A Conceptual Framework for Adoption of Education Card in India – Student's Perception

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Abstract

In the state-of-the-art era convinced modernizations in the field of usually known Integrated Circuit (IC) cards have focused ondelivering of an actually mobile computing platform which is acknowledged as the SMARTCARD, which on one side integrate the broadly distributed, separate systems formingscalability intrinsic hooked on the information system, and on the other side it offers an exposed frame to perfectly plugin anyvendordefinite, technologydefinite or platforms definite add-ons into the system without any obligationof amending the present ones.

This paper identifies the factors affecting the adaptability of the EDUCATION CARD in the Indian education system from student perspective.

Keywords: Education Card, Indian Education System, Information Technology (IT)

Introduction

Conferring to the cutting–edge technology developed in the arena of Information Technology (IT), most of us will come to an inference that Information Technology is progressing at an incredible speed, providing us further modernizations, improvements and inventions in the last one decade. Certainly no facet of human life is currently missing this revolution.

In the latest centuries convinced innovations in the field of conventionally recognized Integrated Circuit (IC) cards have directed to the delivery of an actually mobile computing podium identified as the Smart Card, which on one side permits to assimilate the broadly dispersed, disconnected systems creating a scalability fundamentals into the information system, and on the other side it provides an exposed framework to flawlessly plugin any vendor definite, technology definite or platforms definite supplements into the system devoid of the requirement to amend the present one. This increases the value of data distribution among the unlike applications and in utmost cases it eradicates the necessity for them to be tangibly present on the identical network, subsequently this in turn slices down the networking charges and maintenance expenses. Scientifically Smart Card carries on developing, fresh plus inventive concepts which are

rapidly turning out to be an actual fact of life (*Blackmore*, *2010*).

Ever since the first Smart Card system was presented by Moreno in 1974 (*Smart Card*, *2014*), several Smart Card grounded systems have appeared. It can be used for countless applications. Smart Card is labeled as "SMART" because it encloses a computer chip. It is a plastic card, alike in form to a credit card comprising of one or added implanted semiconductor chips. Latest hi-tech development has appreciated the growth of a contactless Smart Card, which means the chip links with a card reader by means of Radio Frequency Identification (RFID) (*Smart ID Cards for Education*, *2015*). Smart Card has developed a significant association with human life. It is a protected maneuver that permits optimistic user credentials and at the same time it is multifunctional, cost effective exercise that can be simply acclimate for both physical and logical entree. Smart Card provides plentiful advanced security features as compared to the simple plastic cards, and magnetic strip cards. The motive for advance security features in Smart Cardis for the fact that the end-users of the system are provided with the access to it. Consequently the security section is placed into the hands of the end–users, and hence it is open for the attacks from hackers, ingenious and malicious strangers. The improvement of Smart Card, along with fast progresses in cryptography, has led to a solution to the aforementioned problem (***Taherdoost****etal*.,*2011*).

These days the notable movement is the use of multi-application cards. A multi-application card is a Smart Card which has a provision of using multiple sorts of applications on the card itself thus lessening the number of cards in the wallet. This proposal is concentrating on the multi-application Smart Card for the educational use only. However before applying any technology modernization, the societies' intention to adopt or acceptance would be the utmost essential thing in order to be fruitful.

Background

A student admission procedure is still a manual, labor–intensive plus time consuming process. A limited number of institutions which provide higher education have accepted the wired admissions procedure, but then also a student needs to submit their previous education credentials and testimonials in a photocopy medium besides this they have to produce the original credentials and testimonials for verifying the genuineness to complete the admission procedure, which sets the students in danger that the original credentials and testimonials might get damaged or lost in the process, and apart from this the cost of the photocopying and the swelling necessity of the paper for photocopying are some other important issues.

India is having a bulky student population plus maximum of the education system in India is not yet computerized, which places Indian education system in the absolute situation to inspire the Smart Card empowered campus. Handling the campus assets every time is quite a challenging task for the administrators. As the assets and departments has stretched and changed far away from simple computers workstations and printers to the recent community labs, campus intranet, electronic learning resources, meal program and transport facilities. Nowadays, campuses certainly not have any options of abandoning the hi–tech revolutions happening all around them (*Rastogi and Das*, *2002*)

Along with the aforementioned problem a different set of problem also trails, which is the job application procedure for different government and private sectors. To the latest point of time the Smart Card has not been familiarized in the job application procedure for any of the above mentioned sectors. At the present time many of the job applications procedure are online but many of the organization demands for the post–submission of the application form and the photocopies of the credentials and testimonials. Accordingly, the present job application procedure is also an added reason which causes the swelling necessity of the paper for photocopying.

Number of Acknowledged Schools and Enrolment in India:

The number of acknowledged schools and the overall enrolment in India has observed a stimulating growth over the years. The figures has increased from approximately 2,30,700 schools and 2,38,000 enrolments in 1950–51 to nearly 14,25,600 schools (as of 2013–14) and 25,48,000 enrolments (as of 2013–14), as per a recent MHRD report (source: *Educational Statistics at a Glance – 2014*).

Number of Higher Education Institutions and Enrolment in India:

Higher education in India has observed an inspiring progress over the years. The number of higher educational institutions has grown up from 27 universities and 578 colleges in 1950–51 to nearly 712 universities (as of 2013–14) and 36,671 colleges (as of 2013–14) as per a recent MHRD report (source: *Educational Statistics at a Glance – 2014*).

Significant Facts

The yearly admission of students is exceeding to 2.5 crores (counting the enrolment under Open and Distance Learning System). The highest portion of student enrolment (82.9%) is at under–graduate level, followed by post–graduate (8.7%) and Diploma (7.0%), while all other levels are forming only 1.4%. India is currently graded as the third largest higher education system in the world after US and China (*ASHE*, *2013*).

Now, if we take an instance of admission procedure at undergraduate level in different higher education institutes then we can realize that a Higher Secondary (12th Standard) passed out student while applying for the undergraduate (UG) level admission in a single college has to submit 2 Admit Cards (10th&12th Standard) + 2 Pass Certificates (10th&12th Standard) + 2 Mark Sheets (10th&12th Standard) + 1 Migration Certificate, a total of 7(Seven) photocopies of the credentials and testimonials.

Therefore as per the data mentioned at the preceding sub–section *(Number of Higher Education Institutions and Enrolment in India),* if 82.9% of 2.5 crores enrolling students submit a total of 7(seven) photocopies each then the total number of papers used in photocopy is approximately 14.5crores.

Total Enrollment	X	UG Enrollment %	=	Total no. of UG Enrolling Students
25000000	X	82.9 %	=	**20725000 Students**

Total UG Enrolling Students	X	No. Photocopy Submitted by Each	=	Total no. of Paper Used
20725000	X	7	=	**145075000 Papers**

Figure 1: Paper Usage Estimation Source: Calculated Figures

An individual tree can yield around 80,500 sheets of paper (*How Much Information, 2003*) and accordingly it requires approximately 1800 trees to fulfill the annual need of paper for Indian students (UG enrolling only) and that also applying to only one college. A regular A4 sheet is from 80 g/m^2 paper (*Grams/Square Meter to Pounds/Ream, 2005*) and weighs nearly 5g (*Paper Density, 2015*), these types of paper is normally used by photocopy (Xerox) machines (*Paper Size, 2015*). Paper manufacturing is the third most energy demanding industry, spending nearly 12% of all energy in the manufacturing sector (*The Facts – Paper Consumption and Its Impact*).

In this digital era, the worldwide ecological footmark is massive. *Nearly 4 billion (400 crores) trees worldwide are cut down each year for paper* manufacturing *representing about 35 percent of all harvested trees.* World consumption of paper has grown up 400 percent in the past 40 years (*Martin and Colby, 2011*). Growing universal consumption and the fight to deliver low–priced paper has caused continuous market pressure which started to push manufacturer deeper into formerly unindustrialized forest lands, and has transformed high variety, carbon rich normal forest into wild rising, purely sterile tree plantations.

The paper manufacturing is the fourth major emitter of greenhouse gases in the industrial sector. Universal manufacture of pulp and paper sector is forecast to rise to 500 million tons by 2020 (*Forests: What future do we want?, 2011*). The most recent hazard to the globe is not the plastic bags, it's the yearly left–over, discarded tons of paper tossed out by workplace printers and photocopy machines, which is binned within hours.

Literature Review

Clemente (2014)have studied different Information Technology management models and has proposed a conceptual framework model for the MadinatZayed and Ruwais Colleges in Abu Dhabi, UAE. The proposed model has provided some helpful results to prove that this particular model was needed and will overcome most of the problems present in those colleges like management issues.***Chopra (2010)*** have explored the RFID Smart Card security and practices in the perspective of privacy. The study was comprised of several kinds of outbreaks which include snooping, duplicating and skimming which in turn specified the lack of security which leads to defilement of confidentiality. ***Mirza and Alghathbar (2009)*** have conducted a study on 20 different universities across the four regions of the world namely Australian Continent, North America, Western Europe and South East Asia to discover the different applications that are presently begin used by these universities and have determined a total of 34 different applications out which 2 universities are using *STORING ACADEMIC INFORMATION* application through Smart Card. ***Mohammadi (2009)***have studied the Smart Card application and acceptance model to estimate the users' approval of Smart Card technology amongst the students of universities in Iran. Different studies have been conducted on the implementation and application of Smart Cards, maximum of which have been concentrated on the areas like privacy, security and data storage on Smart Cards ***Gupta (2008), Crotch–Harvey (1997)***. A study by the printer industrialist Xerox had found that – *"Office staffs throw away 45% of everything they print within a day, equivalent to more than a trillion pages every year. The most popular 'one–time use' examples are daily assignments, drafts and emails*." Paul Smith, a laboratory manager at Xerox's research center in Toronto, Canada, said –"S*ome people use what they've printed only for a minute. A cover page on a network printer job only survives may be 30 seconds: you just recognize your job and then you recycle it* ***Smith (2007)***." ***Al–Alawi and Al–Amer (2006)*** have studied the

acceptance and consciousness of the people to substitute their current cards with the new National Smart Card in Bahrain. The study has also found out the measures adopted by the government to form alertness between the public about the practice and features of the Smart Card under the national Smart Card program. ***Zahedi (2006)*** have studied in the direction of the Smart Card technology acceptance amongst the students of TarbiatModares University in Iran. ***Arami et al. (2004)*** have conducted a study on the students of Vienna University of Economics and Business Administration in Austria, to define the level of approval of Smart Card technology. ***Dhar (2004)*** have evidently stated that the prospect for Smart Card rest on the introduction of multi–application cards as well as changing the simple mentality that the Smart Cards are merely a device for making financial transaction only. ***Lee et al. (2003)***have determined the level of acceptance of Smart Card technology by the students of Nanyang Technological University in Singapore plus a further study of students in Murdoch University in Australia was also conducted to realize the willingness of adoption of the Smart Card technology. An information paper by Panel on Security of the Legislative Council ***(Experience of Using Smart Identity Cards in Other Countries; 18 January 2001)*** had stated that – *"Smart Card applications are getting well accepted worldwide. Smart Card consumptions are expected to grow significantly in the near future. The total consumption of Smart Cards in the whole industry in 1999 was 1,400 million (140 crores) cards, with an increase of 17% comparing to the figure in 1998. In the year of 2000, the consumption is forecasted to be 1,750 million (175 crores) cards, representing an overall year–on–year growth rate of 25%. Many countries/regions are issuing or planning to issue smart ID cards, and the direction is to aim for multi–applications."*

Research Objectives

Despite the fact that the aforementioned research/study areas (subject wise and/or topographical wise) are certainly undeniable, esteemed and beneficial, but the proposed study work will be concentrating on a slightly diverse area:

- To analyze the perception of students concerning on the practice of Education Card in the Indian education system.

The proposed study will be reasonably targeting in understanding the vision, observations and opinions of the Indian education system's students only.

Sampling

The questionnaire was distributed among 100 students from which 95 was found suitable to be used for analysis. Only the state of West Bengal was covered for the purpose of sampling. Stratified random sampling was used for the process. The sampling frame was divided in two broad strata namely universities (Higher Education) andSchools (10+2).

Data Analyses Methodology

The data collected from the survey will be subjected to data cleaning in order to recognize missing data, sample characteristics and meet the expectations of normality. After this, the descriptive analysis will be used to review the respondents' demography. Factor analysiswill also be used to help in reducing the number of variables that do not measure the constructs in this study as supposed by the respondents. In this case, the component factor analysis with Varimax Rotation will be conducted on all the variables to extract factors from the scales of each construct. The researchers will ensure that all items meet the acceptable limit level. Thus, in this study, all items below 0.50 will not be retained and those having a loading factor limit of above 0.50 will all be retained. The validity of the instrument will be determined by content and construct validity. The construct validity will be determined through the factor analysis in which the Kaiser- Meyer (KMO) index of sampling adequacy and Bartlett's test of Sphericity will equally be determined. All variables with KMO above .6 will be regarded as valid for this proposed study.

Empirics

The demographics of the respondent are presented under the 3 attributes i.e. age, gender, and category. Gender-wise, nearly 53% of the respondents were male and remaining 47% female. In age group 19 – 21 year there was highest number of respondents forming 25%, followed by the age group 17 – 19 years (21%), 15 – 17 years (19%), above 23 years (18%)and 21 – 23 years (17%). On the other hand, 18 respondents (19%) belongs from General category, 13 respondents (14%) belongs from SC category, 24 respondents (25%) belongs from ST category, 19 respondents (20%) belongs from OBC category and 21 respondents (22%) belongs from Minority category.

Table 1

What is your Gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	50	52.6	52.6	52.6
	Female	45	47.4	47.4	100.0
	Total	95	100.0	100.0	

Table 2

What is your Age Group? (in Years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		18	18.9	18.9	18.9
	17 – 19	20	21.1	21.1	40.0
	19 – 21	24	25.3	25.3	65.3
	21 – 23	16	16.8	16.8	82.1
	Above 23	17	17.9	17.9	100.0
	Total	95	100.0	100.0	

Table 3

What is your Category?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	General	18	18.9	18.9	18.9
	SC	13	13.7	13.7	32.6
	ST	24	25.3	25.3	57.9
	OBC	19	20.0	20.0	77.9
	Minority	21	22.1	22.1	100.0
	Total	95	100.0	100.0	

Factor Analysis Results

The raw data was analyzed using SPSS 20.0 and factor analysis in order to summarize the 7 variables into smaller sets. Then data was subjected to principal component analysis. Hence, these 7 variables were reduced to 2 principal components through Varimax rotation. Items with factor loadings of 0.6 or higher were clustered together to form separate constructs, as recommended by *Hair et al.* (*2006*). Here, the researcher has considered only those factors whose Eigen-value is more than one. Table 5 indicates that, in the present test the Kaiser-Meyer-Olkin (KMO) measure was 0.766. Bartlett's Sphericity test also found highly significant; Chi-Square = 529.255, df = 21with a significance of 0.000 it provide support for validity of the factor analysis of the data set and indicates that, factor analysis is appropriate.

Table 4

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.797	.799	7

According to Table 4 the reliability statistics (Cronbach's Alpha) is .797 which is fairly high thus the reliability or internal consistency of the dataset is effective. We can proceed for factor analysis.

Table 5

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.766
Bartlett's Test of Sphericity	Approx. Chi-Square	529.255
	df	21
	Sig.	.000

According to Table 5 the value of Kaiser-Meyer-Olkin Measure of Sampling Adequacy is .766 which depicts that the sampling adequacy is fine. Bartlett's Test of Sphericity is significant which specifies that the correlation matrix in not an identity matrix. We can get a valid output with Factor Analysis.

Table 6

Communalities

	Initial	Extraction
Accuracy of the card	1.000	.880
Availability of the card	1.000	.782
Easiness in using & understanding the card	1.000	.875
Manageability of the card	1.000	.927
Reduced card delivering cost	1.000	.671
Reliability of the card	1.000	.882
Simplified issuance of card	1.000	.659

Extraction Method: Principal Component Analysis.

According to Table 6 the communalities of all the variables is higher than 0.6 which means more than 60% of the variations in all the variables are explained by the factors.

Table 7

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.917	55.960	55.960	3.917	55.960	55.960	3.908	55.829	55.829
2	1.759	25.128	81.088	1.759	25.128	81.088	1.768	25.258	81.088
3	.507	7.239	88.327						
4	.400	5.720	94.046						
5	.192	2.742	96.788						
6	.153	2.186	98.974						
7	.072	1.026	100.000						

Extraction Method: Principal Component Analysis.

According to Table 7 two FACTORS were extracted which explains about 81% of the total variance.

Table 8

Rotated Component Matrix[a]

	Component	
	1	2
Accuracy of the card	-.068	.936
Availability of the card	.884	.005
Easiness in using & understanding the card	.930	-.104
Manageability of the card	.962	-.024
Reduced card delivering cost	.819	.001
Reliability of the card	.027	.939
Simplified issuance of card	.811	.014

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

According to Table 8 FACTOR 1 has highest loading on 'Availability of the card', 'Easiness in using & understanding the card', 'Manageability of the card', 'Reduced card delivering cost', and 'Simplified issuance of card'. Therefore the FACTOR 1 is named as 'User Friendliness' according to the pattern of behavior exhibited by those variables.

Secondly, the FACTOR 2 has maximum loading on 'Accuracy of the card' and 'Reliability of the card'. Therefore FACTOR 2 is named as 'Authenticity' according to the pattern of behavior shown by those variables.

Conclusion

The research study leads us to two major dimensions of the student's perception of different educational institute of West Bengal. The dimensions are classified as 'User Friendliness', which is composed of different variables like 'Availability of the card', 'Easiness in using & understanding the card', 'Manageability of the card', 'Reduced card delivering cost', and 'Simplified issuance of card'. The 2nd dimension is the 'Authenticity' feature, which includes the 'Accuracy of the card' and 'Reliability of the card' of the Education Card.

Thus the perceived preferences of students are the flexibility to use the card in terms of its design, cost, usability and the security features so that it cannot be manipulated or misused.

Effective designing and proper implementation and monitoring of the card can create difference in the framework of education industry. It can reduce wastage of papers which is a major concern for the environmentalists today. It can also streamline administrative works and ensure proper deadlines for various events relevant to education arena. It can also take care of the mishandling and misinterpretation of data thus leading to minimization of information distortion.

Limitations & Future Scope

The study was conducted only covering the state of West Bengal. Sample size used is also quite less due to time constraint. In future, continuation of this research work can be made by increasing the sample size and covering a greater area. Even studies can be made in different states and the result can be compared to check any variability in terms of student's perception.

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