A Feedback System Based Self-Evaluation Framework for Quality Assurance of Multi-Modal Digital Distance Education

Suchismita Biswas, Pramatha Nath Basu, and Tapan Chowdhury

***Abstract*—The concept of Quality Assurance (QA) in Education have proved its importance to provide trustworthy and state of the art education system. Some guidelines for this purpose are already in place. With the new concepts of education dissemination the need of newer effective QA methodologies are evident. The present work has been undertaken to derive a framework for QA of multi-modal digital distance education in developing countries' environment that incorporates QA processes in all identified functional areas of a multi-modal digital distance education dissemination system which is primarily based on survey feedback. The relevant educational organization may implement the framework for self-evaluation to assure quality of disseminated courses. The suggestive framework has been described along with the details about involved processes and phases.**

***Index Terms*—Digital distance education, multi-modal digital distance education, quality assurance, quality factor, QA process, feedback based QA.**

I. Introduction

The fear psychosis of the students of getting insignificant or nothing-at-all education from distance education providers as well as underestimation of such programs by the recruiters are not totally baseless since the comparisons between the face-to-face learning outcomes and the outcomes in distance mode reveal that there are cases of significant differences between the two in many cases. In general, the quality assurance system of the distance courses compared to that of the classroom courses is less emphasized as well as the continuous quality management process and tracking of the total education dissemination system are being ignored. This is not to be denied that in third world countries even eminent institutions that have their conventional face-to-face programs of world-class standard are sometimes deprived off proper recognition of their courses in distance mode, by the recruiters and general public. This aspect is well known [1], [2].

Jadavpur University, one of the premier Universities of India, highly successful in its traditional course dissemination, is carrying out an experimental Multimodal Digital Distance Education program [2]. The emphasis of the program has been on proper quality control so that the students passing out of distance mode are treated in the industry for recruitment at par with those of face-to-face mode particularly if they are attending the same course. The effort has met some remarkable success. This paper describes the present workers' understanding of the methodologies and some aspects of quality assurance.

Manuscript received February 20, 2012; revised December 12, 2012. This work was supported in part by the Jadavpur University, India. Suchismita Biswas. Author is with the Narula Institute of Technology, Kolkata – 700109, West Bengal, India (e-mail: suchismita2006@ gmail.com).

Pramatha Nath Basu is with School of Education Technology, Jadavpur University, Kolkata - 700032, West Bengal, India (e-mail: basupn@yahoo.co.in).

Tapan Chowdhury is with Techno India College, Salt lake, India (e-mail: tapan2004cse@yahoo.co.in).

II. Multimodal Digital Distance Education

Multimodal digital distance education uses several modes like distance mode and face-to-face mode to disseminate the course to the students, which are selected primarily according to the topics and pedagogical approach adopted for a particular topic [2]. The primary intention behind the incorporation of multiple modes is to ease out the Internet bandwidth problems, to equip students with supporting tutorials, practical laboratory instructions for practicing offline, to support mentor-observed practical classes etc., which in effect enhance the "teaching-in-absentia" process in a more effective way.

III. The Suggested Framework

The framework is suggested keeping in mind the distance education scenario in the developing countries [3]. The following reasons mainly stand out as hindrances in the way of a quality digital distance education in the developing countries [4], [5].

- Communication technology: availability, accessibility, speed etc. ;
- Overall economic scenario;
- Awareness on the effectiveness of digital distance education and acceptance of such systems;
- Ignorance of quality assurance process in distance education;

For assuring quality of a MMDDE dissemination system, there is an acute crisis of standard guidelines that can lead to a healthy, well-structured and fully disciplined QA process. In present work, we have developed a conceptual framework which would facilitate the incorporation of the quality assurance process as well as ease up the process of implementation by following the steps defined in it. After going through some experimental phase with trials and errors, we have suggested the following framework for a distance education development that incorporates quality assurance in

DOI: 10.7763/IJEEEE.2013.V3.193

every step.

A. Identification of Principal Functional Areas of the System

To build quality assurance process framework we have identified 8 principal functional areas which can be accumulated to get the total functionality of an education dissemination system for dissemination of a digital distance education course. Thus proper monitoring of each area would lead to development of a total quality management process of the total system.

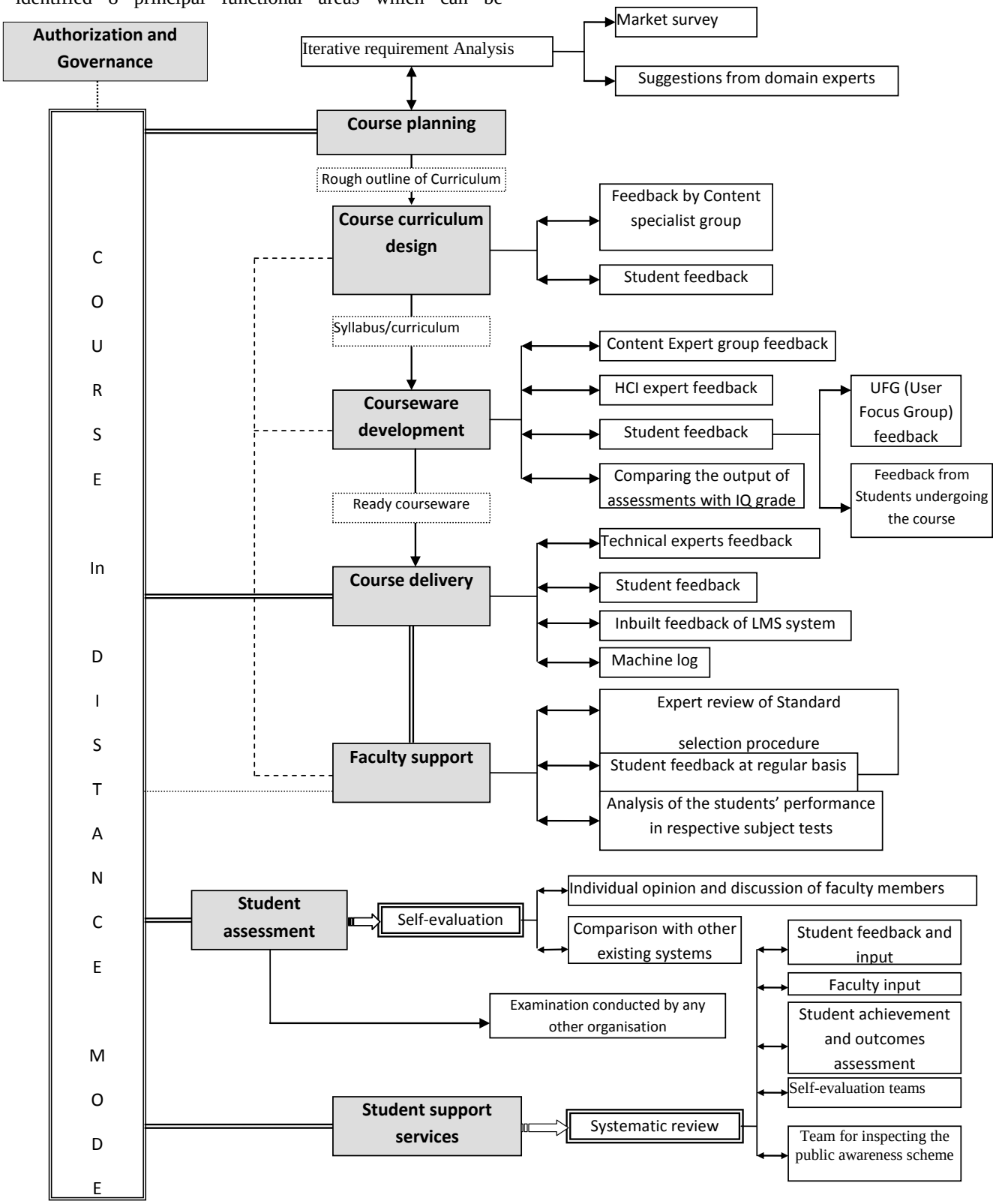

Fig. 1. The diagrammatic representation of the conceptual feedback based framework for QA of a MMDDE system.

1) Authorization and governance

Here the provider institution is assumed to be a competent authority to launch a course through distance education. The governance, management, financial control and quality assurance arrangements of the organization must be sufficient to manage existing operations and respond to development and change.

We did not include the authorization and governance part

as we assumed that the authority itself may conduct the TQM process fully or partially as intended, i.e. the total framework may be implemented by the authority itself for self-evaluation or it may involve a third party organization to carry out the processes.

2) Course outline and curriculum design

For an existing course, over-all objective of the course must be designed keeping an eye on the factors like sustainability and acceptability (by the recruiters/learners) of the course. The course outline designing involves the overall planning and sketching a rough schematic outline about the coverage, duration, required background target learners and the recruitment scope and area after course completion. The course curriculum preparation involves the preparation of more precise structure of the total course curriculum including the detailed syllabi of the subjects and their temporal division [4].

3) Courseware design and development

The development of the courseware prepares the main qualitative base of an MMDDE system as the principle of teaching-in-absentia of distance education reaches to a success when the courseware is really capable to properly "teach" a distant learner.

4) Courseware delivery

Geographical distance of the learners in an MMDDE course leads to the compulsion of the proper choice of mode of dissemination of courseware. Failure to provide proper and prompt delivery (both on-line and offline) of courseware may stand as a large hindrance in the way of achieving good quality education system. The mode of delivery must be optimized as, for example, the problems like bandwidth scarcity, communication infrastructure etc. stands in the way to proper dissemination of online materials in current scenario and the list is, unfortunately, for India, is not so insignificant [4], [6].

5) Face-to-face teaching-learning

Multi-modal digital distance education involves classroom teaching partially as and when required by the course topics. The contact hours primarily include requisite laboratory works.

6) Faculty support

Being an indispensable part of classroom teaching system, the importance of the faculty members does not reduce in a distance education system as courseware quality monitoring and maintenance depends a lot on them as well as their support to the learners is a matter of importance, too.

7) Student assessment

Student assessment has been taken into consideration as a principal functional area, as the proper assessment would provide with the proper outcome, which depicts the quality of the MMDDE system as a whole.

8) Student support services

We have incorporated the concept of student support services which would cover up the constant monitoring on particular areas of the system.

B. The Processes and Factors of the Proposed Framework

The processes and the quality factors have been identified for each functional area to make sure about the flawless functioning of the area in a discrete manner. Table I shows relevant QA processes and sub-processes, which are feedback based, along with the quality factors identified for each identified functional area.

C. The Framework

The proposed framework concentrates on the TQM of a MMDDE system which means total quality management of the aforementioned functional areas. Proper implementation of the processes and sub-processes (if any) would result in the proper assessment of the education system which would lead to proper quality management of the system. We have termed the subordinate processes of a major process as 'sub-process'.

Fig. 1 shows the conceptual framework would help in assimilating the total quality assurance process for the above-mentioned course as well as ease up the process of implementation by following the steps defined in it. The shaded blocks indicate different functional areas of work. Each bi-directional arrow indicates a feedback process whereas the unidirectional arrows indicate the sub-processes within a single process. The boxes with dotted outlines are the deliverables from one process to another. The double outlined boxes with a block arrow indicate internal teamwork for a process. The interconnection between the factors and the program is denoted by double-lines and dotted lines.

D. How to Implement the Proposed Framework

The implementation of this framework means the implementation of the processes properly. The implementation can be streamlined in the way as shown in Fig. 2.

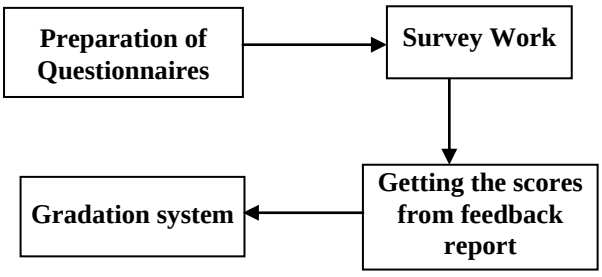

Fig. 2. The implementation outline of the feedback processes defined in each functional area.

Implementation features:

1) Preparing the questionnaire (for each process)

1) The first step for implementation of a process seems to be preparing the questionnaires. The questions must be
   - Relevant;
   - Concise;
   - Proper to take out the information about the current scenario of the functional area;
   - Linguistically legible and unambiguous;
2) The quality factors of each process of the aforementioned table are to be checked thoroughly by the survey work. At the time of designing and preparing the questionnaires, these factors must be covered.

3) For expert focus group questions, the questions should carry the correct information about the infrastructure and functional whereabouts of the education system to get the proper opinion of the experts.
4) Each question must carry proper weight (W_i) according to their importance and coverage towards grading an MMDDE system. The accuracy of weightage assignment of the questionnaires is emphasized here as the proposed framework is based on the cumulative calculation of the marks obtained by each functional phase of the total system.
5) It seems to be convenient to prepare the questions in such a way that the target people may provide the answer through a scale of 1 to 10 (preferably with increasing marks assigned to good quality).

TABLE I: THE QUALITY FACTORS, QA PROCESSES AND SUB-PROCESSES FOR THE FUNCTIONAL AREAS

Functional area	Quality factors to be monitored	Proposed QA Process and sub-process for QA
Course outline and curriculum design	• Acceptability (to the recruiters); • Whether up-to date or not; • Sustainability; • Educational background of students to be fixed;	1. Iterative requirement Analysis: a. Market survey (from employers, industry and subject experts); b. Suggestions from domain experts;
	• Sequence of the subjects • Topic sequencing • The syllabus: time, volume, students' ability to capture, relevance, comprehensive or not;	1. Feedback by Content specialist group; 2. Student feedback (from students undergoing the existing course, if any);
Courseware development	• Content: depth, degree of coverage, accuracy, language legibility, visual design; • Appropriate media selection according the topic; • Technical aspects of computer based material: Audio-video quality, Temporal and logical integration, user-friendliness, File-size and Band-width consideration (for web materials); • Accessibility of the websites; • Graceful degradation; • Student-to-teacher or peer-to-peer real time platform communication provision;	1. Content Expert group feedback; 2. Human Computer Interaction (HCI) expert feedback; 3. Student feedback: a. User Focus Group (UFG) feedback; b. Feedback from Students undergoing the course; c. Comparing the output of assessments with IQ grade;
Courseware delivery	• speed (of on-line deliverables); • punctuality; • service attitude;	1. Student feedback (about the speed, punctuality and service attitude); 2. Technical experts feedback (about technical infrastructure); 3. Inbuilt feedback from the server of Learning Management System (LMS) and/or Machine log;
Face to face teaching -learning	• Lab duration; • Teaching methodology; • Infrastructure;	1. Student feedback; 2. subject experts' feedback:
Faculty support	• Qualification; • Experience; • Provision of on-going re-training process; • Availability of teachers to the students;	1. Expert focus group review on Standard selection procedure; 2. Student feedback (making them anonymous to comment freely) at regular basis; 3. Analysis of the students' performance;
Student assessment	• Frequency; • Mode; • Question pattern; • Marks division; • Evaluation of answer scripts;	1. Feedback by self-evaluation team (built up within the provider organization): a. Individual opinion of faculty members; b. Comparison with existing systems of other education providers; 2. Examination conducted by any other organization;
Student support services	• Promptness; • Accessibility to the students; • Efficiency and provision to monitor the requirement for arranging contact sessions, placement opportunities, public awareness etc.;	A. Student feedback; B. Faculty input; C. Self-evaluation teams;

2) Selecting UFG and EFG group members

The student feedback and expert reports are important to assure quality of an education system. The EFG members are to be chosen on the basis of the factors like their expertise field, experience, nature of experience etc. In present work, we regarded the employers as the EFG members. The group may include the researchers, eminent academic personalities relevant to this field, corporate R&D group members.

The UFG group may include the students of currently ongoing courses of the present system or of another similar course, common people for getting economy-based feedback etc. The students of the UFG must be chosen by examining the qualifying factors like percentage of attendance, sincerity, seriousness, academic result, faculty feedback about the student etc.

3) Accomplishment of full survey work

The questionnaires are to be sent to the members of UFG and EFG with a time constraint of getting back the report. Each and every member of the corresponding groups must receive the questionnaire along with the allotted time slot.

The reports must be collected timely.

4) Gradation system

The final grades would be decided by calculating the weightage of the answers.

Now, as we regarded the questions to be weighted ones, it seems more logical to calculate the weighted mean ($\overline{S_q}$) of the points obtained in a particular questionnaire.

$$\overline{S_q} = \frac{\sum_{k=1}^{m}(S_k * W_k)}{\sum_{k=1}^{m} W_k} \quad (1)$$

where, m = No. of questions in the questionnaire;

S_k = score against the answer of k^{th} question given by the target member;

W_k = weight of the question itself;

The unweighted average of the points obtained in the questionnaires (S_{ph}) of a particular phase is calculated. Final gradation system requires the average points attained by the total system which can be obtained by calculating the unweighted average of the points obtained by the phases.

$$S_{ph} = \frac{\sum_{q=1}^{N_q}\overline{S_q}}{N_q} \quad (2)$$

where, N_q = No. of questionnaires in a particular phase

The final score of the MMDDE system or course is calculated by simply taking out the unweighted average of the scores obtained by the functional phases.

$$S_{final} = \frac{\sum_{ph=1}^{N_{ph}} S_{ph}}{N_{ph}} \quad (3)$$

where, N_{ph} = No. of phases in the system;

The scale of the obtained score and the range of the points for determination of the grade of the course depend on the choice of the implementer organization.

5) Provision for further analysis

The questionnaire may include comments section, which would reflect the current scenario of the system in a better and vivid way. Proper analysis of the comments section may lead to gathering of some useful information for the further enhancement of the system, especially when obtained grade reflects a not-up-to-the-standard scenario.

IV. Conclusion

The framework, described in the present paper, is a suggestive one, based on some experimental model which is mainly meant for QA in MMDDE systems. An educational organization may implement the QA framework by building up a particular QA team within the organization to carry out the QA processes for self-evaluation of a particular MMDDE course. No third party involvement for QA process is required to implement the proposed framework. But at the same time, the framework may be adopted by a third party QA too, definitely with some necessary changes within the framework, which has not been regarded here.

The suggested framework has definite subtle differences from existing commonly adopted methodologies. The common problems in achieving a superior quality distance education may be counteracted with the proper incorporation of the highlighted concept, especially in the developing countries like India.

References

[1] V. S. Prasad. Strategies for Sustainable Open and Distance Learning. [Online]. *7*(*6*). pp. 2-3. Available: www.col.org/worldreview/volume6.htm

[2] T. K. Ghoshal, K. Datta, and S. Bhattacharya. Multimodal Digital Distance Education – The JU Model. [Online]. Available: http://elearn.cdac.in/.../PDF/ 21-Multimodal%20Digital% 20Distance% 20Education%20–20The%20JU%20Model-21.pdf

[3] V. Prakash, "Internationalization of Higher Education: The Indian Context," Panel paper, International Institute for Educational Planning, UNESCO, 2005.

[4] R. Middlehurst, "Quality Assurance Implications of New Forms of Higher Education," European Network for Quality Assurance in Higher Education, 2001

[5] K. Barker, "Quality Guidelines for Technology assisted Distance Education," Future Ed, March 1999

[6] M. Betz, "Curriculum, instruction, and the Internet," *Educational* Technology & *Society*, vol. 3, no. 2, pp. 1-12, 2000.

[7] C. M. Gunawardena, "Distance Education," University of New Mexico.

[8] I. Jmg, "Technology Innovations and the Development of Distance Education: Korean Experience," *Open Learning*, vol. 15, no. 3, 2000.

Suchismita Biswas has completed her Masters from Jadavpur University, India. She was formerly assistant professor in Narula Institute of Technology. She has continued research works on natural language processing from Indian Statistical Institute, Kolkata. Currently She is a full time research scholar at National Institute of Technology, Durgapur, India.