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**TRABAJO DE GRADO PREVIO A LA OBTENCIÓN DEL
TÍTULO DE INGENIERO EN SISTEMAS COMPUTACIONALES**

ARTÍCULO CIENTÍFICO (INGLÉS)

TEMA

**INTEGRACIÓN A MOODLE DE LA METODOLOGÍA DE EVALUACIÓN DE DESTREZAS CON
CRITERIO DE DESEMPEÑO PROPUESTA POR EL MINISTERIO DE EDUCACIÓN DEL ECUADOR COMO
INSTRUMENTO DE EVALUACIÓN ACADÉMICA.**

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Moodle Integration Methodology Skills Assessment with Performance Criteria proposed by the Ministerio de Educación del Ecuador and

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Abstract. *The Ministerio de Educación of Ecuador, in an effort to improve the quality of education, is applying a teaching-learning which aims to develop and empower the students, skills in each of the academic areas. Mastering an action by the students and the choice of the skills to be developed by teachers, is leading to new strategies and tools to raise standards of quality in education.*

This article discusses how working skills development model in our educational system, in addition to the project description where a tool for evaluating teaching skills is provided, taking advantage of Moodle, a learning management system widely used and with excellent options for customized.

Keywords

Moodle, Skills, Assessment, Virtual, Plugins.

Resumen. *El Ministerio de Educación del Ecuador, en su afán de mejorar la calidad de la educación, se encuentra aplicando una metodología de enseñanza-aprendizaje en el cual pretende desarrollar y potencializar en los estudiantes, destrezas en cada una de las áreas académicas. El dominar una acción por parte de los estudiantes y la elección de las destrezas a desarrollar por parte de los docentes, es lo que lleva a buscar nuevas estrategias y herramientas para elevar los estándares de calidad en la educación.*

En este artículo se detalla la forma como trabaja el modelo de desarrollo destrezas en nuestro sistema educativo, además de la descripción del proyecto en donde se brinda una herramienta al docente para la evaluación de destrezas, aprovechando las ventajas de Moodle, un gestor de contenidos de aprendizaje ampliamente utilizado y con excelentes opciones para personalizarse.

Palabras Clave

Moodle, Destrezas, Cuestionario, Virtual, Plugins.

1. Introduction

The Ecuadorian teacher has no technological tools that can integrate assessment with Performance Criteria Skills, leading to perform the evaluation manually. Although there are third-party applications to evaluate online quizzes, these do not meet the specific needs of our current educational system.

Teachers offer different ICT tools for assessment activities, some free, some for sale; but analysis of the skills tested in each quiz, makes them manually. The teacher has to extract information from the skills that have been developed by the students on the scores that were obtained by classifying the quizzes and strengthen those that still need to be strengthened. Having a tool that integrates assessment quiz and assessment skills, allows teachers get immediate diagnostic evaluation indicators that students have met and to be further improved by optimizing revision tasks, qualification and evaluation. With this dedicated more time to improve the level of teaching with new strategies, helping the preparation of reports and especially learning to make a more personalized education identifying students who need to strengthen their knowledge. Also at the present time, educational institutions are in a process of evaluation and institutional accreditation, and one of the indicators is related to the evaluation of learning.

According to curricular reform presented by the Ministry of Education of Ecuador, the use of information technology; is essential to the academic process, focused on training students can develop their own knowledge and develop their ability to perform different activities. While it is true that there are a lot of ICT tools that support the process of teaching and learning in our country there are few of these tools that support the Teachers work such as obtaining an integrative assessment of learning outcomes that timely detect weaknesses and limitations of students.

Teachers are increasingly integrating ICTs in academic tasks, although these are sometimes limited to

spreadsheet and text editors, the use of virtual classrooms to complement formal education is increasing in educational institutions and specifically the environment Moodle, that being a free application software and adaptable to any educational need, allows creation tasks management courses and student assessment. That is why it is integrated into the module quizzes of this LMS features that enable an assessment of skills with Performance Criteria and get to more than one qualifying quiz, an analysis of state or skills evaluated, on the guidelines the following main objectives::

- Analyze the pedagogical evaluation tool used by the Ministry of Education.
- Leverage the possibilities Moodle for customization and integration features.
- Integrate Moodle instrument assessing pedagogical skills with Performance Criteria.

2. Materials and Methods

In the curriculum reform of basic general education 2010 the Ministry of Education, there are several concepts and teaching methodologies, including constructivist; which states that the student develops and creates its own knowledge.

A new feature that presents the proposed curriculum is to implement the skills to performance criteria, same to be established from the microcurricular planning and therefore the assessment instruments, should focus on assessing these skills.

One of the most commonly used assessment tools is the questionnaire. The goal of designing a questionnaire to assess. When the teacher assesses, seeks to quantify the learning process, constructing a questionnaire with different types of questions. In a model of education based on skills with Performance Criteria, questionnaire design, is focused on evaluating one or more skills in their students. That is why every question that forms the quiz; accompanied with Essential Assessment Indicator belonging to assess skill. This indicator allows us to recognize whether the teaching - learning is complying with the purposes outlined at the beginning of the process and the evaluation teaches us that indicators are true and which are not, I mean every question posed has an essential indicator evaluation, taking thus even several questions pertaining to a display. With this, the teacher must make a continuous assessment in each academic block to obtain a timely diagnosis of student achievement and take the necessary corrective measures at any stage of the process in order to meet the objectives.

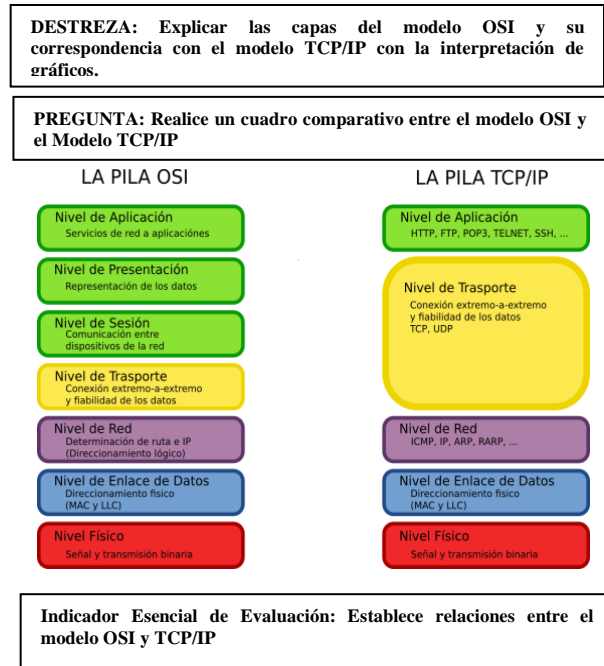


Figure 1 Structure of a question assessing skills with Performance Criteria.
Source: Own

Choosing a Moodle learning platform to include in the quiz module characteristics allowing evaluation design Skills with Performance Criteria will allow teachers expedite the process of evaluation of the questionnaires because of the advantages the platform for such committed, and partly through this integration you can get all the compliments indicators and unfulfilled dexterity which was assessed in the questionnaire.

Carrying out a study of the operation of Moodle from a developer perspective, we analyzed the structure of the database, the interaction between the module quizzes, the question bank and engine questions.

Additionally methods and standards to be followed for a development process on the platform and libraries management database with the XMLDB tool, the user interface by studying the Forms API is studied, and the using Moodle template to create local modules and plugins.

The integration with the LMS has the following characteristics:

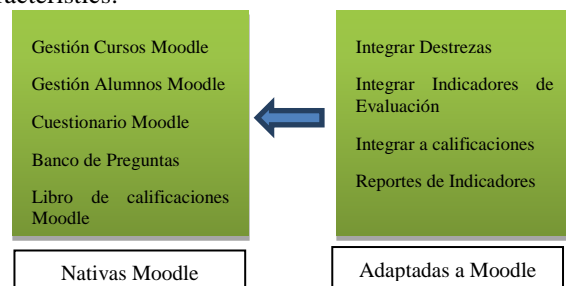


Figure 2 Moodle integration process
Source: Own

Moodle Quiz module

The questionnaire module (Quiz Module) that is not the same as Questionnaire module of Moodle. Allows teachers to design and construct quizzes with a range of question types as such true-false, multiple choice, short answer questions and with the possibility of extending these types thanks to modular structure. These questions are stored in a bank of questions (question bank). The engine of questions (question engine) is responsible for rendering process questions and student responses. It is used by the module quiz, your scripts are in the question / directory.

The lib / questionlib.php library contains functions that can be used by any module you need to use the questions. Loading this library questiontype instances of all classes generated by the questiontype.php file is created.

The question bank stores the definitions of all the questions, organized into categories, and the engine of questions instead stores information about a user attempts to access them.

Characteristics of the modified Questionnaire Module

- The module has all characteristics corresponding to Moodle.
- Skills to be evaluated over the course will be set
- When adding questions to the module must be selected evaluation indicator.
- Statistics indicators achieved and assessed by the questionnaire skills.

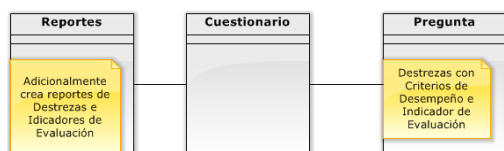


Figure 3 Modeling Moodle integration

Source: Own

The application will use the tables in the database that make the question bank and quiz module additionally necessary tables will be created to build essential skills and evaluation indicators, together with appropriate relationships to native tables Moodle.

Creating and Assigning Skills to Performance Criteria

Given the set course, the first step is to add the Performance Criteria Skills with that work, and therefore determine Evaluation Indicators each.

Thus proceeds to go to the Site Administration menu and go to the Skills section.

When the course is new, the message "There are no skills assigned to this course" and proceeds to click the Add button New Skills shown.

Income indicators Essential Skills Assessment.

According to microcurricular planning for the course to be taught, Skills taken with Essential Criteria Evaluation and Performance Indicators and proceeds to charge the Moodle platform.

In the form that is displayed, the name of Skill is required; why redialing red, the indicator is optional and you can leave later submit, but to keep Skills creation scheme with Performance Criteria should always go hand in creating the essential skill accompanied Indicator evaluation, this consistency by defining concepts.

The indicator field is the name of the indicator itself, the description contains more extended information. To remove an indicator should be left blank the name and save the changes.

Creating the Quiz activity

First you must activate the option of editing in Moodle, then the page is displayed with options to edit each of the activities that have shaped and each of the blocks are activated, then proceed to select the menu will display the activity that belongs to us is the Quiz.

By adding activity Quiz, the Moodle configuration window for this activity, with the additional option which is the Skills section presents; same we create for the course and you have to choose to be evaluated, then creating and configuring a Skills Assessment quiz with Performance Criteria.

Adding questions to the Questionnaire

Once you create the quiz, we proceed to add the questions; the process is traditional with Moodle works, ie you have to click to edit the quiz and proceed to add a question. You can use any of the types of questions that Moodle has.

Each of the questions has the list of Essential Evaluation Indicators belonging to the skills that have been configured on the current course of which only one indicator is chosen for each question.

Show Essential Evaluation Indicators

Once designed the quiz, the next step is the evaluation of students, and the corresponding qualification; that performs the same platform. Based on the results the interpretation of Essential Indicators Evaluation is done by clicking the View button Assessment Essential Indicators found in the table of course grades, and presents the analysis results of the evaluated skills and their respective indicators, this information can be exported to a PDF document by clicking the appropriate button to download the report.

2.1 Tools

Will use tool that has XMLDB Moodle to manage them to create additional tables. The server database is MySQL version 5.5 and Moodle is 2.6

XMLDB is the layer of abstraction Moodle database is the code library that allows you to interact and access Moodle database. The XMLDB editor is a tool to make the xml files that specify how Moodle should establish its database tables. Above developers had to do it separately creating a file for each of the different RDBMS, but now an archive database-neutral, which will handle many more databases are needed only. Additionally possessing different API allows us to create HTML forms easily through libraries written in PHP code, one of which is the Forms API. To determine which tables involved in the quiz module, you have to check the official information and using a database designer that supports creating an entity relationship diagram from the database. An IDE for writing PHP code in this project using Netbeans and configuring tools as a debugger to follow step by step the behavior of the LMS in its various instances and behaviors quiz module. The database used in the development of the application is MySQL in version 5.5.35, to mount the Moodle website and make the project, the Apache Web server was used in version 2.2.2. You must configure the server extensions required for proper installation of Moodle, and in addition to enable extensions for debugging php.

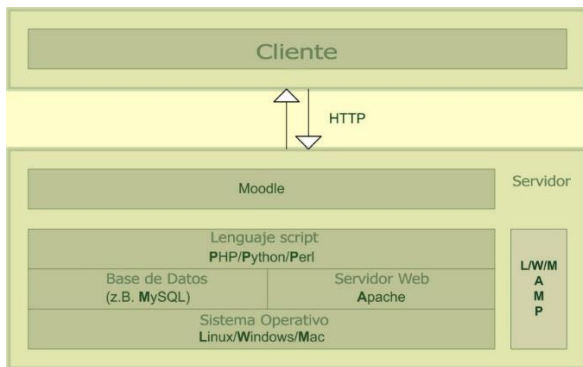


Figure 4 Moodle architecture
Source: Own

3. Results

This tool is intended for use by teachers in building assessment tools type questionnaire with the question types supported by Moodle Quiz module and evaluate skills with Performance Criteria.

Once you have configured a Moodle course and defined blocks study, continue with the process of creating skills and their respective Essential Evaluation Indicators, then create the quiz activity and structure with the skills to be evaluated.

Reports are generated using tables Essential Evaluation Indicators are of great support to teachers to design a contingency plan and structure new assessments to reinforce those indicators that are not being met.

The strategies used in this paper show the possibilities Moodle to extend their capabilities and adapt to specific needs and above all continue to build tools that help the work of teachers in the teaching-learning process of simplifying certain repetitive tasks as in this case the development, qualification questionnaires together with the skills assessment with performance criteria.

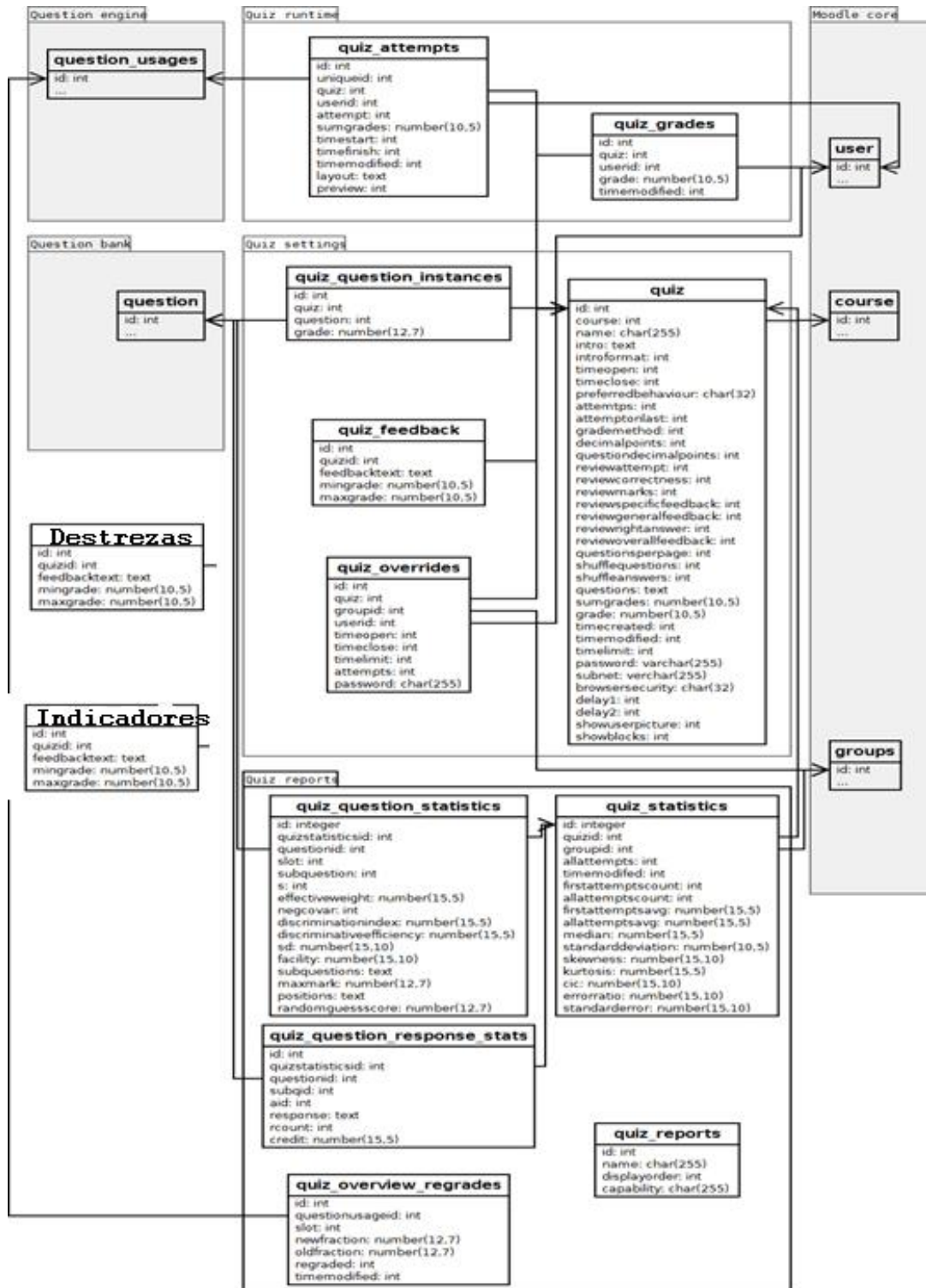
Here are some benefits that this application provides detailed.

IMPACT	BENEFITS
Economic	Saving time and money in building assessment tools. Optimization of time to prepare reports of meta-assessment processes
Social	Improving teaching - learning, an institution may be in prime locations in an accreditation process
Tecnologic	Promote the development of ICT tools to help the task of teaching.
Educational	Improving the quality of education, obtaining essential indicators of evaluation time
Ecological	Reducing the use of paper and printing.

Table 1: Table of project benefits

Source: Own

3.1 Physical Model



4. Conclusions

Using open source platform enables the development of high quality software, leaving aside the issue of licenses and making the most of adaptability to the environment of each society.

This tool can be used by teachers in basic education in building assessment tools and evaluation type questionnaire with Performance Criteria Skills.

The reports generated by the table of Essential indicators met and unmet evaluation can be used for academic assessment carried out on the boards of course.

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Recommendations

It is recommended for handling the database is done through the XMLDB tool that provides Moodle, as it facilitates the integration between the platform and the database.

To begin with any development for Moodle, you should first read the official developer documentation and subsequently documenting the different ways in which you can develop on the platform.

Analyze Skills according to annual planning that will develop in each curricular area and establish appropriate evaluation indicators Essential for better analysis.

It is advisable to register all Skills Performance Criteria to be evaluated over the course in order to have a global vision in designing the questionnaire with the skills to evaluate.

When you create a course in Moodle, you should create a category denoting the year of basic or matter in general and add into it the course and curricular to keep organized the skills to be evaluated throughout the year and keeping the sequence of questionnaires that were created in each block.

It is advisable to subscribe to forums and get experiences of other developers and exploit for their own benefit and that the absence of such information, this is the most suitable source for it.

Bibliography

- [1] Moodle community. (2014). Database. Database Structures. Obtenido de <http://docs.moodle.org/dev/Database>
- [2] David Flanagan. (2011). JavaScript The Definitive Guide. (M. Loukides, Ed.) (Sixth.). Retrieved from oreilli.com
- [3] Moodle community. (2013). Moodle Forms. Form API. Obtenido Enero 01, 2014, from http://docs.moodle.org/dev/Form_API
- [4] García Alba, M. J. (2010). Análisis del desarrollo de extensiones para Moodle: Desarrollo de un módulo para la gestión de laboratorios docentes. UNIVERSIDAD DE ALCALÁ. Obtenido de <http://www2.uah.es/libretics/files/GruposLab.pdf>
- [5] Gómez Poveda, María Ángeles, Díaz-Alejo Gómez, J. A. (2010). Introducción a la plataforma Moodle. Características de Moodle. Obtenido Octubre 10, 2013, de http://cefire.edu.gva.es/file.php/1/moodle/T1_Introduccion/11caracteristicas_de_moodle.html
- [6] Moodle Community. (2014). MoodleDocs. Actividades. Obtenido Febrero 10, 2014, from <http://docs.moodle.org/all/es/Actividades>
- [7] Guitarra Santacruz Martha Alicia. (2011). Actualización y Fortalecimiento Curricular de la Educación General Básica. Quito. Obtenido de <http://www.educacion.gob.ec>
- [8] Kniberg, H., Skarin, M., Poppendieck, P. D. M., & Anderson, D. (2010). Kanban y Scrum – obteniendo lo mejor de ambos. (D. Plesa, Ed.) (p. 107). Obtenido de <http://www.proyectalis.com>
- [9] Ministerio de Educación Nacional de Colombia. (2009). La educación virtual: ventajas y desventajas - Observatorio de Medios. Ministerio Educación de Colombia. Obtenido Octubre 05, 2013, de <http://www.mineducacion.gov.co/observatorio/1722/article-201744.html>
- [10] Moodle Community. (2014). Moodle Documentation. NEWMODULE Moodle. Obtenido February 26, 2014, de http://docs.moodle.org/dev/NEWMODULE_Documentation
- [11] Moodle Community. (2014). Versiones de Moodle. Historia de las versiones. Obtenido Marzo 12, 2014, from http://docs.moodle.org/all/es/Historia_de_las_versiones#Moodle_2.6
- [12] Petr Škoda (škodák). (2013). Local customisations. Local plugins. Obtenido Noviembre 25, 2013, de http://docs.moodle.org/dev/Local_plugins
- [13] Moncur, Michael. (2002). *MySQL your visual blueprint for creating open source databases*. (W. technology P. Group, Ed.) (p. 304). New York: Wiley Publishing, Inc.
- [14] PHP Documentation Group. (2014). Manual de PHP. Obtenido de <http://php.net/manual/es/manual.php>
- [15] The phpMyAdmin devel team. (2014). documentación oficial de phpMyAdmin. Obtenido Mayo 09, 2014, de <https://phpmyadmin-spanish.readthedocs.org/en/latest/>
- [16] Powell, G. (2007). XML Databases (Primera., p. 470). Wiley Publishing. Obtenido de <http://www.wiley.com>
- [17] Moodle community. (2012). Question API - MoodleDocs. Obtenido April 10, 2014, de http://docs.moodle.org/dev/Question_API
- [18] Ruíz Vélez, William de Jesús, “Metodologías En La Educación Virtual - Internet En El Aula”, 2010 <<http://internetaula.ning.com/profiles/blogs/metodologias-en-la-educacion>>

- [19] Coy, J. (2013). *Instant Moodle Quiz Module How-to*. Birmingham: Packt Pub. Obtenido de <http://search.ebscohost.com/login.aspx?direct=true&db=edsebk&AN=533209&lang=es&site=eds-live>
- [20] Moore, J., & Churchward, M. (2010). *Moodle 1.9 extension development: customize and extend Moodle by using its robust plugin systems* / Jonathan Moore, Michael Churchward. Birmingham, U.K.: Packt Pub., c2010. Obtenido de <http://search.ebscohost.com/login.aspx?direct=true&db=edshlc&AN=edshlc.012673252-3&lang=es&site=eds-live>

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