National Statics Clearinghouse (NSC) Database

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Abstract

A National Statics Clearinghouse (NSC) containing information about, and links to, major publications, pedagogical advances, and course materials related to statics is under construction. The NSC database will allow easy searching by keyword, author, and institution provides “one-stop shopping” for instructors searching for information and materials focused on improving student learning in statics. The NSC enhances dissemination of knowledge and provides a launching platform for faculty efforts in teaching statics.

I. Introduction

Statics is taught in almost all engineering and engineering technology programs (both 2 and 4-year). Thus, a large number of instructors in colleges and universities are engaged in teaching statics. Their background, training, and ability to stay current with the teaching resources available to them vary widely. Also, there are faculty continually developing, often in isolation, innovative ways to improve teaching and learning of statics. Thus, many new instructional insights or resources continually become available. For instance, the ASEE 1998 and 1999 Annual Conference proceedings illustrate web-based multimedia courseware related to statics. Work recorded by Ogleby et. al. (1998), Jack (1998), Toogood et. al. (1998), and Holzer & Andruet (1999) is available to any student or instructor who knows to access it. Similarly, there are a number of articles in journals and conference proceedings related to incorporation of design, using case studies and open-ended problems, simulations, physical models, hands-on experiments, and various other active-learning strategies.

It will be a great help to instructors if resources on statics (both new and old) are compiled at one site. The National Engineering Education Delivery System (NEEDS), supported by the Synthesis Coalition, was started using a similar concept. While NEEDS is intended to be a national resource for tracking educational materials, information and advances for the entire spectrum of engineering education, maintaining such a database is a huge task. For example, none of the authors listed above are currently listed in the NEEDS database. Even the recent funding by NSF’s Action Agenda for Engineering Education for continued development and maintenance of the NEEDS database may not solve this problem as there are a large number of engineering subjects and NEEDS may not be able to devote extensive attention to just one of them.

II. The National Statics Clearinghouse

The National Science Foundation recently funded a proposal entitled "Statics: The next generation." This proposal included creation of a National Statics Clearinghouse (NSC) to act
as a web-based information portal to publications, pedagogical advances, and courseware related to statics education. Creating and updating this database on a focused topic will be easier and more cost effective then developing and maintaining a huge database like NEEDS. The National Statics Clearinghouse (NSC) will be a statics portal and resource for pedagogy, incorporation of design into statics, integration of related subjects, web-based learning materials, a launching pad for further development, and enhanced dissemination.

The NSC database is easily searchable by keywords, authors, institution, publication year, etc., via web browsers. The NSC also features a content submission tool allowing user (statics’ instructors and students) input of new information and reviews of existing items for inclusion in the database. In addition, the NSC is dynamic in nature and includes links to other sites or resources related to statics teaching and learning.

This paper describes the design of the NSC database, the types of articles and resources included, and current database content. Content will continue to be added during the spring 1999 semester (a live demonstration of the database will be included in the paper’s presentation at the ASEE 2000 Annual Conference). This paper is also an advertisement of the database and a request for all interested parties to help in its development by suggesting or adding new information.

III. Initial Input

The first materials to be loaded into the NSC database were taken from ASEE Annual Conference proceedings. Since ASEE proceedings have been put on CD-ROMs in recent years, they provide a significant resource already in electronic format. The proceedings from 1996 to 1999 were searched using the keyword "statics" and over 300 papers were found. Three-experienced faculty familiar with teaching statics are reviewing these papers. The primary focus of the review is on the value of the material for teachers of statics, either because of content directly applicable to the classroom or support to instructors as they prepare for the teaching and learning process. A star rating system is used, with a range of one to five stars. Five stars indicate that the paper is a tremendous resource for a vast majority of statics instructors and contains significant content towards increasing the learning of students.

This same approach will also be taken towards other related conference proceedings, journals, and on-line resources. For instance, recent Frontiers in Education conference proceedings are available via the world-wide-web. In these cases, the database will not "contain" the actual paper, but will provide a rating (along with information like reviews or user feedback) and a link to the paper at its home web site.

IV. Database Interface

The NSC database is being initially created in MySQL database system. Later this will be exported to PostgreSQL. PostgreSQL is a sophisticated open-source, Object-Relational Database Management System available at no cost. The database will consist of data-tables with the following fields: title, author, affiliation, abstract, keywords, ratings, comments, source, link addresses, and publication year. Each record in the data-table will provide a complete information set about one item on statics.
The NSC database can be searched through any standard web browser. The user interface is a HTML form with text fields, buttons, and pop-up menus so search information can be entered and sent to the web server (and from there to other Common Gateway Interface (CGI) programs) for processing. CGI programs written in PERL will act as the engine searching the database for the required information. PERL was selected as the best available language for string processing and its excellent Application Programming Interface (API) for working with MySQL and PostgreSQL. The database can be searched using criteria like keywords, author, year of publication, source, affiliation, and / or general text search. Once the user submits the search information through the HTML form, the CGI programs will process it. The CGI programs’ embedded SQL queries will query the database and return search results to the users web browser. Search results can then be sorted by year of publication, alphabetically, or by the star rating. The results will also include links to the respective articles.

The ability to receive feedback and comments from the users will be created. All comments submitted by users will be e-mailed for review and inclusion in the database. The database will be dynamic in nature, supporting constant updating and editing.

V. Contact Information

The authors would greatly appreciate a wide range of input for the NSC. Suggestions of features or capabilities of the statics information portal and specific items related to teaching and learning in statics to be considered for inclusion are welcome. Intellectual property rights will be maintained and enforced as appropriate. The author's email addresses are given in their biographies. The web URL for the NSC is www.ndsu.nodak.edu/instruct/mehta/NSC/.

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References

3. National Engineering Education Delivery System or NEEDS. URL: http://www.needs.org
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