Original Article

Design and validity of the university digital formative assessment questionnaire (CEFDU)

Doris-Fuster Guillen[1], Jessica Paola Palacios Garay[2], Yolvi Ocana Fernandez[3], Jenny Marianella Zavaleta Oliver[4], Walter Florencio Bryson Mallca[5]

[1]Universidad Privada San Juan Bautista

[2]Universidad Nacional Mayor de San Marcos

[3]Universidad Privada San Juan Bautista

[4]Universidad Privada San Juan Bautista

[5]Universidad Privada San Juan Bautista

Abstract

The purpose of the research is to design and validate the university digital formative evaluation questionnaire, considered as an instrument for collecting statements referring to feedback-continuous, innovative and regulatory formative evaluation. The methodology corresponds to a positivist paradigm, a quantitative approach to descriptive design, the instrument was subjected to processes of content validity, construct validity and reliability. The university digital formative evaluation questionnaire (CEFDU) was validated by expert judgment that allowed verifying the theoretical agreement between components, indicators and reagents, the validity of the instrument is an informed opinion of specialists or with experience in the research topic and can make judgments and assessments of relevance, coherence and clarity of the items. The study sample The study sample consisted of 256 students from 12 universities. The questionnaire was validated with doctors specialized in evaluation. CEFDU consists of 51 items, for which psychometric tests or construct validity were applied through exploratory and confirmatory factor analysis using the extraction method: unweighted least squares, the Kaiser-Meyer-Olkin Measure of sampling adequacy with the value 0.976, Bartlett's sphericity test (Approx Chi-square = 16614.701; df = 1275; Sig. <0.0001) and the total explained variance (74.009%), after the aforementioned confirmatory factor analysis that allowed confirmation and statistical acceptance of the theoretical model created from theoretical constructs that support it to the digital formative evaluation. For this, the maximum likelihood estimation method and the multivariate non-normality of Mardia in Kurtosis = 115,184 and p-value ≤ 0.001 in the that all items are significant p <.001. The model was subjected to goodness-of-fit indicators whose results are optimal and the questionnaire model is accepted.

Keywords: Validated questionnaire, feedback-continuous formative evaluation, innovative and regulatory.

INTRODUCTION

As online learning is increasingly adopted in higher education institutions, many faculty are faced with the challenges of designing and implementing effective pedagogical practices that promote student learning. One of the challenge points is the design and development of evaluation activities that truly inform the teaching and learning process.

Address for correspondence: Doris-Fuster Guillen
Universidad Privada San Juan Bautista
Email: doris.fuster@upsjb.edu.pe

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Although both formative and summative assessment are important in teaching and learning, summative assessment has been dominating instructional processes in higher education at the expense of formative assessment. In higher education in many countries, efforts to practice formative assessment are hampered by a variety of factors that lead to poor practice [1].

The use of technology, especially for formative assessments, would be very useful for teachers as a facilitator of time-consuming formative assessments; therefore, most teachers do not end up doing formative assessment even though they help provide necessary feedback to identify students' preconceived ideas, misconceptions, and other challenges. The challenge of the time consumed to facilitate formative assessments can be solved through the use of educational technological tools [2]; however, the specialists, who are in charge of monitoring and accompanying the teachers,

Developing

Conceptualization of online formative assessment

Formative assessment has the potential to support teaching and learning in the classroom[4].Evidence indicates that high-quality formative assessment has a powerful impact on student learning. Generally speaking, assessment aims to help students improve their learning. In practice, assessment is a self-reflective process that promotes student achievement.[5].Likewise, online formative assessment presents an approach that helps guide students towards meaningful and self-regulated learning. In addition, it is also considered as a formative electronic evaluation in which the achievements of the interactions with the students and among themselves through the use of ICT are collected.[2].

Digital formative assessment is a fairly new term for assessment[6]; however, it is established that the digital formative assessment tool has positive effects on student performance and motivation. In addition, student use assessments support their performance and motivation, especially among high achievers.[7]. Feedback is an integral part of education and there is a substantial body of trials exploring and confirming its effect on learning; but a particularly powerful approach and that there are benefits to forms of feedback between peers and tutors although these depend on implementation factors[8].

Formative assessment originates from educational theories on testing and assessment, studying how assessment in the classroom can influence learning and student development and be further related and contextualized in classroom practice and teacher professional development.[9]. It is well known that formative assessment focuses on both the learning process and the student's academic performance. It is shown that the participants have better results in the digital formative tests compared to the traditional oral tests. Likewise, there are positive opinions about digital formative assessment because students show satisfaction with digital formative assessments in terms of peer collaboration during tests, enriched test materials and preparation time.[7]. Assessment, in its various forms, is a key element in any teaching process. Digital formative assessment is done to improve the teaching-learning process and provide students with feedback on their progress rather than just grades.[10].

The purpose of formative assessment

The purpose of the formative evaluation is to develop a responsible and conscious learning in the student through the accompaniment of the teacher that allows building a learning structure in a systematic way; therefore, schools must promote innovative learning proposals with relevant tools and resources for this purpose. It must be clear that the formative evaluation is characterized by using different techniques, means and instruments, among which are observation, the checklist, rubrics, the interview, the portfolio, different types of organizers, the performance record and others. that are functional for educational actors[eleven].

Factors Influencing Formative Assessment

Regarding the factors that influence formative assessment, it is established that knowledge and skills (for example, data literacy), psychological factors (for example, social pressure) and social factors (for example, collaboration) influence the use of formative assessment. Identified prerequisites can inform professional development initiatives regarding formative assessment[4].

Teachers are playing a crucial role in the implementation of formative assessment that has been widely recognized as a valuable strategy to improve student learning outcomes. Personal and contextual factors that influence teachers' intentions and implementation regarding formative assessment were identified; That is why those in charge of educational management are required to implement support measures so that teachers develop formative evaluation strategies according to the context and thus there will be a probability that they will effectively play the role they must play in the implementation of the formative assessment[12].

Importance of online formative assessment

Formative assessment is a topic with an important agenda in educational reform around the world due to the benefits it offers in assessment for learning.[13]. Assessment is a fundamental component of all teaching-learning. Exactly how it is used will depend on its purpose or function, the moment, the agent, the referent, the methodology or the instruments. Traditionally, assessment has been used to obtain information on student learning outcomes. In this regard, it has had a summative rather than a formative or diagnostic function.[14].

Definitely, formative assessment has a great impact on student learning and, in general, students spend their time on

the materials that are covered in the assessment part. Assessment directly affects your learning[fifteen]. The important point to consider is that evaluation should be for learning. The distinction between formative and summative assessment is that summative assessment focuses largely on what students have learned, in other words, the results of the learning process; but formative assessment emphasizes the learning process rather than the product of learning by providing feedback[16].

The evaluation for learning is an evaluation of the process, unlike the evaluation of learning, which is an evolution of output, certifying. Other learning benefits are evident in the positive relationship with student reading performance, this formative assessment mediated by the teacher-student relationship and the attitude towards reading. Likewise, formative assessment can also help to reduce achievement gaps between students.[17].

Theoretical approach to formative assessment

The formative evaluation approach is the socioformative evaluation that is focused on the development and improvement of students that allows them to face the challenges in a knowledge society since it addresses problems within a context and collaboration.[18].

The formative assessment approach is based on cognitive theory and sociocultural theory that are based on several activities: providing continuous feedback, promoting student participation, making changes in classroom teaching.[19]. Additionally, it facilitates student learning, meaningful feedback, student engagement, and learning progressions.[twenty].

In the digital academic context, students use information and communication technologies for many reasons, such as taking basic notes to search for information, presenting content, solving teaching-learning activities, or communicating. Although not all students are equally proficient in technology and academic use of technology is necessary, these students use technology naturally[twenty-one]. The easy use of technology by students provides opportunities to learn and can be used for the teacher to perform an adequate digital formative assessment.

Advantages of digital formative assessment

There are advantages to conducting digital formative assessment because, by using digital technologies, they improve the quality of feedback received by students during formative assessment. These advantages are (1) the time factor: feedback through digital technology is immediate; (2) the format: the feedback resulting from the interactions is received in a personal device adapted to the user and can be received in various formats (text, audio, video, etc.), which greatly enriches the messages and (3) facilitates access to a wide range of complementary resources available on the Internet[10].

Prerequisites for the effective use of formative assessment

The prerequisites for the effective use of formative assessment by teachers are the following: (1) knowledge and skills such as data literacy; (2) psychological factors such as social pressure and (3) social factors such as collaboration and influence the use of formative assessment. Identified prerequisites can inform professional development initiatives regarding formative assessment as well as teacher education programs[4].

Formative evaluation cycle

The formative assessment cycle consists of: (1) clarifying expectations, ie learning objectives and success criteria; (2) elicit learning responses from students; (3) analyze student responses; (4) communicate about the results (including feedback) and (5) take concrete actions to adjust teaching and/or learning. Ideally, students and teachers are active and interacting in all phases; therefore, they co-regulate student learning[22].

Digital formative assessment dimensions

Dimension called feedback formative evaluation

The dimension called digital continuous feedback formative assessment helps in shaping the assessment process by supporting classroom environments that allow students and teachers to assess learning and providing mechanisms to present information about student learning during instructional sequences.[23]. Elaborate feedback is more effective than simple feedback (knowledge of results) if students work on complex tasks[24].

Formative assessment and feedback are fundamental aspects of learning. In higher education (HE), both issues have received considerable attention in recent years with advocates linking assessment and feedback.This lastpromotes personal reflection through the use of reflective mini-quizzes. The process was evaluated by academic tutors in the resubmission stage and/or in the peer feedback stage; At that stage, a variety of motivating factors and tactics were noted; however, students tended to find the revision the most beneficial [25].

One way that technology can be a significant support in teaching and learning is by enhancing the ability to provide formative assessment of students' knowledge and skills during the teaching-learning process. It is important to provide immediate feedback during the formative assessment process with the goal of improving performance; is crucial in the process. Students believe in the importance of formative assessment and receiving immediate feedback. Formative assessment is shown to contribute to the learning process by improving student engagement, saving learning time, ensuring equal participation with opportunities, and creating a fun and exciting learning environment.

Digital innovative formative assessment dimension

Regarding the digital innovative formative assessment dimension, formative assessment, including feedback to students on their learning, is widely recognized as an effective means of supporting student learning. The potential of formative assessment to improve student learning is often not fully harnessed in classroom practice. The use of digital platforms for feedback provides the opportunity to individualize feedback, increase student engagement, collect evidence of learning for all students, facilitate reflective processes, and support self-regulated learning. A key finding is that although technological innovations have evolved considerably, Many promising possibilities are not yet being exploited for formative assessment purposes. More importantly, it is shown that it is not the technologies themselves, but the ways in which they are used that have an impact on their formative potential. Formative assessment can open up the potential to move from converging forms of feedback to more open and divergent feedback practices [27].

The online knowledge survey, online peer scaffolding through student-generated questions and peer responses, and electronic reflective journals are proposed as innovative digital formative assessment as a practical contribution to research. Education professionals who wish to develop technology-enhanced formative assessment activities that promote students' self-regulated learning [1].

Digital regulatory formative assessment dimension

The digital regulatory formative assessment dimension has the potential to carry out regulation activities that promote the development of student self-regulation skills. The teacher often intends to use formative assessment to encourage self-regulation; however, this requires a determined interaction between students and teachers. The formative evaluation process, described in five phases of the formative evaluation cycle, makes it easier for teachers to explain specific behaviors of students and teachers in their training classroom that aims to stimulate self-regulated learning. The results show that the use of the five phases of the formative assessment cycle helps to specify co-regulatory formative assessment behaviors that are related to various phases of regulation. They also show that starting from the student's perspective, explaining expected student behavior, and using this to explain related teacher behavior challenges assessments and implementations of teacher formative intent. The activities make teachers realize the importance of deliberately designing regulatory formative assessments. Teacher-explained examples describe actual co-regulatory interactions between students and teachers in the classroom and are found to differ to the extent that they are teacher-directed or student-directed. This challenges our thinking about the co-regulation processes prompted by formative assessments and how this can stimulate students to develop self-regulation skills.[28].

To foster the development of students' self-regulation skills, classroom formative assessment practices should gradually allow these co-regulation interactions to become more student-directed within the context of teacher-defined goals. The idea is to gradually have students lead more of the co-regulation process [29].

There are digital formative assessment tools that allow the teacher to create learning paths through questions, introduce feedback that appears immediately when answering, and check the progress of the students. Learning and self-regulation are encouraged through four forms of feedback. There is high satisfaction with this learning activity related to the appreciation of the help that students received from their peers. Pedagogical implications are presented related to the creation of groups of students to carry out the activity and its different levels of execution, the difficulty, order and nature of the questions, the type of feedback introduced and the design of the task for a correct scaffolding that promotes self-assessment and regulated learning [30].

Methodology

The research corresponds to a positivist research with a quantitative approach of descriptive design. The university digital formative assessment questionnaire was subjected to processes of content validity, construct validity and reliability of the instrument. The university digital formative assessment questionnaire (CEFDU) was validated by expert judgment, which allowed verifying the theoretical agreement between components, indicators, and items. The validity of the instrument is an informed opinion of specialists or people with experience in the research topic and can make judgments and assessments of relevance, coherence and clarity of the items. The questionnaire was validated with evaluation specialist doctors.

The psychometric tests or construct validity of the questionnaire were carried out through exploratory and confirmatory factor analysis. The first allowed to know constructs that are not seen (latent) to be able to verify if they are valid, then allowed to create a model; For this, variance ratios were used in the elimination of the items, the stability of the factorial loads through the different extraction methods, the analysis of principal components, unweighted least squares, main axis factorization, alpha factorization, and image factorization. . For the confirmation of the items, within each dimension, the factorial load ≥ 0.30 has been considered, using the extraction method: unweighted least squares, the Kaiser-Meyer-Olkin Measure of sampling adequacy with the value 0.976, Bartlett's test of sphericity (Approx. Chi-square = 16614.701; gl = 1275; Sig. <0.0001) and total variance explained (74.009%), after the aforementioned confirmatory factor analysis that allowed confirmation and statistical acceptance of the theoretical model created from theoretical constructs that support the digital formative evaluation. For this, the maximum

likelihood estimation method and the multivariate non-normality of Mardia were used in Kurtosis = 115.184 and p-value ≤ 0.001 in the that all items are significant *** <.001. The model was subjected to goodness of fit indicators whose results are optimal and the questionnaire model is accepted. The After the aforementioned, the confirmatory factor analysis that allowed the confirmation and statistical acceptance of the theoretical model created from theoretical constructs that support it to the digital formative evaluation, for this, the maximum likelihood estimation method and the multivariate non-normality of Mardia were used. in Kurtosis = 115,184 and p-value ≤ 0.001 in which all items are significant *** <,001. The model was subjected to goodness of fit indicators whose results are optimal and the questionnaire model is accepted. The After the aforementioned, the confirmatory factor analysis that allowed the confirmation and statistical acceptance of the theoretical model created from theoretical constructs that support it to the digital formative evaluation, for this, the maximum likelihood estimation method and the multivariate non-normality of Mardia were used. in Kurtosis = 115,184 and p-value ≤ 0.001 in which all items are significant *** <,001. The model was subjected to goodness of fit indicators whose results are optimal and the questionnaire model is accepted. TheNormed fit index with value 0.913, comparative fit index 0.972, Tucker-Lewis index 0.967, incremental fit index 0.972, mean square error of approximation 0.041 and square root mean square error 0.054.

Show

The study sample consisted of 256 students from 12 public and private universities in Peru: Universidad Nacional Mayor de San Marcos,La Molina National Agrarian University, National University of Education, Daniel Alcides Carrión National University,César Vallejo University, San Juan Bautista Private University, Norbert Wiener University, University of Human Sciences, Technological University of Peru, Los Andes Peruvian University, San Ignaciano de Loyola University. Sedes Sapientiae Catholic University, San Luis Gonzaga National University

Instrument

The survey technique was established and the questionnaire was built to measure the university digital formative evaluation (CEFDU) for university students to evaluate the pedagogical actions carried out by teachers, using the semantic differential ordinal scale 1 to 7 meaning 1 and 2, minimum action carried out , 3,4,5 some actions carried out, 6 and 7 maximum actions carried out, made up of 51 items. The instrument groups items that correspond to three dimensions and 8 indicators. The first dimension called continuous feedback formative evaluation with 35 items; the second dimension innovative formative evaluation with 12 items and the regulatory formative evaluation with 4 items.

Design of validity of a scale

The research addresses the construction process of a measurement scale, it comprises eight steps: the first is identification or specification of the theoretical construct of the subject to be investigated; the second is definition of the dimensions and indicators; the third is identification of the technique and elaboration of the items according to the theoretical construct of the indicators; fourth is content validity; fifth is the pilot test, improvements and adjustments of the items; sixth is the application of the questionnaire; seventh is the exploratory and confirmatory psychometric analysis; lastly, the reliability of the instrument with adjustment indices.

Results

Exploratory data analysis

The exploratory analysis of the data consisted of the application of the exploratory factorial analysis by means of the analysis of principal components as a method of extraction of dimensions due to the non-necessity of compliance with multivariate normality. Likewise, the varimax rotation with Kaiser normalization was used in order to obtain the underlying dimensions of the questionnaire that measures digital formative assessment. The digital formative assessment questionnaire initially consisted of 79 items that, after an iterative process, those items with problems or with potential problems were eliminated according to the variance ratio indicator; 51 items remained. Table 1 shows the ratio of variances of the iterative process of elimination and conservation of the items, in which item p52 did not present problems in its factor loading; that is, in the entire iterative process, it only presented a factor load greater than 0.30.

On the other hand, the items: p14, p15, p16, p17, p18, p19, p20, p23, p25, p26, p27, p29, p30, p31, p32, p33, p34, p35, p36, p37, p38, p41 , p63, p71, p72, p74 and p77 were eliminated for presenting values in their ratio of variances lower than 1.50, while item p13 was eliminated for presenting stability problems.

Finally, the remaining items: p1, p2, p3, p4, p5, p6, p7, p8, p9, p10, p11, p12, p21, p22, p24, p28, p39, p40, p42, p43, p44, p45, p46, p47, p48, p49, p50, p51, p52, p53, p54, p55, p56, p57, p58, p59, p60, p61, p62, p64, p65, p66, p67, p68, p69, p70, p73, p75, p76, p78 and p79, do not present discrimination problems in their factor loads despite having two or more factor loads greater than 0.30, since the variance ratio indicator is greater than 2.00.

TABLE 1: Iterative Process of the Variance Ratio in the Elimination of Items from the Exploratory Factor Analysis of the Digital Formative Assessment Questionnaire

starting items	Variance ratio Iterations (28 iterations)					final items
	1	2	3	4	5	
p1		5.21	5.17	5.40	5.38	**p1**
p2	4.63	3.68	3.64	3.98	3.95	**p2**
p3	5.05	4.80	4.75	4.31	4.23	**p3**
p4	4.16	3.60	3.58	3.31	3.25	**p4**
p5	3.54	3.00	2.92	2.63	2.57	**p5**
p6	4.35	4.55	4.46	3.74	3.60	**p6**
p7	3.58	4.00	4.72	4.07	3.88	**p7**
p8	3.56	4.30	5.73	4.35	4.21	**p8**
p9	4.57	5.39	5.35	4.46	4.26	**p9**
p10	3.97	3.53	3.20	3.00	2.91	**p10**
p11	4.74	5.55	5.08	4.42	4.22	**p11**
p12	2.40	2.71	3.36	2.54	2.38	**p12**
p13	1.68	2.00	2.49	1.82	**1.79**	
p14	**1.07**					
p15	2.11	2.06	1.77	**1.47**		
p16	2.37	2.19	1.91	**1.36**		
p17	1.67	**1.49**				
p18	**1.41**					
p19	1.86	1.67	**1.31**			
p20	2.48	2.08	**1.42**			
p21	2.37	2.10	1.56	2.25	2.42	**p21**
p22	2.01	1.79	1.57	2.77	2.95	**p22**
p23	1.77	1.66	**1.30**			
p24	2.17	2.29	1.95	2.29	2.43	**p24**
p25	**1.27**					
p26	1.55	**1.21**				
p27	1.50	**1.02**				
p28	1.61	2.44	2.84	2.85	2.95	**p28**
p29	2.05	**1.27**				
p30	**1.22**					
p31	1.89	**1.37**				
p32	1.57	**1.19**				
p33	**1.16**					
p34	**1.22**					
p35	**1.09**					
p36	**1.25**					
p37	**1.03**					
p38	**1.05**					
p39	1.52	2.00	2.30	2.46	2.54	**p39**
p40	2.43	3.90	4.09	2.92	2.93	**p40**
p41	**1.46**					

p42	1.78	1.89	2.19	3.33	3.44	**p42**
p43	3.42	3.17	2.45			**p43**
p44	2.54	2.26	2.89	3.51	3.60	**p44**
p45	2.21	2.21	2.21	2.28	2.32	**p45**
p46	3.18	2.94	2.90	2.96	3.09	**p46**
p47	2.51	2.40	2.35	2.48	2.58	**p47**
p48	2.76	3.01	3.00	3.05	3.12	**p48**
p49	2.96	3.15	3.15	3.10	3.27	**p49**
p50	2.66	2.93	2.96	2.97	3.06	**p50**
p51	2.08	2.17	2.20	2.26	2.29	**p51**
p52	No issues on factor loadings					**p52**
p53	4.51	4.40	4.41	4.31	4.26	**p53**
p54	2.74	2.86	2.86	2.84	2.89	**p54**
p55	3.45	2.98	3.10	3.40	3.49	**p55**
p56	5.11	4.56	4.58	4.84	4.83	**p56**
p57	3.60	4.04	3.91	3.97	3.99	**p57**
p58	2.38	2.52	2.51	2.45	2.46	**p58**
p59	2.82	3.00	2.99	3.08	3.16	**p59**
p60	3.24	4.41	4.34	4.29	4.32	**p60**
p61	3.83	5.22	5.13	5.11	5.28	**p61**
p62	2.43	3.37	3.45	3.51	3.57	**p62**
p63	**1.46**					
p64	2.82	3.34	3.34	3.29	3.32	**p64**
p65				7.00	7.07	**p65**
p66	2.00	2.92	4.24	4.23	4.37	**p66**
p67	1.53	2.12	2.53	6.38		**p67**
p68	1.69	2.20	2.72	5.65	6.16	**p68**
p69	2.11	2.92	2.93	3.00	3.08	**p69**
p70	1.88	2.61	3.40	3.43	3.58	**p70**
p71	**1.41**					
p72	**1.42**					
p73	1.57	2.40	2.44	2.59	2.73	**p73**
p74	**1.19**					
p75	1.93	2.42	2.47	2.49	2.60	**p75**
p76	2.37	3.73	3.39	3.06	3.09	**p76**
p77	**1.18**					
p78	1.73	2.60	2.66	2.69	2.82	**p78**
p79	2.06					**p79**

Note: based on factor loadings greater than 0.30. Twenty-eight items were eliminated, those that presented variance ratios less than 2.00.

As can be seen in Table 2, the factor loadings showed stability when extracted by the different methods such as principal component analysis, unweighted least squares, principal axis factorization, alpha factorization, and image factorization; therefore, they did not require compliance with multivariate normality, since their values of the digital formative assessment items are similar and are well discriminated in a single underlying dimension.

TABLE 2: Stability of Factor Loadings by Different Extraction Methods of the Exploratory Factor Analysis Digital Formative Assessment Questionnaire

items	extraction method				
	Principal component analysis	**Unweighted least squares**	**Principal axis factorization**	**alpha factorization**	**image factorization**
Q21	0.671	0.653	0.653	0.656	0.614
Q22	0.669	0.648	0.648	0.653	0.597
Q24	0.653	0.635	0.635	0.641	0.563
Q28	0.739	0.724	0.724	0.719	0.714
Q39	0.706	0.691	0.691	0.691	0.660
Q42	0.720	0.702	0.702	0.707	0.634
Q43	0.711	0.684	0.683	0.691	0.591
Q44	0.689	0.669	0.669	0.673	0.599
Q45	0.683	0.667	0.667	0.670	0.612
Q46	0.721	0.702	0.702	0.708	0.617
Q47	0.668	0.650	0.649	0.654	0.576
Q48	0.717	0.701	0.701	0.703	0.653
Q49	0.674	0.655	0.655	0.657	0.620
P50	0.712	0.695	0.695	0.697	0.651
Q51	0.596	0.583	0.583	0.584	0.538
Q53	0.722	0.702	0.702	0.705	0.644
Q54	0.730	0.715	0.715	0.717	0.663
Q55	0.707	0.691	0.691	0.694	0.632
Q56	0.735	0.715	0.715	0.716	0.665
Q57	0.718	0.697	0.697	0.700	0.657
Q58	0.709	0.696	0.695	0.694	0.675
Q59	0.729	0.713	0.713	0.714	0.677
P60	0.790	0.777	0.777	0.776	0.764
Q61	0.801	0.788	0.788	0.787	0.783
Q62	0.763	0.750	0.750	0.749	0.721
Q64	0.746	0.731	0.731	0.731	0.707
Q66	0.767	0.750	0.750	0.749	0.741
Q67	0.776	0.754	0.754	0.754	0.744
Q68	0.785	0.768	0.768	0.767	0.755
Q69	0.777	0.770	0.770	0.767	0.766
P70	0.780	0.769	0.769	0.767	0.757
Q73	0.691	0.677	0.677	0.677	0.667
Q75	0.710	0.696	0.695	0.695	0.670
Q78	0.695	0.678	0.678	0.681	0.651
Q79	0.637	0.612	0.612	0.613	0.593
P1	0.747	0.717	0.717	0.718	0.723
P2	0.760	0.739	0.739	0.743	0.740
P3	0.771	0.755	0.755	0.756	0.749
P4	0.740	0.726	0.726	0.726	0.719
P5	0.742	0.735	0.735	0.733	0.727

Q6	0.764	0.751	0.751	0.750	0.739
Q7	0.767	0.756	0.756	0.754	0.745
Q8	0.785	0.770	0.770	0.770	0.753
Q9	0.767	0.749	0.749	0.747	0.743
Q10	0.729	0.706	0.706	0.706	0.704
Q11	0.788	0.770	0.770	0.771	0.758
Q12	0.733	0.724	0.724	0.724	0.713
P40	0.639	0.570	0.570	0.569	0.567
Q52	0.824	0.723	0.724	0.720	0.616
Q65	0.799	0.763	0.762	0.781	0.612
Q76	0.654	0.572	0.572	0.567	0.490

Note: The extraction methods presented do not require multivariate normality.

For the confirmation of the items, within each dimension, the factorial load ≥ 0.30 has been considered, using the extraction method: unweighted least squares, the Kaiser-Meyer-Olkin Measure of sampling adequacy with the value 0.976, Bartlett's test of sphericity (Approx. Chi-square = 16614.701; gl = 1275; Sig. <0.0001) and total variance explained (74.009%).

TABLE 3: Exploratory Factor Analysis of the Digital Formative Assessment Questionnaire

Item	Component			Variance ratio
	1	2	3	
Q21	**0.671**	0.432		2.42
Q22	**0.669**	0.390		2.95
Q24	**0.653**	0.418	0.303	2.43
Q28	**0.739**	0.430		2.95
Q39	**0.706**	0.443		2.54
Q42	**0.720**	0.388		3.44
Q43	**0.711**			
Q44	**0.689**	0.363	0.310	3.60
Q45	**0.683**	0.448		2.32
Q46	**0.721**	0.410		3.09
Q47	**0.668**	0.416		2.58
Q48	**0.717**	0.406		3.12
Q49	**0.674**	0.372	0.318	3.27
P50	**0.712**	0.407		3.06
Q51	**0.596**	0.394	0.369	2.29
Q53	**0.722**	0.350	0.307	4.26
Q54	**0.730**	0.429		2.89
Q55	**0.707**	0.379	0.378	3.49
Q56	**0.735**		0.335	4.83
Q57	**0.718**	0.359		3.99
Q58	**0.709**	0.452		2.46
Q59	**0.729**	0.410		3.16
P60	**0.790**	0.380		4.32
Q61	**0.801**	0.348		5.28
Q62	**0.763**	0.404		3.57
Q64	**0.746**	0.409		3.32
Q66	**0.767**	0.367		4.37

Q67	**0.776**			
Q68	**0.785**	0.316		6.16
Q69	**0.777**	0.443		3.08
P70	**0.780**	0.412		3.58
Q73	**0.691**	0.418	0.316	2.73
Q75	**0.710**	0.441		2.60
Q78	**0.695**	0.414		2.82
Q79	**0.637**			
P1	0.322	**0.747**		5.38
P2	0.382	**0.760**		3.95
P3	0.375	**0.771**		4.23
P4	0.410	**0.740**		3.25
P5	0.463	**0.742**		2.57
Q6	0.403	**0.764**		3.60
Q7	0.389	**0.767**		3.88
Q8	0.383	**0.785**		4.21
Q9	0.372	**0.767**		4.26
Q10	0.427	**0.729**		2.91
Q11	0.383	**0.788**		4.22
Q12	0.476	**0.733**		2.38
P40	0.374		**0.639**	2.93
Q52			**0.824**	
Q65	0.300		**0.799**	7.07
Q76	0.372		**0.654**	3.09

Note: Factor loadings ≥ 0.30.

Extraction method: unweighted least squares.

Kaiser-Meyer-Olkin measure of sampling adequacy (0.976).

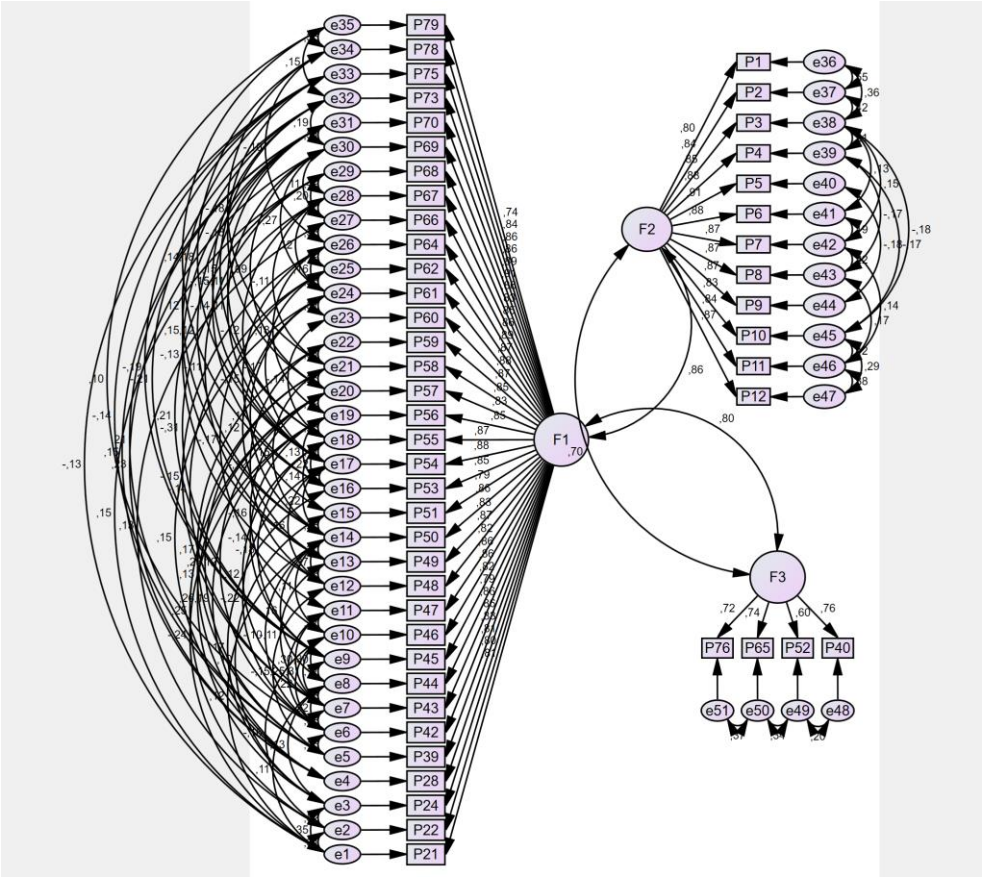
Bartlett's test of sphericity (Approx. Chi-square = 16614.701; df = 1275; Sig. <0.0001).

Total variance explained (74.009%).

Table 3 shows the distribution of the digital formative assessment items in underlying components of the stable and discriminating factor loads. Where the first dimension called digital continuous feedback formative evaluation was represented by the items:p21, p22, p24, p28, p39, p42, p43, p44, p45, p46, p47, p48, p49, p50, p51, p53, p54, p55, p56, p57, p58, p59, p60, p61, p62, p64, p66, p67, p68, p69, p70, p73, p75, p78 and p79. The second dimension digital innovative formative evaluation made up of the items: p1, p2, p3, p4, p5, p6, p7, p8, p9, p10, p11 and p12, and the third dimension digital regulatory formative evaluation made up of the items p40, p52, p65 and p76.

Confirmatory data analysis

FIGURE 1: Confirmatory Factor Analysis of the Digital Formative Assessment Questionnaire



Note: Standardized coefficients

The results of the exploratory factor analysis were validated and contrasted by confirmatory factor analysis, in order to confirm the underlying structure found in the exploratory factor analysis.

TABLE 4: Coefficients of the Confirmatory Factor Analysis of the Digital Formative Assessment Questionnaire

Relationship			Coefficient		I KNOW	CR	*p*-value
			Estimated	Standardized			
Q21	<---	F1	1	0.81			
Q22	<---	F1	1,009	0.796	0.056	18,167	***
Q24	<---	F1	1,004	0.811	0.052	19,252	***
Q28	<---	F1	0.936	0.826	0.059	15,935	***
Q39	<---	F1	0.962	0.862	0.057	16,976	***
Q42	<---	F1	1,024	0.856	0.061	16,824	***
Q43	<---	F1	0.977	0.791	0.065	14,967	***
Q44	<---	F1	1,006	0.823	0.06	16,787	***
Q45	<---	F1	0.964	0.863	0.057	17,019	***
Q46	<---	F1	1,081	0.862	0.064	16,989	***
Q47	<---	F1	0.995	0.816	0.064	15,662	***
Q48	<---	F1	0.951	0.866	0.056	17,123	***
Q49	<---	F1	0.902	0.826	0.057	15,923	***
P50	<---	F1	0.947	0.86	0.053	17,996	***
Q51	<---	F1	0.894	0.787	0.06	14,853	***
Q53	<---	F1	0.961	0.849	0.058	16,588	***

Q54	<---	F1	0.979	0.88	0.056	17,538	***
Q55	<---	F1	1,014	0.874	0.058	17,357	***
Q56	<---	F1	1,016	0.847	0.068	14,865	***
Q57	<---	F1	0.942	0.827	0.059	15,956	***
Q58	<---	F1	0.941	0.855	0.056	16,779	***
Q59	<---	F1	0.98	0.868	0.057	17,172	***
P60	<---	F1	0.948	0.883	0.054	17,656	***
Q61	<---	F1	0.96	0.872	0.055	17,314	***
Q62	<---	F1	1,012	0.893	0.056	17,958	***
Q64	<---	F1	0.927	0.863	0.054	17,033	***
Q66	<---	F1	0.919	0.845	0.056	16,488	***
Q67	<---	F1	0.978	0.83	0.061	16,043	***
Q68	<---	F1	1,038	0.855	0.057	18,135	***
Q69	<---	F1	0.998	0.909	0.054	18,484	***
P70	<---	F1	1,026	0.892	0.057	17,929	***
Q73	<---	F1	0.997	0.865	0.058	17,066	***
Q75	<---	F1	0.98	0.859	0.061	15,954	***
Q78	<---	F1	0.955	0.842	0.058	16,407	***
Q79	<---	F1	0.894	0.737	0.066	13,582	***
P1	<---	F2	1	0.802			
P2	<---	F2	1,082	0.84	0.046	23,623	***
P3	<---	F2	1,057	0.854	0.052	20,245	***
P4	<---	F2	1.14	0.885	0.066	17,157	***
P5	<---	F2	1,133	0.909	0.063	17,875	***
Q6	<---	F2	1,127	0.878	0.066	16,993	***
Q7	<---	F2	1,047	0.873	0.062	16,815	***
Q8	<---	F2	1.09	0.873	0.065	16,807	***
Q9	<---	F2	1,033	0.872	0.062	16,758	***
Q10	<---	F2	0.979	0.827	0.063	15,528	***
Q11	<---	F2	1,007	0.837	0.064	15,801	***
Q12	<---	F2	1,091	0.87	0.065	16,758	***
P40	<---	F3	1	0.757			
Q52	<---	F3	0.843	0.595	0.089	9,475	***
Q65	<---	F3	0.904	0.736	0.088	10,325	***
Q76	<---	F3	0.895	0.72	0.089	10,096	***

Note: Maximum likelihood estimation method

Multivariate non-normality of Mardia in Kurtosis = 115,184 andp-value ≤ 0.001

*** <.001.

The confirmatory factorial model was estimated using the maximum likelihood method despite not satisfying the assumption of multivariate normality due to the sample size, since this does not guarantee the minimum amount for estimation using non-parametric methods.

From Table 4 and Figure 1, it was observed that all the coefficients are significant and directly related, since all the coefficients have a positive sign.

TABLE 5: Covariability Relationships in the Confirmatory Factor Analysis of the Digital Formative Assessment Questionnaire

Relationship			Coefficient		I KNOW	CR	*p*-value
			Estimated	Standardized			
F1	<-->	F3	1,225	0.798	0.158	7,740	***
F2	<-->	F3	0.995	0.700	0.139	7,165	***
F1	<-->	F2	1,128	0.861	0.132	8,572	***

e36	<-->	e37	0.347	0.550	0.049	7,102	***
e28	<-->	e29	0.284	0.488	0.041	6,961	***
e2	<-->	e3	0.406	0.516	0.053	7,643	***
e45	<-->	e46	0.223	0.421	0.039	5,800	***
e37	<-->	e38	0.231	0.424	0.038	6,001	***
e23	<-->	e24	0.142	0.370	0.023	6,209	***
e6	<-->	e7	0.248	0.377	0.042	5,945	***
e10	<-->	e11	0.234	0.370	0.041	5,682	***
e18	<-->	e19	0.119	0.235	0.029	4,103	***
e46	<-->	e47	0.185	0.376	0.036	5,200	***
e7	<-->	e8	0.248	0.335	0.044	5,631	***
e34	<-->	e35	0.257	0.363	0.045	5,766	***
e38	<-->	e45	-0.096	-0.185	0.027	-3,595	***
e12	<-->	e13	0.156	0.326	0.030	5,119	***
e30	<-->	e31	0.103	0.306	0.021	4,973	***
e36	<-->	e38	0.211	0.363	0.040	5,319	***
e14	<-->	e15	0.156	0.280	0.031	5,096	***
e8	<-->	e10	0.187	0.299	0.036	5,134	***
e6	<-->	e8	0.196	0.324	0.036	5,404	***
e1	<-->	e3	0.261	0.352	0.045	5,820	***
e26	<-->	e27	0.168	0.376	0.026	6,367	***
e21	<-->	e22	0.139	0.307	0.028	4,910	***
e9	<-->	e28	-0.161	-0.307	0.031	-5,207	***
e45	<-->	e47	0.144	0.290	0.037	3,938	***
e8	<-->	e9	0.094	0.169	0.029	3,208	0.001
e20	<-->	e21	0.131	0.253	0.027	4,806	***
e12	<-->	e14	0.116	0.268	0.025	4,589	***
e1	<-->	e2	0.244	0.310	0.047	5,135	***
e7	<-->	e10	0.212	0.312	0.043	4,945	***
e27	<-->	e28	0.162	0.300	0.032	5,121	***
e7	<-->	e11	0.222	0.295	0.046	4,820	***
e16	<-->	e18	0.104	0.218	0.030	3,500	***
e14	<-->	e17	0.093	0.222	0.022	4,182	***
e13	<-->	e14	0.099	0.203	0.027	3,740	***
e1	<-->	e19	-0.157	-0.241	0.034	-4,608	***
e50	<-->	e51	0.443	0.371	0.110	4,025	***
e24	<-->	e30	0.095	0.271	0.018	5,197	***
e9	<-->	e32	-0.098	-0.212	0.027	-3,636	***
e5	<-->	e31	0.086	0.206	0.024	3,634	***
e17	<-->	e18	0.071	0.169	0.024	2,955	0.003
e14	<-->	e21	0.067	0.148	0.020	3,304	***
e3	<-->	e16	0.104	0.169	0.029	3,530	***
e17	<-->	e34	0.082	0.181	0.025	3,343	***
e30	<-->	e32	0.072	0.192	0.020	3,515	***
e2	<-->	e27	0.084	0.133	0.027	3,067	0.002
e21	<-->	e34	-0.087	-0.177	0.025	-3,557	***
e25	<-->	e26	0.074	0.190	0.023	3,271	0.001

e16	<-->	e19	0.068	0.126	0.031	2,229	0.026
e2	<-->	e10	-0.109	-0.158	0.032	-3,436	***
e13	<-->	e32	0.075	0.149	0.028	2,672	0.008
e43	<-->	e46	0.083	0.171	0.029	2,844	0.004
e10	<-->	e20	-0.095	-0.164	0.028	-3,377	***
e27	<-->	e29	0.102	0.197	0.029	3,460	***
e4	<-->	e19	-0.112	-0.194	0.031	-3,547	***
e12	<-->	e17	0.066	0.160	0.023	2,827	0.005
e15	<-->	e18	0.080	0.143	0.030	2,635	0.008
e5	<-->	e21	0.107	0.233	0.027	3,991	***
e42	<-->	e43	0.093	0.216	0.031	3,037	0.002
e3	<-->	e15	0.071	0.098	0.033	2,118	0.034
e15	<-->	e26	-0.080	-0.149	0.027	-3,007	0.003
e6	<-->	e17	-0.102	-0.221	0.023	-4,387	***
e38	<-->	e39	0.098	0.208	0.029	3,324	***
e14	<-->	e24	0.071	0.165	0.019	3,763	***
e2	<-->	e20	0.173	0.249	0.039	4,444	***
e27	<-->	e30	0.041	0.110	0.017	2,390	0.017
e6	<-->	e11	0.153	0.249	0.036	4,228	***
e24	<-->	e26	0.068	0.164	0.020	3,447	***
e20	<-->	e33	-0.093	-0.175	0.029	-3,168	0.002
e8	<-->	e14	0.087	0.158	0.027	3,267	0.001
e4	<-->	e30	0.095	0.230	0.026	3,678	***
e17	<-->	e28	-0.058	-0.119	0.022	-2,655	0.008
e3	<-->	e20	0.174	0.264	0.035	4,911	***
e26	<-->	e34	-0.048	-0.102	0.022	-2,156	0.031
e6	<-->	e14	-0.050	-0.102	0.023	-2,173	0.030
e12	<-->	e31	-0.052	-0.130	0.022	-2,337	0.019
e4	<-->	e21	0.067	0.130	0.027	2,526	0.012
e32	<-->	e35	0.101	0.151	0.037	2,768	0.006
e19	<-->	e26	0.086	0.176	0.025	3,515	***
e7	<-->	e26	-0.089	-0.154	0.027	-3,323	***
e11	<-->	e25	-0.085	-0.168	0.028	-3,096	0.002
e19	<-->	e20	0.110	0.191	0.030	3,718	***
e16	<-->	e31	-0.060	-0.136	0.024	-2,504	0.012
e17	<-->	e25	-0.067	-0.174	0.021	-3,206	0.001
e18	<-->	e32	0.071	0.154	0.026	2,705	0.007
e17	<-->	e32	-0.065	-0.151	0.025	-2,671	0.008
e49	<-->	e50	0.540	0.343	0.110	4,887	***
e39	<-->	e45	-0.081	-0.168	0.030	-2,714	0.007
e39	<-->	e43	-0.074	-0.167	0.029	-2,542	0.011
e21	<-->	e28	-0.056	-0.106	0.023	-2,464	0.014
e16	<-->	e35	0.097	0.140	0.037	2,592	0.010
e13	<-->	e29	-0.063	-0.114	0.027	-2,350	0.019
e12	<-->	e22	-0.054	-0.123	0.023	-2,306	0.021
e10	<-->	e14	0.054	0.107	0.023	2,330	0.020
e9	<-->	e33	-0.089	-0.191	0.028	-3,229	0.001

e9	<-->	e29	-0.107	-0.213	0.030	-3,545	***
e7	<-->	e18	0.073	0.121	0.028	2,584	0.010
e6	<-->	e10	0.124	0.222	0.034	3,621	***
e5	<-->	e33	-0.068	-0.145	0.027	-2,518	0.012
e5	<-->	e22	0.078	0.173	0.028	2,749	0.006
e5	<-->	e6	0.079	0.160	0.025	3,166	0.002
e5	<-->	e12	-0.066	-0.150	0.024	-2,727	0.006
e4	<-->	e31	0.069	0.147	0.029	2,399	0.016
e4	<-->	e24	0.074	0.152	0.025	2,921	0.003
e3	<-->	e8	0.092	0.129	0.031	2,977	0.003
e1	<-->	e33	-0.075	-0.126	0.033	-2,275	0.023
e1	<-->	e29	0.094	0.146	0.031	3,005	0.003
e48	<-->	e49	0.331	0.203	0.130	2,546	0.011
e41	<-->	e42	0.081	0.186	0.030	2,683	0.007
e40	<-->	e44	-0.066	-0.180	0.027	-2,438	0.015
e42	<-->	e46	0.063	0.136	0.026	2,414	0.016
e38	<-->	e42	0.066	0.145	0.026	2,582	0.010
e24	<-->	e25	0.088	0.226	0.021	4,168	***
e16	<-->	e17	0.057	0.127	0.026	2,227	0.026
e14	<-->	e33	0.054	0.116	0.024	2,224	0.026
e14	<-->	e31	0.049	0.119	0.020	2,403	0.016
e9	<-->	e18	-0.082	-0.184	0.026	-3,198	0.001
e7	<-->	e25	-0.078	-0.143	0.029	-2,685	0.007
e6	<-->	e20	-0.067	-0.120	0.025	-2,632	0.008
e1	<-->	e14	0.067	0.117	0.027	2,520	0.012
e38	<-->	e41	0.060	0.126	0.028	2,125	0.034
e24	<-->	e28	0.060	0.119	0.021	2,860	0.004
e20	<-->	e30	0.039	0.093	0.019	2,020	0.043
e17	<-->	e30	-0.038	-0.111	0.017	-2,222	0.026
e13	<-->	e24	0.058	0.124	0.022	2,599	0.009
e9	<-->	e19	-0.072	-0.141	0.028	-2,574	0.010
e7	<-->	e13	-0.072	-0.110	0.031	-2,321	0.020
e6	<-->	e35	0.073	0.103	0.034	2,174	0.030
e1	<-->	e8	0.078	0.110	0.035	2,258	0.024
e18	<-->	e31	-0.047	-0.113	0.021	-2,180	0.029
e18	<-->	e23	-0.056	-0.140	0.021	-2,649	0.008

All the covariability relationships were significant, which means that there are indirectly variables that share something in common through their random errors.

In Table 6, according to the fit indicators, the confirmatory factorial model was adequate since it met 6 of the 9 goodness-of-fit indicators.

TABLE 6: Goodness of Fit Indicators of the Confirmatory Factor Analysis of the Digital Formative Assessment Questionnaire

Name	fit measure	Worth	Acceptable limit*
Norm Fit Index	NFI	0.913	≥0.90
Goodness of fit index	GFI	0.821	≥0.90
comparative fit index	IFC	0.972	≥0.90
Tucker–Lewis index	TLI	0.967	≥0.90
Incremental Adjustment Index	IFI	0.972	≥0.90
Adjusted goodness-of-fit index	AGFI	0.783	≥0.85

Relative Fit Index	R.F.I.	0.898	≥0.90
root mean square error of approximation	RMSEA	0.041	≤0.05
square root mean square error	RMR	0.054	≤0.10

* Byrme, B. (2010). Structural Equation Modeling with AMOS. 2nd. Ed. New York. Routledge Taylor & Francis Group.

After the construct validity through exploratory and confirmatory analysis, the instrument was subjected to reliability through Cronbach's Alpha Omega and Theta coefficient, resulting in the reliable digital formative evaluation instrument, as well as each of the analyzes by dimensions.

reliability analysis

TABLE 7: Reliability of the Digital Formative Assessment Questionnaire

reliability	Variable	Dimension 1	dimension 2	dimension 3
Cronbach's Alpha	0.989	0.989	0.973	0.842
Omega coefficient	0.976	0.989	0.976	0.896
Theta coefficient	0.990	0.989	0.973	0.846
# items	**51**	**35**	**12**	**4**

According to the reliability statistics, the questionnaire was reliable and presented internal consistency.

University Digital Formative Assessment Questionnaire (CEFDU)

Instructions

The university student marks in one of the boxes as appropriate from 0 to 7 how much the university professor knows or performs said activity.

No.	Components / dimensions / items	Minimum value		Intermediate value			Maximum value	
	Digital continuous feedback formative assessment	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1.	Teachers make use of virtual environments to highlight your achievements							
2.	Teachers identify your weaknesses and communicate through virtual environments in a timely manner							
3.	Teachers using virtual environments guide you to analyze the reason for your mistakes							
4.	*The teacher promotes the active participation of all students in the virtual learning environment*							
5.	The teacher uses instruments in virtual environments for all learning previously socialized with students							
6.	The teacher creates spaces in the virtual environments so that you can self-assess your learning throughout the process.							
7.	The teacher generates spaces for co-evaluation of your learning with other people in your environment in a virtual way							
8.	The teacher clearly explains and proposes the peer-assessment criteria through virtual environments							
9.	The activities that your teacher proposes to you through the virtual environments are oriented to your previous knowledge							
10.	*The teacher proposes different strategies and digital tools for you to learn according to your learning style*							
11.	The teacher uses an instrument through virtual environments to evaluate you according to your learning rates and achievements							

12.	The teacher raises problematic situations in virtual environments and you understand them easily							
13.	The teacher proposes tasks to solve in virtual environments of gradual complexity							
14.	The teacher proposes activities to develop in virtual environments based on your previous learning							
15.	The teacher presents simple learning activities to solve through virtual environments							
16.	The teacher presents learning tasks in virtual environments taking into account your interests							
17.	The teacher presents learning activities through virtual environments that help to solve or understand the problems of your reality or environment							
18.	The teacher presents tasks and activities in virtual environments taking into account your learning style or your personal difficulties							
19.	The teacher makes use of virtual environments and tries to achieve learning related to your family environment or social characteristics							
20.	Through virtual environments, the teacher promotes learning that is useful in the social environment							
21.	The teacher promotes learning in virtual environments that are easy to share with other people or your classmates							
22.	The teacher makes use of virtual environments and promotes actions so that from your learning you help or collaborate with other classmates							
23.	Through virtual environments, the teacher promotes actions that allow you to discuss the solutions with other classmates or with your teacher.							
24.	The teacher proposes learning processes in virtual environments, these generate spaces to discuss ideas and learning achievements							
25.	The teacher promotes the use of various strategies and ways to solve learning problems in virtual environments							
26.	The teacher constantly guides you to improve your learning through virtual environments							
27.	The teacher makes use of virtual environments to guide or provide feedback on learning in a clear and timely manner							
28.	Through virtual environments, the teacher creates spaces for your classmates or other people in your environment to offer you feedback or guidance							
29.	The teacher promotes activities in virtual environments to share your work or learning products and thus receive guidance or feedback from people around you							
30.	The teacher generates spaces to demonstrate your learning in virtual environments							
31.	The teacher carries out learning activities through virtual environments and in the development guides and guides you							
32.	The teacher carries out the orientation through the virtual environments based on the analysis of your errors to improve your learning							

33.	The teacher promotes various ways of solving and solving learning problems through virtual environments							
34.	The teacher promotes learning actions in virtual environments having as a starting point a significant and problematic situation							
35.	Through virtual environments, the teacher generates challenging spaces and activities							
Digital Innovative Formative Assessment								
36.	The teacher explores your previous knowledge through digital tools and resources in the virtual environment.							
37.	The teacher explores your previous knowledge and compares it with different situations in the context, relying on digital resources.							
38.	The teacher uses your previous knowledge and uses it to solve problems through virtual environments							
39.	The teacher explores your prior knowledge using instruments with digital formats							
40.	The teacher leads you to identify academic difficulties with multiple strategies through virtual environments							
41.	The teacher helps you identify practical solutions using digital tools							
42.	Teachers promote problematic situations that allow you to discover the topic to be developed through virtual environments							
43.	Teachers explain the importance of dealing with the problem of context using digital tools.							
44.	Teachers use digital tools to explain the relationship of the problem raised in the context							
45.	Teachers using virtual environments invite you to read and understand the problem that is presented							
46.	Teachers invite you to express the problem in your own words using virtual environments							
47.	Teachers present various strategies through virtual environments that allow solving the problem							
Digital Regulatory Formative Assessment								
48.	The teacher performs unscheduled assessments in the learning process in virtual environments							
49.	The teacher presents different activities in virtual environments that are repetitive and boring							
50.	The teacher provides guidance only at the end of the learning activities in the virtual environments							
51.	The teacher guides in only one way to solve or solve learning problems in virtual environments							

Conclusions

Conclusion of the introduction

Digital formative assessment will be effective if students' abilities to learn continuously are developed; emphasizes the teaching-learning process; engages students; promotes self-evaluation, peer evaluation and helps students understand their own learning.

Development conclusion

Continuous feedback is an essential part of digital formative assessment; This feedback is given to the student in order to take corrective actions on its performance, aimed at improving their learning process.

Conclusion of the methodology

The construction of the university digital formative

evaluation questionnaire complies with the eight stages of the process of elaboration of a scale, as a final product it is the university digital formative evaluation questionnaire with 3 dimensions and 51 items or reagents that were subjected to content validity, validity of construct (exploratory and confirmatory) and the reliability of the instrument, establishing a model with acceptable fit indices. The university digital formative evaluation questionnaire (CEFFU) is aimed at students that allows them to identify the formative evaluation actions carried out by teachers in their daily pedagogical practice. For the design and standardization of the university digital formative evaluation questionnaire.

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