

**THE CURRICULUM AS A LIVING DOCUMENT FOR ACHIEVING
EDUCATION FOR SUSTAINABLE DEVELOPMENT**

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INTRODUCTION

Irrespective of professional discipline, the ultimate purpose of the education delivered by higher educational institutions is to prepare competent individuals who would solve the pressing needs of society with the knowledge and skills acquired through that education. Having a full appreciation for what it takes to achieve this goal is often a challenge to faculty whose job it is to implement the demands of the academic programs and to get future graduates ready to meet societal needs.

Although most instructors have typically had advanced training in specific disciplines, they usually have not had any particular training in the methodology of classroom delivery necessary to achieve maximum learning by the students. By and large, in most institutions, progress and upward mobility of faculty through the various academic cadres is measured almost exclusively in terms of scholarly research output, often with very little consideration for the importance of teaching effectiveness. Unfortunately, when institutional policies are not geared to making student learning a priority, knowledge is not effectively imparted to students, and those graduated from these programs soon go into the workforce inadequately prepared to help society.

For any program at a higher educational institution to adequately respond to the challenges of education for the sustainable development of a society, a virile, dynamic and living curriculum is essential. Because the needs of society are always changing due to the continuously changing pace of technology, global market forces, and the unique peculiarities of that society, the relevance of an institution to the society is in its readiness to adapt to these changing realities. In other words, the objectives of the training each academic program aims at achieving must be synchronized with societal needs in an on-going and continuous way. The curriculum is the vehicle by which this can be achieved. The challenge to a program director and faculty is how the curriculum can best be structured to accomplish this goal. The quality and currency of the curriculum must therefore feature prominently in any accreditation process.

QUALITY ASSURANCE IN HIGHER EDUCATION

Accreditation agencies are tasked with the responsibility of assuring high quality in the product delivery of higher educational institutions. In most developing and transition countries, the responsibility of keeping a close eye on the quality of every program in each institution poses an awesome challenge especially because of the potentially unsustainable growth in the number of institutions and in the corresponding explosion in student population over a short period of time (World Bank¹). A case in point is an agency like the Nigerian National Universities Commission

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which has had to supervise the phenomenal growth in the number of universities in Nigeria from 6 in 1970 to 30 in 1990 to an astounding 92 in 2009 (NUC²). Because such agencies could be overwhelmed by the sheer volume of work to be done, some fine details in the curriculum of a program in an institution could easily be missed.

An immediate concern in the accreditation process is where the emphasis of the accreditation process should be, institutional or programmatic. There is often an overlap of accreditation activities between the state agencies that hold the purse strings of public institutions and that are mostly concerned with institutional accreditation, and the professional organizations that are focused on program quality (Ewell³). Cooperation between both bodies is therefore crucial.

The process for accrediting a program consists essentially of the following (Materu⁴):

- A self-study prepared by the program as a critical self-evaluation of the effectiveness of the program;
- An external peer review by trained evaluators, including a site visit;
- A written report by the evaluators on the site visit which focuses on the academic quality standards, quality assurance processes, and recommended improvements;
- A decision by the accrediting agency to fully or conditionally accredit the program, or to deny accreditation with reasons given.

The accreditation process is founded on several criteria, including the quality of students, program educational objectives, program outcomes, curriculum, quality and adequacy of teaching faculty, available facilities, and the level of institutional support for the program (ABET⁵). Several factors limit the ability of many institutions from meeting these criteria. A large student population makes low student-to-faculty ratios difficult to attain. This hampers student-faculty interactions, effective student advisory and adequate control of course prerequisites. Programs in the technological and life sciences particularly suffer because of the availability of few qualified faculty and of inadequate facilities due to limited available resources. These challenges and others that have significant cost implications have been extensively described by others (Saint, et al.⁶, Ibidapo-Obe⁷, Massaquoi⁸). However, the quality of the curriculum and the setting of the agenda for a program have near-zero cost implications and fall squarely within the purview of the program director and faculty, and these should be critical elements in any self-study phase of an accreditation exercise.

IMPORTANCE OF PROGRAM OUTCOMES

The objectives of a program for meeting the needs of society in a particular discipline dictate what the outcomes of the education of a graduate should be. Any perception from employers that graduates produced by a program do not adequately meet industry expectations should be seen as an indictment of the curriculum design process of the program. The outcomes of a program are in essence the results of the execution of an appropriate curriculum. If these outcomes are to meet the requirements for the needs-sensitive objectives of the program, then the curriculum must be fashioned to be sufficiently fluid to make it adaptive to the rapid growth of technology and changing societal expectations. Thus, the mark of the relevance of an academic program to its society is the readiness of faculty to undertake periodic review of the curriculum in consonance with these societal needs.

The flipside of this, however, is that a curriculum that remains stagnant for many years is a direct indication that the changing needs of society are not being adequately addressed. It often suggests that teaching faculty of the program are somewhat oblivious to the current trends in knowledge. Although this observation is applicable to any academic discipline, it is by far more pronounced in disciplines such as engineering and the life sciences in which technology and research developments change the fastest. In such areas, a stagnant curriculum very quickly becomes obsolete and irrelevant, and those that teach it become progressively ineffective (Akinmusuru⁹).

OUTCOME-BASED EDUCATION

Outcome-based education is a philosophy that focuses on the ability of students to demonstrate that they know and are able to perform some stated learning outcomes. Based on the needs of society, outcome targets that must be met are set. Thus, as societal priorities and technology evolve, the targets are changed accordingly. The curriculum should therefore be designed backward, first by determining the intended outcomes and then shaping the curriculum to achieve them.

For a program to be effective, the reasoning process of its program director should be as follows:

- Find out the needs of industry and other societal stakeholders (Falade¹⁰);
- Determine what the outcomes of the training of graduates of the program should be in order to meet these societal needs. These are in essence the direct consequences of the educational experience of the graduates (Pascarella and Terenzini¹¹, Terenzini¹²);
- Determine what it would take to enable the education of students, from when they enroll in the program to when they graduate, to meet these intended outcomes of the training;
- Put in place assessment tools to continuously measure student learning throughout the program in order to achieve the above goal (Ewell^{13, 14}, Shaeiwitz¹⁵);
- Create a conducive environment that would ensure optimum learning experience for the students;
- Seek to remain on the cusp of emerging knowledge through research that have current relevance;
- Continuously interact with industry and other stakeholders to determine new needs of society by periodically dialoging, questionnaire surveys, faculty sabbaticals in industry, etc.;
- Undertake periodic reviews of the curriculum in order that updated outcomes meet current needs of society, and iteratively adjust curriculum content as needed.

ASSESSMENT AND FEEDBACK

Traditionally, an instructor would teach through the course curriculum and would simply assume that a student who had passed all the examinations set for the course in the pre-set curriculum was ready to graduate and perform appropriately in the particular discipline (Fig. 1).

This old paradigm unfortunately fails to take into account all the characteristics students bring with them into a program, such as their pre-college academic preparation and socioeconomic status (inputs), the changing needs of society, the evolution of new technologies, and the ever-changing effects of the global economy. It does not take into account the campus climate, faculty quality, assessment policies, and existing infrastructure (learning environment).

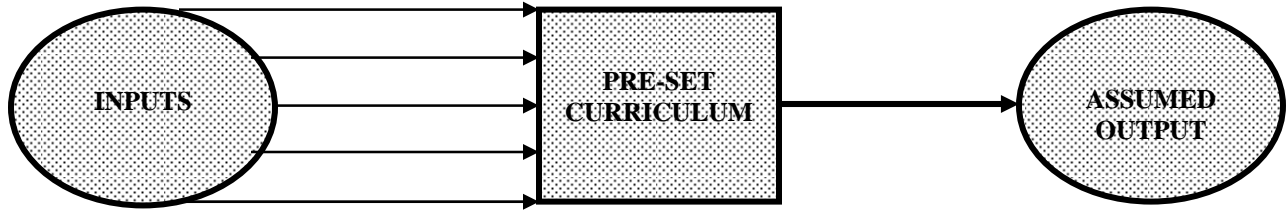


FIG 1: TRADITIONAL THINKING WITH PRE-SET CURRICULUM

In addition, there is no means by which the adequacy of the students' acquired knowledge and skills at the point of graduation (intended outcomes) can be determined in their preparation for life after college. It also does not follow up on their career growth to find out what areas of the training of the student could be improved upon to enhance the quality of the education of succeeding sets of graduates (feedback).

The new educational paradigm (Fig.2) is all about considering the total learning experience of the student (Azzi, et al.¹⁶). Specific indicators are put in place to ensure that the intended learning outcomes are achieved. These parameters are evaluated and the result imbedded in improvements to the learning environment of current and future students.

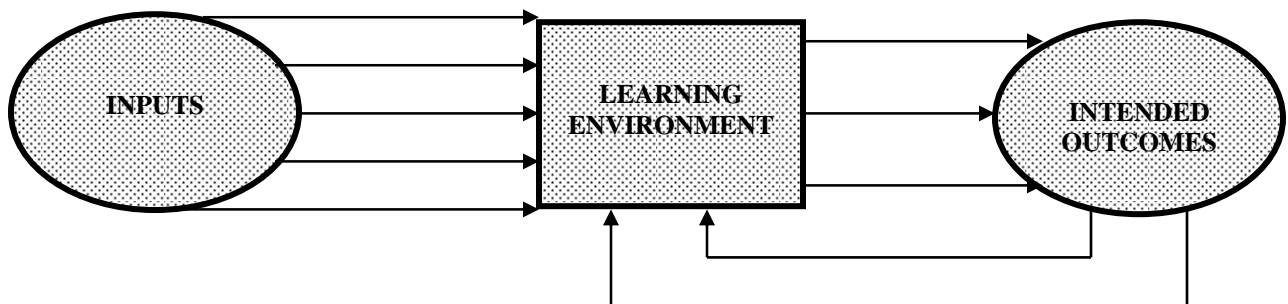


FIG. 2: NEW PARADIGM FOCUSED ON STUDENT LEARNING

In addition to the above factors, the learning environment of a student is shaped by curricular influences (courses taken, major field, etc.), formal instructional experiences (type and quality of instruction, interaction with faculty in class, etc.), out-of-class experiences (peer relations, informal interaction with faculty, paid work while in school and other personal and family obligations, etc.), and characteristics of the institution (mission, size, selectivity, culture, etc.) (Astin¹⁷). Programs need to be responsive and adaptive to these factors (El-Khawas¹⁸).

CONTINUOUS ASSESSMENT AND THE CURRICULUM

A program does not have to be weak to require periodic review. On the contrary, a review that is undertaken once every five years would potentially reveal to program faculty all the important

aspects of the discipline that have changed lately and would position the program to always be current in its delivery. Assessment is the process for collecting data for the purpose of evaluating the achievements of program outcomes and objectives, and the evaluation of these data determines the extent to which the intended outcomes and objectives are being achieved. Outcome indicators are the measuring instruments (milestones) used in assessment, and the means by which achievement of outcomes is confirmed. At graduation, these indicators are the skills and knowledge a graduate demonstrates. In general, the process of program assessment typically comes in at least three levels, viz. single course assessment, interconnectedness of courses in a program, and program-wide level. Adoption of these levels in program administration would definitely improve the quality of the preparation of graduates to meet the program objectives.

Course assessment at the single course level allows for immediate feedback to an instructor on his teaching effectiveness, and this is characterized in Fig. 3.

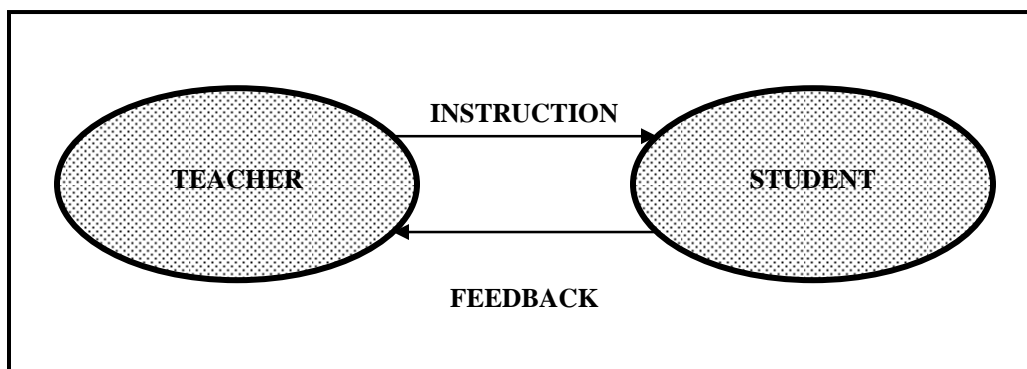


FIG. 3: TEACHER-STUDENT INTERACTION IN COURSE

An instructor may use any, some or all of the following tools to measure student learning in a course, with the aim of improving on classroom delivery:

- Background probe or test of prerequisite knowledge at the beginning of a new class;
- Pop quiz at the beginning or end of class time to determine student understanding in real time of the material just taught;
- Take-home group assignments to provide experience in teamwork;
- Periodic tests and end-of-semester examinations to measure overall assessment of the course;
- End-of-term confidential evaluation of the instructor by the students. This has been found extremely helpful to instructors to assist in improving teaching effectiveness.

The second level seeks to examine the interconnectedness of the courses in a program (Fig. 4). This is useful primarily by program directors for assigning resources for maximum efficiency. It is also a means of determining which course is obsolete and therefore needs to be deleted, which is superfluous as material in it may be easily available in other courses, and which course needs to be added because of emerging needs.

This level is characterized by the following:

- Overlaps in the contents of some courses that can be trimmed off without loss of quality;
- How much of a service course from another program is relevant to the program;
- Cost effectiveness of teaching a service course in-house versus from another program;
- Identification of similar courses from different programs that can be taught by one instructor;
- Identification of laboratory and other facilities that can be shared by more than one program.
- Identification of need for a new course because of newly identified industry needs.

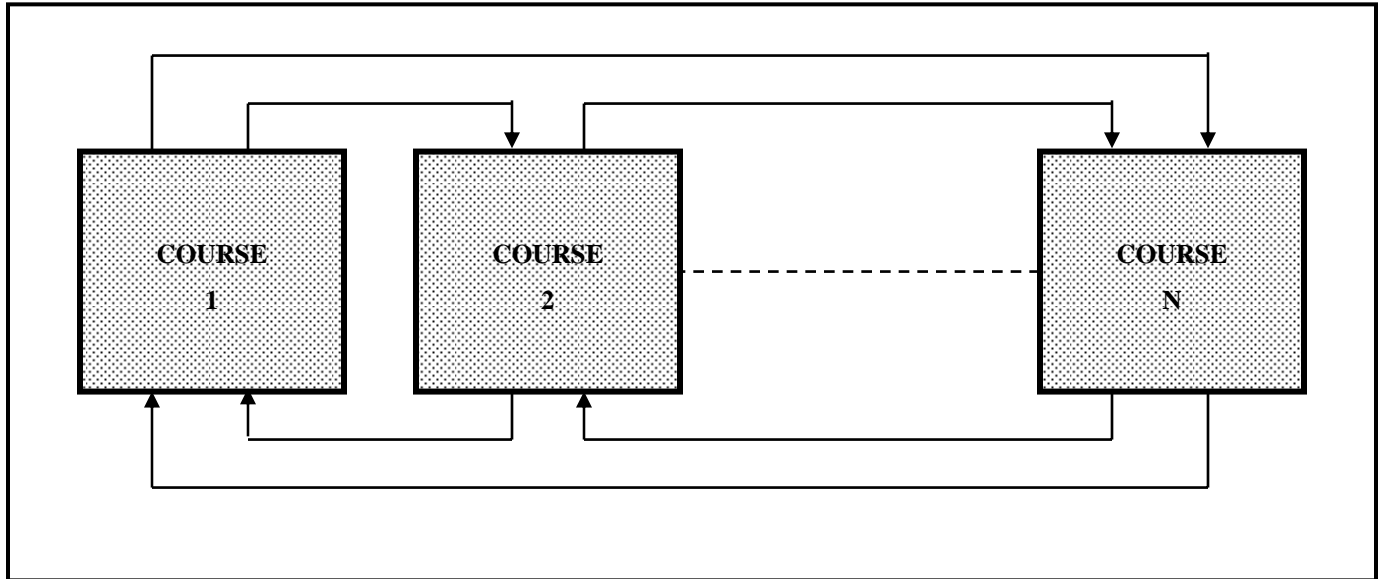


FIG. 4: INTERCONNECTEDNESS OF COURSES IN PROGRAM

Based on the above, it may become necessary to increase or reduce the credit weightings of some courses or to eliminate them altogether, thereby optimizing the resources available to the program without reducing the quality of the learning experience. These rationalization processes do not only make sense, they help to allay the concerns of stakeholders about the need for universities to become prudent and more accountable in the way their limited resources are used.

The third level of program assessment involves seeking and obtaining feedback from stakeholders to the program and other interested constituencies (Fig.5). This is the area in which most programs appear to experience the most challenges. But then, it is the one area that could expose a program to the influence of society, and through which a program can assess its relevance. Key aspects of this level are as follows:

- A program chair conducts individualized exit interviews with graduating seniors to seek information about what their expectations had been at enrollment, how these expectations were sustained or altered as they progressed through the program, and whether their ultimate goals were met. Experience has shown that such interviews provide good insight into the

effectiveness of the program from the perspective of the students, and a wealth of information with which to improve the quality of the program.

- Questionnaire survey of recently graduated alumni/alumnae, for information on any disconnect between what was learnt in school and what was being encountered at work.
- Questionnaire survey of employers of recently graduated alumni/alumnae, for feedback on their on-the-job skills, with suggestions on what changes in training industry would expect.
- Inviting experienced industry practitioners to serve an advisory board for the program. Input of these practitioners would assist the program to stay abreast of current industry trends.
- Using feedback from accreditation agencies on program review.

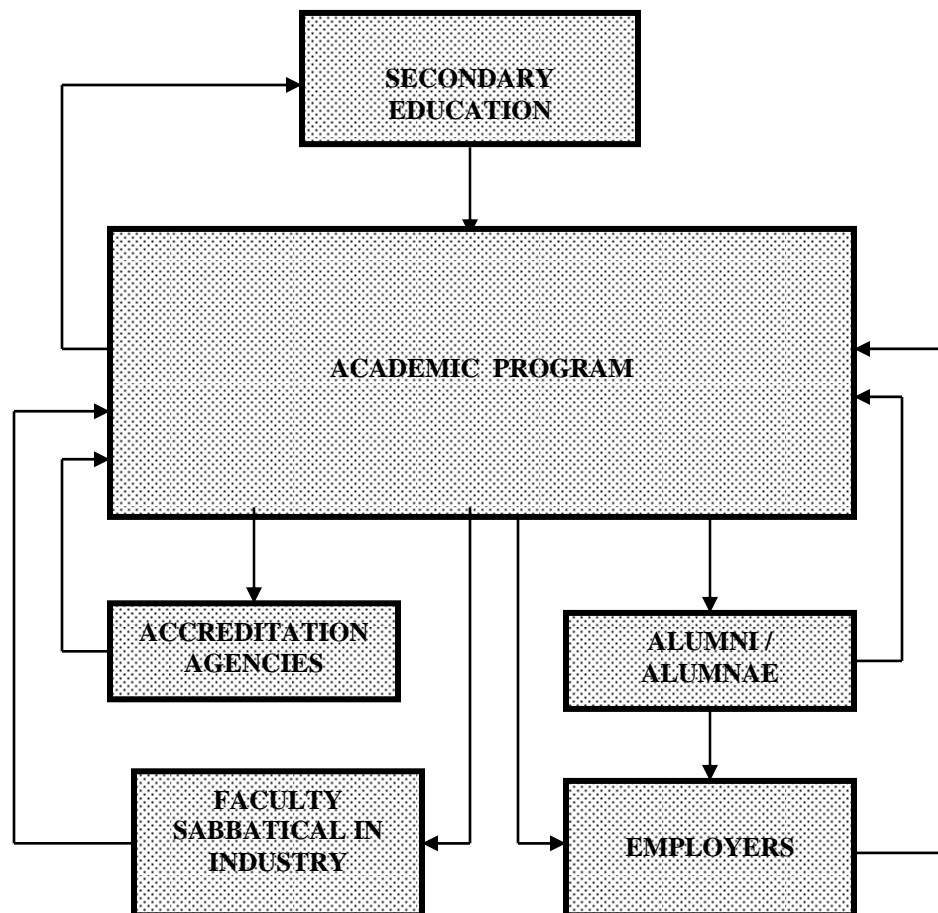


FIG. 5: MODES OF FEEDBACK FOR CONTINUOUS IMPROVEMENT

- Some instructors may also find that spending some months in industry would give them hands-on exposure to the newer industry practices which could improve on the contents of their course curricula. This could be achieved through summer attachments or sabbaticals.
- Instructors should be encouraged to engage in lifelong continuing education as a routine means of self improvement. Such could include participating in training workshops

organized by industry on new technologies that could impact positively on the contents of their courses and on their classroom delivery.

- Using data accumulated over several years of teaching freshmen to suggest modifications, as necessary, to pre-university (secondary education) administrators for better preparation of high school students for a more fulfilling college experience;

A continuous feedback from industry and from graduates of the program enables program directors and instructors to constantly remain well-informed of current trends, and this augurs well for student learning and faculty professional growth. The paradigm of continuously reviewing the program effectiveness helps employers and society at large, as they ultimately would be the beneficiaries (or victims) of the work of the graduates so produced.

CONCLUSIONS

Although most academic programs in practically all higher educational institutions experience the hardships of inadequate resources (faculty, equipment, books, etc.) primarily for lack of funds, it has been shown in this paper that keeping a curriculum current and relevant to the society is a task that a program chair and the teaching faculty can undertake with little cost implications. A curriculum that has remained stagnant and not reviewed for a long time is a clear indicator that the instructors have either not taken seriously the responsibility of producing graduates who would be relevant to the community, or are oblivious of the direct correlation between carrying out periodic reviews of the curriculum and producing high quality graduates.

One is aware that several programs undertake some measure of curriculum review periodically. Most of these reviews however do not take feedback from industry into consideration. Such are based primarily on perception of the faculty of what they think should be included in the curriculum. Invariably, experience has shown that this almost always results in simply adding on new courses to the existing ones, thereby unnecessarily burdening students with additional workload without any proven benefits to the learning process. From feedback from industry, the intended outcomes of a program are determined. These outcome targets are modified as industry needs evolve. Starting with these targets as baseline, a good program seeks to create the vehicle (curriculum) by which these targets can be achieved. Thus, an effective curriculum is best designed by working backward from the outcome targets.

It is appreciated that most instructors naturally take the training of their students seriously and intend to produce graduates that would contribute positively to society. It is however also clear that designing a living and virile curriculum that would make this possible does not just happen. It is a process that has to be learnt. Fortunately, quality assurance experts versed and trained in curriculum design can now assist universities in the training of their faculty to revitalize their curricula (Esiobu, et al.¹⁹). Such training is applicable for all disciplines, from the humanities to the social sciences, and from engineering and technology to the medical and life sciences.

We advocate that accreditation and professional agencies should insist, as a part of the self-study in a program accreditation process, on curriculum designs which are based on well articulated outcomes to achieve the right kind of education consistent with the needs of the immediate society. They should be focused on demonstrated student learning, with built-in measurable milestones that can be used to confirm the achievement of the intended outcome targets. Most

program chairs and deans typically do not think much about program review until they are under the pressure of an impending accreditation visit. We advocate that they should instead aim at making in-house periodic reviews of their programs a normal part of doing business as teachers, and as producers of manpower for industry, rather than prepare for accreditation visits with trepidation. This would ensure that such visitations effectively become incidental non-events.

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