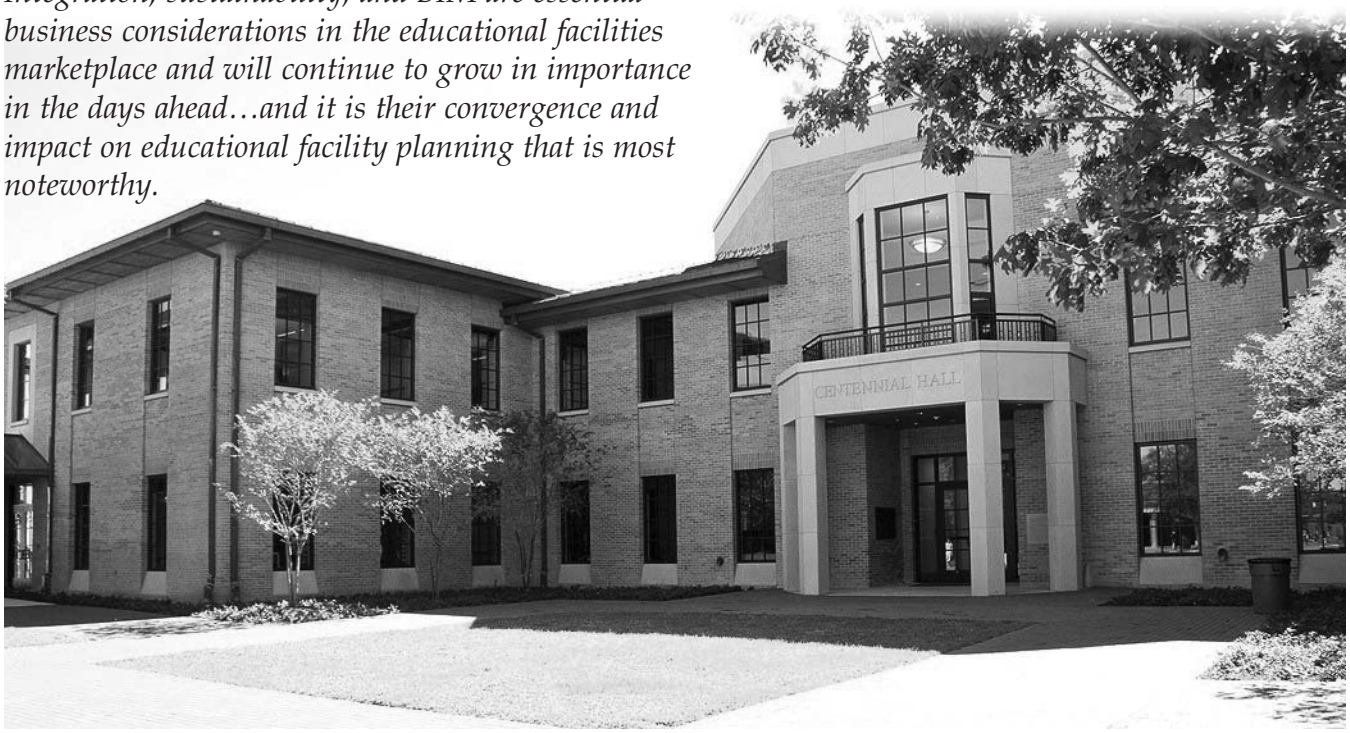
What's in Your Back Pack?

Three essential items for survival in the tough and changing world of campus construction

By Rick del Monte

Integration, sustainability, and BIM are essential business considerations in the educational facilities marketplace and will continue to grow in importance in the days ahead…and it is their convergence and impact on educational facility planning that is most noteworthy.



St. Marks: Building private school facilities by incorporating BIM, integration and sustainable elements can reduce project delivery times and streamline budgets.

As students know, the tools in their backpacks can influence success. If they're off to math class, a good calculator is essential. When on their way to English class, a laptop is fundamental. Building facility executives too have tools in their backpacks to assure the successful creation of educational buildings. Only their tools are knowledge-based skills: hire and train the best people, provide outstanding buildings, and complete projects on time and on budget. These will continue to be important for the future, but three new tools have emerged that are now playing an important role as well — integration, sustainability, and building information modeling (BIM). Though all three of these are important on their own, it is their convergence and impact on educational facility planning that is most noteworthy.

Models Help Define Educational Facility Needs

Recently, building information modeling (BIM) has been all the rage in facility planning. BIM offers an intelligent 3D model that contains information such as the physical properties of the model components, the cost, and the schedule for construction. Floor plans, elevations and sections of the facility automatically update and interact with each other intelligently. The term 'intelli-

Baylor Front Perspective with Front Evelvation

The Baylor University Science Building in Waco, TX is four stories encompassing 508,000 square feet. It includes three, two-story auditoriums and five interdisciplinary research centers. It was created using a design-build project delivery system involving BIM, integration, and sustainability. (Harly Ellis design)

gent model' refers to the concept that all individual elements of a model exhibit physical properties and behave in an intelligent way. For example, a wall would "know" if it rises to the ceiling or attaches to a structural component.

BIM is producing a fundamental change in the way facilities are being designed. It also offers an exceptional tool for design charettes with facilities teams, school boards, and college and university planning groups. Through the BIM software, invested parties can actually see the impact of their design options unfold on the computer screen as "what-if" scenarios are created right before their eyes.

These new BIM packages also give facility planners the ability to do energy modeling at the early stages where major changes in the structure and its orientation are still relatively easy to accomplish. Programs are even beginning to incorporate energy conservation concepts, such as daylighting calculations which take into account glass types and exterior shading.

By allowing the design team to explore multiple options at an early stage in the design, the software can influence budgets and perform value engineering to minimize the cost impact while maximizing the functional value of the educational facility both for its students and its faculty and staff. For example, we were developing a new $3.3 million high school stadium for a private school in Dallas. While trying to work with a specified budget but needing to add a $105,000 scoreboard, the team was able to save over $45,000 by relocating four of the existing 90-foot light poles on the 3D model.

Seeing the value of this tool, some design and construction firms create their own 3D modeling software. At Beck for example, we created DProfiler™, a simple, yet intelligent 3D modeling application driving a real time cost estimate. The user can evaluate numerous project alternatives with very little effort and convey the assumptions clearly to all participants in the early stages. Beck recently donated copies of DProfiler to universities who requested it for use in construction-related coursework. So far, 17 educational facilities have implemented it, from Auburn to Purdue, to the University of Texas.

Green Thinking in the Educational Environment

Sustainability is the second necessary tool for educational facility planners today. For our purposes, I'll define sustainability as the design and construction practices that significantly reduce or eliminate the negative impact of our facilities on the environment and occupants.

Currently, buildings in the U.S. consume 65.2 percent of all electricity and emit 48 percent of greenhouse gases. In addition, they produce 136 million tons of waste. Just imagine how those figures can grow if we don't incorporate sustainable practices into design and construction. We must recognize that, by 2010, another 38 million buildings will likely be added to the American landscape. The impact of our facilities on the environment is understandably under constant scrutiny and regulation. In order to receive governmental funding to finance educational facilities it is imperative that we incorporate environmentally "green" options.

How is sustainability measured? The Leadership in Energy & Environmental Design (LEED), developed by the United States Green Building Council is currently the most recognized standard. It uses a points-based rating system which targets five zones: site planning, water efficiency, energy efficiency, conservation of materials, and indoor environmental quality. Developing an economic cost strategy for acquiring the greatest number of points, and following through with the documentation of those points, requires a combined team effort focused on sustainability from conceptual design through building occupancy.

Currently we are on our third or fourth generation of LEED educational facilities. It has become exceedingly clear that to achieve higher levels of LEED certification requires a strong commitment from all the members of the team. Incorporating sustainable requirements earlier into a project design can produce a more cost-effective solution. Input from the contractor(s) and key sub-consultants is essential in determining what is achievable within the project budget, and to make sure that any additional costs can be value engineered so they do not impact the budget at a later date.

Integrate to Improve Facilities and Processes

The final of our three tools is the idea of integration. Integration refers to the process by which all the participants in the facility planning team collaborate in a way that rewards the success of the overall facility project rather than the contributions of the individual partners involved in the design and construction process.

Integration has previously been used interchangeably with the term design-build; however this is not very accurate. Better examples of the integration process have been around for a long time under titles such as teaming and partnering.

The true key to integration is understanding that collaboration and working together will produce better results by using collective team strengths to balance out the knowledge and expertise of all team players.

However, despite understanding these great rewards, very little has changed in the creation of our facilities by the architecture, engineering, and construction entities. Facility design firms too often continue to operate in territorial ways, staunchly defending their little piece of the pie without considering the contributions of the entire team. So, what is going to be different in the future? I believe the difference is in embracing the challenge we face with sustainability and understanding the promise that BIM holds to help us meet that challenge. Then, facility design and construction teams can leverage the technology available to them and gain significant competitive advantages--but only if they evolve the reward structure so that the interests of individual parties becomes aligned to address the greater good. And this can only take place through proper integration of expectations and processes.

We Don't Need to Face it Alone

Times are difficult. Proposed education building plans are being cut or delayed and budgets are impacted by the recessionary nature of our current economy. However educational leaders, facility planners, and their design and construction partners can learn to create a better and more cooperative future through the use of new technologies and more efficient processes. The new technologies we embrace today give educational facility planners and their teams a collaborative tool beyond anything available in the past.

Integration gives us a platform by which we can face these challenges and optimize facility and building processes. But, to make this a reality we must overcome some traditional barriers. Architects need to be willing to take price risks, contractors need to be willing to take on design risks, and owners need to be willing to share the rewards inherent in defining a better, more cooperative building process. Our educational facilities are being designed to train and grow the leaders of tomorrow. What tools will you carry in your backpack to assure that your facilities team will make grade-A decisions for the buildings—the physical facilities that will serve your students for decades to come? ■

Rick del Monte, AIA is a managing director with The Beck Group in Dallas, TX.