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Curriculum Innovation: The Complexities of Implementing General Information Technology at School Level

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Abstract

The purpose of this study was to explore how General Information Technology (GIT) is implemented in the General Certificate of Education (G.C.E.) Advanced Level (A/L) curriculum in Sri Lanka. The specific objectives were to examine the factors affecting the implementation of GIT as an innovation at school level, to understand the views of students and teachers on implementing GIT, and to explore the strengths and weaknesses of implementing GIT as an innovation. The study is exploratory, constructivist, and qualitative in nature. The multiple-case study design was used to have an in-depth study. A purposive sample of two urban schools was selected within the Kandy Educational Zone, where there are Computer Learning Centres (CLCs) that currently teach GIT. Data were collected using semi-structured interviews, observations, and document analysis. The theoretical framework was informed by Fullan's Interactive Factors Affecting Implementation Model. The following themes emerged in the analysis: lack of sufficient awareness of aims and objectives of implementing GIT by teachers and students, poor physical resources and infrastructure in the CLC, less enthusiasm among students due to rules and regulations in the CLC, poor teacher professional development programmes, weak administration in the school, poor monitoring systems of the Ministry of Education, Provincial Department of Education, Zonal Education Office, and the school, and lack of adequate support from the family for the students to learn GIT. Due to the above reasons, both teachers and students were less enthusiastic about the implementation of GIT. Measures such as providing required physical resources and maintenance from the Ministry of Education, revising the syllabus to fulfil students' needs that align with the National Vocational Qualification Framework (NVQF) guidelines, and establishing a proper monitoring system are recommended.

Keywords: Computer Learning Centre, Curriculum, General Information Technology (GIT), Implementation, Information and Communication Technology (ICT).

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Introduction

As Information and Communication Technology (ICT) education is of paramount importance to national development, it is the responsibility of the Government to equip citizens with ICT skills. General Information Technology (GIT) was initiated in 2002 in the General Certification of Education (G.C.E.) Advanced Level (A/L) curriculum, and the national level examination has been held since 2005. This subject is introduced to students in Grade 12. After completing the syllabus within one year, students have to sit for this national level examination. Although this was introduced with the intention of imparting knowledge in basic theories and principles required to become a professional beginner in Information Technology (IT), the majority of the students hesitate to sit for the national level examination.

The introduction of GIT represented a significant curriculum innovation aimed at integrating IT literacy into the senior secondary education system. As a curriculum innovation, GIT also demanded new approaches to teaching and learning, assessment, and teacher training to ensure the effective transfer of ICT skills. After two decades, several changes have been made in the secondary education curriculum in schools. At present, the ICT subject is taught from Grades 6 to 9, and some of the students in Grades 10 and 11 study ICT as an optional subject. However, GIT was introduced with the intention of imparting basic knowledge of ICT. Further, schools implemented GIT with limited physical facilities and infrastructure. Therefore, it was decided to focus attention on exploring the complexities of the implementation of GIT in the G. C. E. (A/L) curriculum in Sri Lanka as a curriculum innovation.

Aim and Objectives

The aim of this study was to explore the complexities of the implementation of GIT in the G.C.E. (A/L) curriculum in Sri Lanka.

The specific objectives of the study were to:

1. examine the factors affecting the implementation of GIT as an innovation at school level
2. find out the views of students and teachers on implementing GIT
3. explore the strengths and weaknesses of implementing GIT as a curriculum innovation

Review of Literature

Among the research work reviewed, most of the studies focused on the implementation of ICT education while few studies focused on GIT as a unique subject implemented in Sri Lanka.

In examining the challenges of implementing ICT Education, Bukaliya and Mubika (2012), in their study conducted in Zimbabwe, found that there were no budgets allocated for computer procurement and a lack of qualified teachers. They recommended that teacher education institutions integrate Computer Education through clear policy frameworks and strengthen administrative and technical capacity by providing in-service training programmes. Insufficient funds for computers, accessories, and infrastructure, a lack of professionally qualified teachers, and inadequate revision material have been identified as major issues and challenges in implementing effective teaching of Computer Studies in Zambia (Gregory, 2016). Aboderine and Olukayode (2014) found similar issues in Nigeria, such as computer resources, budgetary

constraints, trained manpower, and time for computer lessons. Hammon (2017) investigating the problems in implementing computer education in Nigeria, found that physical infrastructure facilities, teacher qualifications, and inadequate government funding were problems. Muruthi (2017) found that infrastructure facilities, administrative support, and poor ICT policies affected the implementation of ICT Education in Kenya. These studies highlighted the need for government support and improvement of infrastructure to ensure successful implementation of Computer Education in schools.

Adefunke et al. (2014), studying the implementation of the National Computer Education Curriculum in Nigeria, revealed no significant difference in awareness between teachers in private and public schools. However, there was a significant difference in the availability of computer hardware and software in public and private schools. The majority of Nigerian computer teachers had basic computer knowledge; almost half were deficient in advanced computer operations. The study suggested adequate human and material resources, in-service training opportunities, and computer laboratories in primary schools. It also recommended periodic reviews of the curriculum and increasing budgetary provision for ICT.

Bamidele and Bakare (2015) and Yadev et al. (2016) investigated the implementation of Computer Science Education (CSE) in Nigeria and United States, respectively. They found low implementation rates, lack of computer facilities, and poor attitudes among stakeholders. The study also highlighted the need for professional development to meet curriculum needs.

To avoid weaknesses in quantitative and qualitative studies, some researchers used mixed methods. Chen (2010), studying the implementation and sustainability of ICT integration in two primary schools in Taiwan, found that external support from the Government, parents, and cross-school learning was influential in the change effort.

Most of these researchers have used quantitative research methods and mixed methods and highlighted the importance of providing professional training and addressing challenges in implementing Computer Science Education in schools. By examining the implementation process using qualitative methods, a researcher can gain a deeper understanding of the process and its impact on the education system.

Research literature on ICT in Sri Lanka is limited. Gunawardana (2007) found a shortage of software professionals and a proliferation of small training institutes, leading to doubts about the quality of students graduating from these institutes. Silva (2007) studying the challenges and perspectives of IT in Sri Lanka and found that poor performance in the GIT Examination was due to medium of instruction, and also found out that insufficient computer laboratories, lack of well-trained teachers, and insufficient teaching materials were challenges. Ilmudeen (2013), examining the importance of the ICT curriculum in government schools, found challenges such as lack of computer laboratories, inadequate qualified teachers, low student motivation, and absence of national-level certification for students. In the context of Sri Lanka, the specific challenges surrounding the implementation of GIT as a unique subject remain underexplored. This study aims to fill this gap by examining the factors affecting the implementation of GIT in

schools, with a particular focus on infrastructure, teacher qualifications, student motivation, and curriculum.

In a few studies, the researchers have used theoretical frameworks such as Roger's Diffusion of Innovation Model, Stufflebeam's CIPP Model, Vygotsky's Activity Theory, and Fullan's Interactive Factors Affecting Implementation Model to investigate the implementation process of ICT. GIT is a subject unique to Sri Lanka, and research related to its implementation is scarce, and theoretical frameworks have rarely been applied to explore this process.

Therefore, to fill the research gap, it was decided to look at the process of implementing GIT at school level from a theoretical perspective.

Theoretical framework

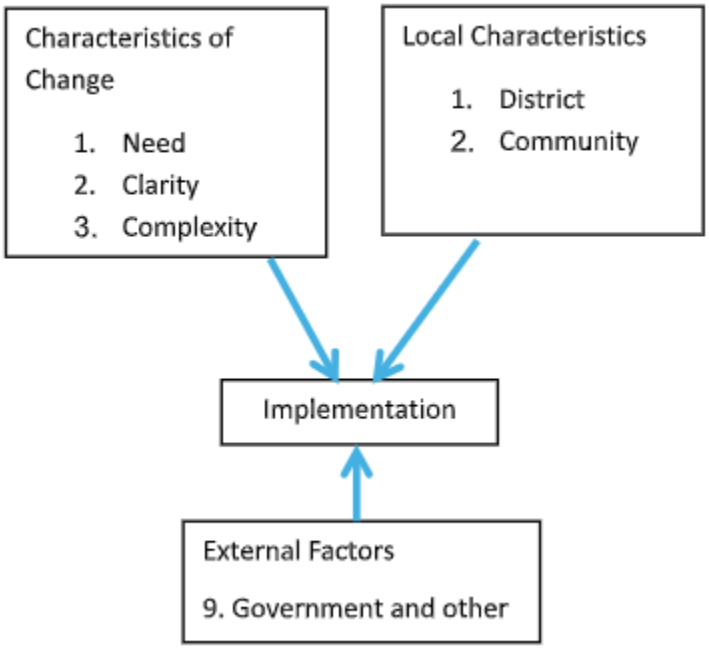
Curriculum implementation is a multifactorial process where different stakeholders are associated. There are various curriculum development, implementation, and evaluation models. The implementation of GIT in the G. C. E. (A/L) curriculum is an innovation. Fullan (2001) defines curriculum innovation as a complex process of planned change in educational content, teaching methods, and assessment strategies aimed at improving student learning outcomes. Hence, in this study, curriculum innovation was considered as an educational change.

Fullan (2001) suggested educational change is technically simple and socially complex. Though there are several theories that investigated the complexity of change, when considering a framework to examine the implementation of a new subject for change, Fullan's (2001) Interactive Factors Affecting Implementation Model was selected as appropriate and relevant in grounding this study.

Fullan (2001) discusses the factors affecting each of the stages in the change process. He begins to simplify the change process by mapping it with an outline of three broad phases: initiation, implementation, and institutionalization. However, our study relates specifically to the implementation phase, which ties more directly to the scope of the study.

Figure 1

Interactive Factors of Change Model (Adapted from Fullan, 2001)



The idea of implementing an innovation that has been successfully documented may seem like a simple task. However, whether the implementation is a success or failure is determined by factors influencing the dynamic nature of the process. In fact, Fullan's Interactive Factors of Change Model places a strong emphasis on collaboration and interaction among stakeholders. It highlights the importance of building relationships, shared vision, and collective responsibility for change.

Further, Fullan's model takes a systemic perspective, considering the interconnectedness of various factors within the educational system. It recognizes that change cannot be isolated to a single innovation but requires a systemic approach that addresses multiple interrelated factors such as leadership, professional development, and organizational culture. This systemic view may be more appropriate when the change initiative aims to address broader systemic issues.

When considering the process of GIT implementation, Fullan's model provides a framework to analyze interconnected systemic factors that affect change and interactive factors in relation to the implementation process. Therefore, it was decided to follow the Interactive Factors of Change Model (Fullan, 2001) and study the factors affecting the implementation of GIT.

Methodology

In order to understand the expectations and reality of the implementation of GIT, a qualitative research paradigm was used, as our ontological and epistemological views align with

constructivism that knowledge is socially constructed by people active in the research process (Guba & Lincoln, 1994). For the qualitative paradigm, the world consists of constructed reality, and these constructions take the form of individual interpretations (Gall et al., 2003). In this research, a multiple- case study design was used to make sense of the data to come to an in-depth understanding of implementing GIT in the G.C.E. (A/L) curriculum in two schools.

Using the purposive sampling method, two urban schools within the Kandy Educational Zone were selected where there are Computer Learning Centres (CLCs) that currently implement GIT. School A and School B are two urban schools in the Kandy Zone. School A is a 1AB type school that has a CLC with more facilities, whereas School B is a 1C type school where there are few facilities in the CLC. In School A, there were 16 Grade 12 classes, whereas, in School B, there were only two Grade 12 classes.

Table 1

Context of two heterogeneous schools

	School A	School B
Grade Type of School	1AB	1C
Number of GIT Teachers	2	1
CLC Facilities	Computer lab with adequate physical resources and infrastructure	Computer lab with poor physical resources and infrastructure
Number of Grade 12 Classes	16	2
Number of Students in School	3500	1000

In order to collect preliminary data, questionnaires were given to 250 students. Considering the responses, 20 students from each school and all the GIT teachers in these two schools were selected for interviews. Data were collected from the sample using semi- structured interviews. Ten lessons from each school were observed to understand the reality of the teaching learning process of GIT. Documentary reviews were used to further understand the context of implementing GIT in these schools. Thematic analysis was used to analyze qualitative data.

Results and Discussion

The first objective of the study was to explore the factors affecting the implementation of GIT as a curriculum innovation in the target schools. Hence, we analyzed data in relation to schools A and B using cross-case analysis to understand the factors that affect the implementation of GIT in schools. The data collected were analyzed and discussed under the following sub themes.

Awareness of teachers and students on the aims and objectives of GIT

When analyzing the interview data, it was noticed that the teachers were not aware of the aims and objectives of introducing GIT.

One of the GIT teachers said:

"The aim of the syllabus is to provide ICT literacy to the students." (Teacher 1, School A)

Teacher 1 in School B was of the same view as Teacher 1 in School A.

Teacher 2 in School A said:

"Students will be able to use ICT in day-to-day life." (Teacher 2, School A)

When it was asked whether they were aware of the aims and objectives in the syllabus, all GIT teachers said that they had not read the aims and objectives stated in the syllabus.

On the other hand, the students were not aware of the aims and objectives of the subject either. When asked whether their teachers clearly explained the aims and objectives of the syllabus, they said that they had not explained the aims and objectives of the GIT syllabus. This suggests that both teachers and students in these two schools did not clearly know the aims and objectives defined by the Ministry of Education, for introducing GIT in schools.

This is what Fullan (2001) illustrated under clarity included in the characteristics of change in the model. The clarity of aims and objectives is a perennial problem in the implementation process. The teachers selected were working with a limited awareness of the aims and objectives of the GIT curriculum.

Poor physical resources and infrastructure in the CLC

The data analyzed in this section were based on the inventory and documents maintained in the CLC. In order to commence GIT in School A, a CLC was established in 2003. To initiate the programme, the students were provided with a well-equipped laboratory to access computers.

The Government has given twenty (20) computers and three (03) printers to the school. These computers were networked. There was one computer given to the teacher for her own purposes. The school obtained the internet facility from a local internet service provider (ISP). Among the 20 computers, only 10 were in working condition. Although the internet was working most of the time, there were failures. This was evidenced by the maintenance records. The computer operating system was Microsoft Windows XP, with the Microsoft Office package installed on all personal computers (PCs).

Moreover, ten netbooks and a multimedia projector were in the CLC. However, those facilities were not provided by the Government. The school has received netbooks after winning a competition and the multimedia projector has been bought by the school using school funds. The resources available to School B were worse when compared to School A. The CLC was established in 2007 in School B. To initiate the programme, 10 computers and one printer were given to the school by the Government. These computers were networked. One computer was given to the teacher.

As there was a requirement for software to implement GIT, the computer operating system Microsoft Windows XP with the Microsoft Office package was installed on all PCs. Internet facility was provided by a local ISP.

Confirming the findings of observations and documents, the two teachers in School A in the interview said that they had no convenient access to the school's ICT resources and technical support.

Teacher 1 in School A reported:

"I use a multimedia projector in the lab to explain lessons... and it is easy to conduct the lesson. But in our lab, there are only 10 computers. We received 10 net books as we won a competition... So, I use netbooks as well. But in arts classes, there are more than 40 students. Therefore, it is difficult to work. Sometimes, the internet is slow or not working. We don't get the technical support we need." (Teacher 1, School A)

Such responses suggested some issues in relation to inadequate in-house ICT resources. After establishing the CLC, physical resources and infrastructure were not supplied, and there was no efficient maintenance procedure.

This was confirmed by the responses of students A7, A8, A15, and A17:

"When we start computer practical lessons, we come across hardware errors frequently ... or very slow... Most of the time, our internet connection is not working or very slow. We are disgusted."

However, the response of School B Teacher 2 was completely different. She had some other issues. Her teaching methodology has been changed due to poor ICT resources.

"I teach GIT in the classroom. Only the other teacher does her GIT lessons in the CLC. I do practical lessons in the classroom. I feel that equal access to the CLC was a good feeling. Then the children would participate in the lesson enthusiastically. To allow the children to participate in the lessons enthusiastically, it is good that all teachers have equal access to the lab." (Teacher 2, School A)

This may have happened due to the weak administration of the Principal. On the other hand, the reason may be the poor physical resources and infrastructure available at school. There are more than 80 classes in the school, which operate with one CLC. Based on the above findings, it is suggested that both teachers and students face a lot of problems due to poor ICT infrastructure and in-house physical resources available to the school.

Confirming the findings of interviews and observations in School A, the GIT teacher in School B reported:

"In our CLC, only two computers are working. But in the arts class, there are more than 20 students. Therefore, it is difficult to work. Sometimes the internet is slow or not working."
(Teacher 1, School B)

Further, she added:

"Our computers are old, and it is difficult to update software as well as RAMs...We cannot run multimedia software on these computers. The director of ICT came and tried to repair them by himself. But he failed. In fact, we need new computers in the lab." (Teacher 1, School B)

Furthermore, Teacher 1, School B, complained:

"We don't have a multimedia projector... If we had one, it would be very useful...I could incorporate it into my lessons. The situation in the CLC is worse. Only two computers are working. How can I manage with two computers?" (Teacher 1, School B)

In this school too, the GIT teacher failed to implement GIT properly due to inadequate physical resources and infrastructure.

Less enthusiasm for studying GIT due to rules and regulations in the CLC

Some rules and regulations have been displayed in the CLC in Schools A and B. In both schools, the rules and regulations were similar.

Following are some of the rules displayed in the CLC in School A:

- Remove shoes and socks before entering the laboratory.
- Avoid bringing food and water.
- Avoid bringing pen drives.
- Avoid unwanted websites.

In Schools A and B, the students were to remove their shoes and socks outside the laboratory. This was applicable to students. However, the observations confirmed that the teachers do not remove shoes.

During the interviews, most of the students said:

"We do not like to remove shoes... The other thing is that without washing our feet, we have to wear them again. As students remove socks and shoes, there is an unpleasant smell." (Student A15)

In School B, the teacher explains the reason for the reluctance to remove shoes.

"Our students don't like to remove shoes. They do not like to remove their socks either. Because they are old and torn. That is a common situation. Most of the students come from poor families. Sometimes, I buy socks for them. And throughout the day, I have to bear this unpleasant smell." (Teacher 1, School B)

Embarrassment due to poverty could be a reason for their reluctance to remove shoes when entering the laboratory.

Restricting food and water in the CLC is a wise decision, but this was applicable only to the students. It was observed that ICT teachers have their meals in the CLC in School A. This situation was similar to School B.

Students were restricted from using pen drives in the CLC. The teacher in charge of the CLC said that pen drives are the main cause of spreading computer viruses. If one computer becomes infected, all the other computers in the network would be affected. This suggests that these schools do not have powerful antivirus software. However, due to this restriction, both teachers and students cannot store documents to use after the lesson.

Restricting unwanted websites, on the other hand, is a good decision because it helps restrict students from accessing social media and irrelevant websites. In order to prevent students from accessing the above, a firewall could be used.

It was observed that the CLC in School B was an untidy and dirty room. It has not been cleaned for a long time. Both schools were similar in terms of rules and regulations in their CLCs. In fact, implementing rules and regulations is essential for maintaining the CLC effectively. However, GIT teachers should avoid discouraging students from utilizing the CLC.

All GIT teachers in Schools A and B complained that they do not have anybody to help them when they encounter problems related to teaching.

In both schools, GIT teachers were found to be less enthusiastic about teaching GIT due to the discouraging responses from the school and students. The teachers who teach the main subjects focus their attention on covering the syllabus and preparing the students for the G.C.E. (A.L.) Examination. Hence, they use the GIT period to teach other main subjects. Moreover, they encourage students to follow major subjects. Furthermore, GIT teachers have to perform other tasks in school, especially IT-related work. As principals in those two schools assign different tasks to GIT teachers to be done during school hours, they have to give priority to them.

This situation is discussed by Fullan (2001) under the principal, including local factors which affect the implementation process. The principal is a local factor that affects the implementation of GIT

in Schools A and B. The weak administration of the principals has led to poor implementation of GIT in these schools.

Poor teacher professional development programme

All the GIT teachers in Schools A and B are English-qualified teachers; they need subject knowledge as well as professional competency. However, teachers do not receive sufficient training to teach GIT. Yet they believe that participating in short-term training courses could help them update their knowledge. This suggests that the schools do not get adequate support from the Zonal Education Office, National Institute of Education (NIE), or other higher authorities. Hence, teacher professional development can be considered a significant factor influencing the implementation of GIT. On the other hand, the lack of such development reflects a weakness on the part of the Government.

Weak school administration

Documents, such as the main timetable in the school and the laboratory timetable, were observed to understand the actual condition in School A. When those two timetables were reviewed, it was revealed that there were clashes. The laboratory timetable was set by the Centre Manager of the Computer Learning Centre.

Teacher 1, School A, said:

"I prepare the CLC timetable. As the centre manager, I have to be in the CLC throughout the day. The equipment in the lab is very expensive. I am the one who is responsible for them. So, I included all my classes on the timetable." (Teacher 1, School A)

The Centre Manager believed that she should be in the CLC throughout the day. When she has theory lessons too, she conducts her lessons in the CLC. Those periods could be used for practical lessons of the other GIT classes.

Teacher 2 confirmed this and said:

"Always there are clashes in the timetable. I teach GIT in the classroom throughout the year. It's boring to teach practical lessons in the classroom. I informed the principal, but nothing happened." (Teacher 2, School A)

The situation in School B was different from school A, as the GIT teacher is the only ICT teacher in the school. The documents, such as the school's main timetable and the CLC timetable, were observed. It was revealed that there were no clashes in those two timetables. The CLC timetable was set by the centre manager of the computer learning center.

Teacher 1, School B said:

"I prepare the laboratory timetable. As the centre manager, I have to be in the lab throughout the day. So, I put all my classes on the schedule. And as I am the only ICT teacher in the school, there are no clashes." (Teacher 1, School B)

The principal of School B, too, confirmed it:

"I don't interfere with the work in the lab... I have given the responsibility of setting the lab timetable to the centre manager."

The teacher in School B reported:

"I write term notes, but I don't write lesson plans or weekly notes. No one supervises them."

According to the above statements of the interviewees, the weak administration of the school affected the implementation of GIT in the school. In the process of curriculum implementation, the Principal plays a vital role. If the Principal does not take administrative decisions where necessary, it affects the process of implementation. This is another reason for the unsuccessful implementation of GIT, the Principal being a 'local factor' as discussed by Fullan (2001).

Poor monitoring system of the Ministry of Education, Provincial Department of Education, Zonal Education Office, and school management

The interview responses of the teachers, In-Service Advisor (ISA), and Director of Education revealed that there is no proper monitoring system in either the Ministry of Education or Provincial Department of Education, and this may be the reason for giving less attention to this subject. Teachers 1 and 2 in School A said that there is no proper monitoring conducted by the zonal and provincial-level officers.

Teacher 1, School A, said:

"GIT lessons are not supervised by the officers who come from the Zonal Education Office or provincial Education Department...I don't write term notes, weekly notes, or lesson notes. It's a waste of time. GIT lessons are not supervised by the internal supervisors."

(Teacher 1, School A)

Teacher 1 also said that the Principal of School A lacks an ICT background and does not observe GIT lessons. This was later confirmed by the Principal of School A:

"*I don't have any knowledge of ICT... I don't observe GIT lessons, their lesson plans, and term notes...*" (Principal School A)

The responses in School B were similar to those in School A.

Teacher 1, School B, said that there is no proper supervision conducted by the zonal and provincial- level officers:

"GIT lessons are not supervised by the officers who come from the Zonal Education Office or Provincial Department of Education... and I write term notes and weekly notes. But there is no proper monitoring system. I don't know whether I am writing them correctly." (Teacher 1, School B)

The In-Service Advisor of the Zonal Education Office confirmed that they do not supervise GIT teachers:

"We observe ICT teachers... I am the only ISA in this zone. So, I pay more attention to the ICT teachers." (ISA, ICT)

This could be one of the reasons why GIT teachers do not plan their lessons.

She further added that:

"We don't maintain GIT results, or we don't analyze GIT results. It's difficult to collect data from schools. As GIT results are released a long time after the exam, we pay more attention to the G.C.E. (O/L) and G.C.E. (A/L) ICT subjects." (ISA-ICT)

This was confirmed by the Director of ICT in the Zone. He said that he has not maintained any records pertaining to GIT. This shows that GIT results are not analyzed by the Provincial Department of Education. This is the external factor discussed by Fullan in his Interactive Model of Change. Fullan (2001) pointed out the Government and other agencies as external factors that affect the process of implementation.

Not only the Zonal Education Office, but the school too, pays less attention to the implementation of the subject GIT. The two teachers in School A said that GIT lessons were not supervised by the internal supervisors. Further, they said that they did not write term notes, weekly notes, daily notes, or lesson notes.

The GIT teacher in School B, too, said that GIT lessons were not supervised by the internal supervisors. Further, she said that the Principal of School B lacks the ICT knowledge, and she does not observe GIT lessons.

This was confirmed by the Principal at School B:

"I don't have any knowledge of ICT... I don't observe GIT lessons. Even their lesson plans and term notes..." (Principal, School B)

These findings suggest that there is no proper monitoring system in the school or in the Zonal Education Office. In school, the Members of the Management Committee do not have any knowledge of ICT. This could be the reason for their reluctance to supervise GIT teachers. The Principal plays a vital role in implementing GIT. The influences of the Principal in the process of implementation, in a positive or negative manner, affect the implementation of GIT.

External support from the family

The GIT syllabus consists of both theory and practical components. The students were not satisfied with the allocated time in the timetable. The schools lack sufficient number of computers, and most of the time, they have not got an opportunity to do their practical work. Hence, they said that they need additional time to use the computer. Further, they claimed that they needed additional support from their homes.

In School A, only 20 out of 132 students had computers at home. Their fathers, brothers, or sisters helped them with practical computer work.

As Student 3 said:

"I have a computer at home. My father helps me with computer work. It is quite interesting. I feel that the time allocated for GIT is not enough. We need additional time. The other thing is, sometimes, we don't get a chance to use the computer at the school." (Student 3, School A)

Student 14, School A, said:

"My father helps me with computer practicals. Therefore, it is easy to do practical lessons in the class…I use the computer for a long time at home." (Student 14, School A)

The above statements suggest that the students who get support from the family benefit more.

Student 15 in School A commented:

"We don't do computer practicals. Practical lessons are done in the class…. It's disgusting…. I don't have a computer at home. I don't know what to do at the exam." (Student 15, School A)

The study revealed that, among parents, there is a misconception that children get spoilt by using computers. The students said that their parents believed their children would become addicted to computer games, social media, and other illegal websites.

Student 16, School A, said:

"I have a computer at home. But my parents do not know anything about computers. They believe that I will get spoiled if I use computers." (Student 16, School A)

Similarly, in School B, out of the 20 students interviewed, only two had computers at home. Their fathers, brothers, or sisters helped them with computer practical work.

Teacher 1, School B confirmed the above situation:

"Our students are very poor. Their parents can't afford money to buy them a computer. If they have additional support from home, they could improve their computer skills." (Teacher 1, School B)

Hence, this confirms that receiving additional support from family is another influential factor. This is what Fullan illustrated under "community" in local characteristics. Parents and the support of the family lead to the successful implementation of GIT.

Findings of the study through the lens of Fullan's Interactive Factors of Implementation Model

In this section, the findings of the study will be mapped to Fullan's Interactive Factors of Implementation Model and discussed compared with the research literature.

Complexity of the subject components and lack of relevance

The students in the Commerce and Arts classes viewed some of the components in the GIT syllabus, such as Mathematics, Logic Gates, and Programming, as difficult sections. The GIT teachers were also of the view that the above components are difficult for the students in Commerce and Arts classes. Moreover, the students in Commerce and Arts classes considered the above-mentioned sections not useful to them. Further, some of the students said that they are not interested in doing a job in the IT field. The students in Arts classes like Photo Editing, Graphic Design, Desktop Publishing, Video Editing, and Artificial Intelligence. Those components

help them to get a job in the private sector. This is what is classified under "need" in the characteristics of change, as outlined by Fullan (2001).

The knowledge of Mathematics and English affects GIT as a context-specific factor. In target schools, all the GIT teachers are English teachers, and they teach GIT in English. This affects the implementation of GIT in schools. When teachers explain subject content in English and dictate notes, students encounter difficulties in studying GIT. Moreover, some mathematical components are included in the syllabus. In target schools, the majority of students in the Arts section faced difficulties in studying Logic Gates and Number Systems. It was observed that a majority of them have failed in Mathematics at the G.C.E. Ordinary Level (O/L) Examination. The GIT teachers in both schools confirmed that these students are weak in mathematical components in the GIT syllabus. This is a unique subtheme that emerged in this study.

Moreover, ICT has been introduced as a compulsory subject in the junior secondary curriculum since 2017. As a result, students are required to repeat many of the components already covered in the GIT syllabus. Consequently, the GIT syllabus lacks relevance for Grade 12 students.

Failure to provide sufficient support to implement GIT

It was found that the Government and the Ministry of Education failed to provide sufficient support to target schools. As far as GIT is concerned, the implementation of this subject is a complex process. In order to implement GIT successfully, the Government should provide human resources, physical resources, and infrastructure to schools. Moreover, the Zonal Education Office

has failed to establish an effective maintenance process in these schools. When they need assistance to repair computers, upgrade processors, or RAMs, it should be provided without delay. The poor support from the Zonal Education Office leads to poor implementation of GIT. In fact, because of this lack of timely support, they were unable to maintain quality in GIT subjects. That is the reason that Fullan (2001) discussed "quality" and "practicality" in the characteristics of change.

Gregory (2016) found that inadequate funds to procure computers, their accessories, and set up infrastructure such as computer laboratories, were the major challenges in the implementation process. The researcher recommended that the Government should provide grants to schools to procure more computers, their accessories, and set up infrastructure. Similarly, Hammon (2017) recommended that the Government should strive to ensure adequate funding for Computer Education to enhance its implementation and provide the necessary facilities. Murithi (2017) also emphasized that infrastructure facilities affected the implementation of ICT Education in schools.

Ilmudeen (2012) too investigated the implementation of ICT curriculum in government schools in Sri Lanka. The researcher found out that lack of computer laboratories and cost of devices require more funds for the implementation and maintenance of computer laboratories. In this study, too, failure to provide sufficient support to implement GIT, especially physical resources and infrastructure, affects the implementation of practical lessons of GIT in schools.

Negative attitudes of teachers, principals, and students towards GIT implementation

The Principals of both schools, A and B, do not have adequate knowledge of IT and they are not interested in IT either. Due to this reason, in these two schools, GIT teachers do not get adequate support to implement the GIT syllabus effectively. Further, the other teachers who work in Grade 12 do not encourage their students to follow GIT. On the other hand, they use the GIT period for main subjects. Further, they encourage students to neglect this subject. Students, too, have negative attitudes toward studying GIT.

Lack of support from the principals and parents

Both school principals and parents of students do not support the implementation of GIT in schools due to their negative attitudes towards GIT. Parents are reluctant to encourage their children to study GIT because their primary focus is on their children passing the G.C.E. (A/L) examination. Studying a subject like GIT requires additional parental support, which is often lacking. Moreover, the Principals in both schools did not possess sufficient knowledge of ICT. As a result, they neither supported the GIT teachers nor effectively managed the operations of the CLC. This aligns with Fullan's (2001) observation that the Principal and community are critical local factors influencing the implementation process. This was confirmed by Chen (2010), revealing that the external support from parents influence the change effort of implementing ICT in schools.

Lack of adequate support from higher authorities

When implementing GIT, both School A and School B have not got adequate support from the Ministry of Education and other higher authorities. When implementing GIT in the school

curriculum, the Government, Ministry of Education, Provincial Department of Education, and Zonal Education Office should provide physical resources, human resources, and infrastructure. On the other hand, teachers in these schools need training programmes to update their knowledge as ICT is a dynamic subject. Furthermore, these teachers have not received adequate support from higher authorities, such as those in the Zonal Education Office, to discuss subject-related matters. GIT teachers need assistance for the maintenance of physical resources and infrastructure.

Deek and Kimmel (1999) stated the curricular design, teacher certification standards, and teacher preparation programmes are the three critical issues that must be addressed. Similarly, Bukaliya and Mubika (2012), too, revealed that there were no teachers qualified to teach Computers Studies in schools. The teachers who taught the subject often did so with equipment shortages and the lack of in-service IT training programmes, which hindered their effectiveness. Further, Mingaine (2013) recommended that qualified teachers with ICT skills should be employed and in-service training programmes should be designed for the ones already in profession. Adefunke et al. (2014) revealed that the majority of Nigerian computer teachers had basic computer knowledge, while almost half of the teachers sampled were deficient in advanced computer operations. This has negative implications for the effective implementation of the curriculum.

Hammon (2017) investigated the problem of implementation of Computer Education in junior secondary schools. He recommended that the Government should employ qualified and relevant teachers. In our study too, GIT teachers were specialized in English Language, and their Principals

had assigned them the duty of teaching GIT. They have not received a continuing professional training programme to update their knowledge. This study too, confirmed that GIT teachers' ICT knowledge, their professional qualifications, and lack of continuing teacher education programmes have affected the implementation of the process.

Strengths and weaknesses related to the implementation of GIT

The third objective in our study was to explore the strengths and weaknesses of the implementation of GIT at school level. The implementation process of GIT has revealed several significant weaknesses. One of the primary concerns is the curriculum content, which overlaps considerably with the ICT subject taught in junior secondary classes. This repetition causes less interest in students, as they find the material redundant. Many students also feel that studying GIT is a waste of their valuable time, further diminishing their motivation to engage in the subject. In addition, the Government has not provided adequate facilities or resources to ensure the successful implementation of GIT in schools. A critical weakness lies in the lack of support from key educational authorities, including the Ministry of Education, Provincial Education Office, and Zonal Education Office. These institutions have not efficiently and effectively facilitated the introduction of GIT into the curriculum. Furthermore, the administrative structure has failed to adequately monitor the implementation process, leaving gaps in its execution. The Ministry of Education has also failed in providing sufficient professional training to GIT teachers, resulting in a lack of preparedness among teachers to deliver the subject effectively. Consequently, the overall implementation of GIT suffers from a lack of coordination, resources, and teacher readiness, which hinder its success at school level.

Conclusion

This study highlights the significant challenges faced by schools in the Kandy Educational Zone in implementing the GIT curriculum effectively. The lack of in-house resources, particularly, an inadequate number of computers and poor internet connectivity, have affected the teaching and learning process. In addition, the outdated curriculum fails to align with the evolving needs of students, who primarily aim to pass the G.C.E. (A/L) Examination and enter the University. Furthermore, the absence of a nationally recognized certification diminishes student motivation to pursue GIT as a subject.

Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance the successful implementation of GIT in schools:

Provision of Resources and Infrastructure

Schools should be equipped with a sufficient number of computers and reliable internet connectivity to facilitate the effective teaching of GIT. Additionally, efficient maintenance procedures should be established to ensure the longevity and proper functioning of these resources. The school administration and Zonal Educational Office should collaborate to provide necessary support for maintaining ICT laboratories effectively.

Curriculum Revision and Development

The GIT curriculum should be revised to align with the evolving technological landscape and to cater to the interests and needs of students. The curriculum should incorporate engaging topics such as photo editing, audio and video editing, Internet of Things (IoT), and Artificial Intelligence (AI) to make learning more relevant and appealing. Furthermore, the ICT syllabus for senior grades should be updated to build upon the foundational ICT knowledge introduced in Grade 6 since 2017.

Teacher Training and Professional Development

Since many GIT teachers in target schools are English teachers without formal ICT qualifications, continuing professional training should be provided to enhance their competency. Training programmes should be regularly conducted to ensure teachers stay updated with the latest developments in ICT. The relevant authorities must prioritize providing structured and certified ICT training to GIT teachers.

Nationally Recognized Certification

Currently, students who complete the GIT Examination do not receive a nationally recognized certificate, which reduces their motivation to pursue the subject. To address this issue, the Government should align the GIT syllabus with an appropriate National Vocational Qualification (NVQ) level. This would enable students to obtain a recognized certification upon successful completion of the examination, increasing their employability and interest in the subject.

Monitoring and Evaluation

The Ministry of Education, Provincial Departments of Education, and Zonal Educational Offices should introduce a structured monitoring and evaluation system for GIT implementation. Proper supervision should be carried out at school level, and assessment procedures should be systematically monitored at zonal and provincial levels. School-based assessments (SBA) should be effectively supervised, and term tests should be conducted regularly. The results from SBA, term tests, and national-level examinations should be analyzed at different administrative levels to ensure continuous improvement.

By implementing these recommendations, the effectiveness of GIT Education in schools can be significantly enhanced, ensuring that students acquire essential ICT skills that prepare them for future academic and career opportunities.

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