

# Online Survey Portal for Collection of Data for Accreditation: A Case Study from an Engineering College in South India

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**Abstract**— Employer survey and alumni survey are the two major assessment tools used by higher education institutions worldwide to assess the attainment of programme educational objectives (PEOs) and programme outcomes (POs). The traditional methods hitherto adopted to collect data, such as posting of questionnaires or responses through emails, have proved to be inefficient and time consuming. The proposed methodology, which hosts the survey on a web portal, provides better convenience for the respondent in terms of choosing the device for sending the response. This paper demonstrates that a web based survey portal could be trustworthy and user friendly, resulting in better response compared to traditional methods.

**Index Terms**— Accreditation, Alumni Survey, Employer Survey, PEOs, POs, Online Portal, Mobile Response.

## 1 INTRODUCTION

There is a paradigm shift in engineering institutions in India, from teacher centric to student centric education. The institutions are increasingly looking at what the students can deliver at the end of four years of under-graduate programme. More importantly, the institutions are questioning themselves, whether their graduates, after 3-5 years of professional experience, have the wherewithal to survive and contribute as engineering professionals in highly competitive environment. While programme outcomes (POs) reflect what the student can deliver at the time of graduation, programme educational objectives (PEOs) indicate what the graduate can deliver after 3-5 years experience in the field.

Now, it has become mandatory for engineering colleges in India to get accredited by the National Board of Accreditation (NBA), in order to get new programmes approved by the statutory bodies such as the University Grants Commission (UGC) or the All India Council of Technical Education (AICTE) [9]. Accreditation has gained more importance due to mushrooming of large number of engineering colleges in the country and the consequent need to ensure that they meet the expectations of stake holders, comprising students, parents and the industry. An unaccredited institution will not be eligible for most of the government funding programmes for higher education institutions. It is important to note that India became a permanent signatory to the 'Washington Accord' in July, 2015. The implication is that an accredited engineering programme is an educational passport for an Indian graduate to pursue higher studies in countries such as the USA, UK, Australia, Germany, and many other member countries of the Washington Accord [6]. Many Indian institutes are also getting accredited by international accreditation agencies like Accreditation Board for Engineering and Technology (ABET), USA.

Accreditation is a rigorous process carried out for an institution to recognise its competency to perform its assigned specific tasks. Major accreditation bodies in India are National Board of Accreditation (NBA), National Assessment and Ac-

creditation Council (NAAC), Bar Council of India (BCI), Medical Council of India (MCI), etc [8]. One of the credible means of assessing PEOs and POs is through surveys; alumni survey to get feedback from alumni who have graduated in the last 1 to 5 years, and; employer survey to learn firsthand from the employer the performance of the graduates. An institution would formulate sets of statements of POs and PEOs, through well documented processes. The initial statements are prepared by brain storming in the peer group. Then, feedback is elicited by the stake holders, namely, alumni, parents, students and the industry, in order to fine tune the statements [7]. Now, design of curriculum and individual courses are aimed at achieving the main objectives listed in PEOs and POs.

The proven assessment methods for assessing PEOs and POs are the alumni survey and the employer survey. The surveys comprise a set of questions, some direct and others indirect, so that authentic and credible feedback could be obtained from the stake holders [2]. While this paper does not go into the nitty gritty of framing of survey questions, we are more interested in the administration of the survey in an efficient manner by employing modern communication tools. Most of the institutions, which have used traditional methods such as mail surveys, emails, telephone surveys, etc., have experienced either inordinate delay in getting response or poor response. Braunsberger et al also compares the feasibility between telephonic survey and web-based survey. Web based survey is analyzed to be cheaper and less time consuming. In our own Institution, the National Institute of Engineering, Mysuru, INDIA, we resorted to traditional survey methods mentioned above during the years 2011-14. While the response rate for alumni survey has been 20-25%, the response rate for employer survey has been a pathetic 5-6%. It became apparent that the respondents deemed the filling of questionnaire as an additional burden, which is time consuming. The entire exercise required a formal setting, where the respondent has to sit with his/her desktop or laptop or a writing desk to finish the job. Therefore, there was a tendency to postpone the task, which ultimately, was lost from memory.

Therefore, we started exploring ways and means of improving response. We wanted to adopt a methodology, which provided a means of giving feedback even in a non-formal setting, such as travelling in a car or relaxing during break time [10]. This paper highlights utilization of modern communication technology, which enabled use of even a smart phone to give the response, thereby, conveying the impression to the respondent that it is not a very formal task after all. The methodology, which hosts the survey on a web portal, provides better convenience for the respondent in terms of choosing the device for sending the response. The webpage provides an optimal viewing and interaction experience—easy reading and navigation with a minimum of resizing, panning, and scrolling—across a wide range of devices (from desktop computer monitors to mobile phones). Our study demonstrates that a web based survey portal could be trustworthy and user friendly, resulting in better response compared to traditional methods.

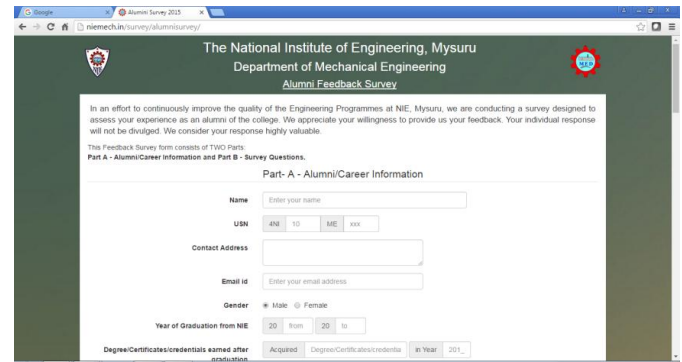


Figure 1: Screenshot of Alumni Survey Portal  
The rating can be given at the following four levels:

1-Excellent	2-Good	3-Satisfactory	4-Not Satisfactory
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## 2 THE PROCESS OF ALUMNI AND EMPLOYER SURVEY

As stated earlier, alumni and employer surveys provide indirect means for assessing POs and PEOs. The suggested frequency of conducting these surveys is listed in table no.1 below.

Table 1: Indirect Assessment Tools

Objectives being Assessed	Assessment Tool	Weightage	Frequency
Programme Educational Objectives	Alumni Survey	Typically 75 %	Annual
	Employer Survey	Typically 25 %	
Programme Outcomes	Junior Alumni Survey*	100 %	Annual

\* Those who have graduated the previous year

The process of generating response from survey is a proven process. However, a scientific design of survey questionnaire is of paramount importance. The conceptual dimension of student outcomes identifies many definitions related to higher education. Content validation of a survey form is one the most important task because it is the data which interacts with the alumni/employer. It should be short enough so that it does not discourage the responder but also should generate sufficient data for further documentation of any required report [4].

The main input fields required for an alumni survey would be the unique number issued by the university, name of the graduate, year of graduation and specialization of the degree. Type of organisation and major responsibilities handled by the alumni would be valuable information. Further any other information related to achievements made by alumni can also be gathered by alumni survey. Questions should be formulated so that whenever there is a response generated it can be mapped and assessment of these POs can be done.

Figure 1 shows a typical screen presented to the respondent. The respondent can rate a particular aspect on a scale of 1 to 4, 1 being most favourable rating while 4 denotes a negative assessment.

The responses received at level-1 should be registered as response of 100% while the response at level-4 should be reckoned as 0%. We need to use a simple mathematical equation to calculate the attainment level of each PO by the number of response received. The response received at Good (level-2) and Satisfactory (level-3) should therefore be scored as 66.66 and 33.33, respectively, or rounded off to a nearest number. For example, if the response received is 100 (variable t) of which, 22 are excellent (variable p), 33 are good (variable q), 20 are satisfactory (variable r) and 25 are not satisfactory (variable s). Attainment Level can be calculated by the following equation,

$$\text{Attainment} = ((p \times 1) + (q \times 0.7) + (r \times 0.4) + (s \times 0)) / t = ((22 \times 1) + (33 \times 0.7) + (20 \times 0.4) + (25 \times 0)) / 100 = 53.1\%$$

Experts suggest that while employer and alumni survey should be the major tools for assessing PEOs, junior alumni survey (survey of alumni who graduated the previous year) should be one of the components, in addition to other direct assessment methods, for assessing POs. The methodology, which is usually followed for conducting the surveys is illustrated in figures 2 and 3 below.

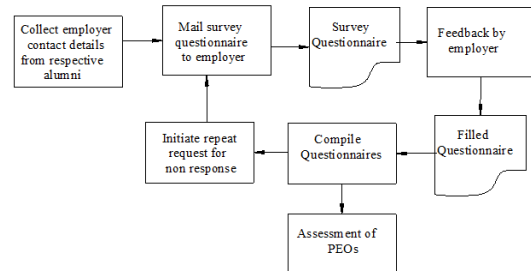


Figure 2: Process of Employer Survey

Compilation of contact details of immediate reporting officer of an alumnus is the first step in carrying out employer survey. The best way of doing it is to administer alumni survey questionnaire first and eliciting employer details as a part of the questionnaire. Once the contact details are available,

questionnaires are dispatched to the employer, who in most cases is the immediate reporting officer for the alumni. The filled questionnaires, which are received, are carefully compiled and filed for further analysis. In case of non responses, repeat requests need to be dispatched to get the response.

The alumni survey is little straight forward and carried out as shown in figure 3 below. In this case also, repeat requests need to be sent to alumni to get required number of responses.

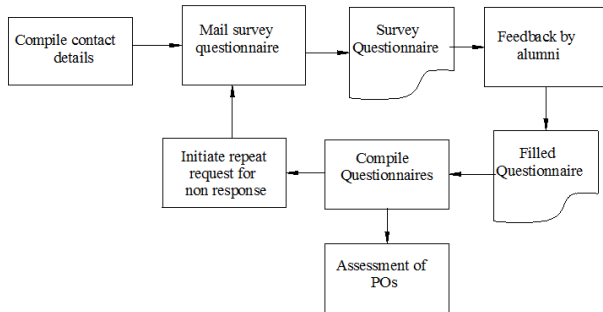


Figure 3: Process of Alumni Survey

### 3 PORTAL FOR HOSTING OF SURVEYS

The first step for the online portal is to choose the domain name and where hosting of website can be done. After searching for various domain names niemech.in was chosen. For hosting the website we took the hosting in quick2host.in with 10 years plan and with unlimited database space and 20GB storage space.

The initial plan was to get the response from the alumni/employer and send as an email through Pre Processor Hypertext (PHP) mailer, which is a code library to send emails via PHP code from a web server. Later it was decided to have the data saved in the database and send the email with the response in a PDF as attachment. For having the response in a PDF we used TCPDF, which is a free and open source software PHP class for generating PDF documents.

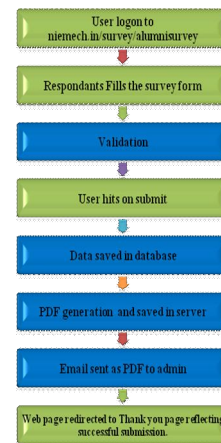
For the UI (User Interface) design, we started with plain HTML with CSS. Later on, we used Bootstrap to make the webpage responsive to provide an optimal viewing and interaction experience—easy reading and navigation with a minimum of resizing, panning, and scrolling—across a wide range of devices (from desktop computer monitors to mobile phones).

Once the UI with all the necessary fields were done, the next step was validating each field. Some of the examples are as below.

1. Name field should contain a maximum of 40 characters and should allow only letters.
2. Making the first letter of each word capital once the name is entered.
3. Some part of the USN (University Seat Number) fixed. (For Ex. 4NI09ME109, in this 4NI(college code) and ME (Branch Code) being fixed)
4. Validating the email address.
5. Removing all the fields related to employment, which the employment option is selected as Unemployed.

6. Making the field available to fill option which is not mentioned in the list of organization type when others check box is checked.

The flowchart from the designer perspective is given below,



The processes in blue box are background processes which are not visible to users, while green boxes are foreground process.

#### 3.1 PO Calculation:

For the PO calculation we create two views (from the database table), one to cumulate the number of response for each question and the other to calculate the PO using the formula mentioned above.

#### 3.2 PO Graph:

For the PO graph we used PHPLOTP, which is a PHP graphics class for creating charts and plots.

#### 3.3 Documentation requirements

Most accreditation agencies never give any specified format for scrutiny. This makes documentation a tricky process. Every institution has to understand the requirements of each accrediting agencies and has to prepare required documents with suitable justification. Documentation forms a major part in any accreditation process. The report has to convey all details necessary and should also be concise. Any change in format can result in complete change of data to be collected.

### 4 RESULTS AND DISCUSSIONS

Many researchers have addressed the need for shifting to new technologies to adapt to changing demography of respondents (Lambert, A. D., & Miller, A. L. 2015). Smart phones have really caught the imagination of younger generation in general and corporate executives in particular. Smart phones are emerging as powerful aids for social interaction. Many respondents have expressed their inability in accessing personnel mail at companies compelled with non access of Microsoft office application. Online portal was proposed to overcome these shortcomings which are given in the following charts. The earlier practice of eliciting survey responses from alumni is illustrated in figure 5. Survey form in word format was sent by email to the alumni. The filled forms were sent

back by alumni, which were compiled and analysed.

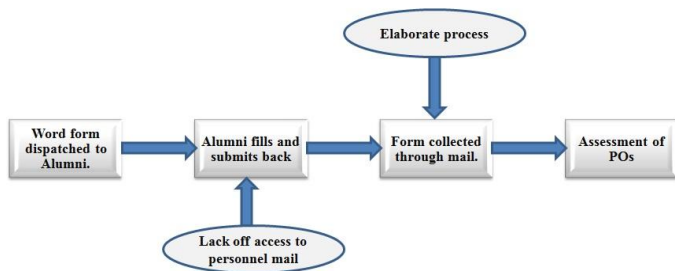


Figure 5: Previous Process of Conducting Surveys

On the other hand, the new process of conducting surveys, illustrated in figure 6, involved sending a message to the smart phone of the respondent. The message comprised a link, which straight away, linked the respondent to the survey website.

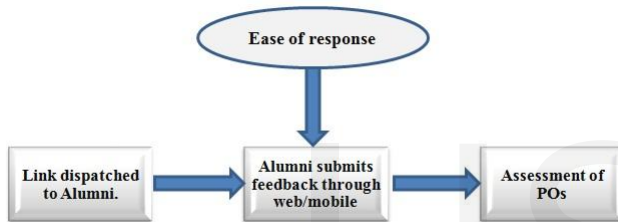


Figure 6: New Process of Conducting Surveys

Respondents expressed their ease in responding to survey as they could reply through smart phones, which are very common among graduates. The interface which was similar to common survey platforms, proved to be user friendly. A comparison of responses received for alumni and employer surveys is presented in table 2 below. While the first three rows show the number of responses collected for the first three years, i.e., from the year 2011 to 2013, using the old process, the last two rows pertain to the responses received as per the new method using smart phone.

Table 2: Number of responses of Alumni and Employer Survey

Sl. No	Alumni Graduating Year	No of responses			
		Alumni Survey		Employer Survey	
		No. of alumni contacted	No. of responses	No. of alumni contacted	No. of responses
1	2011	124	19	10	0
2	2012	131	23	15	2
3	2013	137	27	20	3
4	2014 (Online portal)	135	52	35	9

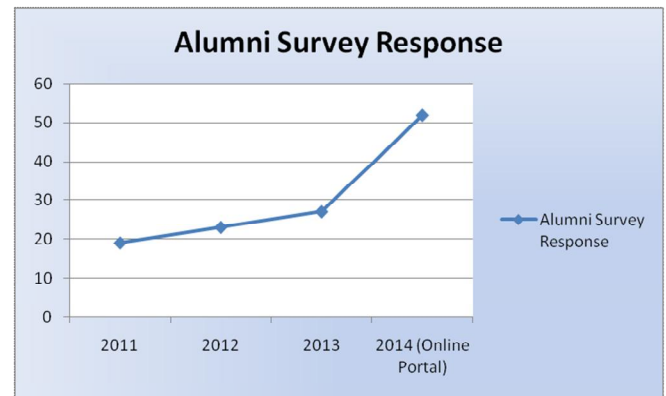


Figure 6: Impact of Online Portal on Alumni Survey

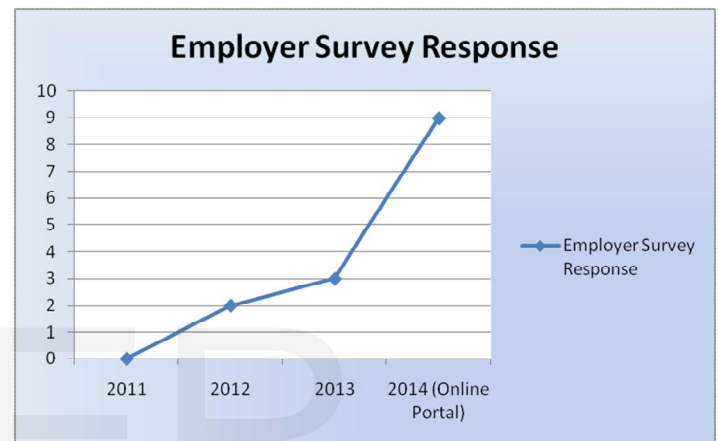


Figure 6: Impact of Online Portal on Employer Survey

It can be seen that the online portal has significantly increased the number of responses by both alumni and employers. Poor response of employers to surveys conducted by institutions is a phenomenon faced worldwide including many reputed universities from the USA to Australia. This may be mainly due to difficulty involved in tracking graduates and their employers. Other reasons appear to be absence of regular contact with alumni and tendency to postpone the task by alumni and employer alike. The new process employing a survey portal has been successful in addressing some of these issues.

## 5 CONCLUSIONS

As part of outcome based education system, higher education institutions need to conduct alumni and employer surveys to assess the attainment of PEOs and POs. The response rate in the conventional method of carrying out survey either using paper format or email, is quite dismal. In our own institution, while the response rate for alumni survey has been 20-25%, the response rate for employer survey has been a pathetic 5-6%. It became apparent that the respondents deemed the filling of questionnaire as an additional burden, which is time consuming. The entire exercise required a formal setting, where the respondent has to sit with his/her desktop or laptop or a writing desk to finish the job. Therefore, there was a tendency to postpone the task, which ultimately, was lost from



memory.

As seen in responses, development of a web portal has resulted in substantial increase in responses as also discussed in Dumford et al. keeping in mind the change in mindset of respondents we need to adapt new system to avail responses from alumni and survey. The respondents of our new portal expressed their satisfaction about the convenience in responding to surveys. Making the survey mobile compatible accelerates the responses. The process was designed in such a way that it can be easily replicated for any higher education institution. The results were also authenticated by experts, who expressed satisfaction that the survey portal meets international standards. Further, we also need to explore technologies where we can make these surveys even more efficient, ease to respond, safe to document, and instant accessible by more number of people.

## ACKNOWLEDGMENT

The author would like to thank the Principal and Management of The National Institute of Engineering, Mysuru for their support and TEQIP-II for financial support

## REFERENCES

- [1] Braunsberger, K., Wybenga, H., & Gates, R. (2007). A comparison of reliability between telephone and web-based surveys. *Journal of Business Research*, 60(7), 758-764.
- [2] Cabrera, A. F., Weerts, D. J., & Zulick, B. J. (2005). Making an impact with alumni surveys. *New Directions for Institutional Research*, 2005(126), 5-17.
- [3] Dumford, A. D., & Miller, A. L. Does Allowing Survey Takers to Switch Devices Improve Responses?
- [4] Ewell, P. T. (1983). Information on Student Outcomes: How to Get It and How to Use It. An NCHEMS Executive Overview.
- [5] Lambert, A. D., & Miller, A. L. (2015). Living with Smartphones: Does Completion Device Affect Survey Responses?. *Research in Higher Education*, 56(2), 166-177.
- [6] Prasad, G., & Bhar, C. (2010). Accreditation system for technical education programmes in India: A critical review. *European Journal of Engineering Education*, 35(2), 187-213.
- [7] Soundarajan, N. (2002). Preparing for accreditation under EC 2000: an experience report. *Journal of Engineering Education*, 91(1), 117-123.
- [8] Stella, A. (2015). Institutional accreditation in India. *International higher education*, (27).
- [9] Viswanadhan, K. G., Rao, N. J., & Mukhopadhyay, C. (2004). A prediction of the accreditation status of engineering programmes in India: a logistic regression approach. *World Transactions on Engineering and Technology Education*, 3(2), 195-198.
- [10] Wang, M. C., Dziuban, C. D., & Moskal, P. D. (2001). A web-based survey system for distributed learning impact evaluation. *The Internet and higher education*, 2(4), 211-220.