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4D and Smart Cards Make the Grade on Campus



MAPUA INSTITUTE OF TECHNOLOGY
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Smart cards, cards that resemble credit cards but have small, computer chips embedded within them that can store information, are becoming increasingly popular for a variety of reasons. A smart card can store about one hundred times as much information as a magnetic stripe card, including electronic cash, medical history, and general identification information. Smart cards are also compatible with portable electronic devices. With the popularity of smart card technology increasing on a global scale, there has also been a growing need for applications that support and function with this type of technology. At the Mapua Institute of Technology, the largest engineering school in the Philippines located in capital of Manila, 4D is being used in conjunction with contactless smart card technology to benefit student life in a variety of ways.

STUDENT LIFE BEFORE SMART CARDS

Before smart card technology was implemented on the Mapua campus, student life was daily inundated with inefficient and antiquated processes. When ID cards needed to be checked for security reasons, these were checked visually and on an individual basis. Considering that Mapua has 15,000 students at the college level

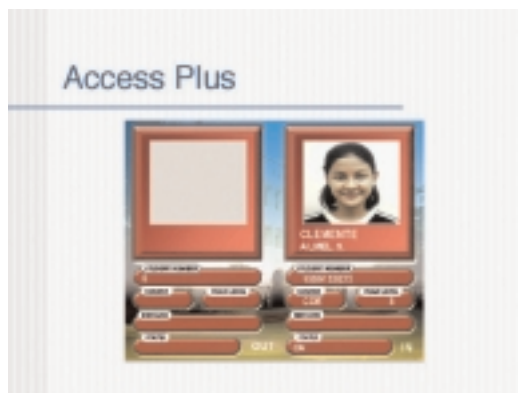
along with a pre-engineering school of approximately 1,800 students, the ID-checking process could not be expedited without sacrificing security concerns. At the library, a separate card was needed to check books out, and this process would involve exchanging library cards and borrowers' slips. When students needed attention for medical and dental needs, looking up individual health records was far from instantaneous, and at the bookstore, there was no option available for streamlining the purchasing process.

SMART CARDS AND 4D CHANGE CAMPUS LIFE

With the help of 4D Server and 4D Client, smart card technology has been successfully implemented at Mapua. Each smart card holds up to 1KB of information, and student records can be accessed from a single 4D database whenever a campus smart card reader interacts with a student's smart card. According to Reinier Veral, Mapua's Internet Research Administrator, "The smart card reader is connected to the computer via the COM1 port, the serial communications port where the old mouse was connected. When the smart card is flashed on top of the reader, identification occurs. 4D monitors the COM1 port using the ON TIMER event every 20 milliseconds to see if there is a card on the field. When it

In Focus

Each student smart card can store information ranging from electronic cash to dental records.



- 4D Server with virtually zero-admin
- 4D Client
- 4D modules serve as user interfaces for different identification purposes
- 4D programming language saves coding time with commands

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detects a card, it sends a request to the card for the card serial number. This serial number is actually tied to a particular student, and once the serial number of the card is known, 4D initiates a query to retrieve a particular student record. Once the record is loaded, it is displayed on a form."

Different student information is accessed using a variety of 4D modules. The modules are forms that serve as user interfaces for the various identification purposes that smart cards serve throughout campus. For example, the library module allows the smart card to act as a library card, keeping track of all books borrowed and returned. The bookstore module gives the card the ability to act as an "e-wallet" where electronic money can be used to buy items. The medical/dental module allows the smart card to act as a health card, providing easy access to medical records. On the average, for the majority of the modules used in the 4D solution, the development time was less than one month.

All the modules reside in stations, which are actually 4D clients that connect to a central 4D server. For Veral, this is a huge benefit for any changes in the system that may need to be accommodated in the future. "4D is a perfect fit for the solution that we wanted to create," said Veral. "If there are additional requirements or modifications in the future, no additional installation is needed because all the changes will actually be reflected on the stations. This is transparently done by 4D Server once a 4D Client connects. And as always, the almost zero-admin of 4D Server is a plus." Veral also finds that the commands provided by 4D's rich programming language are much easier to use than those required by other programming languages. "If we were to use a different programming language such as C++, accessing the port would require more lines of code and these commands would require that you know certain things about the port such as the port's actual address," notes Veral. "With 4D, we use just a single command, and the port addresses and details are all constants that are declared."

The import capabilities of the 4D development environment also give the Mapua solution a remarkable ease-of-use. The original database of the school was written in FoxPro® and when the files needed to be exported into the new 4D database, the process was simple with 4D's importing features, and no encoding was needed. In addition, importing a student's photo onto a card for identification purposes is an easy process. After taking pictures with a digital camera and saving the pictures with student numbers as the file names, Veral used the 4D Pack command GET PICTURE FILE to import all the pictures into the database by creating a simple method.

ONE CARD, A WORLD OF POSSIBILITIES

Today at Mapua, students simply flash their smart cards on a card reader to accomplish a number of tasks. With smart cards, a student's identity can be confirmed, complete with a digital photo. Using electronic cash at the bookstore makes the process of purchasing items run more smoothly without the actual, physical exchange of cash. At the library, the days of writing in library cards and distributing borrower slips are gone, with smart cards holding all borrower and book information. And as for health services, smart cards hold all the details about a student's health and dental records, allowing physicians immediate access to crucial information such as blood type, allergies, medications, and more. On-campus processes are now more efficient with the combined powers of 4D and smart card technology, and students are seeing the benefits on a daily basis.

FOR MORE INFORMATION, PLEASE CONTACT:

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