Efficient Online Tutoring Using Web Services

Mr.M.Balakrishnan[1] and Dr.K.Duraiswamy[2]

**[1] Assistant Professor, Department of Computer Science and Engineering,
Selvam College of Technology, Namakkal, Tamilnadu, India**

**[2] Dean (Academic), K.S.Rangasamy College of Technology,
Tiruchengode, Tamilnadu, India**

Abstract

Web Services is a technology that allows applications to communicate with each other in a platform and programming language-independent manner. The development and implementation of a tutoring service through online is presented. Online tutoring is all about using web services or the internet for tutorials or tutoring activities. Students would be learning from their tutors through the use of internet. Online tutoring or e-tutoring would need certain applications and programs, like instant messaging that would make discussions possible. Aside from discussions and lectures done through internet and web conferencing, quizzes, exam results, and recommendations are also done through the internet. In this paper, we propose a structural frame of integrated web services for online interactive training/education environments with object-oriented interface to multiple platforms of resource allocation. After analyzing the requirements tutor environment, it is shown how Web Services can address many of the requirements put forward in terms of operability, deployment and usage services. The proposed framework of is experimented to show the performance improvement with the existing model in terms of application throughput, delivery report, interaction of more number of people, and scalability.

Keywords: *Web service, online Tutoring, Throughput, and Scalability.*

1. Introduction

In using technology to provide tutoring online, new studies are suggesting that the important element may be the definition of the process of tutoring in the new cyberspace environment more than the choice of the technology. Although electronic tools are needed to deliver tutoring online, a definition of the online process and its best practices may be needed first in order to help select the appropriate technology or, in the words of Frank Christ (2002), put "pedagogy before technology." Historically, online tutoring began with email. In this format, a student sent a question to the tutor with the expectation that the return email would contain the answer. Instead, what happened was a disconnection: The tutor, being a good guide, sent back a Socratic answer with more questioning prompts; the student, expecting the answer, became frustrated. Although the student may expect a give and take interaction in a face-to-face tutoring session, the email format suggested to the student that the question should be answered with a direct answer. This illustration is an example of using technology without fully developing the concept of tutoring in the online environment.

Initial tutoring online models begin with email but there has been an emergence of new models as new tools became available, both in asynchronous and synchronous formats. The following models are presented in the context of the specific tool used, for example, Blackboard or NetTutor.A learning service is in our understanding an event. In order to support the accomplishment of a specific educational objective event is provided by a learning service provider. This is achieved by creating a learning environment consisting of educators, educational material, communication infrastructure, meeting places, etc. Examples of a learning service are the delivery of a course, the provision of a web-based training application or the provision of self-study material.

We envision a scenario where learning services are announced and mediated by electronic means. Although the web enables choosing from a variety of educational resources, it is difficult for learners to find appropriate learning services such as courses, seminars, and web-based training applications. Corporate and independent learners seek learning services with heterogeneous properties (traditional courses, online courses, assessment services, mini-learning units, etc.) from heterogeneous sources (in-house training, external training providers, higher education institutions, etc.). The rationality of the selection process of a learning service performed by a human being is limited for the following reasons, limited overview of the learning services available, limited capabilities of processing all the information describing learning services.

2. Literature Survey

In people's daily life, with the development of human-computing interaction, more and more natural human-computing interfaces have been integrated for enhancing work efficiency [1]. In the learning area, human-computing interface can facilitate the teacher to teach the class and help

the students learn and discuss with others. Several projects, such as [2] and [3], implement special human-computing interfaces in their learning environment. At the same time, mobile devices such as mobile phone, smart phone, PDA, and laptop have been easily accessible for ordinary people. Researchers in [9] and [11] emphasize that mobile devices play an important role in learning. For example, the teacher uses his Smart Phone to bring the presentation file and to control the slideshow, while the students can use a laptop to discuss with others. Some of these features have been incorporated in several projects.

Previous Smart Platform enables mobile devices roaming with users to connect into Smart Space by preinstalled modules (eContainer and eADK-based agent of Smart Platform). However, it lacks convenience for the users, especially for those who first come into Smart Space to use their mobile devices. Open Smart Platform applies OSPG as the Web-based mobile interface for mobile devices interaction in Smart Space. OSPG provides the mobile interfaces, such as PPT upload or Turn-to-Next-Page, as a Web page [5], [7].

Since almost all the mobile devices such as laptop, PDA, smart phone, or even normal cell phones have an integrated Web browser, it is very convenient for the users to access the services and interfaces inside Smart Space [4], [8]. Besides providing extensibility, load scalability for the mobile devices to interact with Smart Space is also improved by this mechanism. Serving as a proxy between the mobile devices and modules inside Smart Space, when the concurrent mobile device access increases, OSPG could involve load balancing [6], [10] and cache mechanism to alleviate the total load for Smart Space and also could control the total number of the concurrent mobile devices in order to avoid the overload of the whole system. This article will review the evolution of online tutoring and discuss the best practices suggested by the studies.

3. Efficient Online Tutoring Service

Tutoring services are complete entities designed for a specific purpose and targeted at a specific audience. Providers of learning services can state clearly which kind of skills they want to develop and train in the learner. Learning objects are of a more general nature and of a smaller granularity level. Educators and (semi-) automated tutoring systems compose learning services out of learning objects and other educational resources. Because of the extensive use of resources, learning services - especially in the corporate world - do not come for free. Hence, exchange transactions comprising provision, offer placement, announcement, booking, and payment of educational services need to be supported by a mediating infrastructure where users are authenticated.

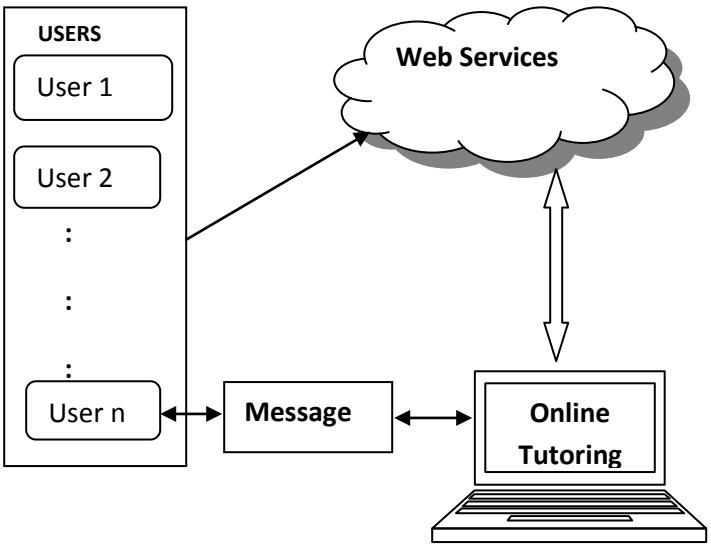


Fig 1. Online Tutoring Service

Tutoring services which make use of physical or human resources are offered according to a specific schedule since the use of those resources needs to be managed. A talk is held at a specific point of time, a course is offered within a semester period, tutoring sessions require an appointment, etc. When it comes to the delivery of a learning service, providers follow a specific objective. In the case of the delivery of a course, for example, the accompanying objective can be explicitly expressed by the educational objective and the learning goals of the course. Consumers of services are motivated by a particular objective when they consume a service. Mediation of learning services requires matching the goals of the prospective learner with the educational objective addressed by a learning service. The modeling of learning services with web services also opens the possibility of automated integration of educational services into a smart learning space and the automated combination of them. To perform this task, however, we need also semantic information about the educational services.

The online tutoring service was originally conceived as a means to provide assistance for students enrolled in distance learning classes. However, before its launch, the program was opened up as a free resource available to all Pima students. Tutoring is provided in writing, math, and accounting. Students who wish to use the service obtain an access code from their instructor or the West Campus Learning Center. Students may choose to communicate with a tutor in real time or may leave questions and retrieve the tutor's response at a later time. The program provides a number of options: one-on-one tutoring; group sessions led by a tutor; and sessions that

include groups of students, their instructor, and a tutor for support. As online tutoring continues to grow, there is an expectation that more academic subjects will be added to the service. After Pima's yearlong pilot project, the tutors are now developing best practices, which focus not on the technology itself, but on the development of the whole online tutoring environment. Moreover, part of establishing the online tutoring environment is to establish the expectations and the parameters for students.

4. Result and Discussion

Web Services provide an ideal contemporary solution for hyper linking software components over the Internet. During the 11 weeks of the course, a total of 25 users participated in the experimental group. In experiment initially 5 users only participated. The communication rate was 82%.First of all, the student judgments should be in line with the staff-tutors' rating. After all, the students could have been satisfied too easily. The two staff-tutors rated all questions, including the questions started but not yet rated by the students. The overall agreement between the tutors on solved versus not-solved questions is high: 85% or 73%.

If we combine the judgment of the students and the tutors, by counting a question as solved if at least two of the three ratings are 4 or above, the number of questions solved is approximately the same as the number indicated by the students. So student opinion does not differ much from expert (staff) opinions. Second, irrespective of an overall agreement between students and staff, there should only be very few 'false-positives'. A false-positive is an answer that according to the student is right but actually is wrong. Too many false-positives are a threat to the quality of education. Based on the ratings, we identified 8 questions that required further analysis.

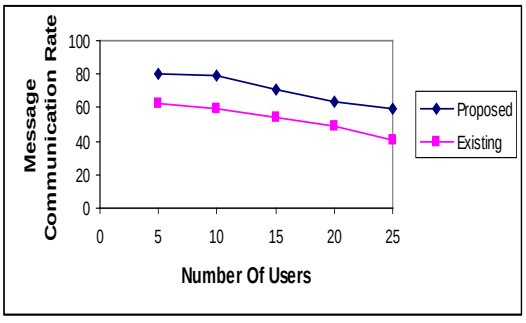


Fig 2. Number of users Vs Message Communication rate

From the experimental results, if Number of users increased the communication rate decreased. Compared to existing work our proposed model is having high efficiency.

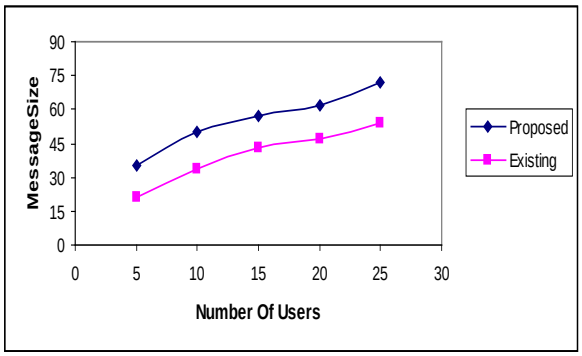
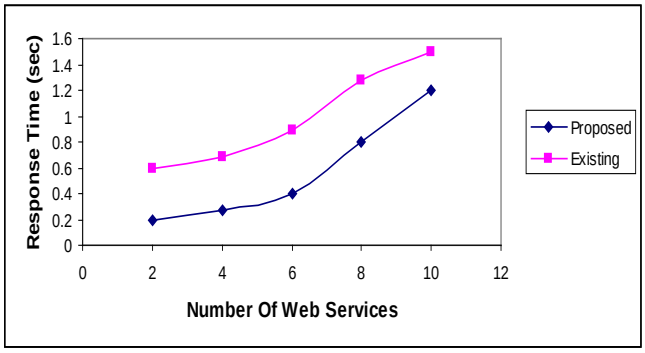


Fig 3. Number of users Vs Message Size

The above figure shows the figure as Number of users Vs Message Communication rate. The number of users is directly proportional to the message size. So if more number of users participates the message size also increased automatically.

Fig 4. Number of web services Vs Response Time

The figure 4 shows that the number of web services vs. response time. If Number of web services increased, then the response time also increased. Our proposed model is having effective response time compared to existing model.The proposed framework is experimented to show the performance improvement with the existing model in terms of application throughput, delivery report, interaction of more number of people, and scalability. Our framework has high throughput, less delivery time and increased scalability. Our model interacts with more number of users.



5. Conclusion

The evolution of online tutoring has showed us that success may not depend so much upon the tool selected, but on the development of an appropriate culture for online tutoring, an understanding of the process and parameters involved. Learning services which make use of physical or human resources are offered according to a specific schedule since the use of those resources needs to be managed.

In this paper we propose an encapsulated education environment which effectively integrated Web Services to exploit the resource sharing for relevant online tutoring domain. Our model has some properties as Easy installation, Ease of use, Low maintenance efforts, and Integration with other Internet/Intranet based education tools. The experimental results show the improved performance of throughput, delivery time and scalability.

References

[1] Yue Suo, Naoki Miyata, Hiroki Morikawa, Toru Ishida, and Yuanchun Shi, "Open Smart Classroom: Extensible and Scalable Learning System in Smart Space Using Web Service Technology", IEEE transactions on knowledge and data engineering, vol. 21, no. 6, june 2009.

[2] H. Allert, C. Richter, and W. Nejdl. Learning objects and the semantic web. explicitly modelling instructional theories and paradigms. In Proceedings of E-Learn 2002: World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education (formerly the WebNet Conference), Montreal, Canada, Oct. 2002.

[3] ebXML, Business Process Specification Schema.

http://www.ebxml.org/specs/ebBPSS.pdf.

[4] N. Friesen, A. Roberts, and S. Fisher. Cancore: Metadata for learning objects. Canadian Journal of Learning and Technology, 28(3):43–53, 2002.

[5] A. Maedche and S. Staab. Services on the move – towards p2p-enabled semantic web services. In Proceedings of the Tenth International Conference on Information Technology and Travel & Tourism, ENTER 2003, Helsinki, Jan. 2003.

[6] M. Sintek and S. Decker. Triple–a query, inference, and transformation language for the semantic web. In Proceedings of the International Semantic Web Conference (ISWC2002), Sardinia, Italia, June 2002.

[7] Addison Wesley. (2005). The Tutor Center. Retrieved September 20, 2005 from http://www.aw-bc.com/tutorcenter/index.html

[8] Christ, F.L. (2002, February). Achieving student retention, satisfaction, and success through online pedagogy. A presentation at TechEd, California State

University, Long Beach.

[9] Doherty, B. & Atkinson, M. (2004, Spring). A pilot study of online tutoring using Smarthinking. PowerPoint presentation. Retrieved June 15, 2004 from http://www.smarthinking.com

[10] Fryer,W. (2003, June 30). John Couch: Delivering measurable achievement, NECC Presentation. Retrieved April 24, 2006, from http://webpages.acs. ttu.edu/wfryer/ necc2003/couch.html

[11] L. Stojanovic, S. Staab, and R. Studer. elearning based on the semantic web. In Proceedings of the World Conference on the WWW and Internet WebNet2001, Orlando, Florida, USA, 2001.

M.Balakrishnan received the M.E. degrees in Computer Science and Engineering from K.S.Rangasamy College of Technology, Tiruchengode, in 2006 respectively. During 2007-2009, he worked as Lecturer in K.S.Rangasamy College of Technology in Tiruchengode. He now with Selvam College of Technology, Namakkal, Tamilnadu, India as Assistant Professor in Department of Computer Science and Engineering.

Dr.K.Duraiswamy received the B.E., M.Sc. and Ph.D. degrees, from the University of Madras and Anna University in 1965, 1968 and 1987 respectively. He worked as a Lecturer in the Department of Electrical Engineering in Government College of Engineering, Salem from 1968, as an Assistant professor in Government College of Technology, Coimbatore from 1983 and as the Principal at K.S.Rangasamy College of Technology from 1995. He is currently working as a Dean in the Department of Computer Science and Engineering at K.S.Rangasamy College of Technology (Autonomous Institution).His research interest includes Mobile Computing, Soft Computing, Computer Architecture and Data Mining. He is a senior member of ISTE, IEEE and CSI.