Biometric System Applicability on Teaching Staffs Attendance Management in Higher Learning Institutions in Tanzania

Kweyamba Maximilian Pastory, Justus Gration Muhoza and Geofrey Ndunguru
The Local Government Training Institute (LGTI) – Dodoma, Tanzania

Abstract: Workplace attendance management is widely a challenge in developing countries like Tanzania. Public employee in Tanzania works under regular working hours from 7:30 a.m. to 9:30 p.m. as stipulated by various laws, including the Employment and Labour Relation Act (ELRA) of 2003, the Public service act of 2019, and the Standing order for public service of 2009. Some public employees who work on shift bases are not required to attend work early in the morning like other routine workers. Some of these professionals include nurses, and doctors, who work under shifts. Introducing and using digitalised technology, such as biometric fingerprint attendance devices, is believed to present a significant opportunity for enhancing employee attendance. However, its applicability is yet to be known to those employees who work on a shift basis and field work as per the standing order for public service of 2009 and other laws. The difference in reporting time among public employees leads to the need for understanding the applicability of biometric attendance registers to manage academic staff attendance in higher learning Institutions in Tanzania, whose core functions are controlled by class attendance journals. This study draws experience from high learning institutions in Tanzania to ascertain the applicability of biometric systems in addressing academic staff attendance management and attendance problems. The study employed an interpretivism research paradigm that allows the study to use a qualitative approach following an exploratory case study design. Thematic analysis was used to identify, analyse, interpret, and report every day of data collection through key informant interviews and in-depth interviews. Head of department and HR documents were also subjected to content analysis. The findings unveil challenges that blur the reality that academic staff, unlike administrative staff, do not abide by the use of biometric attendance regulation placed at the main entrance as they have other mechanisms such as class attendance and class journal left with class representatives. With biometric system, academic staff can still falsify their workplace performance. Moreover, those who work extra time till early night cannot abide by the use of a biometric system termed to sign in and out like any other non-academic staff; otherwise will be against the law that requires them to work 9hrs a day as they sometimes work beyond nine houses a day. The study recommends taking into account the character and operational performance of academic staff at Tanzania's higher-learning institutions when designing and using digital technologies to manage academic staff attendance. Special biometric machines should be installed in classes and programmed so that academicians will sign in and out when attending classes. Their attendance should be monitored by class representatives and students based on the session they have as agreed upon by higher learning in Tanzania on a daily, weekly, and monthly basis.

Keywords: Academic staff, Academic staff attendance management, Biometric system, public high learning institutions.

INTRODUCTION

In most African nations, poor employee attendance is a persistent issue (Garaba, 2021). For instance, incidences of teacher absence are often recorded in Uganda (between 21 percent and 27 percent). Attendance problems interfere with their professional responsibilities, including creating lesson plans, weekly assessments, and marking their students' in-class assignments (Zikanga, *et al*., 2021; Khamis, 2009). Attendance problem is probably more serious in other African countries; for example, in Kenya attendance rate includes coming to work late and even leaving early, ranging between 20 percent and 40 percent (Donflo & Hanna, 2005; Khamis, 2009). The situation is even worse in Tanzania's remote areas, particularly in some government organisations (Mgonja 2017). Various studies show that employee workplace attendance rates are lower than in other East African Countries (Baker, 2010; Garaba, 2021). According to World Bank research from 2011, around one in four secondary and elementary teachers (public employees) who work in remote areas of Tanzania miss school on any given day (Mgonja M.G and Makulilo B.A., 2022). In addition, a sizable percentage of students

and teachers in public schools who responded to a survey by (Betwel, 2013) on teachers' professional misconduct in Sumbawanga say that attendance is still a significant concern. Furthermore, Nombo, *et al*. (2020) noted a high absenteeism rate among Tanzanian workers, particularly during the rainy seasons and occasionally due to alcohol addiction.

Technological Advancement In The Public Organisations

One of the most significant advancements in public organisations that can increase and provide rational staff attendance management and improve service delivery is the adoption of biometric attendance technology (Crowell, K. 2002). Public institution has embraced the advancement in biometric technology to improve employee attendance, but this has not been the case for all institutions. In order to track and record individual employees' availability and create an overall picture of staff availability across all organisational departments, biometric attendance systems are digital technology widely used in public and private organisations, including high-learning institutions. Using biometric attendance

systems (BAS) for human resource management (HRM) has not yet gained sufficient acceptance from high-learning institution administrators to distinguish how academic and non-academic staff sign in and out. There are fewer disagreements over attendance and other disciplinary matters due to the automated technologies used to verify employees' attendance (Crowell, K. 2002). Instead of using a biometric system, which captures records in real-time and without bias, employees with traditional methods of attendance registers use spreadsheets to record their attendance (Coughlan, 2021). This method is likely biased and frequently does not reflect an employee's attendance record. Most organisations use biometric attendance system data to make employee payrolls, manage attendance records, and compile a department report on staff availability (2020).

Biometric technology plays a vital role in Human resource management functions (HRM), affecting its functioning and practices in many ways (Tyagi 2020). Biometric attendance record system is an electronic device that recognises users by examining each person's unique biological and physical characteristics (Sharma, *et al.*, 2015). These systems are divided into categories according to the characteristics or features of the identifier used for identification, such as DNA, Iris, Face, Retina, Fingerprint, Palm Print, Keystroke, and similar ones (Mwighusa, 2015). Mwighusa, (2015), and Wolf, (2017), have discussed the attributes of biometrics, which include performance, robustness, acceptability, uniqueness, permanence, universality, and collectability. Below is a summarised model illustrating a biometric that can identify people based on their biological traits (physiological traits) or actions they take (behavioral traits).
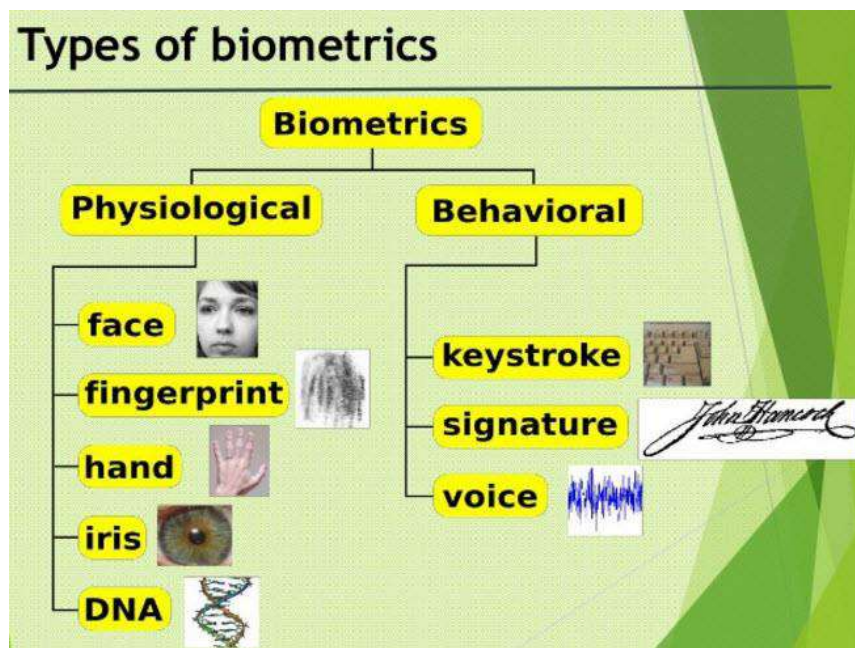

Figure 1: Biological and Physiological biometric recognition systems
Source: *hptts://www.ellprocus.com.edu/different-tupses-biometric-sensors/system*

Using biometric technology gives solutions for modern human resource (HR) challenges like absenteeism, arriving late, departing early, and even signing on behalf of others (Mgonja, 2017). Monitoring attendance is an essential aspect of job performance and one of the main supporting functions of human resource managers. The scope of the absenteeism problem can only be determined with adequate and trustworthy data recording and monitoring procedures (Coughlan, 2021). Some vital aspects are monitored to determine the legality of employee attendance at work: daily employee contribution, his/her efficiency, approved leave records, reliable employee attendance, and organising adequate recording for an employee who departs for whatever reason. When seen in conjugation with the leave record and well-organised leave record of an employee, the attendance record allows the HR manager to link the salary and other incentives to the performance output in terms of person-hours (Robbins, 1982).

For ten years or more, several nations have used biometric systems for various purposes (Adewole, *et al*., 2014). Organisations are using biometric technology to monitor better employee time spent and attendance. The costs associated with an organisation's human resources make up a sizeable amount of those of using a biometric system. Biometric systems are a great approach to tackling time management issues since they link individuals to their own human resource records and integrate with other human resource operations for the best employee treatment (Sharma, *et al*., 2015). According to Sharma, *et al*., (2015), biometric systems are widespread and rapidly expanding as more organisations, including Tanzanian universities, adopt biometric systems to improve worker performance and efficiency (Mgonja and Makulilo, 2022). Biometric technology can assist in tracking employee movement and time spent at work. This function can help decrease time theft by ensuring employees arrive on time and leave when their shift or obligation is complete, following existing laws, policies, regulations, and standing orders (Ononiwu & Okarafor, 2012). Employee satisfaction and dedication can rise when employees perceive their efforts are recognised through a balanced workload and rewards. Biometric systems can be used by human resource managers in all functions related to human resource recognition. A biometric system can check employee attendance so that those who work extra hours or overtime are compensated fairly. Employee attendance management ensures that employees in public institutions arrive on time and provide services to consumers or service users, which improves operational effectiveness and the organisation's public image.

Employee attendance timing, identification, and reward management are crucial in achieving operational performance (Jonah, A, 1995). Employee attendance has a direct influence on operational performance of an organisation. Employees must attend to their duties as scheduled to enhance organisation performance. Biometric system is essential in ensuring that the actual employee attends to duty. Where employee identification and follow-up are not made effective, employees who are expected to be on duty may fail to report. Their colleagues may sign for them if manual attendance registers are used instead of the biometric attendance register system. At higher learning institutions, the teaching, learning, and consultancy activities may be

adversely affected if some teaching staff (academicians) fail to report for duty. Good pay and compensation scheme ensures that employees are paid as due to them. When compensation packages are computed accurately, it enhances motivation of teaching staff employees.

Conceptualising Biometric System

Biometric system is an automatic finger, face, and sound recognition that verifies an employee's identity and computes employee traits with high speed (in one second or less) accuracy. Biometric systems should address attendance timing, employee identification, and employees' overall in and out timing. An effectively operationalised and institutionalised biometric system should lead to more accurate employee attendance records. The system should also help human resource managers ban unethical attendance behavior, eliminate the practice of signing on behalf of their colleagues' buddy punching,' more authentic identification of employees, and more accurate disciplinary proceedings related to attendance and absenteeism of employees (Shehu and Dika, 2011). When working time is managed well, conscientious employees perceive their work is recognised. Employees who do not attend to their duties are identified among the workplace workers and encouraged to improve. Improved job satisfaction may be realised through practical computation of extra teaching hours and overtime, management of extra workload, and recognition of hard work. The employer can also identify areas of high employee absenteeism in the workplace which can be used to re-organise work and used as a basis for a disciplinary proceeding related to employee attendance.

These records at each level and cader must be analysed before they can be used better; otherwise, they waste resources. In organisations where biometric system has been implemented and monitored, there has been a significant impact on staff attendance and a reduction in the practices of arriving late for work and leaving early. Employees (academic staff) in public organisations (high-learning institutions) have expressed opposition to biometric system installations where all academic and non-academic staff must sign in and out regularly (Mgonja, 2017). Many organisations where it has been placed have not yet considered monitoring or payroll integration, nor have they controlled how much time employees spend on organisation and use to boost staff productivity (Bettesse, 2005). It is essential to recognise that implementing a system into an

Publisher: SARC Publisher

organisation does not simply check the box for technological adoption; instead, it must be used to its full potential to provide tremendous benefits. The current study focuses on the viability of using biometric systems to control academic staff attendance management in higher learning institutions in Tanzania.

THEORETICAL FRAMEWORK

Different ideas describe how to deal with employee workplace attendance issues, how human resource managers handle employee absences to manage an organisation's operational performance, and how to use organisational human resources best. The theories of planned behaviour (TPB), expectancy theory, institution theory, and classical theories served as the foundation for this study's theoretical framework. For instance, it is advised to use classical theories when using scientific management techniques to address employee operational issues. One of the proponents of scientific management theories, Frederick Taylor, suggested that giving employees financial incentives would increase their motivation to perform well (Shields, *et al*., 2015). Put another way, giving employees (in this case, academic staff) financial incentives encourage them to increase their attendance at work. Taylor, (1911) come up with four principles. He believed these principles, if well implemented, could result in a high degree of efficiency, effectiveness, and optimal productivity. The principles are as follows. First, develop science to replace the old rule-of-thumb methods. Taylor was firm in the belief that there could be an organised body of knowledge in management that could be taught and learned, which is the only best way of doing things. Second, scientifically select and then train each and develop the workers. Third, closely cooperate with the workers to ensure all the work is being done following the principles of the science which has been developed. Fourth, there should be almost deliberate equal division of work between the management and the other workers. Therefore, these principles ured managers to take a more systematic approach in performing the coordinative roles. The expectance theory of Victor Vroom, (1964) emphasised this viewpoint. He maintains that people go to work because they enjoy getting paid and have expectations; if those expectations are realised, they will show up to work, but if they are not, they will not be motivated, and they will not likely show up as required by their employment contracts. The technique is inconsiderate of the idea that an

employee's social elements (human interactions), such as culture, cooperation, and social groups inside an organisation, can encourage one to attend to work, according to essential accusations leveled against scientific management approaches (Locke, 1982). According to Dempsey*, et al*., (2018), social influences such as peer behaviour and attitudes can direct or restrain social behaviours in an organisation without the use of law. In this instance, Korajczyk, (1961) contends that an employee's place in a group is so crucial that, rather than go against the moral code of his group, he would not take advantage of the financial incentives. This suggests that social norms in an organisation can occasionally govern employees' decisions about whether or not to report to work rather than financial incentives or current laws, policies, and regulations.

Institutional theory is another important theory that was thought to inform the study. The institutional theory encompasses a wide range of theoretical approaches from various academic disciplines such as sociology, public administration, management, political science, and even history. Former works on institutionalism, such as Meyer and Rowan's, (1977) institutionalised organisation and DiMaggio and Powell's, (1983) revisited iron cage, were from sociology and political science. Institutional theories describe how institutional norms and rules can affect employee behavior and how an organization responds to customers in public organizations (Jensen*, et al*., 2009). Institutions in this context relate to hard institutions, such as government agencies, and soft institutions, such as enacted laws, policies, and regulations, as well as organizational culture and social norms that influence behavior. In relation to the present study, institutional theorists assume that the applicability of biometric systems to academic staff attendance management does not occur in a vacuum but in a framework of institutions (De Corte, 2017). Institutions play a prominent role in determining the behaviour of actors and outcomes of implementing a biometric system for academic staff to monitor their attendance behaviour. They shape interests and desires of individuals (Powell & Colyvas, 2008). Through a process known as isomorphism, institutions institutionalise and legitimise, constrain, or modify behaviour to promote existing formal and informal institutional rules, customs, and norms (DiMaggio & Powell, 1983). In this study, institutional rules reflect the legal and policy guidelines that guide implementing and

16

using biometric systems to control employee attendance behaviour. They also entail organisational norms and their perceptions of using biometric systems for signing in and out every time they are on duty. Directly related to application of biometric systems, institutionalism pays greater attention to the context, which, according to Powell and DiMaggio (1991), includes the influence of working culture and institutional policy. In this study, it implies the need to gain insight into how working culture, organisational policy, and realities shape academic staff's behaviour using a biometric system in signing in and out when they are on lecturing duties. In this respect, it becomes imperative to focus on the influence of both the formal institutional rule and working culture of academic staff on the use of biometric systems for managing their attendance.

This theory is also supported by the theory of planned behaviour, which supports employee attendance management and how internal and external factors influence employee behaviour. The Theory of Planned Behaviour (TPB), which is an expansion of rational action, was first articulated by Ajzen in 1985. According to the theory, a person's behavior intentions within an organization can be influenced by attitude, subjective norms, and perceived behavioral control (Ajzen, 1985). A person needs to be supported by the action and feel pressure from others to take it in order to do it (subjective norms). Unforeseen circumstances, however, may cause expected behavior to shift over time, reversing the prediction's accuracy (Ajzen, 1985).

A summarised model in figure 2 shows the Theories of planned behaviour (TPB)
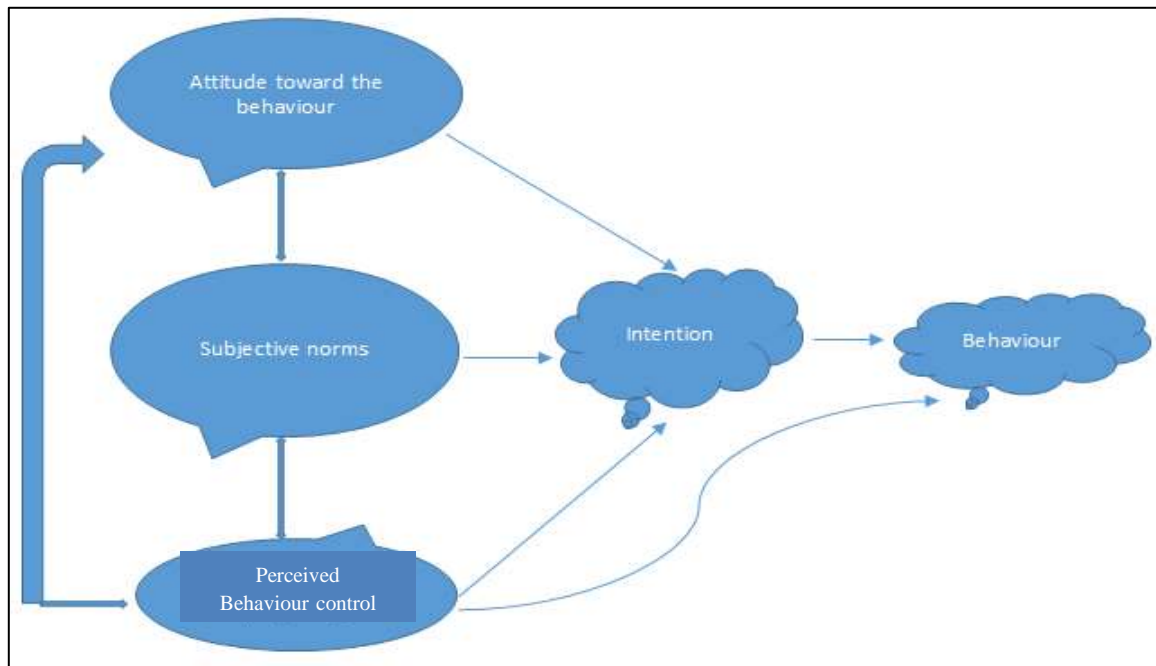

Figure 2: Planned behavior theory
Source: Aljzen, (1991)

Given unforeseen circumstances that interfere with their initial working aims, this indicates that part of the employee's behaviours is carried out unwillingly. This is when 'behavioural control' should be used. The key concept of TPB is "behavioural control," which refers to how others perceive one's capacity to carry out a specific behaviour (Ajzen, 1985). The theory of planned behaviour (TPB), in contrast, is criticised by Barber, (2011) for ignoring the possibility that employees may purposefully act unreasonably. According to Sniehotta, *et al*., (2014), TPB has a

static explanatory nature, which makes it challenging to comprehend the impacts of behaviour on cognitions and future behaviour as they are known to exist.

The aforementioned ideas provide a straightforward explanation for how employees behave in an organisation. Additionally, this enables employers (Human resource department) to develop management plans, eliminate issues affecting productivity and operational performance, and minimise atypical employee behaviour such as excessive absence from work.

Taylor emphasises financial incentives for long-term employee performance behaviour, among other factors, in scientific management theory. Taylor believes that financial incentives such as fair and adequate pay, bonuses, and logical monitoring can scientifically influence employee attendance and performance at work. On the other hand, the expectation theory insists on the pride of being paid, which means people have expectations. If their expectations are met, people will show up to work, but if they are not, they will not be motivated, and as a result, they are likely not to show up as required by their employment contracts.

Similarly, institution theories concentrate on how institutional norms, regulations, and policies affect employee behaviour and organisational responses to customers. Jonson's, (1999) focus is on hard institutions, such as government agencies, and soft institutions, such as established laws, policies, rules, organisational cultures, and social norms that shape individual behaviour. The idea strongly emphasises how organisational structure, norms, rules, and laws influence employee behaviour and whether or not they report to work. Along with other systems for controlling employees' behaviour in an organisation, the TPB strongly focuses on attitude and social norms (social pressure). According to the TPB, an organisation's behaviour is the outcome of an employee's intentions, which are influenced by their attitudes, social pressure, or societal standards (Ajzen, 1985).

Consequently, employers require methods, social standards, or pressure (Ajzen, 1985). Employers, therefore, require tools to mould workers' attitudes and social norms toward the desired behaviours. However, no theory can adequately describe employee behaviour; hence, four different theoretical arguments were considered in this publication.

The study employed theories triangulation to allow the researcher to examine the applicability of biometric systems on Teaching Staffs Attendance Management in High Learning Institutions in Tanzania from different theoretical angles. Despite the difference in focus, the theories agree on some aspects that the incentive and external factors attribute to employee motivation and behaviour. Therefore, each theory's theoretical value and applicability depend on the circumstances existing at a particular moment in time within a particular context. These theories show that internal and external factors can affect how employees behave.

According to the TPB's explanation of employee behaviour, a person's behavioural intentions inside an organisation can be influenced by attitude, subjective norms, and perceived behavioural control.

On the other hand, institution theories describe how institutional norms, laws, and regulations influence employee behaviour and an organisation's reaction to customers. Both hard and soft institutions, such as established laws, regulations, procedures, organisational cultures, and social conventions, will affect employee attendance at work and how an organisation might use soft institutions to influence individual behaviour. Hard institutions include government agencies. Scientific management emphasises supervision and financial rewards, which are also thought to influence employee behaviour toward work dedication and workplace attendance. Uncertainties, however, may prevent certain employees from attending and result in predictions that are the opposite of what actually happened (such as poor attendance). According to this perspective, employers should make an effort to manage employees' behaviour to make sure that their intentions for greater attendance are followed through on in their actions. The current study assumes that an employer's biometric system installation choice is intended to regulate employee attendance patterns at local government training institute (LGTI) representing high learning institutions in Tanzania. Employers' installation of biometric systems is seen to respond to concerns about employee attendance based on prior attendance records or the need to improve employee attendance behaviour. It is thought that LGTI's choice to employ biometric technologies lessens difficulties associated with manual or conventional attendance registers, which impeded precise and prompt attendance tracking. It is also considered that management believed technology would alter the absenteeism culture, if there was one, and influence academic staff attendance behaviour since it will uphold the spirit of punctuality and good attendance, enhancing workplace performance.

Managing Attendance of Teaching Staff vs. Non-Teaching Staff
The preliminary investigation and reviewed documents from ISW, IFM, TIA, NIT, CBE, UDSM, MZUMBE, ARU, and Rwegarulila water institute (among the high-learning institutions in Tanzania) made by the researcher indicate that most higher learning institutions in Tanzania and

Universities, the usage of biometric system was intended for controlling employee attendance issues, of non-teaching staff who follows regular hours of work as stipulated by the Tanzanian standing order and employment and labour relation act of 2003. Some high learning institutions, such as ISW, TIA, IFM, UDSM, NIT, ARU, Rwegarulila water institute, and DUCE's teaching staff, do not sign in and out at 7:30 a.m. and 9:30 p.m., respectively. Instead, their attendance is regulated by class representatives and special journals located in classes. Some biometric machines are placed on classes where both academicians and students sign in and out. Some institutions, such as Local Government Training Institutes (LGTI), seem to be different to some extent in the signing modalities, particularly for academic staff who sign in and out as non-academic staff to biometric machines placed at the main entrance, without reconsidering the nature of their duties as academic staff. In higher learning institutions, unlike other fields of work, academicians have to work beyond 9:30 p.m. when having evening sessions. Academic staff may sometimes have teaching sessions that require them to stay at work while other academic and non-teaching staff leave at 9:30 p.m. Those who work beyond normal working are not compensated based on extra duties as non-academic staff whose extra duties payment is based on hours beyond regular working hours. Teaching staff whose sometimes required to stay at work beyond regular working hours, their compensation depends on workload that does not consider how long that employee stays at work station beyond 9:30 p.m. Some teaching staff has to prepare their lesson or consultancy guidelines outside the working station. For instance, a preparation made at government libraries or preparations conducted at other high learning institutions when academic staff is not required to be at his/her workstation. Given the biometric signing principles teaching staff who do not appear at their workstation for any pre-preparation reasons related to their scheme of work will be regarded as absentees. They may be disciplined without considering the nature and conduct of their responsibilities if we rely on stipulated hours of work in the Public Service Standing Order of 2009 and the Employment and Labour Act of 2003. Teaching staff duties are preparing learning resources for tutorial exercises; conducting research, seminar, and case studies; designing and conducting short course programs; administering test and semester exams; marking tests and semester exams; carrying out consultancy and community service; supervising student projects; preparing teaching manuals and writing papers for publication. These duties do not require teaching staff to spare their entire day at workstations. Sometimes, they can perform those duties outside their work environment where biometric systems are unavailable. Sometimes given the teaching syllabus, academic staff can make arrangements and teach on weekend days or even at very late hours, bearing in mind that what they want to achieve is not limited to regular working hours.

Section F.1 office hours of Tanzania's Standing Order for Public Service of 2009 state that (1) government offices working in the public sectors throughout the country shall be open for public business during the following hours. Except on Saturdays, Sundays, and public holidays, all weekdays from 7.30 a.m. to 3.30 p.m. Subsection two of the same document's Attendance Registers section states that (1) supervising officers and human resource officers should ensure that public servants arrive on time and do not leave their offices before the official closing time. (2) The organization must keep attendance records in the format specified to track the time when public employees report for duty. The register must be signed by staff members of all levels working in offices, local government offices, government agencies, parastatal organizations, hospitals, and so force, but not by those who are required to work in "shifts" (such as nursing staff and other hospital staff who work on shift) or whose duties require them to spend a significant amount of time outdoors since they are not required to report to an office, institution, and so force on each work day (The Tanzania standing order for public service 2009).

Contrary to this section, those who work on a shift basis or in the field and are required to sign in and out between 7:30 a.m. and 9:30 a.m. will violate the established laws as stated in section F.1 subsection (1) and (2) of the Tanzania government's standing order; however, the laws allow administration officials to determine how their attendance will be monitored. Academicians may have their teaching session at 10:30 p.m. or late hours at 17:30; those who sign at 10:30 a.m. will be considered latecomers. Teaching staff in high learning institutions, even in universities their duties involve a significant part of their time being spent on preparing learning resources for tutorial exercises performed outdoors in different libraries and even other high learning institutions and duty,

in that case, they do not necessarily report to office at 7:30 a.m. and leave 9:30 p.m. as stated in the public service standing order and public service act of 2009 and 2019 respectively. The nature of employee work depends on when and how they will discharge their responsibilities that do not necessarily report to work as contended in section F.1 subsection (1) of public employee standing order of 2009.

Several studies have reported negative consequences of employee workplace attendance, particularly in organisation and management, expenses, and performance. A study in Sub-Sahara Africa by Harber (2017) revealed that an increase in employees' absenteeism to five percent could negatively affect the pre-determined operational outcome of an organisation. A study in Kenya by Muasya, (2016) concluded that the escalating teachers' absenteeism resulted in some teachers' failure to cover syllabi and affected pupils' performance. A similar observation was made by Guidorzi and Karamperidou, (2020). They argue that employee attendance is among the most troubling obstacles to attaining universal development in developing countries. It leads to several negative impacts on service delivery and a severe waste of employer funds.

Various measures have been put in place to mitigate the problem of employees' attendance at work. Traditionally, signing attendance register books was the primary technique used by employers for keeping employee attendance records and controlling their work attendance as stipulated in the standing order (URT Public Service act of 2019 and public service standing order of 2009). The attendance register was essential for managing and monitoring employees who practiced late arrivals, early departures, or total absenteeism at work, even those who were good at providing excuses now and then. Moreover, attendance register could provide evidence to testify against employees once he or she is charged with attendance-related misconduct. Once proven guilty, an employee was likely to be warned, and his or her salary could be stopped, deducted, or even terminated. Such a document was also used to determine employees with outstanding performance and who might be honored with financial incentives, among other things (Bower, 2001). However, as Mgonja, (2007) and Masiaga, (2017) contended, poor monitoring and forgeries of attendance records in traditional and analogical registers was a shared experience amongst employees that had

implications for employees, service beneficiaries, and employers as well.

The invention of ICT technology, particularly the biometric system, has opened a window for novel opportunities to control employees' workplace attendance. For example, Evans, (2021) noted that digital technology works by either supplementing traditional methods of managing employees' attendance or replacing them with new digitised techniques or devices. Cameras and Biometric machines are used to monitor employees' attendance at work. The application of biometric system is perceived to bring more chaos to some employees when forced to sign in and out at normal working hours, especially for those who work on shift bases and whose job is outdoor or those whose work is not necessarily required to report to work regularly from 7:30 a.m. and leave work at 9:30 p.m. Therefore, this proposed study examined the applicability of Biometric System On Teaching Staff Attendance Management at high learning institutions in Tanzania using Local Government Training Institute (LGTI) as the case study.

MATERIALS AND METHODS

This study aimed to examine the perceived view, attitudes, and opinions on the applicability of Biometric System on Teaching Staff Attendance Management in higher learning institutions in Tanzania. Local government training institute represents other higher-learning institutes as it is among many higher-learning institutions whose work is almost similar and applies the same caliber of job description and attendance.

The study was underpinned by the interpretivist paradigm, which believes that reality is socially constructed and seeks to understand reality from an individual respondent's point of view. It is also believed that a single phenomenon can have multiple realities, experiences, views, perceptions, meanings, opinions, attitudes, and interpretations. The interpretivist paradigm also believes that studying a phenomenon within a unit of analysis provides the voice of respondents, which can not be directly observed or by measuring the extent or counting but by subjective interpretation of individuals. The paradigm enabled the researcher to examine academic staff underlying multiples realities, perceptions, opinions, views, and interpretations of the applicability of biometric system on academic staff attendance management if it is moral to optimise its uses as it is for non-

academic staff whose duties require them to attend to work at 7:30 a.m. and leave work at 9:30 p.m.

The study employs a qualitative approach to study a small sample of twenty-eighty sample size compared to a mixed or quantitative approach that requires a large sample size. A small sample size under this approach enables the study to explore participants' subjective views, experiences, opinions, and interpretations of the applicability of biometric systems on employee attendance management. Therefore, the approach enabled the study to have a broader and deeper description of the rational applicability of biometric systems on academic staff attendance management at higher-learning institutions using local government training institutes as a case study. The study embedded two designs, exploratory and case study design to have exploratory case study design. The main assumption of using the embedded two designs is that first, the researcher employed a case study design to study a small number of participants (Yin, 2018), which requires a time-consuming data collection method of key informant interviews. Twenty-eight participants were used to having a deeper investigation to reveal their experiences, perceptions, opinions, views, and interpretations toward the rational application of biometric system on academic staff attendance management in higher-learning institutions in Tanzania. Exploratory study designs were also employed because the issue under study was not clearly defined by the previous study (Yin, 2018). Most of the studies looked at the challenges of implementing biometric systems and if biometric systems are a panacea for workplace absenteeism. Another study focused on the effect of Human Resource Interventions based on biometric attendance system records to improve employee absenteeism rates. Hence there is a lack of in-depth information needed in the context of applicability of biometric systems for academic staff attendance management in higher-learning institutions in Tanzania. Therefore, exploratory design enabled the study to examine academic staff's personal voice on the subject matter to have

a thicker description and deeper understanding of the applicability of biometric systems on academic staff attendance management in higher-learning institutions. The study was conducted at Dodoma, Tanzania's local government training institute. The government established the institute in 1994 by an Act of Parliament, Act no, 26 of 1994. Currently it has tentatively 109 teaching staff and 121 non-teaching staff. The academic wing has (five) departments: Community Development, Local Government, Human Resources, Accounting, and Finance. The researcher selected LGTI because it is one of the higher-learning institutions that has invested in installing and using a biometric system for managing employee attendance since 2019. Secondly, it is the only higher-learning institution in which even academic staff are required to report to work at 7:30 a.m.; however, the leaving time is not well defined as some of them have to remain at work when other non-academic staff leaves the workstation at 9:30 p.m.

For confidentiality and anonymity, all the departments were not given names. All heads of department, including the HR department, were purposefully selected to be involved in this study because they know well about their subordinates' attendance habits. Few selected academic staff were also conveniently selected to participate in the study. Conveniently, academic staff was selected because they qualified as academic staff to participate in the study, and no other added criteria were used to select them. Therefore the study included a total of nine (six) heads of department and a total of fifteen (15) academic staff. According to Creswell, J. W. & Creswell, J. D, (2018), the sample size depends on the purpose of the study, available time and resources, and manageability of the data collection tools. Moreover, according to Creswell, J. W, (2013). qualitative researchers decide whom or what they want to study or cases needed as long as they are relevant to the study and based on the saturation point attained. Thus 28 participants were ideal for the study because they enabled the researcher to meet the purpose of the study.

Table 1 summary of study participants

S/N	Managerial department	DRAC	DHR	DPFA	HRO		Total	
1.		one	one	one	one		One	**Total**
2.	Academic staff head of department and	**A**	**B**	**C**	**D**	**E**	**F**	
3.	HR department	one	one	one	one	one	One	Six
4.	Teaching staff	Three	Three	Three	Three	Three		Fifteen
	Grand total							**Thirty-one**

Source: Researcher's Field Data (2023)

METHOD OF DATA COLLECTION

Data for this study were collected from both primary and secondary sources. Primary data was collected from twenty-eight participants. The key informants and in-depth Interviews were the most used method for data collection from primary sources. Secondary data were collected through documentary review from heads of department and personnel management office, particularly on HR memos and documented disciplinary cases regarding academic staff absenteeism misconduct. The methods were interactive, whereby the researcher had a face-to-face encounter with all heads of department and academic staff, which enabled the researcher to capture academic staff opinions, attitudes, feelings, views, perceptions, and interpretations in order to have a thick description and deeper understanding of the applicability of biometric system on academic staff attendance management in high learning institution in Tanzania. The researcher was the main tool for data collection process. Research ethics guided the data collection process whereby the researcher asked questions to answer the research objective (Yin, 2013). Data collection involved heterogeneous participation because participants were interviewed individually and from different departments. The saturation point (Hennink & Bailey, 2011) was attained after interviewing the sixth academic staff; however, the researcher continued to other academic staff to gather underlying information from the diverse participants. The study's trustworthiness was ensured through dependability, credibility, confirmability, and transferability.

In this study, thematic analysis was adopted to analyse qualitative data. Thematic analysis was used to identify, analyse, interpret, and report every day of data collection through key informant interviews and in-depth interviews. Head of department and HR documents were also subjected to content analysis. Data were transcribed and categorised into themes for interpretation. The searcher chooses thematic analysis because it is a qualitative data analysis and uses in summarising subjective collected data, which helps the production of a rational report (Nowell*, et al*., 2017)

RESULTS AND DISCUSSION

This part of manuscript presents the findings and discussion related to the topic under investigation. This study aimed to examine the applicability of biometric system on academic staff attendance management using the local government training institute (LGTI) as a case study.

The study identified several axial and open codes from respondents.

Table 2: Open and axial codes

No	Usability		Rationality		Readiness
1 2 3 4 5	-Control employee attendance -Staff availability -User friendly -Not necessary, and we do not always sigh -We signed because they were installed	1 2 3 4 5	-More accurate compared to the old method -Not useful to control the quality of work -Stable for non-accademic staff -Rational if were installed in classes -How many forms are to be used to monitor attendance -Irrational because sometimes we have to stay beyond normal working hours	1 2	-Forced and Not ready to sign in and out -Threatened by the ups and HR office to be punished if we do not sign in and out at normal working hours

The study highlights that using biometric systems directly impacts staff availability, particularly for non-teaching staff compared to academic staff. Being paperless, it is environmentally friendly and relatively resistant to tempering, which makes it reliable and user-friendly. It is an effective way to monitor and record staff attendance and ensures discipline and punctuality. However, it was observed that for academic staff, biometric applicability was not seriously considered because some were signing and some were not signing regularly as they did not see if it was mandatory. Some academic staff insisted that they were signing because they found them installed, told by the Human resource manager to sign, and because others are signing. What seemed important to them was to sign in the class journal to justify their class attendance as they started that even their extra time teaching allowance is not justified by the biometric justifications; instead, management uses attendance journal to justify academicians' extra teaching payment. Attendance is directly related to productivity and cost for the organisation; however, it was observed not reliable for controlling the quality of work. Apart from reducing the absenteeism rate, it saves time for human resource functions. It can be used as a control mechanism for absence if it is effectively linked to the compensation function and leave record. One of the respondents from the head of department interviewed said that

"… the introduction of Biometric fingerprint attendance register system in Tanzania's public sectors was not an accidentally consequence; it was a timing of technological advancement required to deal with absenteeism problem in the workplace. The system was adopted and introduced to improve employee attendance and workplace attendance management as one of the HR functions in Tanzania. As it is used, it is a technology that is accurate in employee identification and improving employee attendance; however, when and how to use it for some of the disciplines is yet a question to be known…."

The finding above was similar to the comment made by Bolle and Pankanti, (2014). The system

makes a perfect identification of individual characteristics to identify an individual employee. It is true that the biometric fingerprint attendance register system brought an evolution in HR attendance management. It enhances and vanishes complaints from the workers that HR managers sometimes used the old technology to scandalise employee attendance by sometimes drawing a line even before agreeable time of attending to work. One key informant had this comment to say;

"… biometric system is a tool of transparency regarding any disciplinary problem associated with absenteeism in Tanzania. Individual employees can not forge his/her attendance because there is no possibility of signing on behalf of their friends. When proven guilty, employee does not complain of being mistreated; however, I do not think it may be used for academicians because academicians are not in favour of the use of a biometric system because class representatives on behalf of their fellow class members monitor academicians' attendance in their respective classes where they have tutorial, seminar, and lectures and sometimes they may make preparation for their tutorial and lecture outside the compass ….

The level of readiness is shallow in Tanzania's higher learning institutions regarding the use of Biometric attendance system. It may be so because the introduction of Biometric attendance system has been perceived to be applicable to public employees who work regularly and report to work from 7:30 a.m. to 9:30 p.m. Those who work on shift basis or have field work it was a mandate of admnistrative officials to plan on how they will attend their duties. Some public higher learning institutions do not use this system for academic staff, such as ISW, UDSM, DUCE, NIT, TIA, and IFM. It was observed that at (LGTI) both non-academic staff and academic staff are using biometric system uniformly to sign in and out at 7:30 a.m. than planning for a better way of using the system for academic staff. Academicians responded that they were signing in and out because they were informed to sign in and out by the HR manager though they do not think it was mandatory compared to non-academic staff given that they were signing in to class attendance

journal. Most of the interviewed academicians lamented that...

....We are signing in because we were told to sign in and out, but sometimes we don't, we do not think it is mandatory; however, I know if management decides to use biometrics for checking in and out movement of academic staff will take time to prove that we attend to work as required ...."

Most public institutions are using biometric data substantially to control employee attendance and idle time. Analysis shows that the application of biometric system to academic staff in higher learning institutions should not be as to those non-academic staff whose work is as per the Employment and Labour Relation Act of 2003 and the Standing Order for public service of 2009 that requires employees to report to work at 7:30 a.m. up to 9:30 p.m. and even when they leave the work they have to sigh out at any point. Therefore, since academic staff's responsibility differs from those of non-academic staff in the same institution, they have to be left flexible, given full autonomy, and controlled by other means such as class journals or attendance that will be signed when an academic staff has a tutorial, seminar, or lecture. For non-academic staff, the biometric system may motivate them to perform their work on time, enter on time in the office, not delaying the tiffin time, and leave the office after office hours.

Bader & Sanker, (2019) had a different observation when they argued that such a system is negatively a motivational tool because employees will get feared and will come in time and leave the organisation in time, but their contribution, if measured may not be tangible since employee motivation to work, is not amplified by the attendance. Employee behaviour is not controlled by external factors such as using biometric systems. Employees remaining in the organisation for a long time does not guarantee a positive contribution to organisation's operational performance.

It was observed that no significant changes in the availability of academic staff and their performance because the way was signing in and out during traditional modal is similar even after the installation of biometric machine at the main entrance. Attendance signing register provided to class representatives was more effective for monitoring academic staff workplace attendance. This demonstrates that the installed biometric systems cannot regulate academic staff adhering to

their teaching schedule. Academic staff observed that the HR manager and other administration officials required them to check in and out of their workspaces on the same times as non-academic staff, despite the fact that they sometimes had to work until late hours when others left at 9:30 p.m.

CONCLUSION AND RECOMMENDATION

The goal of the study serves as the foundation for the conclusion. The study discovered that using a biometric system is crucial for controlling employee attendance in Tanzania workplaces because it assures efficient use of workers' time and effort for the company's functioning. Although certain organisations in Tanzania have adopted and deployed biometric systems, there have been some complaints from operational cadres, such as academic staff in higher learning institutions in Tanzania. In the study area, academic staff insisted that provided that they attend classes, signing in for classes is remarkably enough instead of being influenced to sign in and out on biometric machines installed at administration blocks. In such instances, some lamented that they are signing because others are doing so, but it does not make sense as they do not even use the machine when claiming extra teaching workload. Administrative personnel should re-think a better approach to managing academic staff attendance by recognising the academic staff's work schedules, as outlined in the Tanzanian standing order for public service of 2009.

It was observed that academic staff was not satisfied with the use of biometric systems that are institutionalised at Local Government training institutes. The signing mechanisms are boring because teaching staff must register on an installed biometric system at the main entrance with other non-academic staff. In addition, they have to sign attendance provided to class representatives, which were used in calculating extra workload. It was also observed that, even when their session goes beyond regular working hours, there is no point will be compensated based on their signing on biometric system as to those non-academic staff because their compensation for extra teaching workload depends on the defined workload, that is ten hours a week. The study concluded that there should be a different approach to managing academic staff attendance. Academicians should use signing attendance provided to class representatives, or biometric machines should be

Publisher: SARC Publisher

installed in classes and crosschecked with teaching timetables where academic staff spares their time with service users. Academicians should be given self-autonomy to control how they provide their work, but supervisors ensure that they work within established laws, regulations, policies, and standards. Human resource managers should examine a method of managing academicians' attendance that ensures effectiveness in operational performance. When organizations upgrade their employee attendance management systems, operational performance should be considered. Administrative staff in higher learning institutions must make an effort to consciously understand the working nature of academic staff in order to distinguish between academicians' and non-academic staff's attendance patterns.

REFERENCES

1. Ajzen, I. "The theory of planned behavior. Organizational Behavior and Human Decision Processes." 50.2 (1991): 179–211.
2. Abdulsalam, S. O., Babatunde, R. S., Shittu, T. M. & Oloyede, M. O. "Development of fingerprint biometric attendance system for non-academic staff in a tertiary institution." *Development* 5.2 (2014):62-70.
3. Baker, T. "Restoring Teacher Dignity." *Learners Outcomes, TDMS, and the 2010/11 Budget, Dar es Salaam* 1 (2010). https://www.scri bd.com/.../PETS-Education-Tanzania.
4. Bader, M. A. & Sankar, J. P. "Attendance Management and Employee Performance among Selected Commercial Banks in the Kingdom of Bahrain." *International Journal of Economics, Commerce and Management* (2019):760-773.
5. Battesse, W. T. "Sustainability: a new and complex challenge for crisis managers." *International Journal of Sustainable Strategic Management* 2.1 (2005): 4-16.
6. Betweli, O. K. "Curbing Teacher Misconduct in Public Primary Schools in Sumbawanga Municipal and Rural Districts, Tanzania: Headteachers' strategies and Challenges." *European Journal of Research and Reflection in Educational Sciences* 8.4 (2020):22-40.
7. Betweli, O. "The Nature of Teacher Professional Misconduct in Tanzania Public Primary Schools: The Case of Sumbawanga Municipality and Rural Districts."

8. *International Journal of Education* 5.1 (2013):81-93.
8. Bowers, T. "Teacher Absenteeism and Ill Health Retirement: A review." *Cambridge Journal of Education* 31.2 (2001): 135–157.
9. Carlsson, B. & Jacobsson, S. "What makes the automation industry strategic?." *Economics of Innovation and New Technology* 1 (1991): 257-269.
10. Coughlan, A.C. "Employee Absenteeism: A Guide to Managing Absence." *IBEC Research Unit* 7 (2011).
11. Crowell, K. "Importance of Biometric Technology." *Carnegie Mellon University* (2002).
12. Creswell, J. W. & Creswell, J. D. "Research design: qualitative, quantitative, and mixed approaches." (5th ed). *SAGE Publications Inc* (2018).
13. Creswell, J. W. "Research Design: Qualitative, Quantitative, and Mixed Methods Approaches." *London: Sage Publications* (2013).
14. De Corte, J., Roose, R., Bradt, L. & Roets, G. "Service Users with Experience of Poverty as Institutional Entrepreneurs in Public Services in Belgium: An Institutional Theory Perspective on Policy Implementation." *Social policy & administration* (2017).
15. Dempsey, R.C., McAlaney, J. & Bewick, B.M. "A Critical Appraisal of the Social Norms Approach as an Interventional Strategy for Health-Related Behavior and Attitude Change." *Front. Psychology* 9 (2018): 1-16.
16. DiMaggio, P. & Powell, W. W. "The Iron Cage Revisited: Collective Rationality and Institutional Isomorphism in Organizational Fields." *American Sociological Review* 48.2 (1983): 147-160.
17. Duflo, E. & Hanna, R. "Monitoring Works: Getting Teachers to Come to school." *National Bureau of Economic Research. NBER Working Paper No. 11880* (2005).
18. Evans, D. K. "Education Technology for Effective Teachers." *World Bank, Washington, DC. World Bank*. https://openknowledge. worldbank.org/h andle/ (2021).
19. Garaba, A. M. "The Impacts of Teachers' Absenteeism on Students' Academic Achievements: A Case of Selected Secondary Schools in Tabora Municipality, Tanzania." *International Journal of Innovative Research and Advanced Studies* 8.4 (2021):166-183.

20. Guidorzi, B. and and Karamperidou, D. "Time to Teach – Teacher attendance and time on task in primary schools in Rwanda." *UNICEF* (2020).

21. Jensen, T. B., Kjærgaard, A. & Svejvig, P. "Using Institutional Theory with Sensemaking Theory: a Case Study of Information System Implementation in Healthcare." *Journal of Information Technology* 24.4 (2009): 343-353.

22. Jonah, A. "Fingerprint in Management attendance." *Maxvin Pub. India* (1995).

23. Harber, C. "Human and Material Resources: Finance, Teachers, and Physical Resources. In: Schooling in Sub-Saharan Africa." *Cham: Palgrave Macmillan* (2017).

24. Hennink, M., Hutter, I. & Bailey, A. "Qualitative Research Methods." *Sage* (2011).

25. Korajczyk, R. W. "The Human Relations Approach and Its Critics." *Master's Theses. Loyola University Chicago*. https://ecommons. luc.edu/luc_theses /1613 (1961).

26. Khamis, S. "Teachers Absenteeism and Teacher Accountability." *USAID Education Strategy Development, Columbia University: New York* (2009).

27. hptts://www.ellprocus.com.edu/different-tupses-biometric-sensors/system

28. Locke, E. A. "The Ideas of Frederick W. Taylor: An Evaluation." *Academy of Management Review* 7.1 (1982):14–24.

29. Masiaga, A. S. "Contribution of Heads of Schools in Curbing Teachers' Professional Misconduct In Public Secondary Schools in Kinondoni Municipality, Tanzania." *Doctoral dissertation, The Open University of Tanzania* (2017).

30. Meyer, J. W. & Rowan, B. "Institutionalized Organizations: Formal Structure as Myth and Ceremony." *American Journal of Sociology* 83.2 (1977):340-363.

31. Tyagi, M., Tyagi, P.K., Daga, A. and Gupta, S.K. "Effect of HR Intervention Based on biometric Attendance System Record to Improve Employee Absenteeism." *Journal of Academic of Hospital Administration* 31.1|32.2 (2019-2020).

32. Mgonja, M. G. "Responding to workplace absenteeism in Tanzania: The case study of public and private schools in Ilala Municipality and Mkuranga District." *International Journal of Educational Leadership and Management* 5.1 (2017): 85-108.

33. Mgonja, M.G. and Makulilo, A.B. "Are Biometric Attendance Registers a Panacea for Workplace Absenteeism in Tanzania? A Lesson from Public Secondary School in Nyamagana Municipality." *Tanzania Journal of Sociology* 8.1 (2022):77 - 104.

34. Michael, G. M. and Alexander, B. M. "Are Biometric Attendance Registers a Panacea for Workplace Absenteeism in Tanzania? A Lesson from Public Secondary Schools in Nyamagana Municipality." *Tanzania Journal of Sociology* 8.1 (2022):77 - 104

35. Muasya, J. "Effects of teacher absenteeism on pupils' performance in public and private primary schools in kitui central sub-county, Kenya." *Doctoral dissertation, University of Nairobi* (2016).

36. Mwighusa, D.N. "Transforming Voters Registration Paradigm in Tanzania, The shift from OMR to BVR." *International Journal of Science and Research (IJSR), Dar es Salaam, Tanzania* 4.8 (2015).

37. Nombo, N. M., Nyangarika, A. & Mwesiga, G. N. "Factors Leading to Absenteeism of Teachers in Public Secondary Schools in Tandahimba District." *IJARIIE* 6.4 (2020):180-192.

38. Nowell, L.S., Norris, J.M., White, D.E. and Moules, N.J. "Thematic Analysis: Striving to Meet the Trustworthiness Criteria." *International Journal of Qualitative Methods* 16 (2017): 1-13.

39. Ononiwu, G.C. & Okorafor, G.N. "Radio frequency identification-based attendance system with automatic door unit." *Academic Research International* 2.2 (2012).

40. Powell, W. W. & Colyvas, J. A. "Microfoundations of Institutional Theory." *The Sage Handbook of Organizational Institutionalism* 276 (2008) 298.

41. Powell, W. W. & DiMaggio, P. J. "The New Institutionalism in Organizational Analysis." (1991).

42. Robbins, S.P. "Personnel: The Management of Human Resources." *Englewood Cliffs: Prentice-Hall, Inc* (1982).

43. Ragowsky, A. & Somers, T. M. "Enterprise Resource Planning." (2002):11-15.

44. Sharma, A.K, Raghuwanshi, A. and Sharma, V.K. "Biometric System- Review." *International Journal of Computer Science and Information Technologies* 6.2 (2015): 4616-4619.

45. Shields, J., Brown, M., Kaine, S., Dolle-Samuel, C., North-Samardzic, A., McLean, P.

& Plimmer, G. "Managing employee performance & reward: Concepts, practices, strategies." *Cambridge: Cambridge University Press* (2015).

46. Shehu, V. & Dika, A. "Using real-time computer vision algorithms in automatic attendance management systems." *Proceedings of the ITI 2010 32nd Int. Conf. On Information Technology Interfaces, June 21-24, 2010, Cavtat, Croatia* (2011).

47. Sniehotta, F. F., Presseau, J. & Araújo-Soares, V. "Time to retire the theory of planned behaviour." *Health psychology review* 8.1 (2014):1-7.

48. Taylor, F.W. "The Principles of Scientific Management." *New York: harper and Brother* (1911).

49. The Tanzania Standing Order for the Public Service, Pursuant to S.35 (5) of the Public Service Act, Cap.298. 3.5 (2009): 62–80.

50. Vroom, V. "Work and Motivation." *New York: Johns Wiley and Sons* (1964).

51. World Bank. "Service Delivery Indicators: Pilot in Education and Health Care in Africa." African Economic Research Consortium.microdata.world bank. org/index.php/catalog/.../2574, (2011).

52. Wolf, P. "Introducing Biometric Technology in Elections." *IDEA-Sweden* (2017).

53. Yin, R. K. "Case Study Research: Design and Methods." *London: Sage Publications* (2013).

54. Yin, R. K. "Case Study Research: Design and Methods." *London: SagePublications* (2018).

55. Zikanga, D. K., Anumaka, B. I., Tamale, M. B. & Mugizi, W. "Remuneration and Job Performance of Teachers in Government Aided Secondary Schools in Western Uganda." *Interdisciplinary Journal of Education Research* 3.2 (2021): 10-22.

Cite this article as:
Pastory, K.M., Muhoza, J.G. and Ndunguru, G. "Biometric System Applicability on Teaching Staffs Attendance Management in Higher Learning Institutions in Tanzania." *Sarcouncil Journal of Public Administration and Management* 2.2 (2023): pp 13-27.