

1 A Programming

introduction 2

activities - core* 10

- Program Cuisine - Dining Out 10
- Programming a New Community Center 11
- Post-Occupancy Evaluation - Building Users 12
- Post-Occupancy Evaluation - Function Change 13
- New Facility - Community Center 14
- Development of an Architectural Program 15

*A maximum of 40 hours of core credit may be earned in this experience area.

exhibits 28

- Exhibit 1A-1 28
- Exhibit 1A-2 29
- Exhibit 1A-3 30
- Exhibit 1A-4 31
- Exhibit 1A-5 31
- Exhibit 1A-6 31
- Exhibit 1A-7 32
- Exhibit 1A-8 34

narrative 3

activities - elective 16

- Assessment of Client Needs 16
- Project Kick-Off Meeting 17
- Impact of Code & Site Restrictions on Project Scope 18
- New Facility - Children's Museum 19
- New Facility - Motorcycle Dealer 20
- New Facility - Library 21
- Law Office Addition to a 3,000 GSF Building 22
- A Dynamometer Room for a Motorcycle Dealership 23
- Hospital Layout - Focus on Patient Experience 24
- Addition to a University Science Facility 25
- Partnering with a Contractor: Dealing with a Project Program That Is Over Budget 26
- Project Where There Is an Active Neighborhood Association (Historic District) 27

1A Introduction

By completing the activities in this chapter, you will gain an understanding of the principles involved in programming. The following information is taken from the NCARB IDP Guidelines:

Programming

Minimum Programming Experience: 80 hours

Definition: The process of discovering the owner/client's requirement and desires for a project and setting them down in written, numerical, and graphic form.

Tasks

At the completion of your internship, you should be able to:

- Assess the client's needs, opportunities, and constraints
- Develop and/or review a program with the client
- Develop a vision and goals for the project
- Develop or review client's design standards and guidelines
- Establish sustainability goals for the project
- Define the scope of the pre-design services

Knowledge Of/Skill In

- Architectural programming including working with clients to define their needs
- Facilities planning (e.g., building use; building conditions; systems conditions; infrastructure; space allocation)
- Space planning
- Sustainable design
- Contract negotiation (e.g., fees, scope, schedules)
- Oral and written communications
- Critical thinking (e.g., analysis, synthesis, and evaluation of information)
- Interpersonal skills (e.g., listening, diplomacy, responsiveness)
- Team building, leadership, participation
- Creativity and vision

resources

Download the current Intern Development Program (IDP) guidelines at www.ncarb.org/Experience-Through-Internships.aspx.

The American Institute of Architects. Demkin, Joseph A., ed. *The Architect's Handbook of Professional Practice*. 14th ed. Hoboken: John Wiley & Sons, 2008.

- Chapter 6.2 - Communicating with Clients
- Chapter 6.3 - Building Client Relationships
- Chapter 12.1 - Programming

The American Institute of Architects. Demkin, Joseph A., ed. *The Architect's Handbook of Professional Practice*. 13th ed. New York: John Wiley & Sons, 2001.

- Chapter 1.2 - Understanding Client Values
- Chapter 2.3 - Managing Change in Client Facilities
- Chapter 5.1 - Meeting Client Needs
- Chapter 17.1 - Programming

The American Institute of Architects, *The Architecture Student's Handbook of Professional Practice*. 14th ed. Hoboken: John Wiley & Sons, 2009.

- Chapter 6.1 - Defining Project Services
- Chapter 6.3 - Programming

Narrative

The programmer serves as a translator between the owner(s) and users, who generally are lay people regarding architecture, and the architects who will design a project. Put another way, the programmer separates the signal from the noise, culling crucial data from all the information available about a project. In particular, the programmer helps owners, users, and designers define the scope of work to be solved by the design effort.

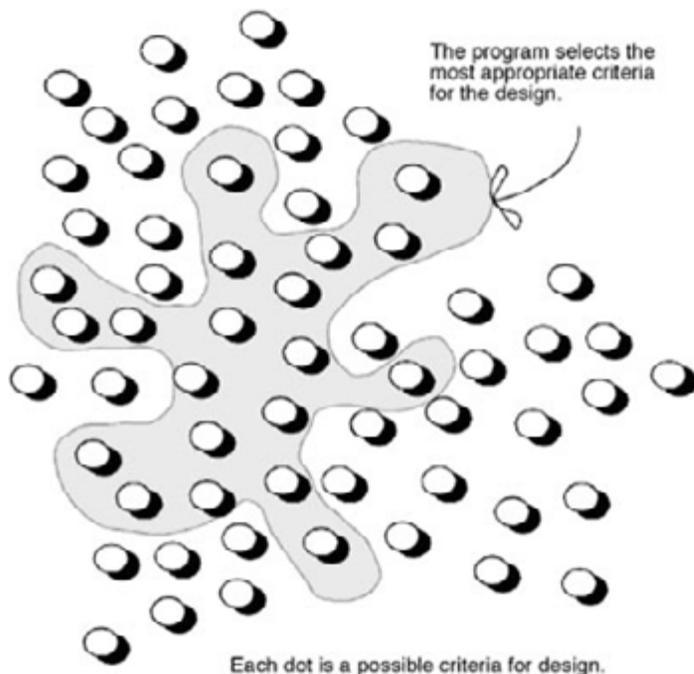
How Does Programming Fit Into The Design Delivery Process?

Programming takes place before any design work begins. The level of detail included in the program should be suited to the designer's task.

For example, programming for a master site plan project should address issues such as the overall image of the facility, its orientation, the gross square footage of built space, the impact of topography and the surrounding context, circulation patterns, parking, utility service to the site, the relationship of one building to another, and expected changes through time.

The program should address issues specific to the building and the site, such as the its scale, image, and functions; the climate; the interrelationship of interior spaces; the flow of goods and services through the building; and the affordability of the project.

For the space planning, interior design, or design development level of a building project, the program provides criteria for interior layouts, selection of furnishings, special lighting and power supply, detailed storage needs, and other issues at that level of detail.



Why Do Architectural Programming?

When executed well, the programming process makes it possible for the architect to focus the design effort on optimizing the form and plan of the project. Redesigning a project over and over as the requirements emerge, called “programming by design,” is very inefficient and takes away time that could be spent making a design more technically effective, functional, and beautiful. (Vitruvius’s definition of architecture: firmness, commodity, and delight.)

The programming phase is the best time to receive input from a wide variety of project stakeholders. Everyone who will be affected by the design should be given an opportunity to participate in programming. To ensure all relevant data is collected, the programmer has to be diligent in arranging for early input.

“If our artistic rhythms—a result—are to be significant, our prior meditations—the cause—must be so.”
—Louis H. Sullivan

Who Should Develop The Architectural Program?

Who the project stakeholders are depends on the type of project. For a small project in which the client is a sole proprietor, the client and the architect may be the only members of the programming team. For public sector projects, such as schools or libraries, a building committee can be set up involving a major decision-maker representing the client (the superintendent of schools, a school principal, or head librarian) and representatives of major groups affected by the project (teachers, parents, students for a school or staff, library patrons, and neighbors of a library). For a corporate client, representatives of each major department may contribute to the programming process.

Often the client is in the best position to recommend a list of participants/stakeholders. The programmer should request the participation of those who will be affected by the design. The more you learn from others who are affected by the design, the better the design will be able to serve those who use it.

It should be made clear at the beginning of the work if the programming committee has authority to approve the program or only to recommend approval to a higher authority. It is also important for the committee members to know how they will make their decisions. Will it be by consensus or majority vote, or will the boss dictate the end result?

How Is A Program Developed?

The programming process can be organized in many ways but, regardless of the format, several general topics must be addressed in order to achieve a comprehensive (qualitative and quantitative) program. There are six steps associated with the programming process:

- 1. Research the project type.**
What is the social, cultural, historical, and economic context of the facility type and the specific project?
- 2. Identify project goals.**
What do the clients (owners, users, general public) want the project to accomplish? What are the project goals?
- 3. Gather and analyze information.**
What information is needed to accomplish these goals?
- 4. Diagram processes and relationships.**
How will the goals be accomplished, given the information gathered in Step 3?
- 5. Establish quantitative requirements.**
What are the quantitative requirements; square footages, budget, schedule?
- 6. Synthesize the program.**
What does all of the above mean in terms of the designer's task?
How is the architectural program synthesized?

Each of these steps is described briefly in the following section on the programming process. The activities included in this chapter address the steps as well.

resources

Download the current Architect Registration Examination (ARE) guidelines at www.ncarb.org/ARE.aspx.

Cherry, Edith. *Programming for Design: From Theory to Practice*. New York: John Wiley & Sons, 1999.

Steps in the Programming Process

No definitive process has been agreed upon by architects and others involved in programming for architectural projects. However, each programming effort will cover the steps outlined here:

Step 1: Research the project type.

Every project type has a characteristic history, vocabulary, and set of spatial relationships. The programmer has to be familiar with these aspects of the project type and be able to communicate them to the owners, users, and design architects. Sources of information include architectural literature, information produced by associations related to the functions of the project type, case studies, and post occupancy evaluations. For example, when developing a program for a fire station, you could search for articles online on that building type, study plans of fire stations to see what space types are included and how they are related, review literature from an association of firefighters, and visit local fire stations.

Step 2: Identify project goals.

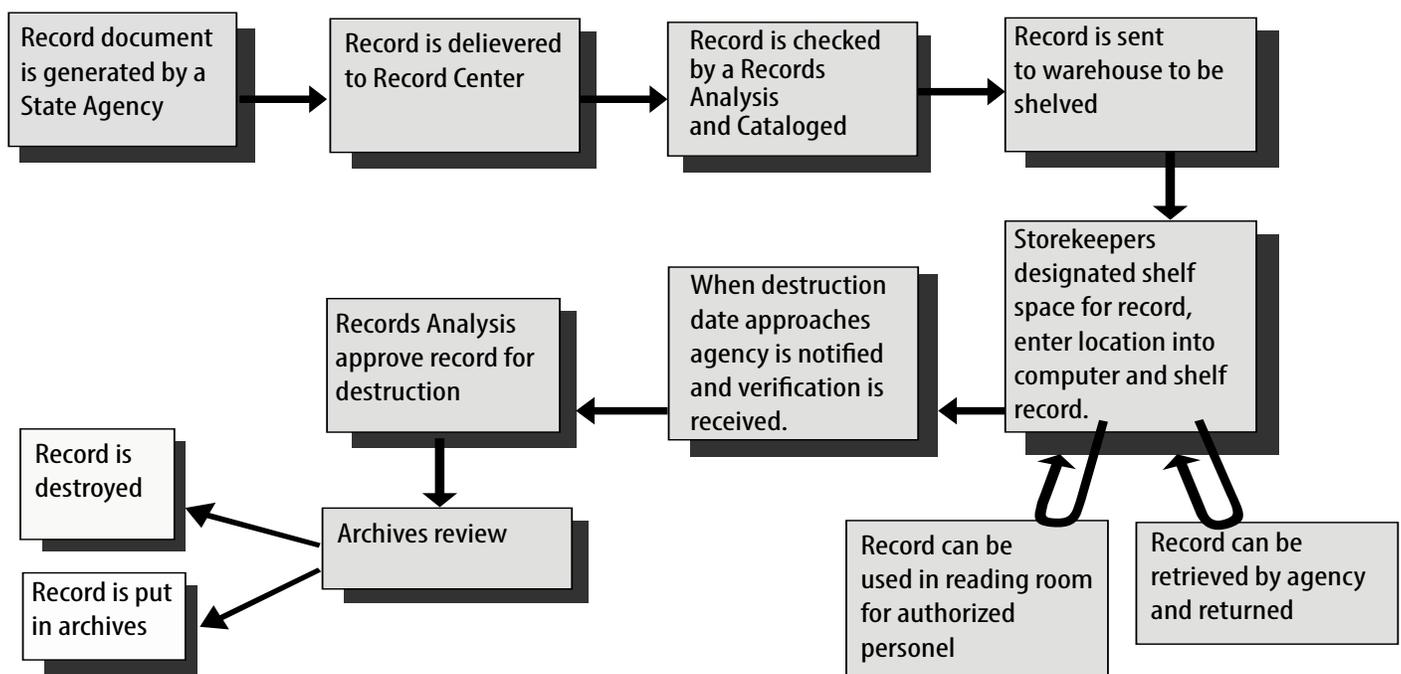
Working with the project committee, establish the major goals of the project—the big ideas. Do not get involved at this point with details that can be addressed later.

Step 3: Gather and analyze information.

Using the project goals as a guide, gather information on activities, schedules, numbers of people, site characteristics, climate, zoning, space criteria, code information, and user profiles. Look for information relevant to the project type such as broad code issues that will affect the design task and the space requirements for each function (e.g., 25 square feet/student is a common space criteria for sizing classrooms).

Step 4: Diagram processes and relationships.

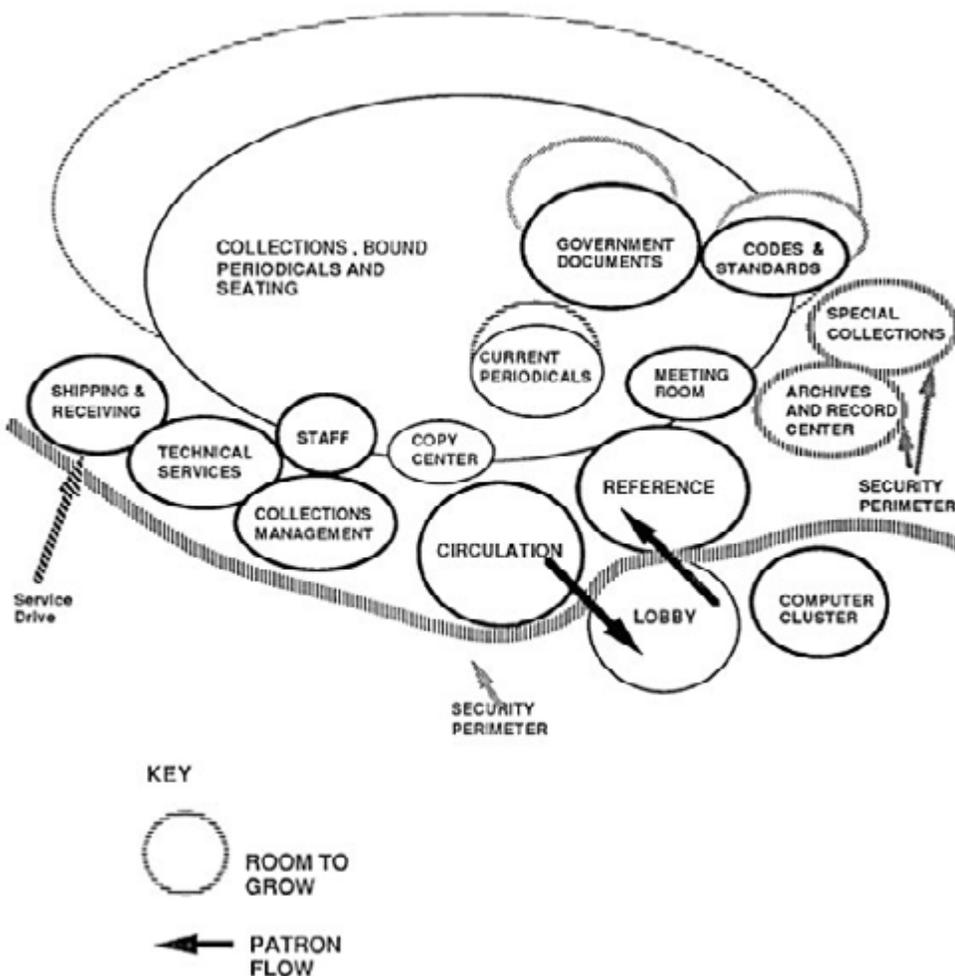
Given the information available, how can design strategies be created to reach the project goals? Take the information developed in Step 3 and place it in diagrammatic form to depict the processes and relationships the finished project must accommodate. Although not solutions themselves, these diagrams help to conceptualize design solutions and are abstract enough to be addressed by any number of physical solutions.



Programming

1A

Flowcharts and relationship diagrams (often called bubble diagrams) are two of the ways you can illustrate information about the client's needs for a project. For example, on page 5 is a sample flowchart for materials housed in a state records center. The idea of a flowchart is to show how goods, services, visitors, staff, information, and other important components of an organization will operate in a new facility. A sample relationship diagram for a university library is shown below. This type of diagram is a step toward laying out the spaces in a facility design.



resources

Hershberger, Robert G.
*Architectural Programming and
Predesign Manager*. New York:
McGraw-Hill, 1999.

Step 5: Establish quantitative requirements.

This step determines how big a facility will be, what it will cost, and when it will be completed.

The size of a facility is determined by using the space criteria developed in Step 3 to allocate space for all the activities identified in that step. Space requirements for the identified activities are called the net assignable square footage (NASF), net because this space is not the total amount required for the project and assignable because the area is assigned to an activity. The total area of the building is called the gross square footage (GSF). The difference between the GSF and the NASF is the space used for common areas such as corridors, public rest rooms, and open but covered space, as well as general support areas, which includes mechanical and electrical equipment space, custodial closets,

and wall thicknesses. The GSF is determined by assuming that the NASF is a percentage of the GSF. The percentage is determined by experience. For example, in a middle school classroom building, the NASF is expected to range between 64 and 68 percent of the GSF. See Exhibit [1A-1](#), [1A-2](#), and [1A-3](#) for sample space allocations.

Establishing the project budget is often a balancing act between the budget goals and the needs and desires of the client. The [diagram on page 6](#) indicates that quantity and quality are in inverse proportion to each other. For a specific budget goal, a client can have a small amount of high-quality space, a large amount of low-quality space, or something in between. The program must find a balance acceptable to the client, which often requires several sessions with the project committee.

The importance of completing this part of the programming exercise cannot be overstated. The objective of the programming work is to define a meaningful scope of work for the design. If the size of the project and the budget are not reconciled, the scope of work will not be realistic. To proceed with design without a realistic scope of work is to invite serious problems later in the project.

Time, as reflected in the project schedule and completion date, also affects project cost. Therefore, cost estimates are adjusted to allow for inflation. Specifically, they frequently are inflated to the midpoint of construction because contractors allow for inflation during construction in their bids. If a project is delayed, the original budget may have to be increased or the project size decreased.

Step 6: Synthesize the program.

In the end, the program must summarize the information and identify the major issues revealed by the programming effort. This step is the most difficult and is best conducted with the designer's input. (Note: Sometimes the programmer and the designer are the same person, and sometimes not.) The questions to be addressed include these: What are the major design issues? What are the major challenges to achieving the project goals? The purpose of the completed program is to focus the design effort and make it as effective as possible. This step also serves to educate the client about the major issues.

Step 7: Document the program.

When documenting an architectural program, value brevity over inclusiveness. The focus of the program document should be the definition of the scope of the work in qualitative and quantitative respects. If it is a program for schematic design of a building, the program should relate the criteria for the schematic design. It does not need to have information on location of electrical outlets and other details that can be resolved in design development. Details that have been discussed should be noted elsewhere, and the notes addressed in later project phases.

notes

Take brief notes while reading the narrative and list key resources you used to complete the activities. Note discussion outcomes from meetings with your supervisor, mentor, or consultants. When finalizing the activity documentation (PDF), include your notes and the Emerging Professional's Companion activity description.

Skills and Tools For Architectural Programming

An architectural programmer needs good research skills. The programmer must answer questions such as: What information do we need? Where is that information? How much information is enough? What do we do if the information we have (e.g., projections) is unreliable?

Until about two decades ago, finding information could be a major problem. Today, with the Internet as a major research tool, information is easy to find. In fact, information overload can be a problem. In addition, since credentials are not required to place information on the Internet, the individual sifting through the quantities of available data must assess its reliability.

“The mere gathering of data should not be considered a substitute for thinking, any more than the gathering of seeds or fruit can be a substitute for nourishment.”

—Anonymous

Sometimes the client is the best source for project data. Even if such client information is flawed, it is the “book” they use, value, and work with, and it will help you see the world through the client’s eyes. However, you are obligated to inform clients about alternatives, as well. Architects always have the dual obligation of learning from and informing the client.

Interviewing

A programmer is like a cultural anthropologist trying to find out what makes a subculture (your clients) tick. A client organization has a governing system, a value system, an economic system, and folklore. Familiarizing yourself with this subculture will help your programming effort. To be a good interviewer, you need to:

- Plan your questions ahead of time and give the client a copy of them before the interview if possible.
- Be prepared to put your questions on the bottom of the pile while the clients tell you what they want you to know. Then get your list out and have your turn.
- Find a good way to document what you are told. You need to feed this information back to the client and your colleagues in the office.
- Be diplomatic if someone gives you information you do not need. Often, such information provides useful insights.
- Be an active listener.

“[T]o listen is to surrender self-thoughts, impinging awareness, and judgments; to listen is to admit a stance, a vantage, a world other than our own.”

—Sven Birkerts

Documentation Skills

The programmer will want to document interviews used to gather information, as well as decisions made during the programming process. The programmer also must be able to compile the program for the owner’s approval and for the use of the design architects. Whenever possible, diagrams and room layouts should be sketched to assist the design architect.

resources

William Peña is often referred to as the “father of architectural programming.”

Peña, William, and Steven Parshall. *Problem Seeking: An Architectural Programming Primer*. New York: John Wiley & Sons, 2001.

The Building Owners and Managers Association International (BOMA) has set standards for measuring buildings, including: office buildings, multi-unit residential, retail, and other building typologies. Learn more about these standards at www.boma.org/MeasurementStandards.

Analytical Skills

Before bringing a new person onto his programming team, William Peña would ask them, “Are you numerical?” To be a good programmer, you have to like people first and diagrams and numbers next. Today’s computer spreadsheet programs, like Excel, make managing the numbers much easier, making it possible to try more scenarios. In attempting to reconcile an owner’s space desires and budget, a programmer can test area (gross square footage) against quality (cost/square foot) at various levels. Most importantly, a programmer must be able to think clearly. This can be difficult, as we each have a personal thinking style that may not be shared by the rest of the world. We have to be analysts some of the time; idealists some of the time; synthesizers some of the time; and pragmatists some of the time. We have to be versatile thinkers, calling on the appropriate thinking style at the proper time.

A programmer also has to think critically, examining ideas as objectively as possible. This is helped by asking questions such as these: Where does this idea fit into the larger scheme of things? How does the value system of the person who suggested this idea affect its meaning? Why did that person say what he said? Why do I keep holding on to this idea when it seems to be weakly supported? How can we reconcile ideas that on the surface seem to be competing?

Finally, the architectural programmer should enjoy synthesizing, or bringing together, ideas. The programmer brings the client, user, and the designer together to agree on a scope of work, and in the process must synthesize ideas as diverse as a climate analysis and a strategy for achieving an image the client has in mind. The programmer provides a service that helps make the design effort more effective and focused, so that creativity has a chance to flourish in the design.

Written by Edith Cherry, FAIA

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notes

Program Cuisine – Dining Out

Supplemental Experience for eight (8) Core IDP Hours

Many people go out to dinner to celebrate a special occasion. Typically the restaurant is chosen based on the type of celebration. Most restaurants have a similar basic program, but it is the additional services and function spaces provided that make them unique and more enjoyable for certain events.

Activity – Core

Compare the following programs: a pizza facility to host a child’s birthday party, a restaurant you would take your sweetheart to on Valentine’s Day, and a place suitable for a happy hour with coworkers.

Write a report describing what makes each of these places appropriate to celebrate the respective event. Assume that each place is located in the same town, and they have the same 3,000 square foot layout. Each restaurant has a dining room that is 60% of the total area and the kitchen, storage, and other areas make up the remaining 40%.

In your report, answer the following:

- How many square feet per person is necessary for the type of restaurant?
- What additions would be needed to make each space unique to its purpose?
- How are server and guests considered in the layout?

Produce plan seating and service diagrams to accompany the written report to explain your solutions.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Programming a New Community Center

Supplemental Experience for eight (8) Core IDP Hours

You are programming a community center for a city with a population of 500,000 that has fifteen other community centers. The activities vary from center to center. You analyzed the square footage for three recently built or expanded centers. Additionally, a budget review has shown that the construction cost allows for a total gross area of 20,000 square feet.

Data on the other community centers are provided in Exhibits [1A-1](#), [1A-2](#), and [1A-3](#).

Activity - Core

For the community center you are programming, develop a draft list of spaces and sizes, totaling 20,000 gross square feet (GSF). From the information shown in the exhibits, decide on an area multiplier to convert total net assignable square feet (NASF) to total gross square feet.

Write a report describing why you made space allocations and program decisions that are on your list. If a 5,000 GSF addition was part of phase two, what programmatic functions would be housed in that space?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Post-Occupancy Evaluation – Building Users

Supplemental Experience for eight (8) Core IDP Hours

Interviewing clients before the design process starts is an essential part of the programming process. Usually this is best accomplished one-on-one, without asking a client to fill out a questionnaire. However, when buildings include a large variety of users/occupants, a survey is an acceptable tool. Similarly, interviewing the building users after the project is completed and they have occupied it for several months is also important.

Activity – Core

Select two projects of similar building types completed by your firm or your mentor's firm less than two years ago. Create a questionnaire for the occupants to complete. Write a summary of feedback you expect to receive from the occupants. Compare your summary to the post occupancy evaluations, if available.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Post-Occupancy Evaluation – Function Change

Supplemental Experience for eight (8) Core IDP Hours

A post-occupancy evaluation (POE) is used to determine the user's level of satisfaction with a building's design and function after at least a year of occupancy. The purpose of this activity is to consider how building functions change over time. This information can be useful in determining the degree of flexibility that should be designed into a project.

Activity – Core

Select a project designed by your office or a mentor's office that has been occupied for 5 to 7 years. If a documented program exists, review it. Review the construction documents to familiarize yourself with changes that may have occurred between the programming and construction documentation.

Make arrangements to visit the building and interview at least three people who have used the building for two years or more.

If the organization has a facility manager, be sure to interview him or her. Ask what changes have been requested and executed. Are there new needs for the current staff?

Write a report (with appropriate graphs or diagrams) on what design elements have proven successful and what aspects resulted in requested or executed change. Try to determine what caused changes. Did the user's intentions change? Did the user's operations require adjustments to the building? Did the designers miss something in the program? Did the programmer miss something? Was the budget sufficient to accomplish the original intentions? What new programmatic requirements are needed with the current staff?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

New Facility – Community Center

Supplemental Experience for eight (8) Core IDP Hours

In this scenario, you are programming a new community center that will replace an older building. In initial conversations with the director of community services, you learn that you are the second firm taking on this task. Apparently the pro-fitness staff thinks the questionnaire was “selectively distributed” because they did not agree with the results.

Through further discussion you discover factions within the community center staff. One faction supports the use of the center for weight training—a free gym of sorts. Another faction feels the clientele of a “free gym” would not be a good influence on adolescents. This group prefers fitness training, aerobics, and spinning bicycle classes. How could the architect reconcile the debate?

Activity – Core

Research community centers and write a report (maximum 250 words) that outlines your programmatic recommendations, and include a programming bubble diagram. In addition, prepare a questionnaire that is relevant to multiple users, to be distributed to all members.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Development of an Architectural Program

Supplemental Experience for eight (8) Core IDP Hours

Select a project designed by your firm or a mentor's firm that has recently been occupied. If the project program was documented prior to design (as is recommended by all programmers), do not refer to that document until after completion of this exercise. Visit the facility and examine the plans and other drawings. Review the information in the programming narrative, the programming activities, and the references referred to in those sources.

Activity - Core

Reconstruct components of the architectural program as follows:

- Develop a set of goals that the completed project addressed.
- Develop a relationship diagram for the project.
- Calculate the square footage from the floor plan, and determine the efficiency ratio of the plan.
- Interview the project designer and determine the major design issues that were resolved. Relate these issues to the other program information. Determine what the role of the client played in the development of the program and the formulation of the design.
- If there was a documented program, compare the information you develop to the documented program prepared for the project. Explain the differences.
- Determine how programming is done in your office or your mentor's office today. Is the process different from the process used on your "retroactive program"?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Assessment of Client Needs

Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, a large corporation has hired your firm to design a new office building. You are the programmer for the project. The site is a lovely, located in a southwestern city in the U.S., where water is a precious resource. However, the city has not yet enacted any ordinances that limit water use.

The chief executive officer (CEO) has envisioned a sparkling white building on a green lawn. He is not from the Southwest and misses the greenery of other parts of the country. Some of the management directors are more sensitive to the water issues of the area.

Activity - Elective

On many issues, the programmer should act as a neutral party. Create a questionnaire that will pose unbiased questions to the entire management team assessing their functional needs, as well as meeting aesthetic desires. Include three office building precedents with differing strategies. Use diplomatic language.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Project Kick-Off Meeting

Supplemental Experience for eight (8) Elective IDP Hours

Initial client contact and interviews are key to a successful programming phase. Often you will find clients do not know what they want the first time around. A kick-off meeting is defined as the first meeting with the client and project team held in order to make introductions and discuss roles and responsibilities of stakeholders. Multiple meetings and conference calls may be necessary before programming can begin.

Activity – Elective

Ask to attend a project kick off meeting with your supervisor or IDP mentor for a new project. Be sure to take thoughtful notes, including who attended the meeting and why they are a project stakeholder. What materials or information was shared with the client? Write a report that summarizes your interpretation of client needs. Use any graphs or tables necessary to communicate your findings. Meet with your supervisor or mentor (or with whom you attended the meeting) and compare notes.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Impact of Code & Site Restrictions on Project Scope

Supplemental Experience for eight (8) Elective IDP Hours

Often project scope is affected by code and site restrictions. Codes may limit the number of floors and the size of the footprint of a building. Soil conditions may limit the building to one area of the lot because soil conditions are poor everywhere else or a portion of the site may be within a flood plain. Often these variables affect programmatic elements of a building.

Activity - Elective

Select a small recent project that was significantly impacted by code and site restrictions. Reference the applicable local building code of the project you have chosen. If the restrictions were lifted, or a variance approved, what programmatic changes would you recommend? Write a narrative describing the new building based on your new assessment. Include citations from the applicable codes or ordinances.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

New Facility - Children's Museum

Supplemental Experience for eight (8) Elective IDP Hours

The Happy Valley Children's Museum has been operating for more than eight years in "found space" at a local shopping center. The museum is very popular, with an active board of directors ready to raise funds for a permanent home.

In this scenario, your firm is asked to design a new facility for the Happy Valley Children's Museum, with you as programmer. You asked the museum director for current literature and brochures on the museum, as well as the last eight years of annual reports. Exhibits [1A-4](#), [1A-5](#), and [1A-6](#) are excerpts from those materials.

Activity - Elective

Review the exhibits listed above and develop a draft set of goals for the project. It may help to have a list of organizational goals and a separate list of facility goals that implement them. The museum director recommends four considerations:

- Function (activities that require space)
- Form (aesthetics, psychological effect)
- Economy (attitude toward resources, amount of budget)
- Time (move-in date, expected changes over time)

Keep your list of goals concise. Take material that is a subset of a larger, more important goal out of this list, and move it to the part of the program that delineates strategies for accomplishing that goal. Make a list of questions you want to ask to address goals you think need to be added. For a real project, you would take this draft to the first building committee meeting to begin the discussion on goals.

A few days after you draft the goals, review them. Can you boil them down more? Are some of the ideas so closely related they could be combined? Or conversely, does one of the statements cover too many ideas? Make changes to your goals as necessary.

Once you have completed your goals, write a brief report (maximum 250 words) to the building committee. Be sure to explain the function, form, economy, and time.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

New Facility - Motorcycle Dealer

Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, a popular motorcycle dealer has outgrown the tire store where he first began his business. Over the last ten years he has increased his revenue, number of customers, and expanded services. He has been very successful and wants a new building.

Activity - Elective

Determine the program for the project. Interviews have been held with the staff. As part of the programming, you will interpret the staff interviews (Exhibit 1A-7) and develop a flowchart showing how a motorcycle moves through the facility and a relationship (“bubble”) diagram for spaces needed in the new facility.

After making the diagrams, write a descriptive narrative (maximum 250 words). Do you have all the information needed for each diagram? What else would you ask the client?

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

New Facility - Library

Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, your community has decided to build a new library to replace the current outdated and inefficient facility. The community has decided to come to you for design assistance. As an architect that specializes in library design and a founder of a popular book club, you are flattered. The client has decided to give you freedom to develop the program as long as they agree with the direction of your ideas. But you realize that documenting client approval is important.

Activity - Elective

Research the program of a local public library and use this program as the older library you will replace. Through sketch quality bubble diagrams and a written narrative, communicate to the client your initial ideas for a new 50,000 gross square foot (GSF) library.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Law Office Addition to a 3,000 GSF Building *Supplemental Experience for eight (8) Elective IDP Hours*

In this scenario, you are programming an addition to an existing 3,000 gross square foot (GSF) building. The existing building will be remodeled. An additional 2,000 gross square feet (GSF) will constitute the new quarters for an office of 20-25 lawyers. The original building was built in the late 1940's and was used as optometrists' offices. The long narrow shape of these offices will not be suitable for the lawyers, so the interior of the existing building will have to be gutted. You do all the interviews and attend all the user group meetings, and now you have to create a program for this building.

Activity - Elective

Prepare a report to the clients including a detailed scope of work, price per square foot (based on building requirements) and a list of design objectives that will be necessary to renovate the current building with the new client expectations. Interview a senior person in your firm or a mentor's firm to find out what types of unforeseen conditions may arise during construction that may impact the program. Include a summary of findings in a client report, with any appropriate diagrams. Include what you believe to be the appropriate contingency for this project.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

A Dynamometer Room for a Motorcycle Dealership

Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, Big Boss wants to add a dynamometer room to his dealership. He says that when new bikes with fuel injection get tuned, the mechanics need to run them to be sure everything is working right. They have been placing a laptop with the testing program on the handlebars and running the bikes down the interstate at 80 mph to test the tune up. Big Boss doesn't think that is a good idea. His worker's compensation insurance carrier agrees.

One of the chief mechanics, Jeff Smith, has run dynos in previous jobs and is the "main man" to operate the new addition. As you talk to Jeff about how this space should work, he tells you that the customers want to watch their bikes being tested. The dyno is usually sunk in the floor and the bike turns a big drum. The bike has to be running. The force on the drum and measurements on the bike controls indicate what is going on in the bike. He also points out that some of the bikes are air-cooled. "So, we have to have a big fan blowing on the bike while it's running. Plus, we don't want to be breathing all that exhaust."

Activity - Elective

Research the applicable building code to see occupancy type for a dyno room. Big Boss has a total of 30 employees. Only the 12 mechanics will be authorized to use the dyno.

Write a report detailing the programmatic requirements for a dyno room. Include major elements of the design (with estimated square footages, adjacencies) that will have a large cost impact. List and explain the program requirements to protect the customers and those needed to protect the employees. Remember to include acoustical and exhaust requirements in your report. Synthesize the program issues succinctly.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Hospital Layout - Focus on Patient Experience

Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, one lazy summer day, Johnny decides to climb a tall tree. Unfortunately he is not a good climber and quickly falls out of the tree, breaking his arm and leg. His mom was nearby and calls an ambulance which quickly arrives and takes him to the hospital. After running initial tests the doctor determines that Johnny needs routine surgery which requires a night in the hospital. The next day Johnny is released and returns home to recuperate.

Activity - Elective

Using the layout of a local hospital, create a diagram of Johnny's patient experience in the hospital showing the medical services he receives from the time he enters until his departure the next day. Sequentially list all programmatic functions (with basic definitions, adjacencies and approximate square footages) that were required to make Johnny the patient better. Estimate how many hospital employees came into contact with the patient.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Addition to a University Science Facility

Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, you are programming an addition to a science facility at Tankersly State University. The addition will house a new microbiology division in the biology department. The department uses two types of spaces: lecture/seminar rooms and labs. The enrollment data obtained from the university registrar is described in [Exhibit 1A-8](#), column A. The university schedules courses in 39 time slots per week. Labs meet in four hour sessions. Lecture/seminars meet in 1-hour (MWF) or 1.5-hour (TTH) sessions.

University policy schedules labs at no more than 50% utilization and lecture/seminars at no more than 75% utilization. So, for example, the university is willing to have a lecture/seminar room be empty 25% of the time so the room can be used for meetings and other purposes. Labs are scheduled at 50% due to the difficulty of scheduling four-hour sessions and the required prep time between sessions.

Activity - Elective

Using the information provided above, determine how many of each type of teaching space (lecture/seminar and lab) is needed to accommodate the microbiology program at Tankersly. Place your results in the last three columns of [Exhibit 1A-8](#). It may be difficult to achieve the desired percentage of utilization. If you propose one more classroom or lab, the utilization may fall below the desired percentage; propose one less, and the classroom or lab will be too heavily scheduled. Experiment with assuming one or more courses can be taught at different times in the same classroom or lab, but do not mix lecture/seminar and labs. These types of classes cannot be taught in the same rooms because equipment needs are very different. Can you come closer to the desired utilizations?

Write a report summarizing your findings. Include a copy of the [Exhibit 1A-8](#) chart showing your recommended occupancy sequence. Include recommendations of support spaces needed in the addition. Provide diagrams when necessary to illustrate required adjacencies.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Partnering with a Contractor: Dealing with a Project Program that is Over Budget

Supplemental Experience for eight (8) Elective IDP Hours

In this scenario, your office wishes to pursue a design-build project with a contractor who is trusted by the partners in the office. The client, who knows both your firm and the contractor, is on board and wants to move on the project as soon as possible.

You all discuss the quality-versus-quantity issue and agree on a cost per square foot for the building. A contract is signed with all parties for a fixed construction price.

When programming begins, everyone understands that, if the budget remains unchanged, the agreed upon cost per square foot implies a limit on the gross square footage of the project. However, as programming progresses, the owner has a hard time agreeing to reductions in the response to his needs that are needed to stay within the budget. "Scope creep" is at work. A little more space is added here; a little more there. You keep adjusting your spreadsheet, illustrating that the bottom line is going up and up. The contractor thinks he can be very efficient.

Finally, everyone agrees that the project program is way over budget. The project has been delayed while these efforts were being made. Soon, the schedule will be the governing factor, since the owner's lease for the existing location ends on a fixed date. All parties are getting nervous and defensive.

Activity - Elective

Write a narrative detailing how to prevent this situation as the programmer. Could there have been an agreement made in the beginning to establish the rules for programming? Explain and include any limitations and criteria that could have been set. Detail actions to take and the feasibility of this project. Create a questionnaire with that clearly addresses the conclusions in your narrative and that can be used to prevent this from happening in the future.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Project Where There is an Active Neighborhood Association (Historic District)

Supplemental Experience for eight (8) Elective IDP Hours

1A

In this scenario, your client is a developer building an infill project in a historic district on two undeveloped lots. In order to develop a profitable project on the expensive lots, the developer is proposing multifamily housing that is denser than the surrounding neighborhood. The zoning on the site allows for development at the density the developer desires.

From experience, you are aware the historic district has an active neighborhood association. You propose to your client that you meet with the neighborhood association to discuss the project and listen to their concerns.

Activity - Elective

Prepare a questionnaire to distribute at the next neighborhood association meeting to allow you to establish the scope, design objectives and limitations of the public's needs for the proposed project. Knowing this project will most likely produce opposing points of view, describe in a narrative a programming technique to use with the developer and neighborhood association together so they feel they have participated in the design. Review and cite a local historic district code in your questionnaire, and if needed, include appropriate diagrams or graphics.

Share your work with your IDP supervisor or mentor and make suggested changes. Document the final version as a PDF.

Programming

1A

Exhibit 1A-1

Microsoft Excel - Exhibit_1A-1.xlsx

	A	B	C	D
1	Downtown Community Center (December 1999)			
2				
3	Assignable Space	Area (sq.ft)	%GSF	
4	Vestibule #500B	150		
5	Vestibule #600B	150		
6	Hallway #500C (lobby)	420		
7	Hallway #600C (lobby)	560		
8	Reception 501	90		
9	YDI Reception	247		
10	YDI Office #1	224		
11	YDI Office #2	104		
12	YDI Office #3	102		
13	Reception 600E	195		
14	Crafts	1,204		
15	Storage for crafts 618	140		
16	Storage for crafts 619	94		
17	Fitness	1,436		
18	Lockers	68		
19	Storage for fitness	133		
20	Office 614	127		
21	Communications (office) 613	132		
22	Office 615	163		
23	Storage for office 615	44		
24	Gym (showers in restrooms, no lockers)	7,140		
25	Storage 611 for gym	261		
26	Storage 612 for gym	219		
27	Computer classroom	912		
28	Server Room	120		
29	Game Room	1,584		
30	Storage for Game Room	174		
31	Meeting Room (divisible into 2 sections)	2,592		
32	Chair Storage #1	165		
33	Chair Storage #2	108		
34	Electrical Equipment Storage	21		
35	Kitchen	233		
36		Total	19,312	61%
37				
38	Non-Assignable Space			
39	Men's Room, Women's Room			
40	Walls, Hallways (except lobby)			
41	Janitor, mechanical rooms, electrical rooms			
42		Total	12,463	39%
43				
44	Gross Square Footage (GSF)	31,772		
45				
46	Sitework	Units		
47	Bus Shelter	1		
48	Handicapped Parking Spaces	9		
49	Parking Spaces	53		
50	Basketball Courts	2		
51				

[Back to Narrative](#)

[Back to "Programming a New Community Center"](#)

Microsoft Excel - Exhibit_1A_2.xlsx

	A	B	C	D	E
1	Midtown Community Center	Addition February 2003			
2					
3	Assignable Space	Area (sq.ft)	Notes		% GSF
4	Office/Reception	270			
5	Storage for Office/Reception	35			
6	Gymnasium	5,610			
7	Gym Office	144			
8	Lockers, Showers, Toilets	592			
9	Weight Room	812	New Addition		
10	Computer Classroom	942	New Addition		
11	Storage for Computer Classroom	75	New Addition		
12	Storage (general)	178	New Addition		
13	Classroom 1 and 2	1,539	New Addition		
14	Storage for Classroom 1	94	New Addition		
15	Storage for Classroom 2	45	New Addition		
16	Storage (general)	84	New Addition		
17	Storage for outdoors	60	New Addition		
18	Ceramics Storage	743	New Addition		
19	Kilns	203	New Addition; 4 kilns		
20	Art Studio	1,033	New Addition		
21	Indian Room (meeting room)	2,425			
22	Kitchen	625			
23	Vending	153			
24	Office #2	675	open office?		
25	Game Room	1,078			
26	Office #1	130			
27	Reception	323			
28	Assignable Space Total	17,868			78%
29	Non-assignable space	5,023			
30	Total gross square footage (GSF)	#####			
31					
32	New Addition				
33	Assignable Space	5,808			64%
34	Non-assignable Space	3,227			
35	New Addition gross square footage	9,035			
36					
37	Sitework				
38	Parking				
39	Handicapped		2		
40	Van-accessible		1		
41	Regular		99		
42	Bicycle		4		
43	Basketball Courts				
44	84x50		1		
45	74x42		1		
46	42x42 Half Court on Parking		3		

[Back to Narrative](#)
[Back to "Programming a New Community Center"](#)

Exhibit 1A-3

Microsoft Excel - Exhibit_1A-3.xlsx

	A	B	C	D
1	Taylor Ranch Community Center (1/03)			
2				
3	Assignable space	Area (sq ft)	% GSF	
4	Fitness	1,391		
5	Storage	117		
6	Storage	109		
7	Computer Classroom	1,669		
8	Chair storage	150		
9	Equipment storage	154		
10	Chair storage	106		
11	Games	1,389		
12	Open office	364		
13	Office	103		
14	Office	177		
15	Office	140		
16	Office	101		
17	AV	101		
18	Data/com	103		
19	Chair storage	108		
20	Materials storage	115		
21	Arts & Crafts	1,201		
22	Meeting/Classroom	1,652		
23	Kitchen	429		
24	Storage	116		
25	Storage	116		
26	Storage	58		
27	Chair storage	152		
28	Storage	310		
29	Storage	102		
30	Chair storage	205		
31	Meeting room	3,073		
32	Vending	168		
33	Total	13,979	63%	
34				
35	Non-assignable space			
36	Janitor	87		
37	Electrical	104		
38	Mechanical	308		
39	Hallway	251		
40	Hallway	1,568		
41	Hallway	496		
42	Vestibule	75		
43	Hallway (lobby)	1,878		
44	Vestibule	113		
45	Hallway	1,188		
46	Vestibule	76		
47	Janitor room	213		
48	Men's toilet	326		
49	Women's toilet	291		
50	Accessible toilet	77		
51	Walls	1,370		
52	Total	8,371	37%	
53				
54	Total gross square feet (GSF)	22,350		

[Back to Narrative](#)

[Back to "Programming a New Community Center"](#)

From a Happy Valley Children's Museum's general publicity brochure:

The Happy Valley Children's Museum celebrates the child in all of us. We believe that learning is fun and fun is learning. Through play, we encourage children to expand their own learning. We accomplish these objectives by providing an environment that allows for exploration and interaction with that environment and the people, young and old, who are using it.

There are times when children hope to be stimulated by the environment. There are also times when they hope to be the stimulus. We offer opportunities to do both. The same reciprocity occurs between children and our staff.

We seek to be the place where the entire community comes to learn and play.

Exhibit 1A-5

From the most recent annual report:

The following activities that took place this year illustrate the variety of experiences children have at the Happy Valley Children's Museum:

- A ten-year-old played chimes in the garden.
- A class of third graders made costumes and put on a play they wrote.
- First graders built a playhouse out of cardboard boxes.
- A teenage intern conducted a workshop for intern candidates.
- A workshop was held for local third grade teachers.
- Children gave a musical concert in the amphitheater.
- The Museum on Wheels visited 18 schools.

Statistics:

- 64,000 individuals visited the museum during the year.
- 8,020 school children visited from local schools.
- 220 volunteers helped maintain exhibits, designed and built new exhibits, assisted on the exhibit floor, cleaned the museum, and helped in hundreds of other ways.
- 10,250 new members joined the museum.

Exhibit 1A-6

From the collection of annual reports:

For the last eight years, the following visitor statistics emerged, beginning with the first year of operation:

- | | |
|----------|----------|
| • 6,000 | • 20,000 |
| • 8,000 | • 32,000 |
| • 9,000 | • 40,000 |
| • 12,000 | • 64,000 |

The annual reports indicate that the exhibit floor and the "Birthday Room" are rented for private parties as a fund-raising activity.

[Back to "New Facility - Children's Museum"](#)

Exhibit 1A-7

Excerpts of interviews for the motorcycle dealership follow:

Chucky, Warehouse Manager: “Well, we get the bikes by semi-tractor trailer. You have to watch the drivers, ’cause none of them can back up a truck. Half the time they run over the curb or come close to wreckin’ somethin’. Bikes come crated in the worst to get off crates you ever saw. We use that hyster there to get them off the truck and into the warehouse. Course, there’s all kind of paperwork to do when they come to keep some truck jockey from ending up with a new bike by accident. Then, we’re left with all this wood from the crates.”

Antonio, Bike Prep: “Yeah, see, the bikes don’t get here ready to ride. No way. My guys have to put on the bars and a bunch of other stuff. They won’t put all that stuff on at the factory ’cause it makes the crate too big. Plus, there’s always something scuffed up or chipped paint or somethin’. We do some of it and then let the mechanics check it out.”

Squid, Head Mechanic: “We make sure all the parts got put on in the right place. Half the time the factory guys are dreaming instead of working. Plus we have to jet everything for this altitude. Once we get them runnin’ right, then the bikes get a bath. Be sure you put a drain in the wash bay. And be sure it doesn’t stop up every five minutes.”

Danny, Parts Manager: “If a bike was ordered with a special part, like a fancy muffler, we would have ordered that part. It gets delivered, and we have to check it into the inventory. We have to keep all the parts in a separate area kind of under lock and key, or they walk off. So, that’s why we have a window between the parts storage and the mechanics’ area, see, over there. We also have a window between parts storage and the parts counter in the display room. Also, we have to keep a good inventory and know where all the parts are when someone needs this gadget or that widget. Well, anyway, we have to have the muffler ready for the mechanic to put it on before we tell the customer to come get their new dream!”

Beth, Bookkeeper: “Before the bike gets to the floor, we have to be sure the inventory documents are all in order. I also have to record all the credit and payment information, since we finance about 40% of the bike sales.”

Hollywood, Service Manager: “Well, what happens at the service desk is customers bring their bikes in for tune-ups or repairs. They check in here, and we schedule the work. Usually, they call first, but sometimes we repair bikes for people who are on the road and break down nearby. The service desk needs to be near the mechanics, and it is probably best if we have our own door to the outside. The customers can park their bikes right outside, so we don’t have to push them so far into the holding area. They stay there ’til they get worked on. Oh, and we need a couch and a coffee pot, ’cause the travelers are here for quite awhile sometimes.”

Lefty, Parts Sales Desk: “We need to be handy to the customers, but close to the parts warehouse. Customers come and look at all the motor clothes and parts and stuff. They can order parts for their bikes here. We have all these catalogs with every part you can ever imagine.”

Maggie, Motor Clothes: “Well, most people think bikes are the hot sales item. But we make more on motor clothes than bikes. Course, I wouldn’t be able to get a bike salesperson to admit that. What we

Exhibit 1A-7 continued on page 34

Excerpts of interviews for the motorcycle dealership follow:

want is for customers to come in and have a good time, browse around, and buy something. Don't make any straight lines to the parts desk. Make the customer come past all the clothes on the way to parts or service. Oh, and I need some storage for replacement stock. We get a great deal if we buy a ton of T-shirts, but I can't display them all at once."

Becky, Head Salesperson: "Look, on the sales floor there needs to be lots of lights so these babies sparkle. There is nothing as glorious as tons of chrome, all in one room! Give us enough room to spread the bikes out for folks to walk between them and take a good look. And we need some little offices to make the sales deals. They can be small, cause we're always out on the floor selling those bikes."

Boss Man, Dealership Owner: "Hey, all I need is a nice office with windows onto the sales floor. I like to be near the main entry 'cause I like to welcome the customers."

Exhibit 1A-8

University Classroom/Lab Size Data

Course	A	B	C	D	E	F	G
MBio 302	510	3	90	39			
MBio 303	483	3	90	39			
MBio 302 Lab	510	4	24	39			
MBio 303 Lab	483	4	24	39			
MBio 402	450	3	90	39			
MBio 403	412	3	90	39			
MBio 402	450	4	24	39			
MBio 403 Lab	412	4	24	39			

Key	
A	Projected total enrollment
B	Number of hours attended per week
C	Optimum class size
D	Time slots available per week for scheduling
E	Number of teaching stations required at 100% utilization ($A/C \times B/D = E$). This number may be a fraction.
F	Number of teaching stations proposed that approaches the desired percent utilization. It is important to remember that you cannot build a fraction of a teaching station.
G	Percent utilization of proposed number of teaching stations ($F/E=G$)

[Back to "Addition to a University Science Facility"](#)

notes

Take brief notes while reading the narrative and list key resources you used to complete the activities. Note discussion outcomes from meetings with your supervisor, mentor, or consultants. When finalizing the activity documentation (PDF), include your notes and the Emerging Professional's Companion activity description.

1A

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