulate on horizontal PV panels. This leads to reduce or full stoppage of energy production. This can damage the whole system also.

4. Evidence of Success.

The consumption of power savings was calculated as below:

34 Nos. 11 watt each CFL lamp have been introduced which takes zero consumption from conventional energy source, whereas 34 Nos. 70 watt conventional street lights may consumed $(34 \times 70 \times 12\text{hrs.}) / 1000 = 28.56$ KWh Per day. Hence approximate consumption of power savings is about 29 units per day which get monetary benefits from electricity (conventional) bill.

5. Problem encountered and Resources required.

Street lights were not employed all the streets of the residential campus. With the use of solar lights the problem was overcome. In addition to that the misuse of power was saved due to implementing automatic on / off system. The man employed for this purpose was withdrawn and thus manpower was saved.

The CFL lamps, stand for setting lamp, solar battery were used as the main resource for this practice. Beside this engineering help was provided by the section of University engineer.

