COLLECTION-BASED CONTINUING EDUCATION & DECISION SUPPORT IN ARCHITECTURAL PROGRAMMING
PROCEEDINGS FROM WORKSHOP HOSTED BY CRS CENTER

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Acknowledgements
Published by HOK for the CRS Center
THE IDEA

Assemble a group of Willie Pena-trained professionals, and others, to form a “wiki-like” knowledge community.

— A wiki is a web application which allows people to add, modify, or delete content in collaboration with others.

PURPOSE

Develop and deploy a digital collection of architectural programming tutorials and tools able to support:

• self-paced continuing education courses for beginners
• in-house company training programs
• continuing education certification

Form an online community of experts that allows current and comprehensive content to be created and reviewed in collaboration

Deliver a service for individuals worldwide who directly engage in architectural programming (e.g. students, instructors, and business professionals).

COLLABORATION

Through collaboration and cooperation among

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- * Participated by teleconference
GOALS
KNOWLEDGE COMMUNITY GOALS

Knowledge Community Goals include:
To form an inclusive, open knowledge community that is:
- formal
- sustainable
- relevant
- global

To support:
- continuing education
- in-house training, and
- certification

For pre-design professionals in built environment.

To develop and deploy a digital collection of programming tutorials and tools.

To provide “residuals” for retirement funding of grey-haired knowledge community.

A group of people who engage in knowledge-sharing activities in support of a common work interest.
The purpose of the CRS Center is to advance innovation and leadership in the design and construction industry.

CRS CENTER GOALS

Established at Texas A&M in 1990
Purpose is to advance innovation and leadership in the design and construction industry.
Acts as the repository of business archives, slide archives, publications and architectural program library of the architecture engineering and planning firm CRS, and its successor firm CRSS.
Goals include:
- To make archived programming material easily accessible
- To be involved in continuing development of programming tools & techniques
- To generate student awareness and interest in programming
- To offer educational opportunities (students, professionals, society)
- To be compensated for services (beyond being a repository)
Course Gateway provides strategic advice and works with clients to create purpose-built solutions for education, decision support and knowledge management.

Course Gateway goals

Provides strategic advice and works with clients to create purpose-built solutions for education, decision support and knowledge management.

Goals include:

- To test commercial viability of collections-based education and decision-support system
- To expand professional services in architectural programming
THE PROCESS

CONTRIBUTING FIRMS & PROFESSIONALS

COLLECTION

COLLECT DEVELOP DISTRIBUTE CERTIFY

GROUPS & COMMUNITIES

DECISION SUPPORT APPLICATIONS

PROFESSIONALS

EDUCATION PROGRAMS

LEARNERS

THE COMPONENTS

CONTRIBUTING FIRMS & PROFESSIONALS

The Knowledge Community includes “legacy CRC” firms/professionals that would contribute to the collection.

CURATOR

Curator manages the public collection, oversees its distribution, and certifies that students and professionals know how to use the information.

PRODUCER

Producer further develops the collection and enrolls users in the distribution of the knowledge: 1) for educational programs, or 2) for decision support applications. The producer will seek channels to expand the community on a global scale.
ON-LINE EDUCATION CONCEPTS

1. **Learning Object** – A video lecture, text file, graphic or picture, game, simulation, or other item designed for presentation, and often interactivity, as tutorial or learning activity.

2. **Repositories and Collections** – A repository is a location where digital learning objects are stored. A repository may be indexed, like a library or archive, but is not necessarily structured for a purpose. A collection is a set of digital learning objects that is structured for teaching and learning purposes. A collection may reside in a single repository, in a set of links to digital objects not resident in a single repository, or be a blend of both.

3. **Curator** – The person, persons or organization responsible for determining what is included, and what is excluded, in a collection. Like the editor and publisher of a reference work, textbook, or manual the curator of a collection bears responsibility for the scope, currency, veracity, and functional performance of the items in a collection.

4. **Content and Media Management Systems** – As digital content has exploded, many enterprises adopted systems to manage and control the content used in their work. Media management systems, pioneered by organizations whose product was digital content, are able to gracefully deal with the large file sizes of rich media, their complex intellectual property, and include many other features specifically for managing rich media.

5. **Learning Management Systems** – Specialized content management systems which organize digital content for courses, support class discussions and interaction, and help with class administration.

6. **Learning Community** – This term was coined (or re-purposed) to describe an online community of learners, especially those that emerged as an aspect of a MOOC or created by online class discussion forums in a Learning Management System.

7. **Adaptive Learning Technology** – Adaptive learning technology refers to the use of educational engagement and performance data to adapt, customize or personalize the learning experience for a group or individual.

8. **Gamification** – This is the use of techniques and platforms from computer and online gaming for purposes of education or problem solving.

9. **Knowledge Representation** – In an educational context, knowledge representation underlies the ability to create question answering capability, derive summaries of material, and form the basis for automated tutoring systems (see Adaptive Learning Technology above and Cognitive Assistance below).

10. **Cognitive Assistance** – Learning support provided by computer-based reasoning, usually manifest as personalized guidance for learners in the form of responses to individual queries.
Digital Object
A special purpose calculator, video tutorial, text file, graphic or picture, game, simulation, or other item designed for presentation and often interaction as tutorial or just-in-time learning activity. A good example of a digital object for decision support is the New York Times app for comparing, and learning about, rent vs. buy economics in residential real estate.

Repositories and Collections
A repository is a location where digital learning objects are stored. A repository may be indexed, like a library or an archive, but is not necessarily structured for a purpose. A collection is a set of digital objects that is structured for decision support purposes. A collection may reside in a single repository, consist entirely of a set of links to digital objects not resident in a single repository, or a blend of both. UpToDate.com is a decision support collection that provides clinicians with “medical knowledge at the point of care.”

Curator
The person, persons or organization responsible for determining what is included, and what is excluded, in a collection. Like the editor and publisher of a reference work, textbook, or manual the curator of a collection bears responsibility for the scope, currency, veracity, and functional performance of the items in a collection. For example, UpToDate “combines an advanced publishing platform with the rigor of a sophisticated editorial process managed by a faculty of accomplished physician authors and editors, renowned leaders [a.k.a. curators] in their specialties.”

Content and Media Management Systems
As digital content has exploded, many enterprises have adopted systems to manage the content used in their work. For basic content management, a very common system is SharePoint from Microsoft but new cloud-based models from the likes of Dropbox, Box.net, and Google are increasingly popular. In content management, vendors abound as do open source options. Media management systems are able to gracefully deal with the large file sizes of rich media, their complex intellectual property, the need to track derivative works, and include many other features specifically for managing rich media such as transcoding among formats and packaging multi-part products.

Decision Support Systems (Analogous to Learning Management Systems)
Specialized content management systems with search, recommendation, and cognitive assistance features (see below). Decision support systems organize and present selected digital content as usable knowledge.

Knowledge Community (Similar to a Learning Community)
An online community that enables both peer-to-peer exchange and expert-to-learner exchanges. These are common in customer support, open source software, and corporate knowledge management activities.

Search and Recommendation Engines (Similar to Adaptive Learning Technology)
Increasingly sophisticated search approaches allow an individual to access usable information in digital repositories or collections. A recommendation engine mines search and use data to adapt, customize or personalize the decision support experience for a group or individual. Includes collaborative filtering: “others who bought this item also bought items x, y and z.”

Gamification
Gamification is the use of techniques and platforms from computer and online gaming for purposes of education or problem solving. It is based on the recognition that computer gaming in all its forms (e.g. online, PC, consoles, casual, etc.) have tremendous reach in terms of usage, and the concomitant technologies of simulation, communication, shared objects, and data can be used to enhance just-in-time learning and decision making.

Knowledge Representation
Based on a long history as a research field in Artificial Intelligence, Knowledge Representation (KR) focuses on machine readable representation of knowledge such as facts, definitions, relationships, causal factors, and implications. Typically KR systems are able to use a set of facts and knowledge to derive new relationships or knowledge via a reasoning or inference system. In a decision support context, knowledge representation underlies the ability to create question answering capability, derive summaries of material, and form the basis for automated just-in-time learning systems (see Recommendation Engines above and Cognitive Assistance below).

Cognitive Assistance
Decision support provided by computer-based reasoning, usually manifests as personalized guidance for users in the form of responses to individual queries.
INQUIRE: Intelligent Textbook
A prototype of an intelligent textbook that answers students' questions, engages their interest, and improves their understanding.
https://www.youtube.com/watch?v=FT/W31MBfTfA

KHAN ACADEMY
Khan Academy is a non-profit educational organization created in 2006 by educator Salman Khan to provide "a free, world-class education for anyone, anywhere."
https://www.KhanAcademy.org

THE UPSHOT APPLICATION
A New York Times website with analysis and data visualizations about politics, policy and everyday life. Interactive data visualizations are excellent examples of digital learning objects.
https://www.facebook.com/upshot

DUOLINGO
Duolingo is a free language-learning and crowdsourced text translation platform. The service is designed so that, as users progress through the lessons, they simultaneously help to translate websites and other documents.
https://www.duolingo.com

E-CORNELL
eCornell is a subsidiary of Cornell University that provides online professional and executive development to students around the world. eCornell offers more than 3D award-winning professional certificate programs in a wide variety of disciplines.
http://www.ecornell.com

UP TO DATE
Up To Date is the premier evidence-based clinical decision support resource, trusted worldwide by healthcare practitioners to help them make the right decisions at the point of care.
http://www.uptodate.com/home

BASECAMP
Basecamp is a web-based application that facilitates project-management.
https://basecamp.com/tour

LINKEDIN
LinkedIn is a business-oriented social networking service. Launched on May 5, 2003, it is mainly used for professional networking. In 2006, LinkedIn increased to 20 million viewers.
https://www.linkedin.com
An author creates, publishes, and curates a structured collection of digital information objects related to continuing education and practice in a specific occupation or profession. These include:

- Knowledge map (which represents the major bodies of knowledge relevant to the profession or occupation as well as relationships and dependencies among those bodies of knowledge) that delineates what is included in the collection and what available through links.
- Curriculum guide (which equates mastery of accumulations of bodies of knowledge and mastery, at different levels, of the occupation and profession).
- Suggested courses of study.
- Tagged video, audio, text, and graphical tutorial objects designed to teach knowledge in the field (includes links to same).
- Tagged video, audio, text, and graphical objects designed to instruct or refresh professionals in the field about techniques or procedures (includes links to same).
- Tagged video, audio, text, and graphical objects that are reference documents or tools for professionals in the field.
- Tagged assessments for self-paced learners to evaluate their progress relative to bodies of knowledge or mastery (includes links).

Tags for all objects are searchable, plain language use guides and/or teaching notes that are visible to all users. The author or authors curate the collection by:

1. Editorial decisions to accept or reject changes or additions to collection of objects.
2. Decisions to expand or contract the collection by new creation or acquisition of objects.
3. Updating the knowledge map and curriculum guide to reflect changes to collection and/or changed practices in the field.

A continuing education instructor's access to and use of the collection mirrors his or her use of textbooks, manuals, reference works, professional tools, and other supporting teaching materials. Instructors create a course by structuring a student’s path through a set of objects from the collection, perhaps using suggested courses of study (from author). Self-paced learning assessments are static and visible to all so instructors may choose to create their own assessments to determine student mastery.

Instructor-created class communities are visible to the author and class community members have access to a forum where they can ask questions of the author, suggest or request revisions, and propose new material to be added to the collection. Instructors who use the collection to support a course will be asked for explicit feedback on the collection during and following course completion.

Instructors and students share a login as part of a class or individually. The student can search and browse the collection or follow a path laid out in the curriculum guide, using the self-paced assessments to determine mastery. Student login provides access to a student contribution forum for suggestions to author or authors. With professional login, an individual can search and browse the collection or follow a path laid out in the curriculum guide, using the self-paced assessments to determine mastery. Professional login provides access to a professional community for peer-to-peer interaction and forum for suggestions to author or authors. Using the knowledge map and tags, the search function will recommend objects as direct or related. With use by larger numbers of professionals the quality and depth of recommendations for in-the-field use will improve.
NEEDS
NEEDS

SYSTEM
There is a need for a SYSTEM that will increase value in
- selling
- improving
- training
• Promote a repeatable common process
• Be reinforced by OJT (On Job Training)
• Provide access to knowledge and information
• Efficient way to work on far-flung projects
• Attract the next generation of professional educators

EDUCATION
The EDUCATION component of the system should
• Address multiple career tracks
  - foundational
  - expert
  - master
• Educate stakeholders/owners
• Improve how the profession values programming
• Convey Problem Seeking process as a ‘decision support method’ that has application beyond architecture
  - For example, TED Lectures
  - Why Problem Seeking is a useful tool
• Provide CERTIFICATION
  - Of pre-design capabilities that owners require
  - Educate stakeholders/owners on the need for formalized credentials
  - Similar to LEED Accreditation that indicates levels of proficiency
  - Like “merit badges”

VALUE PROPOSITION
The system should promote the VALUE PROPOSITION
• For programming and pre-design services
  - Measure performance
  - Get message out
  - Professionals (internal audience)
  - Clients (external audience)
• For the Problem Seeking Method
  - A thinking process that will give company a competitive advantage that is fast & economical to use
  - That can be adapted to a wide range of applications

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### 1. Which category best describes your participation?

<table>
<thead>
<tr>
<th>Category</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representing a Firm</td>
<td>3</td>
<td>26%</td>
</tr>
<tr>
<td>Representing yourself (Individual)</td>
<td>5</td>
<td>42%</td>
</tr>
<tr>
<td>Representing a University</td>
<td>2</td>
<td>17%</td>
</tr>
<tr>
<td>Representing another category</td>
<td>2</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 2. What do you think of forming a Programming Knowledge Community?

<table>
<thead>
<tr>
<th>Benefit 1</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experts</td>
<td>11</td>
<td>92%</td>
</tr>
<tr>
<td>Training</td>
<td>11</td>
<td>92%</td>
</tr>
<tr>
<td>Etc</td>
<td>6</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 3. What is your opinion of the CRS Center and Course Gateway collaborating to provide collection, educational and decision support services to the programming knowledge community?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Like</td>
<td>11</td>
<td>92%</td>
</tr>
<tr>
<td>Dislike</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>I don't know</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 4. What benefits would this collaboration be able to provide you or your organization? List three (3).

<table>
<thead>
<tr>
<th>Benefit 1</th>
<th>Benefit 2</th>
<th>Benefit 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work with smart folks</td>
<td>Work with smart folks</td>
<td>Work with smart folks</td>
</tr>
<tr>
<td>Work with smart folks</td>
<td>Work with smart folks</td>
<td>Work with smart folks</td>
</tr>
<tr>
<td>Work with smart folks</td>
<td>Work with smart folks</td>
<td>Work with smart folks</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 5. Would you or your firm be in a position to support this initiative financially?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2</td>
<td>17%</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>50%</td>
</tr>
<tr>
<td>Maybe</td>
<td>4</td>
<td>33%</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>100%</td>
</tr>
</tbody>
</table>

### NEEDS

The following survey solicits feedback from the workshop participants.
PRE-DESIGN
THE CHARTER FOR PRE-DESIGN KNOWLEDGE COMMUNITY

WHO We, practitioners, educators and owners, that are engaged in architectural programming and pre-design process.

WHAT Agree to:
- Form a knowledge community
- Establish a web application for virtual collaboration
- Organize initiatives
- Provide resources for financial support

WHY For the purpose of:
- Fostering Problem Seeking Principles
- Providing Education
- Promoting the Discipline
- Defining & Communicating Value Proposition
- Advancing the Art & Science of the Method
- Improving the Quality of Design & Construction of Built Environment
- Making Money

HOW LONG Over staged time periods required to establish a self-sustaining knowledge community:
- Start-up: October — December 2014
- Pilot projects and ramp up: Begin 2015
A Steering Committee of the pre-design knowledge community was formed on October 3rd and 4th, 2014 during a meeting in College Station, Texas. Members have been tasked with the following actions over the next three months:

- Launch Pre-Design Knowledge Community
- Organize and Prepare Action Plan for Start-Up
- Define initiatives:
  - Support Team Formation
  - Value Proposition & Brand
  - Programming of Requirements for an On-line System

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Eberhard Laepple
HOK

Lawrence Lander
PDR

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THANK YOU WILLIE!!