Abstract – The purpose of this article is to present the development of a research assistance library service – online assistance in finding resources on a given topic – in the period between 2006 and 2012. With the implementation of the Bologna process in Croatia, there was a need for a more proactive involvement of the Faculty of Electrical Engineering and Computing Central Library in the Faculty teaching procedure. With its resources available, the FER Central Library sought to contribute to the quality of the way students conduct research for their papers, and therefore launched the research support service, which, over the years, developed into a successful virtual link between given research topics, mentors, students, and the Library itself. Furthermore, the virtual library support proved to be a useful non-formal learning tool. Results of an online questionnaire the service users completed are presented, and the future plans for further improvement of the service are set forth.

I. INTRODUCTION

Environment in which academic libraries operate is rapidly changing, and consequently, the way the libraries organize their services develops accordingly. Services need to be adapted to market demands and user needs, and library mission and objectives need to be developed in this direction. The rapid development of information and communication technology is changing the way users search for and obtain information. More and more information are available in electronic form, which leads to overabundance of sources and the inability to distinguish credible sources from those irrelevant. Abundance of information, resources and ways to get quality literature can often confuse the user. Many users are not familiar with the opportunities provided by information technology, many are not aware of the depth of the information environment; do not govern the skills and knowledge necessary for the selection of available information.

Fundamental task of academic libraries is to support the educational and research work of the members of the academic community. As stated by [1], the first principle of modern teaching becomes learning based on research, and the teaching process is based on preparing students to critically rethink, and on mastering the skills of argumentation. For this purpose, it is necessary to provide easy access to diverse sources of knowledge and information for students, as well as for teachers. According to [2], digital reference services refer to a network of expertise, intermediation and resources put at the disposal of a user seeking answers in an online/networked environment. A digital reference occurs when a question is received electronically and responded to electronically. As outlined by [3], it is important to note that in developed countries an increasing number of universities have established special units to support academic teaching, while "libraries" are increasingly being referred to as "learning resource centers". Although a growing number of libraries in Croatia have over the years developed some kind of online reference service1, as stated by [3], there is one important aspect in the Croatian academic librarianship to which, unfortunately, insufficient attention is paid - competency of subject experts to organize information related to scientific research projects and activities of teachers themselves. In formal education environment such as a faculty, academic libraries and librarians can serve as a link between formal and informal learning, i.e. as a "service" in the course of studying and life-long learning, and they act as an important component in the process of non-formal learning. According to [4], non-formal learning consists of learning embedded in planned activities that are not explicitly designated as learning, but which contain an important learning element.

II. FER RESEARCH ASSISTANCE LIBRARY SERVICE

Faculty of Electrical Engineering and Computing (hereinafter FER) counts around 3,800 students at Bachelor and Master program level, and 450 Ph.D. students [5]. In the academic year 2005/2006 the Bologna Process was implemented in Croatia, and FER managed successfully to apply the guidelines and standards of the program to its curriculum.

FER Central Library, as an organizational unit of the Faculty, finds its calling and mission in providing a high-quality support to scientific-teaching procedure, as an active partner in enhancing the quality of learning outcomes [5]. With the implementation of the Bologna Process at the Faculty, recognizing information needs for new generations of students and scientists has become the

1 For example, Ask a Librarian (http://www.knjiznica.hr/pitajte- knjiznicare/) by Zagreb City Libraries, and QuestionPoint, offered in Croatia by the National and University Library in Zagreb (http://www.nsk.hr/en/ask-a-librarian/).
primary goal of the Central Library, as the transformation of its traditional role into a new one, directed towards the 21st century study needs, became evident.

The Faculty curriculum includes writing seminar papers, participating in a project, and preparing BSc and MSc thesis at the end of the study program. With its resources available, FER Central Library sought to contribute to the quality of the way students conduct research for their papers, and therefore launched a research support service. By the usage of the Library holdings, and the skills of information retrieving and searching the available online databases, the Library staff recommends literature and materials to students, postgraduates, corporate employees, etc. For the purposes of entry and processing of data related to the literature search on demand service, a database was developed, as well as a web form for communicating with Library users [5].

After receiving a request, a librarian would begin to search for reference material on a given topic. In doing so, the librarian would primarily use the FER library catalogue, available online databases, and catalogues of other libraries in Croatia. The reply including information about the prepared materials (references to literature and Internet-pages or a guidance to other sources), as well as electronic sources (electronic articles and e-books), would be sent via e-mail, while printed materials would be put on hold to be picked up at the Library. Although insufficiently informed about teaching process itself, this segment of the Library indicates its striving to be as actively possible involved in the process of enhancing the quality of studying, and thus learning outcomes as well. By supporting the curriculum and helping students to successfully master the required tasks, the Library becomes a medium through which students are achieving their objectives, and thereby also acquire new knowledge and skills. As stated by [7], although FER Library users are advanced users of information technology, in practice they lack knowledge about information sources and their use, retrieval strategies, as well as ethics of quoting. Therefore, the FER library serves as a virtual place of non-formal learning, which is primarily based on information literacy.

The Library staff was caught unprepared by the first student rush: when creating the software for monitoring of teaching, the Faculty administration did not recognize the Library as a potential user of the software, and librarians did not have access to course details, such as the list of recommended materials for the given course, etc. Furthermore, librarians were not sufficiently familiar with the changes occurring in the teaching process.

Therefore, the first version of the form used for submitting requests for the Library service was an ad hoc paper one, and the Library staff was dependant solely on the information provided by students.

Estimating that the number of users will increase, the FER Library developed first of many versions of the online form, which was accessible through the FER Library web page. This type of web form helped librarians to locate exactly what students needed, as well as to keep track of the data relevant for assessing and evaluating the service itself. A great improvement occurred in the third year of the service, when Vice-Dean for Student Affairs initiated the integration of the Library reference service into the Faculty’s Information Support Centre system (Quilt CMS) [6], that is, a part of the system which relates to the Seminar and Project course. The application enabled students to choose whether they want “librarian’s help in writing a seminar paper, project, etc”. The request would then be automatically sent via email at ferlib@fer.hr [10]. This major breakthrough enabled [8] the Library staff to have access to a large number of data…, detailed information about the paper itself, but also the mentor.

III. QUESTIONNAIRE RESULTS AND COMMENTS

For the purpose of continuous improvement of the service with the goal of meeting the user needs, and current curriculum as well, the Library has systematically conducted evaluations of the service, as well as recorded quantitative data related to it. The analysis was conducted over the period of six academic years.

2 The aim of the Seminar course is improvement of presentation, communication and writing skills of students by providing an opportunity to discuss their ongoing work and interests with others. Students work in smaller groups on recent developments in the field of electrical engineering and information technology or computing (http://www.fer.unizg.hr/predmet/seminar, accessed 2013-01-11).

3 Project requires finding the necessary literature, analysis of similar problems and solutions, identification of project requirements, definition of technical objectives, planning and time management, creation of alternative solutions, decision making, solution implementation, writing technical documentation and presentation (http://www.fer.unizg.hr/predmet/pro, accessed 2013-01-11).

4 In Croatia, Ministry of Science, Education and Sports, in cooperation with Croatian Academic and Research Network and Rudjer Bošković Institute Library, formed the Centre for Online Databases, which offers access to more than forty databases. There are many journals of which full text is available, and there are others which give abstracts of the articles. Because of licensing agreements, these databases can only be used by current scientific-teaching staff and students. This is a very important tool for locating the latest developments and information in technical engineering and computing. In 2012 FER arranged a licensing agreement for IEEE database access, which will, henceforward, surely contribute to the quality of the suggested materials.

5 At first, a paper form. An online form (with data organized in Access database) was created in the 2nd year of service, and since the 3rd year of service, a segment from "Quilt CMS" system has been used.

6 Quilt Content Management System was developed at University of Zagreb Faculty of Electrical Engineering and Computing. Its core functionality is management of all internet and intranet contents of Faculty. Today it also includes a large number of applications that support complete education process at the institution." [8].

7 Three graduated librarians share the work on these requests separately.
A. The analysis

In the period between 2006 and 2012 (October 1\textsuperscript{st} 2012) there were 1,919 requests submitted, out of which nine requests remained unsolved (2009/2010).

![Graph showing requests through the academic years, expressed in percentage](image1)

The largest number of requests was registered in the academic year 2010/2011, while the smallest number was registered in the academic year 2011/2012 (Figure 1). There was a sharp decline in the number of submitted requests in the final year of analysis, since there was a shortage of staff (due to the Library audit\textsuperscript{11}), and the Library staff was not able to receive requests via the "Quilt CMS" system.

The higher number of requests in a four-year period (2007/2008 – 2010/2011, Figure 1) can be explained by the availability of the service via the web form, that is its accessibility through the Quilt CMS system. It is important to point out that by the latter the service received significant rise in the number of requests, but also a qualitative shift in its visibility in the formalized educational processes.

Over the years four different types of forms were developed for reference transaction, out of which two are no longer in use (printed form and the first version of the web form). During the above mentioned period requests were submitted in other ways as well (by e-mail, over the phone, or personally at the reference desk) – see Figure 2.

![Graph showing type of reference transaction in the period between 2006 and 2012, expressed in percentage](image2)

Figure 2 – Type of reference transaction in the period between 2006 and 2012, expressed in percentage

The distribution of requests over the year, there is a striking imbalance (Figure 3) - third (44%), second and fourth month of make 3/4 of the total number of requests.

![Graph showing frequency of requests by months for the period between 2006 and 2012, expressed in percentage](image3)

Figure 3 – Frequency of requests by months for the period between 2006 and 2012, expressed in percentage

Incorporating the service into the teaching process (Seminar course web form, "Quilt CMS" system) made the most important contribution to the rise in the number of requests - on average, more than 60% of requests per year were submitted via the "Quilt CMS" system. However, the highest increase was registered regarding requests submitted via e-mail – in the academic year 2011/2012 there was a 50% increase of such requests as compared to the previous academic year.

In the distribution of requests over the year, there is a striking imbalance (Figure 3) - third (44%), second and fourth month of make 3/4 of the total number of requests.

The users were asked to specify the type of paper they need librarian's assistance with. Figure 4 shows different types of papers noted by users. Most requests were related to seminar papers, graduate papers and bachelor thesis.

\textsuperscript{11} Running an audit of the Central Library, as well as twelve department libraries of the Faculty
1,180 unique topics (formed by users and/or mentors) were attached to the total number of requests submitted (1,919). Along with a topic, key words could be attached to the request as well. Key words were also specified by librarians; however, up until January 2011 it remained unspecified who attached key words to a specific request. There were 6,377 unique key words attached to the submitted requests. The most frequently used terms do not appear in large numbers, which proves the uniqueness of topics and requests.

Out of the total number of requests, in 63.11% librarians suggested at least one title of printed materials belonging to the Library holdings. Therefore, for 2/3 of requests, librarians suggested sources from the Library holdings; 2,170 unique titles (which makes less than 10% of the total Library holdings) were recommended, that is, the Library holdings were recommended 5,438 times altogether.

According to type of library holdings (Figure 5), most (51.78%) printed materials were textbooks, as expected, since textbooks make up the largest part of the Library holdings. Master thesis and doctoral thesis were recommended in a slightly smaller percentage (45.51%). A third of suggestions regarded external sources (links, digital materials available via online databases, or otherwise).

There were 2,181 recommended documents in digital format (pdf), out of which most are scientific papers from credible online sources (databases of peer-reviewed literature).

B. User and mentor feedback

In 2007 the Library staff asked the Faculty professors (specified as mentors in the submitted requests) to evaluate the Library service – the sample consisted of 84 examinees. Only 34 of them (40.05%) filled in the feedback form. The questionnaire consisted of four questions, and the feedback showed that all examinees fully support the service. Furthermore, they believe that the service was helpful to students and that it serves as a support to the teaching process of the Faculty.

Over the period between 2007 and 2012, the Library also assessed the service based on user feedback (with the exception of the academic year 2009/2010). Figure 6 shows user evaluation of the service and satisfaction of the user experience. There is a positive trend in both evaluating the service and satisfaction with it. Annual average positive growth in evaluating the service is 3.5%, while annual average positive growth in satisfaction with the service is 5.3%.

It is interesting that, although that year the service „lost“ its most attractive method of submitting the requests (Seminar course web form), the users continued
to evaluate the service as extremely high, even more than before (91.7%, Figure 6).

Users have mostly (54%, Table I) used the service only once, that is, they submitted only one request during the analyzed period. Among those users who repeatedly used the service (46%, Table I), the most frequent ones are those with two (20.9%) and three requests (14.5%) submitted (Figure 7). Given the number of repeated users, it could be concluded that the service has met the user expectations (if it is considered that multiple use of the service indicates high satisfaction rate).

<table>
<thead>
<tr>
<th>Users</th>
<th>(N)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-time users</td>
<td>1036</td>
<td>54.0%</td>
</tr>
<tr>
<td>Repeated users</td>
<td>883</td>
<td>46.0%</td>
</tr>
<tr>
<td>Total</td>
<td>1919</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure 7 – Recurrence of requests, expressed in percentage

IV. CONCLUSION

FER Central Library has recognized the need to replace traditional services with the new online service and content, and it strengthened its patron-centered attitude with e-students as its focal-point. With its digital reference service the Library serves students, Faculty and staff by promoting and supporting the thoughtful use of information technology in finding, evaluating, and using information for scientific and academic work, and thus can be considered as a vital element in the process of non-formal learning.

The Library's goal for the future is to build up its support to distance education system by expanding the scope of services and introducing chat-based reference, a text-messaging service, as well as by building an institutional digital repository.

REFERENCES