



## A Study of the Computer Literacy Skills of Mauritian Police Officers

Sameerchand Pudaruth, Somveer Kishnah

Computer Science Department, Faculty of Engineering, University of Mauritius  
Computer Science Department, Faculty of Engineering, University of Mauritius

### ABSTRACT

The main aim of this work was to study the computer literacy skills of officers of the Mauritian Police Force (MPF). At the same time, the results were used to demonstrate the impact of a short course in IT on them. To our knowledge, this is the first study of its kind. At the very beginning of the course, the officers were requested to take an online test which contained very basic questions on the course materials that they were going to cover. The same test was then administered to them on the last day of the training. The answers for the first test were not provided to them and they did not know that they would be required to take the test again on the last week. The results were collected and then compared. The mean score for the first test was 43.1% which increased to 69.2% on the last day. This clearly shows that the police officers have benefitted a lot from the course. The results of this study will provide important guidelines for the Government of Mauritius and the Commissioner of Police to know the strengths and weaknesses of its law enforcement officers and this will definitely help in the development of more appropriate commissioned courses.

### Indexing terms/Keywords

Information Technology, Computer Literacy, Training, Mauritius Police Force.

### Academic Discipline And Sub-Disciplines

Education; Information Technology

### SUBJECT CLASSIFICATION

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With respect to an evolving policing which is constantly facing the new challenges of the 21st century, the Mauritius Police Force (MPF) – under the National Policing Strategic Framework (NPSF) – is now making a radical shift from being a Force to becoming a Service and therefore providing a more effective and efficient police service in the country. One important element in the Police Reform Programme is to set up an information system known as the Crime Occurrence Tracking System (COTS) that will satisfy the actual and future information requirements of the police force with regard to tracking of crimes. Additionally, the system will also provide facilities for the computerisation of the Occurrence Book and the Master Registers, tracking the movement of case files and generates relevant statistical information at the appropriate times. The system must also maintain confidentiality and provide accessibility of information to authorised officers.

A further computerisation development is the deployment of an Integrated Justice Information System (JIS) that would connect the Police, the Judiciary and the Prison Department. All such innovation will undeniably necessitate the provision for adequate training in basic Information Technology to police officers so that the latter can be proficient in using computers. It was mentioned under the NPSF that by the end of 2013, all police stations will be linked to the COTS and therefore police officers will have to be computer literate in order to use the system. Moving into the direction of increasing computer literacy among police officers, the MPF worked in collaboration with the University of Mauritius to design a short IT training course which was launched in October 2011.

The training is being dispensed at the Faculty of Engineering by the staff of the Computer Science and Engineering Department. About twenty staff are involved in the training and to date some 3000 police officers from different police divisions have already been trained. The course sessions are spread over a duration of 8 weeks. Each training session last for 3 hours and therefore the total training time is 24 hours. In each session, there are 20 police officers. The course is meant to be a basic introductory course which is highly practical. The syllabus covers the following topics: hardware, software, types of computers, windows explorer, word-processing, spreadsheets, databases, presentation software, internet, browsers, search engines, email, computer security and cybercrimes. To our knowledge, this is the first study of its kind.

The paper proceeds as follows. In the next section, we tried to showcase some related works though literature on this kind of work is sparse. Section III presents the methodology and the results are evaluated in Section IV. Finally, we conclude the paper by highlighting some possible directions for future works.

## RELATED WORKS

Literature review which assesses the computer skills of police officers is almost inexistent. The closest work to ours is a PhD thesis by Kilic Osman [1]. In particular, he studied the information literacy skills of police officers in their workplace by requesting them to complete a survey form which consisted mainly of 5-point Likert questions and some open-ended questions. The results were analysed from various angles. The educational level, department, rank and experience were also taken into account. Information literacy is not the same as computer literacy. Information literacy is a higher skill which includes computer literacy. Information literacy refers to the management of information which can be done either on paper, electronically or in any other ways. Computer literacy skills are restricted to the handling of information that is accessible via a computer system. A very similar study to [1] was done by Al Daihani and Rehman [2].

Hashim et al. [3] conducted a study to assess the attitudes of law enforcement officers towards ICT. The results were discussed at length and many interesting conclusions were drawn. His results showed that age and gender of the respondents did not have any correlation with the IT skills of the respondent. However, their education, rank and experience did matter. He was convinced that the involvement of top-management was a prerequisite for the successful use of IT in the Royal Malaysia Police (RMP). A similar study was performed by Ellahi and Manarvi [4]. However, only the attitude of the police officers towards IT was investigated. Other factors such as age, education and experience was not accounted for. It was found that the higher the computer skills of the officers, the better is their attitude towards IT and the more they will use and rely on such facilities. The main recommendation made to the authorities was to provide adequate training and equipment to all police departments so that they can adopt IT faster and can be used more effectively to fight crimes. A recent study [5] in Nigeria showed that the use of IT in police departments is still something of an utopian dream. The study revealed that most police officers are not acquainted with computer tools and many of them do not even have access to computer resources. A long list of recommendations is made most of which are encouraging the government to spend massively in IT education not only for police officers but also at school level.

One of the earlier studies about police officers and the use of Information Technology was done by Goodman [6] as he realised that police officers of tomorrow would need an adequate knowledge of technology in order to tackle the increasing series of computer-related crimes. A comprehensive analysis of computer crimes and computer fraud was done in [7]. A number of recommendations were made to enable law enforcement officers to be in better positions to handle such crimes. Apart from legal issues, training of officers for the investigation of electronic crimes was considered a priority in [7][8]. It was concluded in [9] that the effective use of IT can considerably reduce crime rates.



## METHODOLOGY

Five cohorts of students (totaling 91 heads) took part in this study. These police officers were administered an online questionnaire on the very first day of the course even before any type of forming training had started. The results were collected but the answers were not provided to the students. The same test was later given on the last day of the course. The results were again noted and compared with the previous one. There were thirty-four (34) questions on the questionnaire. Twenty-six (26) of them were content questions and the remaining seven (7) were personal questions. All the content questions, except the last one, were multiple choice questions with five choices. The last question was an open-ended question which required the students to give a definition for the term 'file attachment'. The personal questions allowed us to collect information such as the age and gender of the police officers, whether they have a Facebook account, whether they own a personal computer or a laptop, whether they had an email address and whether they had an internet connection at home. All the questions are shown below in Table 1. Summarised results for the content questions are shown in Table 2.

**Table 1. Questions and their Statistics**

#	Questions
1	DVD stands for:
2	What is the main purpose of a spreadsheet like Microsoft Excel?
3	What is the meaning of the acronym WWW?
4	Which one of the following ICT acts is not in force in Mauritius?
5	Which one of the following statements is true about Microsoft Word?
6	Microsoft is a/an:
7	The intersection of a row and a column is called a/an:
8	What is the default font size of a new Word document based on a Normal template?
9	Which of the following is the best classification for the Internet?
10	Which one of the following passwords do you think is the most secure?
11	How many bytes are there in one kilobyte?
12	In Word Processing, changing the appearance of a document is usually termed as:
13	The cell address F5 refers to:
14	The main component inside the casing of a personal computer which links all peripheral devices is called a/an:
15	Which country has the highest number of Internet users?
16	A word processor would most likely be used to do:
17	Adobe Acrobat Reader is a/an:
18	What could be a reasonable storage capacity for a pen drive (flash disk) manufactured in 2012?
19	Which of the following symbols is used for multiplication in Microsoft Excel?
20	Which search engine is the number 1 in the world?
21	Internet Explorer is a/an:
22	Is Microsoft Excel an open source software (i.e. it is free)?
23	Which unit is used to get an estimate of the processing speed (power) of a computer?
24	Who is the CEO of Facebook?
25	You will often see the three symbols, B, I and U together in Word Processing packages. What is the usual meaning of U?



26	What is a file attachment with respect to an email account?
27	Do you feel the need to use IT for work-related activities?
28	Do you have a Facebook account or any account on any other social network?
29	Do you have an email address? If yes, please write it in the textbox below.
30	Do you have a personal computer (or a laptop) at home?
31	Do you have an internet connection at home?
32	How old are you? Choose the most appropriate range from the list provided.
33	Please enter your gender.

**Table 2. Summarised Results for Content Questions**

Q#	Correct Responses		Correct Responses		Increase in Good Answers %	Number of Blanks		Number of Blanks		Decrease in Blank Answers %
	Start of Course	End of Course	Start of Course %	End of Course %		Start of Course	End of Course	Start of Course %	End of Course %	
1	77	88	85	97	12	9	0	10	0	10
2	29	67	32	74	42	11	0	12	0	12
3	55	80	60	88	27	3	0	3	0	3
4	23	34	25	37	12	13	2	14	2	12
5	54	75	59	82	23	11	3	12	3	9
6	7	32	8	35	27	3	1	3	1	2
7	41	70	45	77	32	10	2	11	2	9
8	42	75	46	82	36	14	5	15	5	10
9	77	81	85	89	4	3	1	3	1	2
10	45	78	49	86	36	9	0	10	0	10
11	12	48	13	53	40	4	2	4	2	2
12	53	76	58	84	25	12	2	13	2	11
13	26	57	29	63	34	18	2	20	2	18
14	25	52	27	57	30	2	1	2	1	1
15	9	60	10	66	56	4	0	4	0	4
16	58	69	64	76	12	9	1	10	1	9
17	43	53	47	58	11	5	3	5	3	2
18	47	70	52	77	25	10	3	11	3	8
19	53	86	58	95	36	11	1	12	1	11
20	58	75	64	82	19	5	0	5	0	5
21	30	48	33	53	20	3	1	3	1	2
22	21	22	23	24	1	14	3	15	3	12
23	11	35	12	38	26	7	3	8	3	4
24	36	60	40	66	26	9	2	10	2	8
25	67	85	74	93	20	8	2	9	2	7
26	16	65	18	71	54	58	15	64	16	47
<b>AVG</b>	<b>39</b>	<b>63</b>	<b>43</b>	<b>69</b>	<b>26</b>	<b>10</b>	<b>2</b>	<b>11</b>	<b>2</b>	<b>9</b>





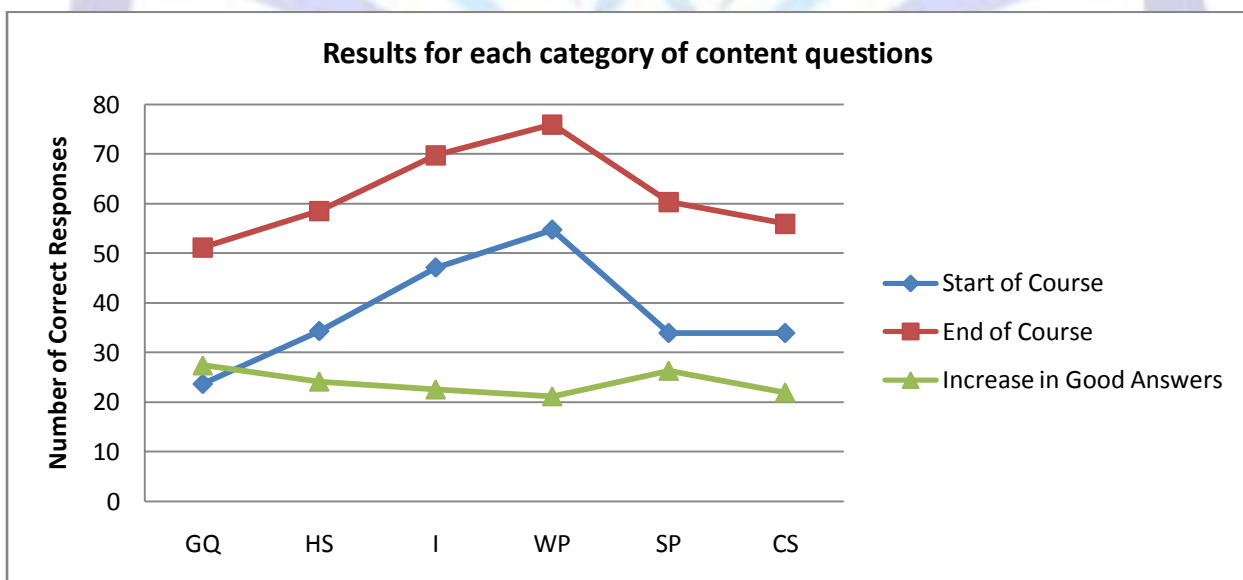
Out of the 26 content questions, four were general knowledge questions, five questions were about computer hardware and storage, five questions were related to the Internet, five were on word-processing, five were about spreadsheets and two questions on different aspects of computer security. The results obtained at the beginning and at the end of the course are shown in Table 3.

**Table 3. Results for each Category of Questions**

Question Categories	Correct Responses					
	Start of Course	End of Course	Start of Course %	End of Course %	Increase in Good Answers	Increase in Good Answers %
<b>General Questions (GQ):</b> 6, 15, 17, 24	24	51	26	56	28	30
<b>Hardware &amp; Storage (HS):</b> 1, 11, 14, 18, 23	34	59	38	64	24	27
<b>Internet (I):</b> 3, 9, 20, 21, 26	47	70	52	77	23	25
<b>Word Processing (WP):</b> 5, 8, 12, 16, 25	55	76	60	84	21	23
<b>Spreadsheets (SP):</b> 2, 7, 13, 19, 22	34	60	37	66	26	29
<b>Computer Security (CS):</b> 4, 10	34	56	37	62	22	24

## EVALUATION OF RESULTS

In this section, we provide detailed discussion on each question. We start by describing the results for the six categories of questions and then we move on to give comments on each individual question.



**Fig 1. Results for each category of content questions**



From Figure 1, we can clearly see that the officers did much better in the second test than the first one. Indeed, there has been an increase of 26% in the number of correct responses. This is clear evidence that the course has been effective in increasing the Information Technology knowledge of these students. The students have improved by about the same amount in each of the six categories. It can be seen that when they joined the course, they had the most knowledge in word-processing (WP) and their poorest performance was on general questions.

We shall now provide comments on each question. Q1 and Q9, with a success rate of 77%, were by far the best answered questions on the first test. However, in the second test, the best answered questions were Q1 (88%), Q19, Q25, Q9, Q3, Q10, Q12, Q20 and Q8 (75%). The worst answered questions in the first test were Q6 (7%), Q9, Q23, Q11 and Q26 (16%). In the second test, these were Q21 (22%), Q7, Q4 and Q11 (35%). The questions which showed the greatest improvement were Q15 (56%), Q26, Q2 and Q11 (40%). The questions which showed the least improvement were Q22 (1%), Q9, Q17, Q1, Q4 and Q16 (12%).

Q1 did not cause much difficulty. For Q2, a good proportion of students thought that Microsoft Excel is used to type letters or to create a database. The most common mistake in Q3 was to think that WWW could perhaps stand for World Website Work. From the responses in Q4, we came to know that most of our police officers are aware of the Information and Communication Technologies Act and the Data Protection Act. The majority of students thought that the Electronic Transaction Act 2000 or the Independent Broadcasting Authority Act 2000 were not acts there were in force in Mauritius. The correct answer was Computer Security Act. This apparently was one of the most difficult questions.

Q5 did not cause much difficulty. However, initially only 7 students knew that Microsoft is an organisation. The others thought that Microsoft was either a software or an operating system. This question showed that there is much confusion in the minds of our police officers as regards to computer jargon. Q7 was answered satisfactorily. The correct answer was 'cell' while the biggest distractor was the word grid. Q8 was also answered satisfactorily. There was no major distractor. Q9 was one of the best answered questions. Most students knew that the Internet was a network and not a hardware, software or a malware. For Q10, most students were able to recognise that a strong password must be sufficiently long and must contain a mixture of numbers, letter and symbols.

Q11 was initially very poorly answered with only 13 good responses. Most students thought that 1 kilobyte contains 1000 bytes. This was expected as in all other cases one kilo stands for one thousand. The correct answer was 1024. Fortunately, at the end, we had 53 correct answers. Most students knew that the correct answer was formatting and not proof-reading or designing. Initially, Q13 proved to be quite difficult. 26 students thought that the cell address F5 referred to the F5 function key on the keyboard and 16 thought that the alphabet F referred to the row while the number 5 referred to the column. There were also 18 blank responses for this question. Fortunately, the number of correct answers more than doubled in the second test. The greatest distractor for Q14 was CPU. The expected answer was motherboard.

Q15 tested the general knowledge of the officers. Initially, 57% of students thought that USA had the highest number of Internet users. 28% thought that it could be either India or Japan. A minority of 10% correctly selected China as their answer. About 14% thought that a word processor is used to compress letters instead of creating documents. Q17 was classified in the general category. The majority of students could classify Adobe Acrobat Reader as a software but there was a lot of confusion as to whether it was a hardware, an operating system, a browser or a search engine. The majority of students knew that the capacity of a flash disk (pen drive) is most likely to be in gigabytes rather than in kilobytes, megabytes, terabytes or petabytes.

Initially only 58% correct responses were received for Q19 but as Microsoft Excel formed an integral part of the course, this became one of the best answered questions with a success rate of 86%. The troupers were 'x' and 'X' and the correct answer being '\*'. No one chose Bing as a search engine in Q20. A few chose yahoo, facebook and youtube. The majority were aware of Google. Initially, the majority thought that Internet Explorer was either a search engine or an operating system. Almost no one chose hardware or virus as their answer. Believed to be an easy question, it proved to be one of the most challenging one. The large majority of students believed that Microsoft Excel is a free software. This number even increased between the first and the second test. There was only a 1% increase in the number of correct responses for this question.

There was a lot of confusion as to which unit is used to measure the speed of a computer. The majority thought that the correct answer was BYTE. A few thought that it could be HTML, HTTP or even WWW. The improvement level was not pleasing enough for this question. Initially, only 40% of students knew that it was Marc Zuckerberg who was the CEO of Facebook and not Bill Gates, Mr Windows, Mr Facebook or Steve Jobs. This was a question in the general category. The success rate rose to 60% for the second test. From a success rate of 74% for Q25, it rose to 93% showing that students have picked up some basic word-processing skills. Q26 was an open-ended question. Initially, only 18% of respondents knew what a file attachment was. This rose to 71% after the second test which is commendable.



The number of blank answers was also recorded for each of the content questions. These were then considered as wrong answers. A Pearson correlation coefficient was computed between the correct responses and the number of blanks at the beginning of the course. A value of -0.20 was obtained showing that there was a very low negative correlation between these two quantities. This means that questions which were well-answered had fewer blank responses than poorly answered questions. A Pearson correlation coefficient was also computed between the increase in correct responses and the reduction in the number of blank answers. A value of 0.38 was obtained showing that there was a relatively high correlation between these two quantities. The mean number of blank answers decreased from 11 (first test) to 2 (second test). This is an indirect evidence of the fact that the students have gained considerable in computer skills.

Out of the 91 officers, 84 (92.3%) were males and 7 (7.7%) were females. Since the number of female students were not statistically significant, it was thus not reasonable to compare the performance of male students with those of the female student. The students were divided into the following five age groups: 18-25 (9), 26-32 (21), 33-40 (25), 41-49 (21) and 50+ (15). The mean age was estimated at 38.5. The number of students who had a computer or a laptop at home rose from 57 (62.6%) to 65 (71.4%). The number of people having an internet connection at home also rose from 49 (53.8%) to 58 (63.7%). The number of officers owning an email account rose from 26 (28.6%) to 90 (98.9%). This was expected as all students were required to create an email account as part of the course. The number of Facebook accounts also rose from 32 (35.2%) to 43 (47.3%) although students were never requested to create accounts on social networks during the course. The number of people who thought that IT is important in their work rose from 66 (83.5%) to 87 (95.6%). The overall mean mark rose from 11.2 (43.1%) to 18.0 (69.2%), an increase of 6.8 (26.1%) marks. These figures are very encouraging. It shows that the course have had a very positive impact on the general computer skills of the students. This has made them more confident in handling computer systems and this explains the increase in the number of computer ownership, internet connections, emails and Facebook accounts. The avalanche effect is of some relevance here.

## CONCLUSION

The benefits of this study are threefold. Firstly, it allowed us to assess the computer literacy skills of the officers before and after the course and whether any learning had actually taken place. This is certainly the case as the mean mark rose from a mere 11.2 (43.1%) to 18.0 (69.2%). Secondly, the results show that this course have had a very positive impact on the officers as we saw a huge increase in the use of IT via the personal questions. This will enable them to become more productive at work. Thirdly, the results of this study will certainly help us draft a more advanced computer literacy or computer studies course for the MPF if one is required in the future as this course has helped us to identify the general strengths and weaknesses of our police force in terms of their IT skills. A further study can be carried out in order to assess the relevancy of the course and whether the general IT knowledge of the police officers has increased over time. The Government of Mauritius and the Commissioner of Police can also rely on these results to commission more appropriate courses which can benefit both law enforcement officers and the population as a whole through a more efficient use of tax-payers money.

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