Education Management Information System (EMIS) and Learning Management in Informal Schools: A Case of Bridge International Schools, Nairobi-Kenya

Authors: [1]Lillian Wamuyu Mwangi – Ng'ayo, [2]Michael Sitawa and [3]Mary Mutisya
[1&3]The Catholic University of Eastern Africa. **Website:** www.cuea.edu
[2] International Peace Support Training Centre (IPSTC). **Website:** https://www.ipstc.org
Corresponding author: Lillian Wamuyu Mwangi – Ng'ayo. **Email:** sankalillian@gmail.com

Chief Editor
Web:
www.ijsdc.org
Email:
info@ijsdc.org

Editing Oversight
Impericals
Consultants
International
Limited

Abstract: *Learning management and education management information systems (EMIS) in informal schools: a case study of bridge international schools in Nairobi is the focus of this study. This research set out to answer three main questions: (i) how effective is EMIS at boosting teacher management efficiency in NFS; (ii) what role does EMIS play in reducing or eliminating NFS learning challenges; and (iii) where exactly in Nairobi County do NFS exist? The study's theoretical framework was constructivism. The researcher employed a Convergent parallel design mixed-methods strategy and zeroed in on a select group of respondents. 15 principals, 45 instructors, and 240 students (one focus group discussion with eight students per grade level) were randomly selected. Questionnaires and in-person interviews were used to compile the data. Descriptive statistics and SPSS for Windows version 21 were used to handle and analyse the collected data. Tables, frequencies, and percentages were used to display quantitative data, while questionnaires and interviews were used to display and analyse qualitative data. Schools should embrace the incorporation of education management information system (EMIS) and learning in informal settings, according to the study's findings, because school leadership and management play a crucial role in mitigating the negative impact EMIS has on Bridge International Academies' pedagogical approach. Kenya's Ministry of Education, Science, and Technology (MoEST) benefited greatly from the study's findings on the impact of EMIS on student learning and its suggestions for the ministry's future policymaking and ICT implementation. Researchers are encouraged to use the study's findings to further their own knowledge of EMIS in non-formal education systems, to test hypotheses, or as background reading for future investigations.*

Keywords: Education Management Information System (EMIS), Learning Management, Informal Schools and Formal schools

1.1 Study background

The Education Management Information System (EMIS) is a crucial tool in the management and planning of educational systems (Villanueva, 2014). It collects, processes, and analyses data related to all aspects of education, including student enrolment, teacher qualifications, infrastructure, and

financial resources. EMIS provides policymakers, educators, and researchers with up-to-date and accurate information to inform decision-making and policy formulation. In informal schools, which cater to marginalized and disadvantaged communities, implementing an effective EMIS can be challenging due to various factors such as limited resources, lack of infrastructure, and high student dropout rates. However, the importance of an EMIS in these schools cannot be underestimated, as it can help track and monitor student progress, identify areas for improvement, and facilitate targeted interventions to ensure quality education for all.

From a global perspective, the variables relevant to EMIS in informal schools include access to education, enrolment rates, completion rates, teacher-student ratios, infrastructure availability, and the overall quality of education. These variables highlight the need to ensure equitable access to education, reduce dropout rates, improve the quality of teaching, and enhance the learning environment in informal schools worldwide (OECD, 2012).

At the continental level, variables to consider in relation to EMIS in informal schools include geographical disparities in educational opportunities, regional education policies and frameworks, funding discrepancies, and cultural and linguistic diversity (Tikly, 2011). These variables emphasize the importance of addressing regional disparities and promoting inclusive education that respects and values the unique needs and backgrounds of students in informal schools across continents. Looking at the regional perspective, variables can include the availability of educational resources, teacher training and qualifications, curriculum relevance, and collaboration between different education stakeholders. These variables highlight the importance of regional cooperation and coordination to ensure that EMIS in informal schools is effective and responsive to the specific challenges and needs of a particular region.

In an African context, variables such as access to education, gender disparities, socioeconomic factors, and the impact of conflicts and emergencies on education are crucial when examining EMIS in informal schools. These variables shed light on the specific challenges faced by African nations in providing quality education in informal settings and emphasize the need for targeted interventions to address these issues. EMIS (Education Management Information System) is defined by De Silva and Valsangkar (2015) as "the system for collecting, storing, analysing, disseminating, and using data within the educational system." Strategic planning in education can be facilitated through the use of EMIS, which governments should use. Depending on the complexity and design of the educational system, EMIS can enable additional functionalities, such as issuing licenses for educational programs and institutions, allowing parents to see their children's grades, providing insight into the needs for professional development of teachers, or identifying the needs for infrastructural investments.

Different countries have different EMIS systems, and sometimes there are even regional variations within the same country. The governmental system of a country, the availability of technology infrastructure, and social attitudes towards data and its usage are the most significant elements determining the disparities between EMIS systems. The EMIS system has a wide range of potential integration points. De Silva and Valsangkar (2015) use the EMIS system in Afghanistan as an example of the successful implementation of IT in education. This system is made up of several interconnected subsystems that store a wealth of information about individual students (identification and

demographic data, grades, GPA, conduct), individual teachers (education, professional training), individual classrooms (number of students, class size, educational profiles, additional features), individual schools (location, number of students, classes, educational profiles, additional features), school infrastructure and property, and the like.

In developing countries, investment in formal education has resulted in high costs of education, high student-to-teacher ratios, inadequate teaching materials, and poor-quality education, among other things (Song, 2010) despite the fact that this is where the majority of countries and donor agencies have focused their bilateral or multilateral assistance programs (Manzoor, Wang, Qutub, & Hongwei, 2016). This has resulted in the need for, and the proliferation of, non-formal schools (Grajcevci & Shala 2016) because formal education has not always achieved the development promise and has, in some instances, worsened education exclusion, especially to poverty-stricken informal settlements.

1.2 Statement of the Problem

The research problem is to investigate the implementation and effectiveness of Education Management Information System (EMIS) and Learning Management in informal schools. Existing knowledge suggests that EMIS and Learning Management Systems have been widely adopted in formal educational settings to enhance administrative processes and improve the quality of teaching and learning. However, there is limited research on the implementation of these systems in informal schools, which cater to marginalized and underserved communities. By linking with previous studies, this research aims to contribute to the ongoing conversation in the field by exploring the challenges and opportunities associated with implementing EMIS and Learning Management Systems in informal schools. This study will shed light on how these systems can be adapted and optimized to meet the unique needs and constraints of informal school settings, thereby enhancing access to quality education for marginalized populations. The findings will also inform policy and practice in education management and contribute to the larger discourse on inclusive and equitable education. An estimated 1.9 million children aged 6-13 in primary school and 2.7 million adolescents aged 14-17 in secondary school are not actively engaged in continuous school learning despite the introduction of Free Primary Education (FPE) in 2003 and Free Secondary Education (FSE) in 2008. Furthermore, 7.8 million Kenyans are illiterate, according to the Kenya National Audit Literacy Survey (2008). This represents around a third of all people in the 15-to-30 age bracket. The areas of the country that are the most prone to poverty are also the ones where illiteracy is the more of a problem: informal urban settlements, desert and semi-arid territories. To meet the educational needs of children, teenagers, and adults who are not able to attend traditional schools, the Alternative Provision of Basic Education and Training (APBET) has developed in such contexts. One of the APBET school models that evolved in informal settlements with the aim of providing high-quality, scalable, and inexpensive education to underprivileged adolescents in slum communities is Bridge International Academies. Since its beginning in 2009, Nairobi's Bridge International Academies have used extensive EMIS technology to educate students in 15 alternative schools. According to the study's author, not enough of this technology is being used to boost Kenya's educational system as a whole. Therefore, the purpose of this research was to highlight the potential and actual effectiveness of EMIS technology in enhancing education generally and learning specifically in the case of Bridge International Academies in Nairobi.

1.3 The Study Objectives

a) To determine how much EMIS improves the effectiveness of student management in Nairobi County, Kenya's Bridge schools.
b) To assess how much EMIS contributes to improving teacher management effectiveness in Bridge schools in Nairobi County, Kenya.
c) To determine how much EMIS helps Bridge schools in Nairobi County, Kenya with their learning issues.
d) To analyse the role of EMIS in enhancing transparency and accountability.

1.4 Literature review

1.4.1 Theoretical Review
Constructivism Theory
Constructivism is an educational theory that emphasizes active learning, the creation of knowledge, and the importance of learners' prior knowledge and experiences (Huang, H. M., 2012). It suggests that individuals construct their understanding of the world based on their own experiences, interactions, and reflection. This theory is particularly relevant in the field of education as it encourages educators to create a learner-centred environment where students can engage and construct their knowledge. One of the main benefits of the constructivist approach is that it promotes deeper learning. By encouraging students to actively construct their knowledge, through discussion, problem-solving, and collaboration, they are more likely to develop a rich understanding of the subject matter. Constructivism also emphasizes the importance of personal meaning, allowing students to connect new knowledge to their existing framework of understanding. This can lead to more meaningful and authentic learning experiences, making education more relevant and applicable to students' lives. Critics of constructivism argue that it might be challenging to implement in certain educational contexts. Constructivist learning can be time-consuming and requires a high level of engagement from both students and teachers. Critics suggest that a more traditional, teacher-centred approach may be more efficient for delivering specific content knowledge within limited time frames. Additionally, the constructivist approach may not suit all learners or subject areas. Some students may struggle with the open-ended. According to Kaufman, D. M. (2018), the incorporation of cognitive thinking into the educational planning process is made possible by constructivism. As a result, conceptions of knowledge and education are the products of a social construction of reason between students and instructors. Windschitl (2002) echoes this sentiment, noting the rising popularity of constructivist pedagogies and, in particular, the use of technology to place lessons in their proper context.

Unified Theory of Acceptance and Use of Technology
The Unified Theory of Acceptance and Use of Technology (UTAUT) is a widely recognized and influential theory in the field of technology acceptance and adoption. It was developed by Venkatesh et al. in 2003 and has been widely used to understand and explain individuals' acceptance and use of technology in various contexts. The relevance of the UTAUT lies in its ability to provide a comprehensive framework for understanding the factors that influence technology acceptance. It integrates and extends several existing theories, such as the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), and the Social Cognitive Theory (SCT), to offer a more comprehensive understanding of user behaviour.

In addition, the UTAUT (Venkatesh et al., 2003) paradigm was employed to understand how people accept and utilize technology. Highly recommended models (SCT) included the Theory of Planned Behaviour (TPB), the Theory of Reasoned Action (TRA), the Innovation Diffusion Theory (IDT), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Model of PC Utilization (MPCU), and the Social Cognitive Theory. To evaluate the efficacy of several IT models, Venkatesh et al., (2003) created the Unified Theory of Acceptance and Use of Technology (UTAUT) by combining key aspects of eight different models. Therefore, the UTAUT model incorporates four factors— performance expectations being just one of them—that determine whether or not schools use technology.

1.4.2 Empirical Review

The EMIS informs those invested in education outside of traditional institutions about the state of the education system and students' progress in school (Pedro et al., 2019). Therefore, the EMIS allows non-formal institutions to collect and evaluate data on student performance and involvement, allowing them to pinpoint problem areas. For instance, EMIS is used by Bridge International Academies to monitor students' engagement in class based on where they are seated. The teacher can keep track of how often each student took part in the activity, and then give extra attention to the children who typically do not (Bridge International, 2017). Data on student attendance and performance in the classroom is crucial to improving the quality of instruction, and EMIS plays a key role in this process (Durnali M. 2013). Keeping tabs on student attendance and performance at non-formal schools, which is often difficult to do in informal settlements where these schools are commonly located, is made much easier with EMIS. It's important to recognize that several factors prevent students who aren't enrolled in formal education from consistently attending class. It was previously difficult to map out student-specific obstacles to school attendance and learning; now, with the advent of EMIS, this is now achievable (UNESCO, 2014).

Permanently absent students in non-formal settings can be monitored in relation to their academic performance, and tailored interventions can be created as needed. Zaidi (2014) agrees, arguing that the EMIS is especially important for non-formal schools because of its capacity to divide data for each student, which is then utilized to create individualized treatments. To rephrase, EMIS may be even more important in non-formal schools with significant absenteeism than in traditional schools (Ruto et al., 2010). Teachers' capacity, abilities, and ability to present excellent learning content to students have all been improved as a result of the EMIS (Carlson & Gadio, 2002), which has a multiplicative effect on students' non-formal learning, involvement, and performance. Ojwang (2010) argues that with the use of EMIS, educators can collaborate with their superiors to design lessons and frameworks that promote student engagement and retention. Standardized content, such as when and how to ask questions, how to engage inactive students, and how to provide feedback to students, is delivered to teachers' digital platforms via EMIS, which is especially beneficial for non-formal schools (Hanemann, 2021). Adopting EMIS platforms is a step in the right direction for non-formal schools looking to improve their pedagogical use of IT (Ng'ang'a, 2010; Chunwijitra, 2013). This is crucial because it allows classroom instructors to raise the bar for student learning. Dighe, Hakeem, and Shaeffer (2009) conducted research in Malaysia and found that using EMIS allowed teachers to better convey complex concepts to pupils using scripted content. Therefore, it may be argued that EMIS makes it simpler for teachers to personalize and exchange learning materials, lesson plans, diversifying teaching, making

students the centre of the classroom, and bringing the real world into the classroom. It is important to remember that EMIS is not a replacement for the hands-on, experiential learning that comes before or after reading or watching a video. Therefore, giving students access to authentic, hands-on learning opportunities is crucial. Binginlas (2009) argues that teaching students how to function in the digital age requires a focus on incorporating EMIS into the classroom.

1.5 The Conceptual Framework

A conceptual framework is a graphical representation of the connections between concepts (Mugenda & Mugenda, 2003). The conceptual framework is presented below, and it emphasizes the connection and interplay between the independent, dependent, and intervening factors. difficulties of student learning in non-formal schools (environmental challenges, school obstacles, household challenges) affect the dependent variables (student participation, higher achievement, improved attendance, and reduced drop-out) through the intervening variables (effectiveness of student management; learning; participation; school attendance); and effectiveness of teacher management; teaching; lesson plan and content; attendance; and performance).
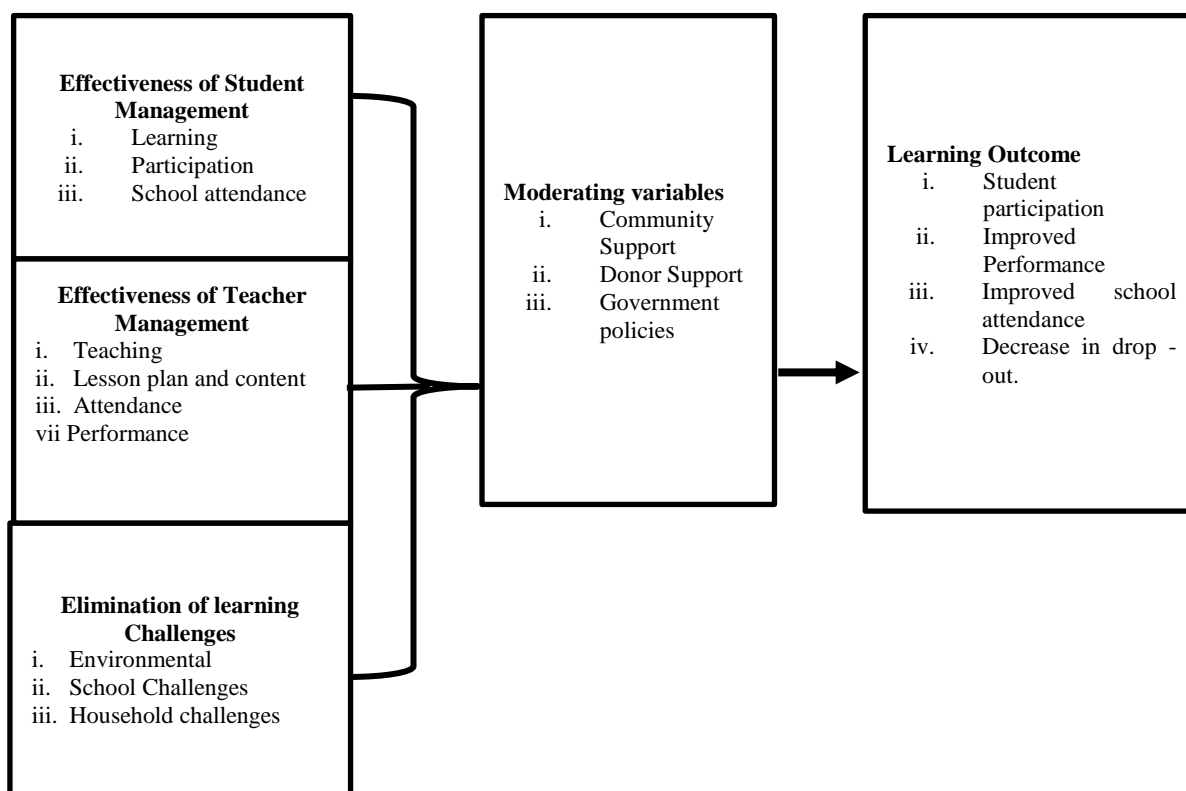

Figure 1: Conceptual Framework
Source: Authors (2022)

1.6 Research Methodology

The research was designed to use descriptive survey design that was quantitative in nature. For the study, the target population comprised of employees, students and parents from Bridge International

Academies giving a total of 405 participants. In this research, convergent parallel design was adopted. Convergent parallel suggests that samples were drawn from every segment of the population. This gave a sample size of 300 participants. All the requisite ethical considerations were taken into account.

1.7 Results and Findings
Presentation of the questionnaire and responses received by the researcher were included in this part. The respondent rate, expressed as a percentage, is the proportion of eligible respondents who actually filled out the survey. There were 300 participants in the study, and 288 completed and submitted their questionnaires. As a result, we now have an 80% response rate.

Using Education Management Information System (EMIS) to enhance formation of learners in Informal Schools
The results on this test was shared in the table.

Table 1: Teachers Responses on EMIS Definition

Teachers Responses on EMIS Definition	Frequencies	Percentages %
Teaching that involves computer	4	9
Use of technology in teaching and management	7	15
Teaching process involving general conferences and technology	25	54
System that enhances easy learning and understanding of a particular learner	10	22
Total	**46**	**100**

Source: Field data (2022)

Table shows that, 4 (9%) of respondents consider EMIS to be computer-based education. While 25 (54%) have said that it is a teaching process incorporating general conferences and technology, just 7 (15%) consider the use of technology in teaching and management. Ten (22% of respondents) cited a system that facilitates learning and comprehension as the reason. The study found that EMIS is a method of instruction that makes use of both technological and broad-based gatherings. Consistent with the accounts supplied by the respondents, it is evident that the implementation of EMIS in the informal educational setting will facilitate both teaching and administration. The study's author believes that using this method could help educators and students work together more effectively.

EMIS enhances class management efficiency in non-formal schools
The study looked at how EMIS helps improve classroom management in non-traditional settings. This was significant because it allowed the researcher to control for factors that she knew would have some bearing on how successfully the Education Management Information System (EMIS) and Learning in Informal Schools were implemented. The tabular data below displays the responses received.

Table 2: EMIS enhances class management in non-formal schools.

EMIS enhances class management.	Frequencies	Percentages %
1. Simplifies teaching	51	17%
2. Guarantees general security of the student's data	67	23%
3. It enhances easier communication between student and teacher	63	21%
4. It promotes time consciousness and effectiveness	54	19%
5. Enhances instant feedback during learning	59	20%
Total	294	100%

Source: Field data (2022)

Table 2 shows that 51 respondents (17%) agree that EMIS makes it easier to teach. A total of 67 respondents (23%) are confident that their pupils' information is safe, while 63 respondents (21%) agree that it improves student-teacher dialogue. 54 respondents (19%) confirmed that time awareness and productivity are both boosted, and rapid feedback on one's progress in learning is praised by 59 respondents (20%).

Results from the field support the claims of Story (2010), who argues that people's actions are drawn to the social worlds they have created for themselves. This means that for many students, learning centres are their primary source of social interaction, making them just as influential in shaping their attitudes, values, and personalities as their families and communities.

EMIS in enhancement of individual student management efficiency

Four statements were used to gauge respondents' levels of agreement or disagreement with the claim that EMIS improves the effectiveness of individual student management in non-formal educational settings. The scale used in this study ranged from "Strongly Disagree" (SD) to "Strongly Agree" (SA).

Table 3: How EMIS enhances individual student management efficiency in non-formal schools.

Enhancement of individual student management Efficiency	SD	D	U	A	SA
EMIS enhances better understanding of the Learner.	0(0%)	63(21%)	71(24%)	84(29%)	10(22%)
Integration of EMIS in non-formal schools enhances easy teaching	0(0%)	18(6%)	64(21%)	131(45%)	81(28%)
EMIS guarantees security of student's data.	0(0%)	1(2%)	14(5%)	123(40%)	156(53%)
EMIS enhances consistent daily growth for both the Teacher and the learner.	0(0%)	21(7%)	16(5%)	121(41%)	136(47%)

Source: Field data (2022)

Table 3 displays the results from the field: 22% strongly agree EMIS improves teachers' comprehension of their students, 21% disagree, 24% are unsure, 26% are neutral, 28% agree, and 0% highly agree.

Respondents as a whole affirmed these views as being representative of their own beliefs. How Non-Formal Educational Institutions Can Benefit from EMIS Integration to Simplify Instruction There were 131 respondents (45%) who agreed with the statement, 64 (28%), who disagreed, 0 (0%), who were unsure, and 0 (0%), who strongly disagreed.

Similarly, when asked whether they thought EMIS ensured the privacy of student information, 123 (40%) of respondents said they agreed and 0 (0% said they strongly disagreed). The results showed that 136 people (47%) highly agreed that EMIS helps both teachers and students improve every day. Of those polled, 41% strongly disagreed, 41% agreed, 41% were unsure, and 7% disagreed. According to the comments, most people think that using EMIS in non-traditional educational settings makes teaching simpler. Teachers benefit from this method because it helps them connect with their students on a deeper level. This method enabled educators to see the uniqueness of each student and motivate them to approach the EMIS curriculum with an open mind. The study's primary goal was to ascertain whether students would benefit from EMIS being used in non-formal settings. Table 4 displays the test findings.

Figure 4: Implementation of EMIS in informal schools to the lives of the individual learner.

Respondent	Number	Percentage
Yes	223	76%
No	56	19%
Others	15	5%
Total	294	100%

Source: Field data (2022)

According to the data presented above, 73% of respondents answered "yes," 18% replied "no," and 9% wrote "others" to indicate missing or unspecified answers. According to the results, most respondents agree that introducing EMIS into non-formal educational settings will have a positive impact on students' lives. Inadequate information or biases about EMIS values may be reflected in the responses identifying others or considered as no or absent.

Conclusions
The research found that non-formal educational institutions were better able to manage their student bodies using EMIS. It investigated how EMIS may improve the effectiveness of non-formal school administration, how it can be used to get rid of obstacles to education, and how it can lessen the severity of existing obstacles to education in the informal settlements of Nairobi County, Kenya. After several methods of utilizing EMIS in the classroom being evaluated, the study concluded that the vast majority of respondents agreed that Education Management Information System (EMIS) and informal schooling should be combined to better engage students in their education.

Recommendations
a) Integration of EMIS in Informal Schools: It is crucial to introduce an EMIS specifically designed to cater to the needs of informal schools. This system should incorporate features such as student enrolment, attendance tracking, and learning progress monitoring. Implementing a robust EMIS

will enable the collection and analysis of valuable data, helping informal schools identify areas for improvement and make informed decisions.

b) Capacity Building for Informal School Administrators: To effectively utilize EMIS tools, administrators and staff of informal schools should be provided with adequate training and capacity building programs. These programs would focus on developing their skills in data management, information analysis, and reporting. Enhancing their understanding and proficiency in using EMIS will enable them to optimize the system's benefits.

c) Resource Allocation and Monitoring: Informal schools often lack resources, both financial and material. EMIS can assist in efficient resource allocation by tracking the usage of available resources and identifying areas where additional support is required. Additionally, monitoring the utilization of resources can help ensure transparency and avoid mismanagement.

d) After periodic examination and critical analysis by a team of specialists in accordance with their constitutions and rules of life, teachers and school administrators should regularly update their teaching guides.

REFERENCES

Durnali, M. (2013). The contributions of e-school, a student information management system, to the data processes, environment, education and economy of Turkey. In Proceedings of the Asian Conference on Technology in the Classroom (pp. 170-184).

Grajcevci, A., & Shala, A. (2016). Formal and non-formal education in the new era. Action Researcher in Education, 7(7), 119-130.

Hanemann, U. (2021). Non-state actors in non-formal youth and adult education.

Huang, H. M. (2012). Toward constructivism for adult learners in online learning environments. British journal of educational technology, 33(1), 27-37.

Kaufman, D. M. (2018). Teaching and learning in medical education: how theory can inform practice. Understanding medical education: evidence, theory, and practice, 37-69.

OECD (2012), Equity and Quality in Education: Supporting Disadvantaged Students and Schools, OECD Publishing. http://dx.doi.org/10.1787/9789264130852-en

Song, S. (2010). E-learning: Investigating students' acceptance of online learning in hospitality programs. Doctoral dissertation. Iowa state University.

Tikly, L. (2011). Towards a framework for researching the quality of education in low-income countries. Comparative education, 47(1), 1-23.

UNESCO (2008). ICT Competences Standards for Teachers. United Kingdom, UNESCO Press

UNESCO (2014). "Education Management Information System (EMIS)." UNESCO, Paris. Available at: http://www.unesco.org/new/en/education/themes/planning-and-managing-education/policy-and-planning/emis/. Accessed April 1, 2014.

Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: Challenges and opportunities for sustainable development.

Ruto, S. J., Ongwenyi, Z. N., & Mugo, J. K. (2010). Educational marginalisation in northern Kenya. *Paper commissioned for the EFA Global Monitoring Report*.

Villanueva, C. C. (2014). Education management information system (EMIS) and the formulation of Education for All (EFA) Plan of Action. UNESCO, 1(1), 1-60.

Windschitl, M., & Sahl, K. (2002). Tracing teachers' use of technology in a laptop computer school: The interplay of teacher beliefs, social dynamics, and institutional culture. *American educational research journal*, *39*(1), 165-205.