



Research Article

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DigiTech use in enhancing effective teaching of Health and Physical Education

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Abstract

The 21st Century's new dimension of digital technology usage in education has been unanimously welcomed worldwide. Higher education and tertiary institutions were awakened by the outbreak of the never experienced coronavirus disease (COVID-19) to embrace e-learning. Southern Africa institutions were not spared from this pandemic which had escalating deaths on daily basis causing Heads of States to announce immediate closure of learning institutions among others to curb the spread of COVID-19. Tertiary institutions implemented teaching and learning as a deficit model. Educators and learners had to go digital learning by embracing, ICT, E-learning, M-learning through the use of Learning Management Systems which include Moodle, Sakai, Google classroom, and such related platforms. In response, Health, Physical Education and Sport educators were not spared to embrace the necessity of Digital Technology usage in online teaching and learning. This paper aims at discussing DigiTech in HPE, its benefits, types of DigiTech, E-learning and blended e-learning, M-learning. For the upcoming digital generation, some useful DigiTech platforms in HPE have been generated to enormously improve the conducive digital teaching and learning environment.

Keywords: Digital Technology, E-Learning, M-Learning, Information Communication Technology (ICT), Health and Physical Education (HPE).

INTRODUCTION

Digital Technology (DigiTech) play a pivotal role in the lives of generations in this 21st Century. Society is rapidly evolving; hence, education becomes a key to all these changes met in our daily lives. Developing countries are not left out, despite that they are slow to embrace and apply the development in their curriculum due to economic, financial and knowledge gap compared to developed countries. DigiTech occupies a prominent place in the continuous, dynamic and life-long teaching-learning process^[1]. DigiTech can be in forms of; world wide web content, internet applications, electronic hardware systems, ICT, computers, computer software and audio-visual devices to mention a few. These devices are widespread and their use had been considered as learning enhancement tools^[2], creating an impact on what, how, where, and why individuals learn^[3]. DigiTech has a rapid, effortless and cost-effective connection among individuals. In line with these societal trends, the need for DigiTech effective integration in Health and Physical Education (HPE) has been necessitated to improve teaching methodology and increase the teaching-learning process in recent years.

Undoubtedly, the power of DigiTech cannot be ignored as we are living in a progressively digitised world^[4]. The COVID-19 pandemic has directly influenced and forced governments, learning institutions, social relations and various spaces to rely mainly on DigiTech^[5]. The fundamental nature of education in the 21st century embraces the Fourth Industrial Revolution (4IR) which embraces reliable, fast, efficient technology compared to traditional education. It is know that in most developing countries DigiTech use in education by teachers had not been fully embraced and given the welcome it deserved^[4] and, thus, it has been argued that its use require teachers to adopt new pedagogies^[6]. Digital Technology enables individuals to work in collaboration towards enhancing and improving skills to achieve common goals.

In adopting the 2030 Agenda for Sustainable Development, the Sustainable Development Goals (SDGs), Goal 4 aims at ensuring access of quality education and life-long opportunities by all people^[7]. This goal prioritises quality; from child enrolment, professional teaching and learning, availability of well-trained teachers, the school environment inclusive of infrastructure and other related inequalities which learners may experience in an educational set up. In 2016, an estimated 85 percent of primary school teachers

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worldwide were trained; the proportion was only 71 percent for Southern Asia and 61 percent for sub-Saharan Africa, hence more trained teachers are needed for quality education in Africa [7]. Worldwide, education systems aim to develop a digital competency learner at any level, whose competencies are required in the 21st century labour market. When education focuses on students' learning, the learners should be critical thinkers who can solve problems they may face in their daily lives. UNESCO (2009) contends integrating DigiTech in school systems is critical to equip learners for the 21st century learning and working environments.

DigiTech implementation has a number of challenges such as cost of facilities and equipment, lack of technology implementation in the classroom is inadequate professional development and training [8], educators' attitudes and beliefs, confidence in skills and knowledge and resistance to technology [9] among others. Without the necessary resources to provide continuous technological training, learning institutions will continue to cite inadequate professional development as a major barrier to technology implementation [10].

In the southern Africa, Eswatini (formerly Swaziland) developed her HPE curriculum with great consideration of DigiTech and 21st century labour market, though is at infancy stage [11]. During the early years of school, learners develop curiosity through observing and manipulating DigiTech of various forms. HPE students at this level learning mostly by coloring, sketching and drawing athletic pictures, telling sport stories from videos and movies, pictures, computers and class in-built television sets. In the middle primary class, with integration of Information and Communication Technology (ICT) lessons, students are introduced to use internet connecting to platforms like youtube channels for sports to improve their understanding of HPE and various sporting codes games. Progressively, these students enhance their skills and abilities of using DigiTech when carrying their daily tasks and operations.

In higher education and tertiary institutions, DigiTech plays an imperative role in carrying out assignments, research projects, research articles, reports, searching and gaining access to information on books, journals, magazines and online reading material through e-journals and e-books. Platforms such as Massive Open Online Courses (MOOCs) and others are used in university education where DigiTech is considered as the main tool and form of the teaching and learning process catalyst which bring transformational changes across various fields [12]. Effective HPE teachers, lecturers and professors in sports related fields effectively use DigiTech efficiently to contribute to their students through adequate preparation for lesson plans, class lectures, assignments, practical, tests, feedback and research.

Unlike the previous specific and continental disasters or pandemics like Ebola, the current Covid-19 pandemic has brought great influence in changing traditional nature of instruction. Understanding DigiTech in teaching-learning and appreciating its existence through subject integration in schools has long term benefits of developing a complete responsible generation. To achieve this important aspect of education, exploring the relation of DigiTech to teaching, learning and context can be achieved through governmental policies and national curricula. Problems and challenges brought by DigiTech to both teachers and learners are undisputable [13]. There are a number of overwhelming benefits which can curb challenges and hindrances along the education pathway. Wide tasks and projects and scheduling in HPE can be easily done through the use of various DigiTech forms. The strengths of using DigiTech are not limited to time saving and quality of documentation enhancement, innovation and critical thinking, but they include networking among educational sport institutions and its members and further reduce operational costs [14, 15].

Benefits of Digital Technology in Health and Physical Education

DigiTech allows students to increase rational decision making, improve information generation, communication skills required for efficient goal achievement in daily life [14, 15, 16]. Innovative didactic models bridge the gaps caused by political, socio-economic and cultural differences by create an information-rich society ready for development [17]. Critical thinking and problem solving skills required in this 4IR can be developed and improved in HPE through exercise science experiments, passive and active video game analysis [15], online laboratories and real-time assessments [13].

There is no doubt on how DigiTech has facilitated international collaborations. Communications through online and face-to-face facilitation using iPods, mobile phones and computer devices are useful and beneficial to sports event organisers, coaches, who have the keenness to communicate educating the sports families about current trends of events. In HPE, students can gain knowledge of solving the same problems they encounter in different ways as given by people with various backgrounds. Online and distance learning, open online live and recorded educational resources offered on various learning platforms have enabled learners to work independently at various levels [14]. DigiTech usage enables learners of various capabilities to use different platforms more independently without or with less dependence on teachers/lecturers, supervisors, managers and other individuals. Free Online learning platforms such as Diploma in Football Medicine and World Anti-doping Agency courses were generated to equip students with specific and sport related knowledge and collaboration abilities with the high ranked professionals and individuals internationally in both theory and practical base [14].

DigiTech which supports assessment tools enable development and monitoring of specific skills in a comprehensive manner which is impossible to do, without technology usage [9, 12, 13, 14]. Educators at different levels in academic institutions are privy to use various assessment forms like; real time formative and skills based assessments as methods of monitoring acquired knowledge, effective feedback and inclusion of adjustments in their teaching methods in accordance with the needs of individuals. If used efficiently and effectively, DigiTech can be competent and valuable in bringing improvements in the teaching and learning process [13, 18]. HPE educators can use gadgets like, white boards, projectors, online learning platforms to conduct tutorial and remedial work which may decrease the rate of absenteeism, increase enrolment and understanding of concepts by both visual and audio learners.

In HPE and sport, an athlete's performance can be monitored by teachers, coaches or athletic trainers without direct supervision. The DigiTech training prerequisite is of great importance in the contribution of optimal performance of duties by academic instructors, coaches' athletic trainers and other professionals in sport. Through digital technology, HPE learners can easily acquire a better understanding of the subject; topics covered and make self-evaluation and assessment on the progression of their work. Unlike the traditional teaching, DigiTech students develop a better way of understanding problem solving methods, innovation methods to penetrate the sport market structures and associated global connections. Therefore, use of DigiTech from primary school level to higher and tertiary educational institutions make learners to work independently with little guidance, making the supervisor's to monitor arising problems, feedback and solution.

Blended E-learning in Health and Physical Education

Blended e-learning presents an opportunity for HPE teaching and learning more interactive between teachers/lecturers, students

through the use of electronically mediated media and information and communication technologies (ICT) as they engage with among themselves and with learning materials [1, 13]. This platform includes all forms of electronically and online educational technology which may be used in learning and teaching by accessing information on designated websites or through an internet search. E-learning includes a wide range of media tools but not limited to those which deliver text, animation, audio, images, video streaming, among others. It also includes web-based learning, technology applications and processes, intranet/extranet and computer-based learning [1].

DigiTech enable students to acquire various skills through online learning. Online Learning requires HPE students to be connected to the internet and learning it does not require a classroom. The benefits of asynchronous learning incorporate flexibility, pacing, affordability, self-paced, among others. E-learning is a double-ended learning platform which can take form of flexible distance learning and can be linked with face-to-face teaching especially in blended learning. Interaction become more focused and improved among learners and between learners and teachers through use of platforms to connect such as organizational and individualized emails, zoom, adobe connect, webinar, dartfish and social media among others which may allow computer mediated panels and conferencing.

Interactive Mobile Learning is an e-learning platform which uses mobile devices like iPods, smart phones and tablets. The Covid-19 pandemic has revealed to authenticate literature on use of mobile technologies for distance learning [19] which vast majority of the higher education students and lectures in most developing countries were not openly supporting rather opting to use of desktops and personal computers to do their work [20]. Mobile learning activities can be designed to make a student use immediate context and surroundings by instant messages, audio and verbal conversations on Facebook, LinkedIn, Youtube, Twitter and Telegram. Smart phones also make learners access their health; physical activity pattern during leisure and recreational times. Importantly, these interactive mobile devices are effective means of daily personal and public business gadgets in making payments of sport affiliations fees, sports equipment and online bookings for sporting events. For biomechanical analysis, mobile phones can work as cameras for athletic pictures capturing and videos which can be transferred to other gadgets for analysis.

Use of e-learning content through an e-learning process has become an answer during 21st century particularly, the Covid-19 pandemic where there are complicated modern societal wide gaps, economic superiority of some groups or classes with exploding populations. Teachers can easily package e-content by setting the virtual classroom situation such as Google classroom, Webex and Microsoft Teams using e-content which accommodate less time and financial expenditure in other costs in the teaching and learning process.

M- learning in Health and Physical Education

Multimedia learning is also called M-learning referring to auditory/verbal and visual/pictorial presentations of teaching and learning material [21]. It incorporates media and electronic content that use various media content forms [13], for example combinations of; text, audio, still images, animation, video and interactivity content. The strength of multi-media content in human mind and senses cannot be under-estimated. Up and downloads to watch, play or listen off line shows how we develop deep feelings and emotions which trigger mood creating explicit visual vista, participants, and background sound [1]. HPE students and teachers/lecturers need to understand and use multi-media. Examples of practices they can engage in are maintaining websites and search engines, participating in online social networking spaces, emailing and facilitating/participating in online class discussions.

Useful DigiTech platforms in Health and Physical Education

Below are some selected types of DigiTech useful in achieving the objectives, demands in the field of HPE.

DigiTech Types	Purpose in HPE
Computers, iPads, iPods, etc	Electronic devices that have the capacity to create documents (lesson plans inclusive), store retrieves and processes both qualitative and quantitative data very fast [22]. HPE staff and learners use computers for various purposes which include the following; motor learning and control, exercise physiology and measure variables; body composition, determination of maximum oxygen consumption and fitness prescription [13]. Applications in bio-mechanics, sports psychology and exercise physiology and research can be done through use of computers [23, 24].
Internet Search and Engines	These provide knowledge and information to teachers and learners to facilitate their understanding. HPE is a science subject hence people may experience difficulties in understanding the concepts therefore, internet provide quick solutions and more related reading material to the problems at hand. In cases where learners are given assignments, not only for presentation, they use search engines to enrich understanding [23, 25]
Massive Open Online Courses (MOOCs)	Facilitating online courses has brought a lot of changes and transformations in the way today's teaching and learning is done using various LMS and MOOCs [14, 23, 26]. The HPE students are not spared to access material and feedback online. DigiTech has made it easy for even bigger classes, teaching staff and learners to access open education not only in Eswatini but around the world with minimal or near to free of charge [13].
Technologies used for HPE Special Needs	In Health and Adaptive Physical Education, use of various technologies in facilitating teaching and learning with an understanding of academic concepts amongst students with special needs is of paramount importance. This can be done through the use of software programs which provide stimulation to acquire learners' attention during practice [26, 27, 28]. The students with various forms of special needs in HAPE class, be it hearing and visual impairments or autism among others, need appropriate DigiTech which facilitates their learning especially where they encounter problems in understanding concepts.
Wearable sports Technologies	These are technical textiles consisting of alternative materials with innovative and beneficial properties which include: lightweight, wireless, heat resilient, flexible and unobtrusive permitting full movements while participating in sport, among others [13]. Biomechanics of Sport enhances the knowledge of HPE educators through the use of wearable technology for sport performance enhancement and prevention of injury. For example, the use of optical motion capture systems helps to analyse biomechanics of many functional tasks which can further be assessed inside or outside a laboratory environment [29].

The potential of DigiTech cannot be ignored in the field of Health and Sports Science education. DigiTech has become instrumental for short and long-term monitoring of athletes using Global Positioning System (GPS) devices for athlete workloads and energy expenditure [30]; inertial measurement units (IMUs) for skill level assessment [31], Magnetic, angular rate and gravity sensors used to study angle range motion [32], Vicon motion capture system (VMCS) [33, 34]. Current trends in sport encourage rational and well-informed decision making. HPE educators, sports coaches, athletes inclusively, by acquainting themselves with DigiTech, have the ability to use to observe and analyse biomechanical risk factors in real-time or over defined exposure time, acceleration and impacts, influencing models of injury prevention.

CONCLUSION

Embracing digital technology in the teaching of HPE is beneficial to both the educators and learners. Educators need skills and up to date knowledge of DigiTech, adequate preparation of online learning and be flexible to shift from traditional way of teaching and assessment to prepare the future generation.

Conflict of interest: None

Author's contribution

Dhemba I, worked on the abstract and benefits of DigiTech and proof reading. Dube A contributed to the introduction, DigiTech platforms and final write up.

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