

Payment systems for schools

This paper analyses the pro's and contra's of a private payment system for schools.

It defines the different building blocks of a payment system and presents a proven solution.



Introduction.

Within schools and universities, several products and services need to be purchased by both students and staff.

Drinks or snacks can be made available through vending machines, a sandwich or lunch can be consumed at the cafeteria, copiers and printers can be used in the libraries or PC classes...

One can imagine that all these products can be purchased with cash money. To avoid cash all over the place -with its related problems- there can be two structural approaches:

Products can only be purchased with a public payment system such as Proton or Bancontact

Products can only be purchased with a private payment system e.g. using a local e-purse on the student card.

Public Payment System

Benefits are the following:

- + The school has minimal administrative overhead
- + the school has minimal responsibility.

Draw backs are:

- May be not all students have a Proton card.
- It is hard to differentiate prices (e.g. social tariff)
- Infrastructure and transaction costs may be important.
- Payment terminals for e.g. copiers are not available.

Private Payment System

Benefits:

- + Transaction costs are minimised.
- + Specialised terminals for e.g. copiers do exist.
- + With prepaid systems, cash is available upfront.
- + The e-purse can be installed on the student badge.
- + Differentiated price structure is possible.

Draw backs are:

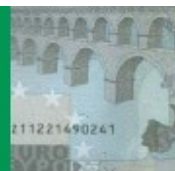
- Payment system infrastructure represents investment.
- Organisation of e-purse must be well done

Private payment system variants

There are two conceptual schemes:

In **account based systems** (equivalent of Bank card) a central server keeps track of all accounts and transactions. All payment terminals need to be online with the server. The server must be secured and protected against crashes, viruses and attacks. This implies an important infrastructure, responsibility and administrative overhead for the school.

In **debit-systems** (equivalent of Proton), the money is as anonymous as Proton or cash. Everyone is responsible for his own card. The responsibility of the school is limited to assuring the correct operation of loading and debiting the e-purse.



E-Purse technologies




There are different possibilities to organise an e-purse on a student or personnel badge:

Magstripe	A magstripe can be organised to hold information such as the student ID as well as a secured electronic purse. Both plastic and low cost carton cards with a magstripe have proven their value in the past.
Contact chipcard	A chipcard contains a memory chip and often a processor (smartcard) which can contain and manage more information in a more secured way.
Contactless smartcard	Proximity cards are equipped with a RF transmitter and receiver avoiding electrical hard contacts. Mifare has established itself as the European standard for contact less smartcards. Mifare allows the same smartcard to be shared in a secure way by several applications of different vendors.

Throughout Europe, most universities and high schools have made the choice to standardise on **MIFARE**.

Payment System Components

Let us consider a private payment system based on an e-purse. The system can be built up using following components:

The cards	The student or personnel cards must hold the e-purse. New cards with preformatted e-purse can be delivered. If Mifare cards are already in use, an e-purse on the existing cards can be formatted, provided access to free sectors is granted. The cards can be printed and personalised with e.g. logo, name, foto, ...	
Payment Stations	At the borders of the payment system, real public money needs to be converted to private money on the e-purse. This is done at an Antenor automat which may accept cash (coins and/or banknotes), Proton and/or Bancontact.	
Payment terminals	For POS of restaurants or shops a payment terminal is connected to the cashregister using a simple payment protocol on a serial connection. If required, these cash-registers can first read the type of user to differentiate prices between staff, students or visitors. For copiers and printers , Antenor has optimised payment terminals that can process upto 4 different prices (e.g. B/W, A3/A4). These terminals have proven to be compliant with almost every copier on the market. Most vending machines for snacks, cold or warm drinks have a standard MDB or executive payment interface. Antenor can deliver and install specialised payment terminals on all these automats.	
Administrative tool	To initialise and verify the e-purses, a simple yet effective SW tool called Card-manager can run on any windows based Workstation. When more sophisticated management tools are required, transactions can be stored and processed in open databases.	

Other applications?

If other applications need to be supported by the same badge, the school may develop this in-house or may work together with third parties, specialised in their corresponding domains. Provided they all use Mifare according to the standards, the badge can safely be shared by different applications and vendors without jeopardising each others integrity.

Conclusion.

Antenor together with its technology partners can implement complete private payment systems adapted to the particular requirements of schools and universities.

Based on open standards, the systems provide a future proof solution and allow gradual implementations.