SIEVAS. Plataforma Informática Facilitadora en la Mejora Continua de la Educación Superior

SIEVAS. Platform Computing Facilitator in the Continuous Improvement of Higher Education

SIEVAS. Platform Computing Facilitador Melhoria Contínua no Ensino Superior

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Resumen

La plataforma informática denominada: "Sistema de Evaluación de Acreditación y Seguimiento (SIEVAS) para la Educación Superior", es una herramienta construida y utilizada para facilitar en las Universidades los procesos de evaluación continua de tipo cíclico y circular, para fines de acreditación internacional en programas de pregrado y postgrado. SIEVAS es utilizada en la organización y Generación de Recursos para la Acreditación en las Naciones de América (GRANA). Está compuesta por 10 elementos fundamentales: el contexto científico, las referencias bibliográficas, las secciones FODA (fortalezas, oportunidades, debilidades y amenazas), las tablas estadísticas, un sistema decimal para asignación de la calidad, gráficas para

procesos y estados de la calidad; laboratorios de monitoreo continuo para impulsar la calidad permanente, manuales de operación, el foro permanente para evaluadores, y la metaevaluación. Esta plataforma fue construida a lo largo de 20 años mediante procesos complejos de análisis y discusión con expertos en distintas áreas del conocimiento que van desde educadores, antropólogos, informáticos, abogados, sociólogos, hasta ingenieros. Fue registrado el código fuente ante el Instituto Nacional del Derecho de Autor (INDAUTOR) de México, el 24 de septiembre de 2013. Esta herramienta ha sido utilizada en procesos de evaluación en Universidades de Centro, Sur y Norteamérica por más de 100 evaluadores en 50 programas educativos de diversos niveles y disciplinas.

Palabras claves: SIEVAS, evaluación interna, evaluación externa, mejora continua, escala decimal.

Abstract

The computing platform called: "Evaluation Accreditation and Monitoring System (SIEVAS by its name in Spanish) for Higher Education", it is a tool built and used to facilitate the processes of continuous evaluation of cyclic and circular type, for purposes of international accreditation in undergraduate and postgraduate programs in universities. SIEVAS is used in the organization and Generation of Resources for Accreditation in Nations of the America (GRANA). Consists of 10 fundamental elements: the scientific context, references, sections SWOT (strengths, weaknesses, opportunities and threats), statistical tables, system decimal for allocation of quality graphics for processes and States of quality; laboratories of continuous monitoring to promote permanent quality, operation manuals, the Permanent Forum for evaluators, and the meta-evaluation. This platform was built over 20 years through complex processes of analysis and discussion with experts in different fields of knowledge ranging from educators, anthropologists, computer scientists, lawyers, sociologists, to engineers. This tool has been used in evaluation at Universities of Central, South and North America by more than 100 evaluators in 50 educational programs of different levels and disciplines.

Key words: SIEVAS, internal evaluation, external evaluation, continuous improvement, decimal scale.

Resumo

Plataforma de computação chamado de "Sistema de Avaliação de Credenciamento e Monitoramento (SIEVAS) para o Ensino Superior" é uma ferramenta construída e utilizada para facilitar as Universidades processa avaliação contínua da cíclico e circular para fins de acreditação internacional programas de graduação e pós-graduação. SIEVAS é utilizado na organização e Geração de Recursos de Acreditação nas Nações Americanas (Grana). É composto por 10 elementos básicos: o contexto científico, as referências, as seções SWOT (forças, fraquezas, oportunidades e ameaças), os quadros estatísticos, um sistema decimal para gráficos de qualidade de mapeamento de processos e estados de qualidade; laboratórios de monitoramento contínuo para promover a qualidade consistente, manuais de operação, o fórum permanente para os avaliadores, ea meta-avaliação. Esta plataforma foi construída ao longo de 20 anos através de complexos processos de análise e discussão com especialistas em diferentes áreas do conhecimento que vão desde educadores, antropólogos, cientistas da computação, advogados, sociólogos, para engenheiros. Foi gravado o código fonte para o Instituto Nacional de Copyright (INDAUTOR) do México, em 24 de Setembro de 2013. Esta ferramenta tem sido utilizada em processos de avaliação em universidades Central, do Sul e América do Norte há mais de 100 avaliadores 50 programas educacionais de vários níveis e disciplinas.

Palavras-chave: SIEVAS, a avaliação interna, a avaliação externa, a melhoria contínua, escala decimal.

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1. Introduction

Assessment in higher education processes occupy a special place among the research and educational practice, constituting a basis for institutional decision making between theory and practice associated with the policies and strategies of Higher Education Institutions in the search for particularly improve the quality and relevance of its educational programs focused on the evaluation of the results, needs assessment, process evaluation and the evaluation of its programs. Traditionally, assessment processes carried out in educational programs or careers of the universities for the purpose of accreditation, are conducted through face-to-face procedures

and processes a considerable percentage, resulting in a lapse of a year to cover all phases of the process, such as: the construction of self-assessment or internal evaluation, external evaluation, external assessors visiting the evaluated institution and the external evaluation delivery of results. Regularly the evaluation is performed by an external entity called: "accreditation evaluation council", "evaluating accrediting agency" or "accrediting evaluation committee". Each entity has specific criteria and indicators to perform evaluations in accordance with national contexts associated with policies established in ministries and secretariats of education.

When an institution of higher education aspires to recognition of accreditation beyond the national context, there are two options to choose: undergo an evaluation using criteria from another country (foreign evaluation) or submit to an international evaluation whose evaluation criteria are associated with policies of international established organizations (UNESCO, OECD, World Bank, WTO)[1], product of the result of different spaces of scientific analysis on the issue of the quality of higher education: conferences, forums, congresses, international chairs, that guide the assessment in a vision and global prospection. GRANA[2] it is an international accreditation body whose headquarters are located in the city of Albuquerque, New Mexico, United States. The scientific and technological support of GRANA is based on the platform called Evaluation Accreditation and Monitoring System (SIEVAS by its name in Spanish) for the continuous improvement in Higher Education. This platform is evaluated and selected constantly by academic experts from 25 countries on three continents (America, Europe and Middle East), using the observatory located in SIEVAS platform as shown in Figure 1.

The amount and type of information requested on assessment processes varies according to criteria and indicators linked to the social, economic and cultural contexts, each evaluator agency in each country or region.[3].

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[1] Mendoza Rojas, Javier. Evaluación, Acreditación, Certificación: Instituciones y Mecanismos de Operación en: Políticas Públicas y Educación Superior, México, ANUIES, 1997, p. 315.

[2] www.certification-grana.org.

[3] www.ets.org/highered/accrediting

Figure 1. Observatory of the SIEVAS platform.
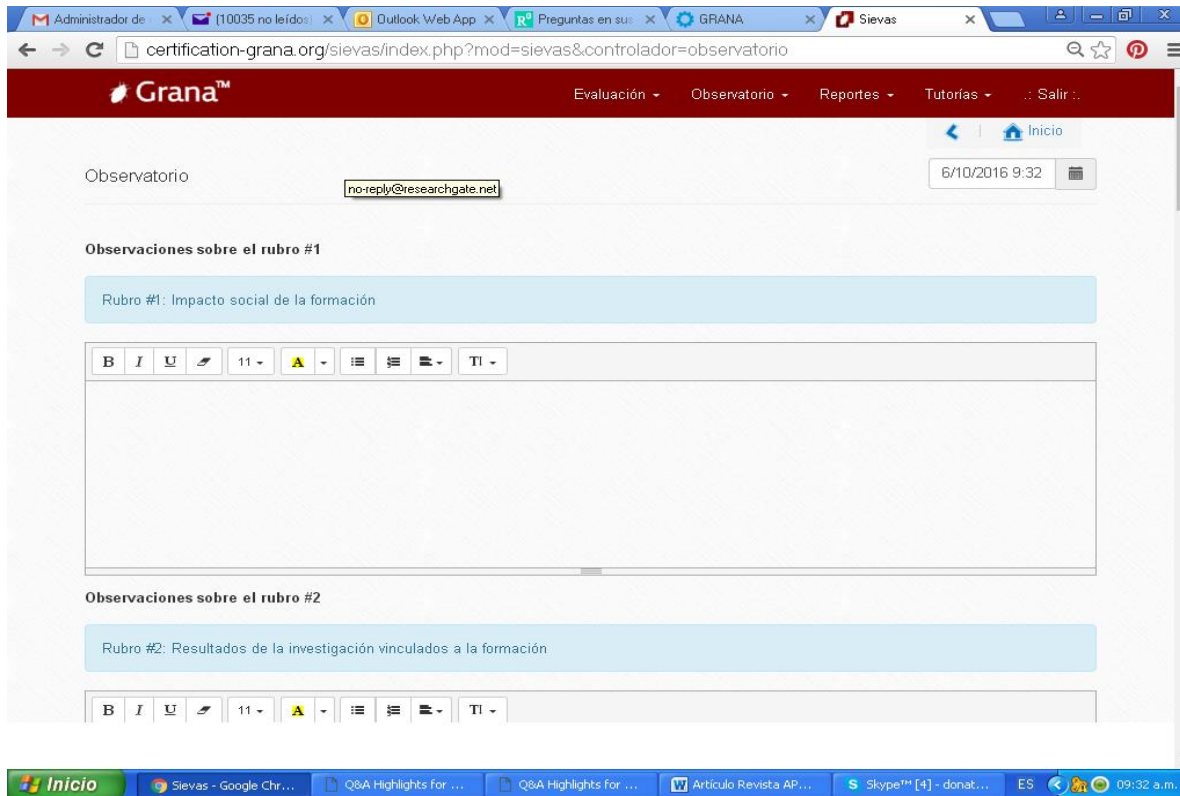
The evaluation phases are invariably initiated by the self-assessment, also called internal evaluation, carried out by an Internal Evaluation Committee (IEC) of the evaluated institution, composed of teachers and managers of the educational program, in some cases a student is included; Of this committee a coordinator is chosen that allows to guide the internal process of the evaluation. The work mechanics of this phase begins with the training of the Internal Evaluation Committee to interpret indicators, processes and procedures, integrates the matrix of strengths, weaknesses, threats and opportunities (SWOT analysis) of the Education Program, as well as information Statistics and the evidentiary documents or evidences required by each indicator or item established by the external evaluating entity. Subsequently, an External Evaluation Committee (CEE) is called "evaluating pair" composed of three academics whose profile is associated with the discipline of the program to be evaluated, which is selected according to the criteria and policies established by the evaluating entity. The coordinator of the EWC is one of the three evaluators and can be chosen by the committee itself or by the external evaluating body. This committee is previously trained to operate the evaluation process based on the criteria, processes and procedures of the external evaluation body. Once the CEE is trained, the external evaluation is initiated, verifying and analyzing in principle the internal evaluation,

which is verified visiting the evaluated institution. Among the activities of the visit are interviews with students, teachers, managers, workers, graduates, employers and managers of organizations and institutions linked to the educational program, making more approximate the appreciation, academic and administrative status of the program evaluated with the criteria And indicators of the external evaluator. Subsequently, a comprehensive report of the external evaluation called "results report" is integrated.

It is very usual for the external evaluation entity to have four types of opinions according to the level of quality that external evaluators consider: five-year accreditation, for three years, a program that is either registered or not accredited. Obviously, the longer the period of accreditation, the higher the quality and vice versa. An emplaced program is conceived as that program that requires a basic minimum of quality compliance and is given a time to comply with the minimum, which goes from three months to six months. When the educational program is not accredited, the institution is instructed to at least meet a minimum level of quality and the times are indicated to request its evaluation again. As part of the deliverables of the external evaluation entity is the certification issued by the external evaluation board, in addition to the final opinion of the external evaluation indicating the recommendations, observations and proposals, to be attended by the evaluated institution. The process that begins with the internal evaluation and concludes with the delivery of external evaluation results has a duration of one year. On the other hand, it is very common the existence of a vacuum in the follow-up of attentions in the observations and recommendations issued by the external evaluation, a disinterest of the institution evaluated by obtaining the accreditation and compliance with the policy or educational policy Of the state, in the continuous and objective improvement of the educational program, accentuating itself more this phenomenon in the public institutions.

The evaluating agencies GRANA and SIEVAS were ideas and conceptions obtained in different working meetings between academics of the University of Guadalajara and the University of New Mexico[4] in Albuquerque, New Mexico, United States. It begins in a workshop organized by the Ibero-American Consortium for Science and Technology Education (ISTEC) and the United Nations website of the United Nations in February 1996, during a visit To the ISTEC headquarters[5], being one of the objectives of this consortium to promote research, innovation and

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[4] https://www.unm.edu/
[5] http://www.istec.org/

the development of science and technology in Latin America, part of this objective was the application of evaluation processes in ISTEC member universities, to diagnose the state of the Relevance, quality and innovation of Higher Education in the Ibero-American region in educational engineering programs. One effect of this purpose was the creation of Engineering for the Americas (EftA[6] por sus siglas en Inglés) Of ISTEC, promoted by the Organization of American States (OAS).

2. IMPACT

GRANA and SIEVAS have succeeded in impacting 50 undergraduate and postgraduate educational programs evaluated in Central America, South America and North America, with the participation of 91 external evaluators from 25 countries on three continents, as shown in Table 1.

Table 1: Educational Programs evaluated by GRANA's SIEVAS

País	Universidad	Número de Programas Educativos Evaluados	Número de Evaluadores externos	Origen de los evaluadores externos
Ecuador	Universidad Técnica Particular de Loja	1	4	Estados Unidos y México.
Colombia	Universidad de Cundinamarca	1	4	Estados Unidos y México.
México	Universidad Autónoma de Nuevo León	5	20	Estados Unidos, España, Brasil, Colombia, Argentina, Perú, Venezuela, México, Inglaterra y Canadá.
México	Universidad de Guadalajara	40	57	Israel, Estados Unidos, Canadá, México, Cuba, Venezuela, Colombia, Ecuador, Panamá, Perú, Chile, Uruguay, Paraguay, Argentina, Bolivia, España, Portugal, Italia, Francia, Austria.
El Salvador	Universidad Gerardo Barrios	3	6	España, Italia, Estados Unidos, y México.

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[6] http://portal.oas.org/default.aspx?tabid=566&language=en-us

Also, it has been proposed that GRANA and particularly SIEVAS be implemented in the International Federation of Schools and Engineering Institutions (IFFES), the Latin American and Caribbean Engineering Institutions Consortium (LACCEI) English), and at the International Workshop of the Global Innovation Network for Entrepreneurship and Technology (GINET) in the United States at the University of Massachusetts in the United States through Webinar, and at the Organization of American States , In 30 congresses, forums and workshops inside and outside Mexico.

There is a record of 600 people participating in the creation of SIEVAS under the coordination of Dr. Donato Vallín as shown in the sample in Table 2.

Table 2: Sample of participants and initial collaborators in the creation of SIEVAS.

Participante	Perfil disciplinar	Institución de origen y país
Donato Vallín González	Doctor en Ciencias de la Educación.	Universidad de Guadalajara, México.
William Moreno	Doctor en Electrónica.	Universidad del Sur de Florida, Estados Unidos
Jorge García	Doctor en Educación.	Universidad de Nuevo Mexico, Estados Unidos.
Ramiro Jordan	Doctor en Redes Computacionales.	Universidad de Nuevo Mexico, Estados Unidos.
Luis Jorge Jaramillo	Doctor en Ingeniería Electrónica.	Universidad Técnica Particular de Loja, Ecuador.
Mónica Luque	Doctorado en Educación.	Universidad de Córdoba, Argentina.
Rubí Dalia Palomera Quiñonez	Maestría en Ingeniería de Proyectos.	Universidad de Guadalajara, México.
Fabián Rosas	Ingeniería en Teleinformática.	Universidad de Guadalajara, México.
Oscar López	Analista.	Universidad de Guadalajara, México.
Jesús D. Medina	Historiador , Sociólogo Y Educador .	Universidad de Guadalajara, México.
Claudia Aponte	Experta en Internacionalización de la Educación superior .	Universidad de Medellín, Colombia.

Through the experiences gained in international academic areas, GRANA and SIEVAS have been pioneers in creating a culture of continuous improvement of quality, relevance and innovation in Educational Programs under the application of elements that significantly allow to overcome the efficiency and applied efficiency In training processes from the evaluation of the results, the evaluation of the needs, the evaluation of the process, to the evaluation of the

programs with an innovative international dimension based on a cyclical and circular model as shown in Figure 2, which allows to form An ecosystem of quality and continuous relevance at the level of the different users: internal evaluators, external evaluators, evaluated institutions and the GRANA organization itself in its tools and virtual sections of SIEVAS.

Figure 2. Cyclic and circular model for permanent improvement.
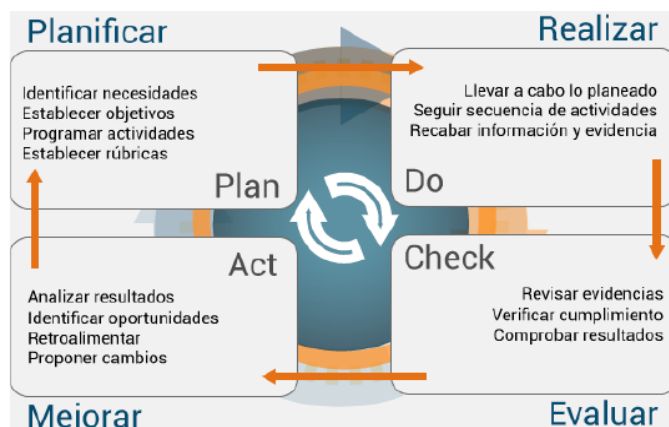
Regarding the use of SIEVAS, a comparison was made between the traditional (national or foreign) evaluation of external evaluators and the international evaluation of GRANA using the SIEVAS system as shown in Table 3, concluding the importance Which has to carry out the evaluation processes with updated models and models of international vision created by academic experts in the field of quality of higher education from 25 countries and three continents.

Table 3. Comparison between the traditional evaluation and the GRANA evaluation of SIEVAS

Tipo de Proceso o Procedimiento de la evaluación	Evaluación Tradicional	Evaluación en SIEVAS de GRANA
1. Criterios de evaluación con contenido científico.	Evaluación local, basada en contexto normativo y de políticas educativas de gobierno.	Evaluación internacional, basado en políticas internacionales de la UNESCO, OEA, OCDE, OMC, Proceso de Bolonia, Banco Mundial y referencial bibliográficas mundiales
2. Integración FODA.	Integración de información cuantitativa con indicadores de primera generación.	Integración de información cualitativa y cuantitativa con indicadores de primera segunda y tercera generación de cada ítem
3. Información Estadística.	Información estadística asociada a numeraria oficial y llenado en formato impreso.	Información estadística asociada a numeraria oficial y de vinculación con entorno internacional integrada en línea y en tiempo real en la plataforma SIEVAS
4. Gráficas dinámicas para análisis de la calidad en línea y en tiempo real.	No se tiene registro.	Cuenta con 150 gráficas dinámicas para análisis de la calidad en línea y en tiempo real
5. Monitoreo continuo para el avance en la calidad.	No se tiene registro.	Cuenta con laboratorios de monitoreo continuo para el avance en la calidad en línea y en tiempo real
6. Manuales de procesos y procedimientos.	Cuentan con manuales impreso y en algunos casos en formato electrónico.	Cuenta con manuales instalados en la plataformas del SIEVAS para bajarlos o consultarlos en línea y en tiempo real
7. Foros de análisis para evaluadores internos y externos.	Se realizan presencialmente.	Se realizan por videoconferencias y por medio de la plataforma SIEVAS
8. La mejora continua de la entidad evaluadora externa.	Se da bajo criterios y momentos particulares.	Se da permanentemente mediante el modelo de GRANA: circular y cíclico
9. Aplicación de la metaevaluación.	Se aplica en algunas entidades de evaluación externa.	Se aplica invariablemente en cada evaluación y de manera constante
10. Origen de los evaluadores.	Evaluadores externos provenientes de país específico asociado al país de origen de la entidad evaluadora externa.	Evaluadores externos provenientes de 5 continentes. Evaluadora externa, con nivel de doctorado y con experiencia en procesos de evaluación

This comparative assessment shows the benefits of having the option of being evaluated by GRANA from educational programs to an institution of higher education.

3. ELEMENTS THAT COMPETE THE SIEVAS PLATFORM

The SIEVAS is composed of 10 interrelated elements or sections:

a)   Decimal evaluation system: 10 dimensions or items, 100 items, 1000 quality indicators of first, second and third generation.

b)   Meaning of dimensions.

c)   Scientific context and prospective dimensions scenarios.

d)   Bibliographic support.

e)   Tutorial support.

f)   Code of Ethics.

g)   Statistical section.

h)   Decimal scale for the assignment of levels, quality sub-levels and dynamic graphs.

i)   Laboratories of continuous monitoring of the quality.

j)   Section for reaccreditation.

a) Decimal evaluation system: 10 dimensions or items, 100 items, 1000 quality indicators of first, second and third generation

The dimensions or items in which the evaluation is divided are: social impact of training, research results linked to training, income, permanence and terminal efficiency in training, teachers linked to training, relevance of the educational model, methodological strategies Of learning in the training processes, infrastructure, equipment, technologies and bibliography in training, impact of extension activities, linkage and diffusion in training, international recognition of training, impact on the relevance of regulations, Finance as facilitators in training. This is shown in Figure 3 taken from the SIEVAS platform.

Figure 3. Dimensions or items

In turn each dimension is made up of 10 items as shown in Figure 4.

Figure 4. Section of 10 items in each dimension
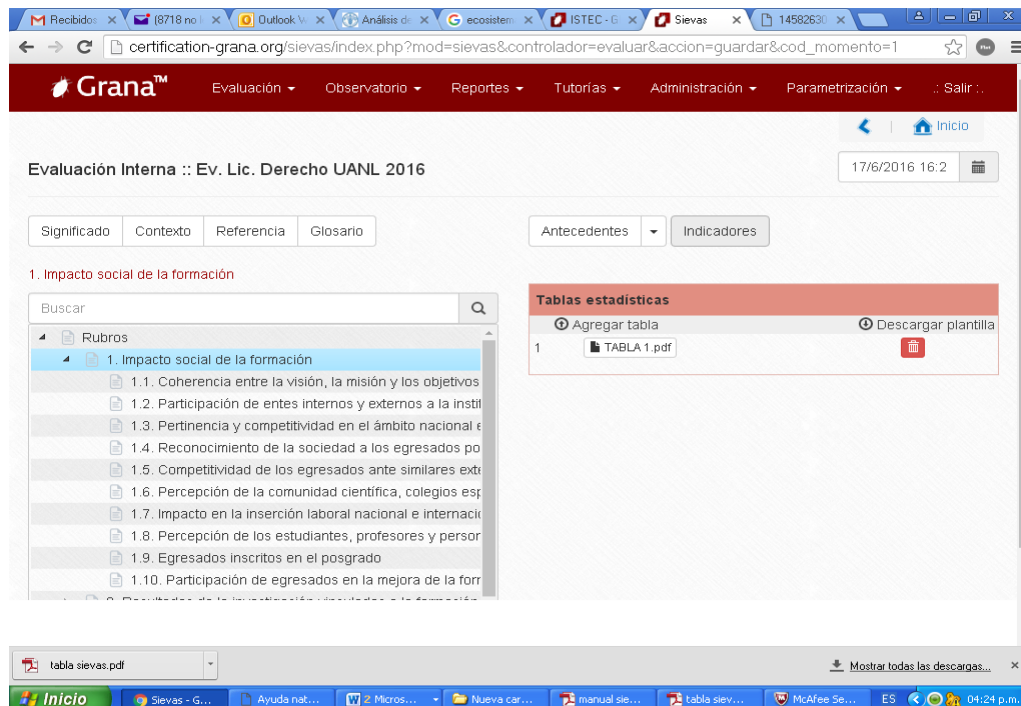
These quality indicators provide timely information on the information requested to the CEI, which in turn will require its analysis by the EWC, for which 10 indicators are assigned per item as shown in Figure 5, taken from the SIEVAS platform.

Figure 5. Assignment of 10 indicators per item
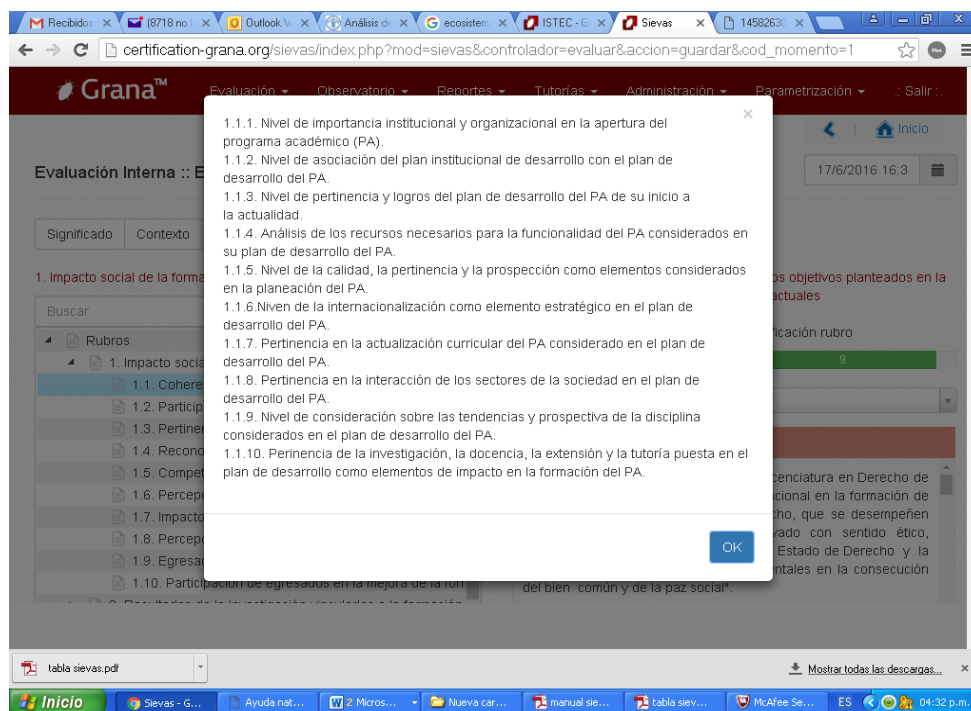
In summary, there are 1000 indicators of first, second and third generation that allow to know in a timely manner the information requirements of the educational program evaluated.

b) Meaning of dimensions

SIEVAS has several support tools to facilitate the development of internal and external evaluations, to specify the information requirements that are requested in each dimension, such as the meaning section, shown in Figure 6.

Figure 6. Meaning of dimension
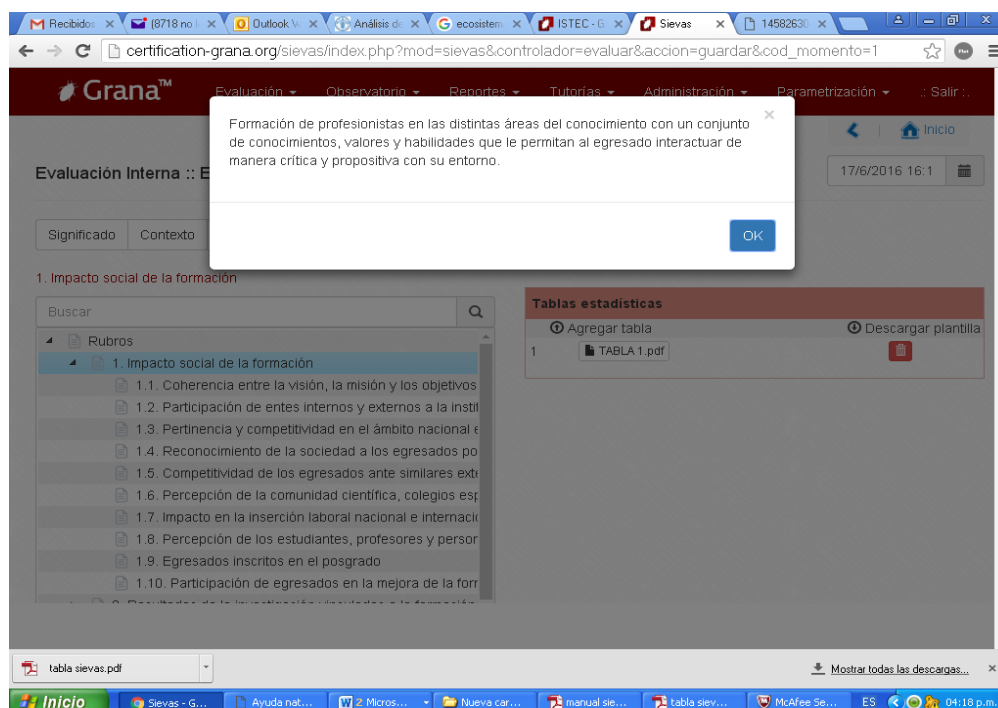
c) **Scientific context and prospective scenarios of the dimensions**

Another support tool is the contextual consultation by dimension that serves to clarify the idea and guideline of the evaluation from an international perspective linked to the results, strategies, policies of the different international organizations of prestige and of the different circles, means and forums Scientific studies on the quality of higher education from the present to possible prospective scenarios and trends in the development and requirement of higher education, as shown in Figure 7, taken from the SIEVAS platform.
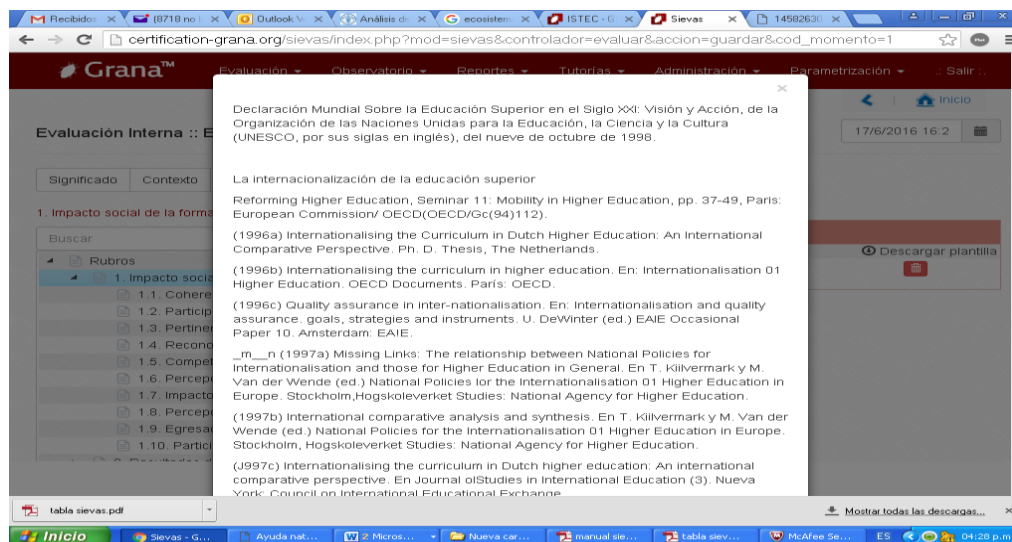
Figure 7. Scientific context of the dimension
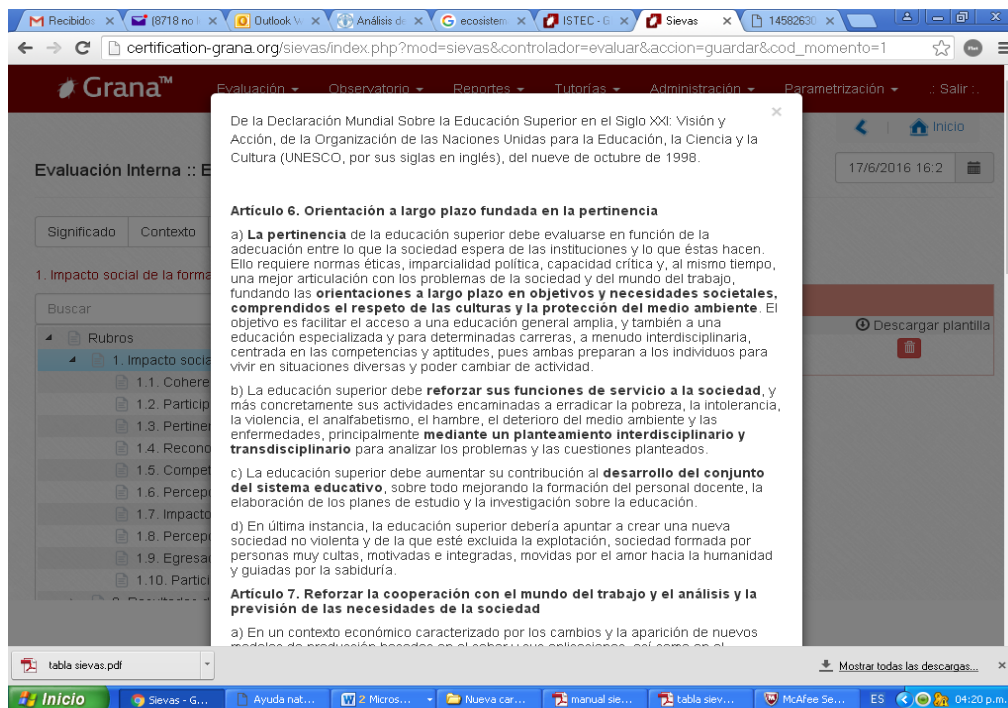

d) Bibliographic support

For complex evaluation processes, the bibliography section, which is an extension of the context section, is available and allows a significant extension of basic bibliographic elements for evaluation processes, as shown in Figure 8.

Figure 8. Bibliographic references

SIEVAS also has a glossary that facilitates the understanding of terms in the processes and procedures of evaluations among multinational evaluators, as shown in Figure 9.
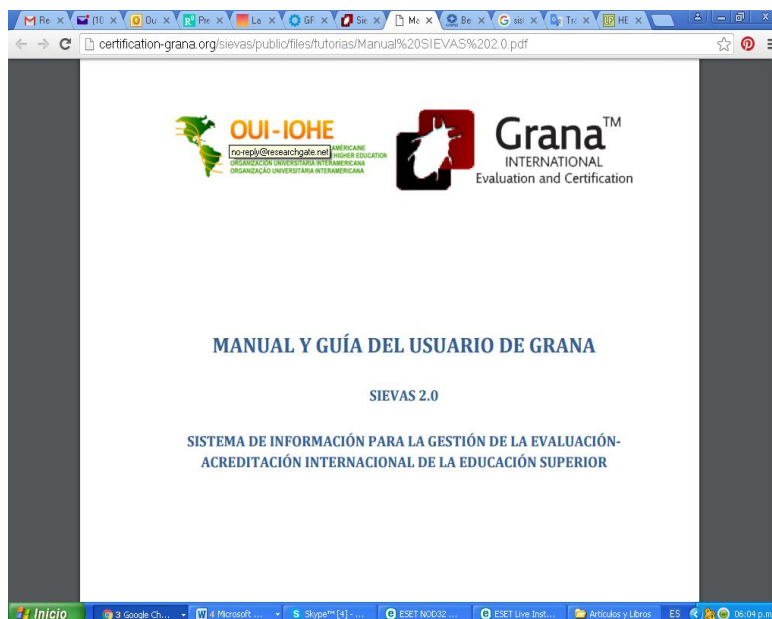
Figure 9. Glossary
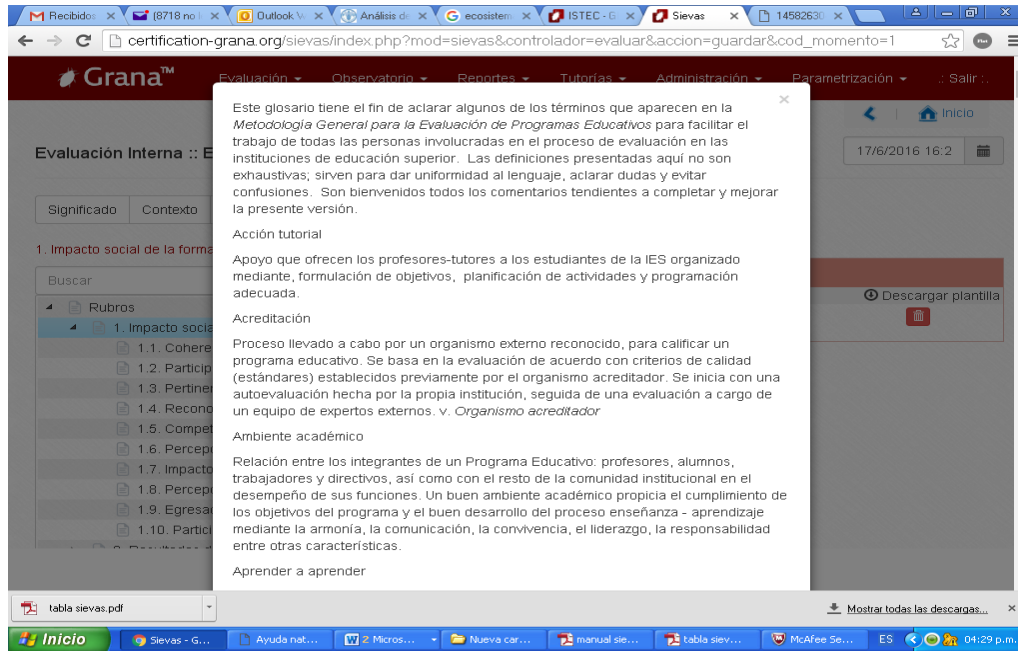
e) **Tutorial support**

An operating manual is provided as a facilitator for the user. See Figure 10.

Figure 10. SIEVAS manual

f) Code of Ethics

There is also a code of ethics that allows the users of the SIEVAS platform to be made aware of the evaluation processes so that, in the exercise of their evaluation activities, it is always based on honesty, legality, justice and morality, with the objective That their work be committed, formal, neutral and impartial, in order to locate the process for the benefit of the institution of higher education or program evaluated (Figure 11).
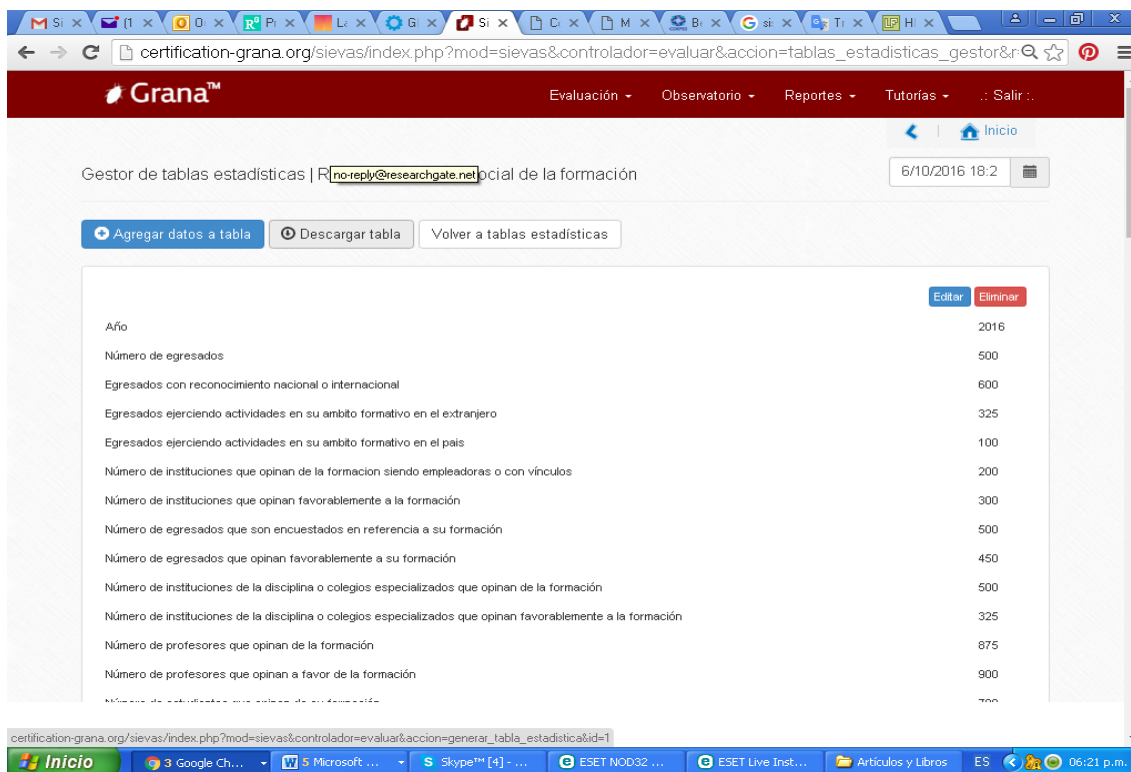
Figure 11. Code of ethics
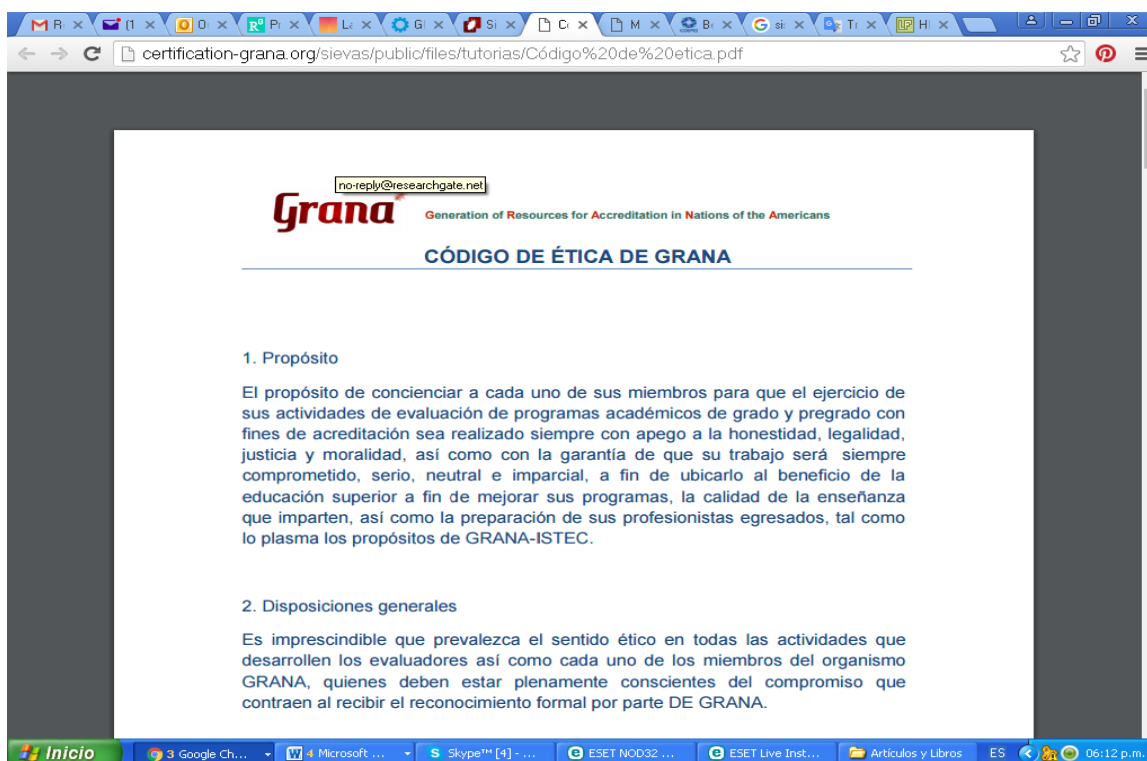
g) Statistical Section

Each of the 10 dimensions is composed of formats or statistical tables that allow quantitative knowledge of the educational program evaluated as shown in Figure 12.

Figure 12. Statistical tables

**h) Decimal scale for the assignment of levels, quality sub-levels and dynamic graphs**

The decimal scale for qualitative and quantitative measurement refers to levels of capacity, competitiveness, relevance, coverage, and innovation of the educational program or institution evaluated, establishing the quality values associated with the value judgment granted by the internal evaluators and External. The scale is seen at levels and sub-levels in Figure 13.

Figure 13. Decimal scale of quality in levels and sub-levels.

|	NIVELES		
	BAJO	**MEDIO**	**ALTO**
SUB-NIVELES	0.1-1 Muy escaza la calidad	3.1-4 Poco incipiente la calidad	6.1-7 Incipientemente alta la calidad
	1.1-2 Escaza la calidad	4.1-5 medianamente incipiente la calidad	7.1-8 Medianamente alta la calidad
	2.1-3 Medianamente escaza la calidad	5.1-6 incipiente la calidad	8.1-9 Alta la calidad
			9.1-10 Muy alta la calidad

Likewise, SIEVAS quality levels and sub-levels have dynamic graphics that allow the online and real-time visualization of the level of quality with which the internal and external evaluation of the Academic Program (PA) is developed, as shown in Figure 14: the circle to the center of red represents the low level, the centric yellow circle represents the average level of quality, and the last circle of green represents the high level of quality, the blue section represents the strengths of the evaluated PA , While the area not covered in blue are PA opportunities.

Figure 14. Quality chart
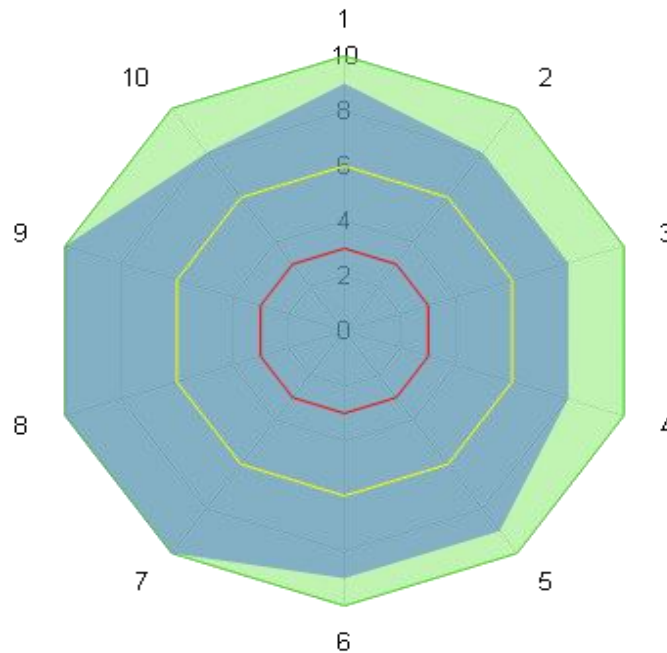
i) Continuous quality monitoring laboratories

Continuous quality monitoring laboratories are applied computer technology that allows the institution or academic program evaluated instantaneously by means of a digital device, such as smartphone, tablet, laptop or fixed computer as can be seen in the Figure 15.

Figure 15. Continuous quality monitoring
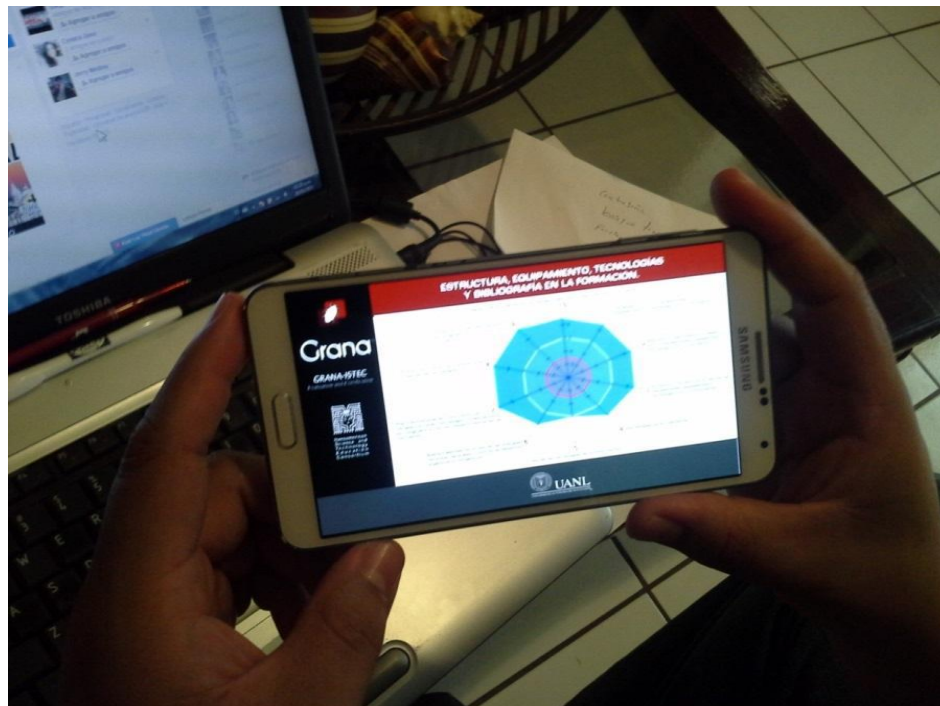
j) Section for accreditation

The re-evaluation for re-accreditation purposes, as mentioned above, is a phase that is applied as part of the continuous or continuous improvement process of the academic program evaluated in the search for assurance and impetus to its quality and relevance, and the model is applied Circular and cyclic. SIEVAS has the technology and the tools to carry out permanent and continuous processes as often as required.

3. CONCLUSIONS

The continuous use of SIEVAS allows, as mentioned and demonstrated in this article, to create a culture of continuous improvement of quality, relevance and innovation in educational programs under the application of elements that significantly allow to overcome the efficiency and effectiveness From evaluation of results, needs assessment, process evaluation and evaluation of programs with an innovative international dimension as shown in Table 4.

Table 4: Conclusions on the processes and approaches of the traditional evaluation and GRANA evaluation using the SIEVAS.

Proceso y Enfoques de la evaluación	Evaluación tradicional	Evaluación GRANA usando SIEVAS
Evaluación de los resultados.	La institución evaluada conoce los resultados hasta 12 meses después de haber iniciada la evaluación.	La institución evaluada conoce los resultados en 100 días después de haberse iniciada la primera evaluación, mientras que en futuras revaluaciones es permanente el conocimiento del nivel de calidad.
Evaluación de las necesidades.	Las necesidades de un programa educativo se asocian a indicadores locales.	Las necesidades de un programa educativo se asocian a indicadores internacionales y nacionales.
Evaluación del proceso.	En ocasiones es aplicada la metaevaluación del proceso de evaluación.	Se aplica invariablemente la metaevaluación.
Evaluación de los programas.	Los programas institucionales que apoyan el programa educativo evaluado cada 5 años o en cada periodo en que es evaluado se asocian.	Los programas institucionales que apoyan el programa educativo se mantienen constantemente vinculados ya que el modelo de GRANA y la plataforma del SIEVAS actúan como facilitadoras permanentes en la mejora continua.

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