Institutional E-Learning Implementation: An Actor-Network Theory (ANT) Perspective

Benjamin Kwofie, Emmanuel Dortey Tetteh, and Cephas Paa Kwasi Coffie

Introduction

The chapter examines the ongoing interactions among the various actors involved in the implementation of the virtual learning platform intended for the continual engagement of students and facilitators caught up in
the COVID-19 pandemic using the lens of the actor-network theory (ANT). The ANT offers a unique framework for making sense of the outcomes of the institution’s efforts to find a way to support and engage students’ learning while locked-up in their homes. While this is not a major problem for institutions in most developed and developing countries irrespective of the level of the institution of learning, developing economies continually find the diffusion of online digital solutions unnecessary and inconvenient despite the potential benefits.

The abundance of literature on e-learning implementation and institutional experiences with different types of online learning platforms suggests that the learning curve for many institutions in this time and era is overdue. In the recent COVID-19 pandemic, one of the greatest lessons learned is the need to strengthen online digital solutions like online shopping, delivery platforms, and financing to avoid standstills in social lives and activities. However, it is unfortunate to note that none of the recent happenings make lasting impressions on the minds of some critical stakeholders on the need to explore measures to avoid future reoccurrences which may disrupt academic work.

In Ghana, the call to engage in distance education left no doubt in the minds of the regulatory authorities that the medium of delivery was to be digital. This is because of the advancements in distance education from an era where the postal systems dominated engagements to a period (late 1990s) when online technologies allowed such correspondence to be deemed obsolete. This call was also necessary to ensure that the wheels of the educational system did not grind to a halt, as the current outbreak has necessitated the closure (offline and online) of primary and junior high schools in Ghana. Currently, in Ghana e-learning platforms are emerging in Universities, nonetheless, the call has been greeted with varied opinions that threaten the successful implementation of the directive.

While it may appear that the regulatory institutions are threading on unchartered waters, it is worth noting that some of these institutions have varied experiences with the deployment of online virtual learning environments amidst the different levels of realization from successful technical deployment to successful integration into traditional learning contexts. Although it is possible to understand what causes
these different levels of attainment, there is an urgent need to explore how the interactions, actions, and inactions of the various actors’ interplay to realize expected outcomes. Consequently, using the case of Koforidua Technical University, the chapter explores the institutional implementation of e-learning platforms from the actor-network theory’s perspective.

The current chapter is divided into 7 sections. The introductory section is followed by a section on e-learning implementation in Higher Education Institutions (HEI). In the third section, we present the actor-network theory and how it provides a useful lens in understanding the implications of current institutional actions in realizing intended outcomes in their effort to implement a Learning Management System (LMS) to support students’ learning online. The fourth section touches on the research methodology applied, followed by an analysis of the current case using ANT in the fifth section. A discussion is presented in the sixth section. The seventh section provides a conclusion and looks briefly at the way forward.

E-Learning Implementation in Higher Education Settings

Electronic learning (e-learning) is described as the use of electronic or digital applications to learn. This mode of learning can be achieved by an individual over the intranet, intranet, on a CD, DVD, etc. The focus here is on individualized learning. Learning electronically, however, does not necessarily mean learning at a distance, e.g., learning with DVD on a personal computer. This term is often used interchangeably with online learning which also involves digitally delivered learning associated with some flexibility, structure, management, assessment, and grading via the internet. Online learning is typically delivered through a Learning Management System (LMS). An LMS is a web-based software for managing the learning process and needs of learners (Kwofie 2015; Machado and Tao 2007). The description suggests certain capabilities of an LMS: content provision and management, assessment of learning progress and achievement, possible communication with instructors
and students, some kind of guide, administration, and management of the learning process. It also suggests the availability and accessibility of this kind of learning outside of the brick-and-mortar classroom environment through a medium that can allow for synchronous and asynchronous communication like the internet, intranet, or extranet. LMS is also referred to as Virtual Learning Environments (VLE) (Falvo and Johnson 2007) due to their ability to replicate learning environments and processes ubiquitously. Learning Management Systems are therefore integrated solutions for creating content, administering learning services, and managing the learning processes of learners (Kwofie 2015).

Implementing LMS are complex engagements the outcomes of which are difficult to predict with accuracy (Kwofie 2015). Many cases of LMS implementation by institutions have been met with unsatisfactory implementation outcomes (Hogarth and Dowson 2008). Unfortunately, many of the analyses of e-learning implementation focus on the outcomes of individual initiatives in isolation rather than afford a deeper analysis of the contributions of the institutional context (Marshall 2010). Kwofie (2015) noted that research on the institutional implementation of e-learning systems was at best scanty and inadequate in providing frameworks to guide understanding guidance to institutions. Perhaps this may explain why institutions today are faced with challenges in their bid to deploy LMS platforms to support students’ learning during this COVID-19 epidemic.

It is interesting to note that to date a lot of the research conducted into e-learning typically remains at the micro-level which entails actual teaching and learning with digital technologies. Arguably these issues are important if effectiveness and specified goals are to be achieved. Research at the meso-level which looks at the management, the organization, and the technology involved, however, is more scarce (Kwofie 2015; Zawacki-Richter 2009; Zawacki-Richter et al. 2009). The scarcity of this kind of research may have contributed to the ad hoc way in which educational institutions go about implementing digital technologies even though this may not necessarily be unique to educational institutions. A lot of these implementations also tend to be left in the hands of technical ICT experts whose sole objective often is to ensure the technical success of the implementation. This singular technical consideration, however,
consisting of analysis, design, installation, configuration, and modification often does not achieve the higher institutional goals which may be to get all users to adopt the technology in a goal-oriented way.

The implementation of digital technologies and any solution for that matter in an institutional context is a broader and far more complex engagement requiring a holistic consideration and approach to ensuring defined goals are accomplished. This is where theoretical frameworks such as the ANT come into provide useful perspectives on how well an implementation project is being handled. By recognizing human and non-human actors as having equal potentials of shaping the outcomes of actions either consciously or unconsciously, the theory the opportunity for a far deeper critical thinking and consideration of how best to create a network of committed, engaged, and knowledgeable actors. This is useful for the successful implementation of any digital technology in any context. In the next section, we proceed to look more critically into the actor-network theory and the tools it provides for achieving this kind of insight.

The Actor-Network Theory (ANT)

The actor-network theory (ANT) is an approach adopted to understand humans and their interactions with inanimate objects. Usually, this theory is applicable in studying emerging technologies or industries driven mainly by technology. Therefore, the ANT is preferred for this study ahead of theories like the social network and institutional theories because; e-learning in Ghana is an emerging industry. While the theory is criticized on the limited explanatory power (Shim and Shin 2016), this can be resolved by combining the theory with other theories to provide description and explanation for the existence of networks. The ANT explores the mechanisms through which networks are formed and/or dismantled instead of providing reasons for the existence of networks (Callon et al. 2010). Further, it is considered as the sociology of translations and noted as a socio-technical approach to studying Information Systems (Walsham 1997). Tatnall and Burgess (2002) note that information systems are complex socio-technical entities and research into their
Implementation needs to take account of these relationships. As put by Afarikumah and Kwankam (2013), the theory hinges on the notion that to achieve any goal, a network of faithful alliances that will carry the network builders’ intentions is required to materialize their goals. They contend that the theory holds a clear view of society as a network of humans and non-human actants that interact and cooperate to pursue clearly defined goals. The theory recognizes that building a network involves the recruitment of human and non-human objects. The creation of this network is studied via inscription or translation. Specifically, the inscription studies the focal actor’s competence to offer innovative products to maintain a competitive advantage while the translation identifies and aligns with the interest of existing actors and gradually innovate to remain the focal actor through the displacement of other actors (Callon 1996). Consequently, because the focal actor’s aim is not product innovation, the study applies the translation approach to understand the institutional implementation of e-learning in Ghana. Translations are the mechanisms through which the network builder recruit actors and ensures their faithful alliance (Afarikumah and Kwankam 2013). Callon (1986), posited that the ANT comprises four moments; problematization, interessement, enrolment, and mobilization. In the next section, the description of these moments and how they help understand the intuitional e-learning implementation in Ghana, using a case in point are provided.

Problematization

This is the first moment of translation which according to Callon (1986), is where an actor strives to be indispensable to other actors by defining the problem and motivating them to join the network. The main actor here suggests to the other actants that the problem would be resolved if they negotiate the ‘obligatory passage point (OPP).’ In this first stage, the theory posits that an alliance or an association between the actors can be formed through the identification of what they want (Callon 1986; Afarikumah and Kwankam 2013). According to Callon (1986), the obligatory passage point is that point where the main actor tries to
convince all the other actors to accept the proposed network. Conseq-
sequently, this stage directs the study to define the focal actor, and the
challenges necessitating the proposal to diffuse e-learning in Ghana. This
stage is significant because it describes the state of learning channels, the
challenges, and the need for the diffusion of e-learning.

**Interessement**

The second stage in the moment of translation is where the main actor
attempts to lock the other actors into a position that has been offered
to them in the network through a series of the process (Callon 1986;
Afarikumah and Kwankam 2013). The main actor here tries to impose
and stabilize other actors’ identities through clearly distinctive actions.
The actions utilized here are developed in the problematization process
with different devices being used for different actors in these actions. This
helps the study to understand the reasons driving the interest of other
actors. While the proposal of e-learning is not new in Ghana, the slow
pace of diffusion initially and the sudden increase in diffusion provides
significant insight into the decision-making processes of the actors.

**Enrolment**

The third moment of translation is the enrolment. Here the main actor
attempts to define and inter-relate the various roles that allow the other
actors to enroll. According to Callon (1986), the enrolment process
involves group multilateral negotiations, trials of strength, and tricks that
accompany the Interessement and enable them to succeed. This signi-
fies the readiness of actors to accept and follow the requirements of the
network to keep the network intact (Shin 2010). Therefore, enrolment
is the process by which other actors accept the interests defined by the
main actor through the process of bargaining and making concessions.
While this tests the strength of OPP and the entire network, it helps
the study to understand the readiness of government institutions, educa-
tional institutions, telecommunication institutions, lecturers, students,
and parents in maintaining the network.
Mobilization

The last moment of translation is the mobilization. This moment involves actions by the main actor aimed at ensuring all actors have legitimate speakers representing them in the various groupings. This also ensures that betrayals from the various groups are avoided in collective agreements (Callon 1986; Afarikumah and Kwankam 2013). According to Walsham (1997), these speakers or representatives are actors who speak or deputize for other actors. The stage helps the study to understand alliances providing support for the growth in the institutional implementation of e-learning in Ghana.

To understand the ANT, there are other key concepts of the framework as a lens for understanding the implementation of a technological artifact. Table 6.1 summarizing these concepts adapted from Afarikumah and Kwankam (2013).

Research Methodology

Research Approach

Using the ANT, the chapter examines the interactions between the actors involved in the implementation of virtual learning platform to sustain learning during the COVID-19. Per the lack of secondary data to support rigorous empirical analysis, the qualitative approach is adopted to provide answers to the research questions. While qualitative studies have different models (Garson 2013), the chapter applies the case, study model. Although time-consuming, sometimes difficult to replicate, and the possibility of bias, this approach is justified because of the need to create new knowledge through the exploration of the emerging e-learning diffusion in Ghana.
### Table 6.1 Key Concepts of the Actor-network theory (ANT)

| key concepts              | Description                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Actor (or Actant)         | Both human beings and non-human actors such as technological artifacts. Any element which bends space around itself makes other elements dependents upon it and translates their will into the language of its own (Callon 1986)          |
| Actor-Network             | The heterogeneous network of aligned interests, including people, organizations, and standards. A set of relations in which an actor constantly influence other actors (Callon 1986)                                                |
| Translation               | The creation and alignment of the interests in actor-network. This process consists of four major stages: problematization, interessement, enrolment, and mobilization                                                     |
| Problematization          | The first process of translation during which an actor defines identities and interests of other actors that are consistent with its interests, and establishes itself as an obligatory passage point (OPP) (Callon 1986). What is the problem that needs to be solved? Who are the relevant actors? Forming the obligatory passage point. What are the obstacles? |
| OPP                       | OPP refers to a situation that has to occur for all actors to satisfy the interests that have been attributed to them by the focal actor. The focal actor defines the OPP through which the other actors must pass through and by which the focal actor becomes indispensable (Callon 1986) |
| Interessement             | After identifying the relevant actors and forming the obligatory passage point, getting the actors interested in and negotiating the roles and terms of their involvement. Establishing a device to make a power balance. Creating activities and sub-activities to convince and stabilize actors |
| Enrolment                 | The third process of translation, where other actors in the network accept (or get aligned to) interests defined for them by the focal actor (Callon 1986). Actors accept the roles that have been defined for them during interessement. Strategies and activities to support actors’ enrolment and start the network |
| Mobilization              | Mobilization involves maintaining a commitment to a cause of action and the OPP. This phase investigates whether the delegate actors in the network adequately represent the masses                                                                    |
Table 6.1 (continued)

| key concepts | Description |
|--------------|-------------|
| Punctualization | The process by which complex actor-networks are black-boxed and linked with other networks to create larger actor-networks (Cressman 2009). Punctualization can thus convert an entire network into a single point or node in another network. |
| Mediator | Whatever transforms, translates, distorts, and modifies the meaning or the elements they are supposed to carry. Their input is never a good predictor of their output; their specificity has to be taken into account every time. They can be counted not just for one but for several, for nothing, or infinity (Latour 2005). |
| Intermediary | Whatever transports meaning or force without transformation: defining its inputs; is enough to define its output. Not only can it be taken as a black box, but also as a black box counting for one, even if it is internally made of many parts (Latour 2013). |
| Translation | The different phases of a general process during which the identity of actors, the possibility of interaction and the margins of maneuver are negotiated and delimited (Callon 1986). |

Source: Adapted from Afarikumah and Kwankam (2013)

Case Description

Established in 1997, the case University has a history of training technical graduates. The case focuses on the institutional implementation of the online Learning Management System for students and tutors with a population of over 8000 and 220, respectively. Although the institution has a history of similar project implementation, they were never able at any point in time to get all tutors and students to utilize it. This can be attributed to an unsuccessful system implementation. For any successful institutional system implementation, there must be a successful setup and configuration as well as a successful institutional process re-engineering (Tetteh et al. 2020).

This time, however, there was an explicit instruction from the government and its agencies and so the outcome may be different. The technology in question to be deployed for supporting teaching and learning is the Moodle LMS. This is an open-source platform with features that supports learning management. Lecturers are required to
set up their courses, interact with students, conduct an assessment, and generally ensure that course objectives are met. The students likewise are required to get on the platform, access their courses, engage in discussions, undertake assessment quizzes, collaborate, and interact with the tutors. The current project covers 5 Faculties and over 20 academic departments with the overall goal of continuing to engage the students who have been locked down at home due to the COVID-19 pandemic and completing the 2nd semester of the academic year.

Data Description and Collection

To provide evidence to support the institutional implementation of e-learning platforms at the case University using the ANT, the data sources include; interviews (semi-structured), informal conversations with human actors, observation of non-human actors, document analysis, and telephone conversations. The application of multiple sources provides the advantage of gathering adequate data from diverse actors. First, the interview was designed and pretested using a sample of 5 and 10 top management and tutors from another institution to ensure the suitability of the questions. Afterward, the required amendments were made before using it at the case University. Next, because of the lockdown which limits human movements, telephone conversations were employed to solicit the response of government workers at the ministry of education. Further, upon obtaining permission from those involved, informal conversations with students and colleagues were recorded. Finally, an inspection of the ICT infrastructure of the institution, and documents on the e-learning implementation were analyzed for data. Table 6.2 provides details on the data of the study.

Data Analysis

The study is unable to apply quantitative analysis because the data collated are fundamentally qualitative in nature, lack a similar measurement scale, and come from different sources. Therefore, the study applies the thematic or content analysis to identify, analyze, and report patterns
Table 6.2  Description of data

| Source                  | Focus                                      | Actor(s)     | Type of data |
|-------------------------|--------------------------------------------|--------------|--------------|
| Interviews              | Head of departments and tutors             | Human        | Qualitative  |
| Informal conversations  | Students and colleagues                   | ✔            |              |
| Telephone conversation  | Government officials                      | ✔            |              |
| Document analysis       | Policy documents, memos, letters, and directives | ✔            |              |
| Observation             | ICT infrastructure                         | Non-human    | ✔            |

*Source* Authors construct

to support the four translation phases of the ANT concerning the implementation of e-learning at the selected case University. As proven by literature, the application of thematic or content analysis is equally useful in analyzing contents from different studies (Snyder 2019), and therefore the study outcome is not affected irrespective of the absence of quantitative analysis.

**ANT Analysis of Institutional LMS Implementation**

In this section, a description of the actions and interactions of the actors and their outcomes is presented through the lens of ANT. This theory provides an insightful framework for understanding and explaining the institutional online LMS implementation and how well the relevant actors are brought into the network.

**Problematization**

Per ANT, the Problematization stage of the translation moments guides us to examine the problems that necessitated the diffusion of e-learning
platforms across the country. Factually, education in Ghana is delivered offline irrespective of the level of the learning institution. This could be explained by the relatively underdeveloped and unequal ICT infrastructural development across the country. However, the outbreak of the COVID-19 created a problem necessitating the diffusion of online learning to sustain learning in the country. While this provides the only solution to sustain the educational sector momentarily, the relative unpreparedness of institutions and ICT infrastructure may create diffusion challenges.

In response, the President of Ghana called on educational institutions to diffuse distance-learning channels to engage students during the suspension of educational activities. This led the ministry of education to set up a committee to work out modalities for the effective operationalizing of the directives. The committee comprised members of the Ministry, the Ghana Education Service, and other stakeholders. This initial call led the institution to hold an emergency executive academic board meeting where a decision was taken to diffuse online LMS to engage students during the lockdown period. While the discussion is primarily focused on sustaining learning activities during the lockdown, it provides insight into the unwillingness exhibited by the institution to continue after the lockdown.

The implementation of the current solution requires the involvement of several actors such as the Information and Communication Technology (ICT) unit of the institution, the University Management, the Deans of faculties, Specialists in online learning systems, the faculty members, students, Telecommunications companies, students and the regulatory bodies like NABPTEX, NAB, NCTE, and Ministry of Education (MoE). The decision from the executive meeting led to the creation of a committee to spearhead the implementation of the LMS for online engagement with students. The terms of reference were to train lecturers within one week to upload their course materials onto the platform. This presupposes that the institution is not preparing for sustainable online learning platforms beyond the COVID-19.
E-learning is the proposed solution by the government of Ghana to resolving the challenges in the educational sector necessitated by the COVID-19. Therefore, to generate interest, the board of higher education institutions becomes necessary actors in the prioritization of the directives. The current implementation began with an emergency academic board meeting decision to upload lecture materials online onto the LMS to engage students. It was followed immediately with the setting up of a committee. The committee was required within one week to prepare tutors to upload their course materials online to engage students. While the time might be short, the urgency of the situation necessitated such a decision. However, this period hindered communication significantly because the committee members expressed concerns over the difficulty to understand the operations of the system. Again, the absence of clearly defined terms of reference resulted in uncertainties regarding the implementation of the directives from the president and the institution’s board. This nearly discouraged some of the committee members as it was apparent management commitment was beginning to become elusive.

Eventually, a letter was issued to the committee members to commence work but this also lacked clearly defined terms of reference. The committee, however, resolved to go ahead and commence with the implementation. A member was asked to set up, configure, and populate a new LMS. This was immediately done as the software was open source and free. Besides, the committee member had acquired extensive experience in the setup and management of the platform and so could manage 3 days to complete the task. Approval had also been given by management for 5-day training for tutors via zoom. This training was deemed to be important but not mandatory as many tutors did not partake and yet suffered no repercussion. It was also not evident whether other stakeholders like deans and heads of departments had been involved and had specific roles to play in the process. This reveals that although the proposed solution by the government of Ghana is prudent, the unpreparedness of the institution to diffuse e-learning previously
leads to less commitment. Therefore, this is consistent with the assertion that the implementation of an information system is complex and requires strategic planning (Tatnall and Burgess 2002).

Enrolment

Per the board of directors’ commitment to instituting the directives of the President of Ghana to sustain the education sector through online learning, the interest generated is with the inclusion of other actors. Consequently, several actors were enrolled in the online LMS implementation process. These include the Chief Information Officer of the institution, 2 Internet Service providers, a dean, an online instructional designer, and a Moodle technical expert. These formed the core of the implementation team. A WhatsApp platform for tutors was subsequently employed to enroll tutors to partake in the 5-day training session. Directives from some regulatory bodies such as the National Accreditation Board (NAB), and the National Board for Professional and Technical Examination (NABPTEX) had also caused the management of the institution to be enrolled as they required the institution to submit modalities for going online in the short and long terms as well as examination conduction via the online platform. Through a request by these regulatory bodies, a member of the implementation committee had been selected to undergo e-learning training to be offered by International Business Machines (IBM).

Nonetheless, what was still not clear in all of this was who was actually in charge and pushing development. It was not clear who was enrolling actors onto the project and to what end. It was also not clear what medium was employed to create awareness and sensitization of the platform to actors. Per the ANT these uncertainties could threaten the long term existence of the network since there are no clear-cut roles for actors. However, after the initial 5-days of training, some tutors managed to contact members of the committee to take them through some of the lessons. While this is ongoing, students had tutorial modules placed on the LMS for them to get acquainted with the use of the platform. A
WhatsApp platform created for students was also employed to communicate with students. Tutors were required after the 5-day training to populate their courses and start actual facilitation the following week.

**Mobilization**

Finally, with most of the actors on board, the current implementation carried out to date shows attempts by the institution to mobilize actors to ensure successful implementation. These include the training provided to tutors to ensure their familiarity with the basic functionalities and features of the LMS platform. Though the period was short, efforts were made to capture video recordings of the training sessions for members to continue learning after the training sessions. Students have also been provided with online training modules to learn how to engage in online learning. A member of the implementation committee with experience and knowledge in instruction design was invited by management to advise on online examination modalities. Inputs were taken and considered with a final decision to submit a proposal to the academic board for approval. More needs to be done to mobilize all actors if success and sustainability are to be assured.

**Discussion**

The available evidence so far points to a lack of clarity on who the main or focal actor is—whether the regulatory body NAB, NABPTESX, or the Ministry of Education. Also, at the institutional level, it is uncertain who the main actor is and extent to which the proposed solution is to be implemented—whether just to engage students, continue with a broken semester, etc. What is clear though is the absence of clear direction and purpose and the mobilization of the existing and necessary resources to address the problem. Whether the main actors are internal, external, one or many is certainly not clear at this moment. Internally, although there appears to be mixed feelings and opinions
on whether or not the online is the way to go, some see it as a directive from authorities beyond the boundaries of the institution and so can have far-reaching consequences when not complied with. Others appear to be simply following instructions from institutional management without clearly understanding and appreciating what is at stake. This may have been caused by the inadequate communication and inappropriate communication channels adopted.

The obligatory passage point, although not clearly defined, may be considered to be acceptable to go online using the LMS to engage students and continue with the semester. To get all networks to understand, accept and arrive at this point is still an activity yet to be consciously undertaken even though the training of tutors was an important action that could have sent signals of institutional intentions. However, less than half of existing tutors participated in this training without any consequence. Behind the scenes, some tutors are contacting members of the committee and other knowledgeable people to further explain the LMS’s functionalities and features and so it can be argued that buying in is gradually taking place. Probably, the deadline slated for the start of the use of the LMS has triggered this need to understand the platform better and improve competency in use. Aside from tutors and students, other important networks, e.g., department and faculty champions, technical and pedagogical support networks are yet to be identified and brought onboard the implementation project. Generally, however, there is some skepticism about going online even though it is yet to be established whether it’s the technology itself or some deep-seated resistance to change.

The 5-day training is a good example of an initiative imposed by the institution to stabilize tutors and get them to commit to the network of trained online instructors being prepared by the institution. Another action by the institution to lockdown actors to commit to the online project is an agreement reached with two telecommunication service organizations for free internet services for students and tutors who log onto the LMS using their channels. This was going to be a major challenge for these two actor-networks. However, the seemingly quick intervention by the institution’s authorities may just have succeeded in removing that barrier as an excuse for not utilizing the LMS. It can
be argued that these actions are insufficient for sending the message of a new dawn and a new norm across as some tutors and students are complaining of inability to access these data platforms. Also, although an online support system, coupled with a WhatsApp platform and telephone lines have been provided to support users, with some communications being sent through the WhatsApp to students to help their understanding and use of the platform, complaints, especially from the students keep rolling in. Solid and stable networks of associations are yet to be created between the LMS and other actors to stabilize acceptance.

The training of tutors was a clear definition of a particular actor-network group and their relevance to the success of the implementation project. This brought tutors together and caused them to form a network of support for each other. There was also the exposition of a team of experts with adequate knowledge and skills to train learners. Actors from the tutors’ network were subsequently calling on this network for further assistance after the formal training as while some complained of lack of understanding, others simply did not attend the training these interrelationships can, therefore, be seen to be getting other actors to enroll. This is also occurring among students whose colleagues have managed to successfully log on to the LMS. Interaction between the technical network and tutor network can be seen to be shaping what will eventually emerge as the institutional LMS. There is very little influence of management here as more resources need to be provided for a more successful implementation engagement. There is a lot of bargaining going on as even within these networks there appears to be the isolation of some members. This may ultimately not auger well for the eventual outcomes.

Efforts to create networks with clear leadership and a spoke’s person to represent the needs and concerns of sub-networks are glaringly missing. It can be argued that the group networks are still in their formative stages and may take time. However, a focal actor’s initiative is urgently required to drive this development of networks to ensure success and sustainability. A network of expert LMS implementers must be created and supported. When this is available, anyone with any problem will know exactly where to go. Currently, they were established as a committee and even this was unrecognized by management. The work done so far was
beyond the request by management suggesting that management may not be abreast of this technology, its potential, and subsequent impact. Quite clearly, mobilization was not taking place.

Conclusion

The brief analysis clearly highlights an unprepared institution caught in the middle of a pandemic and needing to take decisions and actions without a clear-cut strategy. This is synonymous with the diffusion of information technology in SMEs and the diffusion of blockchain technology in the country (Coffie et al. 2020). This has only been made glaring through the lens of ANT without which it would have gone unnoticed. This indicate that the diffusion of e-learning in Ghana is unpopular and not even the outbreak of COVID-19 could adequately prepare the institutions for the uptake. Consequently, there is the need to explore policies to prioritize the diffusion of e-learning in Ghana to provide support for institutions in such times. ANT is a powerful tool for analyzing and understanding how human and non-human actors interplay to create new outcomes such as the deployment of an LMS to support students’ learning online in a crisis. The framework also draws attention to unanswered questions on the future of the project because of the lack of clarity in the problem definition. Also, it is important for the institution to critically pay attention to actions and strategies that can stabilize the identities of the various actors in this network.

The current efforts can be seen as not being consciously designed to achieve stability and threatens the survival of the network. Further, some actors have challenges with internet accessibility, stability, and cost. This is a wake-up call for the government to invest in ICT infrastructure across the country to support the diffusion of e-learning to provide learning support for students all over the country. Although the lockdown is to drive mass diffusion, the diffusion is relatively low because some actors still require additional training and support to use the system. Consequently, there is the need to consider the time and learning curves required for the different learners. Until most of the problems of the actors are adequately addressed, it poses a danger to creation of an
enabling interrelationship that forges the successful implementation of the LMS. Finally, since the mobilization phase is critical for the buy-in of many actor-networks in this project, the absence of clear actions on the part of the institution in this direction can lead to a gradual decline in interest and commitment to the LMS use in the not too distant future.

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