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Formative assessment for virtual education in professional studies

Evaluación formativa para educación virtual en estudios profesionales

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Abstract

The Bachelor of Graphic Design (BGD) of a University in the State of Mexico, presented difficulties in the system of evaluation, notwithstanding applying evaluation only through qualifications, without considering the *formative evaluation system*. Therefore, this study is focused on incorporate *formative assessment* into the subjects of the BGD curriculum through the model of Dick y Carey (2015); the objective generated instructional alternatives to strengthen the teaching-learning process of the subjects in virtual modality. For that reason, each of the elements of the model is presented, which is made up of phases, evaluators, dates, objectives, and instruments, as well as the conclusions of the research.

Formative Assessment, Virtual Education, Instructional, Strategic Planning, Higher EducationSuperior

Resumen

En la Licenciatura en Diseño Gráfico (LDG) de una Universidad en el Estado de México se detectó que presentaba dificultades en la didáctica de evaluación, además de aplicar la evaluación solamente mediante calificaciones, sin considerar la evaluación formativa. Por consiguiente, este estudio tiene como propósito incorporar la *evaluación formativa* en las asignaturas del plan de estudios de la LDG mediante el modelo de Dick y Carey (2015); con el objetivo de generar alternativas instruccionales para fortalecer el proceso de la enseñanza-aprendizaje de las asignaturas en modalidad virtual. Por tanto, se presentan cada uno de los elementos del modelo que se compone de fases, evaluadores, fechas, objetivos e instrumentos, así como las conclusiones de la investigación.

Evaluación Formativa, Educación Virtual, Instruccional, Planeación Estratégica, Educación

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1. Introduction

With the integration of information and communication technologies (ICT) in the field of education, the teaching-learning process has been developing through different environments and situations; hence the challenge lies in recognising the need to analyse what learning in virtual environments implies and how they affect the appropriation and application of the curricular contents of a particular course, as well as the interactions between teacher-student, student-student and student-content. Likewise, to ensure that the application of ICTs is oriented towards the design of diverse learning resources that make it possible to transcend the barriers of time and space, promoting the creation of learning networks, through which the resources designed are shared in order to adapt them to the characteristics and situations required by each student.

In this sense, Miklos and Arroyo (2008) point out that in the digital era, the most successful use of ICT in virtual education projects are those that are born from an academic network that gives them support and viability. Therefore, the challenge focuses on achieving collaborative and cooperative work, which would enable the configuration of networks that strategically define the roles of each actor/institution, and value the contributions of its members in different dimensions: academic, administrative and technological. Consequently, evaluation processes are also affected considering that they must transcend towards the application of ICTs as means or tools that facilitate evaluation. Hence, to achieve the purpose of the study, each of the elements of the Dick and Carey (2015) model was developed, which is composed of phases, evaluators, dates, objectives and instruments. Finally, a number of conclusions are drawn.

1.1. Background

The process of improving higher education is based on the need to train a professional who has a comprehensive training to respond to the demands of society through a solid theoretical and practical training. When developing a diagnosis with teachers who are part of the academic staff of the Bachelor's Degree in Graphic Design at a university in the State of Mexico, it was detected that there were difficulties in the didactics of evaluation.

In addition to applying evaluation only through grades, without considering formative evaluation (Granizo, et. al., 2022; Viadero & Vega, 2022).

Formative assessment emerges as an indispensable element of the methodological process of the Dick and Carey (2015) model. Therefore, the purpose of this study is to incorporate formative assessment into the subjects of the LDG curriculum through the Dick and Carey model; with the aim of generating instructional alternatives to strengthen the teaching-learning process of the subjects. Based on the above, the learning unit of strategic planning (PE) in its virtual modality was taken as a case study, where the purpose of the lesson was that the 9th semester LDG students will apply the strategic planning model of Kotter (2004) to develop the mission, vision and objectives of a specific project.

In that context, it is noted that this formative evaluation report required an expert(s) and one-to-one review of each of the course components. In general, it was necessary to check the functioning of the use of the Canvas platform to work virtually. In particular, instructions, objectives, presentation, examples, grouping, media, participation, practice, feedback, evaluation, rubrics, follow-up activities, results and discussion were reviewed. These components belong to the sections of the platform: syllabus, weekly modules, assignments, audiovisual materials, forums and blogs. All with the indispensable elements of the course that at the time were reviewed by the aforementioned subjects.

1.2. Purpose

The formative evaluation report of the e-learning course aims to provide an overview of the content, process and outcomes of the instructional project. It aims to review the performance of the components that made up the lesson using the content analysis technique. In that sense, specialists and students, either one-on-one or in groups, were required to provide information through an instrument that was applied. This data was translated into results that were analysed and contributed to the continuous improvement of this project.

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1.3 Formative Evaluation

In Cuba, Pasek *et al*. (2017) developed a study focused on formative assessment in the teaching-learning process, with the aim of reflecting on how to apply it appropriately in the teaching-learning process. These authors define formative assessment as a process by which teachers identify their students' mistakes, understand their causes, as well as make decisions to overcome them, and develop improvements in the students' learning process. Also, the research exposes the coincidence of various studies on the need to study the construct of formative assessment from a theoretical, conceptual and methodological framework, its subordination to needs, as well as the demands of its impact on the pedagogical process, its effects and consequences.

Moreno *et al*. (2019) developed a study in Mexico focused on formative assessment as a feedback activity for educational psychology students. The findings resulted from supervised practice through formative assessment, where the subjects who were part of the study who observed and participated in the assessment have the opportunity to improve their professional performance through discursive interaction as part of the process. Consequently, the importance of this type of analysis for the study of the evaluation of supervised practice and its formative value in real situations was recognised.

Joya (2020) developed research in Lima, Peru, focused on formative evaluation as an effective practice in teacher performance. In it, the author mentions that formative assessment as part of the pedagogical process fulfils a function that facilitates the teaching-learning process of students. In this sense, the findings showed that teachers value and promote formative assessment in their classes, derived from the fact that students' competences are improved and strengthened through permanent and systematic assessment.

1.4. Virtual Education

In a study Crisol *et al*. (2020) state that virtual education (VE) focuses on "an evolution of distance education and a transformation for face-to-face and blended learning, as it allows the acquisition of knowledge through the incorporation of technological means, thus facilitating lifelong learning" (p. 15).

While Rizo (2020) states that VE "is one more option for permanent updating that responds to the needs of each person, thus offering different alternatives or solutions to a series of situations that conventional schooling cannot address" (p. 30). Therefore, it is highlighted that EV as well as linking the use and application of ICT in the teaching-learning process, a flexible collaborative work is developed that makes use of ICT, making possible the implementation of new teaching-learning processes.

In Colombia, on the one hand, Yong *et al*. (2017) developed a study that focused on virtual education at higher education level, including the challenges faced by HEIs due to the increase of e-learning programmes. The results show the importance, as well as the need to develop programmes aimed at training in Virtual Education Management, as well as the area that coordinates its development, implementation and evaluation. On the other hand, Torres (2020) focused on the state of virtual education through the use of ICT. The results show a pilot project for the evaluation of education through digital platforms. It also shows that the institution has a virtual education department, where a virtualisation model of the subject Formulation and Evaluation of Investment Projects was developed for replication in other institutions or educational programmes.

León (2022), developed research in Ecuador on empathy in virtual education and meaningful learning, where a remote educational model was adopted to guarantee educational continuity, emphasising that empathy between the student and the teacher is of the utmost importance for quality education. This study developed a VE proposal focused on the search for meaningful learning. The results showed that empathy between the actors involved must be considered as part of the teaching-learning process in order to achieve meaningful learning, and consequently, educational quality.

Based on the above, the following three questions are posed: Should formative assessment be incorporated into the subjects of academic programmes? Does formative assessment contribute to the strengthening of teaching-learning processes? What are the advantages of carrying out formative assessment for the development of meaningful learning?

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Therefore, each of the elements of the model is presented, which consists of phases, evaluators, dates, objectives and instruments, as well as the conclusions of the study.

2. Research Method

A formative evaluation report is part of a methodology proposed by Dick and Carey (2015) in relation to the design of an instructional project. This report was supported by several elements for the continuous improvement of an educational proposal. The elements are composed of phases, evaluators, dates, objectives and instruments. In this particular case, the phases consisted of an expert who was chosen because of his track record in developing strategic plans for more than 15 years, and who is familiar with the target population.

In addition, four students participated, who will be part of a virtual course on strategic planning and in this case, helped with the completion of an instrument to learn about their perception of the subject (Ballesteros, 2007). This report describes the results of the application of the instruments to these subjects, where evaluators, dates of application of the instruments and, at the same time, the components of the lesson were identified. In particular, the most important part was to review the operability of the entire course. Implications arise from the evaluators' observations and at the same time, in each of the components following Dick and Carey's (2015) instructional review process.

2.1. Technique: Expert Review

Description of the Expert

The expert selected, with expertise in strategic planning, implementation, re-engineering and change management for results. Also in senior management at business and government level and familiar with the target population. He is characterised by his high performance, always oriented to the achievement of objectives considering the importance of work teams and senior management. As well as in the development of plans and strategies not only educational but also commercial for different business units (Aramayo, n/d; Rivera & Higuera, 2021).

Instruments

The purpose of the instrument used with the expert (SME) was to make an effective content review of the instructional design of the strategic planning e-learning course. This required the collation of a checklist of the following instructional components: pre-instructional activities, presentation of information, learner participation, assessment and retention/transfer activities; estimating learning type, content, clarity and motivation.

Procedure

The activities are described below in the order specified as part of the data collection process, all of which were necessary to carry out the formative evaluation by the subject matter expert of the virtual PE course:

1. The SME was contacted via email. A letter of invitation was sent to participate in the formative evaluation of the strategic planning course. The purpose of the evaluation was highlighted.

2. The EMS was asked to confirm their participation by the same means.

3. Once the participation of the EMS was confirmed, all the features of the virtual SP course were explained in detail. It was emphasised that a set of instructional materials had been designed, and that their participation was technically required to assess the relevance of the contents.

4. Subsequently, the SME was informed to access the Canvas platform where the PE course was located (link provided), was asked to review the relevance of the course components under his own method. In general, he checked the functioning of the use of the Canvas platform to work virtually. In particular, he reviewed: instructions, objectives, presentation, examples, grouping, media, participation, practice, feedback, assessment, rubrics and follow-up activities. These components belong to the following sections of the platform: syllabus, weekly modules, assignments, audiovisual materials, forums and blogs. All with the indispensable instructional materials of the course.

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5. The SME was then instructed that once the review had been carried out on the Canvas platform, he should proceed to respond to the evaluation instrument that was sent to him. It was requested to return it within five days of receipt.
6. Upon receipt of the instrument with the corresponding responses, the SME was thanked for its time and contributions; it was mentioned if it was of interest to collaborate with a subsequent revision of the course.
7. With the instrument completed, the data were processed.
8. The responses to the components of the questionnaire were categorised, coded and classified.
9. The data were analysed using the corresponding technique and the following report was issued.

2.2. Technique: One-on-One

Subject

For the individual formative evaluation of the virtual course of strategic planning, four students of the 9th semester of the LDG were contacted, regardless of age or gender: (a) two students with the highest academic performance, considering their objectivity, criticism and academic commitment; (b) two students who were below the average academic performance, considering their objectivity and criticism. These students would then take the subject during the autumn 2022 school year.

Instruments

In order to fulfil the purpose of the formative evaluation, data collection was achieved through the application of an individual instrument (subjects of the study). It was an online questionnaire (google survey), which aimed to identify the difficulties that the student would detect with respect to the structure of the course. The instrument consisted of 20 questions, which examined pre-instructional activities, presentation of information, student participation, evaluation and retention or transfer activities; the criteria of clarity, impact and feasibility of the information were considered.

For clarity of instruction

There were three categories of information: messages, links and procedures. The first category, message, referred to the clarity of the message for the learner, determined by vocabulary, sentence complexity, and message structure. Regardless of whether the learner read, heard or saw the message, he or she would be able to follow it. The second category, links, referred to how the message was designed for the learner, including contexts, examples, analogies and demonstrations. The third, procedures, referred to the characteristics of the instruction, such as the sequence, the size of the unit presented, the transition between units, the pace, and the variation built into the presentation. The clarity of instruction would change when any of these elements had been appropriate for the students. Instruction would be so slow and interactive that the learner would lose interest, or proceed so quickly that comprehension would become difficult (Gangé, 1975).

The second criterion, learner impact

It referred to the learner's attitudes about the instruction and his or her achievement of the specific objectives. That is, relevance to him or her; achievable with reasonable effort and whether the experience was interesting and satisfying.

The third criterion, feasibility

It included the learner's ability, the medium of instruction and environmental instruction. Also, the rating scale in the instrument was based on specifically qualitative assessments. In any case, the evaluations were assigned numerical factors, using a Likert scale. That is, a scale of one to five, where 1 meant bad and 5 meant excellent. Thus, the data collection from the instrument and the respective value scales allowed the purpose of the evaluation to be fulfilled.

Procedure

The activities are described below in the order specified as part of the procedure for collecting the data needed for this report:

1. Permission was sought from the Head of School of the LDG academic programme to conduct the study.

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2. The application and the documents required to carry out the study were submitted to the Institutional Review Board (IRB) of the institution.
3. The instrument was applied to the subjects of the study (selected students), respecting the criteria that were framed in the structure of the virtual PE course, as well as the respective value scale.
4. Authorisation was requested from the School Management of the LDG academic programme for the application of the instrument.
5. For the application of the instrument to the subjects of the study, the Director of the School of the AP was asked for the name of four 9th semester students, two with the highest academic performance, and the other two, who were below the average performance, including their email, in order to send a letter of invitation to participate voluntarily, under all the caveats in this study and the respective anonymity.
6. A letter of invitation to participate in the study was sent to the students via email.
7. It was explained to the students that a new set of instructional materials was designed for the online strategic planning course and that their participation was required to assess their perception of it.
8. The students were informed to access the Canvas platform where the SP course was located (link provided) and asked to check the relevance of the course components under the corresponding techniques. In general, they checked the functioning of the use of the Canvas platform to work virtually. In particular, they reviewed: instructions, objectives, presentation, examples, grouping, media, participation, practice, feedback, evaluation, rubrics and follow-up activities. These components belong to the following sections of the platform: syllabus, weekly modules, assignments, audiovisual materials, forums and blogs. All with the indispensable instructional materials of the course they reviewed.
9. The students were instructed to access the link that was sent to them, which would redirect them to the questionnaire that they would answer, being as objective, critical and reflective as possible in their answers.
10. The instrument included the value scales as established in the Likert scale, which measured individual attitudes or predispositions with respect to specific concepts, through coded and selected items, as in this case (Kerlinger, Lee & Bhanthumnavin, 2002).
11. The questionnaire was completed and returned to the instructional designers within five days of receipt; their e-mail addresses were included in the instrument for clarification.
12. As soon as the questionnaires were completed by the study subjects, the data collected were processed.
13. The responses to all the constructs in the questionnaires were categorised, coded and classified.
14. The value scale defined in the instrument was considered and the data analysis proceeded to generate the following report.

3. Results

In order to present the findings, it is necessary to emphasise that the purpose of the study focused on incorporating formative assessment into the subjects of the LDG curriculum using the Dick and Carey (2015) model; with the aim of generating instructional alternatives that will strengthen the teaching-learning process of the subjects in the virtual modality. This section presents the results obtained from the evaluation of the instructional proposal related to the content, process and evaluation of the PE course. The performance of the components that made up the lesson was reviewed using the analysis technique under the Dick and Carey (2015) scheme. In that sense, specialists and students, either one-on-one or in groups, were required through an instrument that was applied to provide information to understand the implications of the responses.

It should be noted that through this analysis technique, qualitative results were obtained that allow us not only to sustain the project, but also to be in a position to make continuous improvements. Meanwhile, it should be noted that the sample population was represented by an expert in strategic planning and four students (one-to-one technique) from the 9th semester of the Bachelor's Degree in Graphic Design at a university in the State of Mexico. It should be noted that the subjects actively participated in the study.

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This intervention allowed us to observe the behaviour of the instructional materials with respect to the virtual strategic planning course. Consequently, the performance of the lesson components by the expert and the students was reviewed. The data was then analysed, classified, categorised and coded.

In general, the information came from two sources: (a) the formative evaluation protocol - expert (SME) which established a characterisation of the main components of the materials, type of learning, content, clarity and motivation; (b) the formative evaluation protocol - individual, which included 20 questions related to the main components of the materials, which were measured using the Likert scale. The analysis of the results allowed us to establish a contextual, in situ picture to understand the perception of the instructional design of the virtual strategic planning course.

3.1. Experts

For this case, as indicated, the expert based on her expertise elaborated an analysis of the components of the materials, contemplating the variables of learning, content, clarity and motivation of the course in two aspects, the context of learning and the context of performance. The latter, according to the instructor, was observed directly in correlation with the content, which is intended to operate the constructs during practice.

Summarised in the learning context, during the application of the instrument, the expert considered that the pre-instruction in relation to the topic of strategic planning was clear and obeyed a pattern of described orientations for the development of instructional activities. Consequently, on motivation, she found that there was a direct correlation between the constructivist pedagogical model and strategic planning as an object of study. He argued that there is evidence that it is the learner who, through the instructions, will have to construct his or her knowledge with the support of the subject components. He also considered that the general and specific objectives were perceived as clear, precise and congruent in relation to the design plan. Thus, the input skills and abilities were clearly exposed to certain verbal and communication orientations with the learners which would lead to learning (Mintzburg & Quinn, 1993).

In terms of presentation, the expert did not make any observations regarding sequence and size; she only suggested that the examples should be congruent with what was being presented. However, she considered that the content framed elements indispensable for the learning of the basic constructs of strategic planning to be directly related to the performance context. He argued that considering the definition of the components of planning was a first step in subsequently seeking to understand the characteristics and its component elements. This process showed that the foundations were laid for building the mission, vision and objectives of a place.

In other words, he explained that not only were the elements intended to be defined, characterised and exemplified, but it was also possible to observe that there were activities that led to measuring performance in the context of a site. Doing practicals, exercises or solving case studies showed that work was not only at an elementary level, but on the contrary, it was perceived that in each of the weekly activities of the instructional project, students were motivated to solve the cases in their workplace. This showed that there was a direct interrelationship between theory and practice. Both aspects involved observing each other in detail under the performance of the units and exercises, following up or monitoring, being relevant in order not to break this pattern of activities that would lead to achieving the goals.

On participation, he argued that practices needed to be reconfigured because the materials did not contribute to the objective of learning achievement. He pointed out that definitions needed to be operationalised to strengthen the understanding of the EP; he also mentioned that it would be necessary to look for new materials, readings or videos, which would delineate the meaning of the participations. He also commented that it was essential to develop more case studies together as requested in this course.

As a result, the feedback activities were not entirely clear. He therefore requested that the trainers or facilitators could develop some activities to enrich this area of opportunity. Meanwhile, the evaluation, particularly in the pre-test, considered that the application in the diagnostic phases, showed indispensable exercises to establish an overview of the knowledge that students would build during the course of their studies.

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He reiterated that the instrument was adequate and ideal, however, he suggested determining a new time period. With regard to follow-up activities, he noted that there was a need to instruct a summary to be produced to confirm retention and transfer.

3.2. Students

The four students who were selected were males and females aged 19-23 years old from the 9th semester of the LDG, two with the best averages of the generation and the other two with the average below average. The result of the application of both instruments, according to the 20 questions applied, determined that the input skills showed that the students were able to apply not only verbal skills but also conceptual, procedural and attitudinal skills, as presented in questions 12 to 15, which were related to these skills.

Therefore, according to the data, the students were motivated with a high degree of pragmatism. The results between the objectives and the total of the questions applied showed that they had analytical-thinking skills identified in answers 7 to 12, which allowed them to receive the proposal with enthusiasm, according to the data. In addition, according to the students, they could develop instrumental and interpersonal and technological competences, according to answer 17.

The pretest (Pretest 1 PE), had the purpose of previously evaluating the students' knowledge on the topic of strategic planning. Therefore, according to the results, the comments in general were about the questions, they considered that they were simple, concrete and easy to answer. For this reason, they recommended that the time allocated to the application of the pre-test should be less than the time proposed.

Direct responses to the instruction. In this item, the students analysed the instructions and considered that there was no inconsistency, neither in the beginning, welcome, instructors, nor the syllabus. However, during the folder sequence of the weekly activities, they considered that the activities of week one could be incorporated into week two to generate a single week of activities.

Likewise, during weeks 2, 3, 4, 5, 6 they recommended that although the instructions were in line with the objectives, the suggested activities did not meet the objectives. On the one hand, they found it confusing to follow the instructions because there were so many sequential folders for each of the objectives, sub-themes and activities. On the other hand, the activities, videos, readings, exercises and diagrams did not fulfil the purpose of the established objectives. Therefore, they recommended that the materials be corrected and that each module be described on a single page of the Canvas. The instructions could be more precise and concrete.

Learning time. No observations were found in this section.

Means of communication, procedures and materials. The means of communication were adequate, and no observations were expressed; it was mentioned that forums and blogs were essential to enrich the information. Regarding the procedures, they considered that along with the materials, they expressed confusion, since the fact of having sequential folders in the weekly activities section confused the students about the purpose of the unit.

It should be clarified that the materials that were placed on the Canvas platform, readings, videos, examples and diagrams, were intended to encourage the subjects to review thoroughly and above all the quality of the information. The goal was to obtain reliable information that would help to provide more pertinent feedback for the model. It is known that Dick and Carey's instructional design establishes processes of continuous improvement, and given the models, it was urgent to determine which one would work best during practice, as was the case here.

3.3. Focused analysis

At this point in the formative evaluation of the virtual strategic planning course instruction, it was premature to make final decisions about changes to the materials for each of the units that make up the instruction. Changes should be made based on the overall effectiveness of the instruction. Therefore, the data collected were used to create an instructional revision analysis table (see Table 1).

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The table has four parts: The component being evaluated is listed in the left-hand column, the problems identified as well as possible changes are described in the next two columns, and the last column contains the evidence used to justify the change and its source. The resources considered to complete the table were: (1) the formative-expert evaluation (SME) protocol and (2) the formative-individual evaluation protocol. It should be noted that as the designers moved through the formative evaluation process, the changes that were made to the materials had different consequences than those intended.

Instruction Review Analysis Form				
	Main material components	Problem	The proposed change in the instruction	Evidence and Reference
1	Preinstruccional Pre-instructional			
	Initial motivation	None	None	Checklist elaborated by the expert (CEE) Students questionnaries
	Objectives	None	None	
	Skills of training	None	None	
2	Presentación			
	Sequence	Confusion to follow the instructions, due to the number of folders presented	Integrate all the contents of each module or unit, in a single Canvas page.	Students questionnaries
	Unit size	None	None	Checklist elaborated by the expert (CEE)
	Content	None	None	
	Examples	Lack of congruence between examples (readings, videos, and diagrams) proposed and the objectives set	Add more specific examples (readings, videos, and diagrams) that contribute complement to the achievement of the objectives.	Checklist elaborated by the expert (CEE) Students questionnaries
	Procedures	Confusion to follow the instructions and find the correct materials, due to the number of folders presented	Integrate all the contents of each module or unit, in a single Canvas page.	Students questionnaries
	Materials			
3	Participation			
	Practice	Lack of definitions	Include definitions in the practices that contribute to their understanding	Checklist elaborated by the expert (CEE)
		Complexity in the location of the folders with audiovisual materials, readings, diagrams, and examples.	Integrate all the audiovisual materials, readings, diagrams, and examples, of each module or unit in a single Canvas page.	Students questionnaries
		Confusion and complexity in the presented materials Difficulting the coherence and comprehension of the material with the requested activities	Add more specific materials (readings, videos, and diagrams) that contribute to the achievement of the objectives.	Students questionnaries
	Feedback	Lack of clarity in feedback activities	Specify feedback activities	Checklist elaborated by the expert (CEE)
4	Evaluation			
	Pretest	Too much time allocated to development	Decrease the time required to fill the product.	Checklist elaborated by the expert (CEE) Students questionnaries
	Postest	None	None	
5	Follow-up			
	Retention, transference, and context of action	The proposed activities will not achieve the impact in the context of action	Include the development of a summary or essay that allows the confirmation of the impact on the students context of action.	Checklist elaborated by the expert (CEE)

Table 1 Instruction Review Analysis
Source: Own Preparation

4. Discussion

According to the authors Dick and Carey (2015), the strategy of reviews reflects systematic thinking, as logic is applied in some processes linked to the problems identified in each of the components. This is why the following approaches are presented in an orderly manner and relevantly informed by observations made before, during and after the instructional project.

4.1. Design decisions

The design of this virtual strategic planning course arose directly from a performance problem that directly involved students of a bachelor's degree course at university level. In this sense, an instructional goal was proposed as an alternative solution, however, during the development of the instructional procedures it was found that despite being an administrative issue, there were problems in the instructional design.

Therefore, the recommended strategy should perfectly align the components to be designed. That is to say, to prepare the instructions perfectly based on the skills and abilities, to establish whether or not to do a pretest and post-test. Verify the attitudes to be developed, as well as the clarity and sequence of the instructions. The above depends on obtaining data that measures individual performance, which in turn can be compared with the actions and objectives set (David, 2003).

Instructional materials

It is recognised that in this area related to the media, although a mechanism was established to obtain truthful information and continuous improvement, the necessary care was not taken to incorporate audiovisual materials, readings, exercises and diagrams in accordance with the instructions and the general and specific objectives. So it has become clear that the Canvas platform has been restructured along with most of the components. It was incorporated in the way it was suggested by the experts and learners.

4.3. Instructional procedures

The procedures that were established are based on the proposed methodology, so the recommendation has been that the objectives should be monitored closely to ensure that they are fully met. Throughout the process, it is necessary to monitor the behaviour of the instructions to avoid confusion on the part of the participants. It should be noted that during the reviews, there were no indications of misunderstanding, but rather it was recommended that the instructions be made more concrete.

4.4. Means of communication and delivery system

In this case, the means of communication used were those recommended in accordance with the instructional model adopted. The Canvas platform that was used generated the necessary means of communication to fulfil the instructions either in the forums or in the blogs. As is known, forums promote the formation of discussions on the topics as intended. Blogs have been created so that students have permanent access to the ideas of both individuals and groups and thus provide feedback on the topics.

Meanwhile, the course emails fulfil the commitment to maintain permanent communication between the instructors, the learners and the group itself.

4.4.1. Resources

According to the course design, it has not been essential to make any recommendations related to funds, staff, facilities or equipment; however, with regard to time, it has been proposed that it should be a course of no more than 5 weeks, with a duration of approximately 30 minutes per session as indicated in the input instructions. For this, there is no particular recommendation, but rather it is indicated that the time is adequate.

Finally, it is considered by technique that the final review of the materials should be effective in achieving the intended learning with the members of your target audience. If that is so, then you are in a position to be ready to reproduce, publish, or configure the instruction of this course for electronic distribution.

5. Conclusions

This study focused on incorporating formative assessment into the subjects of the LDG curriculum using Dick and Carey's (2015) model; to generate instructional alternatives to strengthen the teaching-learning process, particularly focused on the virtual course of the strategic planning subject. In this sense, it first becomes evident the need to develop a strategy focused on incorporating formative assessment into the learning units, where each of the components to be designed must be aligned. In such a way that the instructions are clearly specified based on skills and abilities. As well as considering the skills, abilities and attitudes to be developed and, not least, clarifying the sequence of instructions.

Secondly, it is confirmed that formative assessment contributes to the strengthening of virtual teaching-learning processes, considering that students' competences are improved by means of permanent assessments, as well as contributing to greater participation in class.

Thirdly, it is worth highlighting the advantages of applying formative assessment for the development of significant learning in virtual courses:

a) there is control of when and what is learned; b) a broad vision of the students' training, feedback on learning not achieved, verifying whether the student has the capacity to apply what they have learned; c) development of strategies for the improvement of teaching processes in the virtual modality.

Consequently, formative assessment facilitates the development of competences, the achievement of curricular standards, as well as the significant learning proposed. The limitations of the study were linked to the availability of the participants, as well as the estimated time needed to obtain the information. Finally, the formative evaluation report was developed and presented throughout the process as a guide for the development of the virtual course, with the purpose of improving the plan and the required results before its implementation.

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