

Using Agricultural Learning Portals in Developing Countries: The Case of Organic.Edunet

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ABSTRACT

The use of learning analytics is constantly increasing during the last years in the context of the evaluation of a wide variety of learning-related services, such as the learning portals. Especially in the case of multilingual learning portals, learning analytics may act as indicators that provide insight on the use of the multilingual aspects of the portal, such as the multilingual user interface, the use of translated metadata records and classification systems used for the classification of the resources as well as the engagement of the users in the portal by metadata translated in their own language. This paper provides the preliminary results of an analysis (Protonotarios et al., 2013) which aimed to identify the use of the Organic.Edunet Web portal by users coming from developing countries. The analysis was based mainly on the log files of the portal and the correlation of this information with related information coming from other sources. Based on the outcomes of this analysis, a number of requirements are defined in order to be used as a basis for further work related to multilingualism in the specific portal.

Keywords: Learning analytics, multilinguality, learning portal, developing countries, Organic.Edunet.

1. INTRODUCTION

During the last years, the use of technology-enhanced learning methods has been intensified. Teachers are enhancing their existing traditional courses with modern tools and methodologies while material is mainly used in its digital form instead of the traditional printed copies, due to the advantages provided by the digital files. The creation, management and sharing of this material takes place in a number of learning environments, such as web sites, learning portals and course management platforms. The use of these digital tools provides a significant amount of information related to the use of the digital learning materials by the users in the form of ratings, reviews, tags and comments; this information can facilitate searching, ranking, and recommendations of learning resources. The domain of learning analytics facilitates the study of such user-generated information which in fact describes the way that the learning tools and digital

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material are used by the corresponding users. According to Siemens and Baker (2012), one of the most important uses of this kind of information is the improvement of the learning experience of the users, which comes through the identification of strong points and weaknesses of the learning tools and learning resources, as this is depicted by the learning analytics. Apart from that, learning analytics may provide useful information related to the learning material used by the users, identify learning patterns, predict learning outcomes, provide the users with automated suggestion of relevant resources based on their typical use of a portal etc. (Verbert et al, 2012).

One of the most interesting aspects of the users' behavior in a learning portal is the use of multilinguality tools. Multilinguality in a portal comes in different levels, such as the availability of the user interface in multiple languages (portal level), the existence of metadata in more than one language (metadata level), the existence of resources translated in multiple languages (resource level), as well as the existence of multilinguality tools such as automatic translation components, cross-language information retrieval components and tools allowing users to provide translations of existing information and revise/rate translations provided by other users. The importance of multilinguality in a portal lies mainly in the fact that the majority of the users usually prefer to use a localized version of a portal and access metadata/resources in their native language. These issues can be addressed with a variety of techniques; however, composite solutions combining multiple approaches usually provide the optimal solutions. In all cases, these solutions are based on the use of automatic translation tools.

The analysis of the use of learning portals has been described in several previous publications which were based on various approaches, such as the work done by Sampson and Manouselis (2004), the analysis of the user satisfaction as it was recorded by the users in an online questionnaire (Protonotarios et al., 2011) and the use of the portal's log files (Palavitsinis et al., 2011a). In our analysis we have used the log files of the Organic.Edunet Web portal, which provided information on several aspects related to our study, such as the language of the browser used for accessing the portal, the language of the searches for reaching the Organic.Edunet Web portal and the ones performed for retrieving content within the portal etc. Our study was focused on the users coming from developing countries, as these users are heavily depending on the existence of learning resources in their native language, due to several reasons, including the lack of fluency in English, the need to use localized versions of resources in their courses and the lack of other sources of information e.g. in printed format, in other portals etc.

2. BACKGROUND INFORMATION

2.1 About the Organic.Edunet Web portal

The Organic.Edunet Web portal (www.organic-edunet.eu) is a multilingual learning portal which provides access to almost 11,000 digital educational resources in the field of organic agriculture, agroecology, ecology, energy, sustainability and other green

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topics. The portal was launched in January 2010 and features metadata harvested from a number of networked repositories. All metadata available through the portal are created using the Organic.Edunet metadata application profile (Palavitsinis et al., 2011b), which is a modified version of the IEEE LOM standard. In addition, the Organic.Edunet OA-AE ontology is used for the classification of resources available through the portal (Manouselis et al., 2009). Both the metadata AP and the ontology are translated in seventeen (17) languages. The resources available through the portal are available in eleven (11) languages (mainly English but also Estonian, French, German, Greek, Hungarian, Norwegian, Romanian, Russian, Spanish and Turkish), while the metadata are translated in up to eight (8) languages. The aforementioned aspects of the portal provide an enhanced multilingual environment to be used by any user of the portal.

The reference period for this study is from the launch of the portal until the end of December 2012 (1/1/2010-20/12/2012). During this period, the portal received more than 156,000 visits and 478,000 page views from more than 128,000 unique visitors coming from 195 different countries.

2.2 Defining the developing countries

According to the International Statistical Institute (ISI, www.isi-web.org/component/content/article/5-root/root/81-developing), “countries are divided into developed or developing according to their Gross National Income (GNI) per capita per year. Countries with a GNI of US\$ 11,905 and less in 2010 are defined as developing”. On the other hand, according to the United Nations Statistics Division (<http://unstats.un.org/unsd/methods/m49/m49regin.htm>), Japan in Asia, Canada and the United States in northern America, Australia and New Zealand in Oceania and Europe are considered “developed” regions or areas.



Figure 1: Map of developing countries within the scope of IMF (dark green) and outside the scope of IMF (light green) (Source: Wikipedia - http://en.wikipedia.org/wiki/Developing_country)

In the context of this study, we used the list of developing countries provided by the International Statistical Institute (www.isi-web.org/component/content/article/5-root/root/577-developing2012), and filtered out the countries with less than 100 unique visits were recorded in the reference period. The remaining countries were then grouped based on their geographic region in order to allow the easier management of the



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analytics. There were twenty-seven (27) countries in total, grouped in eight (8) regions, namely Latin America & Caribbean, Northern/Southern/ Eastern and Western Africa, Southern/Southeastern and Eastern Asia.

3. METHODOLOGY

This study was focused on the analysis of the behavior of users coming from developing countries in the Organic.Edunet Web portal in an effort to record the use of the portal and more specifically its multilinguality aspects. The reference period of this analysis is between the official deployment of the portal (1/1/2010) and near the end of the third year of the portal (20/12/2012), when the portal was already heavily disseminated to a diverse and wide audience and its usage was established. For our analysis we used the methodology described in the work by Stoitsis et al. (2012). The following table provides the list of variables studied in this work.

Table 1: A list of variables used in this study, as defined by Stoitsis et al. (2012)

Variable	Description
Visits (per day)	Visits per day for countries with full, partial (only interface) and no language support
Bounces (per day)	Bounces per day for countries with full language, partial and no language support
Page views (per day)	Page views per day for countries with full language, partial and no language support
Unique visitors (per day)	Unique visitors per day for countries with full, partial and no language support
Average time on site (per visit)	Average time on site for users from countries with full, partial and no language support
Average time on page (per visit)	Average time on page for users from countries with full, partial and no language support
Page views (per visit)	Number of pages per visit from countries with full, partial and no language support
Visits from search engines	Number of visits from search engines for each language
Search depth	Average number of pages that user views after using portal search function for each language
Total unique searches	Total number of unique searches using portal search function for each language
Number of keywords used in portal search	Total number of keywords used in portal search for each language

Our work was mainly based on the information provided by the Google Analytics service of the Organic.Edunet Web portal (www.google.com/analytics). The service was set up from the first day of its deployment; therefore contains all the necessary information. For the statistical analysis of the available information, we also used Microsoft Excel.

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4. RESULTS

4.1 Portal-level statistics

During the reference period, the portal received visits from 195 countries all over the world, which resulted in a relatively high diversity of the indicators. Table 2 provides the values of some key indicators for the reference period.

Table 2: Key indicators of the portal during the reference period

	Unique visitors/day	Bounces/day	Pageviews/day	Visits/day
World	118.29	85.10	441.25	144.26

It was noticed that in several cases the portal visitors did not use a translated/localized version of their web browsers; instead they used the generic English one. Visitors from African countries exhibited this behavior which may also indicate that these users might also prefer the English user interface of the portal, make use of non-translated metadata and English resources available in the portal. On the other hand, visitors from Latin America mainly used the Spanish version of the portal using a localized Spanish web browser.

Figure 2 provides an analysis of indicators related to portal-level statistics for the regions of developing countries when accessing the Organic.Edunet Web portal.

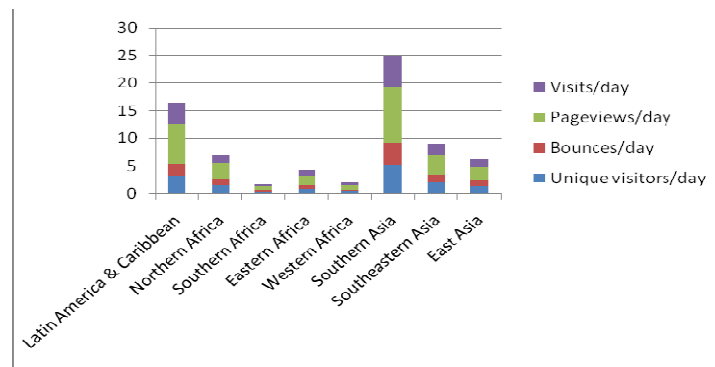


Figure 2: Average values of portal-level statistics for the regions of the developing countries

Southern Asia provided the higher levels of all indicators in this case, probably due to the existence of increased activity from Indian users. Despite the fact that the portal does not feature any resources in Hindi, it seems that Indian users could make use of the non-Hindi metadata and resources. Latin America was a different case, as the language spoken by the corresponding users (Spanish) was supported by the portal in the user interface, the language of the metadata and was also the language of some resources. Visitors from these regions provided the highest number of visits and page views per day. On the other hand, the lowest level of indicators were noticed in the African

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countries, which were not benefited from any kind of localized user interface or content in their language.

4.2 Multilingual search for content

Another interesting factor that was analyzed in the context of our work was the use of queries by the portal visitors. Both the queries made by the users in search engines for accessing the Organic.Edunet Web portal and the queries performed within the portal for accessing content were taken into consideration. In both cases, the language of the terms used for these queries was identified and recorded in order for us to identify whether the users preferred to use terms in their own language or in English as a generic language.

In the first case, based on the log files of the portal, we received a list of more than 40,000 terms in various languages, which were used in web-based search engines by the portal visitors before they reached the portal. In order to facilitate the analysis, we kept only the top-500 which were then filtered in order for us to reject terms which were probably not used by our target users (e.g. terms in European languages). This only left us with terms in English (as a generic language) and Spanish (as the language spoken mainly in Latin America). The indicators analyzed in this step can be found in Table 3.

Table 3: Indicators related to queries performed with generic search engines before visitors reached the portal.

Term language	Total number of visits	Total number of terms	Search depth
English	10,185	93	3.30
Spanish	498	6	1.37

Due to the much more intense use of the English language in the portal, the corresponding indicators provide higher values for the use of English terms. We followed a similar approach for the analysis of the results in the case of the queries performed by the users within the Organic.Edunet Web portal; from a list of more than 5,000 terms used we selected the top-500, which were then filtered in order to discard the European languages. The remaining 108 terms in English, Spanish and French are potential query terms used by our target audience. Table 4 provides the indicators studied in this case and the corresponding values.

Table 4: Indicators related to queries performed within the portal.

Term language	Unique queries	Total number of terms	Search depth
English	2,547	88	2.86
Spanish	426	19	6.21
French	9	1	3.67

It was obvious that the majority of queries were performed with English; however, this also resulted in less pages viewed per visit while the queries made with Spanish or French terms resulted in higher activity of the users in the portal. Despite the relatively high number of visits made from Arab-speaking countries and India, there were no

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terms in these languages among the top-500. This might be explained by the fact that no content in these languages was available by the time of the conduction of this study, which resulted in users leaving the portal before performing any queries or led them to use generic terms in English.

5. DISCUSSION

This study aimed to identify the multilinguality-related factors which may potentially influence the behavior of users from developing countries in the Organic.Edunet Web portal and is part of a more detailed analysis which is described in another publication of the authors. The preliminary results provided in this paper indicate that indeed the behavior of the users in a portal is affected by the multilinguality aspects of the portal.

More specifically, in the vast majority of the cases, we noticed that the visitors of the portal used an English version of their web browser to access the portal. Users from countries the languages of which were supported by the portal at content and/or metadata level tended to spend more time in the portal and navigate to more pages per visit compared to the visits from countries with no language support.

The queries performed by the portal users using generic search engines for accessing the portal, as well as the queries performed within the portal for retrieving resources, were in both cases performed using mainly English terms. This might be due to the fact that there was no resources and/or metadata in the language of the users, or because the user's preference was the English version of the terms over the translations in his native language. Even widely used languages like Arabic, Hindi and Chinese were not used for these queries, indicating that the users from the corresponding countries preferred to use the English version of the search terms. This must be also combined with the fact that no content or metadata were available in these languages.

The results of this work showed that the multilinguality aspects of a learning portal cannot attract users in the same way that the availability of metadata and resources in the native language of the user do. As a result, it seems that the effort put in the translation of metadata and the availability of resources in several languages may be a critical factor not only for attracting users in a learning portal but also for increasing their activity within the portal. The use of automatic translation tools, like the ones provided in the context of the Organic.Lingua ICT-PSP project (www.organic-lingua.eu) may enhance the experience of the users in a multilingual environment which also provides localized versions of metadata and resources. The next step in this research would be to evaluate the effect of the automatic translation tools in the engagement of the users in the portal.

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