PAIRS: Broadening Participation in Computing Search
Conceptual Model P3

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DESCRIPTION OF PROJECT

PAIRS will enable educators at all levels, in both formal and informal settings, to identify, select, and use educational resources that have been shown by research to be effective or promising for increasing the participation of members of under-represented groups in computing. Resources include research articles, teaching methods, assignments, BPC projects, interventions, members of the BPC community, and other sites. In the weeks to come, we will refine the search and make it more user friendly. As with other NSDL libraries, Engineering Pathway does not actually serve the resources, but describes and points to them. It routinely scours its URLs to ensure it is only pointing to live sites, is interoperable with other digital libraries, and is both browsable and searchable.

We are planning for two levels of users: people/organizations that provide online resources for increasing participation of under-represented groups in computing, and the users of such web sites.

The users will include: K-12, Faculty, and College Students. We figured that graduate and undergraduate students could be combined since the resources are so similar.
Screen Shots of Website

Top Portion of Site

Bottom Portion of Site
## Sample Object/Action Analysis

<table>
<thead>
<tr>
<th>Noun (Object)</th>
<th>Verb (Action)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Browse these resources:</td>
<td>Containing all the Link that when clicked takes you to Alliances in the BPC directory</td>
</tr>
<tr>
<td><strong>Sign In</strong></td>
<td>New Users can create their account</td>
</tr>
<tr>
<td><strong>Help</strong></td>
<td>Link that when clicked takes you to the help page</td>
</tr>
<tr>
<td><strong>Contact Us</strong></td>
<td>Link that when clicked takes you to the contact us page</td>
</tr>
<tr>
<td>etc. as deemed necessary based on designer/user agreement</td>
<td></td>
</tr>
<tr>
<td>Noun (Object)</td>
<td>Verb (Action)</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Useful Links</td>
<td>Links to other useful pages</td>
</tr>
<tr>
<td>Professional Societies</td>
<td>pages</td>
</tr>
<tr>
<td>Teaching and Learning Research Centers</td>
<td></td>
</tr>
<tr>
<td>Engineering Education Journals</td>
<td></td>
</tr>
<tr>
<td>Student Competitions</td>
<td></td>
</tr>
<tr>
<td>News and Events</td>
<td>Block containing new events</td>
</tr>
<tr>
<td>Regular Search block</td>
<td></td>
</tr>
<tr>
<td>Advance search to different Grad categories</td>
<td></td>
</tr>
<tr>
<td>etc. as deemed necessary based on designer/user agreement</td>
<td></td>
</tr>
</tbody>
</table>
New Proposed i-Frame

Below is a generic inline frame (iframe) demo.

Attributes: 600px wide, 500px tall, default scrollbar (auto)

Your search will be performed over the collections of the Engineering Pathway. Engineering Pathway is a comprehensive and diverse digital library of rich media, articles, research papers, curricula, and partner organizations on the topics of science, technology, engineering, mathematics, computing and gender. We invite you to peruse these resources or submit those of your own.

Search Learning Resources
Submit Learning Resources

Please Note: You will leave this site and enter the Engineering Pathway site to submit a learning resource. Registration with Engineering Pathway is required for submitting resources. Read more about registration, information gathering and dissemination practices of Engineering Pathway as outlined in their Frequently Asked Questions (FAQ) page.

This i-frame can come in place of regular search block. Clicking on one of the two option will take to respective directed pages
I-Frame
When user click on Search learning resources, I frame will direct to this page for more advance search

Search for Engineering Education Resources

Keyword(s): 
Audience: Select One...
Discipline: All Science and Engineering Disciplines
Resource Type: All

Search Reset

This search is hosted by Engineering Pathway, a digital library of high-quality teaching and learning resources in applied science and math, engineering, computer science/information technology, and engineering technology for use by K-12 and university educators and students. We invite you to visit our site and to view the most recent resources submitted to our ever-expanding collection, five of which are listed below (you will leave the current site to view these external links):

- [Untitled]
- [Untitled]
- [Untitled]
- il-2
- [Untitled]
- tp test 1
**I-Frame**

When user click on Submit learning resources, I frame will take the user to this page for Sign in and all other options related to it.

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**Engineering Pathway**


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**Sign in**

Engineering Pathway Username: 
(Your email address)

Password:

submit

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**Not Registered?**

Create a new Engineering Pathway account.

There are many good reasons to register
- Save learning resources to your Workspace for easy reference.
- Nominate new resources to our collections.
- Complementary Login to the National Science Digital Library (NSDL).
- At your request, receive periodic statistics on downloads of learning resources you have authored.
- Nominate learning resources for the Premier Award and receive CDs of past Premier Award winners.

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Your registration information is always kept confidential

See Will my registration information or author email be kept private? in our list of Frequently Asked Questions (FAQ) for details.
<table>
<thead>
<tr>
<th>WORD</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-12</td>
<td>Children that are enrolled in grades Kindergarten through their Senior year in High School</td>
</tr>
<tr>
<td>College Students</td>
<td>Students that have graduate from High School and are attending an Institution of Higher Learning. This includes (Undergraduates &amp; Graduate Students)</td>
</tr>
<tr>
<td>Faculty</td>
<td>A teacher, teacher’s aid, or professor</td>
</tr>
<tr>
<td>Project</td>
<td>Advancements in the BPC World</td>
</tr>
<tr>
<td>Resources</td>
<td>Support/Aid to aspects of Education</td>
</tr>
<tr>
<td>Practice Type</td>
<td>Types of Activity</td>
</tr>
<tr>
<td></td>
<td>All other will be added as deemed necessary based on designer/user agreement</td>
</tr>
</tbody>
</table>
User Scenario: K-12

A rural high school math teacher has a group of girls with strong math skills. They have asked him what they can do with math. He mentioned computing as a lucrative and exciting career, but the girls’ eyes glazed over. So on “Back to School” night, he wants to show the girls – and their parents – a video that does a better job of describing the kinds of jobs the girls could have, while also handing out information about which kinds of computing jobs are offshored and which aren’t.

From the Engineering Pathway Homepage, when the BPC button (located to the left side) is clicked, you are taken to:
Broadening Participation

Broadening Participation provides resources for motivating engineering in K-12, increasing diversity and connecting to professional societies and organizations.

Recently, the US National Academies - the National Academy of Science, the National Academy of Engineering, the Institute of Medicine, and the National Research Council - issued a report called Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future. Commissioned by Congress the report concluded that major efforts are needed to reinvigorate core science and engineering programs, else the US "could soon lose its privileged position" as a world leader in science and technology. The report is a call to action to strengthen the science and technology infrastructure in the United States, including our investment in broadening the participation and diversity of the scientific and engineering workforce.

Broadening Participation Resources

- Becoming an Engineer
- Computing Diversity
- Engineering Diversity
- Engineering Professional Societies & Organizations
If you click “advanced search” at the top of the page there will be a way to narrow the search for K-12 Engineering Education Resources. The following will be displayed,
Scenario/Example K-12 (cont.):

In the keyword search field, the terms girls, jobs, computing, offshore, are entered. You are then taken to the results:
User Scenario: College Student Undergraduate

An informatics professor requests a Research Experiences for Undergraduates supplement to one of her existing grants to encourage a minority student she knows to go to graduate school. Now that summer is beginning, the professor realizes she needs some guidance on a number of fronts: What should her role be as mentor? What should the student’s role be as a protégé? Is there any special guidance for working with a student of color? And how does one guide an undergraduate research project? It is such a short time for learning methods, making a plan, reading the literature, and carrying out the research. The professor goes to Google and enters the search terms ‘research’ ‘experience’ ‘undergraduates’ and ‘minority’ and gets more than 5,000,000 hits, most them not useful.

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If you click “advanced search” at the top of the page there will be a way to narrow the search for Undergraduate Engineering Education Resources. The following will be displayed,
Scenario/Example College Student Undergraduate (cont.):

In the keyword search field, the terms research, experience, undergraduates, minority are entered. You are then taken to the results:

![Search Results Image]

- **Educating underrepresented minority students in electronics packaging for the 21st century**
  - Reference - Educational Research Paper
  - Discipline: Computing Diversity
  - *In response to the changing ethnicity of the U.S. work force and the dearth of individuals from underrepresented groups pursuing careers in technical fields, the Georgia Tech Summer Undergraduate Packaging Research and...* [more]

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User Scenario: College Student Graduate

An eight-university alliance is working together to recruit students from minority-serving institutions into graduate programs at majority institutions. The principal investigators know that retention is problematic and that minority institutions often provide more nurturing environments where students don’t question their belonging. But the PIs are not the only faculty who will work with students. They have been warned about “worst practices,” such as marking students as different by calling them “my Hispanic grad student.” The PIs plan to hold a half-day workshop for other faculty, but are not sure where to find quality, targeted materials. They believe a central location for finding such materials would serve not only their workshop needs, but help them to support their faculty.

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Scenario/Example College Student Graduate (cont.):

If you click “advanced search” at the top of the page there will be a way to narrow the search for Graduate Engineering Education Resources. The following will be displayed,
In the quick search field, the terms graduate, faculty, minority, worse practices, best practices are entered. You are then taken to the results:
User Scenario: College Student Graduate II

There is a graduate that is looking for more funding for minority students within the computing and engineering fields. The student is also interested in various engineering research within these fields for his thesis. He asks his mentor and he refers him to the BPC Engineering Pathways website. The mentor explains that this is a great way for minorities to find funding fast and efficiently. In addition, the mentor explains that a lot of research is placed on the site for viewing.

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If you click “advanced search” at the top of the page there will be a way to narrow the search for Graduate Engineering Education Resources. The following will be displayed,
Scenario/Example College Student Graduate II (cont.):

In the quick search field, the terms graduate, minority, computing, engineering, funding, research are entered. You are then taken to the results:
Future Support or Site Extension Material

The following scenarios for other items that could be considered for the site.

User Scenario: Fund raising
A minority professor (faculty member) is looking for projects or information to help raise funds to hold a seminar to recruit additional faculty members (both minority and non-minority) to a newly established university engineering PhD program. Where could he go to find fund raising materials?

User Scenario: Faculty
A Faculty member wants to link multiple journals reporting research on engineering education and related work in science disciplines through a single interface, for that he needs to know about the engineering education research developments by general engineering faculty and administrators, so when the professor searches for Journals on engineering education on Google, he gets more than 100,000 hits. Is there a location just for faculty members?