Paper Universitario

TÍTULO

THE USE OF NEW METHODOLOGIES IN TEACHING, LEARNING AND ASSESSMENT DUE TO COVID-19 PANDEMIC

AUTORA

Blanca Fiallos,
**Docente del Área de Académica de Gestión,
Universidad Andina Simón Bolívar, Sede Ecuador**

Quito, 2023

The use of new methodologies in teaching, learning and assessment due to Covid-19 pandemic

Blanca FIALLOS PEÑA*
Simón Bolivar Andean University, Quito - Ecuador

Abstract: The Covid-19 pandemic has significantly impacted in education sector, requiring the adoption of new methodologies in order to ensure continuity of learning. Schools and institutions all over the world, have faced the need of a quick adaptation to the constraints imposed by social distancing restrictions and the transition to remote learning. In addition, the approach of learning has been redefined passing from a traditional model based on the transfer of knowledge to a more learner-focused model through active learning. During the pandemic, students were dramatically pushed to become more autonomous in their learning, to actively participate in online activities, to collaborate with classmates through shared platforms, and develop individual or group projects.

Another crucial aspect addressed during pandemic has been the student assessment. With the elimination of face-to-face examinations, teachers have had to adapt their assessment methods to the online context. Many different strategies had been implemented such as online tests, assignments, active participation in virtual classes, and creative projects. Their main purpose was to assess not only student's content knowledge, but also their interpersonal skills like problem solving, communication and collaboration.

The use of active methodologies such as Portfolio is revealed as a methodological alternative for teaching-learning and assessment in where student becomes an active component of learning, motivating his or her social and ethical commitment.

This investigation is supported in the framework of three master's degree programs in the Education and Management areas of the Universidad Andina Simon Bolivar of Ecuador, and its proposed objectives are to identify the teaching needs that allow the students to gain autonomy in learning with a critical and reflective thinking, added to the capacity for self- and co-evaluation, and reflecting upon the importance of evidencing their own learning process.

In despite of the challenges encountered, the pandemic experience has also led to an increased awareness on the importance of new teaching methodologies, learning and assessment. The use of digital technologies had expanded opportunities for education access and promoted learning flexibility. The experience awarded during this period could positively influence in the evolution of the education system even beyond the pandemic, and also promoting an innovative,e inclusive and student-centered approach.

Keywords: Pandemics, Covid-19. learning methodologies, learning, asssessment

Introduction

In February and March 2020, the pandemic caused by the SARS-CoV-2 coronavirus disease (COVID-19) caused a radical change in the lives of people worldwide and in the economies of the countries. In order to reduce the number of infections and deaths caused by this virus World Health Organization (WHO) and different countries health authorities recommended,

---

* Corresponding Author: blanca.fiallos@uasb.edu.ec.

among other actions, to assume radical measures in order to prevent people's internal and external movement. To that effect, the majority of governments around the planet, imposed general confinement measures, except for health, food and banking services.

In the educational field, educational facilities and institutions were closed at all levels, causing in some cases the interruption of scheduled classes, cancellation of lessons and in a matter of days leading to courses be transferred from face-to-face to an online mode.

At the Universidad Andina Simón Bolívar, Ecuador (UASB-E) the normality of postgraduate programs was interrupted in the middle of the second quarter of the 2020-2021 academic year, when the Academic Coordination Council decided and requested the teaching staff to continue teaching in online mode. In addition, the Virtual Education Management Unit, which previously had functioned as a support office, was strengthened assigning it all the necessary resources for its reinforcement and consequent participation in the maintenance of online teaching activities. Although the institution had already been working for several years on the virtualization of some courses, the migration of all the academic offer to the new modality through the Moodle system was not an easy task for both teachers and students, although the technological infrastructure (space, equipment and internet connection) was available for the optimal performance of classes.

In order to face this situation, UASB-E continued to develop its online teaching activities, giving each teacher the ability to determine which technological tools would use in addition to those provided by the university, such as Zoom and Moodle, while the Virtual Management Unit devoted its entire contingent to provide training to teachers in the use of these technologies.

It is within this frame of reference that is proposed the present research, which aims, through a questionnaire applied to teachers of the areas of Education and Management at UASB-E, to analyze the new teaching-learning and evaluation methodologies used due to the Covid-19 pandemic.

Conceptualization

Teaching-learning methods. These methods appear in order to answer the new students' learning requirements (to know how to be, to do); as well as to promote in them the development of new competencies and capabilities (Montes de Oca & Machado, 2011). Briefly saying, these can be catalogued as innovations that promote the learning of concepts and principles as well as the improvement and decision making through the use of real problems, whether complex or not, that are proposed to students and seeking their reflection on them. Learning methods arise in opposition to the unidirectional and discursive presentation of facts or concepts (Puig & Paneque, 2009).

Active methodologies. Although they have been present in education since last century, active methodologies have gained strength in recent times due to the need for a redesign of teaching-learning processes in where the student is the center of learning and remains motivated throughout the process (Crisol et al., 2020; Konopka et al., 2015). Consequently, knowledge is understood as a personal construction resulting from the cooperation between teacher and students (Crisol et al., 2020).

This cooperation is a base for the construction of knowledge, development of skills, values and attitudes necessary in the future professional lives of the students (Barrientos et al., 2020). Moreover, this type of methodologies require a meaningful evaluation procedure where information is collected from different sources in order to support what stu-

dents have learned, and also the teacher will constantly return information to the students through continuous feedback processes (Crisol et al., 2020).

The active methodologies most commonly used in present times are:

- *Problem-based learning* – PrBL or Problem BL. was started in 1965 at the Faculty of Medicine of McMaster University in Canada as a result of a pedagogical initiative that sought to deeply study the relationship between health-disease and different biological, environmental, individual, or social processes (Arpí et al., 2012); the integration of this procedure generated a curriculum for several areas and a deeply committed methodological strategy with the research.

  The PrBL starts with the teacher who assumes the role of tutor or leader of the group or groups of students who are facing case studies. Once the problem has been formulated, within the group are generated conflicts that allow the identification of learning needs and objectives. During the development of research and analysis, autonomous learning, critical reasoning and problem-solving skills are developed (Arpí et al., 2012).

  The PrBL links what the student has learned (theories) with his or her daily routine (work, practices); and seeks to use professional practice and problem-solving spaces as learning environments. Simultaneously, collective learning is strengthened through student group interaction, promoting a space for the development of social and cooperative skills. In this sense, PrBL allows both the acquisition of knowledge, and the establishment of habits and formation of skills. This happens in accordance with the knowledge obtained through self and collaborative learning, since the approach to real or hypothetical problems takes place in small groups of students supervised by a tutor (Arpí et al., 2012; Rama, 2021).

- *Project-based learning* – PBL. Project-based learning appeared in the 1980s as an educational proposal by John Dewey based on constructivism. This model seeks that students obtain learning based on a challenging teaching, so they feel motivated to learn and become active subjects of their own learning through the use of strategies and tools. Meanwhile teachers play the role of guides and stimulators of that process (Domínguez et al., 2021).

  PBL directs learning towards the execution of a project or plan following the project design approach (Galeana, 2016). It is related to different basic, professional, and multidisciplinary subjects by challenging students to make an effort in learning for a long period of time (Zamarripa et al., 2016). In addition, it promotes decision making and is framed in connection with real world. Finally, the PBL requires a systematic evaluation of both the creation process, and the final product.

  Although the PrBL and PBL can be perceived as similar since both begin with the presentation of a problem, which may take the form of a case. In the PrBL, a model of questions is used and the result does not necessarily imply the presentation of a product, but only a solution to the question posed which may be a fictitious situation or a simulation. Whereas PBL does require the creation of a tangible final product linked to the real world (Montes de Oca & Machado, 2011).

- *Case study learning methodology* -   CsBL. This type of learning emphasizes the analysis of a specific situation that is generally hypothetical. Its solution is based on the scientific method, which consists of systematic observation, measurement, experimentation, formulation, analysis and modification of hypotheses (Labajo, 2016). This methodology raises questions that address a specific fact,

while suggesting solutions to that question. Nowadays, both approaches and solutions can be simulated and efficiently represented in virtual scenarios (Rama, 2021).

- *Flipped Classroom Learning.* This methodology is successfully applied in both scenarios face-to-face, and blended classes where students integrate audiovisual tools in a collaborative manner as part of their learning. It should be noted that this methodology is based on the use of information technologies before and during classes, and on autonomous learning (González & Carrillo, 2016).

  This model covers all the phases of Bloom's Taxonomy, due to the fact that preparing students' presentation motivates his or her own lower order cognitive processes such as knowledge, comprehension and application; and when the class is given, the more complex higher order cognitive processes such as analysis, evaluation and creation are implemented (Bloom, 1956).

- *Competency-based learning.* The definition of competence refers to the knowledge, attitudes and skills that can be useful for the performance of a position, as well as the ability to successfully apply those resources in a given environment, obtaining a satisfactory result (Yániz, 2006).

  Higher education seeks to provide its students with necessary training in order to acquire certain competencies through the planning of learning situations that motivate the improvement of skills, the development of attitudes and finally the acquisition of knowledge. All this seeks the objective that students can reach the solution of a problem, resolution of a task or provision of a service in an effective and efficient manner (Zambrano, 2014).

- *Design Thinking Learning Methodology.* Authors such as Luka (2014) consider that after 1987 Design Thinking was used as a working tool in art, design and architecture. Decades later, Johansson & Woodilla (2009) started with the application of this term in management and education. In England between 2009 and 2010 this methodology was adapted to teaching containing five stages: empathize, define, devise, prototype and evaluate. This sequence could allow the model to identify and solve problems through the active participation of each student with creativity and innovation towards satisfaction, and search for solutions in any area of knowledge (Benavides et al., 2021).

- *Gamification.* According to Deterdin (2011) gamification originated in the use of videogame design elements in environments other than games for the development of a product or service that could be fun, motivating and challenging. Other authors such as Zichermann (2012) and Kapp (2016) also refer to the application of game mechanics in non-game contexts, with the purpose of stimulating and motivating both competition and cooperation among players; therefore, they agree in pointing out gamification as a fundamental element to increase user motivation.

  Inclusion of gamification in education makes students perceive the experience as motivating, strengthening their commitment to learning. Analyzed studies (Ortiz et al., 2018) allow concluding that gamification strongly influences the cognitive development of students, their emotions and the socialization generated during the process. In addition, gamification transforms education into an immersive activity producing in students the feeling of absolute dedication (Perrotta et al., 2013).

Learning methodologies as Design Thinking and Gamification are based on learning and the development of thinking to transform information into knowledge, and are mainly used in basic and high school education. On the other hand, methodologies that are deeply

analyzed (PrBL, PBL, CsBL and Competency-based learning) presented in this section are those applied in higher education and are related to the subject of this research.

Assessment Methods and Instruments - these methods refer to the type of activity that will be used to evaluate students' learning. On the other hand, evaluation instruments properly refer to the tools and techniques used for the collection of learning evidences such as exams, rubrics, debates, written or oral questionnaires, portfolios, papers, or essays. These instruments are used to apply the assessment methods with which the evaluation will be carried out (García et al., 2011; Sánchez & Martínez, 2020).

According to Stiggins et al., (2007) classification, there are four methods of assessment: answer selection or short answer writing; extended written response; evaluation of student performance; and oral response.

When teachers plan the assessments, will consider which is the most appropriate method to verify the desired learning for his/her students, that in turn would imply the use of several assessment methods integrated with the same instrument or, if applicable, several tools linked to a specific method. They should also anticipate the impact that the results of the assessment will have on the student's professional life and whether they serve to adequately determine his or her professional competence.

External factors affect pedagogical practice and force the adoption of modifications both in the context in which teaching takes place and in the approach of that context (Sanmartí, 2007, p. 94). This situation requires teachers to renew their pedagogical practices and consequently their way of assessing learning. In such a critical scenario as the pandemic, the evaluation modifications should aim at obtaining not only academic results, but also the commitment, and emotional stability of all the process participants.

For this reason, at the higher education level, all the new ways of evaluating learning were applied with marked presence during the pandemic, specifically those concerning to the development of competencies and self-learning

Methodology

The study will follow a mixed research approach. Mixed methods are defined as the integration in a single study and in a systematic way of both quantitative and qualitative research in order to obtain a "representation" of the phenomenon. These quantitative and qualitative approaches can be integrated while retaining their original structures and procedures, or they can be adapted, or synthesized to perform the research (Chen, 2006).

Under this methodology, the proposed study combines the qualitative method with the use and application of interviews and focus groups, and the quantitative method with the questionnaire arrangement and a simple regression model. Each of these tools is applied to the teachers of three graduate programs at UASB-E.

However, this article will show contingency tables and graphs, through the crossing of variables that allows the use of simple correspondence analysis to integrate tables of several factors in the Minitab statistical system (2023), and which derive from the initial results of the questionnaire collected through the Question Pro platform, to 31 teachers from the areas of Education and Management of the UASB-E during the period of November 2022-February 2023.

Anderson et al. (2008) point out that contingency tables are two-dimensional matrices that show the joint distribution of two categorical variables. Each cell of the table shows the frequency or count of cases that fall into a specific combination of categories. These tables are particularly useful for analyzing the relationship between nominal variables or categorical variables with a limited number of categories.

Frequency graphs, on the other hand, visually represent the distribution of a variable or the relationship between two variables. Histograms, for example, display the frequency of values of a continuous variable in the form of bars, allowing the shape of the distribution and outliers to be identified. Bar charts are useful for representing the distribution of a categorical variable, where each bar is a category and its height represents the frequency or percentage of cases in each category (Anderson et al., 2008). These graphs can also be used to compare the frequency of a variable in different groups or levels of another variable.

The use of contingency tables and frequency graphs in research methodology provides several benefits. According to Agresti (2013), first of all help to summarize large data sets in a clear and concise manner, facilitating the interpretation of results. In addition, they allow the identification of patterns, trends and associations in the data, which can serve for the formulation of hypotheses or making informed decisions, since they allow effective communication of the results of a research.

Results

Based on the answers given by teachers of the Education and Management areas of UASB-E who responded the research questionnaire according to the teaching, learning and evaluation activities developed with their students during the COVID-19 pandemic, some results can be visualized:

Figure 1
*Types and methods of evaluation most commonly used*
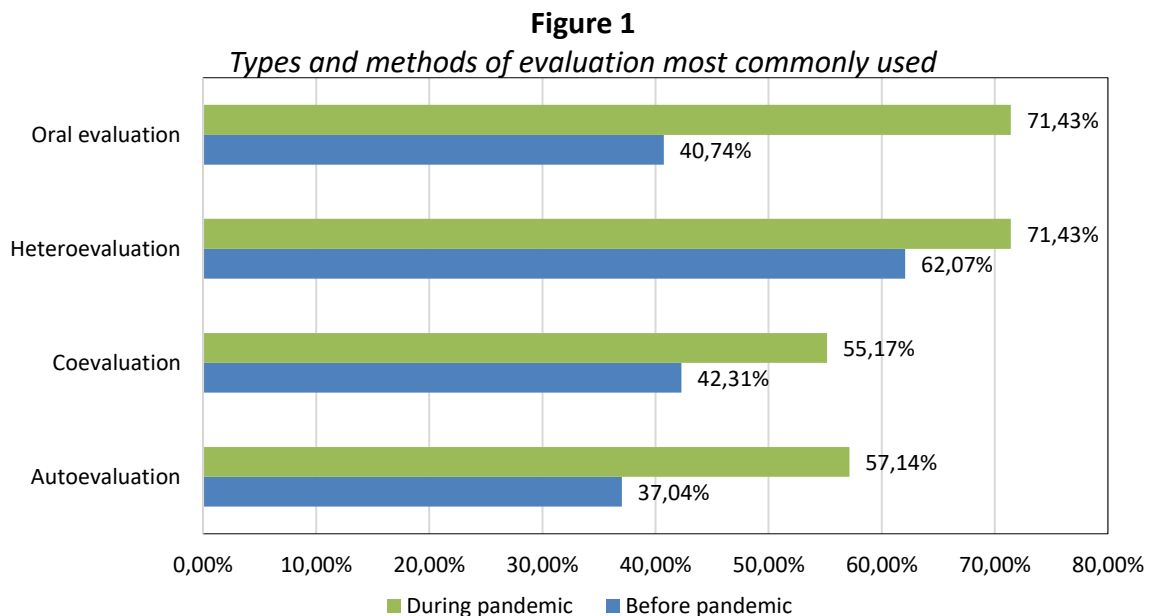
Source: Own elaboration

Figure 1 shows that during the pandemic, around 71% of the teachers surveyed began to use oral evaluation and heteroevaluation more frequently, while 57% of the teachers trusted on self-evaluation, and 55% on coevaluation. It allows to infer the existence of a diversification of the evaluation methods used other than the traditional method. This could be explained by the lack of presence, or the absence of interaction between teacher and students, forcing teachers to seek and apply methodologies that guarantee the learning process.

In this sense, Torres & Torres (2005) define evaluation as a learning process, with different forms of participation: self-evaluation, coevaluation and heteroevaluation through the use of different strategies that take into account the sum of knowledge, individual and social behavior, habits, attitudes, interests, and expectations in the learning and evaluation process.

In conclusion, the three methodologies that have experienced a major growth during the pandemic are oral evaluation, heteroevaluation and self-evaluation. The oral evaluation allows the active participation of students and is an easy resource to use through video conferencing platforms (Zoom, Meet, Teams, etc.), the heteroevaluation is performed among several students whether peers or non-peers, internal or external to the classroom. On the other hand, self-evaluation allows students to reflectively address their evolution throughout the course, which became very important in the context of uncertainty and emotional stress generated by the pandemic.

Figure 2
*Majority use of active methodologies*
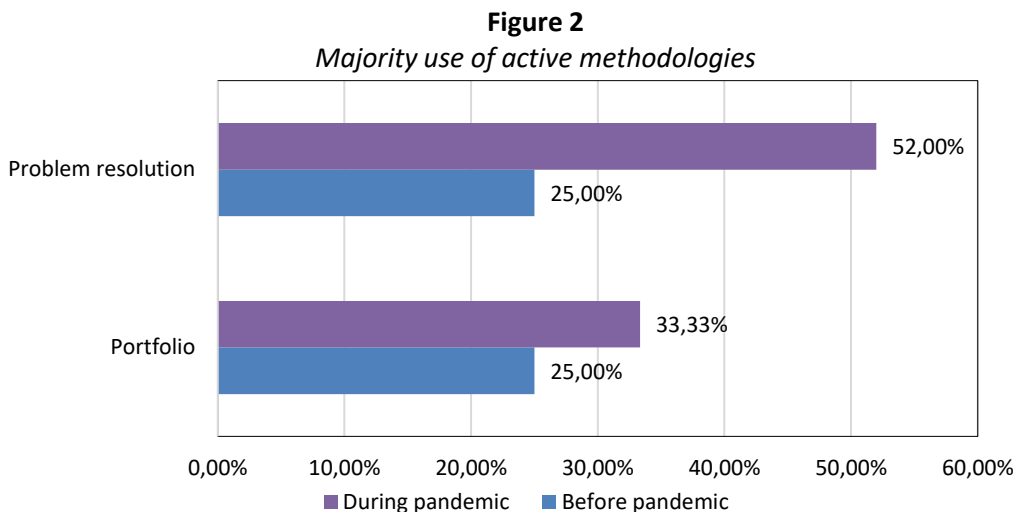
Source: Own elaboration

Figure 2 shows how the use of active methodologies such as problem solving and portfolio has also increased revealing the growing interest of teachers of involve students in the learning process in a way that favors practice (problem solving). This is an investigative competence as it tries to provide a solution to a problem (real or simulated) through the development of a scientific investigative process with a quantitative, qualitative or mixed approach (Nuñez, 2019). The methodology of continuous improvement (portfolio) on the other hand, since it is a technique of collection, compilation, assembly of evidence and professional competencies enables the student for professional development (Barragán, 2005).

The authors Corominas (2000); Rodríguez Espinar (1997); Ibarra (1997), point out that portfolio is currently one of the most relevant and modern learning technique, since it shows the competencies acquired by the students during a period of time, as well as the use of the learning process.
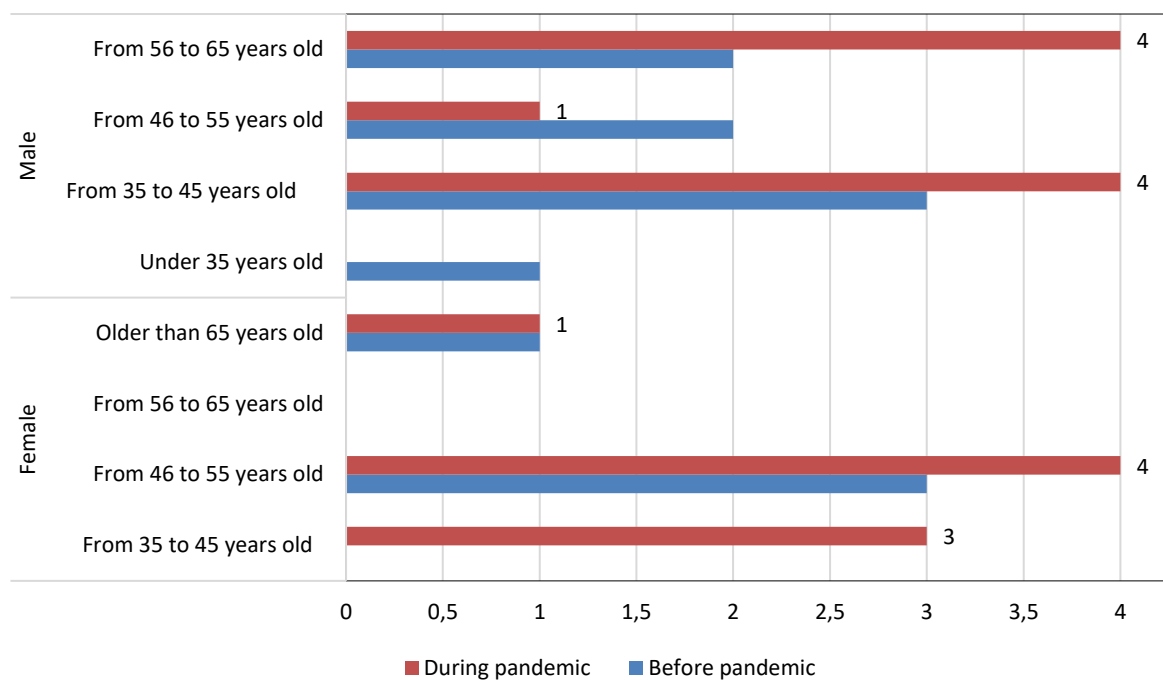
Figure 3
Number of hours per week in class preparation and evaluation (more than 9 hours)
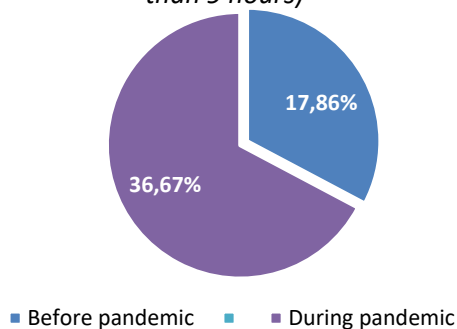
Source: Own elaboration

Figure 3 shows that the context of the pandemic implied for teachers an increase in the hours of class and evaluation preparation (designing of methods) due to the fact that unexpectedly from one moment to another they had to adapt all material from face-to-face classes to the online class format. This would seem to suggest that such situation led to an increase in the stress levels of teachers (CEPAL, 2020) as can be seen in Figure 4.

Figure 4
Teachers who reported stress before and during the pandemic
(gender and age)

Source: Own elaboration

As can be seen in the figure, in the 35 to 45 age group, both men and women reported an increase in the number of people who said they have felt stress. This could be due to intra-family situations in these age groups in addition to the pressure caused by confinement. This increase can also be seen in the male group in the age group 56 to 65 years old, which in this segment may be caused by the pressure to adapt to new technologies.
Regarding this subject, the existence of stress during the pandemic in teachers of educational institutions in Ecuador and Latin America, showed medium and high levels with several triggering factors: adaptation to ICT, increase of the working journey at home and the fear of coronavirus infection (Robinet & Pérez, 2020).

Conclusions and Recommendations

Teachers at the Universidad Andina Simón Bolívar, Ecuador, behaved similarly to teachers of other educational institutions at national and Latin American levels, because due to the effects of the Covid-19 pandemic, they had to make untimely changes in the design of learning, teaching process, and evaluation methods in order to maintain the continuity of education. In the latter, there is a progression in the use of other evaluation methods such as self-evaluation, coevaluation, heteroevaluation and oral evaluation.
The pandemic prompted innovation in education and a change in the traditional model. As a consequence, there is an urgent need to redefine teaching, learning and evaluation towards a

student centered model as part of a system that promotes self-regulation of learning and collaborative work.

Although teachers had to adapt their evaluation methods to the online, virtual, synchronous and asynchronous context, there is an increase in the use of active methodologies such as portfolios, case studies, problem solving, projects, inverted class and others.

Finally, but not least important, the increase in working hours has produced medium and high levels of stress in both gender teachers, but especially in middle-aged female teachers, which could infer that it is the women who are raising their adolescent-aged children while carrying out their academic activities. In addition, there is an increase in the segment of middle-aged men who may be under pressure to adapt to the new modality and technologies.

References

Agresti, A. (2013). *Categorical Data Analysis* (3.ª ed.). Wiley Interscience.

Anderson, D., Sweeney, D., & Williams, T. (2008). *Estadística para administración y economía* (10.ª ed.). Cengage Learning Editores, S.A.

Arpí, C., Àvila, P., Baraldés, M., Benito, H., Gutiérrez, Ma. J., Orts, M., Rigall, R., & Rostan, C. (2012, noviembre). El ABP: origen, modelos y técnicas afines. *Aula de Innovación Educativa*, *216*, 14-18.

Barragán, R. (2005). El Portafolio, metodología de evaluación y aprendizaje de cara al nuevo Espacio Europeo de Educación Superior. Una experiencia práctica en la Universidad de Sevilla. *Revista Latinoamericana De Tecnología Educativa*, *4*(1), 121-140.

Barrientos, E., López, V., & Pérez, D. (2020). Evaluación Auténtica y Evaluación Orientada al Aprendizaje en Educación Superior. Una Revisión en Bases de Datos Internacionales. *Revista Iberoamericana de Evaluación Educativa*, *13*(2), 67-83. https://doi.org/10.15366/riee2020.13.2.004

Benavides, K., Aguilar, G., & Benavides, Y. (2021). *Aplicación de Design Thinking como metodología para el aprendizaje en cursos universitarios*. 183-191.

Bloom, B. (1956). *Taxonomy of educational objectives: Handbook I, The cognitive domain.* Longmans, Green.

CEPAL. (2020). *La educación en tiempos de la pandemia de COVID-19*. CEPAL.

Chen, H. (2006). A theory-driven evaluation perspective on mixed methods research. *Research in the schools. Mid-South Educational Research Association*, *13*, 75-83.

Crisol, E., Romero, M., & Caurcel, M. (2020). Active Methodologies in Higher Education: Perception and Opinion as Evaluated by Professors and Their Students in the Teaching-Learning Process. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01703

Domínguez, O., Contreras, L., Ramírez, G., & Acevedo, L. (2021). Aprendizaje basado en proyectos como una estrategia para la enseñanza en ciencias de la salud. *Educación médica superior*, *35*(4), 1-5.

Galeana, L. (2016). *El Aprendizaje Basado en Proyectos*. Universidad Siglo 21.

García, A., Aguilera, M., Pérez, M. G., & Muñoz, G. (2011). Evaluación de los aprendizajes en el aula. *Instituto Nacional para la Evaluación de la Educación*, 148.

González, N., & Carrillo, G. (2016). El Aprendizaje Cooperativo y la Flipped Classroom: Una pareja ideal mediada por las TIC. *Aularia: Revista Digital de Comunicación*, *5*(2), 43-48.

Konopka, C., Adaime, M., & Mosele, P. (2015). Active Teaching and Learning Methodologies: Some Considerations. *Creative Education*, *6*, 1536-1545. http://dx.doi.org/10.4236/ce.2015.614154

Labajo, E. (2016). *El Método Científico* [Institucional Universitaria]. Universidad Complutense Madrid.

Montes de Oca, N., & Machado, E. (2011). Estrategias docentes y métodos de enseñanza-aprendizaje en la Educación Superior. *Revista de Humanidades Médicas*, *11*(3), 475-488.

Nuñez, N. (2019). Enseñanza de la competencia investigativa: Percepciones y evidencias de los estudiantes universitarios. *Revista Espacios*, *40*(41), 16-42.

Ortiz, A., Jordán, J., & Agredal, M. (2018). Gamificación en educación: Una panorámica sobre el estado de la cuestión. *Educação e Pesquisa*, *44*, e173773. https://doi.org/10.1590/S1678-4634201844173773

Perrotta, C., Featherstone, G., Aston, H., & Houghton, E. (2013). *Game-based learning: Latest evidence and future directions*. The NFER Research Programme.

Puig, W., & Paneque, E. (2009). Consideraciones generales de los métodos de enseñanza y su aplicación en cada etapa del aprendizaje. *Revista Habanera de Ciencias Médicas*, *VIII*(2).

Rama, C. (2021). *La nueva educación híbrida*. Unión de Universidades de América Latina y el Caribe - UDUAL.

Robinet, A., & Pérez, M. (2020). Estrés en los docentes en tiempos de pandemia Covid-19. *Polo del Conocimiento: Revista científico - profesional, 5*(12), 637-653.

Sánchez, M., & Martínez, A. (Eds.). (2020). *Evaluación del y para el aprendizaje: Instrumentos y estrategias*. UNAM.

Sanmartí, N. (2007). *10 Ideas Clave. Evaluar para aprender*. GRAÓ.

Stiggins, R., Arter, J., Chappuis, J., & Chappuis, S. (2007). *Classroom Assessment for Student Learning. Doing It Right-Using It Well*. Pearson Education Inc.

Torres, M., & Torres, C. (2005). Formas de participación en la evaluación. *Educere*, *9*(31), 487-496.

Yániz, C. (2006). Planificar la enseñanza universitaria para el desarrollo de competencias. *Educatio siglo XX*, *24*, 17-34.

Zamarripa, F., Martínez, I., & Juárez, G. (2016). El aprendizaje basado en proyectos en educación superior. *Revista Electrónica Científica de Investigación Educativa*, *3*(1), 391-402.

Zambrano, A. (2014). *Prácticas evaluativas para la mejora de la calidad del aprendizaje: Un estudio contextualizado en La Unión-Chile.* [Tesis Doctoral]. Universitat Autònoma de Barcelona.