Learning, Types of Learning, Traditional Learning Styles and the Impact of E-Learning on the Performance of Secondary School Students: The Perception of Teachers

Mahendrenath Motah
University Of Technology, Mauritius
Pointe aux Sables, Mauritius

mmotah@utm.intnet.mu

Abstract

This paper deals with the concept of learning from the traditional modes of learning through the learning styles to e-learning among adolescent students reading at secondary school level. These students aged between twelve and twenty are faced with the task of accommodating the influence of the traditional learning methods and the new approaches to learning through the introduction of new learning media. E-learning is spreading at a vertiginous speed and sweeping both teachers and students off their balance in many cases; posing serious adjustment problems when teachers and learners are unprepared to face the complex challenges which e-learning is bringing in its trend. Things become even more complex when programmes and equipments become obsolete within short periods of time, due to the introduction of new and more sophisticated approaches to dealing with information, communication and education.

Keywords: learning, learning styles, types of learning, e-learning, performance, perception, new learning media.

Approach

Secondary school teachers reading for their MSc Educational Administration and Technology, and their Post graduate Certificate in Education were solicited to fill in a questionnaire comprising of questions related to learning approaches, learning styles and the impact of e-learning on the performance of their students. They were also asked to express their views on the influence of e-learning on the way students learn. All, if not most of them are quite conversant with the concepts related to learning, learning styles and e-learning. They were given the exercise towards the end of the semester. During the lecture sessions they had the opportunity to discuss lengthily on the importance of teaching methods and students' learning styles; the introduction of information technology; the need for new teaching methods to help learners cope with the impact of e-learning and the emphasis laid on Information Technology Education in the Education System at all levels: primary, secondary, tertiary and vocational.

Findings

A majority of teachers concerned in this study believed that the most appropriate teaching method is the talk and chalk method, followed by demonstrations, discovery, discussions, observations, ands research work. The students' learning styles were in order of priority: Accommodator, diverger, converger, and assimilator.

Limitations

Although the study has touched a sample of teachers, education officers and students from various regions, the result obtained should not be extrapolated over the whole region before an in-depth study of the impact of e-learning on the performance of students at all levels: primary, secondary and tertiary.

Implications

Caution should be exercised in drawing hasty conclusions, as students have various personal characteristics; there are several other social and cultural factors that need to be considered as well as the interplay of individual differences; the learning needs of each individual learner, and the learning preferences of each and everyone should be major aspects to be closely studied.

Value

The paper could be an eye opener to other teachers who are confronted with the learning and teaching issues raised by the introduction of e-learning, multi-media programmes and the use of information technology in the pedagogical activities.

Introduction

Our concern for the impact of e-learning on the academic performance of students was aroused by the recent developments in the teaching and learning conditions as influenced by the decision of educational authorities to declare 2007 as the Year of Information Technology. Much emphasis is being laid on sensitising all active members of the population to get involved in the campaign, and to get as much knowledge and skills in dealing with information technology and the latest trends in electronic multi-media. The whole population is encouraged to be actively involved in getting access to the internet, e-mail, World Wide Web (www) for information, communication and education (IEC). For the purpose of this paper, we have solicited the collaboration of student teachers reading for their postgraduate degrees in educational institutions and universities. The goal of this study is to find out how teachers view the importance of e-learning as compared to the traditional teaching-learning approach, and to express their opinion on the influence of the use of multi-media and information technology on the performance of their students.

Literature Review

Much research has been carried in the field of learning, and suggestions as to what factors intervene in learning among humans, and how most effective learning occurs abound in the literature on learning issues. Various authors, Kolb, Gagne, Skinner, Ausubel, Bandura, Rogers, Knowles among others have expressed their views on the concept of learning and have proposed learning styles, learning models and learning cycles.

Learning is defined as actions under the guidance of the teacher aiming at bringing some relatively permanent change in the way students think, feel act

Some of the guiding principles are:

- Learning should be RELEVANT to existing knowledge and any future tasks.
- Learning should comprise of appropriate SEQUENCING of INSTRUCTION.
- Learning should have ACTIVE STUDENT'S INVOLVEMENT
- Learning is incomplete without FEEDBACK on PERFORMANCE

Relevance

Students understand and remember better if they can fit their learning into a framework (Ausubel, 1960), and students are motivated to learn if that framework fits into what they understand as their ultimate goal.

Sequencing

Learning is adding knowledge to what we already know. Student's understanding is enhanced if teaching is sequenced in a rational order which enables the subject to be developed in a coherent sequential framework (Gagné, 1974)

Sequence can progress from:

- simple to complex
- known to unknown
- example to principle
- concrete to abstract

Active Involvement

Active involvement of students in the learning process is more effective than uninvolved rote learning.

Students must be given every opportunity to practice and apply new knowledge to consolidate their understanding and promote its retention in memory.

Feedback

Learning is a process of acquiring new habits, knowledge and skills which together enable the students to do something they could not do before.

It is therefore essential that the teacher provide opportunities not only for students to practice and apply their new learning but also to receive feedback on their performance

Observational Learning

Observational Learning, also called imitation or modeling, is learning that occurs when a person observes and imitates someone's behavior. The capacity to learn a behavior patterns by observation eliminates tedious trial-and-error learning. Albert Bandura (1977) describes four main processes that are involved in observational learning:

Attention	For observational learning to take place, the first process that has to occur is attention. Before people can reproduce a model's action, they must attend to what the model is saying or doing. Attention is influenced by various factors such as type, warmth, power, novelty, interest etc.
Retention	To reproduce a model's action one must code the information and keep it in memory so that it can be retrieved.
Motor reproduction	The next process involved in observational learning is motor reproduction. People can attend to a model and code in memory what they have seen, then reproduce the action.
Reinforcement	The final process in observational learning involves reinforcement, or incentive conditions.

Theories of Learning

Sensory stimulation theory (Laird, 1985)

Effective learning occurs when the senses are stimulated. The Theory states that when multi-senses are stimulated greater learning takes place. The theory has had an excellent appreciation among teachers, particularly those dealing with young children in the pre-school and primary school sector

Reinforcement theory (B.F. Skinner, 1938, 1953)

This is the belief that behaviour is a function of its consequences. Learner will repeat the desired behaviour if positively reinforced. Positive reinforcement, rewards, certificates etc; as well as negative reinforcement can also strengthen behaviour when a negative condition is stopped or avoided. Parents and teachers alike have adopted the theory which still has many well-wishers.

Cognitive-gestalt approaches (R. Burns)

The emphasis is on the importance of experience, meaning, problem-solving and the development of insights. Many teachers believe that exposure to various situations can help students develop problem-solving abilities if placed in appropriate situations and exposed to varied experiences.

Facilitation theory (Carl Rogers, 1961)

This humanist approach is based on the premises that learning will occur, when the educator acts as a facilitator, learners feel comfortable, atmosphere allows sharing of new ideas, and learners do not feel threatened. The theory is being used by many teachers and counsellors, emphasising the client-centred approach.

Action learning (Reg Revans)

This approach links the world of learning with the world of action through a reflective process within small cooperative learning groups known as 'active learning sets'- there can be no learning without action and no action without learning. Reg Revans (1940) applied the concept of action learning in education. Nowadays, Action learning is receiving a lot of support with the development of electronic media offering learners with loads of information

Experiential learning (D.A. Kolb, 1984)

Experiential learning proposes a four-stage learning process: concrete experience, reflective observation, abstract conceptualisation, and active experimentation. The process can begin at any stage and is continuous. The theory asserts that without reflection we would simply continue to repeat our mistakes.

Kolb found that people learn in four ways with the likelihood of developing one mode of learning more than another. That people learn through concrete experience, observation and reflection, abstract conceptualisation or active experimentation. Based on the above, Honey and Mumford identified four learning styles: Activist, Reflector, Theorist, and Pragmatist.

Holistic learning theory (Laird, 1985)

This theory rests on the premises that the individual personality consists of many elements… specifically... the intellect, emotions, the impulse or desire, intuition and imagination that all require activation if learning is to be more effective.

Adult learning (andragogy) (Malcolm Knowles, 1990)

Andragogy argues that adulthood has arrived when people behave in adult ways and believe themselves to be adults. Is based on the following assumptions – the need to know; self-concept; learners' experience; readiness to learn; orientation to learning, motivation to learn.

Methodology

Study Group

The study involved eighty four secondary school personnel, out of whom, two were Inspectors having taught for over 20 years and the rest were all Education Officers, the majority of them have over 12 years experience and a few of them had at least five years teaching experience. The sample comprised of both male and female, involved in teaching various subject areas and were all below the age of 50 years. The distribution gender-wise and subject- wise is shown in Table 1.

Table 1. Details of sample, gender and subject areas

Subject Areas	Male	Female	Total	As a % of Total No of Teachers
Physical Educ	5	-	5	6
Art & Design	5	4	9	11
Maths	5	2	7	8
V.Arts	1	-	1	1
Biology	5	5	10	12
Chemistry	3	2	5	6
Economics	4	1	5	6
Inst. Music	1	2	3	4
Bus. Studies	9	10	19	23
Accounting	5	2	7	8
Language	3	1	4	5
Computer	-	7	7	8
Home Economics	-	2	2	2
Total Number of Teachers	**46**	**38**	**84**	**100**

They were teaching in Public and Private schools situated in geographical regions which are generally classified as urban, rural and coastal, as shown in Figure 1. Authorities are trying to put the same facilities at the disposal of all institutions irrespective of their location. Hence both teachers and students would be expected to be provided with access to information technology.

Although it is felt that in many cases the access to such facilities is not available. As most schools are situated in the Rural areas as compared to the urban and coastal areas and free education is provided to all children up to the age of 20 years; and the majority of teachers work in Public schools as compared to Private (government subsidised) schools. Figure 1 shows how the teachers are distributed gender-wise in Public and Private Schools
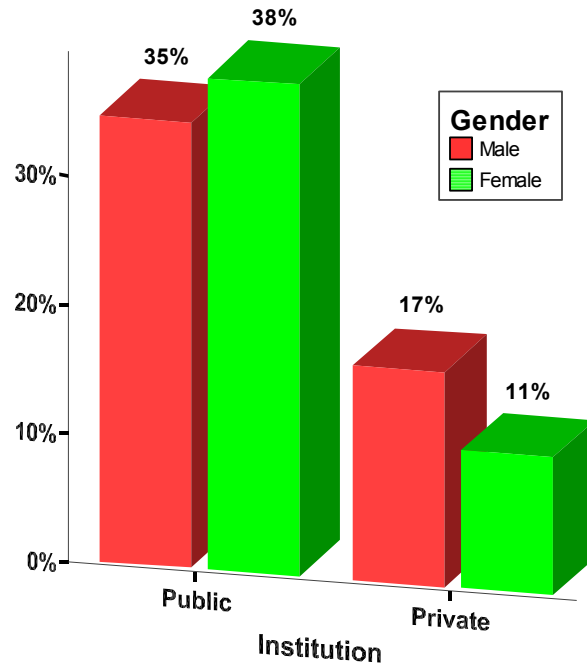

Figure 1. Distribution of teachers gender-wise in Public and Private Schools

Free education and the provision of education facilities to all children and adolescents up to the age of 20 years without discrimination has resulted in an almost 90% attendance in all schools irrespective of the geographical location of the educational institutions.

Table 2 shows the distribution of the student population in all three areas for both boys and girls. The student population aged between 11–20 attended classes in schools situated in the specified regions indicated in the table.

Table 2. Ratio Statistics for Number of Boys / Number of Girls

Group	Mean	95% Confidence Interval for Mean		Minimum	Maximum	Std. Deviation
		Lower Bound	Upper Bound			
Urban	1.889	-.078	3.855	.200	11.500	3.096
Rural	1.445	.512	2.377	.500	5.000	1.304
Coastal	1.000	.	.	1.000	1.000	.
Overall	1.657	.638	2.676	.200	11.500	2.357

The confidence intervals are constructed by assuming a Normal distribution for the ratios.

Figure 2 shows the geographical location of the Public and Private educational institutions concerned with the study. It is noted that more private institutions are situated in the urban areas, while more public institutions are found in the rural areas.
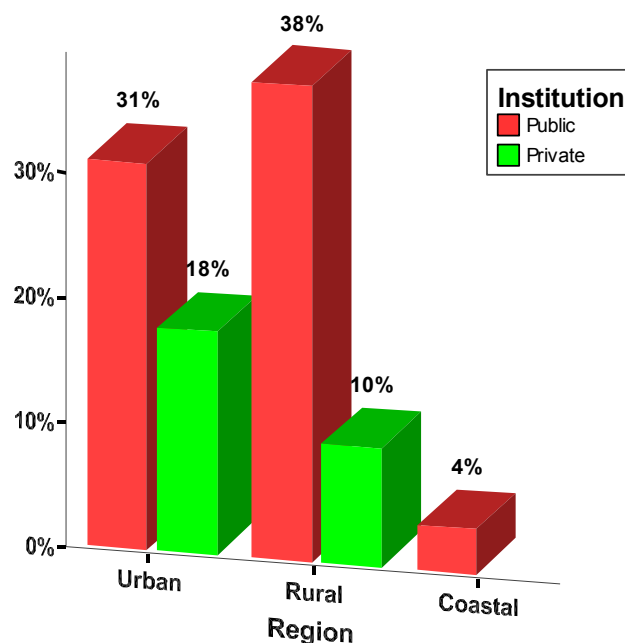

Figure 2 – Geographical location of the number Public and Private institutions percentage-wise.

This state of affairs puts pressure on authorities to provide institutions found in the rural areas with the same facilities offered to institutions in urban areas. It is important to note that the rural areas do not enjoy the same facilities as the urban areas.

Procedures

We wanted to know the teaching methods used by the teachers and learning styles of the students. As mentioned earlier, the teachers involved in the study are all following postgraduate studies and have had intensive exposure and discussion on learning, learning styles and the impact of e-learning. Some of them have also used learning styles tools to find out the learning styles and learning preferences of their students. All the teachers are graduates and are recognised as having expertise in the area of teaching and learning.

Participants were requested to fill in a questionnaire comprising questions on the teaching methods they usually used during their classes; the learning styles of their students; their level of computer literacy; the need for training in the field of IT; the accessibility to e-learning programmes and equipment; and other questions on the impact of e-learning on the performance of their students; and their views on the advantages and drawbacks of computer-assisted teaching and learning.

Results

The following diagrams illustrate the result obtained after the analysis of the data through SPSS.
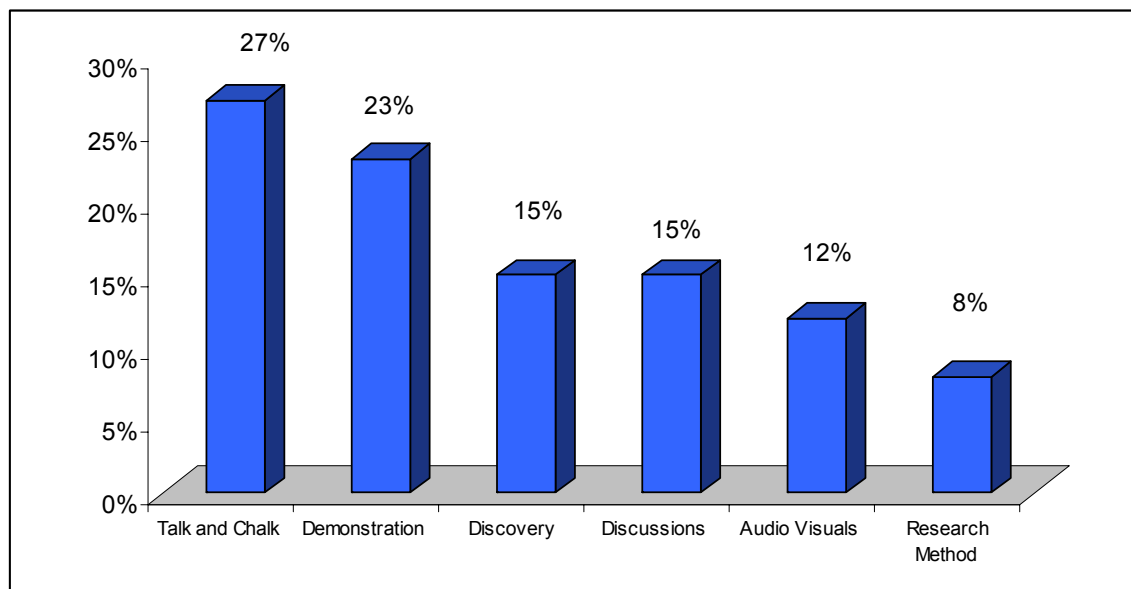

Figure 3. Teaching methods used by teachers

As shown in Figure 3, the preferred method among teachers was the talk and chalk method followed by demonstration; discovery and discussion; use of audio-visuals and finally research method. The traditional talk and chalk method seem to a diehard method and teachers feel that it remains one of the best methods that appeal to both teachers and students. It appears from discussions with teachers concerned with the study that the two methods that, in total, claimed 50% of the preferences among teachers is the traditional methods that have been used over centuries in almost all countries in the world, and seem to be universal.

From teaching methods to learning styles, we have looked into the existing research on learning styles and found Kolb Learning styles classification of Accommodator, Diverger, Converger and Assimilator best fit to appreciate the students learning styles. We have closely analysed the responses of the teachers and have found that we could either use the Honey and Mumford "Activist", "Reflector", "Theorist", and "Pragmatist" or the above mentioned Kolb Learning Styles. After having studied the pros and cons of both these models, we opted for the Kolb proposal, as it helps us to better illustrate our point.

Figure 4 shows the preferred learning styles of the students referred to by the teachers in relation to their appreciation of their students learning styles. The majority of them prefers learning by doing and feeling 30%; those who prefer learning by observing and feeling represent 27% ; students who learn better by doing and thinking are found in the 24%; and the remaining 19% are those students who prefer learning by observing and thinking. The learning preferences of the students put more pressure on teachers who need to be always present to guide them. Hence, the more independent learning as proposed through the introduction of e-learning might prove to be a very important issue for both teachers and educational authorities.
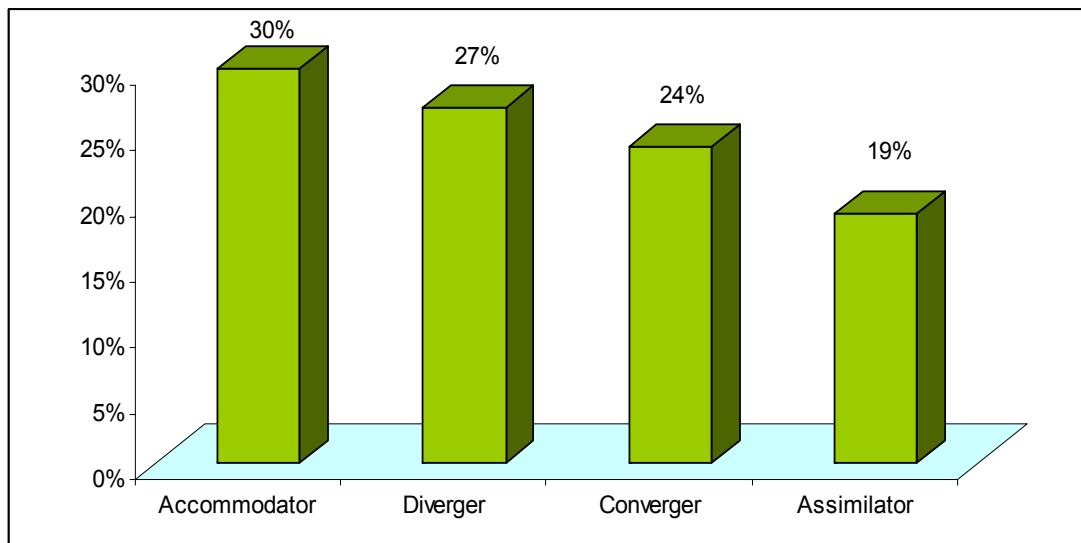
Figure 4. Learning styles among students

The conditions prevailing in the education sector, the emphasis on training of teachers and the various possibilities offered by both public and private training institutions, Universities and Institutes have paved the way for the consolidation of IT programmes in almost all educational institutions. Coupled with the demand for more IT literate workforce, the e-learning projects and programmes can find a high rate of success if wisely handled. As shown in Figure 5, we have an important IT literate teacher population.
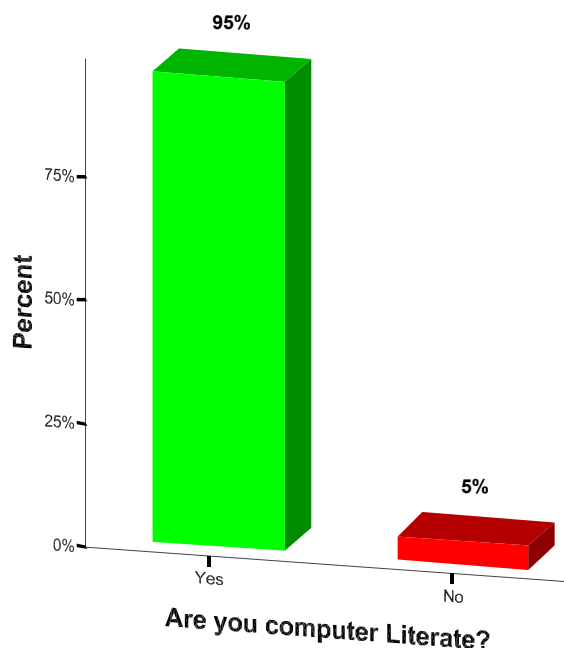
Figure 5. Computer literacy among teachers
(Bars show percents)

Despite the fact that 95% of the sample were said to be IT literate, the need for training is felt by a majority (62%) of the teachers who expressed the view that they needed training in the field of

information technology (Figure 6). The willingness and commitment of those concerned with the study could easily be extrapolated to the whole of the teaching profession. The will is there, we need to find the right pathway to ensure the successful implementation of all Information Technology Educational endeavours.
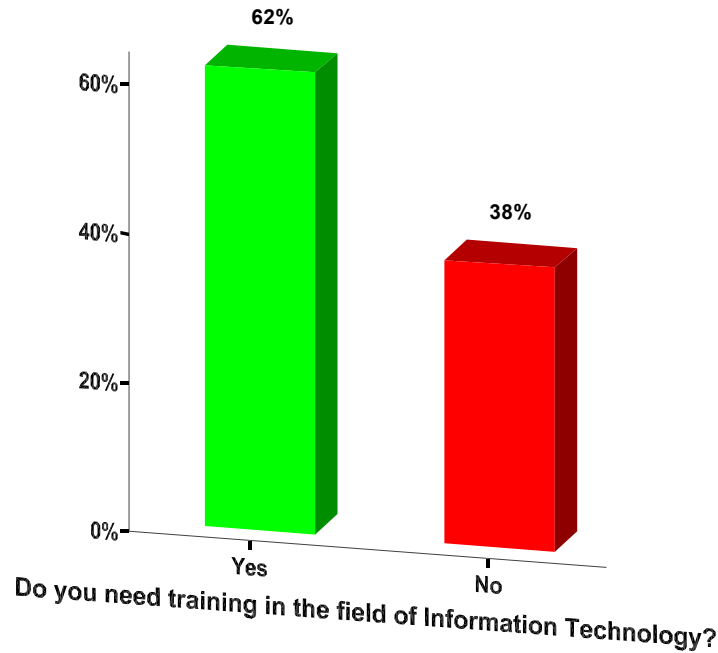

Figure 6. Need for IT training among teachers

An analysis of the data collected on the need for training has revealed some very important issues that can negatively affect any IT project implementation. The success of any project lies in the provision of desirable resources, facilities, equipment, know-how, training opportunities, managerial commitment, necessary logistic support, and other factors which can guarantee the success for all involved.

The study revealed that nearly a quarter of the institutions concerned are not equipped with e-learning equipment. The accessibility of these important tools is an important aspect which cannot be overlooked as the success of the e-learning project rests on the premises that all concerned should enjoy the same facilities. It is inconceivable to have 24% of the school population deprived of such facilities (Figure 7).
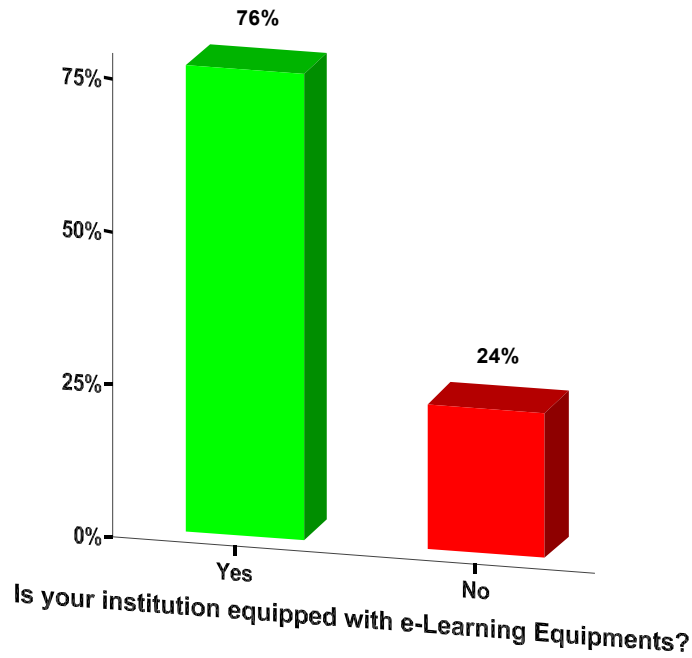
Figure 7. Institutions equipped with e-learning equipment.

Furthermore, it is also revealed that for 36% of the teachers, the equipment available does not help them in teaching their students (Figure 8).
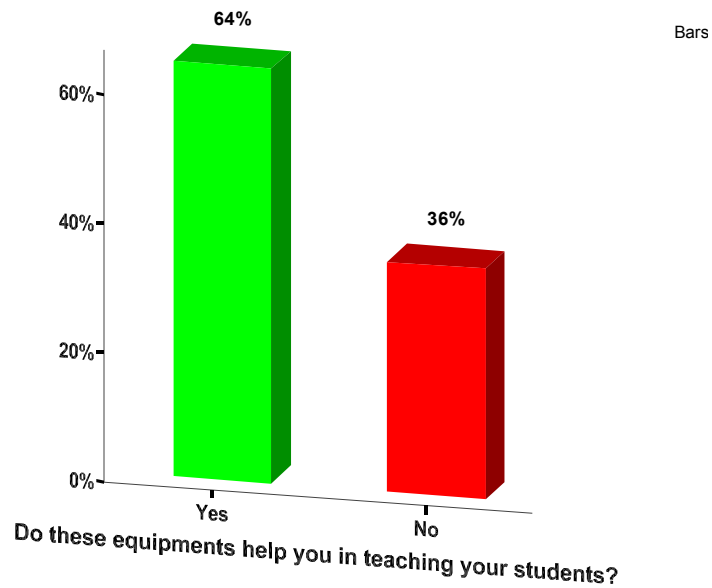
Figure 8. Help provided in teaching

We have brought forward the point that commitment is not enough; we need instruments, equipment and other tools to be made accessible. Unfortunately, as Figure 9 reflects, a surprisingly

poor picture of the prevailing conditions as far as accessibility of the needed equipment is concerned

The fact that the necessary equipment is not easily accessible to both student and teachers pose a major problem in the appreciation of the impact of e-learning on the performance of students as we do not possess all the information needed to reach an objective conclusion.

Things appear blurred as we move further towards an in-depth appraisal of the situation in the institutions concerned. When we analyse the prevailing conditions, and find that the accessibility of the desired equipment is an important issue to nearly 70 % of the population, the feeling is that many are left behind in the quest for mastery of e-learning.
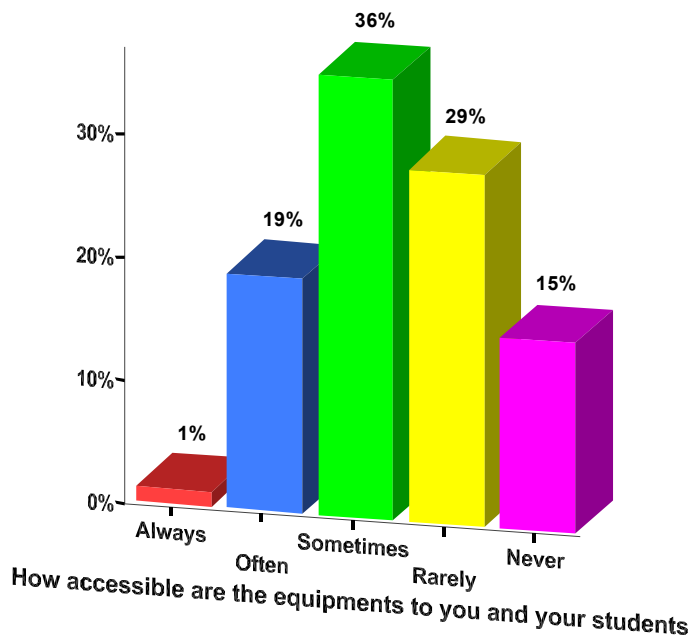

Figure 9. Accessibility of equipment.

As we proceed in our analysis, it becomes clearer that the accessibility of the IT equipment has an important incidence on the performance of not only students, but teachers also.

The teachers felt that if they had the necessary training, their institutions were equipped with the e-learning tools; the performance of their students would be positively affected. The various factors that inhibit the progress of both teachers and students are major hindrance to the positive impact of e-learning among the teaching personnel and their clients.

Figure 10 clearly depicts the situation and highlights the fact that nearly half the number of teachers participating in the present study feels that the performance of almost 50% of their students is not affected by e-learning. They further stated that the performance of their students would not be change with e-learning.
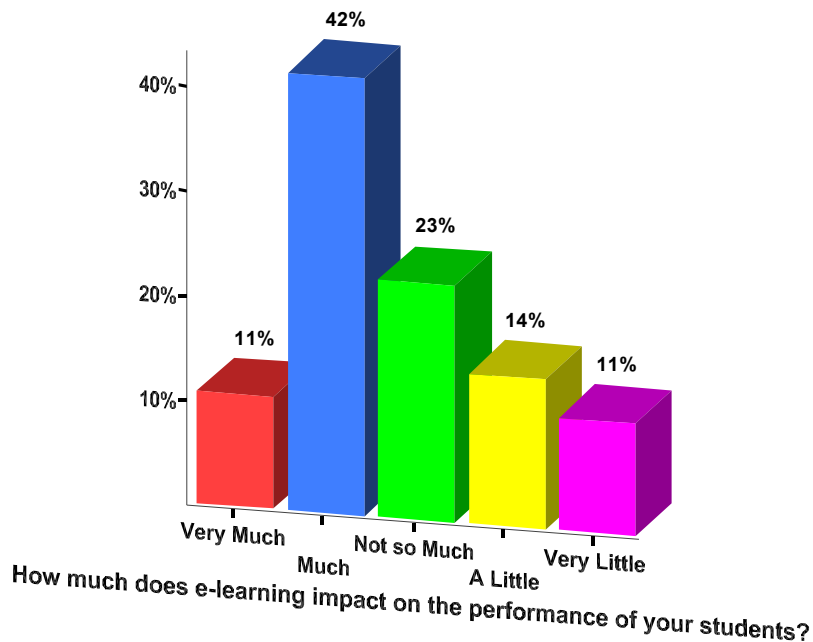
Figure 10. The impact of e-learning on the performance of students.

The opinion of teachers concerning the impact of e-learning on their teaching methods would be another surprising response, as 51% of the respondents felt that the use of multi-media and the use of computer had no influence on their teaching approach.
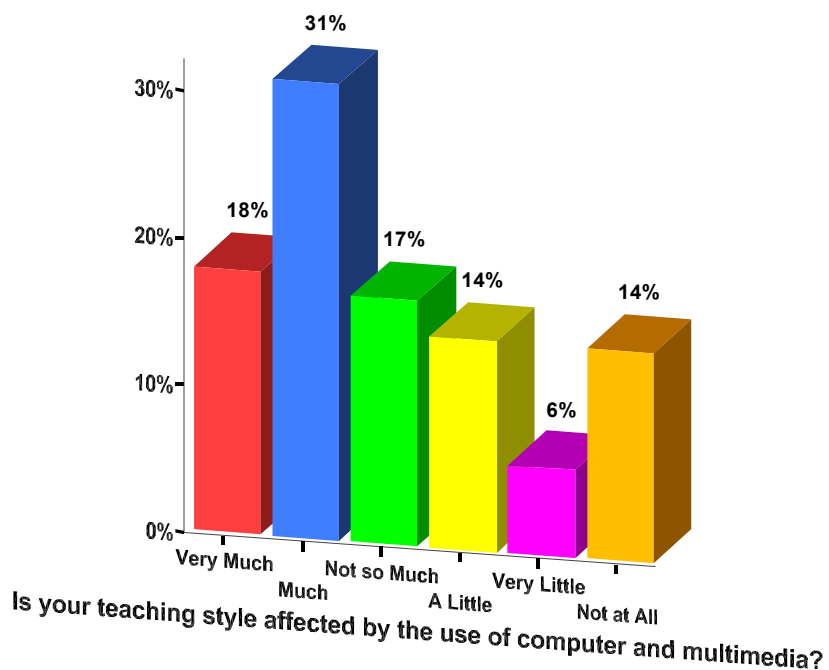

Figure 11. Influence of computer and multi-media on teaching style.

Figure 11 shows aspects which should be a matter of concern for those who believe that computer, multi-media, information and communication technologies would facilitate teaching and learning. The project of creating an E- all system where each and everyone would find his/her happiness, seems to be a matter requiring a tint of deeper concern for those who risk to be left behind.

This short research paper has tried to highlight a few glaring issues that need to be considered before we can take the band wagon together with those who are way ahead in the field if e-learning. Many researchers are still analyzing the e-related projects and trying to find out issues and challenges in the area of e-learning.

Conclusion

This short study highlights the difficulties that several developing countries face or will encounter while introducing IT at various levels in their education system; either through lack of resources or lack of preparedness to handle the rapid changes in the field of Information Technology. Many countries are not well prepared to take the challenge of introducing and implementing e-learning in their education system, because of the unexpected complexities of the application of IT as a learning tool.

The perception is that the world has become smaller as a result of the immense progress made in the field of information and communication technologies. IT is accessible to all across the continents and the oceans through the satellites, cables, and other such devices that have made man more independent and have increased his mobility by making distances shorter and communication faster.

As the analysis of data gathered on a small sample of less than a hundred people, has shown that, there are still many issues that need to be closely considered before we can safely state that e-learning and other related learning methods have contributed to the enhancement of the performance of our students at all levels of our education system, irrespective of individual differences due to heredity and/or environment. We can, at a more individual level state that we have been successful in harnessing new energies for the progress of humanity, and for contributing towards making the world a global village. But, there is still a long way to go before we can make the whole world harvest the benefits from the progress of science and technology.

References

Ausubel, D.P. (1960, Reprinted 1973). *An introduction to educational psychology.* Holt International Edition.

Ausubel, D. P. (1968). *Educational psychology: A cognitive view.* New York, NY: Holt, Rinehart & Winston.

Bandura, A. (1977). *Social learning theory.* Engelwood Cliffs, NJ: Prentice-Hall

Bandura, A. (1986). *Social foundation of thoughts and actions – A social cognitive theory*, Englewood Cliffs, NJ: Prentice-Hall.

Baron, J. (1982). *Intelligence and personality – Handbook of intelligence.* Cambridge University Press.

Bruner, J. S. (1968). *Towards a theory of instruction.* New York, NY: Norton.

Cattell, R.B. (1965). *The scientific analysis of personality.* Baltimore: Penguin.

Gagne, R. M. (1995). *The conditions of learning and theory of instruction.* New York, NY: Holt Rinehart & Winston.

Gagne, R. M. (1974). *Essentials of learning for instruction.* Hinsdale, IL: Dryden.

Gardner, H. (1993). Frames *of mind: The theory of multiple intelligences*. New York: Basic Books.

Gardner, H, (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York: Basic Books.

Goleman, D. (1998a). *Working with emotional intelligence*. NY: Bantam Books.

Goleman, D. (1998b). What makes a leader. *Harvard Business Review, 76*(6), 93.

Hollander, E. P. (1976). *Principles and methods of social psychology* (3rd ed.). New York: Oxford University Press

Honey, P. & Mumford, A. (1986). *The manual of learning styles*. Peter Honey Maidenhead.

Knowles, M. (1990). *The adult learner: A neglected species*. Houston: Gulf.

Kolb, D. A, (1984). *Experiential learning*. Englewood Cliff, NJ: Prentice-Hall.

Laird, D. A. (1985). Learning styles. Retrieved from http://www.dlrn.org/library/dl/guide5.html

Learning Style Inventory. (2000). Retrieved from http://www.howtolearn.com/personal.html

Maslow, A. H. (1954, reprinted 1970). *Motivation & personality*. NY: Harper Row.

Mischel, W. (1999). *Introduction to personality (*6th ed.). Fort Worth, Texas.

Motah, M. (2006). The ontogeny of memory and learning: Natural intelligence versus artificial intelligence in information technology education. *Proceedings of the 2006 Informing Science and IT Education Joint Conference*, pp. 221-231.

Rogers, C.R, (1961). *On becoming a person*. Boston: Houghton Mifflin.

Skinner, B.F. (1938). *The behaviour of organisms: An experimental analysis*. NY: Appleton-Century-Crofts.

Skinner, B.F, (1953). *Science & human behaviour*. New York: McMillan.

Sukhoo, A., Barnard, A., Eloff, M., Van der Poll, J. A., & Motah. M. (2005). Accommodating soft skills in software project management. *Issues in Informing Science and Information Technology*, *2*, 691-703

Wittrock, M. C. (1986). *Students' thought processes: Handbook of research on teaching*. Macmillan.

Biography

Mahendrenath, MOTAH is Senior Lecturer at the University of Technology, Mauritius. He has a Postgraduate Diploma in Educational Psychology from Paris V, Rene Descartes, University; Master's Degrees in Psychology and Ethnology, and a PhD in Arts and Human Sciences from Paris VII, Jussieu University, Paris, France. He has spent three months as a Visitor at Jordanhill College of Education, Glasgow, Scotland in April- July1985 under the British Council. He has spent one month in USA, as a Visitor under USIA in June 1987. He also attended the Laurentian University, Sudbury, CANADA in connection with the Distance Education Links Project, under CIDA in June 1995. He has participated in various Workshops, Seminars and Conferences at National and International levels. He has extensive experience in the fields of Management, Administration and Training at both National and International levels. He has been Training Manager for an International Hotels and Resorts Company from 1996 – 1998. He has also been Advisor in Psychological Matters for the Ministry of Youth and Sports during the period 1999 – 2000, and was actively involved in the preparation of the National Youth Policy, before joining the University of Technology, Mauritius in April 2000. He is Chairperson of the Regional Centre for Urgent Anthropological and Ethno-

logical Research. His interests are research in the field of education and human Sciences. He has launched a Masters in Educational Administration & Technology, and is at present working on a Degree course in Counselling at the UTM. He has been involved in the social field since the 1980's. He acted as Chairman of the Preparation for Retirement Task Group (National Policy for the Elderly. He has participated in workshops on the Elderly, Gerontology, Abortion, Prevention of Drug addiction; Prevention of Alcoholism, Prevention of Delinquency (Chairman of the CYC Board of Visitors), he is also the Lifetime Honorary President of The Victim Support, Mauritius.

He has presented the following papers at International Conferences:

Accommodating Soft Skills in Software Project Management – InSITE Conference, June 2005, Flagstaff, Arizona, USA.

The need for a consensual, coherent and comprehensive approach to tourism education in developing countries, with reference to some Indian Ocean Islands – RDTR Conference Algarve University, Faro, Portugal, October 2005.

The ontogeny of memory and learning: Natural Intelligence versus Artificial Intelligence in Information Technology Education. - InSITE Conference, Salford, UK, June 2006.

He has submitted a RESEARCH paper entitled " Study of the influence of Multiple Intelligences and the use of Soft Skills in Project Write-up among IT and Non-IT Students" for an International Conference in Slovenia scheduled for June 22-25, 2007.