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Technology Update: V-Commerce emerges as a tool to teach nutrition

Vending restrictions are yesterday's news: School districts have discovered vending technology improves meal and nutrition programs in numerous ways.



The Star Food machine from VE Global Solutions can be equipped with a PIN pad, bar code reader or biometric reader.

For the past three years, school systems and legislatures have been struggling, mostly unsuccessfully, with ways to reduce childhood obesity. One reason most initiatives have accomplished little more than creating additional frustrations for all parties involved, not to mention untold financial costs, is they have targeted the existence of vending machines.

Vending machines, also referred to as unattended points of sale and cashier-less distribution points, are now taking on the opposite role – that of solution provider.

Thanks to new vending technology, vending machines are being used to identify students, authorize transactions, dispense healthy meals, chart nutritional consumption, and compile audit data for compliance with subsidized and reimbursable meals programs. Often described as a supplement or replacement for cafeteria-line service, the self-service aspects of "v-commerce" are beginning to revive school foodservice delivery.

Vending provides Student identification

A majority of school foodservice programs operate on a prepayment basis. Prepayments result in vending machine transactions being conducted on a cashless basis with dependence on accurate student account postings.

In addition to accurate transaction settlement, students using vending machines to purchase meals, beverages, a la carte items, or meal components must be identified to facilitate individual nutritional monitoring and foodservice compliance auditing. There are several options for vending machine based student identification, including:

1) PIN-pad reader. This is the most popular of the options for food service vending; a personal identification number (PIN) is entered onto the vending machine via a PIN-pad similar to an ATM keypad. A unique PIN authorizes and initiates the transaction and subsequent transfer of purchased product information to a central consumption database for tracking as well as to a subsidized or reimbursable meals settlement system, as applicable.

2) Contact reader. This is a magnetic stripe reader for swiping a student carried plastic payment card (credit card sized). The friction of the card swipe enables the device to capture data stored on the magnetic track of the card. Interaction between the card code and the reader enables exchange of data for account access and subsequent transaction posting to the purchased product consumption database and subsidized or reimbursable meals settlement system, as appropriate.

3) Scan reader. This is a machine mounted scanning device used to read a bar code printed on a plastic payment card or alternate media. The scanner simply reads the code as it passes in front of a beam of light. The verification and acceptance of a legitimate code initializes the transaction and allows subsequent data transfer of purchased products for subsidized pricing or qualifying reimbursable meal components.

4) Contactless reader. Still in early stages of development and currently cost prohibitive, some vendors intend to accelerate student identification processing through implementation of a radio frequency identification (RFID) reader. In this application, the student carries a payment card with an embedded RFID chip.

Waving the RFID card in close proximity of an RFID reader will enable the rapid transference of account information for transaction authorization. Purchased product data will be sent to the consumption database and the subsidized or reimbursable meals settlement system.

5) Biometrics reader. With biometric authentication, the student does not need to carry a payment platform for processing. Biometric authentication is based on a distinct physical characteristic (e.g., fingerprint or hand geometry) that is always with the student.

Projected to have a high rate of acceptance, biometrics ensures that the person conducting the transaction is the authorized user. Once the transaction is initiated, subsequent consumption database recordation and subsidized or reimbursable meal settlement will follow.

6) Pay key reader. A proprietary RFID chip is embedded in plastic casing no larger than the size of a standard mechanical house key. The pay key reader enables cash value to be loaded (and reloaded) to the chip through coin and bill acceptance at the vending machine, at a free-standing reload station, or through Website posting.

The pay key forms a closed transaction system and is an alternate to more traditional reader options. A proprietary pay key reader enables cashless purchases from stored value carried on the RFID chip in the key.

7) Proprietary reader. Several forms of non-standard payment formats exist, including proprietary smart cards, prepaid cards, key tags, and related payment media platforms. The processing of a transaction with this form of cashless settlement parallels pay key reader processing.

8) Combo reader. Although not yet in the field, there is interest in a double check system that requires two forms of identification to establish validation (e.g., PIN-code and biometric capture or RFID and biometric capture). Using both forms of proof ensures buyer authentication. A combination approach provides a higher degree of security for traffic at an unattended point

of sale. Data processing for a completed transaction parallels other outcomes with postings to a consumption database and subsidized or reimbursable meals settlement system.

Transaction Authorization

Student identification authorization is initiated by data capture at a machine mounted reader. This data is transmitted to a POS network database that verifies the student's identity and the existence of an active student account.

The account is considered active so long as it has available funds for product purchasing and/or qualification status for reduced price or free (reimbursable) goods.

Some meal vending machines may also be equipped for cash acceptance, through a coin mechanism and bill validator, during day parts when meal service is not offered.

Prepayments typify school foodservice

Regardless of ability to accept cash, there is a heavy reliance on prepayments in school foodservice operations.

Typically, deposits to establish or reload prepayment accounts can be completed onsite, via telephone or online. Forms of deposit may include cash, check, credit card, debit card, and e-bank transfer payment.

A prepaid system enables school administrators and authorized users (health care professionals) to review who is buying which products, where, and at what time of day. This data can be analyzed for food choice patterning, meal component preferences, nutritional valuation, spending habit trends, and additional dimensions of data mining.

Additionally, advanced software applications provide online parental access to the student's account. Parents can log in and review what has been purchased, when, and the nutritional value of purchases.

Parents may also be provided the ability to set parameters that block product categories, restrict choices, or limit dollar spending based on allergies, personal preference, healthy habit training, and budgeting.

Meal component Dispensing

Meal components can be dispensed as a complete meal when component parts are selected using a build-to-order (BTO) format. In this case, the student selects from among component category choices to form a custom-made complete meal.

Alternately, the foodservice department can pre-assemble meals and place packaged selections into the vending machine.

In either case, the machine offers another foodservice distribution point without the need for additional service personnel. Part of the motivation to address product delivery is adherence to subsidized or reimbursable meal requirements that student received all required parts (component-based meals or pre-packaged meals) to qualify for settlement.

Machine formats differ

Machine suppliers differ on the adequacy of various vending machine formats to accomplish this assembly of components or complete meals for dispensing.

The use of a modified snack machine (with spirals or coils), for example, may be well suited to dispensing meal components, but not most appropriate for delivering a complete prepackaged meal.

System must track component dispensing

A carousel-type food machine, on the other hand, with rotating shelves and individual compartments, may be best for marketing pre-assembled meals in clear bags or open boxes. The fact that all meal components are dispensed at once is an important consideration in establishing that all components were provided the student while at the machine.

One guideline suggests that machine-based pre-packaged meal authorization and dispensing should occur at a rate of three meals per minute (a selection every 20 seconds) or faster. Obviously, when the student has the option to custom build to order, the process will inherently be slower and may result in less than one meal being dispensed per minute.

Several advances in vending technology enable the meal machines to communicate alerts, events, and sales information. The fact that temperature conditions may be approaching a harmful level or that the stock of products in the machine require replenishment, and other situations, can automatically be communicated to management through e-mail, text messaging, or audible notification of condition.

Vending helps improve awareness

In addition to actual product dispensing, the vending machine location can also influence sales. The creative placement of meal vending machines in non-traditional locations – outside school cafeteria and foodservice operation areas – can increase awareness and elevate sales.

One company points to its innovative placement of healthy product and meal component vending equipment at the school bus discharge zone.

The encounter of an unattended point-of-sale (POS) device immediately upon arrival at school proved to be successful in expanded merchandising as well as overall sales, especially breakfast product sales.

Point of sale Integration

The software of a school's installed POS system can also be used to accommodate vending machine transactions. With this linkage, the vending machine is treated as another node in a POS network; a seamless integration.

For cashless transactions, the vending machine mounted identification reader can be used for data entry that can be immediately transmitted (cabled via Cat 5 wire or wirelessly using Wi-Fi protocol) to the POS database to obtain user authorization and active student account verification.

Account status is used as a basis for subsequent purchase activity. A completed transaction is processed and stored by the POS software as if it occurred at a cashier terminal. It is possible for the vending machines to operate on a cash basis, with or without student product tracking, depending on whether the identification phase is optional.

Linkage to the POS identification database also establishes a channel for charting, tracking, and monitoring nutritional consumption. The recording of purchased products enables an aggregation of nutrients across a broad spectrum of government eligible products.

Automation of purchase transactions enables a compilation, by individual student, of products purchased, time of day, and product quality.

Dieticians, foodservice administrators, and parents (as well as the student) are able to review consumed product contents and compare them to established benchmarks. In some systems, authorized account access enables the reviewer to set restrictions prohibiting the purchase of items not meeting a nutritional threshold. In this case, the student may attempt to purchase the item, but the machine will have the "smarts" to override or deny the transaction.

With a vending machine acting as an unattended POS terminal, the POS interface relies on a predetermined planogram or product map to interpret what product was selected, given a machine shelf location (column or slot). Not unlike reading a vending machine DEX report, the POS system will not know exactly what product is vended, unless the linkage between the machine shelf location and the item's coordinates in the product map determine what has been dispensed.

The POS database then computes the nutritional value of the product purchased and aggregates these values to the student's personal nutritional profile. This updating allows review of nutritional purchases by the student despite the vending machine's inability to independently provide this data.

Reimbursable Meal requirements

Reimbursable meals for the National School Lunch and School Breakfast Programs have specific requirements based on the type of menu planning used. The three main menu planning approaches are: 1) traditional food-based, 2) enhanced food-based, and 3) nutrient standard menu planning.

The traditional food-based and the enhanced food-based menu planning approaches are made up of meal patterns. These are based on the type of meal being served (breakfast, lunch, or after school snack).

A school meal must contain a specified quantity based on the student's age and grade for each of the food components: a) meat or meat alternate; b) vegetable or fruit; c) grains/breads; and d) milk.

The nutrient standard menu planning approach involves schools conducting nutrient analyses on planned school meals. Instead of working with meal components like the food-based approaches, the menu planner averages all nutritional requirements across one week's meal plan.

This analysis must meet the nutrition requirement for the market (age/grade level) being served. Information for meal planning approaches is available at: teamnutrition.usda.gov/Resources/menuplanner.html.

In order for vending machine delivered meals to comply with USDA requirements, schools can opt to dispense prepackaged meals (items bundled and bagged) or provide software enabling the student to elect a build-to-order (BTO) option.

Built to order option

In a BTO scheme, the machine's software is designed to direct forced choice construction of a reimbursable meal, given selections within each required component part.

In other words, the machine will not allow the student to continue creating a reimbursable meal until an item in each component segment is selected (for example, a meat item or approved alternate item must be part of the meal).

This type of lead-through programming provides operational controls that ensure no meal can be dispensed unless it is a complete meal that meets USDA standards. Once the meal is complete, all components are dispensed simultaneously to avoid the student only collecting portions of the final meal.

Machine-based nutrition Campaigns

The Healthy Child Campaign was launched in Fall 2006 as an initiative to help schools better educate children about the importance of healthy eating choices, portion control, and exercise.

The uniqueness of this program is that it is somewhat dependent on vending technology to monitor, control, and guide healthy choices while enabling parents to oversee their child's meal patterns and eating habits. Since the program integrates educational components, product choices, and parental involvement, it has been received as comprehensive and effective.

VE Global Solutions LLC offers an effective vending program called Star Food that is intended to increase student participation in subsidized and reimbursable meal programs. One of the company's strength is its use of temperature-controlled food vending machines, as opposed to modified snack food machines, and emphasizes a first-in, first-out (FIFO) inventory basis.

Prepackaged meals ensure compliance

Star Food uses prepackaged meals to ensure compliance with government programs. The company uses non-proprietary POS software and employs a LAN or wireless system to connect its machines to the school's foodservice POS system.

The delivery of subsidized and reimbursable meals through vending machines can enhance efficiency in school district foodservice operations while providing several benefits, including: increased meal delivery options without expanding the workforce; tracking of student purchases; elimination of unauthorized purchases; increase in non-subsidized product sales through increased convenience and exposure; and centralized management and control of vended products and meal service.

VE Global Solutions

The Star Food solution from VE Global Solutions involves biometric technology, POS integration, optional cash transaction options, and local area networking. The company emphasizes product freshness through a first-in, first-out (FIFO) delivery system. Reimbursable meals are prepackaged to ensure that the student selects a meal that has the requisite components to comply with government requirements.

The food vending machine can be equipped with a PIN-pad, bar code reader, or biometric reader to establish a transaction authorization. Either can be used for student authentication, purchase authorization, and account access.

The installation of refrigerated carousel food vending machines is intended to improve and expand meal plans by placing complete meals in non-traditional areas (outside cafeteria locations).

Vending: The school foodservice solution

A variety of vending solutions that have emerged to not only help foodservice directors improve student access to meal programs, but to assist them in their efforts to educate youngsters about nutrition. In addition, these technologies have proven to be an invaluable tool in monitoring students' meal choices.

As school districts recognize the way in which technology enhances the education function and the monitoring of student choices, government entities at all levels will realize there is more to gain from vending than most have ever imagined.

About the Author:

Michael Kasavana, Ph.D. is the NAMA endowed professor in hospitality management at Michigan State University in East Lansing, Mich. He has been researching vending technology for several years.

School districts utilizing vending machine meal dispensing

- Corpus Christi Independent, Corpus Christi, Texas
- Indian River County Schools, Vero Beach, Fla.
- Mesa County Valley Schools, Grand Junction, Colo.
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877-857-3663

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