A HOLISTIC METHODOLOGY FOR ASSESSING INTERNSHIP LEARNING OUTCOMES IN HIGHER EDUCATION

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Abstract

This study introduces a comprehensive approach to evaluating internships that transcends the conventional focus on singular aspects, aiming to assess the entire internship process. A distinctive feature of this research lies in its proposal of aggregating results, thereby reducing the impact of personal reflections, beliefs, and experiences of interns and supervisors. This approach fosters a more objective and unbiased assessment of internships. Furthermore, the study innovatively underscores the roles of Higher Education Institutions (HEIs), students, and supervisors in the evaluation process. It advocates for a comparative analysis between interns' perceptions and supervisors' evaluations, achieved through regression analysis of pre- and post-internship phases. This analytical technique facilitates the identification of outcomes, program weaknesses, curriculum gaps, and internship objectives, enabling targeted enhancements. The study also integrates the internship process with performance metrics encompassing input, process, and output indicators, offering a holistic framework for evaluation. In conclusion, this research contributes a novel methodology that holistically evaluates internships, bridging gaps in assessment and providing avenues for comprehensive improvements.

1. ORIGINALITY/VALUE

Evaluation of internships usually focus on one aspect of the internship. This study suggests an evaluation of all aspects of an internship throughout its whole process. It also proposes an aggregation of results that minimizes the influence of personal reflections, beliefs and experience of both interns and supervisors for a more objective and unbiased assessment.

Another novelty is that this study equally emphasizes on the roles of the HEI/student/supervisor in evaluating the internship. It suggests a cross-comparison between the intern's own perception towards the internship and the supervisor's evaluation. It addresses this gap by calculating the regression between before and after, and it compares results between supervisors and students' evaluations allowing HEI to identify internships' outcomes,

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weaknesses/shortages in the program/curricula/internship objectives and to pinpoint problematic topics that would require improvement.

Lastly, it links the internship process to performance measures (of input, process and output indicators) and corrective actions, providing a holistic approach to internship evaluation.

2. INTRODUCTION

Internship is integral to many undergraduate degree programs that require practical skill application. It prepares students prior to their professional experience (Ebner, Soucek, & Selenko, 2021), makes explicit links between the practice-based setting and what is taught in the classroom through reflective activities, provides industry feedback to identify areas of weakness and strategies for improvement, encourages students to develop critical perspectives of work practices and how they can be improved and incorporates reflection to consider personal strengths and career aspirations (Jackson, 2017).

Assessment of students' performance and evaluation of courses and teaching are critical elements in the teaching and learning environments and are central to each higher education institution's mission of preparing students for the future (Balla & Boyle, 2006). While a vast knowledge-base exists to inform good practice in assessment of student performance in classroom-based courses, the literature on effective practice for internships, however, appears to be sparse.

Internships are a growing presence on the higher education landscape. They have long been a feature of professional programs or practical disciplines at the graduate and undergraduate levels and often serve as capstone experiences in those programs as well. Internships are often a requirement for certain degrees and tend to be facilitated either through the academic program itself or a centralized academic internship center or career service on campus. Lately, even in the liberal arts and sciences fields, internships have grown in response to pressure for career-ready graduates and as a result of research on effective practices for deep learning.

The gained importance of internship was paradoxically accompanied by an absence of systematic and clear procedures related to its assessment. While quality assurance promotes a greater role to be given to students and accountability and advocates a closer and constantly renewed assessment of learning outcomes, evaluating internships' outcome and feedback seem to have been left out of the equation.

Some researchers have proposed internship assessment methods involving coordination with the industry, self-evaluation by the students or peer assessment. However, none of these methods actually give a holistic view of the internship's performance in terms of assuring quality and guaranteeing the expected learning outcome (Baartman, Gulikers, & Dijkstra, 2013) (El-Mowafy, 2014) (della Volpe, 2017). Thus, the novelty of this work resides in the development of a clear methodology to assess the internship learning outcomes based on clearly defined input measures, learning objectives, gap identification coupled with corresponding corrective actions.

While it is easy to demonstrate that internship experiences are pertinent and important to students' learning, assessing those work-placements or experiences can be quite problematic. In fact, unlike other theoretical courses, students or trainees are often in diverse settings, away from the university, with little or no direct oversight. Assessment in this case has to accommodate a wider range of activities than that of campus-based courses. Designing effective assessment practices remains one of the most challenging issues that universities face when implementing workintegrated learning. Practicing workplace activities only are not sufficient to ensure effective learning. On one hand, the addition of conventional university assessment methods (such as examinations, essays, reports) could potentially conflict with the richer and complex learning that often takes place during an internship, on another hand, good internship assessment design rests on managing the complexity of including a third stakeholder (the internship field) and on having a good partnership between the university and the company (Ajjawi, et al., 2020). Ensuring that students' assessment is complete, authentic and fair brings forth many challenges. Therefore, higher education institutions should make sure that their students' experience and competence assessment is adequate on several levels all while not relying on a single assessment method.

George Miller's work in assessing competence of clinical skills aptly portrays this complexity when he introduced four layers of assessment regarding internships: (1) assessment of knowing, (2) knowing how, (3) showing how

and (4) doing in a realistic and complex context (Baartman, Gulikers, & Dijkstra, 2013). Developing, implementing and evaluating practical knowledge is clearly not straight-forward and requires a careful and critical reconsideration of current assessment practices.

The main purpose of this work is to propose an adequate and relatively simple model for defining pre-requisites and input measures, selecting the right training field, assessing students' skills and learning outcomes during or following the internship, and identifying the corrective actions eventually needed while taking into account the full complexity of such an evaluation. The model is based on quality assurance principles and demonstrates a commitment to continuous improvement of curriculum and learning goals. This work is part of a larger endeavor that aims to address assessment and performance measurement issues in higher education for both accreditation and internal improvement purposes.

3. LITERATURE REVIEW ON INTERNSHIP'S ROLE IN HIGHER EDUCATION AND ITS EVALUATION

Internship is defined by Cambridge Dictionary as being "a period of time during which someone works for a company or organization in order to get experience of a particular type of work"
(McIntosh, 2013) and by the Business Dictionary as a "period of supervised training required for qualifying for a profession that follows a specified number of academic credits or classroom years" (Friedman, 2012). Whether it is called internship, training, placement, professional field experience or work-integrated learning, practical hands-on trainings are a crucial component of many higher education undergraduate programs. Initially limited to technical and applied disciplines, internships have gained popularity throughout the years as a result of the positive outcomes they had on graduates. Today, many undergraduate programs entail practical training as an integral part of the curriculum. The weight, duration and requisites of internships may vary from a program to another and from a country to another, however, its assessment remains complex and problematic as it involves parties and settings external to the university, combined with difficulties to align learning activities with what is or can be assessed by the university (Ajjawi, et al., 2020).

Internship has the potential to incorporate the domains of knowledge, skills, and values. The knowledge dimension focuses on understanding factual information, terminology, principles, concepts, and theories, while the dimension of skills focuses on what the intern will learn to do. Skills can be physical or intellectual. The domain of values focuses on habits, beliefs, and motivations an intern may wish to develop or improve, such as being more patient or being less defensive about criticism. Assessing an internship should therefore assess the student's progress in all those areas in a non-subjective manner. An internship can be a powerful vehicle for a variety of outcomes with several dimensions of learning and development:

- Through the professional dimension, an internship is an opportunity to take the next step in career readiness, to acquire more of the knowledge, skills, attitudes, and values of a profession or an academic discipline and to explore how well those fit with personal interests and strengths. The internship also offers the opportunity to understand the world of work in a more complete way and become socialized into the norms and values of a profession.

- The academic dimension emphasizes the applied learning of a particular academic discipline, thereby deepening understanding of key disciplinary concepts. There are also important essential abilities across disciplines that can be strengthened in an internship, including the ability to look critically at information, think creatively, work in a team, perceive issues from multiple viewpoints, develop analytical abilities, and communicate clearly both verbally and in writing.

- The personal dimension is an opportunity for intellectual and emotional development important to a student's life, regardless of occupation. Internship offers an opportunity to develop qualities such as flexibility, sensitivity, and openness to diversity. The internship can also be a powerful catalyst for developing a sense of potential, testing creative capacities, and exercising judgement. The opportunity to advance self-understanding and self-awareness is a crucial dimension and can include clarifying values and understanding reaction patterns, cultural profiles, ways of thinking, and styles of communicating.

-       The civic dimension emanates from the need for students to acquire knowledge, skills, attitudes, and values that will allow them to function as productive citizens in a democratic society. The internship is a chance to learn about the public relevance and social obligations of a profession and about how those obligations are (or are not) carried out at the internship site (King & Sweitzer, 2014).

In their study, Ajjawi *et al.* identified three key misalignments that led to inauthentic experiences of internship assessment: (1) misalignment between assessment activities creating dissonance between current and future selves, (2) misalignment between work placement activities and assessment activities, and (3) misalignment between the university and workplace roles. Common to these three misalignments is a lack of shared endeavor and coordination among the key stakeholders: student, university and industry (Ajjawi, et al., 2020).

In general, involving both students and workplace (through internship supervisors) in the evaluation process is considered the ideal way of assessing the performance of an internship. Indeed, the combination may facilitate the principles of quality assessment which include having regular feedback among all parties, utilizing both formative and summative assessment pieces, and incorporating critical reflection [23]. There are, however, long-held concerns for the reliability and validity of such assessments. Evaluations conducted by workplace supervisors are largely related to leniency bias, poor rating reliability, lack of engagement, resistance to be directly involved in the assessment process, and inappropriate skills to assess accurately (Jackson, 2017). There can also be difficulties in incorporating supervisor's grades into students' formal grades rendering standardized assessment tools problematic. Moreover, while self-evaluation is a type of assessment that should drive accountability and self-improvement, basing an assessment solely on students' self-evaluation is a very sensitive and risky method as it assumes that students have the needed training and maturity to perform such a task.

Therefore, a multi-dimensional approach to internship assessment is essential if we are to overcome those challenges, recognize the biases in students' self-evaluation and supervisors' evaluation while focusing on internship quality and learning outcome.

4. PLACE OF INTERNSHIP EVALUATION IN QUALITY ASSURANCE AND ACCREDITATION

One of the multiple definitions of quality assurance in higher education is the systematic management and assessment procedures adopted by a higher education institution or system, to monitor performance and to ensure achievement of quality outputs or improved quality. Quality assurance aims to give stakeholders confidence about the quality of management and of the achieved outcomes.

Accreditation is defined in Cambridge dictionary as "the fact of being officially recognized, accepted, or approved of, or the act of officially recognizing, accepting, or approving of something" (McIntosh, 2013). Webster defines the word accredit as the fact "to give official authorization to or approval of something or to consider or recognize as outstanding" (Webster, 2017). As for oxford, accreditation is an "official approval given by an organization stating that somebody/something has achieved a required standard" (Oxford University Press, 2014). Accreditation in higher education refers to a process of assessment and review which enables a higher education program or institution to be recognized or certified as meeting appropriate standards.

Accreditation is performed by accreditation agencies that evaluate the quality of an institution or one of its programs based on a set of standards. Agencies can be national covering one country like those operating in China, India, or Bangladesh (Natarajan, 2011) (Song, 2018) (Samal & Bharati, 2019) (Chowdhury, Alam, Kanti Biswas, Islam, & Islam, 2013) or international, covering several countries or a continent as it is the case in Europe, USA and most of the developed countries (Teichler, 2018).

The quality debate in higher education is not a new topic. In the past, higher education institutions and governments used different terminology, such as academic standards, standards of degrees and diplomas, student assessment, audit and accountability. At that time, the main concerns were largely about maintaining academic standards according to some national or international norms, the maintenance and improvement of levels of teaching and learning, and ensuring sufficient financial and other resources to achieve the institution's mission. Many of these issues are still important today, but the new quality debate focuses now on achieving quality outcomes, assessing the suitability of graduates for the workforce, providing information to stakeholders in order

to assure them of the quality and credibility of outputs, and establishing appropriate management processes to monitor achievement and to monitor the extent to which specified goals and objectives are being met (Meek & Harman, 2000). In other words, today's concerns are more about management processes and their effectiveness, the assessment of outputs, outcomes, monitoring performance, and demonstrating how well outputs/outcomes meet employers' and others' needs.

This brings us to question the place and role of internship, its process management and its assessment in the midst of quality and accreditation efforts. While answering to accountability of graduates' practical learning outcomes and meeting workplace requirements are essential to assuring quality, the translation of this priority into clear actions and accreditation standards is still vague. Acknowledging the important role of internship in the learning process is one thing. Establishing clear and comprehensive assessment methods is something else.

Following a quick review of several institutional accreditation agencies like ACE (Accreditation Institution - Denmark), EVALAG (Evaluation Agency Baden-Württemberg - Germany), ACQUIN (Accreditation, Certification and Quality Assurance Institute - Germany), ANECA (Agencia Nacional de la Evaluación de la Calidad y Acreditación - Spain), QAA (Quality Assurance Agency for Higher Education – United Kingdom), EduQua (Swiss quality label for further education institutions - Switzerland), NEASC (Middle States Commission on Higher Education - USA), and HLC (Higher Learning Commission - USA) (Eaton, 2010), it was striking to notice the dearth of standards dedicated to internship assessment. In fact, none of the abovementioned agencies proposes a specific method to assess internships' objectives, learning outcomes, or internship's impact on the student's academic and professional development.

Moreover, when scanning the standards of programmatic accreditation agencies such as CTI (Commission des Titres d'Ingénieurs - France), ABET (Accreditation Board for Engineering and Technology - USA), or AACSB (Association to Advance Collegiate Schools of Business), the only mention about students' practical work is that there should be direct measures to assure learning. In other words, to have evidence from learner's work such as examinations, quizzes, assignments, and internship or externship feedback that is based on direct observation of specific performance behaviors or outcomes. Some have mentioned that assessment should lead to curricular and process improvement (AACSB, 2020). The German FIBAA (Foundation for International Business Administration Accreditation) requires the program to be systematically oriented towards meeting the anticipated requirements of the dynamic job market and makes use of the results of graduate evaluations. As for highly practical programs with extensive clinical work like Nursing, ACEN (Accreditation Commission for Education in Nursing) standards state that student clinical experiences and practice learning environments are evidence-based, reflect contemporary practice and nationally established patient health and safety goals, and support the achievement of the end-of-program student learning outcomes. As much as all this is true and important, yet it remains very theoretical. In fact, internship assessment is required by most accreditation standards however, none has put forward clear standards and guidance that explicitly elaborates on the performance measure on which Institutions can rely for evaluating their activities (whether internship or class teaching) and providing evidence of their conformity (Asif & Searcy, 2014).

Internship evaluation allows us to analyze and assess the matching between the theoretical and laboratory knowledge acquired on-campus on one side, and the practical and technical skills required in the workplace on the other (Bender, 2021). Closing the gap (between education and industry's needs) in terms of learning outcomes, program's objectives and content will be gradually reached.

5. METHODOLOGY

Several management tools and methods already exist to measure and evaluate quality performance in general; check sheet, grids, flowcharts, balanced scorecard, cause and effect diagram, performance indicators, etc. (Cave, Hanney, Henkel, & Kogan, 2006). Many higher education institutions have adopted those tools from the industry to assess the performance of teaching and research. While we will not delve into the risks and challenges of implementing

"borrowed" methods from the industry, it is important to mention that none of these tools were specifically developed for higher education and even less for assessing the performance of workintegrated learning. The performance evaluation method suggested in this paper takes into account the context of higher education in general and the particularities of evaluating practical learning.

We will start by presenting the process of internship before proposing evaluation tools and indicators to assess the internship's performance at each step of the process.
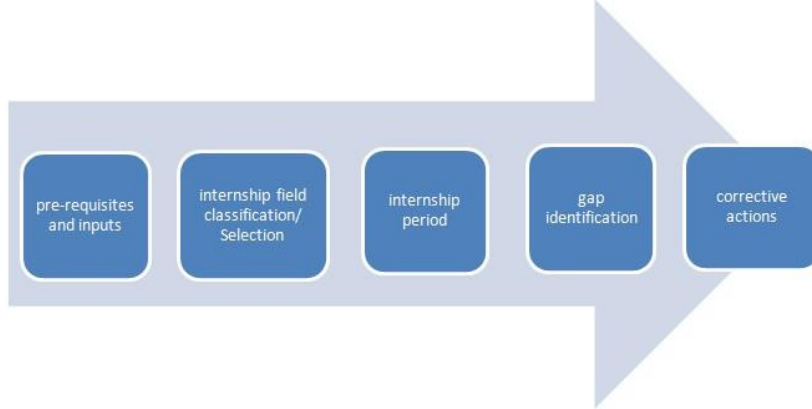

Figure 1. Internship process

We will start by describing the steps:

5.1. Pre-Requisites and Inputs

The first idea in the internship process is to clearly define the objectives and learning outcomes that the student and the institution aim to reach upon internship completion. The second is to make sure that all input measures are adequate and fulfill the internship's mission. Typically, internship learning outcome is to develop students' professional identities and capability through the integration of different forms of knowledge and reflection on the nature of work. Internship should help students see the relevance of their study, contextualize learning outcomes, and promote engagement in learning (Devedzic, et al., 2018). Input measures designate the human, financial and physical resources involved in supporting the internship's purpose. In fact, it is believed that when a set of input resources is demonstrated to be available (and in the presence of institutional will), it indicates a good chance that current conditions favor the creation of quality education (Manning, 2018).

5.2. Internship Classification and Selection

This step allows an efficient classification and selection process of internship venues. It informs about the variety, availability and profile of the available internship venues, the expected dedicated assistance and supervision the student would receive and the diversity of tasks, size of projects, etc. to which the student would be exposed. Students who perform their internship at exceptional institutions will benefit from the experience more likely than those who did it in a merely adequate one.

5.3. Internship Period

This is the actual period where students are doing their practical work under the supervision of an internship supervisor.

5.4. Gap Identification

Following the internship period and the assessment of students' learning outcomes, it is crucial to compare the outcomes to the intended objectives set in the first step. When those gaps are identified, measured, interpreted and corrected, it allows continuous improvement. Managing the performance of internships is in fact the process where actual performance, targets and gaps are reviewed to ensure that timely preventive and corrective actions take place.

5.5. Control Variables and Corrective Actions

Assessing a performance without taking the right improvement measures or corrective actions is a waste of resources. The goal is to detect areas of low performance and improve them by implementing the necessary

corrective measures when meaningful gaps between the actual internship performance and the desired results are identified. Control variables represent the potential list of actions that can or should be realized when the actual results do not satisfy the pre-defined objectives.

As one performance indicator cannot paint a complete picture of an internship's performance, let alone explain the gaps and identify corrective actions, the method proposed in this paper suggests an aggregation of several performance measurements that assess an internship throughout its full process allowing to develop an objective, quantifiable and holistic judgment in the purpose of continuous improvement.

The foundation of a successful internship is the alignment between the internship's intended learning outcomes, learning activities and assessment while considering the following criteria:

o   students should engage in reflection on their personal goals and learn how to perform selfassessment;

o   the internship' learning outcomes are clearly defined and consistent with the program's learning outcomes;

o   prerequisites to the internship are well defined and achieved prior to enrollment; o alignment between the institution's intended outcomes and the workplace expectations should be done prior to the internship, when defining objectives;

Assessing the internship is therefore a continuous process based on qualitative and quantitative measurements of performance, followed by gap identification and corrective actions.

Performance measures or Performance Indicators (PIs) are qualitative or quantitative measures used to evaluate the performance of a company, an activity, a process or an educational program. They are also used to determine whether predefined objectives have been met. PIs in higher education are an important measurement tool used to assess the performance of the institution, a department, a program or an activity, academically, strategically or financially. They can evaluate input measures, processes, outputs or outcomes. Based on their results, the institution would have a clear understanding of the present situation, how effectively it is meeting its objectives and would be able to set up improvement plans. This practice, whether it is part of an accreditation process or self-imposed, is necessary to assure quality and continuous improvement (Roubtsova & Michell , 2013). Several methods and techniques exist to define and to calculate PIs. Although it is not the subject of the present paper, a quick review of literature regarding performance management and the use of PIs in higher education showed that very few authors have addressed the specific context of higher education when proposing this management tool. While some measurements have been developed throughout the years to assess research performance, students' graduation, retention rates or even satisfaction, none has attempted to specifically assess students' internship performance. In this paper several quantitative and qualitative PIs are proposed with the purpose of evaluating the performance of an internship throughout its whole process. By using PIs aligned with the program's learning objectives, it is possible to evaluate effectiveness and measure the achievement of the internship's learning outcomes quantitatively and qualitatively. This achievement should then be compared to a target, whether a previous result, an average of results, a certain threshold (predefined objectives) or if available, a benchmark.

5.6. Internship's Evaluation Method

For each step of the process we will detail the evaluation method and suggest PIs that will help assess and monitor the process' effectiveness. The PIs and their calculation method are detailed in the table at the end of the article.

1-   Pre-requisites and inputs are related to academic pre-requisites that students should acquire prior to their enrolment in the internship and to requirements (academic, human and physical) that the higher education institution should secure in order to maximize the benefits of internships. The following areas are of particular importance:

▪   Curriculum and courses' regular updates. It is important to continuously update the program's curriculum and courses as part of quality and continuous improvement efforts. The update consists in the addition/removal of courses, modification of pre- and co-requisites of courses, significant changes in the courses' objectives and content, establishment of minors (subfields), etc. In other terms, it involves taking in account any adjustment or

enhancement made as a response to an expressed need or corrective action or to the introduction of new technologies that affect the program. *Frequency of curriculum and courses updates* (PI1 in the table);

▪ Qualification of faculty members. The profile of the faculty members teaching and doing research at the department (degrees and experience) reflects the added values that they can bring to the department. Those who hold professional positions in the industry are able to provide students with many opportunities in terms of job placements, participation in industrial projects, real case-studies and most importantly, alignment between theoretical knowledge and practice. Faculty members holding a PhD might not bring industry expertise, however, they offer deep scientific knowledge and research competence. A high ratio of professional experience indicates a high number of faculty members who are involved in the industry, and consequently, higher chances for students to acquire practical know-how prior to their internships and consequently more chances to highly perform

Qualification of the faculty members (PI2 in the table):
i. Percentage of full timers and part-timers having a Professorship degree; ii. Percentage of full
timers and part-timers having a Ph.D. degree; iii. Percentage of full timers and part-timers having
a Master degree; iv. Percentage of full timers with a professional experience;
v. Percentage of part timers who presently hold a position in the industry.

▪ Student's GPA and prerequisite courses. This parameter indicates that the prerequisites that students should acquire prior to their internship (such as a minimum cumulative GPA, prerequisite major courses or minimum earned credits) should be clearly defined and validated before allowing the students to enroll in the internship in order to fully benefit from the internship experience (PI9);

▪ Program's relation with the industry. A program that is designed and taught in collaboration with the business sector is more likely to produce graduates who possess
up-to-date and adequate skills to succeed in the job market (PI10);

▪ Clear definition of internship learning outcomes. It is probably the most important action. The department should have a clear list of skills, attributes and knowledge that students should acquire by the end of their internship period, linked to a detailed assessment scheme. The internship's evaluation (through forms and questionnaires) will be based on that assessment scheme. Assessment of learning outcomes guarantees to stakeholders that students have reached various knowledge and skills and that they are ready for employment or further study (PI11);

▪ Societal and professional impact of the program. The impact of the program on its environment can be assessed by the extent of its collaboration and engagement with the community through the organization of professional development activities. In fact, workshops, conferences, seminars and continuing education programs tend to close the gap between higher education and labor market needs that undergraduate curricula don't seem to fully cover. It includes also the program's participation in presenting findings or innovative techniques and methods that are newly being implemented in the industry and not yet integrated in academic programs through conferences holdings and experts gathering. Societal impact of the program is also translated in the number of joint research projects with the industry (refer to PI3 in the table);

2- Classification and selection of internship venues is important as it guarantees that students will be performing their training in a suitable organization. The proposed indicator allows an efficient selection and ventilation process of internship venues
Internship venue selection criteria (PI4 in the table);

3- The internship period is the period during which the students are physically based in a professional setting for a defined period. In general, internship experience is assessed through questionnaires filled by the students themselves or by the internship supervisor. Many forms and concepts of satisfaction questionnaires and evaluation sheets are used to assess internships, however, it was concluded that they were subjective and lacked accuracy. The study of Baartman *et al.* is one of many studies that established that the involvement of the work-field in training assessment is usually weak. As a result, the assessments are less authentic, the work-field does not know and understand the assessment criteria, does not accept the assessment, and professionals from the

work-field are not involved as assessors. Another finding was that the translation of the competences to be assessed into assessment criteria understandable by students to be used and actually be assessed in appropriate assessment methods is not always available (Baartman, Gulikers, & Dijkstra, 2013). This can result in students' leaning outcome being inappropriately assessed because of the lack of understanding. In our proposal, both the students and the supervisors will fill an evaluation form. These same evaluations will be filled at two different points in time: before and after the internship for the trainee, after the first week and at the end of the internship for the supervisor. Those questionnaires are based on the list of skills and aptitudes determined in the learning objectives of the internship in terms of technical, managerial, personal and soft skills (Devedzic, et al., 2018). Using two evaluation forms at two different points in time based on learning outcomes minimizes the risks of subjectivity and biases.

At the same time, students' performance in theoretical courses taken during or after the internship will be evaluated and compared to their performance in related courses taken before the internship. This comparison is an indirect manner to assess the added value of the internship on success in theoretical courses. An improvement of the student's academic performance following an internship indicates a beneficial and effective internship experience.

Influence of the internship on the student's performance in theoretical courses (PI5 in the table)

Questionnaires results (PI7 in the table)

i.   Questionnaire filled by the student and the beginning of the internship

ii.   Questionnaire filled by the supervisor and the beginning of the internship

iii.   Questionnaire filled by the student at the end of the internship

iv.   Questionnaire filled by the supervisor at the end of the internship

4-   Identifying the gaps between the intended learning outcomes and the achieved ones is the most important step of the process. As assessing learning outcomes is already an arduous practice that still needs to be done more efficiently (Coates, 2015), assessing practical learning in off-campus settings is even more difficult and tricky. Therefore, we suggest several indirect indicators that when combined, would give a holistic and more accurate picture of the extent of learning outcomes achievement.

▪   Students' employability. This indicator informs about the employability of the graduates in general and as a result of a successful internship (recruitment in the same institution where the student performed the internship). This adapted employability rate serves as a proxy to assess the level of satisfaction of the internship field. The higher the ratio, the higher the degree of satisfaction of the training field and/or the realization of the internship's objectives and/or the higher the whole program outcome.

Employability of graduates (PI6 in the table);

▪   Achievement of internship's learning outcomes. This indictor studies the matching between the internship's learning objectives and the actual learning outcome by cross-comparing the four evaluation forms filled by the trainee and the internship's supervisor (as presented in step 3 above).

Evaluation of the internship's learning outcomes as compared to the objectives (PI7 in the table);

▪   A general satisfaction questionnaire is distributed to the students and to the internship fields to evaluate their contentment in the training regardless of the student's technical performance. It actually assesses the students' satisfaction with the internship venue in terms of opportunities, follow-up and supervision. The supervisor's satisfaction evaluates the personal competencies of the students and the quality of follow-up provided by the higher education institution. Technical and scientific skills are covered in PI7. The satisfaction rate and its evolution are to be compared periodically by batches of students and by training field. It enables the assessment of the satisfaction level from two different perspectives, and eventually identifies improvement areas outside purely academic matters.

Students' satisfaction/ Internship's venue satisfaction (PI8 in the table);

5-   At this level, corrective actions can be launched based on the gaps' identification from the previous step. We suggest the below action means along with their deployment method:

A1. Appointing a steering committee, consisting of faculty members, experts and partners from the industry, to review the courses' objectives/content and the internship's objectives and/or assigning a students' committee (currently enrolled students and alumni) to collect their feedback, comments and suggestions;

A2. Assigning a faculty council to review the number of allocated hours/credits for key courses/laboratory work/internship, the pre-requisite courses/GPA needed before starting the internship, etc. and any other academic prerequisite deemed meaningful;

A3. Conducting meetings with the training fields (direct supervisors and directors), in order to describe the internship's objectives, and/or collect additional feedback regarding the students' behavior and knowledge, shortages, and/or come-up with common actions;

A4. Reviewing the evaluation and assessment methods on theoretical and laboratory courses;

A5. Organizing targeted workshops and seminars on-campus delivered by industry specialists;

A6. Reviewing the profile of the faculty members and laboratory assistants.

Table 1. Performance Indicators

Title of the Performance Indicator	Calculation method
PI1 Curriculum and courses' frequency of updates	The ratio of curriculum and/or courses frequency of update should be calculated over several years (for more representativeness). Ratio of general education courses update per year $$= \frac{1}{5} * \frac{n_{ug}}{n_g} * 100$$ Ratio of core courses update per year $= \frac{1}{5} * \frac{n_{uc}}{n_c} * 100$, and Ratio of major courses update per year $= \frac{1}{5} * \frac{n_{um}}{n_m} * 100$ where n the total number of courses in a given curriculum, n_g the number of general courses, n_c the number of core courses and n_m the number of major courses. Let n_{ug} the number of updated general courses, n_{uc} the number of updated core courses and n_{um} the number of updated major courses.
PI2 Qualification of faculty members	$$r_{ii} = \frac{n_{ii}}{n_{PTi} + n_{FTi}} * 100$$ where n_{PTi} and n_{FTi} are, respectively, the number of part time and full time instructors of the program and n_{ii} is the number of part time and full time instructors having a professorship degree for the "Percentage of full timers and part-timers having a Professorship degree indicator"; n_{ii} is the number of part time and full time instructors having a Ph.D. degree for the "Percentage of full timers and parttimers having a Ph.D. degree"; n_{ii} is the number of part time and full time instructors having a master degree for the "Percentage of full timers and parttimers having a Master degree"; $$r_{pFTi} = \frac{n_{pfi}}{n_{FTi}} * 100$$ where n_{pfi} is the number of full time instructors having a professional experience; $$r_{pPTi} = \frac{n_{ppi}}{n_{PTi}} * 100$$ where n_{ppi} is the number of part timers time instructors holding a position in the industry correlation through linear regression.

Table 2 shows the interconnections between the PIs and the control variables. This summary table is important to ensure the coherence between the PI's (level of performance achieved) and the control variables to identify the adequate corrective actions that should be applied upon gap identification. This also ensures that the chosen PI's are not redundant in their usage and that none are missing. Lastly, it serves as a quick reference for the users of PIs to facilitate and prompt the process of gap identification and launching of corrective actions.

Table 2. Interconnection between the PIs and the control variables

PIs		PI1	PI2	PI3	PI4	PI5	PI6	PI7	PI8	PI9	PI10	PI11
Controlvariables	A1	X		X	X	X	X	X	X	X	X	X
	A2					X		X		X		
	A3		X	X	X	X	X	X	X	X	X	X
	A4					X	X	X				
	A5	X		X			X	X			X	
	A6		X				X	X			X	

To conclude, figure 2 summarizes the overall evaluation methodology throughout the whole internship process used as a roadmap for internship assessment.
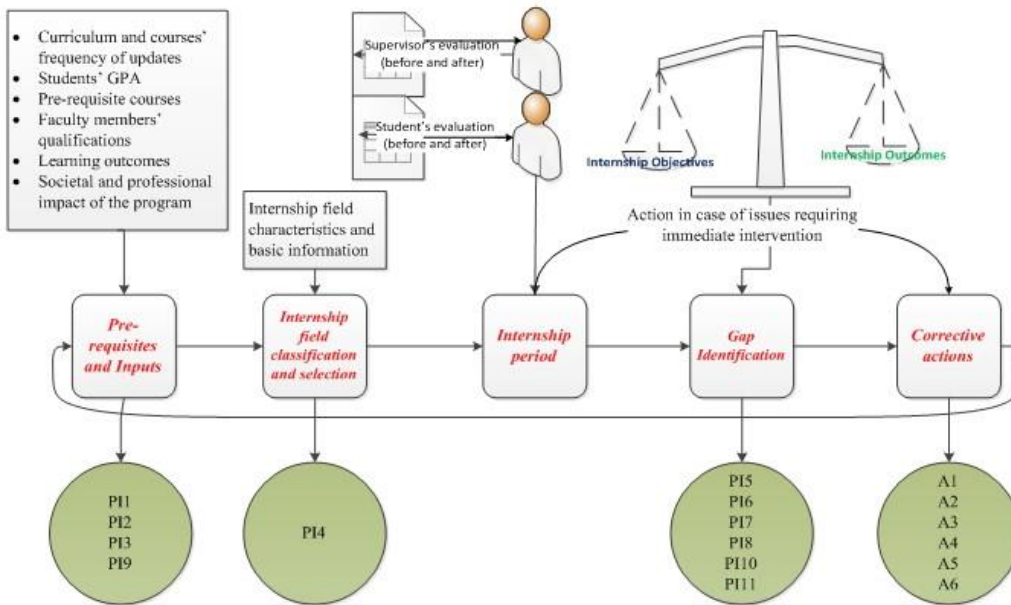

Figure 2. Summary of internship process and assessment

6. CONCLUSION AND FUTURE WORKS

In this paper, eleven PIs were proposed in order to evaluate the performance of an internship throughout its whole process and through several angles. We compared the internship's learning outcomes with its expected objectives, studied the influence of the internship on the student's academic performance, assessed the satisfaction of the internship fields and whether it was translated into actual recruitment, studied the profile of the internship fields as well as that of the faculty members, and lastly, calculated the frequency of curriculum updates and professional development activities. On another hand, six control variables were proposed to be launched as corrective actions to close the gaps between expectations and actual performance whenever needed. At a first stage those corrective actions aim to continuously improve the internship's performance, at a second stage, they will help to enhance the overall program learning outcomes and their coherence with the labor market requirements. As a future work, this scheme should be tested and applied to several academic programs, especially to those where practical work holds an important place, in order to verify its validity.

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