Improving Student Life at Duke University Through a Campus Card System

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This paper is a case study of how the DukeCard program has improved student life at Duke University by providing greater convenience and safety for its cardholders and by serving as a management information system.

By offering many different services, including a Dining plan, a debit account, access to residence halls and academic buildings, library privileges and admission to athletic events, the DukeCard saves students the hassle of carrying several different cards. Since students have just one campus card, they know that they can go to one place for all their card service needs. Duke students also have little need to carry other forms of payment since they can use the DukeCard to make all their on-campus transactions; in fact, many Duke students do not even carry a wallet around campus. This reduces the risk that students’ cash, checkbooks or credit cards will be lost or stolen. The DukeCard also improves students’ safety by limiting and monitoring who has access to the buildings on campus.

The DukeCard system also indirectly improves student life by serving as a management information system that allows the Duke administration to collect demographic data which helps determine the hours of operation and food options for eating facilities on campus.
Improving Student Life at Duke University Through a Campus Card System

Student Life at Duke Before the DukeCard

If current Duke University students were to experience life on campus just a dozen years ago, they would likely be shocked at many of the inconveniences which a typical student faced each day. Today, approximately 6,000 undergraduates and nearly 6,000 graduate and professional students on Duke’s campus (see Appendix A) in Durham, North Carolina, have a DukeCard, and the regular usage of this card for a wide range of campus transactions has become second-nature to most Duke students. Using a single card, students can buy food from dining facilities and vending machines on campus, purchase their textbooks, gain access to their residence halls and to academic buildings, attend athletic events and movies on campus, vote in student elections, clean their laundry, make photocopies, park their cars and pay for their telephone service. Campus life without this card would be almost unfathomable for Duke students of the mid-1990s.

As recently as 1985, though, the idea of a single campus card was a foreign one to most inhabitants of Duke University. In the early 1980s, Duke students typically carried as many as six campus-related cards in their wallets, including their student IDs, library cards, dining cards and key-cards which they used to gain access to their residence halls. Except for the one issued by Dining Services, each of these cards was essentially a piece of cardboard with no picture and no magnetic strip, so students had no picture ID which they could use on- and off-campus to prove that they were enrolled at Duke, and the usage of most of these cards was not related to a computer database.

Besides being stuffed with a plethora of campus cards, a typical Duke student’s wallet was also full of dollar bills and surrounded by clusters of coins. Prior to 1985, students had little choice but to carry significant amounts of cash since there were few other means of payment for purchases made on Duke’s campus. And whenever students wanted to buy soft drinks or snacks from vending machines, wash laundry or make photocopies at the library, they would have to first find and then carry a stash of coins to make the transaction. Besides being inconvenient, constantly carrying cash left students vulnerable to losing money if their wallets were lost or stolen.

Purchasing food on campus was also a nuisance for Duke students before the introduction of an electronic debit system by Duke Dining Services in 1980. Dining Services used paper systems to handle students’ meal plans. Students on East Campus (generally women) purchased a board plan in which they paid for a certain number of meals per week. Access to the board plan was monitored through the use of a paper ticket which was punched each meal. Students on West Campus (generally men) had to obtain books of script from the Dining Services office as they needed them. The script came in disbursements of 5, 10 and 15 cents which were issued in $10 and $20 books.

The script system was troublesome for several reasons. For one thing, it forced students to wait in line at the Dining Services office almost every week. The long lines, which were an annoyance to students and employees alike, were not confined to a single office, though. Every time students bought food at dining facilities on campus, they were forced to thumb through their script books and pull out the proper number of coupons to pay for their meals. Then, the cashier had to check to make sure that the students had paid the correct amount. By the time students had finished paying for their food, their once hot meals were often lukewarm. Furthermore, if students lost their books of script coupons, there was no way for them to replace the unused portion and there was no method for preventing the usage of the lost coupons.
The concern of losing money or coupon scripts was not the only safety issue facing students on Duke’s campus before the early 1980s. Many of the academic buildings on campus were never locked, even late at night when students often studied there alone. This meant that anyone who happened to wander through campus could enter an academic building without any authorization. Even security in students’ residence halls left much to be desired. While every women’s residence hall was protected by a key-card system, doors could be propped open, and there was no effective means to monitor this. Also, anyone who possessed a lost or stolen key-card could enter a residence hall freely and loiter in the halls without being detected by any campus safety organization. Students were concerned because they realized that the buildings in which they lived, worked and studied provided limited access control against intruders.

The Start of the DukeCard Program

At the beginning of the 1985-86 academic year, Duke’s Auxiliary Services introduced the DukeCard, a credit card size piece of laminated plastic which included the student’s name, school, student ID number and photograph on one side and a magnetic strip and a bar code on the opposite side. Envisioning that the DukeCard would eventually be used campus-wide, Auxiliary Services designed the card to meet ABA standards for size, shape and design. The magnetic strip on the back of each DukeCard was encoded in a way which prevented usage of a lost or inactive card. With this encoding, every time a card was swiped through a reader, the transaction was recorded in a database which was maintained on a computer in the DukeCard Office (see Appendix A).

A primary goal of the DukeCard program has always been to improve convenience and safety for the students of Duke University. In accordance with this goal, Duke Dining Services moved the existing Dining debit account to the DukeCard in the fall of 1985. At the beginning of each academic year, Duke students could buy dining plans which entitled them to a set number of Dining Points that correlated to the number of dollars they paid for the meal plan. Instead of carrying cash and script coupon books to make dining hall transactions, students simply handed their DukeCards to the cashiers at eating facilities and the cost of their meals was deducted from their Dining Accounts with a swipe of a card. This removed much of the hassle from the payment process, which pleased both students and employees. And, unlike the script coupon books, if a DukeCard was lost or stolen, a student could replace it without losing the unused Dining Points.

In order to further cut down on the amount of cash which students needed to carry, the DukeCard Office also introduced a second debit account, the Flexible Spending Account, to students in the fall of 1985. With this account, students could purchase goods from the stores on campus. This allowed students to buy textbooks and school supplies without using cash or checks. The Flexible Spending Account, which was (and still is) known as Flex, was denoted as a separate privilege from a Dining Account in the database maintained by the DukeCard Office.

To enable students to use their DukeCards to make Dining and Flex Account transactions, all of the dining facilities and stores on campus were equipped with point of sale card readers prior to the 1985-86 school year. Originally the DukeCard system was comprised of between 30 and 40 point of sale card readers.

At the time of its introduction, the DukeCard served a few other purposes besides maintaining Dining and Flex Accounts. The library used the bar code on the back of each card as a means of patron identification when students checked out books. Also, since the DukeCard featured the cardholder’s picture, the card was used as a visual form of identification for on-campus events. For example, students could gain admission to athletic events, including the widely popular Duke basketball games, by simply showing their cards, eliminating the need for student tickets to many events.

Although the DukeCard was initially designed primarily to be a student campus card, it was also available to Duke faculty members and employees. During the first year of its existence, the DukeCard was useful
to faculty and employees only as a form of identification, as a library card and as a means for having a Flex Account. Over the next two years, though, faculty participation in the DukeCard system increased because of the addition of a Faculty Discount program - a dining account which encouraged faculty-student interaction by matching the amount of money which faculty members deposited - and the introduction of a Faculty Charge program which enabled faculty members to charge meals at campus eateries on their DukeCard and have the money deducted from their paychecks.

The Expansion of the DukeCard Program

The DukeCard’s presence was felt almost immediately by the Duke community. Less than two months after the introduction of the DukeCard in 1985, an editorial in The Chronicle, Duke’s daily student newspaper, proclaimed that the card was “omnipotent.” But the power of the DukeCard was only beginning to be felt; new uses for the DukeCard have been implemented regularly over the past decade.

Dining Accounts
Within three years of the introduction of the DukeCard, the possibilities for usage of Dining Points and Flex began to expand. By the 1988-89 school year, card readers were attached to a few soft drink machines, enabling students to use their Dining Points at these machines, thereby expanding the realm of Dining Accounts beyond the scope of campus dining facilities. By the 1991-92 academic year, a wide range of vending machines, including some snack machines, accepted Dining Points.

The DukeCard sparked a noteworthy change in students’ eating patterns during the 1990-91 school year when five off-campus pizza merchants were allowed to accept Dining Points as a means of payment for the delivery of their products to Duke’s campus at night and on weekends. These merchants agreed to permit Duke to retain 18 percent of the revenue from these Dining Points transactions to help compensate for the potential loss of revenue to Dining Services. The program was tremendously popular among students since it was utterly convenient (pizzas could be delivered to students’ rooms or to study areas); it increased their dining options and greatly expanded the hours when they could purchase food with their Dining Accounts. Over the next few years, additional off-campus pizza and sub sandwich merchants began delivering their products on Dining Points and Flex to Duke students. In 1996-97, there are seven off-campus merchants which offer this service.

Another variation on the use of the DukeCard in Dining Services came in the 1995-96 academic year when Duke implemented a 12-meals-a-week board plan for first-year students as a part of a general revamping of the residential experience. In addition to the board plan meals, first-year students have on their DukeCards a supplemental Dining Account to pay for other meals, snacks and vending.

Flex Accounts
Use of the Flex Account has been on the move as well. Over the years, various campus services have seen the value in - and because of student demand, the need for - allowing students to use their Flex Accounts as a method of payment. By the 1988-89 school year, many of the copy machines on campus were equipped with card readers which allowed cardholders to use Flex to make photocopies. Another significant addition to the services available on the DukeCard has been the installation of Flex readers on laundry machines. This has saved Duke students the hassle of a weekly or biweekly search for quarters to do laundry. Students can now also use their Flex Accounts to pay for their telephone and cable television bills, to purchase advertisements in The Chronicle and to pay for services provided by the Technical Consulting Center. The wider acceptance of Flex on campus has made Duke truly a “cashless society” where carrying a wallet is no longer a necessity since students can conduct nearly all of their on-campus business with the Dining and Flex Accounts on their DukeCards.

Security and Access
A major part of the mission of the DukeCard has been to make Duke a safer place for students to live. The DukeCard took a huge step towards meeting this mission when it began to undertake the task of
providing building security. During the 1989-90 school year, academic buildings were equipped with access readers, and in 1996-97, nearly all major academic buildings have card reader access. In 1990, the effort to use DukeCard access readers for residence halls began in earnest. Today, every residence hall is controlled by DukeCard reader access.

Doors which are controlled by card readers have several advantages over key-card doors. For one thing, every key-card for a given door is identical so anyone who possesses one can access the door, and there is no way to determine the identity of the cardholder. Card readers with DukeCard access, on the other hand, can distinguish between different cardholders, and they also record each card swipe and transfer this information to a database which can be accessed to produce a log of card swipes by a particular cardholder or at a particular card reader. If a key-card is lost or stolen, there are two options: either every key-card for that particular door must be replaced or the risk of having a missing key at large (and potentially in the hands of someone who should not have access to the building) must be accepted. Neither of these is a particularly appealing possibility. If a DukeCard with building access is lost, though, the encoding of the card can be changed to make the lost card inactive and useless for access and other transactions.

Another problem with key-card doors is that they can be propped open for hours at a time without this fact being detected, allowing anyone to enter a seemingly secure building. Doors equipped with card readers have monitor switches which allow the DukeCard Office to constantly monitor their status and promptly discover propped doors so that Duke Police can make sure that these doors are closed. Logs from the DukeCard system can also be an important investigative tool for Duke Police, and an awareness that their DukeCard transactions can be traced likely thwarts some potential criminals.

To accommodate this new security system, the DukeCard Office began to provide 24-hour service in the fall of 1990, ensuring that there was always a place to report a lost or stolen card and a way to get a replacement. The DukeCard Office also provided a focal point for the monitoring of the doors in academic buildings and residence halls on campus.

Access readers have not been confined to residence halls and academic buildings in the DukeCard system. Many of the parking lots on campus were equipped with card readers as early as 1989 to prevent illegally parked cars from depriving parking spaces to students, employees and staff members who had paid for parking privileges. Three years ago, recreational facilities began to be equipped with card readers to ensure that only students, faculty members, employees and other members of the Duke community could use the gyms on campus. This has helped keep the recreational facilities from becoming overcrowded with people who had no affiliation with Duke University and has served to prevent crime.

The use of the DukeCard for access to parking lots, recreational facilities and academic buildings significantly increased the number of non-student cardholders in the DukeCard system, since many employees and faculty members found it impossible to park, work and exercise without being able to gain access to card reader doors.

In recent years, DukeCard readers have also been used to give students special access to particular activities. For example, students must swipe their DukeCards through a reader before voting in a campus election to ensure that they have not already voted. And after the Duke basketball team won its first national championship in 1991, it became necessary to handle access to Duke’s basketball facility by more than a visual check of the DukeCard. Thus, students began swiping their cards for access control. There are no student tickets to Cameron Indoor Stadium; admission is by DukeCard only.

**DukeCard Usage**

The DukeCard system now has over 20,000 cardholders, including 12,000 students and 6,500 employees and faculty members. Many other members of the Duke Community, including alumni and spouses of
employees, also have DukeCards which they use to gain access to recreational facilities and to academic buildings, and some cards are issued for general use of parking lots and academic buildings by departments and contractors. On a typical day, there are more than 250,000 reader transactions through the 705 card readers on the DukeCard system, and each transaction is recorded in the database on the DukeCard Office’s computer.

Do students like the DukeCard? Let’s look at the numbers. True, the DukeCard is nearly indispensable for undergraduate students, since any undergraduate living on campus (which includes about 90 percent of Duke’s undergraduate population) is required to have a Dining Account, and students living in residence halls must swipe their cards through access readers to enter the front door of their residence halls. But the Flex Account is optional, and 91 percent of undergraduates have opted for Flex Accounts, which is not surprising since nearly every on-campus laundry facility is now equipped with a Flex reader. Graduate students, too, have discovered the convenience of using Flex to purchase food from dining facilities and vending machines on campus as well as for making photocopies and other campus transactions. Significantly, 30 percent of graduate students, virtually all of whom reside off campus, have Flex Accounts.

The amount of money students have spent on their Dining Accounts has increased steadily since the inception of the DukeCard program (see Appendix B). Some of this can be attributed to a rise in prices, but the DukeCard has also helped spur this steady growth in Dining Account purchases, which amounts to a 45 percent increase in Dining Account spending over that 11-year period. The largest jump in Dining Account purchases in this period occurred during the 1990-91 academic year (this increase represented a percentage growth which is more than twice as much as that of any other year since the DukeCard was introduced). This increase can be directly attributed to the fact that 1990-91 was the first year when students could purchase food for delivery from off-campus merchants on their DukeCards; sales to these merchants represented more than 10 percent of total Dining Account spending for that year.

Flex spending has increased even more dramatically than food purchases. Students’ spending on Flexible Spending Accounts has nearly tripled since the 1985-86 academic year (see Appendix B). Not surprisingly, the years of the greatest growth in Flex spending coincide with the years when new uses for Flex were added. For example, there was a 43 percent growth in Flex spending between the 1986-87 year and the 1988-89 year, largely because photocopy machines on campus were equipped with Flex readers during this time. Five years later, there was a 51 percent increase in Flex purchase over the two-year period when students were first able to use their Flex Accounts in laundry machines. Flex spending has also steadily increased in both stores and dining facilities, although the amount of money spent on Flex purchases in Duke’s stores has declined slightly during the past two years in large part due to the fluctuations in Duke’s success on the football field and basketball court.

An added benefit of the DukeCard’s ubiquitousness and appeal is that cardholders generally become aware of lost cards quickly since the use of the card is essential for so many aspects of campus life. Furthermore, the frequent usage of the DukeCard encourages cardholders to report lost cards to the DukeCard Office promptly and have replacements made quickly.

**DukeCard Office Services to Cardholders**

A major element of the student satisfaction with the DukeCard program is a 24-hour-a-day/seven-day-a-week card office which offers one-stop services that include issuing new, replacement and temporary cards, making Dining and Flex Account transactions, handling customers inquiries, monitoring doors and responding to concerns about hardware problems.

**Making DukeCards**
Until 1996-97, students’ DukeCards were issued by the Registrar, and all other cardholders obtained their DukeCards at the DukeCard Office. Originally, DukeCards were made manually by taking a Polaroid photograph of the cardholder, typing a label containing the cardholder’s name and school or department, placing the label and photograph on a blank card and then laminating it. Beginning in the fall of 1996, though, the DukeCard Office began to make DukeCards for every type of cardholder (including students), using a new video imaging system. With this system, the cardholder’s picture is captured by a video camera, and the digitized image is included in a database. The card which is produced is a single piece of unlaminated plastic which has a photograph of a campus scene as its background.

Lost and Stolen Cards
If a cardholder reports that his DukeCard has been lost or stolen, the card number is immediately changed so that the card will no longer be active. When cardholders lose their cards, they can have replacement cards made. If cardholders have not actually lost their cards, but their cards are simply unavailable, they have the option of obtaining temporary cards which provide access to all of the cardholder’s privileges and plans. Temporary cards are only active for two days.

Privileges and Plans
The cardholders in the DukeCard database are assigned a series of privileges (see Appendix D) which give them access to Dining and Flex Accounts, academic buildings, residence halls, recreational facilities, parking lots, vending machines and student activities. Within each of these privileges, cardholders have specific plans which designate where and when their cards can be used. For example, students living in Brown Residence Hall would have a plan specific to that building so that they could have access to their residence hall; however other students with the same privilege but different plans could not access Brown Residence Hall. When cardholders swipe their cards through card readers, the system evaluates the privileges and plans in the cardholders’ records and decides whether the cardholders are authorized to make specific transactions. For Dining and Flex Account transactions, the system also checks to ensure that cardholders have sufficient funds on their accounts to make purchases.

The DukeCard Office coordinates the assigning of all privileges to cardholders. In order to do this, the DukeCard system imports information about students through interfaces with the databases maintained by the Registrar and Housing Administration.

Dining and Flex Account Transactions
Students can add money to their Dining or Flex Accounts at the DukeCard Office, and this money is immediately deposited to their accounts. Cardholders can also add money to their Flex Accounts by inserting cash into one of the value transfer stations which are located near some of the copy machines on campus. To comply with the Electronic Funds Transfer Act, all students are issued monthly Account Activity Statements which detail their Dining and Flex transactions for that time period. This provides students with confirmation that their account records in the DukeCard system are indeed correct.

Service Orders
When students discover problems with the card readers on doors, vending machines, copiers, laundry machines and elsewhere on campus, they call the DukeCard Office to report their concerns. The DukeCard Office sends its technicians out to investigate and correct these hardware problems.

How the DukeCard Has Changed Students’ Lives

Safety and Convenience
The overarching themes of the DukeCard have been to improve the convenience and safety of student life on Duke’s campus. The DukeCard has brought about greater convenience for students in several ways. For one thing, the dining process became far more efficient with the use of Dining Points on the DukeCard than it had been when cash and script was used to pay for food on campus. The advent of the Flex Account has reduced the amount of cash and coins which students need to carry around campus and
has made laundry, photocopy and vending machine transactions more convenient. And the inclusion of many different functions on a single card has reduced the clutter in students’ wallets and has made it possible for many students to avoid carrying a wallet altogether.

The DukeCard has also made students’ lives safer in two important ways. First, since Duke students carry around little cash, the danger of losing one’s wallet is less severe than it was before the introduction of the DukeCard. And if a DukeCard is lost or stolen, its encoding can be changed to prevent further usage and ensure that there is no unauthorized use of a student’s Dining and Flex Accounts. Second, by providing card reader door security to academic buildings and residence halls and by monitoring these doors, the DukeCard Office has provided an essential piece of an overall campus security system which makes it more difficult for unauthorized trespassers to intrude the buildings where students live, work and study.

**Use of the DukeCard as a Management Information System**

Because the DukeCard Office’s database contains a wide variety of information about the financial transactions which are made at the dining facilities and on the Duke University campus, it also can be used as a valuable tool in studying trends in student eating patterns. Duke Dining Services uses demographic information compiled from the DukeCard system to adjust the types of Dining it offers and the hours of operation of its various dining facilities. This ensures that the types of Dining provided on campus and the times and places it is offered will best meet students’ needs and desires.

Demographic studies of the information involving students’ DukeCard transactions are also useful for other purposes. For example, when there was a proposal to build new residence halls on Duke’s East Campus, the lunch-time eating patterns of East Campus residents were studied to ensure that the new residence halls would not lead to an overcrowded cafeteria on East Campus in the middle of the day. Also, when a large number of students contracted a stomach virus last winter, their dining transactions were investigated to see if there was a pattern which would suggest that the food at any particular campus dining facility might have caused this illness (the investigation revealed that food was not involved). These uses of the DukeCard system as a management information system have improved student life by providing Duke employees and administrators with an understanding of how decisions they make will affect students’ everyday activities on campus.

**The DukeCard as a Part of Duke’s Culture**

Perhaps the most telling indication of how essential the DukeCard has become to Duke students’ lives is the fact that it has become somewhat of a cultural icon on Duke’s campus. On the first day of first-year student orientation, resident advisors and First-Year Advisory Counselors alert new Duke students that their DukeCard will become their most valued possession over the next four years, and when first-year residence halls make t-shirts sporting “Top-Ten Lists” of their experiences as Duke freshmen, statements like “The DukeCard: Don’t Leave Home Without It” are often near the top of the list. In fact, the DukeCard’s notoriety apparently extends even beyond the walls of Duke’s campus in Durham, North Carolina. An electronic mail message which is often forwarded to college students across the country attempts to characterize students at many of the nation’s best-known universities by postulating what is the most frequently asked question on the various schools’ campuses. For Duke, that question is: “Can I put it on Flex?” Duke students certainly realize that the DukeCard plays a vital role in virtually every aspect of their lives on campus.