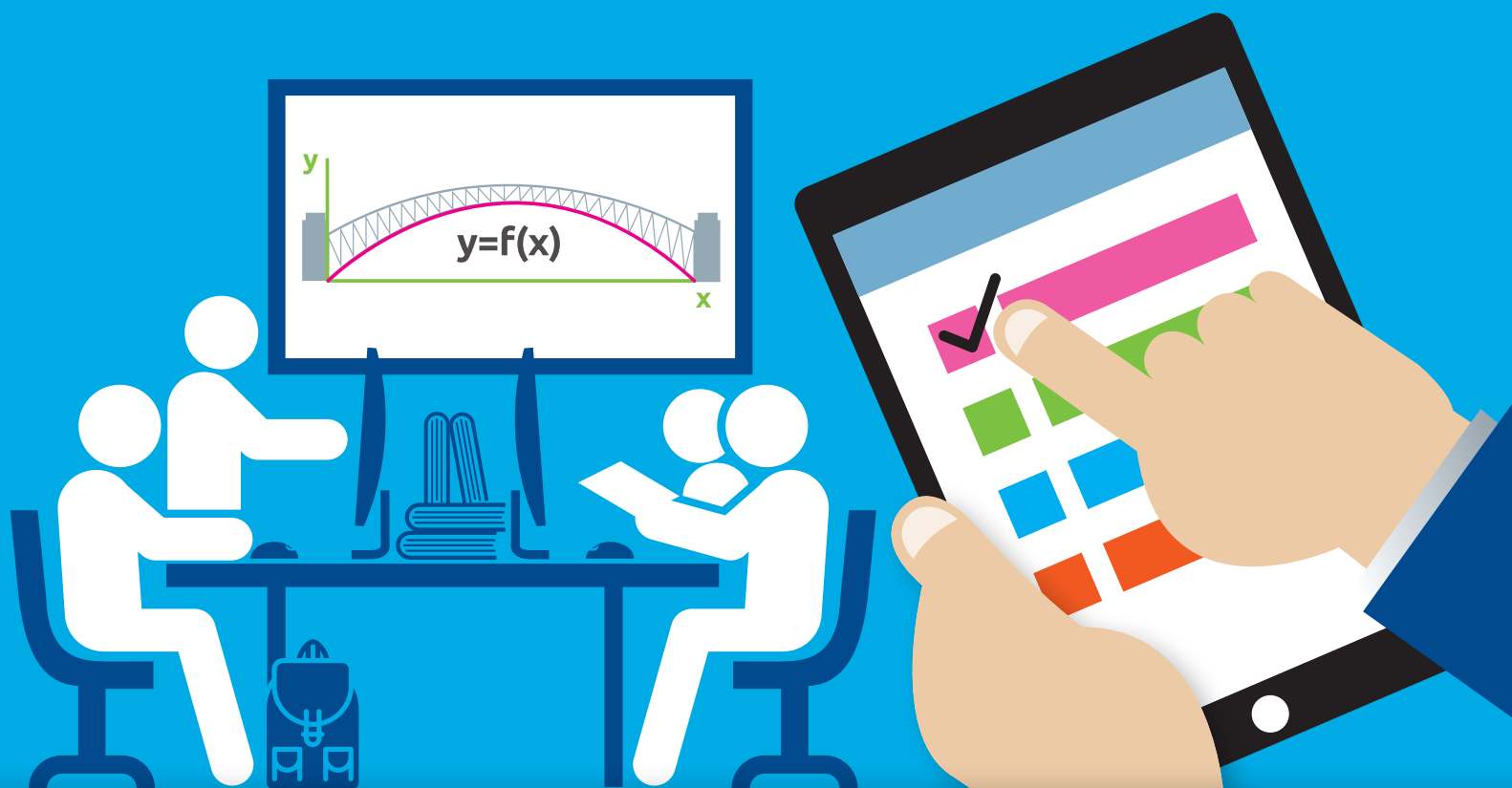


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Performance Assessment in a competency-based educational model

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Table of contents

5	Introduction
12	The teacher's role
14	Teaching scenarios and didactic techniques as a reference framework
16	Relevance for Tecnológico de Monterrey
18	Relevant cases at Tecnológico de Monterrey
22	Relevant cases at other educational institutions
25	New trends
27	A critical look
28	Challenges
30	Recommended actions for teachers and academic leaders
32	Credits and acknowledgments
33	References

Performance Assessment

Performance assessment is the type of evaluation used in the competency-based educational model. Students' actions and products are appraised during the learning process, thus providing feedback on their learning and validating the development of competencies.



Introduction

The learning assessment process has traditionally been one of the most widely used forms of recognizing a person's knowledge or skills in providing information or solving a problematic situation whenever necessary. The earliest records of learning assessments date back to the Middle Ages. However, learning assessment has only recently been formally integrated into school education, with the introduction of various processes to evaluate learning.

The educational focus of learning assessment began to take shape in the 17th century. The economic, social and political conditions of the late 17th and early 18th centuries encouraged developing societies, in their transition towards industrialization, to establish diverse evaluation techniques that would provide significantly more control over the education processes. Thus, there was a need for consistent, integrated criteria in order to achieve a more precise assessment of learning, which is how examinations gradually began to gain importance as evaluation instruments.

Academic instruction during the 19th and early 20th centuries further developed the assessment process as we know it today: a unified process to determine the limits of apprentices, under the same criteria, standards and circumstances, expressed by a numerical value (Díaz-Barriga & Hernández, 2002; Escudero, 2003). The trinomial, learning objectives-exam-grade, has been consolidated as the formula to provide education processes with strength and horizons. However, learning assessment has slowly revealed subtle variations caused by the introduction of different perspectives on what education is supposed to be.

The current trend shows the value of performance assessment as the predominant element, after having quantified knowledge for many years (Hattie & Timperley, 2007; Palm, 2008; Shute, 2008; Stiggins & Chappuis, 2005). This demands a shift from a reductive to a more plural and broader vision of learning assessment, in which judgments are reached bilaterally (teacher-student/among peers) and are linked to their personal context. This results in pieces of information that are more meaningful for the student than grades.

This document aims to present a series of conceptual and technical elements on learning assessment, with an emphasis on performance assessment and authentic assessment, which belong to the Competency-Based Learning Model (Observatory of Educational Innovation, 2015a) and Challenge Based Learning (Observatory of Educational Innovation, 2015b). Throughout this document we also address aspects such as the teacher's role in this transformation process, as well as considerations from educational research and innovations in the field, which could shed light on how to promote change in assessment processes within a higher education framework.

Paradigm shift: From knowledge-based assessment to performance-based assessment

In order to understand the nature of learning assessment in its various approaches and practices, it is necessary to know the existing perspectives on the assessment of the learning process. Therefore, in the next pages we will cover two paradigms that explain learning assessment: positivism and hermeneutics.



The positivist paradigm states that knowledge comes from the observation and construction of a systemic prediction process, applying a quantitative methodology to all sciences, including social sciences. Thus, objective-based pedagogy emerged, proposed a way of planning and guiding learning development to turn curriculum planning into an efficient tool for pedagogical projects (Perrenoud, 1990; Sacristán, 1982).

In this sense, positivism has an extensive legacy of learning assessment, fostering various advancements in the organization and systematization of the assessment process. For example, since the 1940s to date, thanks to the contributions of R. Tyler, the assessment process measures the scope of the educational goals inside and outside the classroom, according to countries' economic and social development needs. However, according to Thomas (1998), positivism also had a negative influence on the fields of pedagogy and educational research, in that it favors systematic and ordered thinking, focusing on the "what" and not on the "how", which has an impact on the self-assessment process.

Hermeneutics explain the world and its phenomena from the individual's interpretative capabilities and the particular understanding of his or her environment, since each person's life is dynamic and unique. In the early 20th century, the field of education put more emphasis on the study of this paradigm and its phenomenology, which favors the students' experience in achieving learning. Thus, pedagogical approaches that resulted in educational models coexisting with traditional schools, such as constructivism, gained strength.

As for the learning assessment processes of this approach, Díaz-Barriga & Hernández (2002) mention that assessment must be constant and must also take into account the procedures and variables shown at the time of learning that allowed its construction.

Furthermore, there has to be an integration between people and their environment, elements that aid in the construction of learning, since student learning should be meaningful for their lives. This is why contextualization is of great importance in this approach.

The perspective posed by hermeneutics makes the evaluation tools seek to collect information to interpret the learning process continuum. Some of the most valuable assessment tools are reflection questions, observation of activities carried out by students, anecdotal records, class journals, creation of portfolios and rubrics. These mechanisms are based on a series of data related to the context, which is crucial for interpretation and further decision making.

This brief glance at both paradigms gives rise to the following reflection:

How do we shift from knowledge- to performance-based assessment, in which not only knowledge, but also the processes and the connection with the environment are valuable?

Performance assessment

Performance assessment is the type of evaluation used by the CBEM (Competency-Based Educational Model). This assessment involves observation, tracking progress and measuring the behaviors of students as they carry out an individual or collective activity related to their learning process (Hancock, 2007). The student is expected to show the acquisition of a series of skills and knowledge in one or more disciplinary areas. The generated products or proposals are the evidence that would allow us to infer the level of the competencies achieved at the time of the assessment.

In the context of performance assessment, students create, produce and provide solutions based on their knowledge, within a context and with a specific goal, carrying out high-level thinking processes. Any judgement resulting from an assessment process must be enriched with diverse viewpoints, extending beyond the academic sphere: potential clients, employers, citizens, etc. (Morrow et al., 2015).



Authentic assessment

Authentic assessment is immersed within the performance assessment framework. Some authors describe this type of evaluation as one that is connected to real-world scenarios. Its mechanisms have meaning and value that transcend the school setting, for a better match between the task and the conditions in which it is assessed (Ashford-Rowe, Herrington & Brown, 2014; Frey, Schmitt & Allen, 2012). To meet this objective, authentic assessment must include the following elements:

Learning activities are more meaningful for the student when they deal with real-world problems, and when they are directly related to the program's progress and the education goals.

SENSE OF CHALLENGE

VALUE OF COLLABORATION

On the one hand, collaboration among students allows for understanding, transferring and addressing a problematic situation with different points of view; on the other, it allows for sharing knowledge from different perspectives, and even disciplines, resulting in more complete solution processes.

TANGIBLE RESULTS

The assessor and the assessee perceive it more accurately, either through performance or a product.

PERFORMANCE FEEDBACK

Feedback must guide not only academic improvement, but also the student's entire performance process during the authentic activity. An open discussion with teachers, employers or professionals participating in the activity could lead to opportunities to develop improvement plans for students.

TRANSCERENCE FROM KNOWLEDGE INTO PRACTICE

The process must be consistent between disciplinary learning and the real-world situation where the performance will be observed, so the transference or application of knowledge can be evident.

ONGOING EDUCATION

The education process is ongoing to ensure an immersion in real-world situations where the transference and improvement processes can be evident.

METACOGNITIVE PROCESSES

Self-monitoring and self-assessment processes must be established to encourage the recognition of strengths and opportunities for improvement.

With authentic assessment, students and teachers go beyond the classroom to insert themselves in their communities, where citizens, particularly employers, can fully estimate the students' abilities to face the challenges of the new millennium.

One of the conditions to conduct performance assessment successfully is to base on strong theoretical frameworks the decisions regarding its planning, implementation, results interpretation and improvement processes. This will allow clear, well-reasoned judgments on the observed actions.

Theoretical frameworks are used to interpret the students' status in the domain of knowledge or a skill, and to understand how they relate to their environment. For this reason, in order to support the results of the assessment, a single theory is not enough, and a series of theoretical frameworks are needed instead.

Therefore, the following are of relevance: The Novice to Expert Theory (Chi, Feltovich & Glasser, 1998; Chi, Glasser & Farr, 1988; Leinhardt, 1989); Problem -Solving Theories (Gick, 1986; Holyoak, 1991; Polya, 1957); and The Taxonomies of Cognitive, Psychomotor and Socioemotional Processes (Harrow, 1972; Marzano & Kendall, 2007; Simpson, 1971; Bloom et al., 1969). These theoretical frameworks, aligned with the vision, mission and perspective of each institution, provide a frame of reference to assess performance.

Any effort to consolidate a performance assessment system in the CBEM must be carried out in the light of theories. These will make it possible to interpret and uphold any judgment resulting from the assessment. Otherwise teachers and students are unlikely to significantly appropriate the information (performance results and feedback), in order to work on improving.



**Basing the
performance
assessment
decisions on strong
theoretical frameworks
will ensure its successful
application.**

Benefits

One of the main advantages of performance assessment is the relationship it establishes with practices that foster constructivist and experiential learning (Hancock, 2007). It is important to remember that these practices lead students to action.

The next pages will explore the main benefits of performance assessment, both for learning achievement and for students, teachers and society (Ahumada, 2005; Astin & Antonio, 2012; Ashford-Rowe, Herrington & Brown, 2014; Díaz-Barriga, 2006; Díaz-Barriga & Hernández, 2002; Hancock, 2007; Hill & Barber, 2014; Kan & Bulut, 2014; Stiggins, 2001; Stipek, 2002; Van Gaal, 2013).





PERFORMANCE ASSESSMENT

For the student

- It increases confidence by taking control of the performance results. The assessment becomes relevant and significant with the active participation of the student.
- It strengthens motivation and commitment by having frequent assessments and timely feedback, rather than a single assessment at the end of the process, which could mean more pressure for the student.
- It provides a clearer idea of what is needed to improve their abilities: they can see their progress and the specific areas they need to work on.
- It encourages self-regulated learning. Students reflect on their strengths and opportunities for improvement, leading to self-assessment.

For the teacher

- It allows tracking the progress of students in order to create preventive, remedial or reinforcing activities.
- It provides diverse and multiple opportunities to observe and document learning, with the aim of improving the students' performance.
- It allows the supervision, self-assessment and improvement of the assessment practices.

For learning achievement

- It clarifies the purpose of learning, particularly in situations where there is a complex web of knowledge from different disciplines.
- It focuses on complex skills, such as tackling and solving intellectual and social problems.
- It considers contextualized problems that take into account the attitudes and values shown therein.
- It assesses the students' abilities in action, where the performed role can be observed, as well as how they interact and cooperate with other students.
- It values the students' thinking processes as well as the products they generate.

For society, organizations and companies



- It provides a better understanding of the students' competencies, since there is a consistency between the graduate profile and the abilities gained by the student.
- It allows them to use their experience for the assessment and evaluation of the students' skills.

The teacher's role

Carrying out the performance assessment requires the educational community to undergo a deep process of reflection and change in order to reconfigure the practices that are no longer relevant in the CBEM. The spotlight is firmly on the teacher as one of the most important educational agents to plan and carry out the transformation processes. His or her decisions will drive students toward the development of the required competencies.

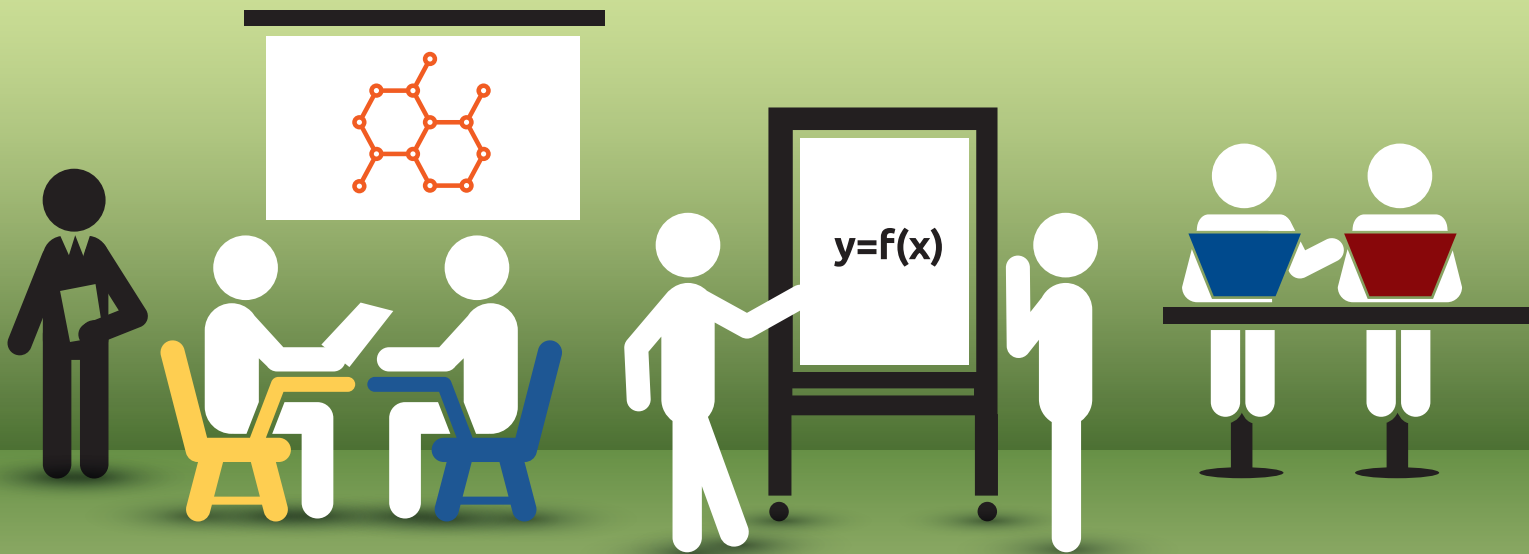
There is a variety of strategies that allow teachers to work under the competency approach (García Cabrero et al. 2008; López & Camarena, 2010; Martínez et al. 2015; Meyer-Adams et al. 2011). Some of these strategies to strengthen teaching practices are:

Redesign of the assessment processes: Working with CBEM amplifies and diversifies the processes and instruments that allow teachers to assess the student's progress. Thus, the test goes from being the main tool to corroborate the progress of the student's learning, to form part of a set of instruments for the assessment process. CBEM requires rubrics that include the criteria and expected performance levels, the generation of educational activities to promote the achievement of the expected performance, as well as challenging yet viable integration programs for students to make full use of the disciplinary, transversal and attitudinal resources to work constructively on them (Kan & Bulut, 2014).

Collegial work: The demands of CBEM in terms of planning, teaching and assessment require multiple viewpoints that result in a set of agreed criteria to strengthen the path that will lead students to the expected performance. In this sense, collegiate work must encourage discussion, reflection, and problem solving in relation to the teaching-learning processes of the different disciplines. Working in this manner is consistent insofar as it is a social construction of knowledge process.

External connection: CBEM requires implementing authentic assessment, especially for the periods prior to graduation. This feature of the performance assessment system suggests the need for teachers that design assessment strategies and activities with a profile that combines solid academic knowledge and an extensive practice. That means they need to be able to connect their students with the real world, immersing them in scenarios where they would face challenges that require the application of their knowledge and the generation of solutions. Therefore, the teacher relational capital becomes extremely important for the proper practice of performance assessment.

Continuous training: One of the main implications to ensure the authenticity of the assessment in CBEM, is the need to be immersed in knowledge application settings, with dynamic, regularly updated methods and content. Therefore, training and continuous updating for teachers becomes a crucial part of their professional practice.

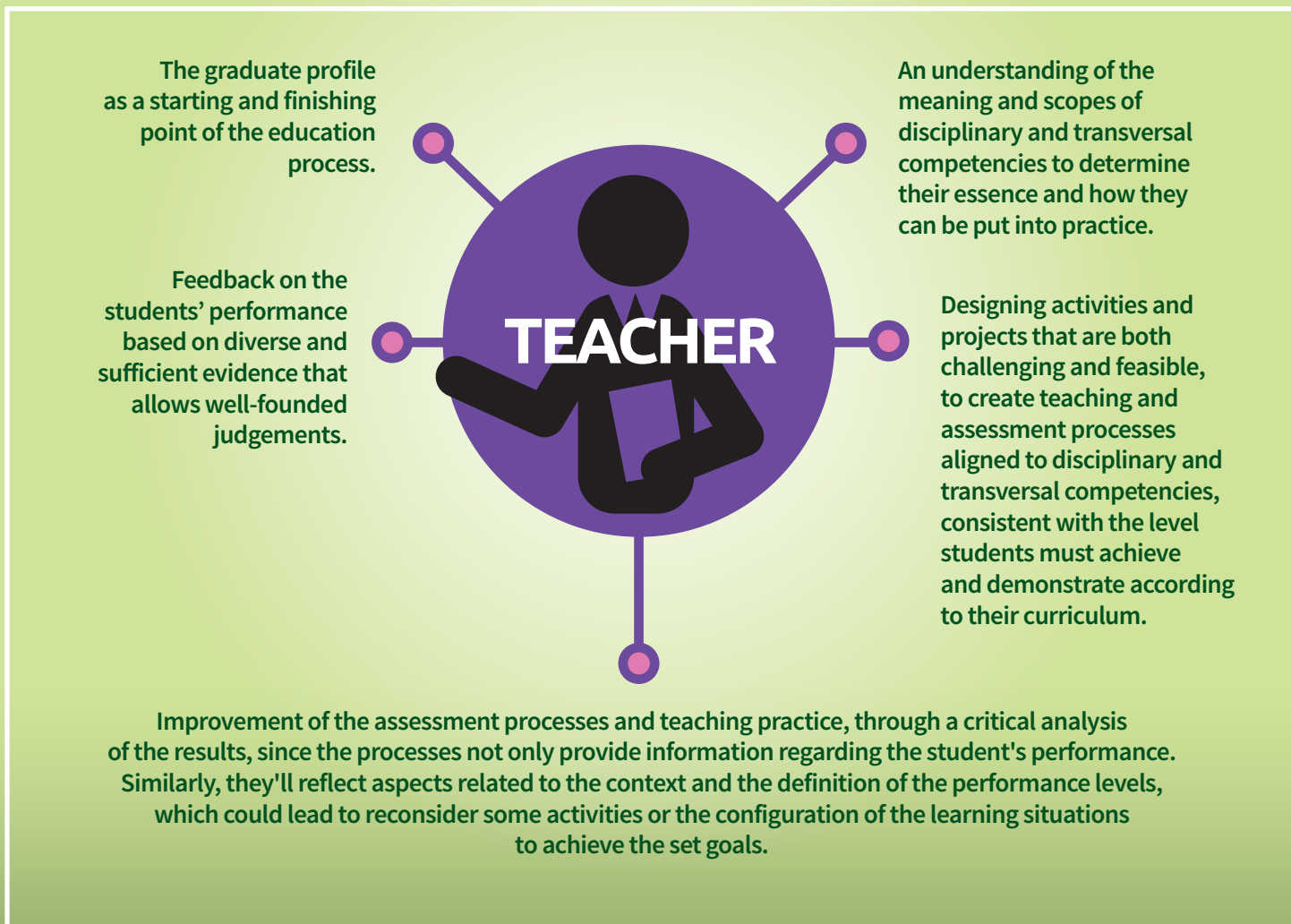


Building an assessment system of excellence

One of the most significant challenges of higher education when working under CBEM lies in structuring an assessment system of excellence. It is given this name because a system of this sort not only seeks to strengthen of the learning process and develop capabilities, but also, at the same time, enable a continuous improvement of the assessment, accountability and transparency of the results obtained

while training the professionals who will serve society (Astin & Antonio, 2012; Rubio, 2009; Hattie & Timperley, 2007).

The consolidation of the system is usually dependent on two factors: institutional support to introduce the necessary changes and support in relation to their assessment policies (usually reflected in the educational model and academic guidelines) and the teachers' efforts to achieve the operationalization of this system of excellence in their disciplines. The following graph shows the five main aspects to consider regarding teaching practice:



The teacher's role in relation to performance assessment requires discussion, consensus, integration with the environment, and continuous updating when it comes to what society expects from a discipline. Carrying out these actions will lead to ideal performance frameworks in which students can develop and demonstrate a series of competencies.

Teaching scenarios and techniques as a frame of reference

Learning and assessment scenarios

Teachers can use different teaching techniques to help the student develop the desired competencies. When choosing which teaching technique could best support the learning process, it is crucial to recognize the scope of the competency and at which particular point of the curriculum the student is. Afterward, potential learning and assessment scenarios can be sketched out. Based on this information, it is possible to visualize the best type of activity or project to ensure the student has acquired the expected competencies (Ashford-Rowe, Herrington and Brown, 2014).

It is worth noting that the selection of the scenario varies according to the degree of control the teacher has over the learning situation and the desired level of immersion for the students. Therefore, these scenarios can be structured, semi structured or real life.

Structured scenario

A context in which the teacher has full control of the environment. The teacher plans, implements and assesses through activities carried out in a scenario, usually the classroom.



Semi structured scenario

A previously documented scenario that uses real-life situations. For example: classwork can be combined with the company or social context.



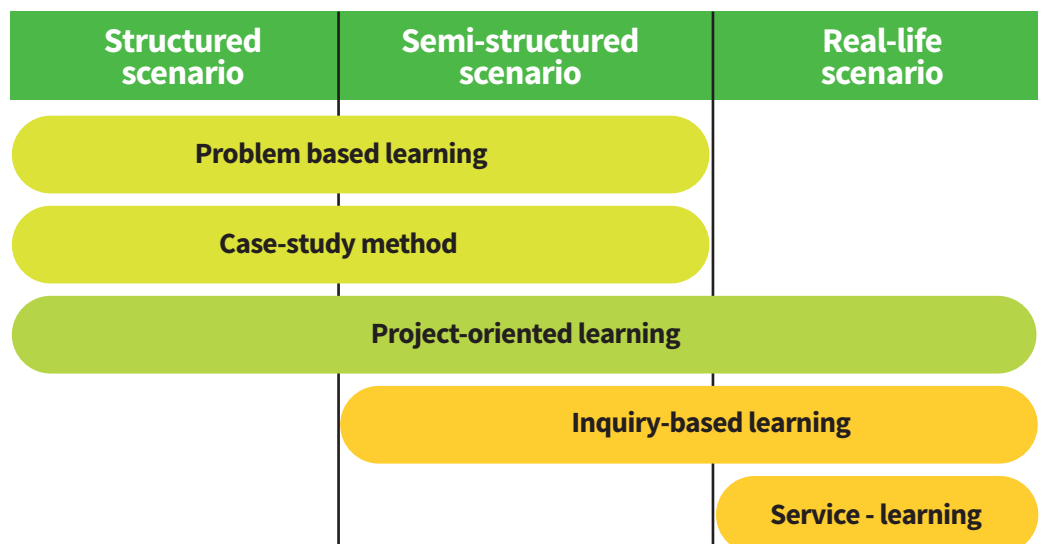
Real life scenario

A scenario in which students are immersed in personal and work activities outside the classroom.



From all the options offered by these scenarios, full immersion in real-world scenarios is not always convenient, since it depends on the student's previous experience, the type and level of competency to develop, etc. These conditions suggest that immersion in real-life scenarios is best left for the final academic periods.

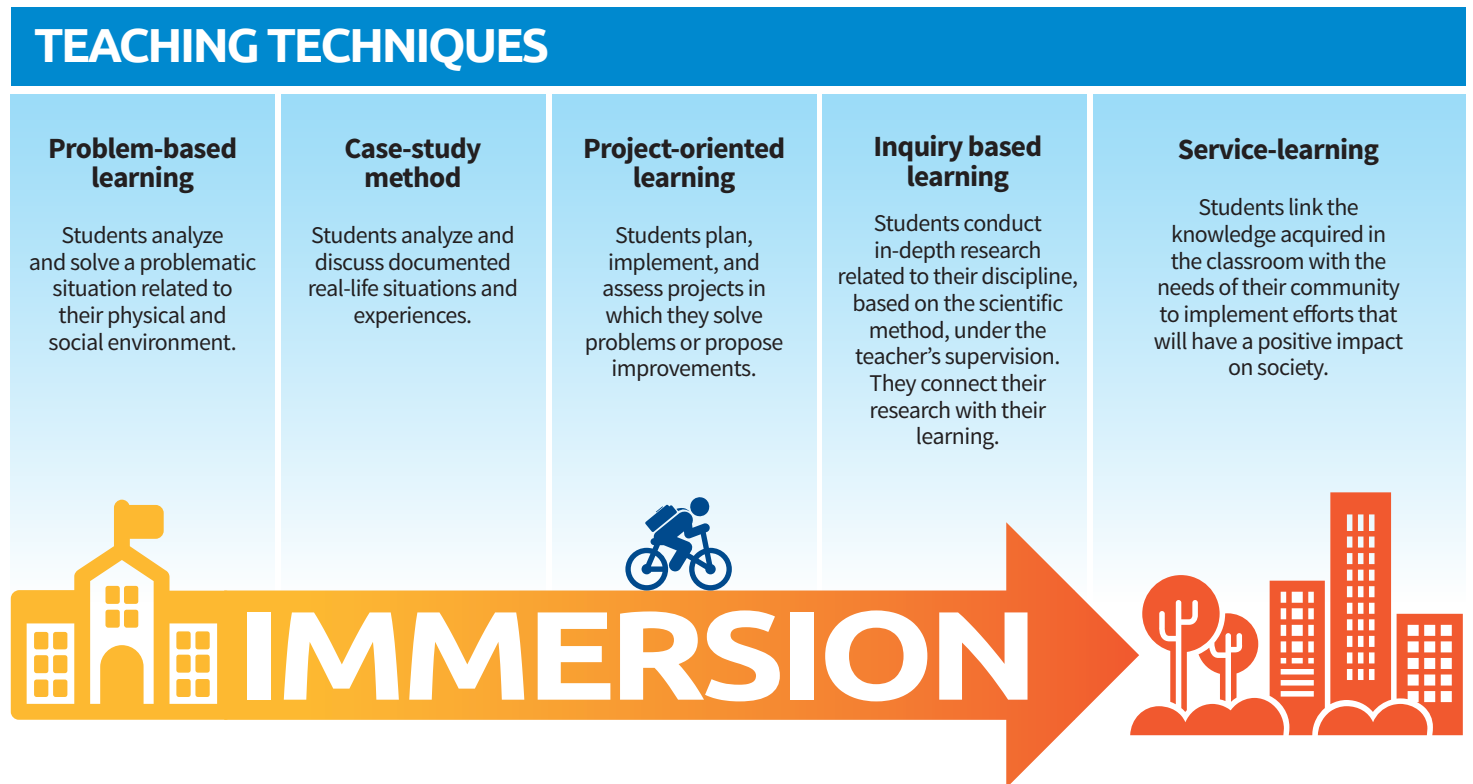
The following graph shows various teaching techniques according to the scenarios in which they can be implemented:



Teaching techniques and assessment instruments

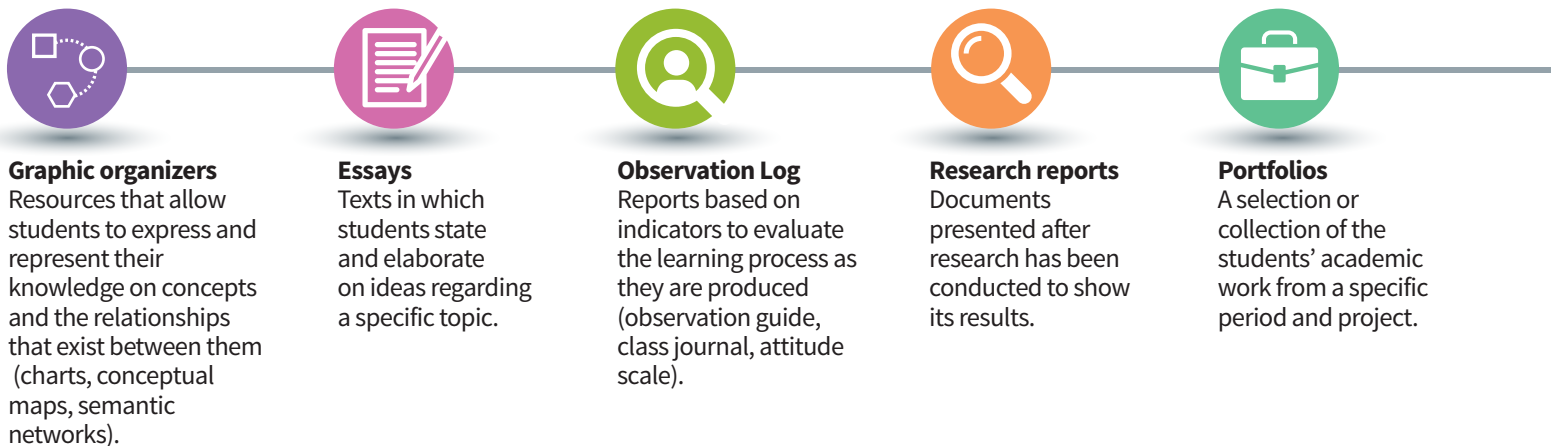
Just as doctors have several tools to assess the needs of their patients, teachers can also use a variety of mechanisms that enable them to observe and analyze student performance. These mechanisms support the assessment process of skills or concepts in multiple contexts and situations (Sturgis & Patrick, 2010). This is the case of teaching techniques that favor the development of competencies, which can be applied to both structured and real-life scenarios.

The following table describes the expected results of the students' work for each teaching technique (DIIIE, 2013).



These are some of the most commonly used assessment instruments to evaluate and gain evidence of the development of competencies (Díaz-Barriga, 2006; SEP, 2013).

ASSESSMENT INSTRUMENTS



Relevance for Tecnológico de Monterrey

Social and labor needs are changing at an accelerated rate. The approach and application of knowledge are now conducted in emerging disciplinary areas, supported by brand new technologies. This is why Tecnológico de Monterrey, through the Tec21 Educational Model, aims to provide students with the competencies needed to perform successfully in a dynamic world, and to enhance the skills of current and future generations to develop the required competencies and face the challenges of the 21st century (Garza, 2016).

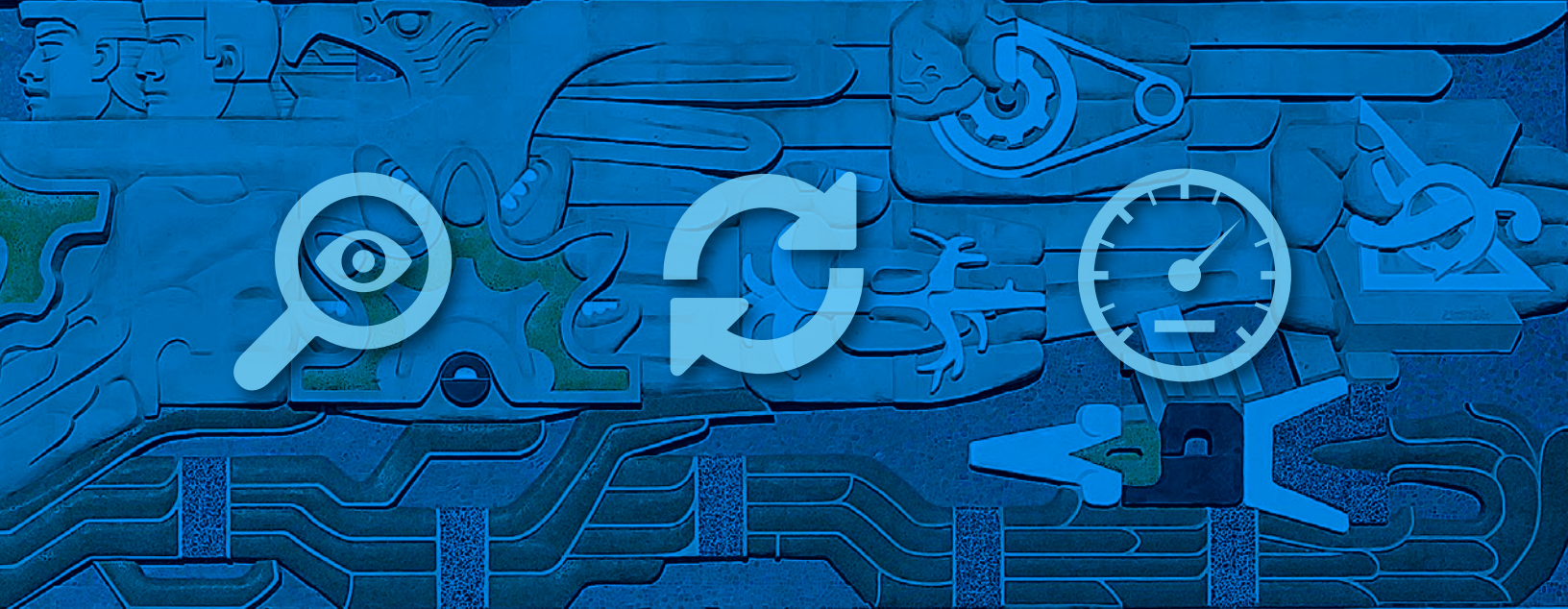
Tecnológico de Monterrey's curriculum model is undergoing a transition to focus on a new way of organizing the teaching-learning process. Therefore, the Tec21 Educational Model seeks to instill in students competencies such as critical thinking, leadership, ethics, citizenship, innovation, intellectual curiosity, oral and written communication, collaborative work and entrepreneurship, through challenges or challenging situations. To achieve this, the model's cornerstone is its inspiring and innovative teachers, capable of designing and implementing attractive, valuable challenges (Ramírez, 2016) that would demonstrate, provide feedback on and assess the performance level of students regarding the acquisition of disciplinary and transversal competencies.



David Garza | Vice provost for Undergraduate Education



David Noel Ramírez | Provost



Performance assessment is a key process in students' education, and must be conducted responsibly and thoughtfully together with them across the learning process. Tests are a useful tool to assess their knowledge mastery in terms of memorization and reasoning. However, it is also necessary to assess knowledge application by solving problems, making decisions, keeping track of the ongoing processes, collaborating as a team, generating new products, etc., supported by an assessment method in which the performance of the students can be observed (F. Ayala, personal communication, March 7, 2016).

Tecnológico de Monterrey has historically implemented various efforts and innovations to achieve a holistic assessment of the students' performance, in order to gauge the understanding and efficient application of their knowledge, beyond testing application. Some of these efforts are: The Center for Evaluation in Mathematics, the personalized instruction system, sequential tests in the Medicine department, among others. There are currently several initiatives, such as the Assessment Center, an exercise in which the development of competencies by students who are graduation candidates is confirmed with the help of teachers and employers. There are also initiatives, like the performance assessment of the Honors international programs, which aim to demonstrate the students' progress and to predict their potential in the workplace. The mechanism used by this initiative consists of interviews with expert international teachers and case solving. Furthermore, innovation initiatives defining the future path of performance assessment are being implemented. These efforts are being carried out through the Center for Teaching Development and Educational Innovation (CEDDIE) and the NOVUS Project (2016).

Another initiative that was enriched by teachers' opinions in regards to performance assessment in the Tec21 Educational Model occurred during the Academic Work Day that took place on every campus, in which 4,660 teachers, divided into 495 teams, participated. The objective of this event was to create a space for teacher interaction in order to reflect, discuss and generate proposals in relation to the assessment schemes in a competency-based educational model. The discussion addressed the importance of continuous performance assessment rather than just at the end of the course. It also touched on the relevancy of providing qualitative feedback to students. In other words, the event addressed the need to move from an assessment based on knowledge to an assessment based on performance.

In this sense, a 2015 Tec21 Educational Model survey, in which 5,400 students from Tecnológico de Monterrey participated, revealed that the key elements students value in relation to assessment are being able to demonstrate their skillset in authentic situations and to complete practical tests. This information only adds to the importance of guiding the assessment efforts and initiatives toward a competency-based educational model.

Relevant cases at Tecnológico de Monterrey

There have been various initiatives at Tecnológico de Monterrey, at different levels, related to performance assessment. The following are some of the most relevant experiences.



Assessment Center at CCM

Professor Verónica Pedrero Padilla

(vpedrero@itesm.mx)

As part of the certification process of international programs, the competencies of students who are graduation candidates are evaluated through the Assessment Center exercise. This method allows us to observe the students' performance in semi-structured circumstances similar to the ones they will encounter in the workplace. The Assessment Center brings together administrators, advisers, consultants and experts with significant work experience. Quantitative and qualitative methodologies are combined in order to measure performance. Once the Assessment Center exercise is over, the evaluators provide feedback to students on their performance regarding their decisions and solutions, and on their attitudes with their teammates (V. Pedrero, personal communication, March 31, 2016).

although the leadership, communication and disciplinary competencies were also considered. Professor Rodríguez worked together with Katherina Gallardo, PhD, a research professor at the School of Education, Humanities and Social Sciences, to design special rubrics for performance assessment and then write the reports using specialized software. A full performance report was issued for each student. Interviews with participants yielded positive results in regards to professional enrichment through contact with real scenarios and the accuracy of the feedback to reflect their strengths and opportunities for improvement (K. Gallardo, personal communication, March 5, 2016).



Escuela Nacional de Medicina y Ciencias de la Salud

Professor Ismael David Piedra Noriega

(ipiedra@itesm.mx)

The Medical school seeks to develop the following competencies in its students: therapeutic management, medical interview and physical exploration skills, clinical reasoning, disease prevention and performance in different medical attention or health system models. Various systems and processes can be used to assess these competencies. During the first semesters, simulated and controlled scenarios are used, in which the student is assessed and receives feedback, together with real scenarios and simulators. During this early stage of their education, students act mostly as observers. In the last trimesters students are exposed to real scenarios, in which they can demonstrate their competencies under the supervision of a teacher or a resident. For this, various assessment instruments can be used, such as portfolios, in which the students must collect a total of 110 pieces of evidence in a twelve-week period to demonstrate that they have acquired the competencies the profile requires. Competencies can also be assessed using the simulation center, in which high-tech robots are programmed so students face various medical experiences and complications, such as dehydration, asthma, strokes, and others.



i Summer: assessment in a multidisciplinary immersion scenario

Professor Jorge Rodríguez Orozco

(corozco@itesm.mx)

Professor Katherina Edith Gallardo Córdova

(katherina.gallardo@itesm.mx)

In the summer of 2015, a multidisciplinary immersion process was held under the supervision of Jorge Rodríguez Orozco, PhD (CEM), director of the IIS program, in which students from disciplines such as industrial engineering, mechatronics and marketing participated. The work scenario was provided by a company that manufactures devices that help with blood circulation and muscular movement, commonly used in spas and other relaxation centers. The challenge was to improve a bioelectromagnetic device called BEM, for which there had been reports of failures when using it, and present an integral solution for its improvement and advertising to the company's executives. The assessment focused on the innovation competency,

Students also take the Structured Clinical Skills Examinations with real patients, through trained actors, in which the assessment is carried out by a team of professors. Finally, students are also exposed to real cases at hospitals and clinics (I. Piedra, personal communication, March 9, 2016).



COMPETERE electronic platform

Professor Katherina Edith Gallardo Córdova

(katherina.gallardo@itesm.mx)

Researchers and teachers at Tecnológico de Monterrey, in conjunction with the Vice Presidency for Online Programs, developed a comprehensive solution to assess performance

for the programs designed under a competency-based educational model. First, the specific characteristics and needs of each participant discipline were reviewed. An electronic platform called COMPETERE was launched, which generates reports on the student's performance. The report includes a written section on the performance levels reached for each competency and a radar graphic view, which shows the global results of the student in relation to the learning expectations. Students that participated in this research project were appreciative of the performance reports, due to the usefulness of the information to improve the development of their abilities (K. Gallardo, personal communication, March 7, 2016).





Performance assessment Diploma course

Professor Jaime Ricardo Valenzuela González
(jrvlg@itesm.mx)

In 2012, Jaime Ricardo Valenzuela González, PhD, and Héctor Méndez Berrueta, PhD, designed a diploma course to train teachers in the design, application and evaluation of assessment instruments appropriate to the specific conditions of their courses, under an educational model based on competencies. The course has four modules: the first one introduces concepts on assessment and competencies; the second module covers 20 assessment tools, from which the participants can choose the ones that best fit their courses; the third module covers the implementation of the performance assessment system; the fourth module covers the meta-assessment, which is the assessment of the assessment system. To date, over 2,000 teachers have been trained nationwide. This diploma course is currently offered by Tecnológico de Monterrey's School of Government and Public Transformation for teachers of technological universities, high school and basic education (R. Valenzuela, personal communication, March 10, 2016).



Integrated Project of the Industrial Engineering program

Professor Jorge César Rodríguez Orozco
(corozco@itesm.mx)

Students from the 9th semester of the course Industrial and Systems Engineering Project participate in projects with the companies Vescica, Indicium and EIQSA, in which they seek to solve real problems faced by these companies. The disciplinary competencies to be developed in students are appropriate for a junior consultant, such as the ability to diagnose a situation, generate alternative solutions and communicate them orally and in writing. Other competencies are also developed, such as those related to ethics, entrepreneurship and critical thinking. The assessment of the competencies is conducted in different stages. First, they use an opinion survey for employers or other teachers, the results of which are used to design a rubric.

Halfway through the course the students are asked to present their diagnosis and the preliminary results to the client, in which they. The teacher makes an observation report of the presentation and gives the students written feedback on their performance as a team. In the last stage, the client is presented with an integrated solution proposed

by each team. The client fills out a survey and the teacher generates an assessment report for every student, which includes their progress in each respective competency (J. Rodríguez, personal communication, March 10, 2016).



Design methodologies

Professor Luis Vargas Mendoza
(lvargas@itesm.mx)

In the Design Methodologies course, the competencies of professional and ethics responsibilities for engineers were implemented, monitored and assessed. In order to reach the "understanding" level of the competency, the students participate in activities where they present summaries, categorizations or explanations, and the teacher assesses the ethics reflection and its formulation using checklists. This allows the teacher to give feedback to students through the Competency Predictive Index, a report on the development of competencies that is presented to them halfway through and at the end of the course. This snapshot of the students' performance significantly improves their satisfaction on being fully informed of what was considered, what they did and what they should have done. Once the semester is over, results tables are used to assign a grade to the student according to the competency level they have shown. In addition to the feedback report provided by the teacher, this table helps the program's director to keep track of the progress and present each 5th- and 9th-semester student with a competency report, offering an overview of how much the students have evolved since they started their undergraduate studies (L. Vargas, personal communication, March 10, 2016).



Honors International Programs

Professor Liliana Manrique Cadena
(لمانريق@itesm.mx)

There are currently 35 honors international programs offered by Tecnológico de Monterrey, which provide students with the opportunity to gain experience abroad and earn a double degree. Students' performance is assessed in their first and ninth semester, to keep track of their progress and predict their potential to occupy a position within an organization.

This process assesses competencies such as: leadership, entrepreneurial capabilities, innovation capabilities, global perspective, critical thinking, self-confidence, teamwork, oral communication and written communication.

The assessment is divided into 3 stages:

- **Online exercises.** Through simulations (cases simulating a real context) and In Basket (cases in which the student is asked to prioritize decisions).
- **Individual Filming.** Students choose a topic to talk about on camera for 3 to 5 minutes.
- **In-depth one-on-one interview.** A teacher interviews the student using the STAR technique (Situation, Task, Action and Result).

Each competency is assessed using at least two different instruments. With the help of these instruments an individual competency report is created.

This report gives the student a number (between 1 and 4, depending on the level of mastery for each of the nine competencies) and written feedback. The program director is also given this information to know the performance levels of his or her students (L. Manrique, personal communication, March 15, 2016).



Ethics, Self and Society

Professor Gabriela Flores Alcocer

(gabriela.flores.alcocer@itesm.mx)

The course Ethics, Self and Society seeks to develop in students the competencies for making decisions that consider respect for people's dignity and awareness of their environment. As part of their various activities during the semester, students conduct research and fieldwork, organize discussions and debates in the classroom regarding their life project, participate in a four-session program with an underprivileged community to contribute in a life project with high school students, and solve ethical dilemmas. According to each activity, students write reports and essays for their individual and collaborative portfolios. All their work is assessed using rubrics. The teacher provides one-on-one feedback after each of the students hand in each piece of work, allowing for clarifications and corrections. This assessment helps the teacher to understand which concepts, skills and procedures were understood best. It also brings the teacher closer to students, by keeping track of their progress and finding the best way to encourage them. Students appreciate the feedback, since it enables them to monitor their progress week by week. This process is not easy and is more time consuming, but it provides a significant benefit to both students and teachers (G. Flores, personal communication, March 11, 2016).





Relevant cases at other educational institutions

The following are a few relevant cases selected for their contribution and innovation to performance assessment.

Please visit the websites included in the references for further information.



Young Women's Leadership Charter School of Chicago (YWLCS)

YWLCS is a public high school dedicated to the education of young women from low-income, urban settings and complex family environments. The founders of this school implemented a performance assessment system with two main features: 1) The achievement of the educational goal is based on excellence, demonstrated by the learning outcomes of the course, regardless of the time it takes to achieve it; and 2) the performance records are updated, so that the best level of performance achieved is reflected.

This is in contrast to the traditional use of grades. Teachers use various pieces of evidence to generate their assessment judgments, using the following scale: high performance, competent and not yet mastered. To pass a course, the students should demonstrate they belong in the first two levels in at least 70% of the results. These performance reports are generated quarterly and are updated in real time throughout the learning process (Farrington & Small, 2008).



Lipscomb University

Lipscomb University is a private art school in Nashville. It has a competency-based educational model aimed at working students attending college to obtain a bachelor's degree. The school is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC). Since 2013, this institution carries out Assessment Center operations, a semi-structured assessment technique in which students are presented with a situation to solve in situ, and are evaluated by academic experts and employers. A total of 15 competencies are assessed, which are translated into a system of badges. Their Customized Outcome-based Relevant Evaluation (CORE) model is based on behavior assessment, in which the student is placed in a simulated situation to observe his or her capabilities. Students carry out collaborative, competitive and individual activities. This process takes 8 hours and up to six students can be assessed by four trained evaluators. Evaluators grade students on a scale of 1 to 5, with 1 being "needs development" and 5 "exceeds standards." Based on these results, students receive digital badges for each demonstrated competency. Students can include them on their résumé as evidence of their competencies. Badges can also be exchanged for course hours/credits. On an assessment day, a student can gain up to 30 credits. Through these assessments, a student could reduce graduation time by up to one year (CAEL, 2014).



Advanced Center for Medical Simulations IAVANTE

The Advanced Center for Medical Simulations (Centro Avanzado de Simulaciones Médicas, IAVANTE) in Spain promotes a learning space for the training of health professionals. It has innovative methodologies such as simulations using virtual scenarios, robots and actors, video analysis and experimental surgery. This allows the creation of scenarios that resemble real life situations, but are artificially configured. The Center conducts joint work with other universities, so that students with different professional medical profiles can demonstrate their learning in situations very similar to those they will face in real life. Thus, students are certified by an assessment test of their professional competencies (IAVANTE, 2016).



New Hampshire – Extended Learning Opportunities

In New Hampshire's high schools, ELOs are opportunities for students to gain academic credit through activities outside the classroom. It involves a joint effort between partners: a member of the community, a highly qualified teacher and an academic coordinator. A curriculum is designed integrating students' interests and the competencies they must develop with the ELOs. Thus, skills such as professionalism, communication, critical thinking and time management are incorporated into the curriculum. Performance assessment is conducted by the institution and the community partner, through four components that make up the learning experience: 1) research related to the student's interest, 2) reflection on what's been learned, 3) a product or service that demonstrates the competencies developed and 4) a presentation to teachers, participating member of the community and other students. This assessment focuses on student reflection and the demonstration of their learning (American Youth Policy Forum, 2016).



Western Governors University

In this online university for working adults, industry experts from various disciplines are invited to be part of the faculty responsible for developing programs and curricula. Each school has a council that oversees and approves programs based on competencies and certifications. Additionally, there is an assessment board with experts, responsible for checking that tests use the right metrics and appropriate mechanisms to assess performance for a given competency, degree or certification (Sturgis & Patrick, 2010).



Capella University: Flexible progress mode

The university, founded in 1993, offers 100% online programs. Its curriculum integrates a flexible progress mode based on the collaboration and experience of expert teachers, instructional designers and assessment specialists. Mechanisms are designed to allow students to demonstrate their development of competencies required for the discipline. This mode allows students to learn at their own pace and use feedback to identify opportunities for improvement. The products created by students to showcase their performance (case studies, research reports, presentations, etc.) are sent to the expert teachers, who assess them to give feedback and indicate whether they have mastered the competency to advance in the curriculum (Grann, 2015).



Urban Alliance High School Internship Program (UA-IP)

UA-IP is a program for low-income high school students from complex family environments, to aid them in the early acquisition of meaningful employment according to their abilities and with the guidance and supervision of an adult. This program aims to help students gain self-confidence, build self-esteem and to develop critical thinking through internships. The program works with the support of partners such as civil organizations or businesses that take in students to experience immersion processes for a 10-month period. Prior to the immersion stage,

students receive intensive training for six weeks in order to learn in detail about the characteristics and needs of the institution in which they will work. Students are guided by a mentor within the organization who will help them develop the competencies required during their stay. At the end, a thorough performance assessment is conducted. As a result of this assessment, the student receives a report of results. In this way, the assessment reflects strengths and abilities of students that a numeric grade would hardly communicate (Smith, 2015).



Accreditation Council for Graduate Medical Education (ACGME)

The Accreditation Council for Graduate Medical Education is an American non-profit organization, which certifies nearly 120,000 students annually from over 700 educational institutions. It focuses on performance assessment on topics such as patient care, medical knowledge, professionalism, interpersonal and communication skills, among others. ACGME's progress resulted in a report describing the use and feasibility of each of the methods and assessment tools they use. According to each element of the assessed competency, the instruments are classified using the following scale: 1) most desirable, 2) second most desirable, or 3) potentially applicable. Thus, for example, for students that are just starting with hospital practices, the council notes that to demonstrate care and respect for the patient the most desirable method is to structure standardized patient care situations; the second most desirable is the 360° evaluation; and the third one is to administer a patient survey regarding the quality of care received (ACGME, 2016).



New trends

This section covers three important aspects that leading institutions are working on in relation to the competency-based educational practice to consolidate their performance assessment systems.

1 Portals to share knowledge and best practices on performance assessment

This trend seeks to create and share a series of studies on performance assessment by turning findings into case studies and practical guides, as well as meta-assessment processes. This is due to the fact that one of the most significant challenges when working with CBEM in an institutional setting is to reach effective communication and to promote discussion that leads to understanding what is to be achieved by implementing graduate profiles, the competencies included and the aspects that guide the decision making for assessment. One example of this trend is the National Institute of Learning Outcomes. Through this web portal, users can access information to get a complete overview on the topic of assessment. It also invites teachers and administrators to understand and share the ways in which academic institutions can productively use students' assessment data to strengthen undergraduate education. The portal also has communication channels to inform different audiences, such as politicians, family members and employers, regarding the assessment's progress. This strategy also includes frequent searches on the assessment efforts of other educational institutions to consolidate their assessment systems.

2 Creation of banks of challenges and projects: cost-benefit analysis

From all the different activities requiring in the application of performance assessment, one of the most complex in the framework of authentic assessment is the design and implementation of a challenge. The mobilization of human, legal and financial resources as well as the materials needed resulting from the definition of a challenge, is an aspect to be considered in light of the resources available. This translates into the tendency to formalize and capitalize the development process of projects and challenges for the common good and to strengthen the culture of assessment.





3 **Digital assessment: Use of digital resources for authentic and performance assessment**

There is a rising trend of increasingly sophisticated digital spaces to manage the assessment processes. Their consolidation solves many of the difficulties of measuring students' results, particularly if they are standardized evaluations that require millions of records and sophisticated analyses in order to understand educational phenomena. The OCDE (2013) has stated that these systems are expected to grow into full-blown databanks of summative and formative assessment results, as well as of the impact of teachers' contributions to the educational process.

In addition to systems to conduct national or international assessments, the use of ICT for assessment purposes in the classroom has also evolved. An example of this trend is the digital assessment initiative presented by Chase et al. (2015). It involves the integration of a series of adaptation tests, instructions and standards to guide teamwork, role play, reflection processes and authentic assessment alternatives, as opposed to traditional assessment instruments.

Another example is the Edutopia portal, in which alternatives to support assessment processes based on ICT are shared, including the creation of reading comprehension virtual groups, interaction of collegiate groups for the assessment of competencies in sciences, the use of online games to learn mathematics, interactive guides for the design of authentic activities, and the creation of quizzes to be answered at the end of the class, such as exit ticket and checking for understanding.

The main benefits of this initiative are:

- It organizes information to allow the effective management and access to contents.
- It provides institutional visibility to challenges and projects through access to collective intellectual work.
- It strengthens the association between content and creators or providers and content managers.
- It publicizes the meta-assessment processes and considerations for each of their documented challenges or projects.
- It enables reuse of contents.

This trend is based on practices that first appeared years ago in relation to the creation of academic communities to share aspects essential to the definition of criteria, standards, action levels, etc. This would standardize practices in terms of judgements during the assessment processes. One of the highlights of the recommendations that emerged from the study of Elwood & Klenowski (2002) on academic communities was the need to communicate which criteria allow for performance assessment. That way students would be familiar with them, in the interest of understanding the framework on which their performance is assessed.

A critical look

While the benefits of performance assessment for learning achievement are evident, a critical view is also warranted to analyze some elements of this practice that could shed light on some of its limitations. These criticisms focus on its (1) subjectivity, (2) pragmatism and (3) operationalism (Brualdi, 1998, quoted in Kan & Bulut, 2014; Del Rey & Sánchez-Parga, 2011; Macchiarola, 2007; Moreno / Soto, 2005).

1. Subjectivity: While results from traditional assessment can be easily marked as right or wrong, this distinction isn't as clear cut in performance assessment, due to the coexistence of qualitative and quantitative data.

It is necessary to remember that performance assessment is based on learning theories and taxonomies that grant objectivity in the formulation of descriptors and mechanisms that make it possible to infer the performance level achieved.

2. Pragmatism: Another criticism to performance assessment comes from having CBEM as its framework. Some opinions on this educational model associate it with purely economic aspects. Del Rey & Sánchez-Parga (2011) mention that CBEM "reduces education to the fabrication of an economically performing student, trained to be competitive in the professional work market" (p. 235). Therefore, there is a risk that the assessment could consider only rational-logic learning useful for the workplace.

Given these considerations, it should be noted that competency-based education includes knowledge, conceptual bases and working with transversal competencies. The latter relate to the development of attitudes and values necessary to perform in different contexts and situations of the students' personal and social life.

3. Operationalism: One of the processes required by performance assessment is the ability to remove various elements of the competency (or subcompetencies) as observable units. This process (defined as operationalism) carries the risk of not assessing the complexity and intent of a competency, i.e., to only observe isolated actions that don't take into account the meaning of the action performed.

However, it is important to remember that every assessment is performed within a performance framework that refers to an integrated activity or task.





Challenges

The main challenges of performance assessment come from the aforementioned paradigm shift, as well as from the planning, instrumentation, assessment and meta-assessment processes its practice involves.

Scalability of the assessment process

The teacher must develop mechanisms to optimize the assessment process and make use of technologies that enable expedited feedback, without neglecting personalization.

The institution's relationship with companies and other entities

A relationship between educational institutions and companies and institutions to work on projects or challenges not only demands the creation of new assessment mechanisms, but also the addition of external voices to make judgements on the students' performance. By including more participants, this process results in the inclusion of even more complex mechanisms requiring proper planning and organization.

Reinforcement of pedagogical knowledge

Institutions that have opted for substantial changes to performance assessment work have considered the creation of a specialized team on issues of planning, implementation, assessment and meta-assessment, to collaborate collegially with the various academic entities. This implementation requires making decisions about training processes in terms of time required to prepare teachers and the depth required to study assessment issues.

Clarification of the different purposes of assessment

One of the most confusing aspects in educational assessment is not caused by the actual assessments, but by the purpose for which they are implemented (Newton, 2007, quoted in Hill & Barber, 2014). It is important that institutions that choose to use CBEM and performance assessment make clear in their manuals and regulations the assessment purposes and the audiences to whom the results will be disclosed: students and parents, certifiers, employers, government and society.

Frequently Asked Questions

How can we manage more efficiently the time devoted to performance assessment ?

a) Planning: Assessment planning doesn't take that much time, as long as work is done in a collegiate manner, reaching consensus for the faculty to adopt.

b) Instrumentation: To select and design assessment mechanisms, it is recommended to consult the training manuals found on specialized sites in order to choose the best alternatives to implement both one-on-one and in a collegiate manner.

c) Assessment: Control, organize and systematize the manner in which the evidence to efficiently provide feedback to the student's performance will be collected.

d) Meta-assessment: It is important to identify the opportunities for improving the planning, instrumentation and assessment phases that can be adjusted to better develop assessment practices.

How frequently should students be provided with feedback, according to the demands of performance assessment?

The frequency in which feedback is provided is directly related to the points at which it is deemed appropriate to check on the student's progress. For modules or courses that are meant to be taught in a short time (2 to 4 weeks), there will be little room for more than two feedback sessions. For longer modules or courses (12 to 16 weeks), there will be more time to think about having three feedback instances. This is because feedback is not limited to telling the students how well they performed in some activity, but it is also meant to provide detailed information on their performance in various activities.

Are performance assessment and competency assessment the same?

No. Performance assessment evaluates the student's demonstration of competencies during the learning process, while competency assessment evaluates the pertinence of the competencies being fostered in the student. While the former assesses the student, the latter assesses the graduate profile and the curriculum.

Is a grade the opposite of performance assessment?

It is complementary rather than opposite. During the evolution of this paradigm shift the numeric grade will still be valid, since it is complemented by qualitative assessment and its in-depth feedback processes. That means the student can receive both a grade and feedback.

Recommended actions for teachers

The following are recommendations for teachers to explore the full potential of performance assessment (Alkharusi, 2008; Díaz-Barriga, 2006; Kan & Bulut, 2014; Quiñones, 2004; Sturgis & Patrick, 2010):



Consider the institutional mission and vision as guidelines, in addition to having a clear understanding of the graduate profile, to gain clarity regarding the competencies and the transversal and disciplinary sub-competencies.

Inquire about the experiences of other teachers and professionals to gain insight into the adequate demonstration of competency achievement. That way you will be able to share a clear understanding of what students need to demonstrate before they advance to higher levels.



Train in the use of performance level descriptors and rubric design to make judgements regarding the students' performance in a given activity.

Clearly communicate the criteria to be used to judge performance, and define execution levels and precise standards.



Use multiple methods and assessment instruments to provide more consistency to the evidence of the student's learning.

Design options for students to engage in self-assessment.



Recommended actions for leaders

Faced with a paradigm shift, academic leaders have to take on the challenge of building an assessment culture that allows for strategies to achieve change toward performance assessment. Here are some recommendations to tackle this challenge:

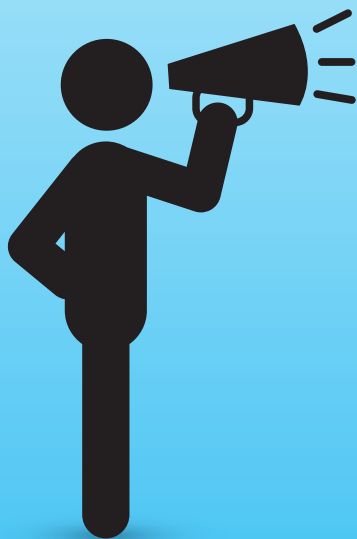
Create a team of experts on the topic of assessment to help teachers during change processes.

Promote assessment systems of excellence that enhance responses to the different purposes of the assessment and to stakeholders.

Check that the collegially-configured graduate profiles are clear, consistent and feasible to assess, and also reflect the vision and mission of the institution.

Encourage the creation of partnerships with companies and institutions where students can develop the competencies they will need in the workplace.

Identify institutions that are benchmarks in the implementation of performance assessment in order to learn from their success.



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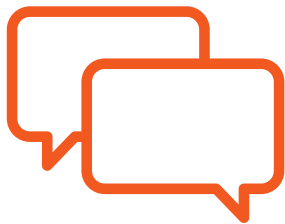
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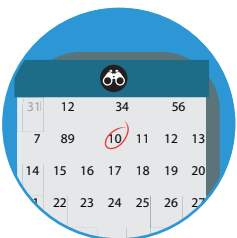
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