AN EVALUATION OF THE EFFECTIVENESS OF THE NATIONAL INTEGRATED EXAMINATION COMPUTER SYSTEM (NIECS) IN THE DEPARMENT OF EDUCATION AT LIMPOPO PROVINCE

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ABSTRACT

The aim of the study was to evaluate if the NIECS is being used effectively for the Learner management by the examination officials in different examination sections.

Nationwide in South Africa, shortage of computer literate officials has become a critical challenge in most of the organisations. Ehlers (2006:63) reiterated that worldwide a severe shortage of professional computer literate people is expected to occur between 2005 and 2020.Since the introduction of National Integrated Examination Computer System (NIECS) at Limpopo Province in 1999, the researcher observed reluctance among examination officials in implementing the NIECS. The objective of the study was to describe the perceptions of examination officials regarding the role of NIECS, to determine the effective use of NIECS, and to identify barriers to the effective use of NIECS in learner management.

The research methodology employed in this study was the Quantitative descriptive simple survey research design. The setting was at Department of Education, Limpopo Province. The population was all examination officials who are working at Head Office, Polokwane, for the purpose of learner management.Non probability, convenience sample of 80 examination officials was used. Data was collected utilising a self report with 41 closed ended and open ended questions. Raw data was fed into a SPSS with the assistance of a statistician. Data analysis was conducted through use of descriptive statistics.

It was established that examination officials are not using NIECS effectively in learner management. The majority of examination officials are data capturers and do not use other modules like Resulting module and Certification. This is despite the fact that they have indicated positive perceptions with regard to the role of NIECS in learner management. Officials indicated that a workload is too large to provide the participants with enough time to use the system, possibly suggesting the divergent workload that each of the participants may possess. Lack of continuous in -service training was cited as barrier to the effective use of NIECS in learner management.

A problem of increased workload will remain a challenge for as long as available technology is not used appropriately. It is recommended that staff development should incorporate computer training in service management programmes.All officials in the organisations should undergo compulsory basic computer literacy training. The training should be done as part and parcel of induction and orientation programmes.

Key Words: Computer, Examinations, Learner, Information, System, Evaluation, Examination officials, learner management.

Introduction
Information is essential commodity in a well managed organisation. It is evident from the department of education in Limpopo that the use of information and communication technology seems to be the solution to information management problems, therefore, Limpopo Provincial Departments of Education, specifically, Examinations Division, as organisation is not exception to the rule.

The implementation and use of National Integrated Examination Computer System (NIECS), which will be under the discussion here, seeks to increase the productivity of Examination officials by reducing paperwork, making information more accessible and facilitating communication of information. It is evident that Examination officials in Limpopo need not only understand examination system but also to use the system effectively and apply the knowledge gained in rendering quality service to the public. However, there appear to be a sense of despondency amongst examination officials regarding the effective use of NIECS in general. Therefore, the study is set to evaluate if examination officials working in Limpopo Province are using NIECS effectively, to the benefit of the public.

Background to the problem
Nationwide in South Africa, shortage of computer literate officials has become a critical challenge in most of the organisations. Ehlers (2006:63) reiterated that worldwide a severe shortage of professional computer literate people is expected to occur between 2005 and 2020. Few officials have to deal with a significant work on a daily basis. Sikwane (2007:1) states that Computer literate officials perform a lot of administrative duties which is part and parcel of being a government official.

The problem is that there is too much administrative work and too few examination officials. " Officials in their daily practice gather data during learners registrations and assessment, collect information from the Learning Centres, as well as from the educators and from learners multiple years` records" ( Murnane 2005:863). Their workload entails capturing learners` detailed information, subjects, marks, grades, and task continuous assessment. In all these aspects, information and documentation becomes crucial in facilitating service delivery.

In most of the South African learning Centres, learners information is still recorded paper or manual school records. In researcher`s personal experience, this paper learner record, which is shared amongst multidisciplinary teams, has demonstrated a lot of logistical and practical realities, redundancy and inefficiency that greatly limit the intended purpose of the record. This substantially led to the inaccurate learners statistics that would have negative impact on distribution of resources to departments of education.

In 1995, the National Department of Education (NDoE) established a National Committee known as Interprovincial Examination Committee (IPEC), to develop a National Integrated

Examination Computer System, later referred to as NIECS. All nine provinces were involved in this project. The main objective of the National Integrated Examination Computer System (NIECS) was to provide management information for managers and educators. Emanating from this strategy, the establishment of National Integrated Examination Computer System was sought by the committee. This was driven by the desire to improve the quality of education in South Africa.

In 1996, the nine provinces started implementing the National Integrated Examination Computer System. In 1999, the Parliament passed an act that introduced State Information Technologies Agency (SITA) to take over all IT services as service provider to all National Systems, including National Department of Education. The researcher was a staff member at Limpopo Department of Education, Examinations and later joined SITA. Prior to the implementation of this project, extensive consultation was made with the stakeholders such as education managers, System Administrators, Examination officials and support groups, allied and educators. In addition to this consultation, was the training of staff members on the Introduction to End user computing. Each Province was allocated with computers that were used by the examination officials for leaner admissions and subject entries, capturing marks, and retrieving reports. The computer module for data capturing on learners, reports and other learner data, is one that constitutes NIECS.

Research Objectives
The objectives of the study are to:
- To assess the perception of examination officials regarding the implemenation of National Integrated Examination Computer System (NIECS) in learner administration;
- To determine the barriers to the effective use of National Integrated Examination Computer System (NIECS) among examination officials in Examination divisions in different Provinces; and

LITERATURE REVIEW

National Integrated Examination Computer System (NIECS) structure and application
The NIECS includes the use of computers by examination officials to organise, process, store, communicate and retrieve information that which is regarded as relevant to the teaching profession. Examination officials have always used pen and paper to organise, process, store and communicate information. In the context of this study, the South African National Department of Education (SANDoE) sought this process of change by introducing Computer – based Examination Information System in the nine (9) Provincial Education Departments. This explains the beginning of the freezing phase of the change process in South Africa. This introduction of NIECS in the teaching profession was sought to bring change in how examination officials document their work, communicate, store and retrieve information.

Prior to the inception of NIECS, Computer based Education Information System (CEISs) started as regional oriented systems rather than all learners administration systems. (Hanson, 2006:93). Since the early 1960`s the National Education Systems has been used to link regional systems such as Transvaal Education Department (TED), OFS Education Department (OED), Natal Education Department (NED), Cape Education Department (CED), House of Assembly (HoA), House of Representatives (HoR), House of Delegates (HoD), Department of Education and Training (DET), Venda Education Department (VED) and Transkei Education Department (TED). During 1991 and 1992, the School examinations system went through a functional re-write in order to re-align it to latest technology. It was

around 1990 that the South African Certification Council (SAFCERT) cloned the School Examination system as used by the Department as a basis for the SAFCERT system. After the elections in 1994, the Government felt that software of out-going state Department would be handed to new institutions since computer systems have , over a number of years, been developed by or on behalf of the state and in view of the fact that the development costs of these systems were relatively expensive, it was considered necessary to formulate a policy whereby systems be made available to other interested parties, in order to ensure optimal utilisation and yet still maintain control. Large cost saving could be achieved through forming continuity and continuing of these systems at Provincial and regional levels as all development and in some cases operational cost had already been paid for.

The outgoing Department of Education and Training recognised the need to facilitate and improve the current systems to support a provincially based examination and agreed to a re-development program to be combined with the regular maintenance of the systems. The system was upgraded again to fall in-line with the latest technology and converted to an NIECS. The year of 1995, saw the provinces coming on board as the ex-departments were being phased out and the National Department of Education acted as an agency for the provincial departments until 1996 when the provinces finally took control of the Senior Certificates (SC) and Adult Based Education and Training (ABET).

During 1995, 1996 and 1997, the outgoing Examining bodies handed over their electronic data to the then newly formed Interprovincial Examination Committee (IPEC) (The Researcher was a member of IPEC), who incorporated the data into the school based examination system thus forming the Examinations historical database. These systems are still in operation on a Central Government level as well as on a de-centralized basis functioning independently in Provincial and District levels.

It was during 1998 and 1999 that all the examination systems were brought in-line with the latest Y2K technology and due to the foresight of the original design, minimal file and system changes were required. Although the original system that was designed back in 1985, was re-written, upgraded several times to remain in line with new technology, the basic functionality still remains the same today.

National Integrated Examination Computer System (NIECS) structure
The system comprises hardware and software. Hardware is the desktop computer with its Central Processing Unit (CPU) and a monitor, keyboard and a mouse. This desktop computer is usually placed on the official`s station or office and linked to the main frame.. A printer could be shared between two or more offices. It is during the unfreezing phase of the management of change process that examination officials and educators should be involved in the decision to choose a system which is compatible with their workflow. Otherwise resistance to change develop early in this phase.

On – line integrated NIECS means that there is a communication network amongst different units within the provincial Education offices, within the different regions and districts, as it is the case at the Province under study. As stated by Swanburg and Swanburg (2006:475), NIECSs are software packages developed specifically for educator's usage. These programmes may be explicit to a particular area of education application, or they may be general to support of the education service division. For Example:
- Learner Historical record module

This is the historical record component of NIECS that includes leaner history and School based assessment, examination records over multiple years, learner progress, leaner monitoring, marks entries, resulting report and certification (Swanburg & Swanburg, 2006:475).

- Learner management module

This module comprises applications that are relevant for examination management. In addition to this module, there are those associated with the use of general purpose. Other modules might include a calendar of events, which is commonly known as a year plan. It consists of a learner management minimum data set (LMMDS), and learner Infrastructure information module (Swanburg and Swanburg, 2006:475).

National Integrated Examination Computer System (NIECS) application
The application of NIECS in learners administration by examination officials require that the learner be firstly registered by the school, and secondly, be registered in the NIECS. This function is normally performed by admitting educators and data captures. Like any other computer system, administrators or data captures are expected to log on onto the NIECS by entering the username and password. Learner admission form information is then captured in the NIECS, and then accessed by entering an admission number or id number.

The learner data elements which are captured into the learner file in the NIECS are the same elements as those in the admission records. This means that, administrators must firstly chart on the paper record and secondly, transfer the same data onto NIECS. Korst, Eusebio-Angeja, Chamorro, Aydin and Gregory (2007:25) describe this as "double charting, which is a vernacular term for the required entry of the same data elements in both computer and paper based system."

It is important to realise that most of the examination officials in their day to day execution of their duties, are in contact not only with NIECSs but other technologies such as Umalusi system regarding rules and regulations for Quality assurance system for evaluation and certification, South African Quality assurance (SAQA) and other monitoring components. Therefore, the question is what are the roles of NIECS in learner administration? These need to be clearly described during the unfreezing phase, if the process of change is to be successful.

The role of National Integrated Examination Computer System (NIECS) IN leaner administration.
Alligood and Tomey (2006:310) define the concept "role" from the functioning unit of society`s perspective. They describe it as a set of expectations of how a person occupying one position behaves toward a person occupying another position. In the context of this study, the researcher regards NIECS as a functioning unit, and describing a "role" would be a set of expectations of what the NIECS should provide in terms of learner administration. It is important to describe the roles of NIECS during unfreezing phase of the change management process because of the threats to staff`s feelings of security when giving up their old routine. Some of the examination officials may even perceive that the role of NIECS is to replace them or take their job. Little or no knowledge about the role of NIECS in learner administration is a potential for resistance to change.

Leaner administration

The concept "learner administration" means the administration rendered by multidisciplinary team, involving services such as capturing of application forms, learner registration, Policies and Procedures, examinations and service statements. The researcher deemed it prudent to differentiate learner administration from teaching for the sake of clear role of NIECS. Teaching is what is rendered by the education professionals in the classroom only; learner administration is inclusive of all administration rendered by education professionals and education management.

The examination administration roles of National Integrated Examination Computer System (NIECS)

The examination administration role of NIECS pertains to those activities that are related to assessment practice implementations. Such activities include documentation of examination administration, record keeping, communication and retrieval of information. Findings from several studies, including Larrabe, Boldreghini, Elder –Sorrels, Turner, Wender, Hart, & Lenzi (2006:56) including the following NIECS examination administration roles:

- Reducing paperwork
- Increase productivity of examination officials and systems administrators;
- Improved documentation of examination administration which include assessment administration plan components such as leaner assessment , school based assessment (SBA), resulting, and evaluation;
- Improved documentation of quality assurance in general and further education and training, incidents reports and many more;
- Perform accurate record keeping function;
- Making information more accessible such as retrieval of assessment information reports e.g. Statement of results, subject certificate, certification, irregularity reports and many more;
- Facilitating communication of information through email facilities, and
- Performing order entries such as printing of entries schedules, preliminary entry schedule, admission letters, statement of results and certification.

The Examination management role of National Integrated Examination Computer System (NIECS)

 Both examination administration and examination management roles of NIECS as outlined above appear to be more congruent with what examination officials and examination managers would expect from the NIECS. However, Derbyshire (2007:17) found that the NIECS did not offer the examination officials what they expected. Instead, examination officials were predominantly negative and mostly critical of NIECS and perceived inability to capture "real systems administration". Therefore, this calls for a need to describe the examination officials ` perceptions regarding the role of NIECS in learner administration.

Positive perceptions regarding the role of National Integrated Examination Computer System (NIECS) in learner administration

Examination officials communicate their perceptions through different behaviours and attitudes such as speaking out their thoughts. Positive perceptions of examination officials regarding the role of NIECS in learner administration are the reflections of utterances, behaviours and attitudes that demonstrate greater acceptance of using NIECS. They range from comments such as, ' the system allows us to check learner admissions and resulting in their learning centres' (Mbananga et al, 2006:54) to, examination officials actively participating in the development of the NIECS and fully participating in their upgrading. This

is a sign that shows that the unfreezing phase of the change management process was effectively implemented. Other positive perceptions are reflected in examination officials embracing, owning and effectively implementing the NIECS. Lee, Lee, Lin & Chang (2005:171) stated that there are studies that have demonstrated that younger, less experienced officials have more positive attitudes towards computer use. User benefit has been implicated as one of the factors that influence the examination officials` positive perceptions regarding the role of NIECS.

Findings from Lee (2006:1376) revealed that officials generally viewed the content of the computer – based learner administration planning system as a reference to aid memory, leaning tool for learner administration, and vehicle for applying judgement to modify administration plan content. All these are the reflection of positive perceptions regarding the role of NIECS in learner administration. Although Roussel, Swansburg, and Swansburg (2006:338) remarked that a whole generation of workers view information technology as a normal part of life, Mbangana and Denhill (2003:1) found that information is not perceived as a priority by the majority of officials. It has not yet been embraced by the education professionals as something necessary for improving quality administration, or as a tool that could improve their administration and practice. This latter statement is supported by the negative perception as they are described below.

Negative perceptions regarding the role of National Integrated Examination Computer System (NIECS)

As early as the inception of NIECS`s, education officials have been alleged to have negative attitudes towards technology. Bozak (2005:80) stated that many officials are sceptical of information technology and may resist learning or using a new system. This type of behaviour is common during the unfreezing phase of the change process. As with positive perceptions, utterances, behaviours, and attitudes which reflects negative perceptions include comments such as, "...it`s really a flawed system...; "the system doesn`t reflect the examination `s practice," and many more, as reported by Darbyshire (2005:17). Fits all, it eliminates creativity; de-autonomising and de-expertising. Some of these negative perceptions still exist in the education profession even in this era.

Other negative perceptions which were identified were that, officials complain of the system wasting their time, too demanding, reluctance and lack of interest to use the NIECS. It is interesting to realise that even some of the education managers also have negative perceptions. Mbananga et.al (2006:54) attest to this that, verbalised responses and concerns from the officials were that, the system increases officials `s workload and waste too much of officials` time. Negative perceptions breed resistance to change. Sometimes the way change is presented rather than change itself precipitate resistance. There are also contributory factors such as barriers to the effective use of NIECS which can precipitate resistance. These are outlined below.

Barriers to the effective use of National Integrated Examination Computer System (NIECS) by examination officials

The concept barrier describes something that stands or prevents people from moving forward from one place to another (Horney, 2006:107). In the context of this study, issues that prevent examination officials from moving from paper records system to using NIECS effectively are described. The researcher observed that there is a fine line of difference between barriers and

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factors that influence the effective use of NIECS. For example, the concept of age can be a factor as well as a barrier to the effective use of NIECS.

Lack of communication between National Integrated Examinations Computer System and Umalusi Quality Assurance Systems (UQAS)

The main component of NIECS is the examination process. The examination process provides a systematic methodology for examination practice (Ammenwerth et al, 2006:69). This systematic methodology is being made possible by the use of Umalusi Quality Assurance Systems which describe and quantify the work of educators (Filho, 2001:100). It contains what is called examination language. It is generally known language that can become a communication barrier between two people and this is applicable to examination language as well. Filho (2001:100) stated that "in many countries, managers have not yet defined the minimum data essential to describe their practice, and this complicates the system design." Therefore, this becomes a barrier to the education officials to effectively use NIECS in learner administration.

Ethical factors

Herman (2006:1) stated that the protection of private and confidential information is the primary ethical obligation of the information management professionals. If this is not achieved, it becomes a barrier. Loss of learner`s information privacy and confidentiality has been widely debated. Cochrane and Ramokolo (2007:33) alluded to the fact that " implementing Electronic Records (ER) is an extremely complex problem that should not be underestimated, especially since information is currently scattered across many records – keeping systems. " The system that is easily accessed by unauthorised personnel poses a high risk to learner information leak. Thus, become a barrier to the users. Passwords and User Identification that are written down on a piece of paper constitutes ethical factor, because they can easily land into unauthorised hands. Staff members who leave the system open and do not log off the system after using it, pose a potential for unauthorised personnel to access the system. Also lost passwords that are not immediately reported to be deactivated pose a risk. This explains the degree of sensitivity when it comes to learner confidential information. It is a concern that some of the staff members are also careless with their passwords. Even then, examination officials need to trust and be confident in the system that deals with their learner`s confidential information; otherwise it becomes a barrier in using the system effectively because of fear of potential litigation. This also breeds resistance to change.

Costs

While costs for installation and implementation of the system have been implicated in many areas as barrier, this has not been alluded to by many education officials. This has been mostly the concern of managers. However, this does not justify examination officials to be less concerned about the cost incurred in installation and implementation of NIECS. Examination officials are aware of the costs incurred by the introduction, installation and implementation of the system. Korst et al. (2006:29) stated that evidence suggests that systems such as Electronic Record (ER) will never allow any actual decrease in labour costs, but only enable officials to decrease time spent on documentation. Managers who are more concerned about cost of purchasing, for example, extra computers where needed, are not aware that they are contributing to the barriers of officials using the NIECS effectively. One computer in each department becomes a barrier where a clerk, subject advisor, education specialist, unit manager as well as other staff member are expected to share or use it.

Lack of incentives

Authors such as Vargas (2009:1) support the notion of rewarding the employees for using the innovation. The author states that, "the most common way of motivating employees is giving them an incentive. In a simple analogy incentive motivation is: Do X work and you will get X rewards." If there is no appreciation such as a simple pad on the back, a thank you note, a motivating comment from the examination managers, examination officials will start to build resistance and negative attitudes which ultimately become barriers to the effective use of NIECS. One would undermine the impact that incentives have on successful implementation of any new innovation. Incentives play a vital role in motivating employees such as examination officials to use the system effectively. However if incentives are rewarded for the sake of coercing the officials to use the system that does not show any benefits, then the exercise will be futile and resistance to change will prevail. The system should also be analysed for its actual benefit to the learner administration. According to Jooste (2009:231) one of the systems that motivate and reward followers is the way in which officials interpret their own role. Such officials given a platform would even transform the way in which a system is implemented. Incentives could be in a form of certificates, status or a token for acknowledging examination officials who consistently maintains good learner administration and other entries in the system.

The use of Maslow`s hierarchy of needs attests to the fact that people are motivated by, amongst others the need for status, self actualisation or self fulfilment characterised by integrity and responsibility (Roussel et. al. 2006:316). Examination managers should also consider offering examination officials incentives in a form of responsibility, for instance "leader of the team' ICT forum," so that examination officials are motivated to use the NIECS effectively.

Indicators

An indicator is a sign that shows that something is changing, or a presentation of measurement. One of the main objectives of introducing system in working environment was to improve administration (Mbananga ET al.2003; 3). Therefore, the effective use of NIECS should be able to demonstrate improvement in learner administration. This means, there must be a sign that shows that learner administration is changing to the better, which is an indicator. It is also a sign that the process of change is in a state of equilibrium.

Dlugacz (2006: xi) emphasised that without measures there can be no real improvements in office administration. This means something must be measured. Therefore, the impression is that indicators are statistics and other related data that officials can use to make informed decisions to improve learner administration. NIECS cannot alone improve learner administration. Examination officials create statistics and use the same statistics to make informed decisions. For example, an examination official creates statistics by generating Examinations Entries Schedule (EES) for the learners in the school. The number of EES generated in the NIECS is translated into Entries School Rate (ESR) which is a statistic and in turn an indicator. Informed decisions can be made out of analysing these ESR in the NIECS, for example, number of ESR in the NIECS allow the school to plan for the staff, to compile reports, even to assess how many staff members are able to teach the learners and even to buy and deliver books for the schools.

The examination officials can also use the learner classification as an indicator. This classification indicates which learner has registered which subjects. Informed decisions can be made from this information. Therefore, annual statistics and reports are all indicators of

either poor or improved learner administration. If all of these indicators are achieved, available and maintained in the NIECS, one can claim that the NIECS is used effectively. If not, the factors influencing the effectiveness use of NIECS should be explored.

Factors influencing the effective use of National Integrated Examination Computer System (NIECS)

The literature describes several factors that influence the effective use of NIECS. Lee et al (2005:170) found that age influence the effective use of NIECS. The authors state that younger officials spent less time on the computer- based leaner administration plan. Something that is unusual, as the general assumption is that younger officials tend to be more inclined to use technology than the older generation. Such contrasts are due to the difference in what is regarded as useful with regard to the different software applications used by these two groups of officials. If younger officials perceive that something is not useful for them, they will obviously resist using it. That is why the development of NIECS that offer real support in documentation would solve some of these negative perceptions.

Ammenwerth, Mansmann, Iller, Eichstadter (2003:69) pointed to four factors influencing the acceptance of a new computer – based documentation system: "the previous acceptance of the system processes, the previous amount of self confidence when using computers, the fit between workflow and the functionality of the system"

What the authors mean is that, if officials accepted or did not accept the implementation of the examination process in the first place, it will either be easy or be difficult for them to capture it in the NIECS. Self confidence in using computers is as a result of being computer literate. Therefore, computer literacy does influence the effective use of NIECS. The fit between examination workflow implies using NIECS without disrupting the normal examination activities in the department. Any disruption will influence the effective use of NIECS. The functionality of an examination documentation system could mean absence of frequent crushes of the computer system, computer offline, or even the relevancy of the examination software applications to different examination departments. Also, the management of the change process does profoundly influence the effective use of NIECS.

RESEARCH METHODOLOGY

Target Population

In the context of this study, the population consisted of all examination officials who are working on day to day basis in the examination section or offices which have computers installed for the purpose of learner administration. The total workforce for NIECS is 149 examination officials. This excluded examination officials working at the regions, districts, circuits, area offices and all who are on all types of special leave. Examination officials at Head Office were chosen as a population of interest for this study because during the initial introduction of the NIECS in the province, were the main people involved in the change process consultations. They also played a part in training sessions as well as being the key people in utilising the NIECS.

Limitations of the Study

This study was conducted at the Department of Education, northwest of Polokwane in Limpopo Province. The department was previously separated by homelands made of

Lebowa, Gazankulu, Venda and part of Transvaal. There are 1300 academic schools with four regional offices. Each region caters for approximately 200 schools and plus minus 25 000 matric learners per region. According to Limpopo department of education, examination establishment (2010) 3479 examination official are allocated at the regions, districts and head office. Thus, the results of this study are limited to the Department of Education in Limpopo and cannot include those who are working in other departments.

Process, data collection, validity and reliability as well as ethical considerations were discussed. Chapter four reports on the analysis of data and the findings from the analysis.

RESULTS, DISCUSSION AND INTERPRETATION OF FINDINGS

Sample Analysis

This chapter describes the analysis of data collected from the examination officials at the department of Education, Limpopo Province. The descriptive statistics was used to analyse data. This allows data to be orgnised in ways that give meaning and facilitate insight and to examine a phenomenon from variety of angles (Burns & Grove, 2005: 461). Thus presentation, interpretation and discussion of results will be conducted according to the section as presented in the questionnaire. The qustionnaire was structured according to the study. All sections represent a descriptive analyssis in terms of frequesncies and graphs.

Although 80 questionnaires were initially distributed to a sample of 80 participants, 43 were completed and returned to the researcher. The response rate, as a result, was 53.75%. The results of the 43 respondents are illustrated in the following paragraphs.

Biographic/demographic information

Figure 1: Age categories of the participants.
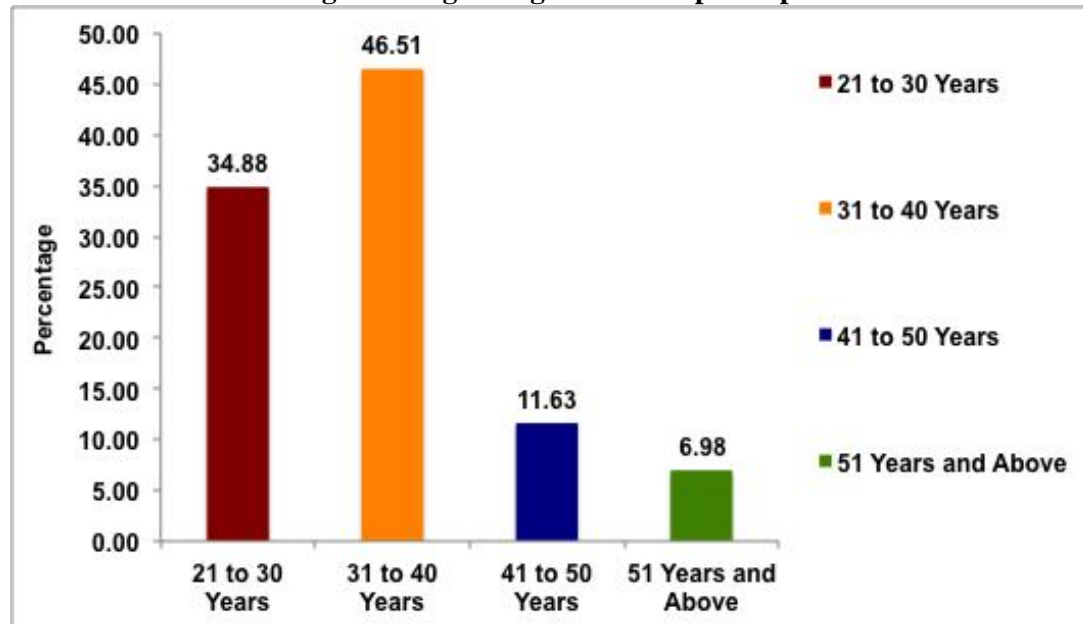
Approximately 80% of the participants were between 21 and 40 years old. Though the percentage of participants above 41 years old was just below 20%, it may be that the organisation is able to attain and retain employees for a substantial period of time, which may be important for training and implementation of computer-based systems.

The results are in line with Lee et al (2005:170) who argue that age is still identified amongst other attributes as a barrier. Age as a barrier, is in line with a well known adage that people Born before Technology (BBT), are experiencing an overwhelming pressure to use technology in their workplace, and this can cause them to resist using it.

Robbins et al (2007: 44) argue that the relationship between age and job performance is likely to be an issue of increasing importance during the next decade. Why? There are at least three reasons. First, there is a widespread belief that job performance declines with increasing age. Regardless of whether it is true or not, many people believe it and act on it.

Second is the reality that the workforce is aging. This is evident in Japan, Europe and United States. Also, life expectancy is increasing in Japan, Europe and the U.S.A. However, in South Africa the workforce is relatively young. The third reason is that recent legislation, such as the Labour Relations Act 66 of 1995, practically outlaws mandatory retirement. Most employees today no longer have to retire at the age of 65. Moreover, the Employment Equity Act of 66 of 1998 requires that employees provide equal opportunities and eliminate unfair discrimination, specifically also on the basis of age.

This implies that employees must provide succession and experience planning to develop and retain older employees. South African organisation must therefore take care not to overlook the likely presence of older people in the workforce, and their effect on performance.

Figure 2: Gender of the participants.
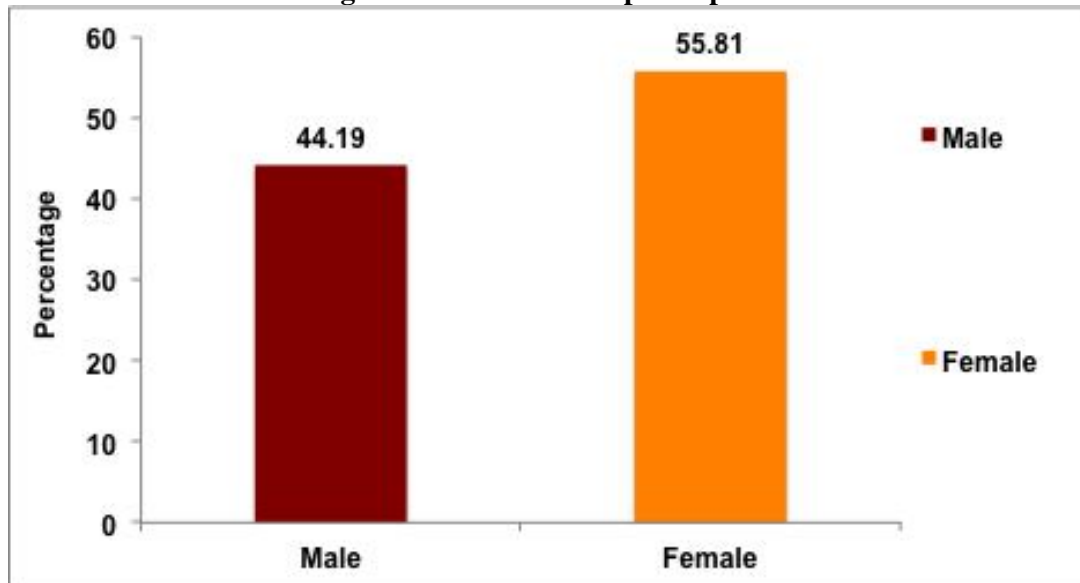
The participants were primarily female, with 44.19% fewer males participating in the study. The gender response percentages are indicative of the gender distribution within the organisation, suggesting that the respondents are representative of the larger population.

The results are in line with SP Robbins et al. (2007: 45), who argue that there has been an influx of women into South African labour force over the last 30 years. In 1960, women comprised 23% of South African workforce, and this figure increased to 36% in 1990. Most recent statistics show that women might comprise 50% of the Western population by 2005; in South Africa, women constitute 54% of the population, but only 39% of the paid workforce. Figure 2 above, indicates and agree with the gender across the occupation in South Africa.

From figure 2, it is evident that women in Limpopo are better represented in occupation. Because of the clear disparity between men and women, the issue of gender has been put under the spotlight.

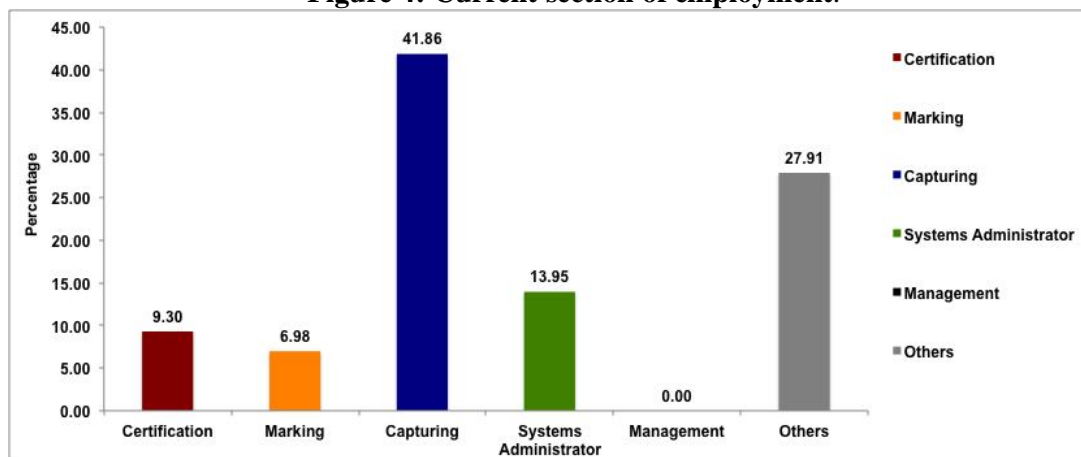**Figure 3: Participants' highest qualification.**
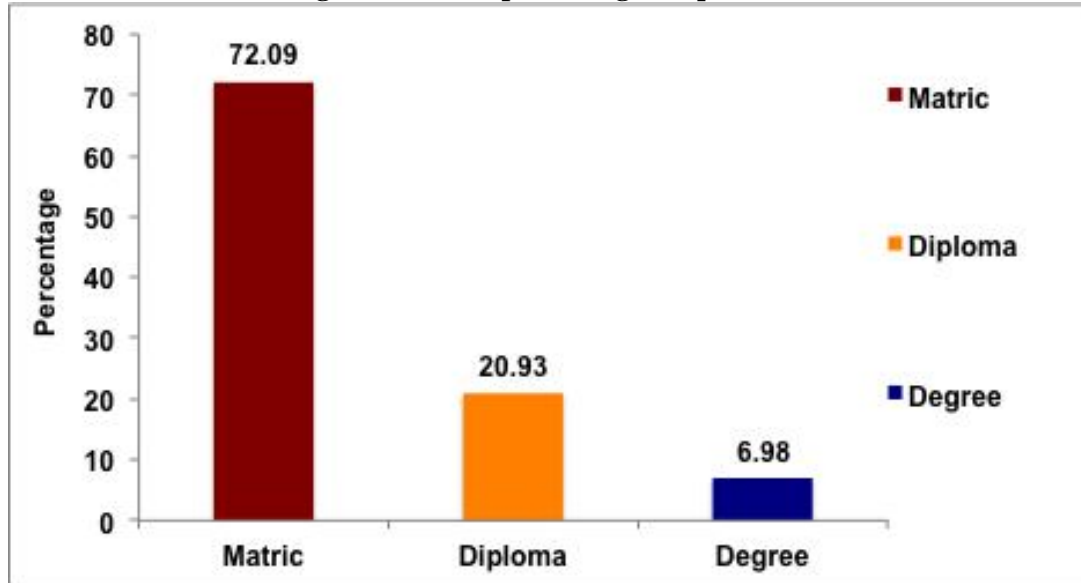
The 72.09% of the participants reported possessing matric (grade 12) as the highest educational qualification they had obtained. Approximately 25% of the participants possessed a tertiary qualification of some type, which may suggest the need for the employees within the organisation to gain more formal educational skills.

Bozak (2005:80) stated scepticism and resistance amongst many workers as barriers to successful implementation of new system. It has been stated that scepticism and resistance are all behaviours that reflect one`s perception. If officials ` perceptions about the role of NIECS in learner administration are negative, the behaviours thereof will be scepticism and resistance. This may also be due to the fact that most employees lack relevant ITC qualifications.

The researcher agrees with Robbins et. al. (2007: 47), who argues that a high IQ is not prerequisite for all jobs. In fact, in many jobs requiring routine work with little opportunity to exercise discretion, a high IQ may be unrelated to performance.

In this study, having matric may provide the necessary skills or abilities to successfully learn and implement a computer-based administrative system.

Figure 4: Current section of employment.

The 41.86% percentage of employees is employed in the capturing department, which may provide some reasoning for many of the respondents indicating matric as their highest qualification (see Figure 3). Approximately one quarter of the participants indicated "Others" as the current section in which they are employed. From the 27.91% (12 out of 43) that indicated "Others", 6 (half – 13.995%) of them specified being currently employed within the "Logistics" section. The other 6 (half – 13.995%) did not provide a specification. There were no participants from the management department, who may have provided additional information about the effectiveness and use of the National Integrated Examination Computer System (NIECS).

Robbins et al, (2007: 49), states that employer`s concern is with explaining and predicting the behaviour of people at work. In this study, Figure 4 above has demonstrated that jobs make different demands on people and people differ in their abilities.
Robbins et al (2007:49) further argue that employee performance, therefore, is enhanced when the ability – job fit in is good. Figure 4 above, fully concur that adequate job performance requires specific intellectual or physical abilities particular to the job.

Figure 5: Length of employment in current position.
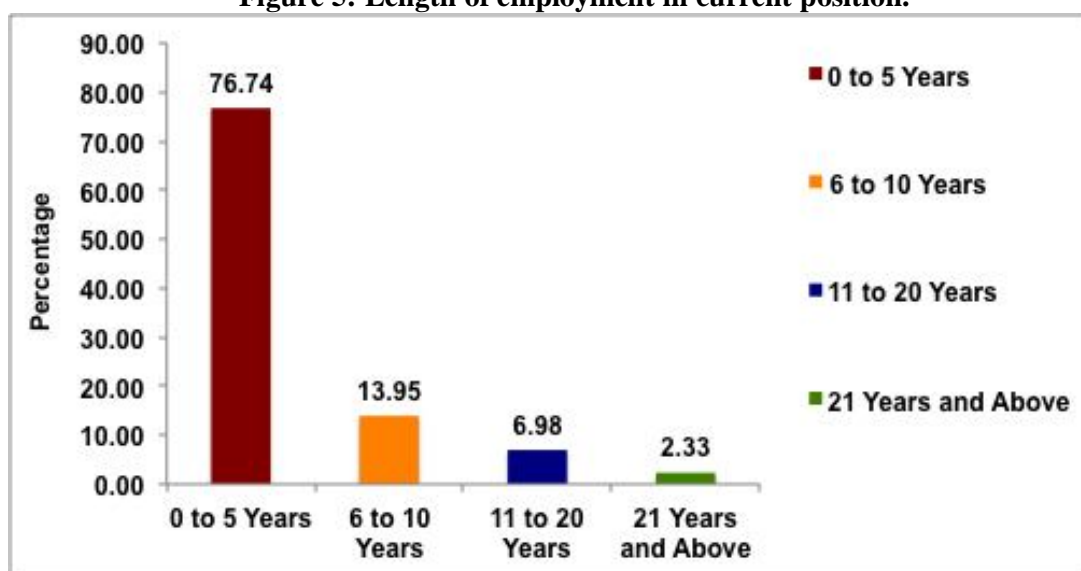
The 76.74% of the participants reported being employed in their current position for up to 5 years, with the percentage of participants working for longer periods substantially lower. The findings may suggest that there are a large number of newly appointed personnel or those employees may shift between positions of employment within the company to other sections or positions.

The results are in line with Robbins et al. (2007:73), who argue that job satisfaction refers to an individual`s general attitude to his or her job. A person with high job satisfaction holds positive attitudes towards the job, and one who is dissatisfied with his or her job holds negative attitudes about the job.

Robbins further argues that when people speak of employee attitude more often than not they mean job satisfaction. In fact, the two are frequently used interchangeably. Because of the high importance Organisational Behaviour researchers have attached to job satisfaction, job involvement and organisational commitment.
Job involvement measure the degree to which a person identifies psychologically with his or her job, and considers his or her perceived performance level important to self-worth. Organisational commitment defines a state in which an employee identifies with a particular organisation and its goals, and wishes to maintain membership in the organisation.

Figure 6: Current position of employment.
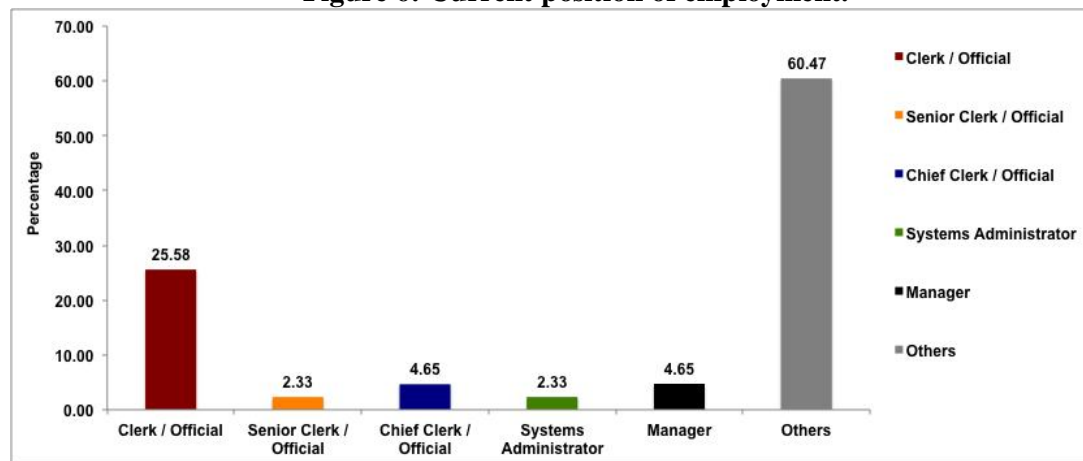
Approximately 60% of the participants reported "Others" as the position in which they are currently employed. As these participants did not specify the particular position in which they are currently employed, it may indicate that they are unaware of the title of their position or that their job encompasses are range of duties that cannot solely be classified under one description. In future, it may be necessary to determine the reasons for the high number of participants indicating "Others" and obtaining further information to understand this response pattern. Just over 25% of the participants are employed as clerks or officials, with fewer participants from more senior positions. However, because clerks are the most likely personnel to utilise the NIECS, it appears appropriate that many of the participants are within this category.
Robbins et al. (2007:57), further argue that the ability directly influences an employee`s level of performance and satisfaction through the ability – job fit. Given management `s desire to get a compatible fit, what can be done?

First, an effective selection process will improve the fit. A job analysis will provide information about jobs currently being done and the abilities that individuals require if they are to perform the job adequately.

Second, promotion and transfer decisions affecting individuals already in the organisation`s employ should reflect the abilities of candidates. Third, the fit can be improved by fine-tuning the job to better match an incumbent`s abilities. A final alternative is to provide training for employees.

Computer knowledge and National Integrated Examination Computer System perceptions

Figure 7: Participants' computer knowledge.
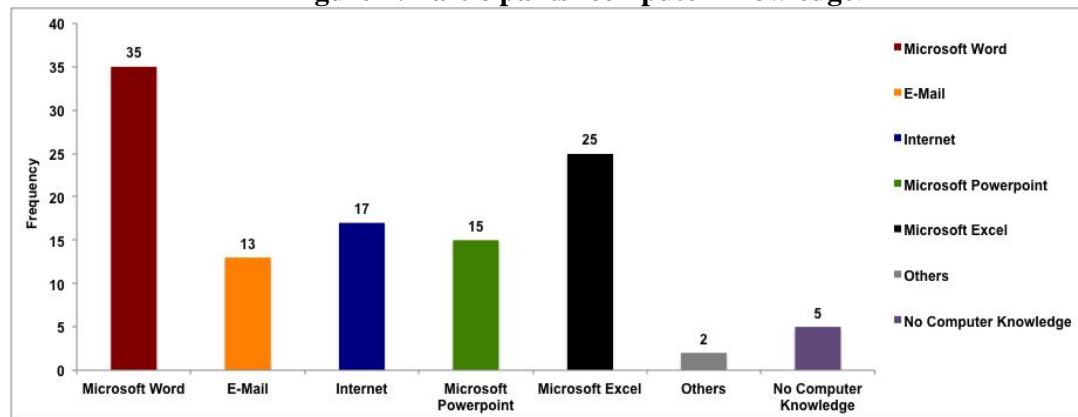
As the participants were able to respond to more than one option for this question, it was best to use the frequency of responses per category for presentation. This graph reads that 35 out of 43 indicated knowledge about Microsoft word, 13 out of 43 indicated knowledge able e-mail, etc. Out of the two that indicated "Others", only 1 of them specified "Microsoft Access" as part of their compute knowledge. The other person did not provide a specification.

According to Scott (2008:4), individual attributes such as age, work experience attitude, anxiety and computer skills affect the development and effective use of examination informatics. These attributes are congruent with some of the factors affecting the effective use of NIECS mentioned by Lee et.al. (2005:170) such as, demographic variables, of which age is still identified amongst other attributes as a barrier, Age as a barrier, is also in line with a well known adage that people Born Before Technology (BBT) are experiencing an overwhelming pressure to use technology in their workplace, and this can cause them to resist using it.

SP Robbins et al. (2007: 49) argue that all complex behaviour is learned. Individual differences in learning make this a complex process to analyse. Southern African organisations are constantly faced with change. To adapt sufficiently to change, our organisations need to gain competitive advantage. Since an organisation`s competitive advantage depends on 40% of its people skills and knowledge, a better understanding of learning is inevitable.

Figure 8: Computer training attended.
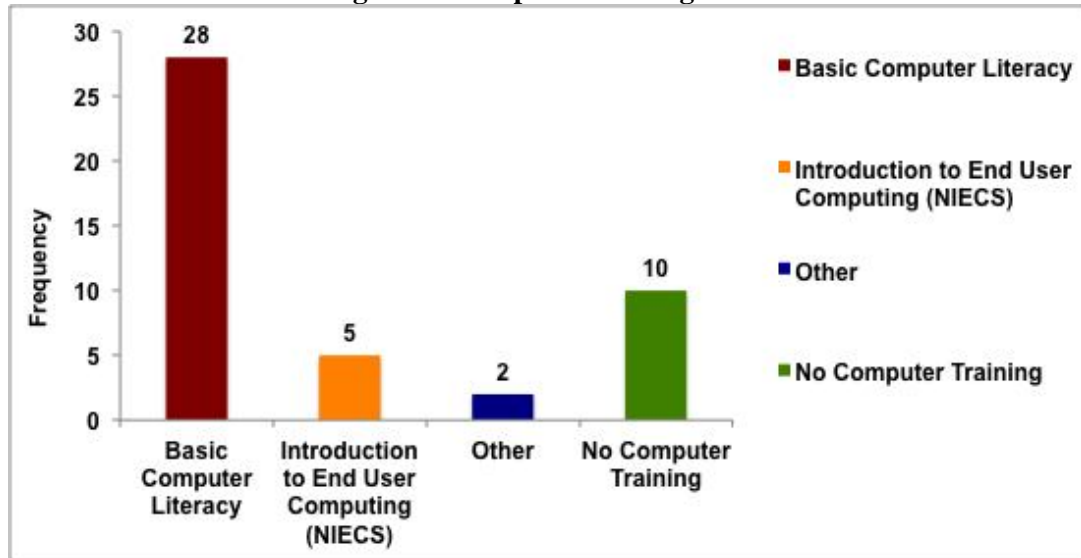
Similarly to the question in Figure 7, participants' could respond to more than one option – hence, frequencies were used in the graphical presentation instead of percentages. Out of the two individuals that responded "Other", only one of them specified, indicating "E-mail" and "Internet" as part of the computer training that they have received and attended. Interestingly, the response frequencies suggested most of the participants have obtained basic computer literacy training, though relatively few have obtained formal NIECS training.

Competencies refer to the skills and abilities to do a particular job or task well (Hornby, 2006:294).Employees need to achieve certain competencies in order to use the system effectively. Firstly, they should be computer literate. Not only this but also to understand the capabilities and limitations of the system (Scott 2000:3).

According to Robbins et al. (2007: 56) most organisations have some type of systematic training programme. Education and training is a tremendous challenge facing South African organisations. Recent labour legislation includes the Employment Equity Act 55 of 1998 and Skill Development Act 97 of 1998. These are aimed at upgrading the knowledge, skills and attitudes of employees, thereby providing tools to benefit from a diverse workforce, and this will entail costs to employers. South African organisations will have to spend millions of rands on training employees.

**Figure 9: Frequency of computer training received**.
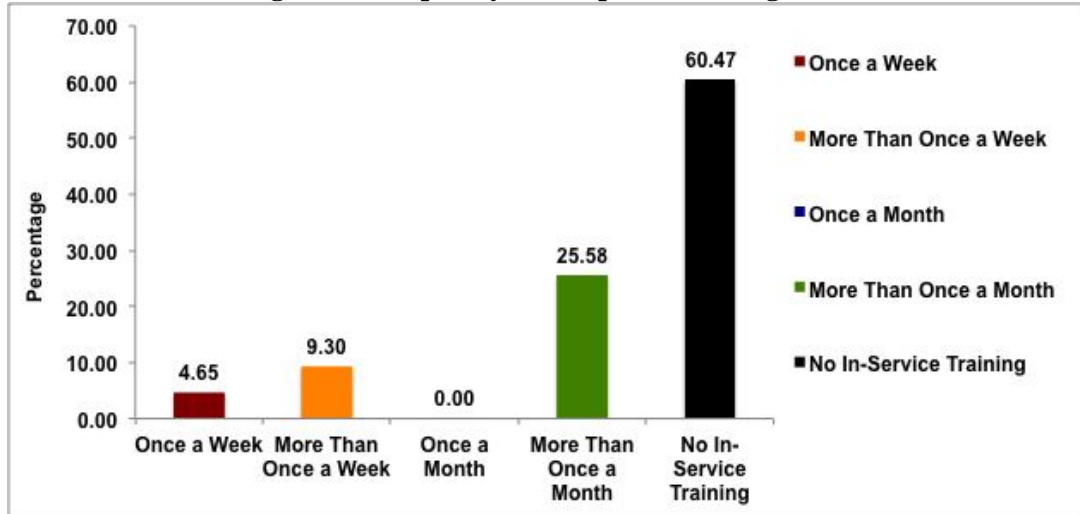
Figure 9, the majority of the participants reported receiving no formal in-service training. An indicator is a sign that shows that something is changing, or a presentation of measurement. One of the main objectives of introducing system in working environment was to improve administration (Mbananga et al.2003; 3). Therefore, the effective use of the system should be able to demonstrate improvement in training. This means, there must be a sign that shows that employees are changing to the better. Figure 9 above, it is a sign that the process of training is not changing.

Robbins et al. (2007: 56) point out that Pick `n Pay has invested in structural learning events. It realised that 40% of its staff were illiterate, and created learning opportunities for staff through on- the – job training, as well as other initiatives ranging from Adult Basic Education (ABET) now referred Adult Education Training (AET) to MBA degrees. To date, nearly 5 000 Pick `n Pay employees have graduated. Pick `n Pay established its own "Institute of Leadership and Quality Service Excellence" to train and retrain its staff continuously so as to maintain excellent service standards. Many organisations should learn from Pick `n pay.

Figure 10: NIECS module competency.
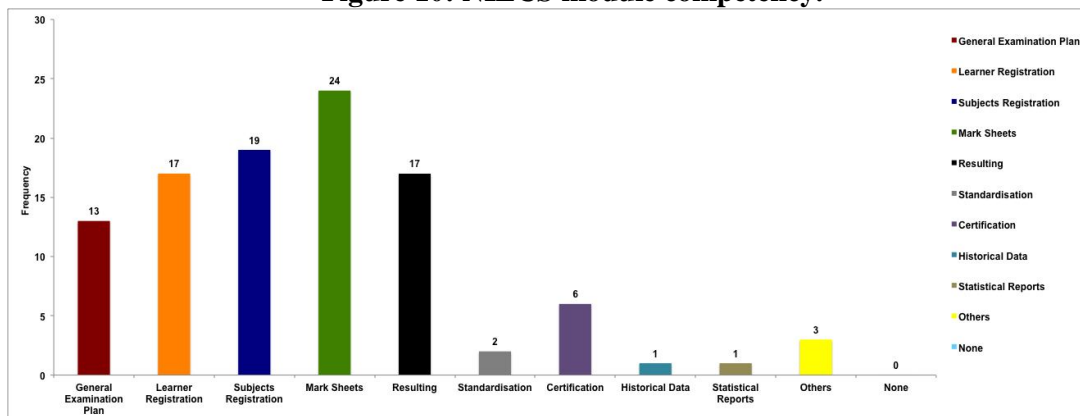
The responses to this question are based on frequencies as opposed to percentages. The three participants that provided a response to "Others" did not provide any specification. The response frequencies indicate that the participants have module competency in selected domains, whereas competency in others is rather limited. The concept "expectations" means a

belief that something will happen because it is likely. (Hornby 2006:512). To determine the effective use of the system in learner management, one has certain expectations from the employee's competency maturity level. This means, one has a belief that there are things that are likely to happen to demonstrate that NIECS is used effectively.

According to Curtis et. al. (2009: 5) the People Capability Maturity Model (People CMM), is a proven set of human capital management practices that provides a roadmap for continuously improving the capability of an organisation`s workforce. The People CMM refers to these practices as workforce practices. Since an organisation cannot implement all of the best workforce practices in an afternoon, the People CMM introduce them in stages. Each progressive level of the People CMM produce a unique transformation in the organisation`s culture by equipping it with more powerful practices for attracting, developing, organising, motivating, and retaining its workforce.

Figure 10 depicts low competency maturity level, perhaps it is because of the lack of training or the restricted training received (a need-to-know basis). Importantly, none of the participants reported not knowing any of the NIECS modules.

Figure 11: Use of the system is time saving, thus allowing more time for learner management.
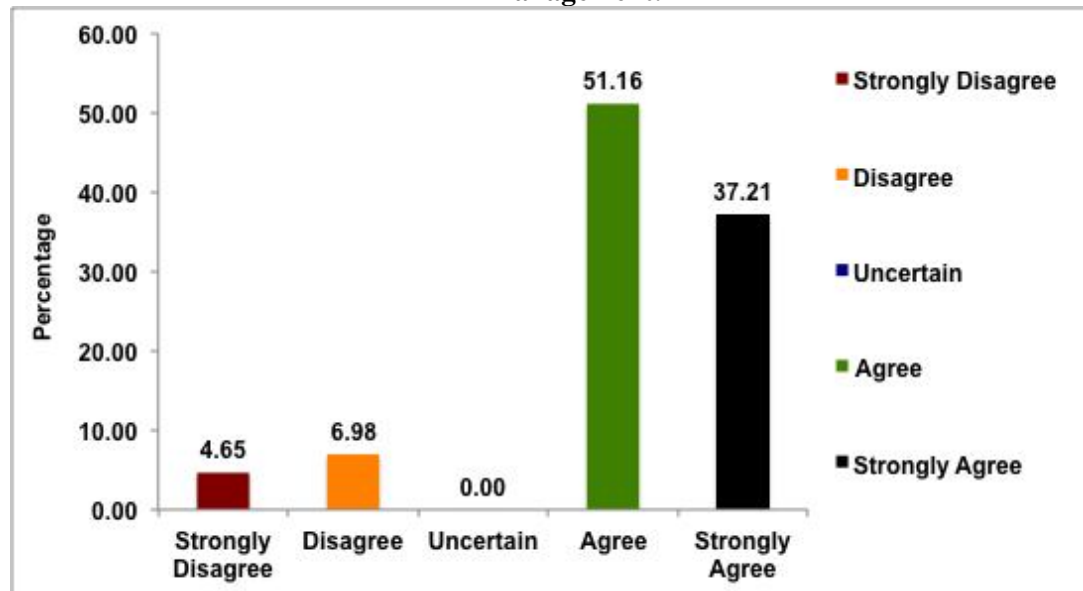
Most of the participants either agreed (51.16%) or strongly agreed (37.21%) that the NIECS system saves time, which allows more time for learner management. This is extremely important, as the system is perceived to have several benefits to the functioning of the employees as well as the service that is provided to the learners.
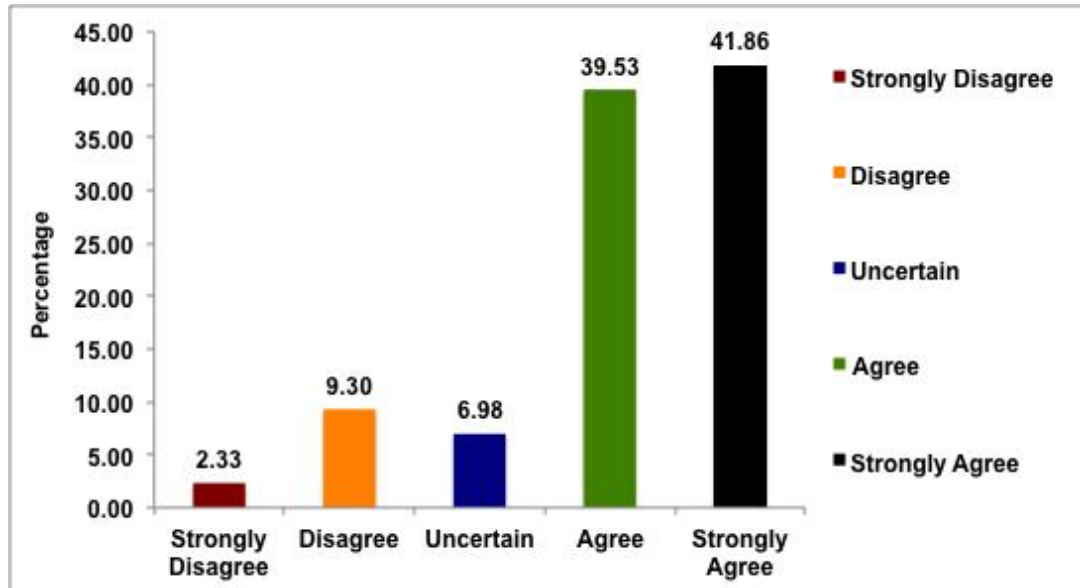
Findings from several studies, including Larrabe, Boldreghini, Elder –Sorrels, Turner, Wender, Hart, & Lenzi (2006:56) including the following system roles:

- Time saving and allowing employee more time to complete other tasks.
- Increase productivity of employees by reducing paperwork.
- Easy access, organisation, retrieval and storage of information.

Laudon and Laudon (2008: 51) concur with the findings that electronic commerce, electronic business, and intensifying global competition are forcing firms to focus on speed to market, improving customer service, and more efficient execution. The flow of information and work needs to be orchestrated so that organisation can perform like a well-oiled machine.

These changes require powerful new systems that can integrate information from many different functional areas and organisational units and coordinate firm activities with those of suppliers other business partners.

**Figure 12: System increases productivity of examination officials by reducing paper work.**

In accordance with the responses to the question in Figure 11, most of the participants either agreed (39.53%) or strongly agreed (41.86%) that the NIECS system increases the productivity of examination officials by reducing paperwork. Not only does the NIECS system appear to save administrative time, but it also avoids the use of extensive amounts of paperwork, enabling quick and easy access to information that is required.

Findings from several studies, including Larrabe, Boldreghini, Elder –Sorrels, Turner, Wender, Hart, & Lenzi (2006:56) including the following systems roles:

- Time saving and allowing employee more time to complete other tasks.
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- Easy access, organisation, retrieval and storage of information

Laudon and Laudon (2008: 51) support the findings in figure 12 that business processes refer to the manner in which work is organised, coordinated, and focused to produce a valuable product or service. Business processes are concrete workflows of material, information, and knowledge – sets of activities. Business processes also refer to the unique ways in which organisations coordinate work, information, and knowledge, and ways in which management chooses to coordinate work. Enterprise Content Management (ECM) is one way of reducing usage of paper.

**Figure 13: System makes examination information more accessible**.
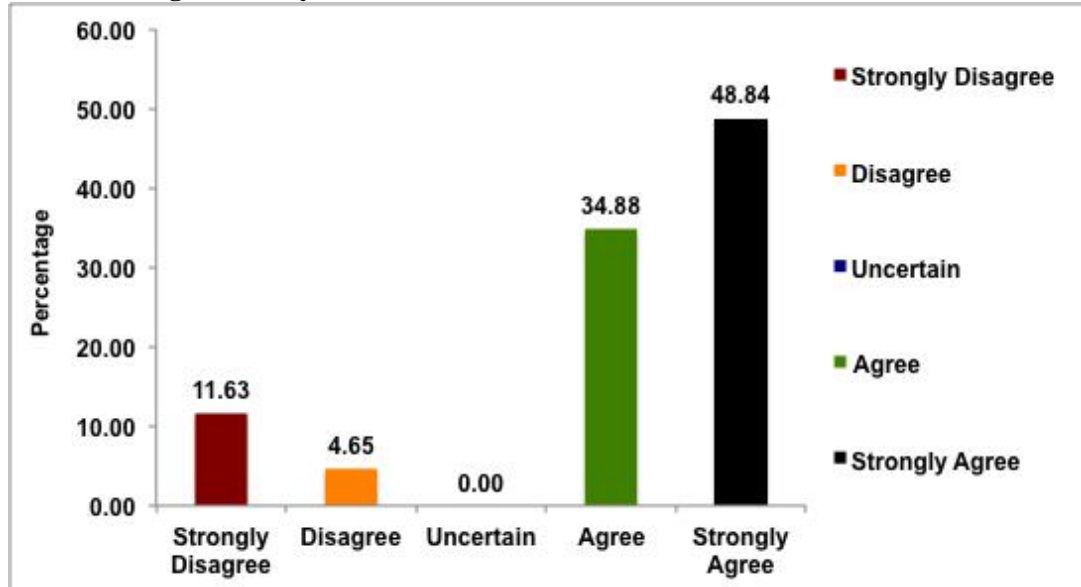
The participants' responses suggest that the NIECS system enables ease of access to examination information (34.88% agreed; 48.84% strongly agreed), perhaps because paperwork is reduced or the required information is more readily accessible on a computer.

Findings from several studies, including Larrabe, Boldreghini, Elder –Sorrels, Turner, Wender, Hart, & Lenzi (2006:56) including the following systems roles:

- Time saving and allowing employee more time to complete other tasks.
- Increase productivity of employees by reducing paperwork.
- Easy access, organisation, retrieval and storage of information.

Laudon and Laudon (2008:52) concur with the findings that Enterprise systems provide a technology platform where organisations can integrate and coordinate their major internal processes. They address the problem of organisational inefficiencies created by isolation islands silo information, business, and processes and technology. A large organisation in study has many different kinds of information systems that support different functions, organisational levels and business processes. Most of these systems are built around different functions, business units and business processes that do not "talk" to each other. Mangers might have a hard time assembling the data they need for comprehensive, overall picture of the organisation`s operations.

**Figure 14: System facilitates retrieval of information easy.**
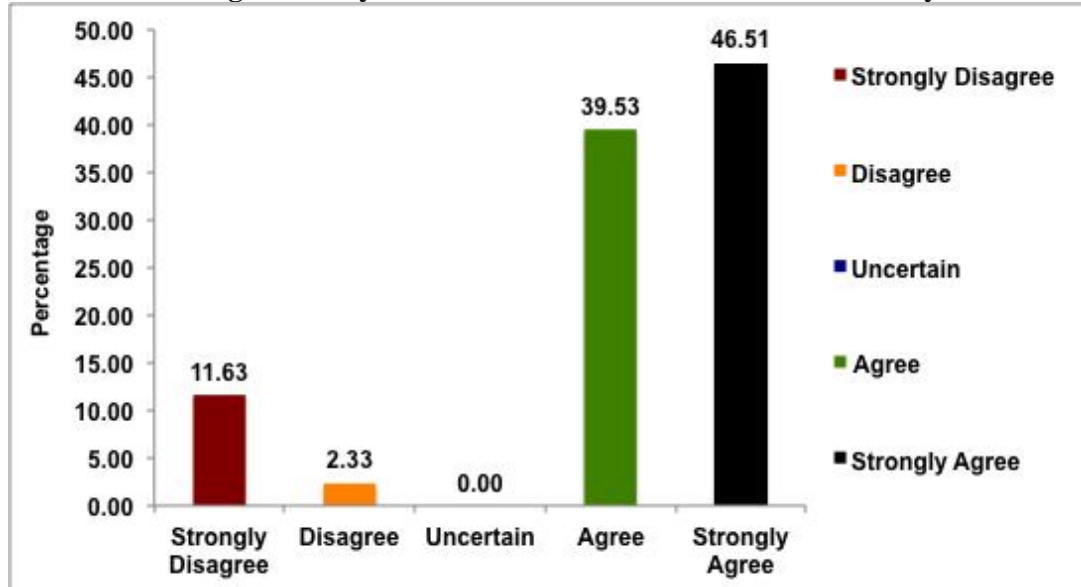
The majority of the respondents either agreed (39.53%) or strongly agreed (46.51%) that the NIECS system facilitates easy retrieval of information. Interestingly, approximately 11% of the participants indicated strong disagreement with the statement, which may indicate that training is necessary to obtain the benefits that are associated with the system. On the other hand, it may suggest that there are certain flaws with the system, which may need to be explored for rectification.

Laudon and Laudon (2008: 53) assert that most of these systems are built around different functions, business units and business processes that do not "talk" to each other. Mangers might have a hard time assembling the data they need for comprehensive, overall picture of the organisation`s operations.

This fragmentation of data in hundred of separate systems could thus have negative impact on organisational efficiency and business performance. Figure 14 illustrate that the system facilitates retrieval of information easy. The enterprise system collects data from key business processes and stores the data in single comprehensive data repository where they can be used by other parts of the business. Managers emerge with more precise and timely information for coordinating the daily operations of the business and a firm wide view of business process and information flow.

Figure 15: System facilitates communication of information to be easy.
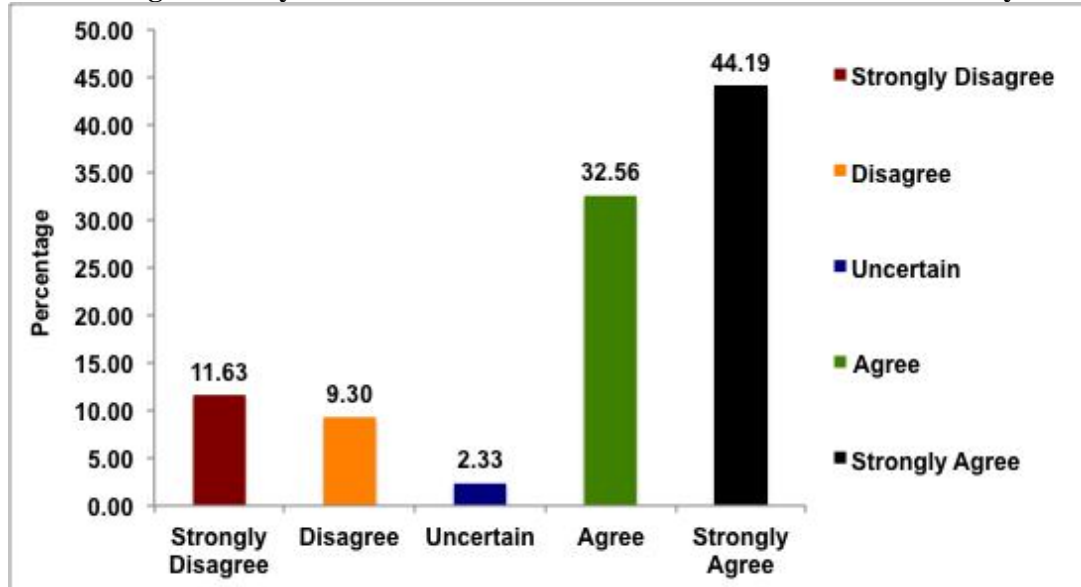
In a similar manner to the response patterns in previous figures, the participants tended to strongly agree (44.19%) or agree (32.56%) that the system facilitates ease of communication of information. Not only does the system appear to aid in the retrieval of information by employees (see Figure 14), it also assists in communicating to and between various personnel and departments, which is important for gaining the most use out of the system.

Laudon and Laudon (2008: 59) agree with figure 15 that Internet technology is making this level of collaboration possible by providing a platform where system from different companies can seamlessly exchange information. Web enabled network for the coordination of transorganisational business processes provide an infrastructure for collaborative commerce activities. Such networks can be termed private industrial networks, and they permit firms and their business partners to share product design and development, marketing, inventory, production scheduling, and unstructured communication such as transmission of graphics, and e-mail.

Figure 16: System improves completeness of documentation.
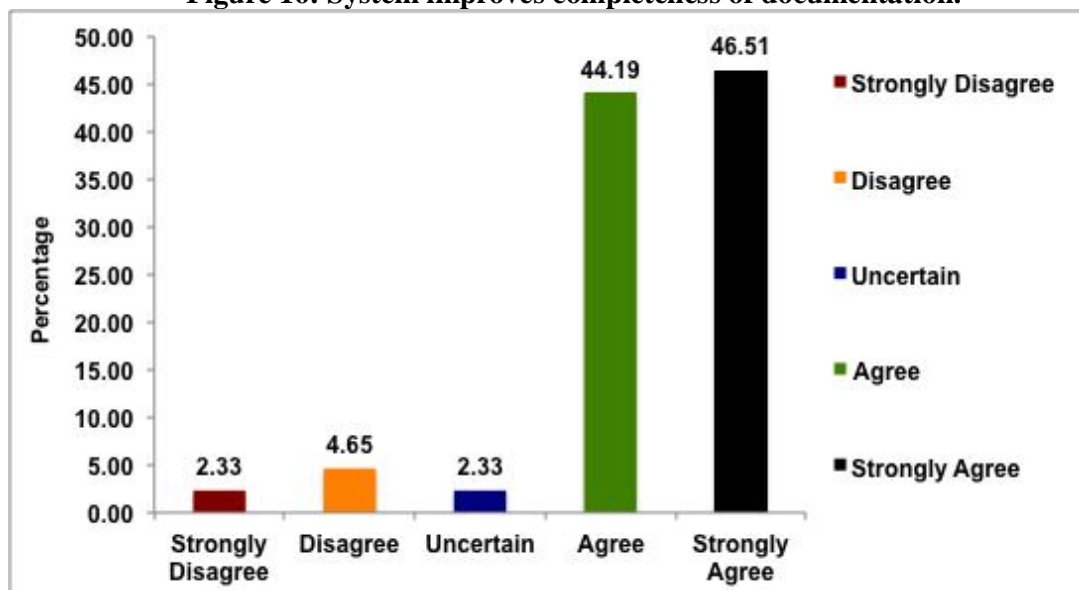
Approximately 90% of the participants either agreed (44.19%) or strongly agreed (46.51%) that the NIECS system improves the overall completeness of examination documentation. The manual paperwork may formerly have been associated with the omission of certain information, which the computer-based system can easily detect and provide notification of such errors. Thus, additional benefits are obtained because the system ensures that all relevant information is included and complete.

 Laudon and Laudon (2008: 220) argue that an effective information system provides users with timely, accurate, and relevant information. This information is stored in computer files as documents. When files are properly arranged and maintained, users can easily access and retrieve the information they need. Well-managed, carefully arranged files make it easy to obtain data for managed business decisions, whereas poorly files lead to chaos in information processing, high costs, poor performance, and little, if any, flexibility. Despite the use of excellent hardware and software, many organisations have insufficient information system because of poor file management.

Figure 17: It is easier to complete information in the system than on a paper record.
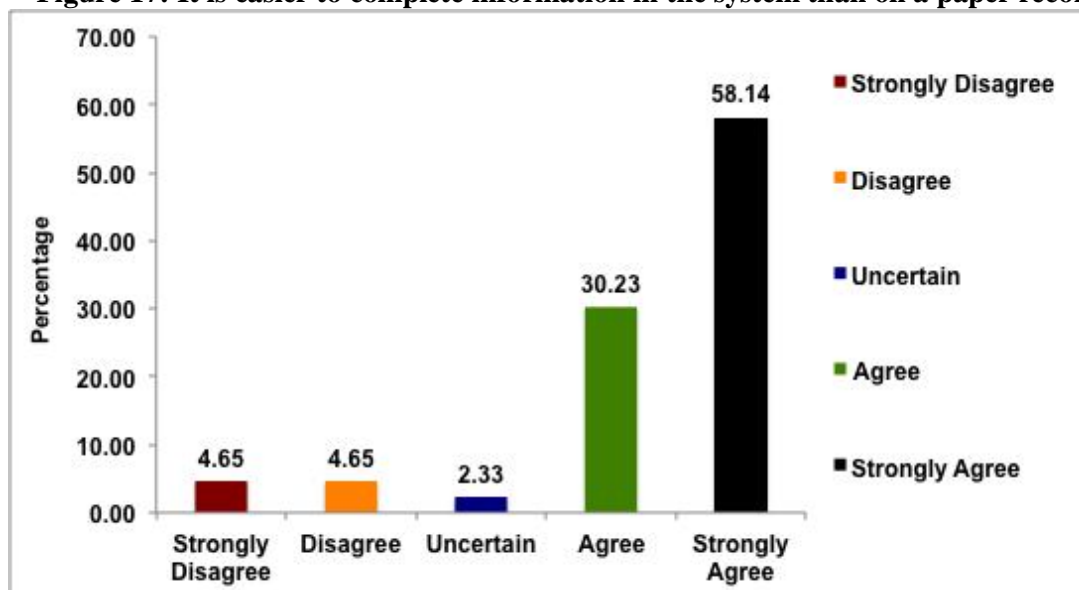
Almost 90% of the respondents strongly agreed (58.14%) or agreed (30.23%) that fulfilling information requirements is easier when using the system compared to completing paper records. Evidently, the NIECS system is highly useful for completing relevant documentation, though appropriate computer knowledge is critical to this process. Hence, employees need to receive the necessary computer and NIECS training to obtain these obvious elements.

According to SITA implementation methodology revision 1.0 Sam L (2011:30) the Enterprise Content Management, (ECM) is all about content management. The ECM agree with figure 17, that world – wide, information has been managed for years by creating electronic data, storing it and manipulating it to be meaningful information, to the benefit of the organisations and individuals alike. The ECM enables information to be completed in the system by improving conformance with relevant legislation; the loss of documents or records will to a large extent be eliminated, the ECM repository (database) provide effective, easy and quick access to quality information, eliminate duplication and increase re-usability and information sharing, ensuring controlled access to documented intellectual property greater accountability of information and processes, automated and standardised processes will lead to improved speed and business administration, decision – making, productivity and ultimate service deliver; and the management of documents through electronic means will reduce the use and wasting paper.

**Figure 18: System facilitates efficient organisation and storage of information.**
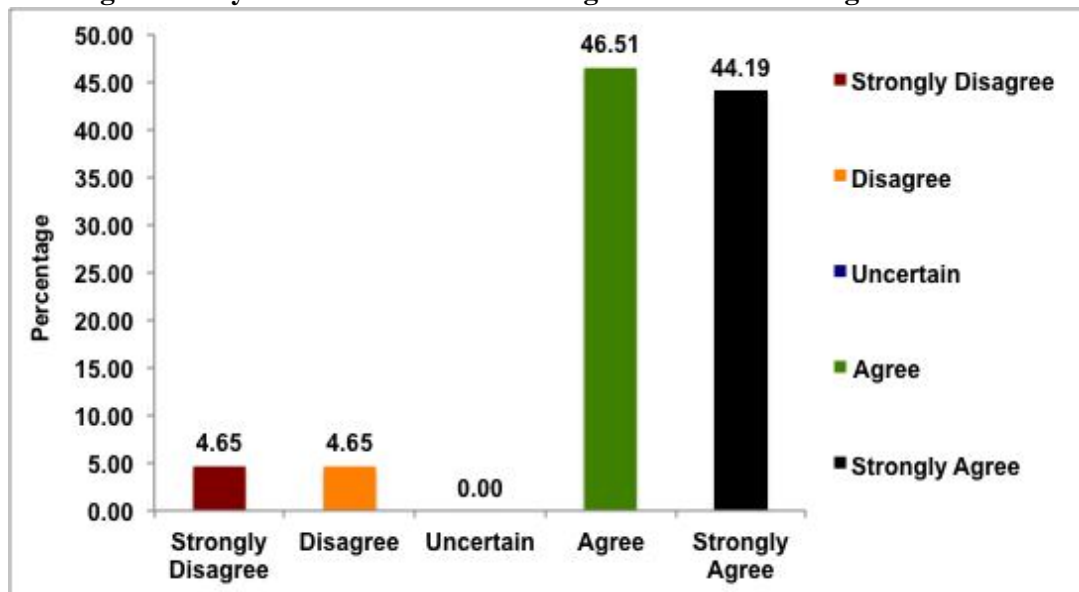
Almost 47% of the participants agreed and 45% strongly agreed that the NIECS system facilitates the efficient organisation and storage of examination information. Hence, the entire process of completing, storing, and retrieving examination information is enhanced as a result of the NIECS system. Clearly, the system has provided profound benefits to the examination information process.

There are similarities between the results and Loudon's argument that implementing a database requires widespread of organisational change in the role of information (and information managers), the allocation of power at senior levels, the ownership and sharing of information and patterns of organisational agreement. A database management system (DBMS) challenges the existing power arrangements in the organisation and for that reason

often generate political resistance. In a traditional file environment, each department constructed files and programs to fulfil its specific needs. Now, with database, files and programs must be built that take into account the full organisation`s interest in data. Although the organisation has spent the money on hardware and software for the database environment, it may not reap the benefit if it is unwilling to make the requisite organisational change.

Figure 19: System makes documentation more accurate.
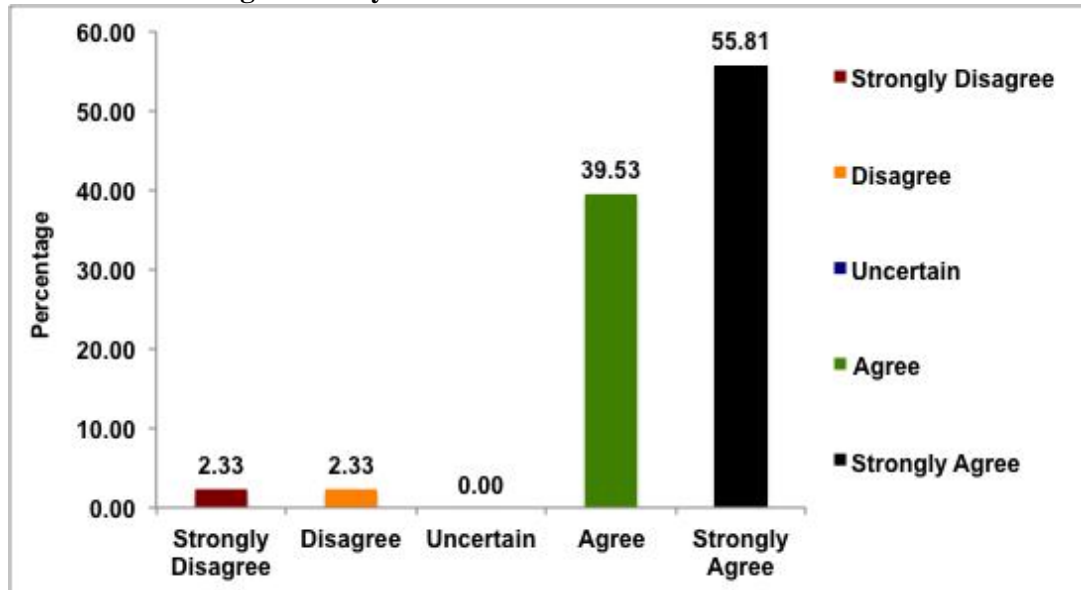
Regardless of whether a system makes processes easier, a system must ensure that information obtained in documentation is accurate. Approximately 95% of the respondents either agreed (39.53%) or strongly agreed (55.81%) that the NIECS system makes documentation more accurate. Hence, it appears as though the employees perceive the NIECS system as enhancing the entire administrative process surrounding examination information.

Laudon & Laudon (2008:220), argue that moving to database environment can be costly long – term process. In addition to the cost of DBMS software, related hardware, and data modelling, organisations should anticipate heavy expenditures for integrating, merging and standardising their data so that they can reside in a database that can serve the entire company. Firms often must spend considerable time merging, cleansing, and standardising the data that will populate their database to eliminate inconsistencies, redundancies, and errors that typically arise when overlapping data are stored and maintained by different systems and different functional areas.

Challenges associated with the use of a computer-based examination information system in learner administration

**Figure 20: I generally have a positive attitude towards the system**.
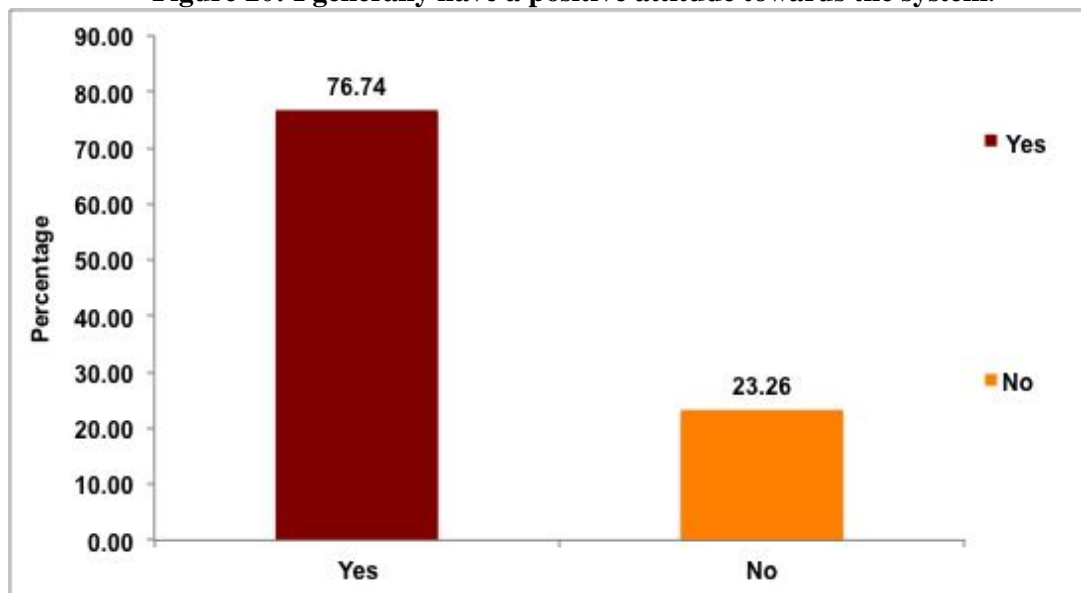
The majority of the participants (76.74%) reported that they typically have a positive attitude towards the system. This may be because it saves time, aids in the completion, storage, and retrieval process, and improves information accuracy. The participants that reported not having a positive attitude towards the system may be experiencing difficulties in using the system due to a lack of appropriate or sufficient training.

Covert barriers are resistance to a computer environment, as mentioned by Scott (2004:4) and Lee et al (2005:170). These barriers are difficult to notice, but are mostly evidences by increased absenteeism, low morale and reluctance to learn new job skills. Increased late coming, increased lunch breaks and poor learner administration are also evidence of covert barriers to the effective use of NIECS. In some instances, rebellion and stubbornness can also become barriers to effective use of NIECS. Passive resistance is covert, yet it slow down implementation of change.

Robbins et al (2007:73), argue that job involvement measure the degree to which a person identifies psychologically with his or her job, and considers his or her perceived performance level important to self- worth. Employees with high job involvement strongly identify with and really care about the kind of work they do.
High job involvement has been found to be related to fewer absences and resignations.

Figure 21: I have basic computer skills and knowledge.
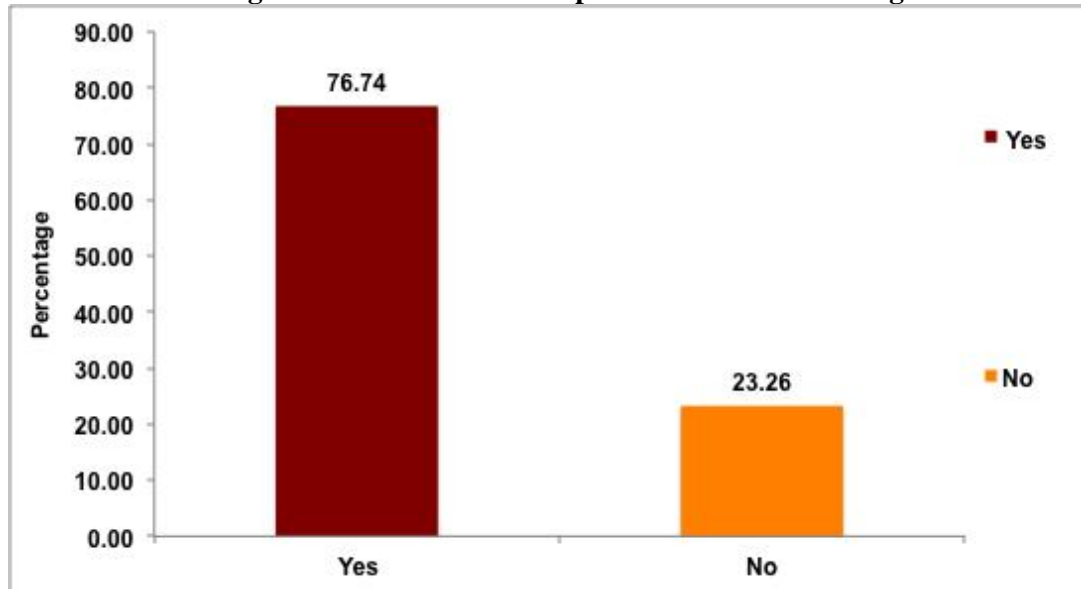
According to Figure 21, the majority of the participants indicated they possessed basic computer skills and knowledge. This corresponds with Figure 7 that denoted that the participants possessed varied levels of computer knowledge and skills. The 23.26% that reported no basic computer knowledge and skills might be suggestive of the limited in-service training employees reportedly received (see Figure 9).

SP Robbins et al. (2007:53), argue that many South African companies are aware of apparent skills shortage. Still, the wisdom of older workers in our country remains untapped and because of myths about the performance of older workers. It is believed that you cannot teach old dog new tricks, but according to evidence, you can! This myth is widely based on wifely held stereotype of older workers having difficulty adapting to new methods and techniques.

Studies consistently demonstrated that older employees are perceived as being relatively inflexible, resistant to change, and less trainable than their younger counterparts, particularly with respect to information technology skills.

But these perceptions are wrong. The evidence in this study indicates that older worker, 50 years and older want to learn and are just capable of learning as people of any age. Older workers know that their skills need to be updated constantly. They do seem to be somewhat less efficient in acquiring complex and demanding skills, that is, they may take longer to train. But once trained, they perform at comparable levels to young workers. Training older employees is, in fact, a good investment. In general, older workers are more stable and loyal than their younger colleagues.

Further argument is that the ability to acquire the skills, knowledge or behaviour necessary to perform a job at a given level- that is, trainability- has been the subject of much research. The evidence indicates that not everyone is equally trainable. A number of individual – difference factors (such as ability, motivational level, and personality) have been found to significantly influence learning and training outcomes. However, age has not been found to influence these outcomes.

Figure 22: I know how to complete at least on NIECS module relevant to section (e.g., registrations).
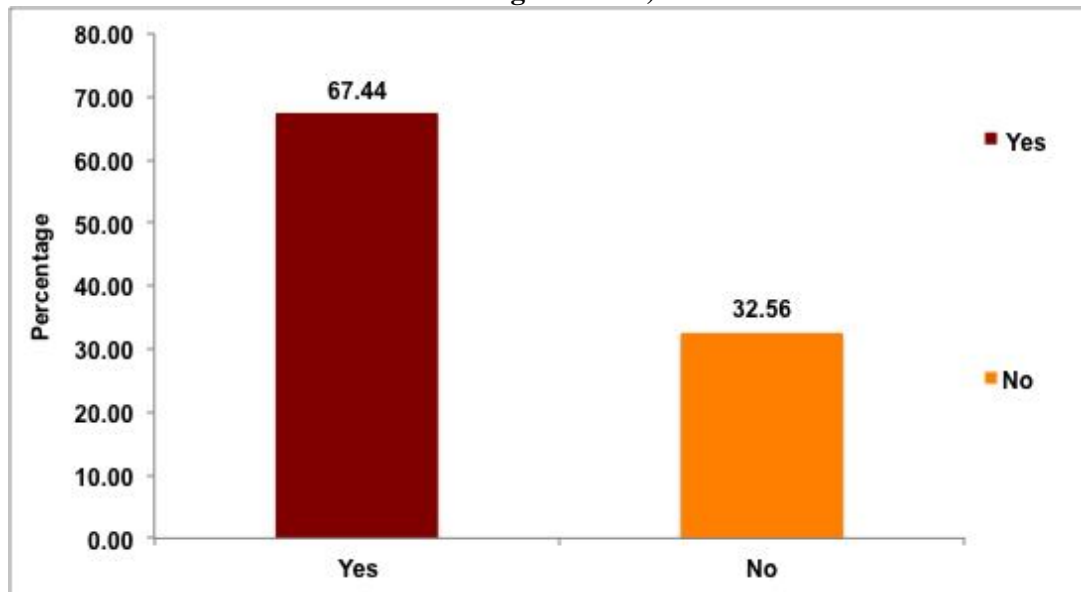
The majority of the participants suggested knowing how to complete the NIECS module most relevant to the section in which they work. However, 32.56% reported "no" to the statement, indicating that many of the participants did not even possess the knowledge necessary to complete the modules appropriate to their section. Again, this may be reflective of the lack of in-service training or the limited knowledge the participants reported regarding all the modules available on the NIECS system.

Robbins et al. (2007: 47) argue that contrary to what we were taught at school, we weren`t all created equal. Regardless of how motivated you are, it is unlikely that you can present the show Lotto as well as Amor Vittone; jump as high as Hestrie Cloete, score a try as fast as Breyton Paulse; or sing as well as Lucky Dube. Of course, just because we aren`t equal, does not imply that some individuals are inherently inferior to others. What we are acknowledging is that everyone has strength and weakness in terms of abilities that make him or her relatively superior or inferior to others in performing certain tasks or activities. From management `s standpoint, the issue is not whether people differ in terms of their abilities, they do! The issue knows how people differ in abilities and using that knowledge to increase the likelihood that employee will perform his or her job well.

**Figure 23: My workload is so large that I cannot work on the system.**
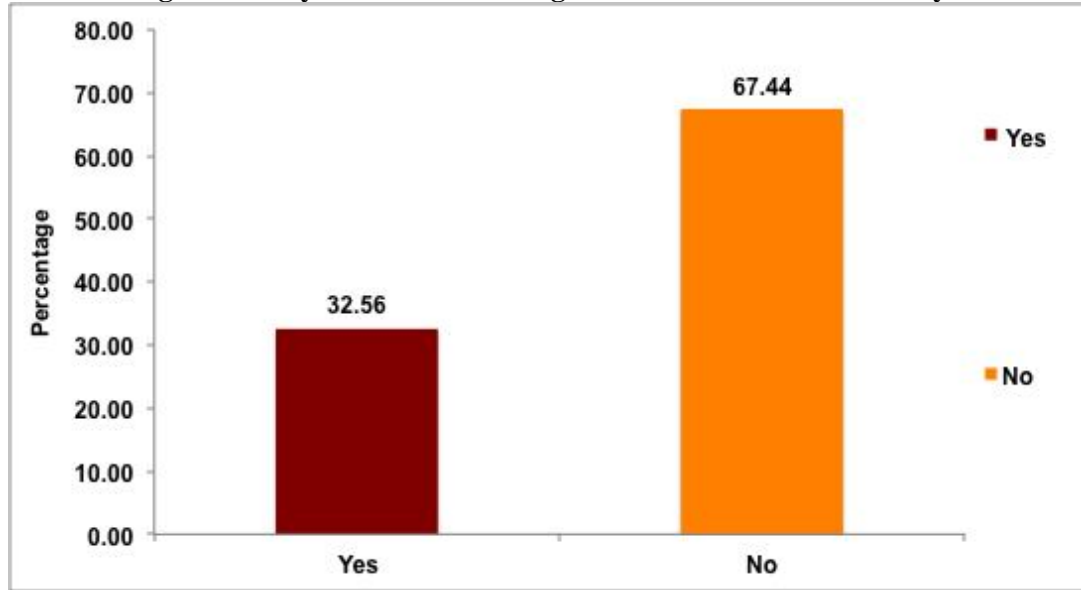
Importantly, the majority of the respondents noted that their workload enables sufficient time for them to work on the system, which suggests that there is often time for them to work with the system and learn how to use it. However, 32.56% indicated a workload that is too large to provide the participants with enough time to use the system, possibly suggesting the divergent workloads that each of the participants may possess.

SP Robbins et al. (2007: 47), argue that Self- management requires an individual to deliberately manipulate stimuli, internal processes, and responses to achieve personal behavioural outcomes. The basic processes involves observing one`s own behaviour, comparing the behaviour with a standard, and rewarding oneself it the behaviour meets the standard.

At SITA, (State Information Technology Agency), performance management is based on principle of self –management. SITA created a learning culture in which employees are instructed on how to set personal goals for performance. They learn how to write individual performance contracts and indentify their own measurement techniques. Finally, they learn how to self-monitor their performance to establish whether individual and organisational goals are being achieved.

Figure 24: I understand the role of the system in our organisation.
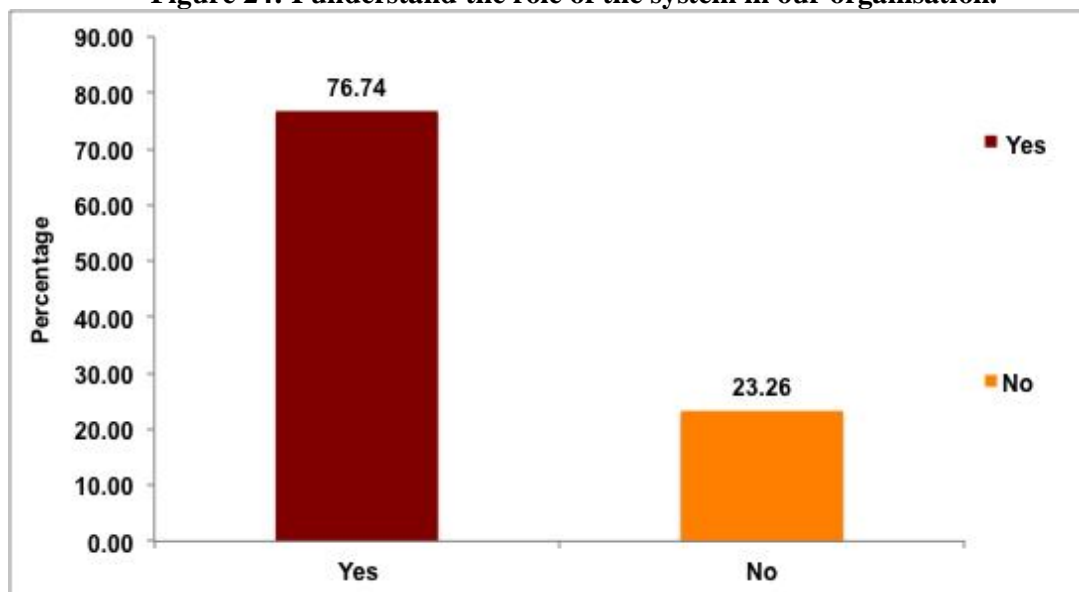

As the employees are required to work with the NIECS system, the majority of the participants importantly indicated that they understand the role of the system in examinations. This suggests that the participants are generally aware of the importance and relevance of the system in the overall learner administration process.

Laudon and Laudon (2008:75), assert that information systems and organisations influence one another. Information systems must be aligned with the organisation to provide information that important groups within the organisation need. At the same time, the organisation must be aware of and be open to the influence of information systems in order to benefit from new technologies.

The interaction between information technology and organisations are very complex and is influenced by a great many mediating factors, including the organisations structure, standards operating procedures, politics, culture, surrounding environment, and management decisions.

Figure 24 above; indicate that most employees are aware that information technology can markedly alter life in organisation. They cannot successfully design news system or understand existing systems without understanding the organisation.

Figure 25: When the system fails to operate, it has a negative impact on learner administration.
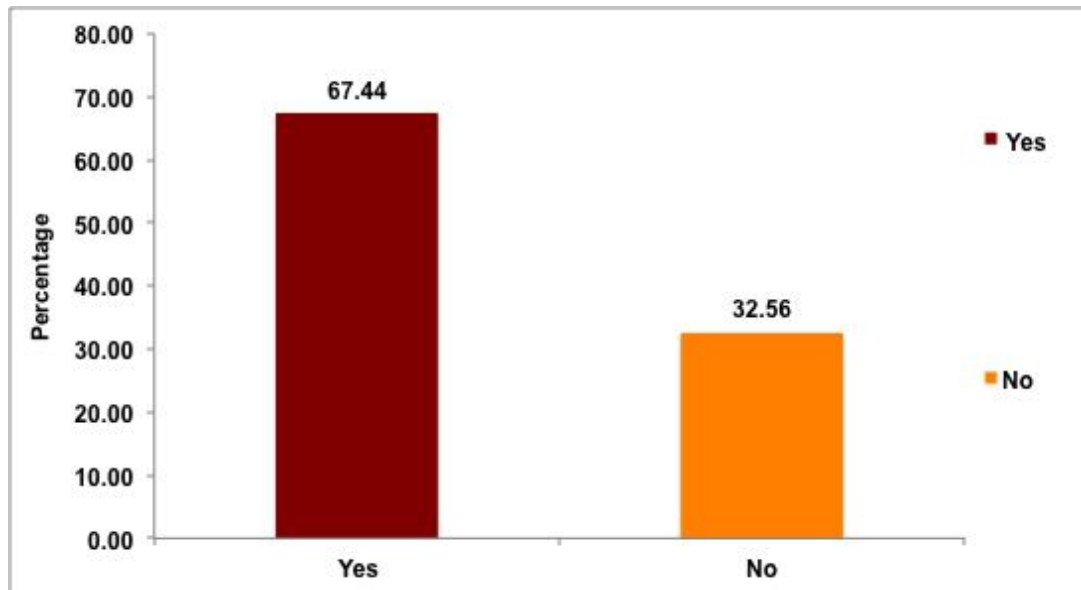

Interestingly, 67.44% of the participants indicated that when the NIECS system fails to operate appropriately, it has a negative impact on learner administration. The response pattern denotes that the system is extremely important, not only to the examination information process but to the overall learner administration process. It appears critical that the system is functioning adequately to ensure that learner administration is completed efficiently and adequately.

Laudon and Loudon (2008: 182) argue that although managers and business professionals do not need to be computer technology experts, they should have a basic understanding of the role of hardware and software in the organisation`s information technology (IT) infrastructure so that they can make technology decisions that promote organisational performance and productivity.

Bank of America (Asia) found that its efficiency and competitiveness were hampered by outdated technology. The company found it could offer more products and services to customers by using the right hardware and software. In order to select appropriate technology, bank `s mangers had to understand the capabilities of computer hardware and software technology, how to select hardware and software to meet current and future business requirements.

Figure 26: The information that I get from the system is relevant to what I do in my section.
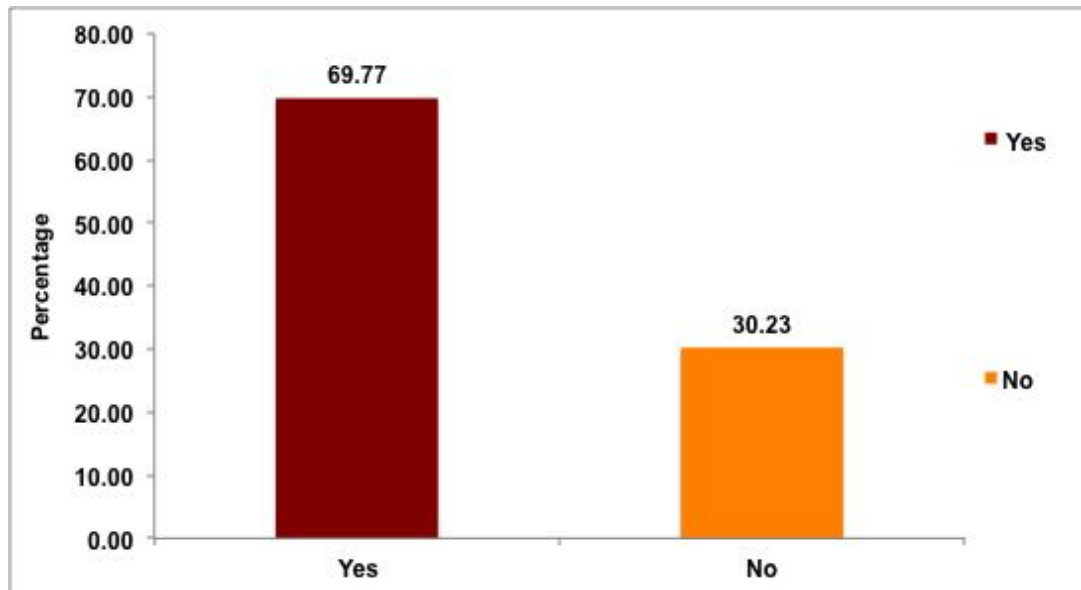

Importantly, the majority of the respondents (69.77%) denoted that the information that they get from the system is relevant to what they do in their relevant sections. This provides an indication that the NIECS system is extremely important to many of the departmental operations and has an impact in many areas of learner administration. About a third of the respondents noted that the information obtained is not relevant to the work they do in their section, which may suggest that they are not aware of how the system fits into their section or that the system is only relevant to particular sections and not others.

Laudon and Loudon (2008: 4) agree with figure 26 above, that today it is widely recognised that information systems knowledge is essential for managers because most organisations need information systems to survive and prosper. Information systems can help companies extend their reach to faraway locations, offer new products and services and reshape jobs and work flows, and perhaps profoundly change the way they conduct business.

Information systems are needed to optimise the flow of information and knowledge within the organisation and help management maximise the firm`s knowledge resources. Because employees `productivity depends on the quality of the systems serving them, management decisions about information technology are critically important to the firm`s prosperity and survival.

Figure 27: There is a system in place to deal with NIECS problems in friendly ways in the section.
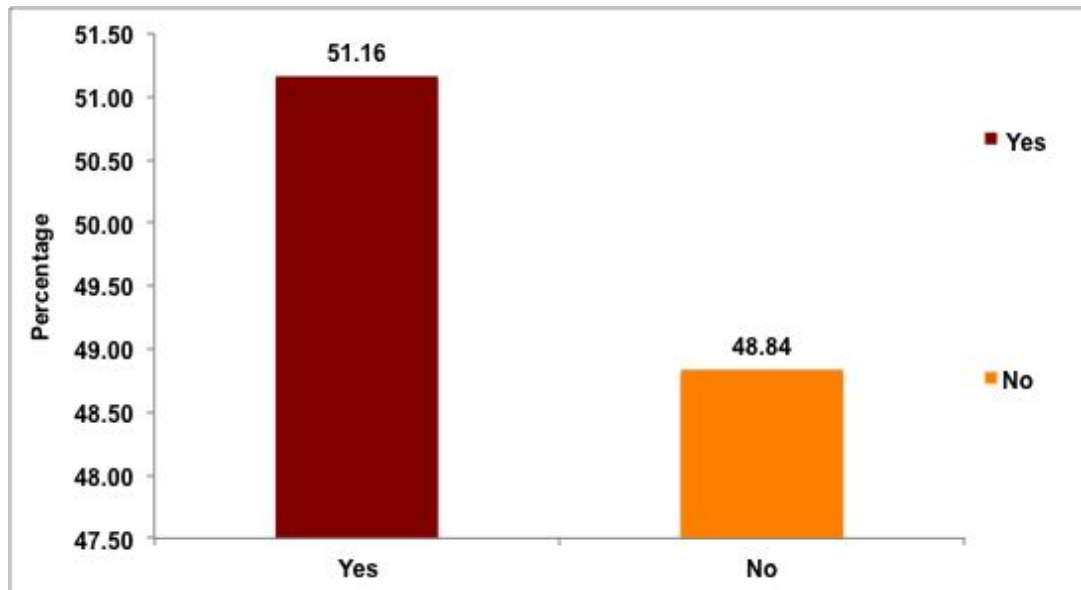

Approximately 51% of the participants reported that there is a system in place to deal with NIECS problems in friendly ways in the section. However, 48.84% disagreed, signifying that there may not be a system in place or that the system that is in place to deal with any problems is not widely known to all employees within each section. Communication should be provided to ensure that all employees are informed about how to deal with NIECS problems in order to ensure that employee relationships do not deteriorate and that work can be completed effectively.

Laudon and Laudon (2008:8), argue that information systems produce the information that organisations need to make decisions, control operations, analyse problems, and create new products or services. These activities are input, processing, and output.

Furthermore, Laudon and Laudon, assert that businesses are not in the business of processing information for its own sake. Instead they process in order to improve organisational performance and produce profits. From a business perspective, an information system is an important instrument for creating value for the organisation.

To fully understand information systems, a manager must understand the broader organisation, management, and information technology dimensions of systems and the power to provide solutions to challenges and problems in the business environment.

Figure 28: One computer is enough for our section.
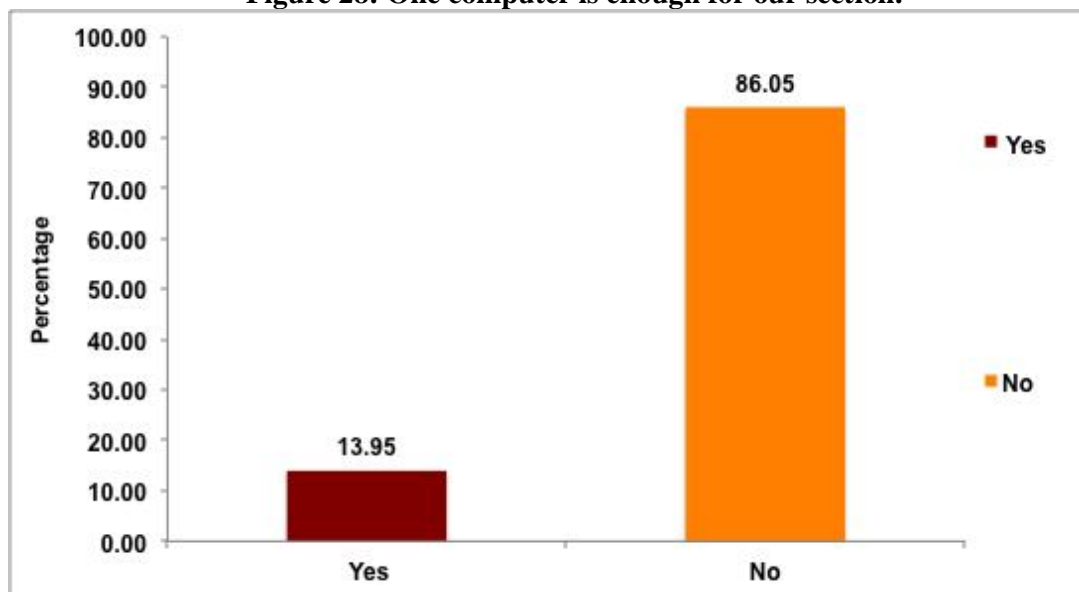
Clearly, most of the participants believe that one computer is insufficient for their particular section. Perhaps, this is an indication as to why certain employees have not received adequate in-service training and the reasons for participants' generally reporting knowledge of certain NIECS modules (see Figure 10). Providing greater equipment may promote the knowledge and use of the system in a manner that may further enhance the benefits of the system.

Laudon and Laudon (2008: 14) point out that computer hardware is the equipment used for input, processing and output activities in an information system. Computer hardware, Computer software, Storage Technology and Communications technology, all of these technologies represent resources that can be shared throughout the organisation and constitute the firm`s information technology (IT) infrastructure. The IT infrastructure provides the foundation or platform on which the firm can build its specific information system. Each organisation must carefully design and manage its information technology infrastructure so that it has the set of technology service it needs for the work it wants to accomplish with information systems. Figure 28 indicates that the management were not creative, to develop novel solution to this problem.

Figure 29: The placement of the system in my section is easy to access.
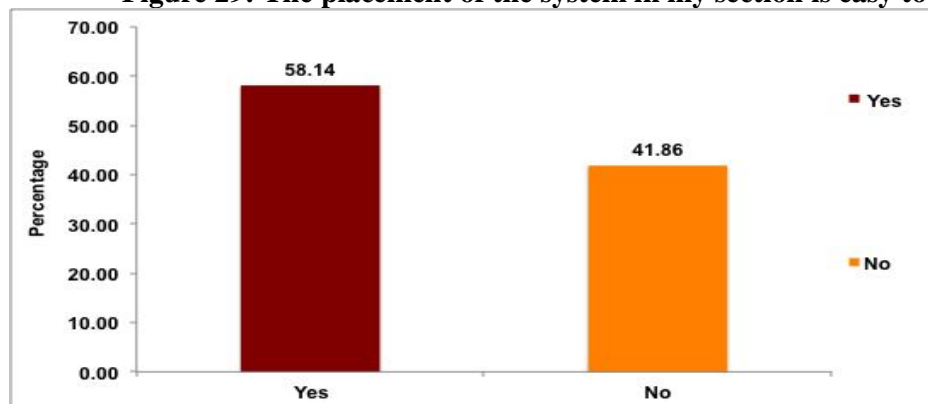

Although the majority of the participants (58.14%) reported that the placement of the system in their section is easy to access, many participants (41.86%) suggested that the placement is

inappropriate and not easily accessible. This may be because only certain employees have been assigned NIECS system-related duties and tasks, whereas others may be less involved in working with the NIECS system.

Laudon and Laudon (2008:18), argue that the soaring power of computer technology has spawned powerful communication networks that organisations can use to access vast storehouse of information from around the world and to coordinate activities across space and time.

Figure 30: Management support examination officials in utilising system in the sections.
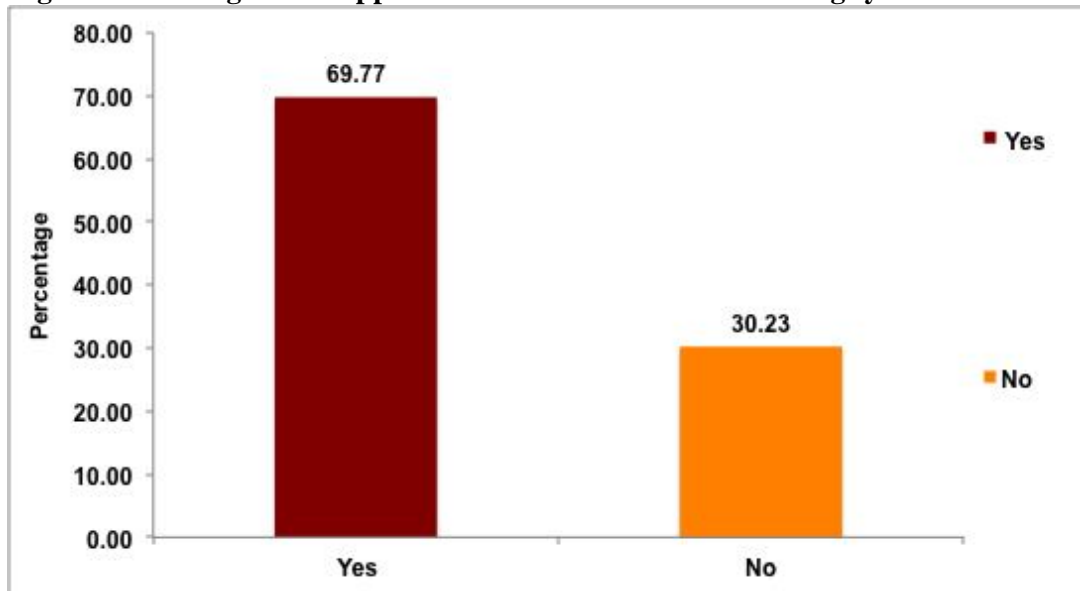

From Figure 30, it is evident that most of the participants perceive management as supportive of the examination officials' use of the NIECS system in their relevant sections. Management would certainly have played a substantial role in initiating the system, so it is important they play an active role in encouraging employees' engagement and use of the system to complete their work. Kurt Lewin argued that successful change in organisations should follow three steps: unfreezing the status quo, movement to a new state, and refreezing the new change to make it permanent

SP Robbins et al (2007: 418) argue that traditional organisations focus on achieving production targets, often at the expense of employees' well –being and needs. The organisation seeks to integrate task and people factors. The organisation, as figure 30 purports, is so people oriented and that the needs of people are continuously identified and strategies developed to meet these needs.

The managers of organisations must realise employees as internal customers and must be satisfied first before the need of external customers can be addressed

Figure 31: The system administrator is readily available to attend to system problems when called.
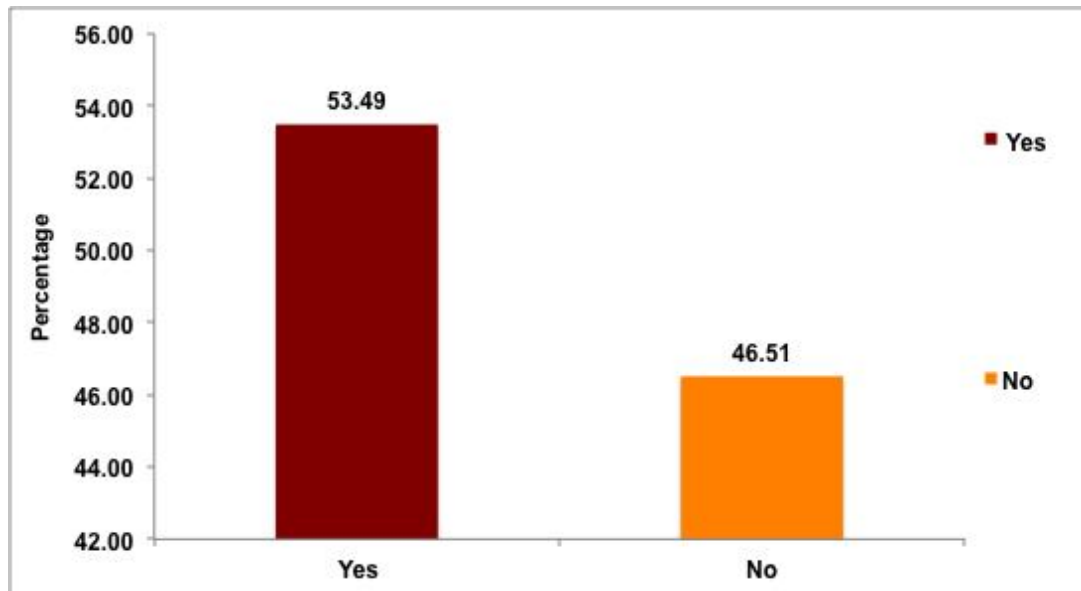
Just over 53% of the participants indicated that the system administrator is available to attend to system-related problems when required. On the other hand, many of the respondents reported the unavailability of the system administrator, which may denote that the administrator is only available at certain times. It may possibly indicate that the participants are not aware of the system administrator, their role, and their availability. It appears important that the organisation provides the employees with details about the system administrator and their availability to ensure that the necessary assistance is obtained when required.

SP Robbins et al. (2007: 417) argue that for the greatest part of the development of management science it was believed that is the role of management to make decisions. The result is like in figure 31, whereby a very small proportion of personnel would do the "thinking" while the majority of the workers would only be "doers". In such an environment very little learning takes place, because there is no incentive for learning and performance. In organisation, all employees must be empowered to make decisions and to learn from the success and failures of these decisions.

Figure 32: I am satisfied with the continuous in-service training on NIECS in my section.
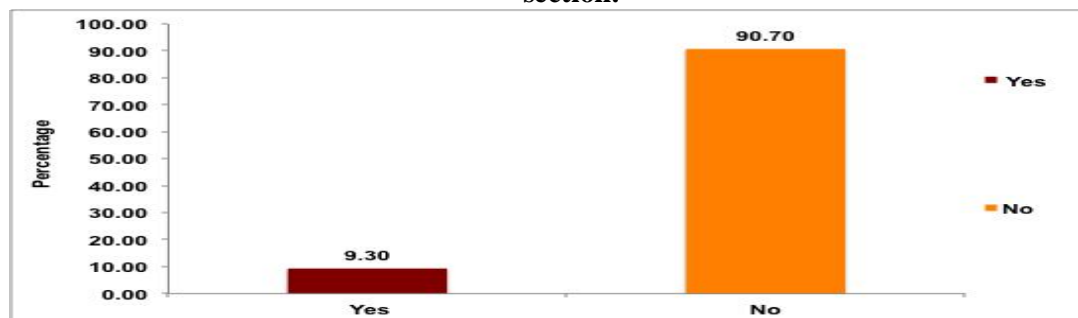

Approximately 90% of the respondents indicated that they are not satisfied with the continuous NIECS in-service training. That is, they appear to not be receiving in-service training that may be necessary to perform their functions. This coincides with the participants' responses to Figure 9, which denoted that many of the participants had not received any in-service training at all. The organisation must improve and provide training in order to maximise the benefits that can be attained from the NIECS system.

According to Kreitner and Kinicki (2006: 9), this is in contrast with findings, that human capital is the productive potential of an individual `s knowledge and actions. When you are hungry, money in your pocket is good because it has the potential to buy a meal. Likewise, a present or future employee with the right combination of knowledge, skills and motivation to excel represents human capital with the potential to give the organisation a competitive advantage. The organisation must encourage employees to study. Will all employees end up working for the same organisation? No. That `s not the point. The point is much bigger-namely, to build the world`s human capital.

The effectiveness of the use of a computer-based examination information system in learner administration

Figure 33: Daily average of learner visits to your office.
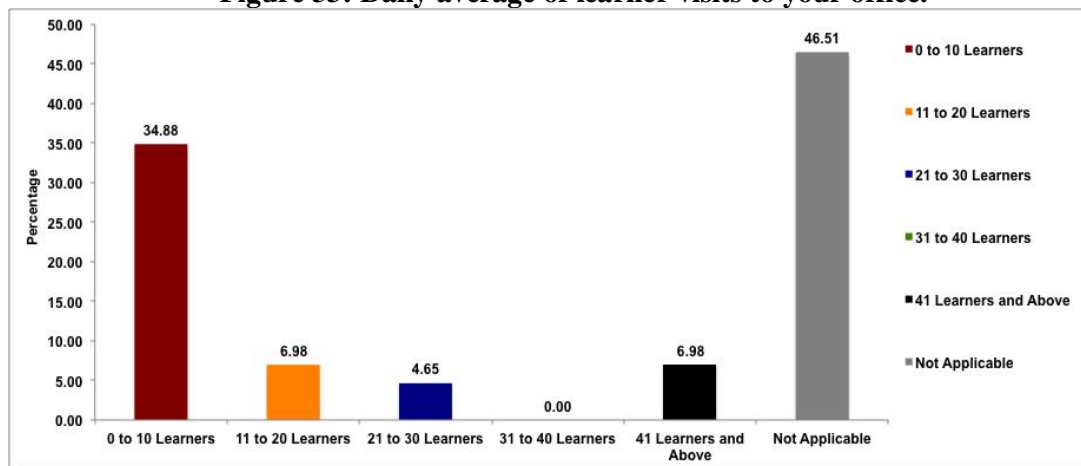
The greatest percentage of participants (46.51%) responded "Not Applicable" to the item, which may suggest that their job or department does not engage or interact face-to-face with learners. Approximately 35% indicated that they receive 0 to 10 learner visits per day. Overall, it appears as though the participants in this study do not experience much face-to-face interaction with learners.

Figure 34: Daily average number of learners attended to in your office.
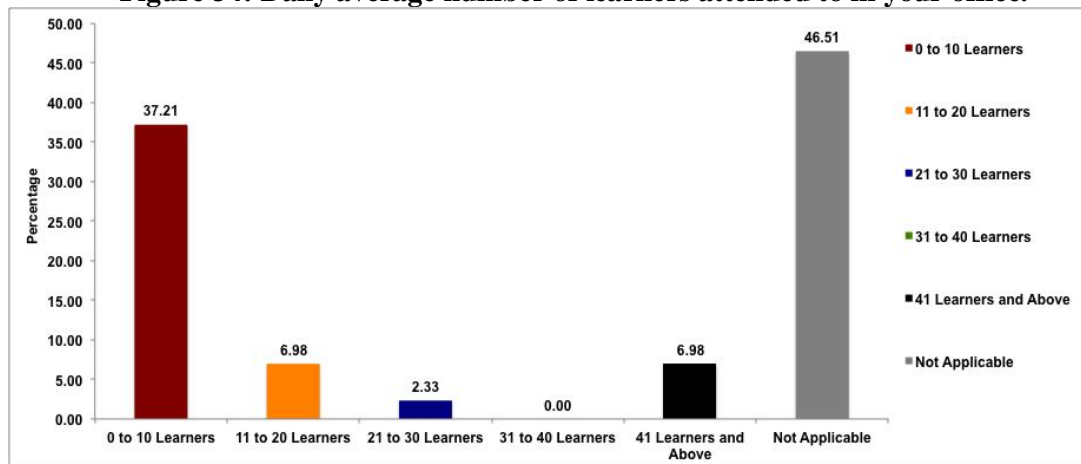
The response pattern to this statement corresponds markedly with Figure 33, perhaps indicating that many of the daily visits by learners, when they occur, result in issues or requests by learners that need to be attended to by the employees.

Figure 35: Module mostly used in the office.
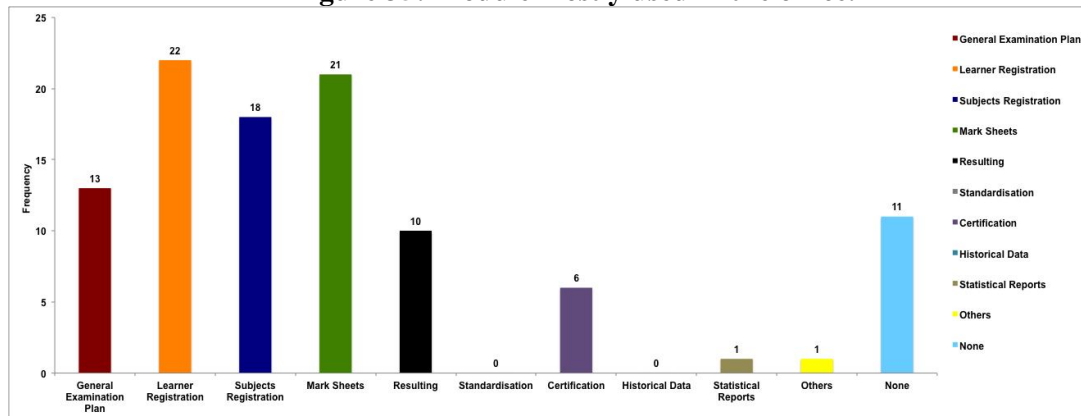
As participants were able to respond to more than one category for this item, the graph above is based on frequencies as opposed to percentages. The participant that provided a response to "Others" did not provide any specification. The response pattern to this item is strikingly similar to the responses to the item in Figure 10, possibly denoting that participants are only knowledgeable of and utilise the NIECS modules that are relevant to the department and work that they are involved in. This may partly explain the limited training provided; once the required learning has occurred, employees may not be provided training for modules which they do not need to be familiar with.

Figure 36: Number of learner entries performed per day.
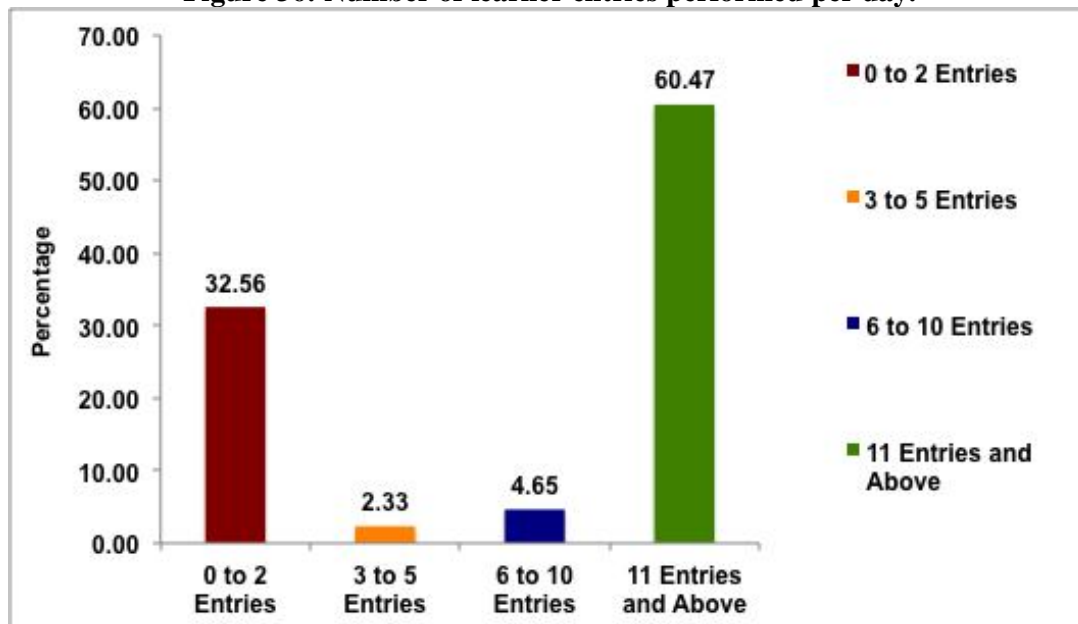
The majority of the participants (60.47%) reported 11 or more entries on a daily basis. Considering the NIECS saves time, aids in accuracy, reduces paperwork, and enhances the entire learner administration process, the number of entries employees are able to perform may have increased due to the NIECS and may enable them greater time to complete other tasks.

Open-ended comment section
Out of the 43 participants, 22 participants completed the "comments" section of the questionnaire. The two major themes are outlined below, with sub-categories within each based on the participants' responses. Participants' responses may have fallen within more than one category, which is why there are more than 22 response frequencies, particularly for theme one.

Theme one: Issues, concerns, and suggestions.
1. Computers needed (frequency: 5).
2. Comfortable chairs required (frequency: 3).
3. Air-conditioning necessary (frequency: 1).
4. Office space necessary (frequency: 2).
5. General equipment/resources needed (frequency: 5).
6. Training needed (frequency: 4).
7. The system is slow (frequency: 3).

Many of the sub-themes outlined by the participants have also appeared in the quantitative closed-ended items that they responded to. In particular, the participants reported insufficient computers in their section (see Figure 28) and a lack of in-service training (see Figure 10). In addition to the furniture and equipment needs that have been outlined, it appears critical that the organisation provide additional computers and more substantial training to maximise the use of the NIECS system.

Theme two: Positive system-related comments.
1. The system works well (frequency: 6).
2. The system makes data management easy (frequency: 2).
3. The system is time saving (frequency: 1).
4. The system enables additional time for learner administration (frequency: 1).
The comments provided by the participants reflect several response patterns that were outlined in the descriptive results obtained. Most importantly, the NIECS system appears to enhance the management of learner examination information and saves valuable time (see Figure 11), which, in turn, provides more time to conduct other learner administration tasks. Clearly, the NIECS has provided substantial support and contributed to improving the administrative functions and the quality of the services provided to learners.

CONCLUSIONS AND RECOMMENDATIONS

Finding from the study
The findings of the study deals with the overall conclusions of the study as a whole and are described according to the five sections based on the structure of the questionnaire.

Findings from the literature Review:
From the literature reviewed, there is a clear understanding that demonstrate a state of equilibrium that is brought about by the fact that the driving force which are forces of change e.g. attitudes towards computers, are balanced by the restraining forces, e.g. large workload, which are the forces working against change. Therefore this is an indication of a "stagnant state of affairs" in terms of change management process.

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Lewin`s change model outlines three phases of change process, namely: Unfreezing, moving and refreezing. The findings from literature review indicate that the process was not well defined and change was not handled as learning organisation.

In recent years, according to Kreitner and Kinicki (2004: 638), organisational theorists have extended the open – system model by adding a "brain" to the "living body". Organisations are said to be human – like cognitive functions, such as the abilities to perceive and interpret, solve problems, and learn from experience.

 Peter Senge, a professor at Massachusetts Institute of Technology, popularised the term learning organisation in his best- selling book entitled The fifth Discipline. He described a learning organisation as a "group of people working together to collectively enhance their capabilities to create results that they truly care about". A learning organisation is one that proactively creates, acquires, and transfers knowledge and that changes its behaviour on the basis of new knowledge and insight. Learning organisations actively try to infuse their organisations with new ideas and information. Next, new knowledge must be transferred throughout the organisation. Learning organisations strive to reduce structural, process, and interpersonal barriers to the sharing of information, ideas, and knowledge among organisational members. Finally, behaviour must change as a result of new knowledge. Learning organisations are results oriented.

Finding from the Primary Research:
Based on the objectives of the study, the perceptions of examination officials regarding the implementation of the NIECS is paramount important. The findings as purported by the survey only 45% attended basic computer training and 60% did not attend in service – training. This is important to note, as a lack of training may influence the ability to use and successfully negotiate the NIECS system.

In organisational behaviour, Robbins et al (2007: 72), states that attitudes are evaluative statements – either favourable or unfavourable – concerning objects, people or events. They reflect how one feels about something. When I say "I like my job", I am expressing my attitude about work.

In the findings of this study, perceptions and the attitudes are important because they affect job behaviour. If workers believe, for example, that supervisors, managers, and bosses are all in conspiracy to make employees work harder for the same or less money, and then it makes sense to try to understand how these attitudes and perceptions were formed, how they relate to actual job behaviour, and how they might be changed.

In order for management to address this perception, training of personnel will bring back confidence and job satisfaction. Robbins at al (2007: 72) further states that a person with job satisfaction holds positive attitudes towards the job, and one, who is dissatisfied, like in the 60% respondents in this study, will holds negative attitudes and perceptions about the job.

The finding on the barriers to effective use of NIECS among officials is, the majority of the participants (76.74%) reported that they typically have a positive attitude towards the system. As a result, productivity has improved because 81.39% of employees agree and strongly agree that they are able to spend more time on other tasks and activities. Robbins et al, (2007: 77) states that "Happy workers are productive workers". Based on the evidence from the findings, productive workers are likely to be happy workers. That is, productivity leads to

satisfaction. If you do good job, you intrinsically feel good about it. Additionally, assuming that the organisation rewards productivity, your higher productivity should increase verbal recognition, your pay level, and probabilities for promotion. These rewards, in turn remove the barriers, and increase your level of satisfaction with your job.

Lastly, the findings on the determining the effective use of NIECS by the officials has revealed that the majority of the participants (60.47%) reported 11 or more entries on a daily basis. Considering the NIECS saves time, aids in accuracy, reduces paperwork, and enhances the entire learner administration process, the number of entries employees are able to perform may have increased due to the NIECS and may enable them greater time to complete other tasks.

Conclusions

This study revealed that NIECS is not used effectively in learner management by the examination officials. This is despite the general perceptions with regards to the role of NIECS in learner management, as indicated by the majority of respondents. Of all the barriers identified, respondents felt very strong about increased workload, inadequate number of computers and most of all lack of continuous in –service training.

In conclusion, the core business of examination is learner management. When officials complain about increased workload, they mean increased learner management in their administration, which could either mean increased number of learners in schools or increased curriculum of learners. This increased learner management, including excessive paper documentation, is rendered at school level. Hence capturing off-line of learner information at schools is strongly and highly recommended. Officials understand the role of computers in examinations, but they do not want to move away from their offices to go and look for learner records in the store rooms that are placed somewhere in the building. Instead, they will continue to suffer the consequences of illegible, inaccurate and incomplete documentation. Not because they rebel against the system, but because they need someone out there, to determine the cost of using desktop computer for hundred of learners, as compared to the cost of using off-line school terminals. Perhaps, even a new technology e.g. "One Point Entry System" that can assist officials with increased "core business". Technology should be a solution to examinations' problems and not a problem itself.

Recommendations

Based on the findings of the study, the researcher makes the following recommendations for:
- Training of Examination officials in Education Department

All examination officials should undergo a compulsory basic computer literacy for at least once every week, until they are competent. The training section within the department should outsource ITC training. Companies such as SITA should be approached for training the personnel regarding computer literacy. The training should be done as part of induction and orientation each year.
- Examination Management

It is recommended that staff development should incorporate NIECS training in their monthly in – service programme. It is also suggested that Management should review the current NIECS and benchmark for more compatible system from outside countries. Computers at schools that are linked to Head office are recommended. Management should support and involve examination officials extensively in decisions regarding NIECS. Officials know what they need. Lastly, it is recommended that management review all three phases of change process as according to Lewins` change model.

- Examination Officials

Examination officials should participate actively in decision making with management regarding the review of the current system. Examination officials should voice out their concerns regarding the decisions taken by the management with regard to the use of NIECS. Voluntary change agents should work closely with management.

Conclusion

The study revealed that within the department of education in Limpopo there is need for change from paper work to automation of information. Change is inevitable. Based on literature review, Lewin`s change management model of unfreezing old ideas and practices need to be cast aside so that new ones can be learned, moving or changing to new ideas learned and refreezing what has been learned.

According to Robert Kreitner and Angelo Kinicki (2004: 673) emphases that change must be managed because there are forces of change. The authors ask important questions as to how do organisations know when they should change? What cues should an organisation look for? Although there are no clear- cut answers to these questions, cues signalling the need for change are found by monitoring the forces of change.

Organisations encounter many different forces of change. These forces come from external sources outside the organisation and from internal sources. External forces revealed by this study were Age, Born Before Technology (BBT), personnel, education, Skill level, and technology advancements. The Internal forces learned in the study were Job dissatisfaction as 90.70% respondents indicated that they are not happy with in service- training and unmet needs.

The study revealed that technology advancements should not be ignored. Development and use of information technologies is probably one of the biggest forces of change. Organisations, Robert Kreitner and Angelo Kinicki (2004: 674), state that large and small, for profit and not for profit, all must adapt to using a host of information technologies. Experts also predict that E-business will continue to create evolutionary change in organisations around the world.

Further research is recommended to determine the cost effectiveness and feasibility of having computer terminals at schools linked to Head office. The results could be used to review the current setup in the Department of Education.

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The entire bibliography is cited in this article and the references pertaining to this article are sighted in the bibliography.

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