An Analysis of Educational Portals' Implementation for Effective Online Learning

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Abstract—Information Communication Technology (ICT) is advancing with rapid development aimed at offering quality education among learners to ensure satisfaction as well as convenience. With the devastating effects of the Coronavirus, many institutions are relying on e-learning technologies to carry out both administrative and academic activities to promote social distancing as well as curb the spread of the novel coronavirus. E-learning allows students from different geographical locations to learn as if in the classroom through the internet, providing tools that enhance effective teaching and learning. The question we ask is: are e-learning platforms performing as expected? To find out the answer to this question, an analysis of the factors identified to have affected implementation utilizing the IS implementation framework within two HEIs in Ghana is outlined in other to enable the identification of similarities and differences to be done.

Keywords—educational portal, framework, institution, implementation, online learning

1 Introduction

The use of e-learning has been believed to be a teaching tool to help the learning process be easier, practical, interesting, interactive, and motivating [6]. The fundamental problem at the core of this research is addressed by the question: are e-learning platforms performing as expected after implementation? To help in answering this question, Cooper and Zmud's [3] Information Systems implementation framework is utilized in analyzing the implementation within two HEIs that have implemented educational portals to aid in the teaching, learning, and the general administration of students.

From the 1960s to now, Ghana's population grew from 3.6 million to about 29.46 million. Over this period, higher educational institutions increased disproportionately as compared to the population. The increase did very little to absorb the large numbers of applicants who, year in and out, and seek admission into these institutions [2]. Another problem that has affected education most recently is COVID-19.

COVID-19 has had an enormous effect on the regular routines of the world bringing about the new normal, including how education is administered across the world. In December of the year 2019, the first active case of the virus was identified in Wuhan,

Hubei, China. Later in March of 2020, the virus was declared a pandemic by the World Health Organization. It brought an era of mass hysteria and confusion alongside a massive number of infections across the world [5]. As a result of these problems, higher educational institutions are beginning to realize the need for cost-effective alternative means of teaching and learning.

2 Background

The development of IS implementation has taken the ways of the innovation, diffusion of innovation, and adoption processes. Whereas an innovation process results in the development of an innovation and the diffusion process sees to how innovation is spread among intended users, the adoption process looks at how individuals, group of people, or originations involves the use the information system. The study of implementation can be more precisely described as the study of the process of adoption of innovations [7]. Based on the conceptualizations of IS literature, implementation can be classified under two perspectives. The first one being that of Alter and Ginzberg [1], which covers pre and post implementation activities and the second being that of Kwon and Zmud [4] which covers a narrow, physical action perspective encompassing a single stage.

From a technological diffusion perspective, Cooper and Zmud [3] defined information technology implementation as "an organizational effort directed toward diffusing appropriate information technology within a user community" [3]. An information system implementation framework was developed by Kwon and Zmud [4] and Cooper and Zmud [3] to aid in the implementation of any information system within an organization or institution and it is presented below in Table 1 and Figure 1.

Table 1. Description and outcomes of the phases in the IS implementation processes

S/N	Implementation Process/Phase	Description	Product/Outcome
1	Initiation	The active and/or passive scanning of organizational problems/opportunities and IT solutions either from a need-pull or technology-push force or both.	A match between an IT solution and its application in the organization is identified.
2	Adoption	Rational and political negotiations ensue to get organizational backing for the implementation of the IT application.	A decision is reached to invest the resources necessary to accommodate the implementation effort.
3	Adaptation	IT application is developed, installed, and maintained. Organizational procedures are revised and developed. Organizational members are trained both in new procedures and IT application.	The IT application is available for use in the organization.
4	Acceptance	Inducement of organizational members to commit to IT application usage.	Application of the IT in organizational work.

(Continued)

Table 1. Description and outcomes of the phases in the IS implementation processes *(Continued)*

S/N	Implementation Process/Phase	Description	Product/Outcome
5	Routinization	Usage of the IT application is encouraged as a normal activity.	Adjustment of the organization's governance systems to account for the IT application. No longer perceived as out of the ordinary.
6	Infusion	Increased organizational effectiveness is obtained through the use of the IT application in a more comprehensive and integrated manner to support higher level aspects of organizational work.	Use of It to its fullest potential.

Source: Cooper and Zmud [3].

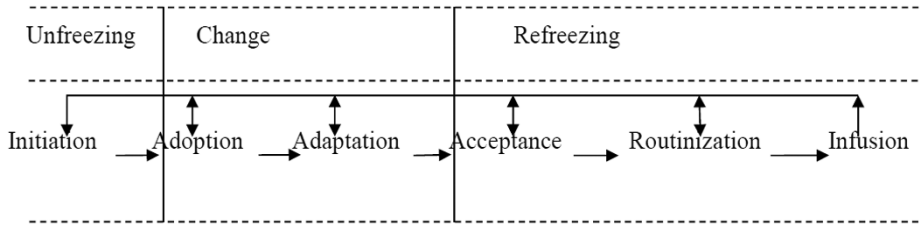

Fig. 1. Modified IS implementation framework

Source: Cooper and Zmud [3].

2.1 Contextual factors influencing IS implementation efforts in institutions

The literature on IS implementation and organizational innovation by Kwon and Zmud [4] outlined five key factors that contribute to the successful or non-successful efforts of organizations in introducing technological innovations. They are individual, structural, technological, task, and environmental.

3 Case descriptions

The selected institutions are Koforidua Technical University and Accra Institute of Technology, all in the Republic of Ghana. Leading and active members involved in the deployment of the system were contacted and visits were arranged. The initial impression from the discourse underlined distinctive experiences in the institutional journey towards the educational portal introduction and integration as well as the presence of specific similarities, which could conceivably give pointers to what works in a successful educational portal implementation in HEIs.

Case 1: The Accra Institute of Technology (AIT) is a technology-driven private university in Ghana. AIT operates both campus-based and online (Open University) systems at both the undergraduate and the postgraduate (graduate) levels, and it is credited with pioneering Open University education in Ghana and in the West Africa sub-region.

Case 2: Koforidua Technical University (formerly Koforidua Polytechnic) was established in the year 1997. The University currently, can currently boast of five (5) Faculties and one Institute with about eight thousand (8,000) students. The University offers thirteen (13) B-Tech programs, twenty (20) HND programs, and other Diploma and Certificate Courses in business, engineering, and science disciplines. The Faculties are resourced with the requisite manpower to facilitate teaching and learning in the University.

4 Findings

4.1 Introduction

This segment analyzes the process followed by the two institutions using Cooper and Zmud [3] IS implementation framework as discussed in the background section. It also looks at the sequence of activities and decisions taken by the institutions and the factors that facilitate and inhibit their outcomes at each of the identified stages of the implementation process. Through this, the recognized similitudes and contrasts will provide insight into how institutions can implement educational portal effectively.

4.2 A process analysis of the various factors identified in the various cases according to the stages in the research framework used

Kwon and Zmud's [4] contextual factors identified in each stage of the two cases have been highlighted to enable a comparison of the similarities and differences to be made as well as the factor categories and strengths of the factors and are presented in table format below. A five-stage Likert scale instrument is utilized to test the various factors.

The factor strengths show how influential the factors identified were regarded to be by a portion of the major players in the implementation process of the two (2) institutions. Some of the factors have been categorized into two or three to highlight how they can be considered by variation. The focus of this research was the identification of the factors and their effect on the various institutions' implementation processes.

Initiation stage. The initiation stage highlights important background activities and developments that enable a more profound understanding of the preceding activities and outcomes of the institutions' efforts and it is presented in Tables 2–5.

Initiation stage: Facilitating factor comparison of the cases in the study

Table 2. Case 1

Facilitating Factors in the Initiation Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Institutional Leadership	Structural					√
2. Management support and commitment	Structural					√
3. Experienced IT development team	Technological				√	
4. External support and advise	Environmental				√	

Table 3. Case 2

Facilitating Factors in the Initiation Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. External collaboration	Environmental				√	
2. Enthusiastic IT team	Structural/Individual/ Technological				√	
3. External IT support	Technological/Environmental					√
4. External online learning facilitator	Environmental/Task			√		
5. Moodle CMC portal Training	Task/Technological					√

Initiation stage: Inhibiting factor comparison of the cases in the study

Table 4. Case 1

Inhibiting Factors in the Initiation Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Inadequate ICT development staff	Structural/Technological				√	
2. CMC portal development time delays	Technological				√	

Table 5. Case 2

Inhibiting Factors in the Initiation Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Lack of experienced online learning technical staff	Structural/Technological/Task				√	
2. No clear institutional online learning vision	Structural					√
3. Lack of experienced online learning Lecturers	Individual/Task			√		

Adoption-decision stage. This stage which includes the making of a choice to adopt or not to have severe ramifications for an institution as it requires the commitment of more critical resources in other to realize the objective of the implementation and it is presented in Tables 6–9.

Adoption stage: Facilitating factor comparison of the cases in the study

Table 6. Case 1

Facilitating Factors in the Adoption Decision Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Earlier test and experimentation with the Moodle CMC portal	Technological				√	
2. Enormous Moodle community support across the world	Technological/ Environmental				√	
3. Free and Open source	Technological			√		
4. Prevalent among numerous prominent HEIs throughout the world	Environmental				√	
5. Adaptable to institutional processes	Technological					√
6. Institutional Leadership	Structural					√
7. Support and commitment of Management	Structural					√
8. Skilled Moodle development team	Individual/ Technological				√	
9. External advise and support	Environmental				√	

Table 7. Case 2

Facilitating Factors in the Adoption Decision Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Skilled Moodle managers	Structural/Technological					√
2. Demand for technology support in teaching, learning, and administration	Individual/Task				√	
3. External community of practice	Environmental				√	
4. Top management involvement and support	Structural				√	
5. Need assessment research undertakings	Structural/Task			√		
6. Demand for technology supported examination	Structural/Task				√	
7. ICT policy Development	Structural				√	

Adoption stage: Inhibiting factor comparison of the cases in the study

Table 8. Case 1

Inhibiting Factors in the Adoption Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Extended system development time	Technological				√	
2. Courseware development time	Task			√		

Table 9. Case 2

Inhibiting Factors in the Adoption Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Financial constraint	Structural					√
2. Absence of comprehensive institutional consideration of the issue	Structural				√	
3. Inadequate evaluation of institutional ICT infrastructure	Structural			√		

Adaptation stage. The CMC portal is set up to get institutional members to utilize new processes embedded within the platform or configured to follow institutionally prescribed processes and it is presented in Tables 10–13.

Adaptation stage: Facilitating factor comparison of the cases in the study

Table 10. Case 1

Facilitating Factors in the Adaptation Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Support and commitment of Management	Structural					√
2. Institutional Leadership	Structural					√
3. Technical staff availability	Structural/Technological					√
4. Technical and advisory external support	Environmental				√	
5. Core Institutional processes to be supported known	Structural/Task					√
6. Institutional courseware developed	Task					√
7. Institutional course sites set up	Technological					√
8. Providing training and testing for all users	Structural/Task					√

Table 11. Case 2

Facilitating Factors in the Adaptation Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Skilled in web application development	Individual/Technological				√	
2. Webhost external support	Technological/Environmental					√
3. Moodle management training	Technological/Task					√
4. Collaborating institution support	Environmental				√	
5. Support of top management	Structural				√	

Adaptation stage: Inhibiting factor comparison of the 4 cases in the study

Table 12. Case 1

Inhibiting Factors in the Adaptation Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Technical staff Inadequacy	Structural/Technological				√	
2. Protracted system development time	Technological				√	
3. National Accreditation challenge	Environmental			√		

Table 13. Case 2

Inhibiting Factors in the Adaptation Stages	Factor Category	Factor Strength				
		1	2	3	4	5
1. Financial limitation	Structural					√
2. Lack of instructional technologists and online learning specialists	Task				√	
3. Scarce ICT/online learning support staff	Structural/Technological					√
4. Lack of strategy for training in online learning utilization	Structural/Task				√	

Acceptance stage. An institution can assess users' acceptance of the CMC portal for institutional activities through careful monitoring and assessment of users' first time utilization of the system. Users' compliance with institutional directives for utilization can indicate how users feel about the introduction of the CMC portal and requirement for use and it is presented in Tables 14–17.

Acceptance stage: Facilitating factor comparison of the 4 cases in the study

Table 14. Case 1

Facilitating Factors in Acceptance Stage	Factor Category	Factor Strength				
		1	2	3	4	5
1. Support and commitment of top management	Structural					√
2. External advise and support learning specialists	Environmental			√		
3. Users' training Provision	Structural				√	
4. Obligatory institutional requirement for employment and admission	Structural				√	

Table 15. Case 2

Facilitating Factors in Acceptance Stage	Factor Category	Factor Strength				
		1	2	3	4	5
1. Perceived usefulness of the Moodle CMC portal by Lecturers	Technological/Task				√	
2. support of Management	Structural				√	
3. Increasing Lecturers interest	Individual				√	
4. Motivated ICT/online learning leadership	Structural					√

Acceptance stage: Inhibiting factor comparison of the 2 cases in the study

Table 16. Case 1

Inhibiting Factors in Acceptance Stage	Factor Category	Factor Strength				
		1	2	3	4	5
1. Challenges with certain Lecturers and administrators	Individual			√		
2. Certain students' behavioral threats	Individual				√	
3. Technical challenges	Technological			√		

Table 17. Case 2

Inhibiting Factors in Acceptance Stage	Factor Category	Factor Strength				
		1	2	3	4	5
1. Scarce ICT/online learning support staff	Structural/ Technological/Task					√
2. Draft policies approval delays	Structural				√	

Routinization stage. Institutional efforts targeted at getting the utilization of the CMC portal to be integrated into the institution's processes feature in this stage and it is presented in Tables 18 and 19.

Routinization stage: Facilitating factor comparison of the cases in the study

Table 18. Case 1

Facilitating Factors in Routinization Stage	Factor Category	Factor Strength				
		1	2	3	4	5
1. Compulsory periodic training of staff	Structural					√
2. Regular sensitization and Orientation of students	Structural				√	
3. Compulsory valuation of course sites every semester	Structural/Task					√
4. Compulsory medium for performing institutionally mandated tasks	Structural/Task					√
5. Conscious reference to the system by students and staffs	Structural/Individual			√		
6. Support and commitment of management	Structural					√

Routinization stage: Inhibiting factor comparison of the cases in the study

Table 19. Case 1

Inhibiting Factors in the Routinization Stage	Factor Category	Factor Strength				
		1	2	3	4	5
1. Inadequate essential technical expertise	Structural/ Technological				√	
2. Slow development time	Technological			√		
3. Technical challenges	Technological				√	
4. Threat by hackers	Environmental				√	

Infusion stage. During this stage, the institution supposedly is seen to be well organized as it is now able to deliver institutional services in a convenient and successful way utilizing the same or fewer resources which were being used before. A lot more students can be served more swiftly by utilizing different delivery alternatives. Higher level aspects of institutional work would now be able to be realized because of the system's support of vital institutional functions and it is presented in Tables 20 and 21.

Infusion stage: Facilitating factor comparison of the cases in the study

Table 20. Case 1

Facilitating Factors in the Infusion Stage	Factor Category	Factor Strength				
		1	2	3	4	5
1. Management monitoring and enforcement of utilization	Structural					√
2. Management Support and commitment	Structural					√
3. Compulsory regular training of lecturers and administrators	Structural				√	
4. Trust in the stability and security of the CMC portal system	Individual/ Technological				√	

Infusion stage: Inhibiting factor comparison of the cases in the study

Table 21. Case 1

Inhibiting Factors in the Infusion Stage	Factor Category	Factor Strength				
		1	2	3	4	5
1. Cost of technology	Structural				√	
2. Trust concerns	Structural/Individual				√	

The outputs or outcomes of each of the two cases are shown in Table 22, and similarities can be drawn from the outcomes, such as at the adoption stages (stage 2); the two institutions had adopted the Moodle system, which is an open source platform, as the institutional CMC portal platform. A look at stage 3 indicates that both cases had the Moodle systems configured and were available for utilization at different levels of each institution but it was only Case 1, which had reached a state of infusion as its management had shown a high level of institutional leadership.

Table 22. A comparison of the outputs of each stage for both Cases

Stages	Case 1	Case 2
Stage 1	Institutionally defined Moodle CMC portal requirements	Use of Moodle CMC portal for weekend program
Stage 2	Adoption of an institutional Moodle CMC portal	Adoption of Moodle as institutional CMC portal system
Stage 3	Functional institutional Moodle CMC portal	Availability of Moodle CMC portal for institutional utilization

(Continued)

Table 22. A comparison of the outputs of each stage for both Cases *(Continued)*

Stages	Case 1	Case 2
Stage 4	Compulsory utilization of institutional Moodle CMC portal system	Growing acceptance within institution of the Moodle CMC portal system
Stage 5	Utilization of Moodle CMC portal perceived as normal	
Stage 6	Integrated utilization of Moodle CMC portal for teaching, learning and administrative services	

A discussion of the portal implementation utilizing the Cooper and Zmud [3] IS implementation framework is presented in the sections below.

5 Discussion

Initiation stage. Satisfactory preparations must be made to clearly highlight the needs to be addressed and the readiness of the institution when planning to introduce a CMC portal into HEIs. The thought of the institution as a new or an already existing one ought to be of great importance as this can have an impact on the implementation process. This is crucial in light of the fact that introducing innovations of this sort can result in resistance by stakeholders who are used to the conventional methods of performing core tasks in institutions which have been in existence for a while. Also, there is an indication that an institution that begins with the system already in place before enrolling the users will be less inclined to face much resistance as seen in Case 1. The consideration of the different CMC portal solutions available as against the institutional processes to be supported at this stage is also vital in light of the fact that different solutions exist which include open source and proprietary, with different implications and requirements for any institution. For instance, an open source will give broad opportunities for institutional configuration and integration but will require experienced and skilled internal technical staffs to develop it. And on the other hand, a proprietary solution would have a standby support team from the vendors although the extent of configuration and integration would be restricted by the capabilities of the application. Before a choice is made concerning which one to pick, the cost of the two options must be carefully considered. An institution-wide goal of this nature must assess the readiness of the staff and students in the utilization of such technologies in the teaching, learning, and administration process as well as the institutional IT infrastructure because the insufficient or undeveloped IT infrastructure can contrarily influence perception and use by the stakeholders. The identification of the reasons for the introduction, or opportunity, and the proposed technological solution and how it fits into the institution's line of work is very vital at this stage. In the case where there exists an institutional educational technology strategy, it will significantly help the institution with its detailed planning required at this stage. The output(s) of this stage when considered cautiously, will lead to the identification of the reasons for the introduction or opportunities along with the identification of CMC portal solution for promotion.

Adoption stage. This is where user participation can aid a successful deployment as well as utilization and this stage is also subject to the consideration of whether the institution is a new or an already existing one. With a new institution, as in Case 1, consideration may be in the direction of environmental factors such as the readiness of the country's IT infrastructure for both online as well as on-campus delivery, the condition of technological development of the citizens in the country, and etc. But for an already existing institution as in Case 2, stakeholders' involvement might be required in the institutional decision. This action may give off an impression of being usurping management authority but at the same time, it can have positive ramifications on some of the stages after this particular stage. During this stage, the decision made which often includes an acceptance or rejection of the proposed CMC portal ought to be based on how well the solution matches the reasons for the introduction or opportunities identified by the institution. A comparison of the various CMC portal solutions ought to have been carried out at the initiation stage to enable an informed choice to be made. Institutional task processes to be supported by the CMC portal must be carefully considered to enable a right fit to be made with the selected solution but when a solution is selected by just a small portion of stakeholders without the consideration of the processes to be supported, the needed support may not be gathered, and this can likewise impact later stages of the implementation process. An institutional selection of a particular CMC portal solution is the outcome of this stage and will be infused into the activities on the next stage.

Adaptation stage. The selected CMC portal solution is developed at the adaptation stage which can be a decision to develop the system from scratch, purchase from off-the-shelf, or customize an open source CMC portal software. During this stage, two things can happen. The first one is that the CMC portal will be configured to either suite the institution's processes or the institution's existing processes changed to fit with that of the CMC portal. The vendor would have to configure the required processes into the CMC portal if it's a proprietary solution but if the CMC portal system is being developed from scratch, desired institutional processes should be incorporated. An internal development team must be acquainted with the institutional processes to be configured and should have the state of art technical competencies to be able to undertake the configuration if it is to oversee to the adaptation of an open source solution. At this stage, an experienced online learning expert will be valuable as in, the knowledge in setting up the CMC portal course site will be required. When using an internal development team, educational technologist, an instructional designer, or an online learning expert will prove extremely convenient at this stage since individuals like that will actually prove useful from the initiation stage to guide the institutional decisions and actions towards the introduction of the CMC portal. Of critical significance in the adaptation stage is the inclusion of pedagogical considerations in the setup and development of courseware. Because without these, the utilization of the CMC portal may appear to be a document repository which overtime, even the most enthusiastic user may quit visiting. Equally critical at this stage is the development of courseware for supporting the programs. There must be a clear decision from the institution on whether it would have lecturers develop the courseware, source the courseware externally, or contract an institutional internal team to oversee their development since it has various implications for the institution's success as their absence or inadequacy will cause difficulties in the

institutional objective. During this stage, consideration of multimedia support for the development of the courseware is necessary as the different media types will help the advancement of learning. Intensive training for the staff and students with the focus on equipping users with the appropriate knowledge and skills required to utilize CMC portal platform effectively is essential at this stage, too, as this will go a long way to enhance its utilization. Other fundamental considerations here also bother on the technical considerations on hosting (hosted externally or internally by a competent institutional team), security, and management of the CMC portal. The output of this stage should be an institutionally ready CMC portal for utilization.

Acceptance stage. At this stage, the institution must endeavor to reinforce the right attitude of users in relation to system utilization. Previous stages monitoring would highlight what may be the concerns of stakeholders which can be elicited through interviews, questions, or focus group discussions. Other strategies like the establishment of an online learning community of practitioners to support the dissemination and sharing of helpful information is vital at this stage. The composition of this group should involve major stakeholders and who should be used to identify and resolve concerns while encouraging continuous utilization by users. Other strategies in different contexts which have been seen to work are the provision of motivation—mostly financial, sponsorship packages, etc.—but these may not always be required. Clear signs of institutional inducement of stakeholders to commit them to the utilization of the CMC portal should be the output of this particular stage.

Routinization stage. The routinization stage seeks to facilitate institutionalization by getting all stakeholders in the institution to utilize the CMC portal in their mandatory tasks so as to become obligatory. The institution must be seen to be encouraging this level of integration through the enactment and enforcement of policies such as online learning policy, the establishment of online learning support centers, updating of existing institutional structures to incorporate online learning, representation of online learning matters in administrative structures, and so forth. The CMC portal can likewise be integrated with other institutional information systems like the registration system, students' information management system, human resource system, and others to urge users to as often as possible visit the platform. Recruitment and periodic refresher courses for staff can also include mandatory courses on CMC portal utilization for supporting teaching, learning, and administration. By these, measures can be put in place to enable stakeholders in the institution not to sidestep the utilization of the system in the performance of their daily routines. The institution must consciously identify and institute these measures to routinize the CMC portal use. A visible establishment of measures directed at encouraging the utilization of the CMC portal as a normal activity through conscious and careful integration with institutional processes and practices should be this stage output.

Infusion stage. The infusion stage, which is the last stage of the institutional implementation process, should see the institution utilizing the CMC portal for higher level aspects of institutional work in a progressively incorporated and thorough way. The provision of opportunities for life-long learning is one example of such higher level institutional work. The CMC portal could be made available for Open University learning type to enable students who cannot make it to their physical campuses to still gain the privilege of having their education with them. All areas of institutional

operations that can be improved through an incorporated and thorough utilization with the CMC portal should be exhausted at this level. This may, however, hypothetically lead to the identification of new areas for consideration that may require the institution to start from the initiation stage. A circumstance in that capacity won't be considered strange but instead, a true consequence of an institution's effort at institutionalizing an innovation such as the CMC portal.

Through the feedback processes, when the actual institutional outcome(s) vary from the expected outcome(s) at every one of the stages described above, the recognized setbacks can be catered for by the institution inside the stage the deficiency was identified. Along these lines, there may not really be the need to start from scratch as the framework may propose.

From the description of the stages above, the proposed framework will be influenced by contextual factors and this will vary from institution to institution yet as has previously been highlighted above, some of these factors will play very strategic roles that can lead the institution to realize its objectives for introducing the CMC portal. Among these are support and commitment from management, institutional leadership, CMC portal development, and management training; the developers having a good understanding of the institutional processes to be supported, adequate technical staff, courseware availability, and management enforcement of utilization.

6 Conclusion

Higher education institutions utilizing the CMC portal for implementing online learning and administration to support Ghanaian students learning tend not to undertake comprehensive planning prior to introducing the system especially institutions that have been in existence for some time. Techniques for deployment and utilization are often uncertain and, thus, make an appropriate assessment of the system's utilization challenging. Institutionalizing any new system like a CMC portal may take time, yet clear institutional strategies must be put in place to realize this objective.

Holistic planning that includes all institutional stakeholders is key for the institutional implementation of a CMC portal for online learning purposes, and also, all institutional processes that will be potentially affected by this new system must be taken into consideration. Strategizing how the system would be rolled out and sustained thereafter ought to be the end result of this holistic planning and this will lead to the realization of technical implementation and the objectives for introducing such a system.

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