

A COHERENT PARADIGM TO SYSTEMATICALLY ARCHIVE AND TRACK THE HIGHER EDUCATIONAL CORE ATTRIBUTES TO DEVELOP AN EFFICIENT HUMAN CAPITAL

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Abstract

Core attributes of an outcome based higher educational institution is much associated with the key educational terms such as graduate attributes, program learning outcomes and course learning outcomes. It is the institutional obligation to ensure that these attributes are precisely delivered and attained in sequence. In order to trace and realize its vision, mission and other higher level strategies, institutions should be capable to track the accomplishments of such attributes. From an educational institutions perspective, the quality of education is normally impacted by its policies, procedures, workforce, facilities, technological resources and the success is primarily measured by the proficiency and quality of its graduates, which can be evaluated by the gained knowledge and skills assessed throughout their educational voyage. Consecutively, in order to produce such capable knowledgeable and skilled graduates, the institutions should ensure the process to deliver an effective curriculum to its students and should also be able to keep track of the attainment status of the delivered curriculum. Without efficiently accomplishing these processes it is obviously not possible to measure the factual knowledge and skills obtained by the graduates. The usual methods of tracking such components are reflections through interviews, questionnaires, surveys, feedbacks and other similar methods. Though such methods are valuable and serve the purpose up to a limited extent but are not scientifically measurable and could be influenced under various parameters. The authors in this research present an innovative unique software that is developed from a patented methodology to measure the delivery and attainment of such components. Followed by rigorous research incorporated with systematic, experiential, pragmatic and scientific approaches into vital consideration, the paradigm in this paper reflects and presents a unique, innovative and rational ploy to measure such attributes applicable in any outcome based educational system. The advantages of the proposed methodology is that it will help develop enhanced quality of education and developed and capable human capital much anticipated by any institution or community.

Keywords: Graduate Attributes, Program Learning Outcomes, Course Learning Outcomes, Qualification Frameworks, Technical Competencies.

INTRODUCTION AND LITERATURE REVIEW

The development and progress of any Higher Educational Institution (HEI) is finally achieved by establishing and strictly following its core institutional initiatives, such as the vision, mission, objectives and core values (Aithal (2016)). In the field of higher education, these initiatives are formed together in conjunction with the concerned stakeholders' feedback and other various coherent factors, such as the community's needs, the economic and progression requirements, the development of human individuals, and the nation's desire for global enhancement. Graduate attributes (GAs) are components and frameworks in the form of knowledge, skills, attitudes and values, which should be inculcated in any graduate by the time he or she graduates from an academic program (Jennifer et al. (2016)). Consecutively, as suggested by Barbara et al. (2012), the success of an educational institution relies on its policies and procedures. These policies and procedures should also be drafted in such a way that they allow for forward thinking, in which a faculty member could go beyond the curriculum to truly achieve the GAs. Hence, pedagogical factors tremendously impact the delivery. Simultaneously, strategic and operational plans, policies and procedures must be strictly followed to realize institutional initiatives as planned and derived. Hence, the policies, procedures and guidelines are drawn in line with these initiatives so that the institution follows the right track to pursue its agile operations. These policies and guidelines are then followed as conduits for implementations of valid processes and are subjected to consistent periodic evaluations and reviews with vital consideration. Consecutively, the curricula and academic programs at HEIs are formed and designed to achieve their key GAs, which in turn are reflected in devising program learning outcomes (PLOs) and then course learning outcomes (CLOs). As stated by Jennifer et al. (2016), Graduate Attributes are frameworks that are formed and placed, binding the university communities to agree and advocate that all its graduates should be occupied with

these values on successfully completion of their studies and also its attainment through curriculum could be formally assessed and graded. Hence embedding, delivering and assessing GAs through the curriculum would ensure and assess if the students are developing specific attributes. The curriculum apparently reflects and maps the learning outcomes of the program as well the course. In order to ensure the mapping of curriculum with the coverage of intended GAs it is vital to apply appropriate teaching and learning strategies alongside the confirmation of its implementation (Green et al. (2009); Sumsion et al. (2004)).

For example, curriculum mapping, which highlights graduate skills development within existing curricula, has the potential to promote a superficial approach to developing graduate attributes unless appropriate teaching and learning strategies are used and evidence of implementation is sought (Green et al. (2009); Sumsion et al. (2004)). Therefore, in any HEI, these attributes are the key elements used to realize the accomplishment of institutional initiatives. GAs are the key attributes that a student should possess upon graduation from any academic program (Barrie (2007)) and should not only reflect the national-level requirements but also encompass and address the international or global level standards (Elspeth et al. (2013)). As proposed by Mason et al. (2011), the process of teaching and learning, if engaged in with the community, would provide better advantages to the capabilities of graduates. Similarly, as specified by Elke et al. (2014), based on experiential learning, GAs should be realistic and formed with a few global components given vital consideration, such as communication skills, critical thinking, self-motivation, research organization and teamwork, which are much anticipated by any industry or employer of a graduate. Research skills also promote intellectual dominance with the student's communication and presentation skills, boosting self-authorship (Jennifer et al. (2016)).

STATEMENT OF THE PROBLEM

To develop and deliver an effective, high-impact academic program and gain its utmost potential, HEIs must consider various progressive actions and methods to periodically strengthen its learning outcomes. While HEIs are struggling hard and attempting to manage the system to produce capable graduates, there seems to be a large concern over the entire process. Graduates are being released from HEIs, and it is seen that, in most cases, the employers or the industry struggle to identify the strengths and weaknesses of the graduate to assign the right task based on his/her interest in a specific area. We should also note that the interest of a graduate in a specific area is led by his/her curiosity and passion, which is very important for the graduate to competitively accomplish the assigned tasks. Passion is an intense feeling that one practices while performing an activity related to his/her identity (Cardon et al. (2005); Gubman (2004); Houlfort et al. (2009)) and thus it acts as a stimulant, as it builds enthusiasm and fondness to accomplish assigned tasks and achieve goals (Koestner et al. (2002)). Consecutively, Lowden et al. (2011) states that though HEIs are progressively addressing the requirements of employers and industry, there are still substantial issues to promote graduate employability. The apt requirements of graduates would vary from one employer to another, wherein each employer would require graduates with different capabilities. Though most of the graduates would have similar analytical and reflective qualities, the range of competencies to work in a global environment would differ under different environments and culture. In addition, GAs are used by higher educational institutions to market and promote its students to the employees and industries (Daniels et. al. (2014)). Thus the existing research indicates that the employability of graduates has progressively developed into a critical concern for employers, which thereby austere calls upon the HEIs to look for an improved and effective approach to periodically revamping and upgrading curricula and to seek a mechanism that could authentically evaluate, monitor and track

students' knowledge and skills gained throughout their tenure at the institution. Now, the questions, whether the HEIs are effectively progressing toward the realization of the developed strategic plans. Arcelo et al. (1987) specifies that it is often seen that the unemployment or the under-employment is also caused due to substantial incongruity between the output of graduates and the demanding requirements of the evolving and specialized job markets. As specified by Pang et al. (2019), the HEIs as well its academic programs and courses should equally focus on delivery and attainment of the skills. Such requirement has increasingly accumulated tremendous pressure on HEIs to prepare the students for demanding job markets. The HEIs are required to revise their curricula to aptly incorporate employer's requirements in graduates. Hence student's competencies that would reflect employer's requirements is too essential. Thus the questions, are these HEIs producing graduates who are sufficiently capable to deliver the services expected by the employers? Are the academic programs and their courses aptly and periodically revamped to fit the evolving requirements of the industry and employers? We believe that, if all of the specified factors were precisely addressed, then the employers and industries would have no major issues in recruiting graduates for jobs, but it is not the situation in the current scenario.

Consecutively, Outcome-Based Education (OBE), is generally defined as an approach in which decisions about the curriculum are driven by the outcomes the students should display at the end of the course, which reflects in their professional knowledge, skills, abilities, values and attitudes. Thus, students know their final destination before they start their educational journey. Based on various researches, outcome-based education begins with a clear specification of what students are to know, what they should be able to do, what attitudes or values they need to be able to demonstrate at the end of the program. Incidentally, the outcomes based approach works best for tasks or knowledge that are easily and clearly measured. With the modern trend in higher education, HEIs across the

world are vastly in the process to adopt the approach of OBE. Across the globe, now with the importance of outcomes based education into the real practice and context, a common unambiguous question that sustains between the HEIs is “how to ensure or evaluate the delivery & attainment of institutional graduate attributes, program learning outcomes & course learning outcomes?” To this question, though we know that there are various methods that have been followed across the globe and that these methods generally are interviews, questionnaires, feedbacks, surveys, making reports via stakeholders such as students, faculty, employers and other entities, then analyzing the received responses. Such methodologies differ from nation to nation, agency to agency and institution to institution. We understand that though these methods are valid, make true sense but are not measurable as these are just the views & insights of individuals & could be influenced under various conditions. Hence the question to scientifically measure the attributes and outcomes still sustains between the HEIs. Means, each one of us are struggling to scientifically measure the delivery & attainment of these core standards. Not only these, with the enhancement and expectations of the job market and the increasing pressure of the job industry to include and merge all the necessary vocational skills, qualifications frameworks into the curriculum, HEIs are striving and working out with all prospective ways to address this critical issue, struggling to find an apt solution, to improve upon the quality of education as anticipated. But as of this day, an authentic scientific approach is truly lacking. In order to address this critical issue, the author presents a very unique, innovative, feasible & rational software tool titled “Learning Outcomes Blaze” to measure the delivery and attainment of graduate attributes and learning outcomes. The tool focuses on implementing a smart methodology, which analytically maps and aligns the course learning outcomes with the program learning outcomes, and the graduate attributes. “Learning Outcomes Blaze” systematically uses formal assessments to authentically evaluate and reflect the delivered curriculum.

“Learning Outcomes Blaze” is based on a patented methodology that encompasses highly complex calculations and requires formal grades of each assessment to be systematically archived to find the probable delivery and attainment of these attributes and outcomes. Consecutively, the methodology extensively uses the concepts of mapping between various entities to authenticate the process.

THE PROPOSED PARADIGM

Though various methods and practices to identify the delivery of learning outcomes are held through traditional methods such as self-appraisal, instructor opinions and peer analysis but those methods usually lack convincing and authentic method of analysis. Therefore, the existing methodologies do not evidently provide any measurable technique to the attainment of the attributes such as the graduate attributes or the learning outcomes. We believe that it will not be possible to effectually develop or further improve a course or an academic program without evaluating through a formal scientific technique. On the other hand, our proposed paradigm follows an authentic digital statistical and measurable technique, using formal assessment grades since assessment techniques are usually entrenched around formal course activities in order to measure the level of student’s performance. Hence it is too vital to note that assessments are one of the formal and coherent methods that would formally assess and evaluate the weightage of students’ understanding on the concepts and related topics. Grading of assessments need to be very formal where every allotted grade must represent eloquent piece of erudition, ensured through well-defined grading rubrics and applied processes of moderation, with respect to the implementation of our system. Our methodology therefore uses the grades of formal assessments to measure the delivery and attainment of these attributes.

With reference to Fig. 1, titled “Conceptual and Rational Framework of the Proposed Paradigm”, which is a broad conceptual layout

of the proposed model, our system starts with the preparation of master matrices outlining the mapping of the GAs and PLOs, with all of the courses delivered in an academic program and entirely aligned to the programs' Plan of Study (POS). The diagram represents the data flow of the HEI's institutional initiatives, such as its vision, mission, objectives and core values, along with the key attributes, such as the GAs and PLOs being used as the top-level derivatives to the system's framework. The POS, which contains the program linked course codes, course titles, credits hours and prerequisite requirements, is designed to reflect the coverage of GAs and PLOs since any academic program is perceptibly designed to be aligned with the institutional initiatives and their attributes.

This process therefore produces a mapping chart of courses against the expected coverage of GAs and PLOs. Consecutively, the corresponding instructor holding autonomy would specify the coverage of GAs and PLOs applicable for the course in parallel to specify and align the mapping of each CLO to the corresponding coverage of GAs and PLOs.

CONCEPTUAL AND RATIONAL FRAMEWORK OF THE PROPOSED PARADIGM

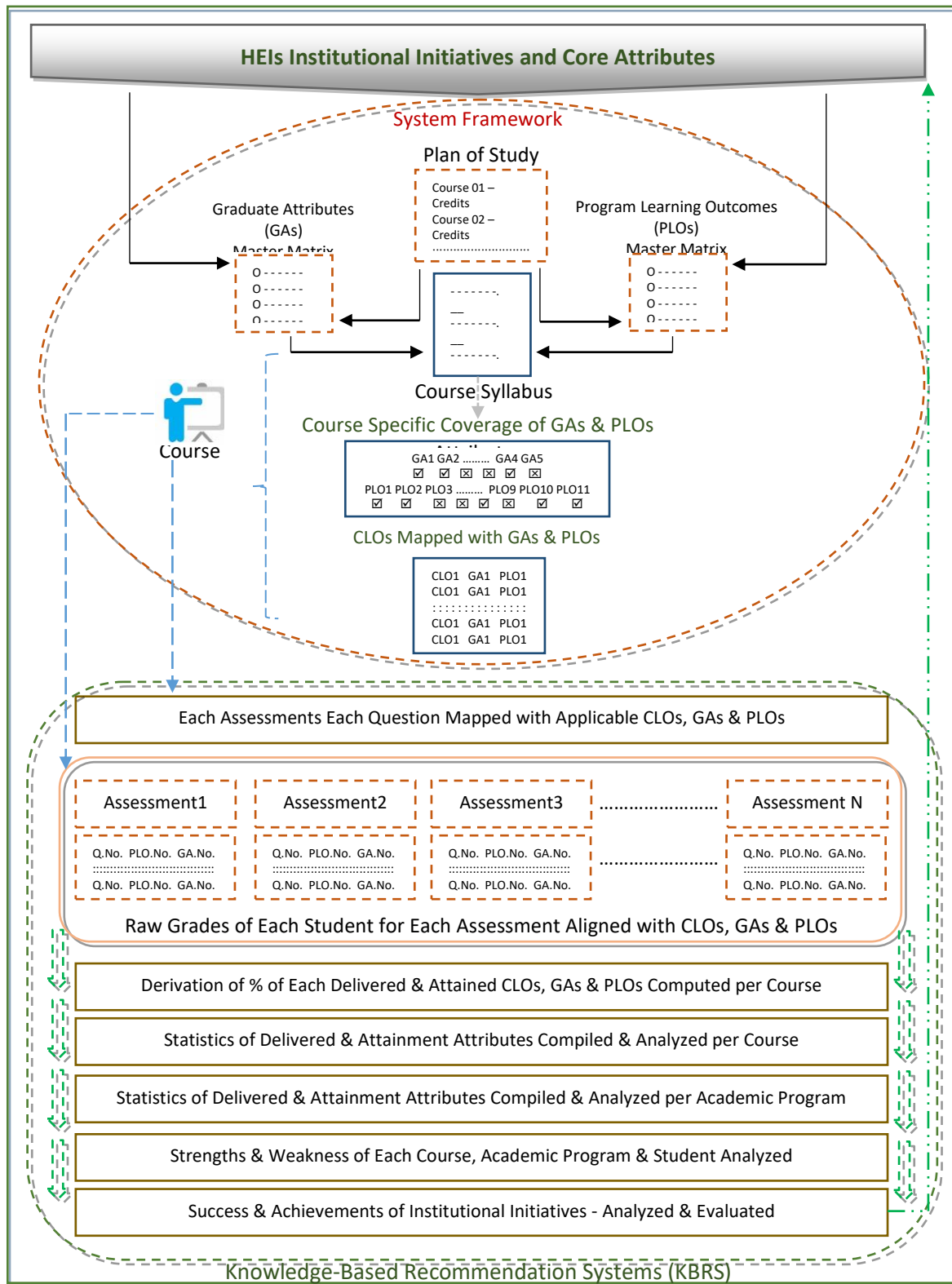


Fig. 1: Conceptual and Rational Framework of the Proposed Paradigm

A refined chart of CLOs mapped with GAs and PLOs is produced. Consecutively, followed by the assessments, the instructor identifies the raw grades obtained by the students for each question, which is already been pre mapped with CLOs and its applicable GAs and PLOs. The remaining statistics shown in Fig. 1 are derived based on precise calculations and relevant formulas and to calculate the delivered and attained statistics.

AN EFFICIENT EFFECTIVE SOLUTION – “LEARNING OUTCOMES BLAZE”

The Invented software “Learning Outcomes Blaze”:

- ☐ Calculates the amount of graduate attributes, program learning outcomes, course learning outcomes in every course, for every individual student and collectively for a group of students.
- ☐ Identifies the strengths and weaknesses of each student.
- ☐ Identifies and compare the efficacy of delivery and attainment of each graduate attribute.
- ☐ Identifies and compare the efficacy of delivery and attainment of each learning outcome.
- ☐ Compares the effectiveness of courses with respect to different terms.
- ☐ Identifies the strengths and weaknesses of courses and academic programs, thereby enabling the system to support further review and development of these components.
- ☐ Evaluates the effectiveness of course contents with respect to the learning outcomes and assessments.
- ☐ Evidently, supports to find out the correlation between delivered and attained statistics, enabling the system to locate the progression of institutional strategic initiatives such as its vision and mission.

☐ Produces statistics to affirm the institutional quality assurance processes, specifically through students learning via course work modules and provide recommendations to revisit relevant policies, procedures and institutional practices.

☐ Helps to have an efficient and much developed human capital much anticipated by any institution and community.

SCIENTIFIC & INNOVATIVE SIGNIFICANCE

Based on the preliminary feedback from concerned stakeholders that is based on a preliminary survey from around 500+ international academic experts, this innovative product is too exciting & very promising. Such product is being anticipated and being looked forward by various educational institutions across the globe, since the outcomes of the product leads to detect the flaws, identify the key areas of improvements in academics both in the courses as well the academic programs, identify the strengths & weaknesses of the students, raise the educational standards and quality of education & most importantly contributes to the development of efficient human capital. The main strength of this product is that it is built using a patented methodology titled “Computational Methodology Towards Attainment of Graduate Attributes and Program Learning Outcomes in an Outcome Based Educational System”, that demonstrates and implements a unique refined systematic methodology. From the

scientific and innovative aspect, the product follows a methodical approach to calculate and measure the learning outcomes. Therefore, from a scientific and innovative aspect, the research involves the concept of measurable outcomes, and the produced statistics would indicate improvements and developments to the quality of education. This full-fledged ground breaking professional product represents an educational technological framework, which can be customized to fit the requirements of any HEI across the globe. The application of this system reflects upon the expected or

targeted quality of education, which is much needed to develop any HEI, its community or the nation as a whole, in this competitive and challenging ecosphere.

ECONOMIC IMPACTS OF “LEARNING OUTCOMES BLAZE”

From an economical perspective, the proposed methodology is expected to:

- ☐ Produce highly capable graduates thereby saving on the nationals seeking employment.
- ☐ Improve and benchmark the quality of education, thus attracting foreign investments.
- ☐ Build on self-support strategies thereby saving on external consultancy or external support.
- ☐ Produce better quality services to raise the standards of community and nation, with the support of developed and highly capable human capital.

KEY HIGHLIGHTS OF “LEARNING OUTCOMES BLAZE”

Learning Outcomes Blaze Software is an outcome of academic research based patented methodology.

It is an authentic academic tool created, designed and developed by a highly experienced academician specialized in American and British higher education. It is a tool that incorporates a hard earned academic experience of more than 25 years in the higher education field. It is scalable and compatible to accommodate the growing demands of any educational institution. Learning Outcomes Blaze software engine processes and compiles its data using authentic academic and scientific standards. Learning Outcomes Blaze is specifically developed for institutions and agencies that follows in the categories such as academic institutions, schools and academies, higher educational institutions, colleges and universities, institutional accrediting agencies, program accrediting agencies, outcome based

educational hubs, institutes and scholastic centers, teaching and learning councils and other educational grants and commissions.

DEDUCTIONS AND CONCLUSIONS

Based on the study and its preliminary research it is found that there are no direct products, though there do exist few indirect survey based tools in the market and those tools are generally Enterprise Resource Planning (ERP) based commercial tools and/or Learning Management Systems (LMS) tools which are used to manage the learning process, available and used in the institutions across the globe. Those products generally deal with supporting educational institutions to align the academic and administrative process via technology and focuses on curriculum design enabling institutions to create appropriate lesson plan, frame course outcomes, program outcomes based on survey and feedbacks but are not meant to scientifically measure the quality of education. Therefore, those indirect products do exist but stand very far from our innovative and novel technological tool, nor the purpose or features of these product stands any close to our product. In other words, those products do not stand anywhere in competency as ruled by our innovative, novel, researched and patented high end academic product. Our product “Learning Outcomes Blaze” is developed followed by a strong professional research, designed by a highly experienced higher education academician, equally specialized and an expert in the field of Information Technology. Consecutively the product “Learning Outcomes Blaze” is a very powerfully designed software, specifically intended for a very unique purpose to measure the outcomes along with various other parameters to be counted in an outcome based educational setting. Hence, the tool “Learning Outcomes Blaze” is a unique and highly sought prospective software tool by educational institutions across the globe.

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