

## Technology Usage by Young Learners at Home and at School- A Nexus.

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### ABSTRACT

With increased affordability and multi-functionalities, computing devices are ubiquitous. Today, there is strong beliefs that ICT can positively impact learning, resulting in mounting pressure on stakeholders and educationalists to provide these tools for learning empowerment. This research paper investigates the extent of use of different technologies by young students both at home and school. Two hundred and twenty students, girls and boys of Lower six (year 11) from 45 schools, both private and public, participated in this study. The study describes the panoply of computer-based activities practiced by them, with special emphasis on the learning aspect. It then reveals that while students were regular users of technology at home, the school environment offered a contrasting picture depicting limited integration of ICT in the learning process. Interestingly though, this study also reveals that students perceived ICT as a useful tool in the learning process, favoring independent and self-learning. This paper posits learners' acceptance of technology for attaining their learning goals. It therefore provides valuable insights to stakeholders of our educational system with regards to the effective integration of ICT as a means to provide alternative learning modes to learners intending to perform better in major subject areas including Mathematics, which is a cornerstone of successful living.

**Keywords:** ICT, Technology acceptance, Young learners, Self-learning, Gender bias

### 1.0 INTRODUCTION

The ubiquity of computers and ever increasing connectedness to the Internet have positioned technology as an agent of change in every sphere of life, be it economic, social or cultural. By the end of 2014, three billion of the world's population was online [1]. In developing countries the percentage of Internet users was 32%.

Over the years, Mauritius has witnessed an exponential growth in household computer ownership and home Internet access (Figure 1), and by extrapolation, it is foreseen that Internet access will pass the threshold of 50% by 2015. In 2014, there were 370, 000 Facebook users in Mauritius, the most common users being in the age group 18-24 [2]. Figure 2 shows that most people in the age group 12-19 [3] were computer users (85.2%). These data therefore confirm that the young generation is "connected" and "technology-oriented".

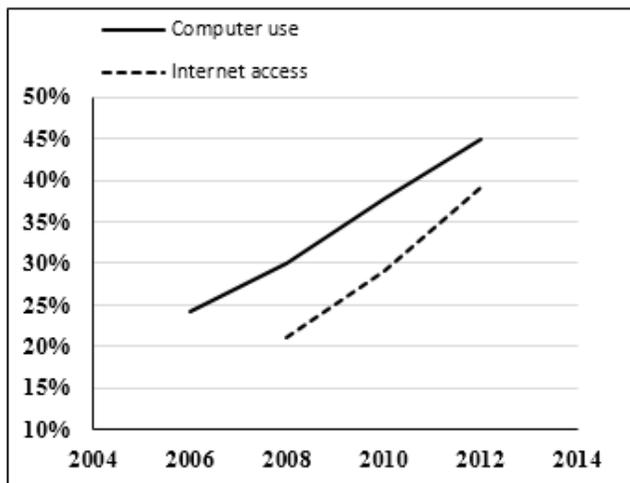


Figure 1: Trend in Computer and Internet use

From the government’s perspective, the vision as set out in the National ICT Strategic Plan(2011-2014) is to make ICT the fifth pillar of the country and position the island as a globally recognized ICT hub and regional gateway to Africa [4].

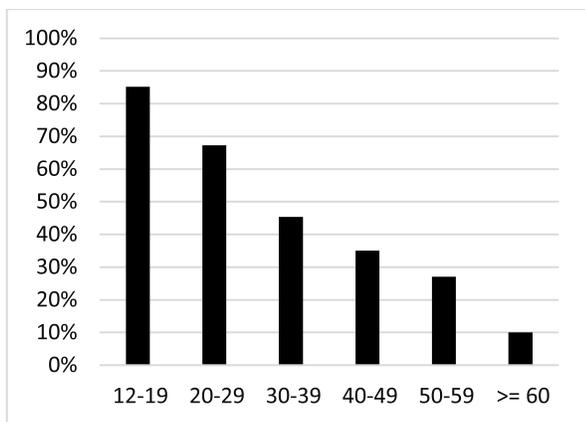


Figure 2: Percentage of people using a computer by age group (2012)

Government’s strategic plan for education 2008-2020 makes provision for all schools to be technologically equipped by 2015, thus ensuring that ICT becomes a tool for teaching/learning in the classroom [5].

However, the uptake of ICT in the learning environment encompasses a number of issues,

including access to the equipment, provision of relevant digital learning content and the readiness of both teachers and students to adopt technological tools for pedagogical gains. All these issues have been intensively researched in depth and breadth but there is a dearth of research dealing with students’ motivation and readiness to embrace technology in their learning.

The starting premise of this research paper rests on the understanding that while ICT tools are revolutionising the ways we conduct business and other activities, these same tools have been poorly tamed to put educational gains on equal footing with gains in other sectors of the country. Today’s young generation of learners, technology savvy, have more to gain from ICT tools for their learning. The presence of computers and other related technological tools in our classrooms is often more a political advocacy than a pedagogical justification. Cuban [6] rightly pointed out in his book “*Oversold but underused computers*” that it is probably much easier to buy a computer than to learn to make efficient use of it. The promises of ICT are highly acclaimed and expected by stakeholders, but policy implementation dangles on slippery roads to make ICT integration mere “digital busywork” [7]. We are therefore at a major crossroad where we hope to see ICT reshaping the learning abilities of children. This research is of particular interest as Mathematics learning disabilities are rampant among too many students [8] and it is worth investigating if ICT can offer prospective avenues to remedy the situation.

## 2.0 LITERATURE REVIEW

Technology is set to transform the educational process in our schools and universities, where more and more computing devices are being infused into the system. Mega reviews of research studies in this area unanimously advocate the potential benefits of incorporating ICT in the learning process [9], [10], [11], [12],

[13]. The gains achieved through the integration of ICT in the educational process are undeniable: great strides have been made towards taming the technology to meet the emerging demands for education [14]. Hawkrige [15] purported four rationales to justify using computers in schools, with the pedagogical rationale specifically based on the belief that computers can be used to teach and learn.

Research has been carried out to investigate the factors affecting the readiness of learners in ICT adoption and these include availability of technological infrastructure, level of computer literacy, perceptions and attitude towards technology, provision of appropriate digital learning content and motivation from ICT-skilled teachers and school management [16], [17]. In a meta-analysis which brought together 15 years of investigations on the effect of teaching and learning with technology on student cognitive and affective outcomes, Lee, Waxman, Michko and Lin [18] found that in terms of magnitude and direction, the overall effect sizes for the two outcomes exhibited a positive effect in teaching and learning with technology. The debate around the real and true objectives of technology use in the classroom remains open. Are we aiming more at technology for direct instruction or as a support for instruction? Tamim *et al.*, cited in Lee *et al.* [18] observed that technology was found to have a greater effect in learning when used to support instruction rather than for direct instruction. At times technology is a mere vehicle for content delivery and does not influence learning any more than the grocery delivery van affects our nutrition [19].

In a study commissioned by the Mauritius Research Council, Khedo, Suntoo and Elaheebocus [20], found that many students were using Online Social Networks (OSNs) for educational purposes and were ready to adapt this new method of learning as a complement to the traditional one. Furthermore, they argue that, though the integration of Educational

Networking as a learning tool is at the centre of numerous debates worldwide, it is still lagging behind in Mauritius due to the reluctance of teachers to use this technology to complement learning as they categorize it as inappropriate and incompatible for studies. According to Jhurree [21, p.253], most primary school pupils displayed positive attitudes towards their ICT class and strong motivation to follow it. Generally, most pupils found that their ICT classrooms provided them with enjoyable and useful experiences.

Technological devices, more specifically, mobile phones, still and video cameras, music and video players and computers have witnessed sky-rocketing sales over the last fifteen years. The trend is such that the number of mobile phones today surpasses the number of inhabitants and many households own more than one computer or tablet. Technology usage in many sectors including the economy, health, communication and entertainment has reached mammoth proportion, yet when it comes to education, we have to admit that both teachers and students are still grappling with ICT tools to tame them towards sound pedagogical gains and meet the emerging demand for education. Not that the equipment is lacking, but from provision to integration, the gap remains to be bridged, and for various reasons. ICTs are still somehow external to traditional school curricula [22].

Today we are well aware of the extensive use of technology by young people. Youngsters juggle phone features with disconcerting ease. Others produce fascinating video clips with simple smartphones. Youngsters have a flair for technology and the latter has become an integral part of their living. These acquired skills can be translated into school settings to help students engage in constructive learning in an already friendly environment [23]. Barnes, Marateo and Ferris [24] mentioned that the Next Gen or Net Geners learn differently from their predecessors, being unique in that they are the first to grow up with digital and cyber technologies. Not only are Net Geners acculturated to the use of

technology, they are saturated with it. This media saturation and ease of access to digital technologies [25] is driving the next generation to think, communicate, and learn in distinctive ways. Probably the greatest asset of technology is the motivation it elicits in young learners to take control of their learning and become independent learners [26].

According to the Mauritius Internet Usage Policy of the Ministry of Education, it is expected that, in line with the aim to produce independent learners, the use of ICT and the Internet are important tools, particularly in developing research skills and individualized learning programmes for students [27]. Despite the abundance of research studies on the benefits of ICT as a learning tool, scant information exists for Mauritius. Furthermore as at date the authors have hardly come across any in-depth study of the technological profile of young Mauritian learners and their preparedness to embrace ICT as an alternative, if not, complementary tool, for learning. This study seeks to unveil this profile and evaluate the adoption of ICT tools in the learners' two most important environments, namely the home and school. The Sankoré project [28] has been running in primary schools since 2011, whereby educators make pedagogical use of interactive digital projectors to bring multimedia learning components to students. At the beginning of 2014, more than 26000 tablets were distributed to secondary school students of form 5 (year 10). Expectations are great but apprehensions are probably greater. ICT affordances have yet to be channelled for these tablets to be of any pedagogical worth in the classrooms.

## 2.1 Gender Bias

Gender bias among computer users have been intensely researched. Heemskerk, Volman and Admiraal [29] suggested that there might be gender differences in the use of technology at

school, while Sanders [30] reported that there is no general trend regarding gender differences in the use of information technology. It appears that there are inconsistencies in the findings, at times related to the methods of data collection on gender differences. There is also a general belief that computers are associated with Mathematics and coupled with the belief that boys perform better than girls in Mathematics, the overall perception is that boys would be more at ease with computer-related activities. This research study therefore also seeks to analyse the present situation in Mauritius where the policy has been to provide equal opportunities and access to both sexes.

## 3.0 AIMS AND OBJECTIVES

The central theme of this research paper focuses on the extent to which young learners are ready to channel the affordances of ICT for their educational benefit. As digital natives, are there avenues to be explored so that the same computer skills they master for their everyday activities can be put to effective use in their learning journey? It is expected that the findings of the research will inform practice on the manner computing tools can impact learning.

To meet the research objectives of this paper, the following five main questions will be addressed:

1. Which technological devices are most commonly used by young students at home and schools and how often do they use them?
2. Which computer-based activities are commonly practiced in schools and at home?
3. What are students' perceptions and beliefs of the pedagogical worth of ICT?
4. How do students rate the provision and condition of ICT facilities in their schools?

5. Is there any gender bias in technology usage among young Mauritian students?

This comparison between home and school use is particularly important as research shows that those who used the computer at home and /or at school showed significant difference in mathematics achievement [14].

**4.0 METHODOLOGY**

A mixed method approach was adopted to collect both quantitative and qualitative data. A questionnaire was administered to 220 students attending 45 schools from both private and state secondary schools at the H.S.C level, covering all regions of the island. This age group was particularly selected because of their maturity and ability to provide a good indication of what the school population voiced on matters pertaining to ICT and education.

The questionnaire, an adapted version of the PISA [31], comprised five major sections, meant to collect data on students’ demography, their home and school technology usage, their attitude and beliefs of the pedagogical worth of ICT, their readiness to embrace ICT in their personal learning experience and the barriers impeding the effective integration of technology in learning. In all there were 80 items, many of which were designed using a five-point Likert scale.

Focus group discussions were held with groups of four to five students. Focus group research is “a way of collecting qualitative data, which—essentially— involves engaging a small number of people in an informal group discussion (or discussions), ‘focused’ around a particular topic or set of issues” [32]. Through semi-structured interviews, students were solicited to confirm, explain and extrapolate some of the responses provided in the completed questionnaires. The questions posed also helped to seek further clarifications, unveil perceptions and discuss

unforeseen issues. Strict confidentiality was observed and no names of students or schools were recorded.

To make out the distinction between learning and entertainment activities, one item of the questionnaire requested the learners to spell out the number hours spent on the computer for each of the two activities.

**5.0 DATA ANALYSIS**

The items of the questionnaire were analysed in depth using Excel 2010 and SPSS 21.0, to yield both descriptive and inferential statistics about the sample of learners under investigation. The findings are reported in the following sections.

**5.1 Descriptive Analysis**

Two hundred and twenty students from 45 of the 130 schools in Mauritius offering higher secondary education, located both in rural and urban areas, completed the questionnaires. The average age of respondents was 17.2 years with a slightly higher percentage of female students (54%). This age group was particularly selected because of its maturity to voice opinions on matters under investigation in this research paper. There was a proportionate representation of learners from both rural (54%) and urban (46%) areas, and their schools were also located in both rural and urban areas with a higher percentage for the latter region. In Mauritius, 58.7% of higher secondary school students attend state schools. In our sample, 55 % of students surveyed were from state schools. On account of these general demographic variables, the respondents constituted a fair and close representation of the student overall population, making this sample appropriate for generalization of findings.

## 5.2 Inferential Analysis

Using SPSS 21.0, various inferential bivariate analyses were carried out in relation to the research issues mentioned above.

### 5.2.1 Comparative Use of the Various Technological Devices at Home and School.

Participants were asked to indicate the different technologies to which they had access at home and school. Figure 3 lists these technologies and depicts the sharp contrast in technology usage between school and home. In the latter environment, a high percentage of young students made extensive use of various technological devices, like the mobile phone, computer/laptop, video players, photo/video camera, internet, storage devices, and music players. However the situation was dramatically different in the school environment, with only 36% using the computer and 33.6% the Internet. In the focus group discussions, this difference

was attributed to restricted access to computing facilities in schools. That 96.8% of students had a computer at home came as no surprise given the affordability of computers and loan facilities offered by government for each household to own a computer. At home, 73.1% of learners confirmed working regularly (5-7 times / week) with their computers, which was not the case in schools. If all students confirmed having access to a computer at school, yet the frequency of access was quite poor - only 36.5% of them had access to computer facilities 2-4 times/week.

**Finding 1:** Most students were technology savvy, making frequent use of a panoply of technological devices for their everyday activities. However, the school environment did not promote extensive use of these devices, either because they were not available or access to them was restricted. This confirms Gilbert’s [7] statement that computers in schools are mere “digital busywork” where not much learning is taking place.

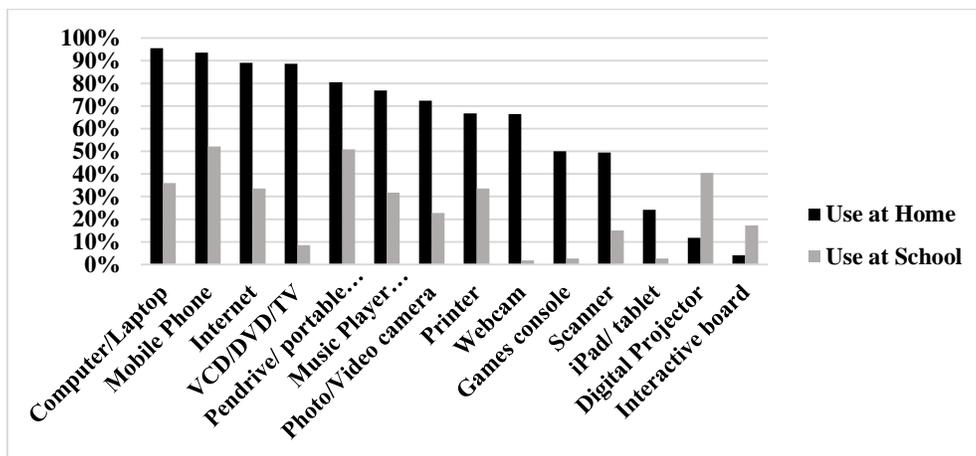


Figure 3: Technology usage

Moreover, most students (94.1%) considered they had average or excellent ICT skills. However frequency of computer use did not correlate with level of ICT skills and a correlation analysis carried out revealed that there was no statistically significant relationship

between the two. While 73.1% students reported making intensive use (5-7 times/ week) of the computer at home, yet only 30% mentioned they had excellent ICT skills. Frequency of use was mostly associated with activities involving

video, music, Internet search, social networking, and which did not require extensive ICT skills.

**Finding 2:** Average mastery of ICT skills was enough for most students to make regular use of the computer for common activities involving music, video and Internet search.

### 5.2.2 Comparing Computer Applications as Practised at Home and School.

Figure 4 shows the wide panoply of computer based activities and compares their corresponding frequencies of use at home and schools. At home, learners used the computer quite intensively for various purposes and the five regular activities (more than 70%) were mostly Internet-based, including searching, social networking and downloading. The most popular application program was word processing. More than 70% students reported being involved in learning-related activities like searching the net for learning materials and downloading past exam papers. Fifty percent mentioned using it for direct learning. Once

again, data revealed a contrasting situation in the school environment, with less than 20% of regular users for most of the activities. Another item of the questionnaire related to the ‘frequency of use’ confirmed this contrasting situation whereby 151 (N=216) students used the computer 5-7 times per week at home the compared to only 6 (N=210) in school.

In general respondents were not frequent users of application programs like spreadsheets, Power point and database management systems, be it at home or school, hence confirming students’ rating of their ICT skills as mostly average. This result is consistent with the findings of a previous study [33] which reported that students tended to be confident in only a limited range of ICT applications, such as word processing, email and web browsing.

**Finding 3:** Learners made more intensive use of computers at home than in school with Internet use being the most popular activity, thus confirming the behavioural trend towards more independent learning.

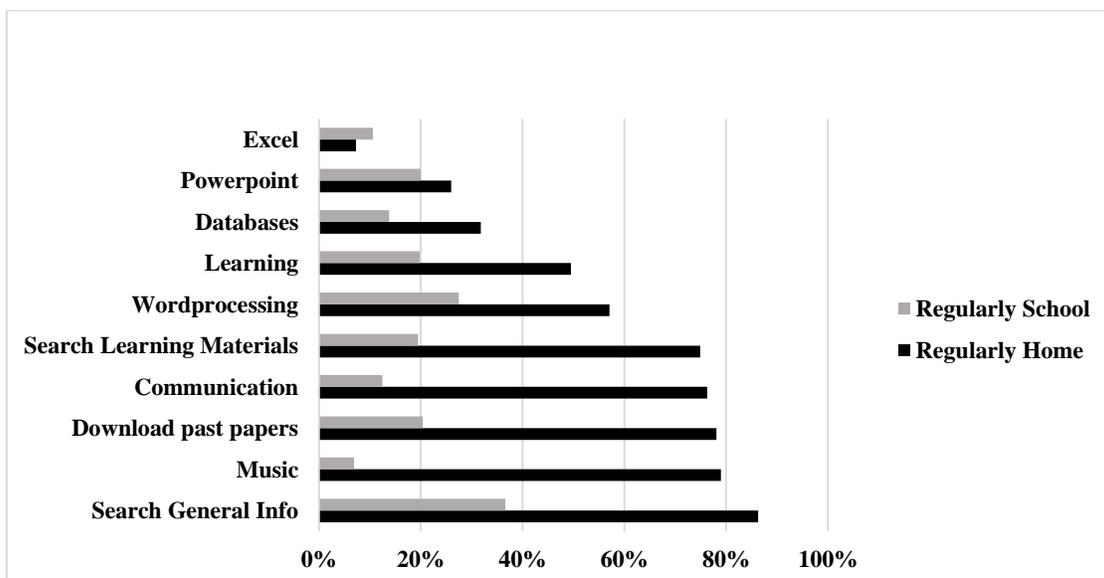


Figure 4: Comparing Home & School computer use

### 5.2.3 Students’ Belief of ICT’s Pedagogical Worth.

One section of the questionnaire measured the construct of belief that ICT serves pedagogical purposes. Cronbach Alpha measures the internal consistency of a test, which describes the extent to which all the items of a test measure the same concept or construct, and hence it is connected

to the inter-relatedness of the items within the test [34], with acceptable values lying between 0.7 and 0.9. The test yielded a value of  $\alpha = 0.672$ , which being close to 0.7, confirmed the internal validity of the 7 items measuring the belief that ICT as a tool can improve learning.

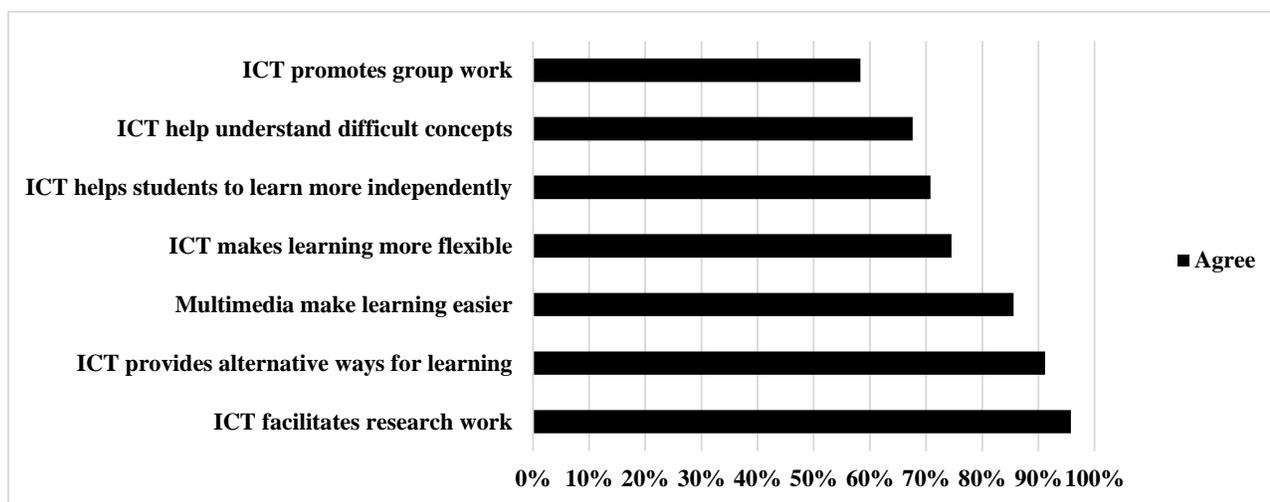


Figure 5: Effects of ICT in learning

More than 70% students agreed that ICT promotes independent learning, affords a flexible mode of learning, facilitates the assimilation of difficult concepts, encourages alternative ways of mastering learning concepts, fosters research in their studies and make learning an easier journey (Figure 5). This clearly indicates their readiness to take greater control of their own learning, confirming the finding of Tubaishat and Lansari [26], which views the promotion of independent learning as one of the important pedagogical attributes of ICT.

**Finding 4:** The majority of respondents perceived ICT as a useful pedagogical tool.

### 5.2.4 Evaluation of ICT Facilities in Schools.

Another section of the questionnaire comprising seven items, investigated students’ views about ICT facilities provided in schools. The Cronbach Alpha value of 0.8 provided for an acceptable internal consistency of the items of this construct. Around 42 % of students agreed that computer facilities in schools were adequate. If a large majority (86.8%) of them mentioned

having access to a computer at school, only 31.9% considered that this access was easy (Figure 6). Sixty-four percent stated using a computer only once a week in their school. Nearly 50% of the respondents declared that they were self-confident in using ICT for learning and 60% of them wished teachers could motivate students to make use of ICT in their learning.

Bivariate analysis revealed one significant association between students' 'self-confidence to use ICT for learning' and their 'level of ICT skills' (Spearman rho 0.204, p= 0.003). This indicates that the more ICT-skilled was the learner, the more he/she leaned towards embracing ICT for learning.

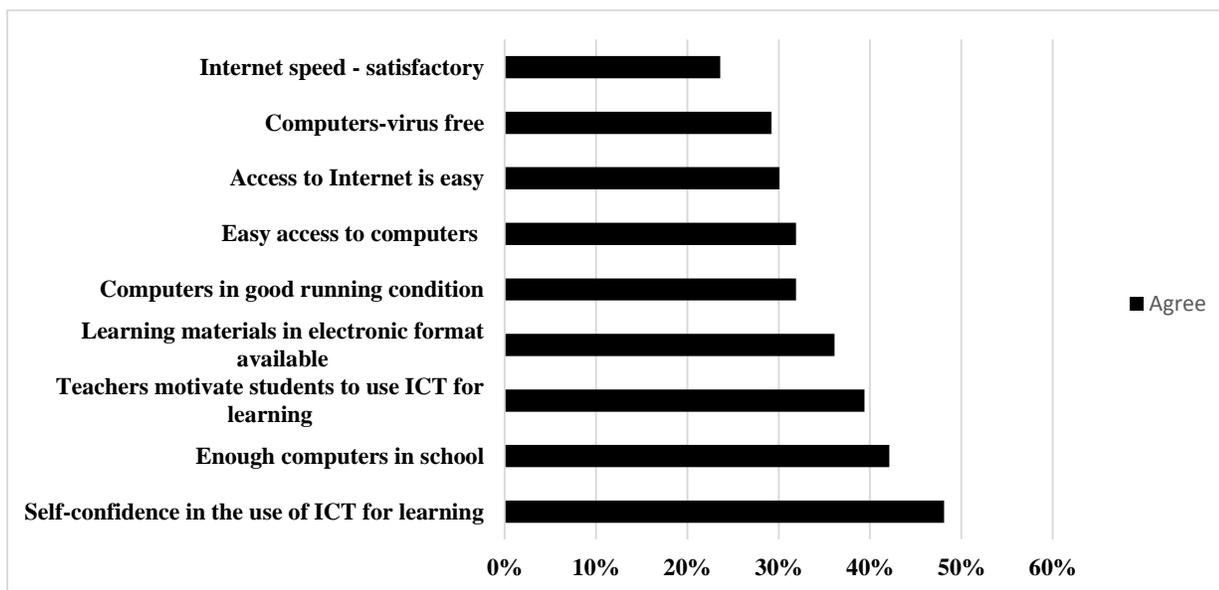


Figure 6: ICT facilities in school

**Finding 5:** Students claimed for more computers in the school, greater accessibility, faster Internet speed and a flexible time-table that would facilitate use of technology in their learning. In general, students were apprehensive of computer facilities available in their schools. Only around 30- 35% were happy with the antivirus policy, the working conditions of computers and the availability of digital resources.

**5.2.5 Other Findings.**

Data published by CSO [3] revealed that as at 2012, only 21% of Mauritians in general used the Internet for educational purposes, the most

common Internet activities being email/chat, information search and entertainment. But this research has unveiled that a large majority of young learners made much greater use of the Internet for their learning; the most common activities were searching the net for learning materials (74.9%) and downloading past exam papers (78.1%). This shows that the younger generation has already embraced a new learning paradigm with technology taking a key leading role.

Students also revealed that they were well aware of the hazards of computer viruses and most of them took necessary precautionary measures by installing an antivirus software, though most of

them (76.5%) went for the free version. But a large majority deplored the situation in schools, indicating a lack of school policy to equip all computers with an appropriate antivirus software.

Data also showed that most respondents (92%) had access to Broadband connectivity, indicating that students had fast and easy access to large volumes of downloads, including videos. It was worth noting that nearly all students (97%) were aware of computer-related health hazards, although it was not clear if they were skilled or sensitized enough to take precautionary measures to minimize such risks.

Data confirmed the frequent use of the computer by our young learners. They spent hours behind the computer screen but what share of this computer time was devoted to learning purposes was measured by another item of the questionnaire. Out of 10 hours spent on the computer, the average time spent on entertainment (5.43 hours) exceeded that spent on learning (4.32 hours) by 1 hour and 7 minutes. But group discussions which also focused on this aspect brought a truer picture revealing that the difference was much greater, reaching in some cases up to 80% of time spent for entertainment.

### 5.3 Gender Comparison

This research also analysed if boys and girls responded differently to various items of the questionnaire, be it the technological devices used, computer-related activities and perception of ICT as a potential learning tool. Regarding the different technologies used and even their frequency of use, there was no significant gender difference. However girls rated themselves with a higher level of ICT skills than boys ( $\chi^2 = 6.479$ ,  $df = 2$ ,  $p = 0.039$ ). Bivariate analyses of different computer-related activities revealed that boys and girls were at par in most of them, except that

boys had an edge in using Excel software ( $\chi^2 = 9.978$ ,  $df = 2$ ,  $p = 0.007$ ), and spent more time playing music and video ( $\chi^2 = 7.278$ ,  $df = 2$ ,  $p = 0.026$ ) than girls. These differences were observed both in the home and school environments. In schools two additional differences were noted, namely that boys were more involved in the use of databases ( $\chi^2 = 10.791$ ,  $df = 2$ ,  $p = 0.005$ ) and in communication activities ( $\chi^2 = 10.486$ ,  $df = 2$ ,  $p = 0.005$ ). Social networking was a popular activity, reported by 74.9% students, with boys being more present than girls on such platforms ( $\chi^2 = 10.539$ ,  $df = 2$ ,  $p = 0.005$ ). Online shopping was a rare activity among young learners, with boys making greater use of such facilities than girls ( $\chi^2 = 9.115$ ,  $df = 2$ ,  $p = 0.010$ ). Fewer girls (22.4%) than boys (51%) agreed that “*Boys are more at ease using ICT*”, indicating that girls did not feel intimidated or uneasy with the use of ICT tools. In fact girls, more than boys, believed that ICT promotes independent learning ( $\chi^2 = 7.907$ ,  $df = 2$ ,  $p = 0.019$ ) and makes learning more flexible ( $\chi^2 = 6.214$ ,  $df = 2$ ,  $p = 0.045$ ). To investigate if there was any gender bias in the use of computer time for learning, a Mann-Whitney U test was carried out and it confirmed that learning among female learners was statistically significantly higher ( $U = 4365.5$ ,  $p = .004$ ). And as shown in figure 7, girls spent more computer time for learning than boys. This confirmed a previous finding by Osman and Alfred [35].

**Finding 6:** This research shows that in Mauritius generally there is no gender difference in the use of technology and that both sexes are equally at ease with this tool, hence confirming that there is no such thing as “male culture of ICT”, or that computing is a male-dominated culture.

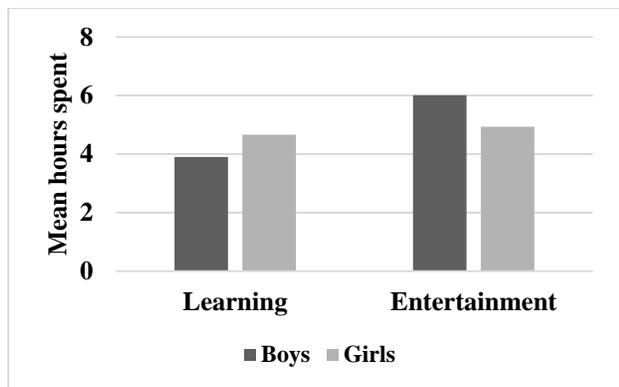


Figure 7: Mean hours spent for learning and entertainment

### 5.4 Technology Usage- Urban versus Rural

When an attempt was made to investigate if there was any urban-rural disparity in technology usage among students, we hardly found any worthwhile differences to be reported, thus asserting that Mauritian students behave in a rather likewise manner, independent of where they lived or whether their schools were located in urban or rural areas. The only marked difference observed was that learners attending urban schools made slightly more frequent use of computers at home (Figure 8). Why would learners attending urban schools make more frequent use of computers at home can probably be an area of future investigation?

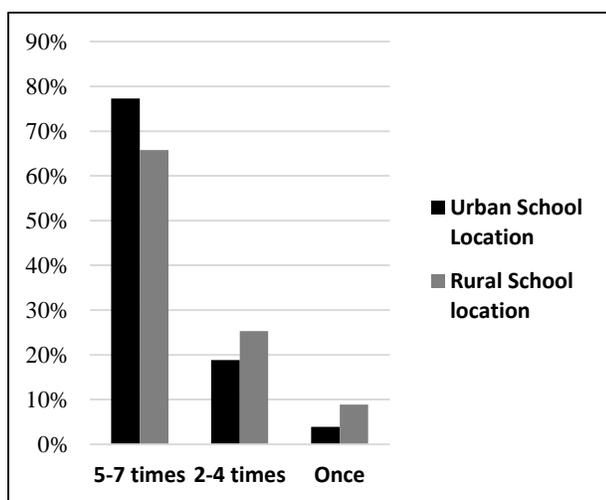


Figure 8: Frequency of use of computer at home

### 5.5 Group Discussions

Focus group discussions were held with 5 groups of 5 students each, from both state and private colleges, two of which were boys' and 3 girls'. Around 30 minutes were spent with each group. The semi structured questions included the following amongst others:

1. Which computer activities were most common among young learners?
2. What explained the relative lower use of computers in school?
3. What percentage of computer time was spent on learning?
4. In which types of learning activities were students involved when using a computer?

The questions were purposely a repetition of some items of the questionnaire as it was important to confirm some of the responses provided by students.

### 5.6 Results of Discussions:

These discussions revealed that only 30 – 40 % of computer time was spent on direct learning, the rest was devoted to entertaining activities like downloading and listening to music, social networking and managing photos amongst others. This confirmed earlier findings that computers were used more for entertainment than for learning. When prompted to provide details of the nature of their computer learning time, discussants revealed that much time was spent browsing the Internet to access learning materials. They opined that the CD-ROM or DVD was an obsolete learning medium, too often misplaced in drawers or on shelves. The discussions confirmed the major obstacles to ICT use in schools as mentioned previously and which included restricted access to computer labs, and slow Internet connection. They said there were no dedicated computer labs for learning, the existing ones were mostly utilised for computer classes. In some cases students

deplored the poor functionalities of old computer systems and the lack of updated antivirus software. This was a major concern for students who did not want to run the risks of transferring viruses to their home computers and losing important documents.

One major learning activity was Internet search for the subject General Paper and for project work. Finding additional resources to complement lessons notes for subjects like Science, Economics, Literature was also a common activity, in addition to downloading past exam papers, marking schemes and revision notes. In one group, students mentioned that educators cautioned them in their selection of websites as some were not reliable and updated sources of curriculum-based materials. The Mauritius Research Council had initiated a project in the past to identify a list of best and reliable websites for a number of subjects at School Certificate level. These sites were vetted by a pool of educators for accuracy and reliability. By providing students with such a list of prescribed web sites, fear to access unreliable sites would be dissipated. The Internet is a vast ocean of resources and tapping the right ones for learning objectives will become a major challenge for educators in a near future as they take more the role of the guide on the side rather than the sage on the stage.

## 6.0 CONCLUSION

The home-take messages of this research paper are numerous and unveil great avenues of ICT intervention to make learning a technology-efficient activity. This study posits that young learners in Mauritius are digital natives as described by Prensky [36], technology being an integral part of their everyday activities. Moreover, they perceived ICT as a pedagogical tool, providing flexibility to their learning and

the opportunity to learn difficult concepts. This research paper however points to the sharp contrasting situation in technology usage and more precisely computer usage between home and school, where a still low usage prevailed in the latter. The tenets of learning continue to remain within traditional pathways, allowing technology to only timidly reframe the pedagogy as reported in a study by Punie *et al.*, cited in Biagi and Loi [22]. Students reported restricted and inadequate ICT facilities in schools, though they expressed strongly their willingness to embrace this tool for learning purposes. The findings of this research reassure that technology usage among young learners is not gender bias, with minor differences in only some specific computer applications. With computing devices getting cheaper and cheaper, more and more learners will have their own portable devices. The challenge will be how to tame the affordances of technology to match learning needs. With time, more investments will be geared towards technology acquisition. Tablets are already being distributed to all Form IV and Form V (year 9 & 10) students. Students are ready to jump on the bandwagon and embrace ICT in learning and teachers have strong beliefs of the tenets of ICT [8]. We therefore have the essentials to make ICT integration in our schools a successful endeavour. It is time to climb the next step of the technology ladder and transform beliefs, perceptions, readiness of teachers and learners, and technology availability into real concrete achievable learning projects, where sound technology-enhanced instructional design can bring innovative learning to our classroom and beyond.

According to this study the factors that affect e-readiness of students include

- The types of computer-based activities
- The regularity with which computers are used
- The availability of the hardware
- Internet connectivity

- The amount of computer time spent on learning activities
- The perception of ICT to facilitate learning by simplifying complex concepts
- The extent to which computers promote self/independent learning which translate the student centred approach of the new learning paradigm
- Availability and accessibility to updated computer facilities.

## 7.0 RECOMMENDATIONS

Futures thinking through horizon scanning predict that innovation would lead to great avenues for alternative learning to take place in a technology-driven but also technology-tamed world. Ignoring this fact will have serious repercussions on learning achievement of students and delay the much wanted education that will spur the knowledge society. Table 1 summarizes the recommendations related to the main findings of this research paper.

Table 1: Findings and corresponding recommendations

<b>Findings</b>	<b>Recommendations</b>
1. Computers in schools were prone to viruses.	All computers must be equipped with reliable and efficient antivirus software.
2. a. There was limited access to computers for learning in schools b. Lack of comprehensive ICT-enhanced learning plan	Build specialized computer-learning labs for the study of all subjects.  School time-table must provide for computer learning activities.
3. Students deplored out of order and old computer systems	Establish a robust maintenance program for computer repairs. Gradual update of old computer systems.
4. Only 39% of learners considered that teachers motivate learners to use ICT for learning	Teachers must be empowered to transfer ICT based learning skills to students.
5. A majority of students had a high opinion of the pedagogical worth of ICT. Fifty percent were self-confident in using ICT for learning	Schools should re-organise learning activities around technology affordances.
6. Students were of the opinion that ICT facilitates self or independent learning.	Learning in school should be learner centred and promote independent and self-learning.
7. Learners were aware of computer health hazards	Sensitize learner on how to avert or minimize computer health hazards.

<p>8. Students were frequent users of a wide panoply of technological devices for different purposes, including learning.</p>	<p>IT skills can be accommodated to maximise learning outcomes.</p>
<p>9. Despite high usage of technology, more computer time was geared towards other activities than learning.</p>	<p>Students must be encouraged and supported to orient a greater percentage of their computer time towards learning purposes.</p>
<p>10. By nature of the computer-based activities reported by learners, these were pitched at mostly lower-order thinking levels, like downloading past exams, reading learning materials and information search.</p>	<p>To help learners maximize on the affordances of ICT, they must be empowered to develop greater cognitive processes and be involved in higher order thinking skills and be more critical, logical, analytical and reflective in their learning.</p>

Policy makers and educational technologists have much to gain from the findings of this research paper if they want to see an emancipated learning paradigm that matches the demands of an emerging class of digital learners.

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