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FACTORS THAT INFLUENCED THE INSTITUTIONALISATION OF TESSA SCIENCE OER IN A GHANAIAN COLLEGE OF EDUCATION

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ABSTRACT: *OLA College of Education, one of the higher education institutions involved in TESSA activities in Ghana, has been able to institutionalise the TESSA OER innovation despite challenges associated with the institutionalisation of educational change. This paper investigated factors that facilitated and those that impeded the change process at its continuation phase in the Ghanaian College of Education. The illuminative case study design was used for this study and data was collected using interviews, documentary analysis and observation. Seven participants, the Principal of the College and six tutors involved in TESSA activities were purposively sampled from whom data was collected. Data generated were analysed thematically and the results presented using description of themes and sub-themes. The findings obtained revealed that factors such as leadership interest and support, established procedures and the existence of committed staff facilitated the continuation of the TESSA Science OER. However, the introduction of another innovation during the continuation phase of the TESSA innovation hampered the institutionalisation efforts. A thorough study of the T-TEL innovation should therefore be done so as to incorporate TESSA Science OER activities into it to enhance quality of teachers trained by the College.*
KEYWORDS: Educational change; facilitating factors; institutionalization; impeding factors; TESSA Science OER

INTRODUCTION

The Open Educational Resources (OER) movement has come at a time when many skilled and qualified teachers need to be trained to fill the teacher gap created by the implementation of the Education for All (EFA) and Millennium Development Goal (MDG) (Walji, 2014; Wright & Reju, 2012; Wolfenden, 2008). Through the use of online teaching, OER could be used to train and retrain teachers and teacher educators at their convenience (Clements & Pawlowski, 2012; Misra, 2014, Green & Vollmer, 2016) in an era of evolving society, economy and technology. According to Green and Vollmer (2016), educators and governments can support public education by effectively sharing educational materials with their citizens at no or minimal cost, without sacrificing the quality of education through the use of OER. Butcher (2011) argued further that OER has emerged as a concept with great potential to support educational transformation. While its educational value lies in the idea of using resources as an integral method of communication of curriculum in educational courses, its transformative power lies in the ease with which such resources, when digitised, can be shared via the internet (Stutchbury, 2016).

The Teacher Education in Sub-Saharan Africa (TESSA) Project led by the Open University, UK, was initiated in 2005 with organisations like the British Broadcasting Corporation, World Service Trust, Commonwealth of Learning, Africa Virtual University, and South Africa Institute of Distance Education. The TESSA Project was funded by the Allan and Nesta Ferguson Charitable Trust and the William and Flora Hewlett Foundation. The TESSA OER is the largest OER initiative created by

teacher educators from Sub-Saharan Africa (SSA) with support from Open University, UK. Like all other OERs, the TESSA OER makes available quality but free and easily acquired information for teachers and teacher educators in SSA. The use of the TESSA OER by teachers and teacher educators in SSA has an eminent potential of improving the quality of education, a feat that will expedite the realisation of SDG goal 4 (Green & Vollmer, 2016; Stutchbury, 2016). Due to its benefits on the quality of education, the TESSA OER units have been implemented by some nations in SSA. According to Wolfenden, Umar, Aguti, and Abdel (2010), the implementation of TESSA OER dates from early 2010 across 13 partner institutions in nine countries. In their evaluation report, Harley and Barasa (2012) asserted that the TESSA OER has been used by the Mauritius Institute of Education in their creative pedagogy module. Also, the Open University of Sudan, has compiled a teaching practice handbook based on the TESSA OER to support teachers pursuing Bachelor of Education degree (distance mode for in-service teachers) on teaching practice. In Nigeria, the National Commission for College Education has created books based on TESSA OER to be used by all pre-service teachers as well as in continuous professional development programmes. Egerton University (Kenya), Makerere University and Kyambogo University (Uganda), and the University of Zambia are adapting TESSA OER in their Distance Education Programmes (Harley & Barasa, 2012).

In Ghana, similar use of the TESSA OER material has been reported among higher education institutions, which form part of the TESSA consortium. At the University of Education, Winneba (Ghana), TESSA OER has been incorporated into some courses taught to regular students at the Basic Education Department, as well as students on the Distance Education Programme (Harley and Barasa, 2012). At Our Lady of Apostles (OLA) College of Education (Ghana), an opportunity has been created for the students to study the TESSA OER materials in their computer laboratory during Information Communication Technology lessons and TESSA Club meetings (Acquah, 2018, Ngman-Wara & Acquah, 2015, Harley and Barasa, 2012). Harley and Barasa (2012) however, argued that due to the unfavourable institutional policies, the institutionalisation process of the TESSA OER in these Higher Education Institutions (HEIs) is somehow being hampered. Despite these challenges encountered by HEIs in their attempts to implement the OER, OLA College of Education (COE), a recent TESSA partner in Ghana seemed to have been able to integrate the TESSA Science OER into its academic programmes. In 2007, the Institute of Education of the University of Cape Coast (UCC), the main body that used to be directly responsible for the assessment and certification of all public colleges of education in Ghana, introduced principals of all colleges of educations in Ghana to the TESSA OER. However, it was only the Principal of OLA College of Education who initiated, implemented and institutionalised the use of the OER.

Research abound on the implementation and adaption/adoption of the TESSA OER in initial partner HEIs (Muganda, 2011; Harley & Barasa, 2012; Murphy & Wolfenden, 2013; Buckler, Perryman, Seal, & Musafir, 2014) and among others who were not part of the initial consortium, like Mauritius Institute of Education (Wolfenden, Buckler, & Keraro, 2010).As far as the researcher is concerned, there seems to be no in-depth studies conducted to identify factors that facilitated the institutionalisation of the TESSA OER. Some initial and anecdotal observations have however been made by some researchers. For instance, Harley and Barasa (2012) observed the lack of institutional policies on OER. Others have mentioned the integration of units of the TESSA OER in initial teacher education and in-service programmes (Wolfenden, 2008; Wolfenden, et al., 2010; Wamutitu, Keraro, Changeiywo, & Cullen, 2011). OLA College of Education is one of the few colleges of education that runs a Science

programme for basic school Science teachers in Ghana. There is ample evidence that Science tutors in the College were highly receptive to, and supportive of the TESSA Science OER (Harley & Barasa, 2012).

Nonetheless, to the knowledge of the researcher, there is lack of documentation on the factors that facilitated the institutionalisation of the Science OER. This is the knowledge gap, which this study sought to fill. The import of this research was to unearth the policies and strategies used by the target college of education to institutionalise such a novel initiative. The purpose of the study was therefore to investigate factors that influenced the institutionalisation of the TESSA Science OER in a Ghanaian College of Education. The study was guided by the following research questions:
1. What factors facilitated the institutionalisation of the TESSA Science OER in OLA College of Education?
2. What factors impeded the institutionalisation process of the TESSA Science OER?

THEORETICAL CONTEXT

This paper is situated in the theory of educational change and throws light on the factors that affect the various phases of the educational change process. The institutionalisation of educational change is seen as the process of making an innovation or programme part and parcel of the activities of an organisation or institution (Acquah, 2018). There are several theories on educational change processes proposed by different scholars. However, for the purpose of this study, Fullan's (2001, 2007) theory on the process of change was used.

Fullan's (2001, 2007) change process is divided into three different phases/stages. These phases are initiation; implementation; and continuation. The institutionalisation of change occurs when an institution is able to go through these three phases successfully. According to Bukari (2007) and Tarosa (2013), when all the stakeholders including the government are actively engaged in the change process, success is assured even in difficult situations. Initiation as the first phase deals with preparation for change, the implementation phase is when the change is being practiced and the continuation phase is when steps are taken to sustain and improve the change. Several factors exist that affect each phase of the change process (Fullan, 2007). Accordingly, Lewin (as cited in Tarosa, 2013) asserted that when more factors militate against the institutionalisation of change, the process is adversely affected, but when more factors work in favour of the process, the desired change will be accomplished. Fullan (2001, 2007) pointed out that during the process of change, the initiation phase is affected by factors such as access to information, advocacy from school administrators and teachers, external change agent, and new policy. The implementation phase is also affected by need, clarity, practicality, role of school leadership and external support, among others.

The continuation phase of the change process, which is the focus of this study, is broadly conceived as the process whereby actors adopt specific cultural element or objects in a social system (Clark, 1968). Certain factors that negatively affect the continuation phase of change as asserted by Fullan (2007) and Sakulsampaopol (2010), are the lack of interest and support by higher authorities including the principals of colleges, the lack of commitment of teachers and teacher turn over or attrition and established procedures. Tarosa (2013) also argued that the lack of interest and support of the principal often leads to the truncation of any innovation no matter the phase it has reached. The interest and support of school leadership, especially that of the principal, is key to the institutionalisation of change

irrespective of the phase (Carlyon & Branson, 2018). Thus, when there is lack of leadership support and interest for sustaining change, its sustenance is adversely affected. Dickerson (2001) in his study pointed out that the availability of skilled and committed teachers generated through effective professional development, and established procedures are also essential factors, critical for the continuation phase of the institutionalisation process. The continuation of educational change is a difficult feat to achieve but not impossible (Hargreaves & Fink, 2003). These authors asserted that 'educational change that enhances and enriches deep learning among students are particularly problematic and its continuation over time has presented severe challenges for educational reformers' (p. 1). Hargreaves & Fink (2003) are of the view that researchers interested in educational change and change agents are at a loss as to how to move from the implementation phase of change to the continuation phase, where practices are integrated effortlessly into teachers' repertoires and affect many teachers but not just a few. To consolidate change, strengthening factors need to be reinforced, facilitated and good practices encouraged (Razzaq, 2012; Tarosa, 2013). Fullan (2007) is of the view that change promoters need to be committed to change and have the skills for the change process as well as the change itself.

METHODOLOGY

Since the research sought to hear the voices of participants who have experienced the institutionalisation of change (TESSA Science OER), an interpretive methodology was adopted. The intrinsic case study, situated in illuminative evaluation design (Elis, 2003) was adopted for this study. Seven (7) participants, constituting the Principal and six tutors of OLA College of Education formed the sampled participants. The Principal was purposively selected because according to Fullan (2007), heads of educational institutions are the key agents in systemic change, so it was significant that she was sampled for the study. The Principal of the College has been at post for over nine years and has been present from the initiation stage of the TESSA Project to its institutionalization, and could be easily accessed. The tutors consisted of the former and current Project Lead, the Technical Lead of the project and three Science tutors. One the Science tutors was the TESSA Science Coordinator. These tutors were personally involved in using the OER units in the College thus they were purposively selected. Qualitative data was collected using semi-structured interviews, observation, and document analysis. The interview protocol contained ten (10) items. The first two items solicited background information on participants' age and teaching experience, and the remaining eight items sought information on factors that facilitated the institutionalisation of the innovation and those that impeded the process. Interview sessions lasted between 60 to 90 minutes and all were audio recorded.

Analysis of the data generated from interview sessions followed the interpretivist convention. The audio-recorded interview data was transcribed using Microsoft word and transcripts read over a number of times to gain a practical understanding of meanings and actions within the data (Miles & Huberman, 1994). The transcribed texts were analysed by attaching codes to units of information (Cobern, 1993). Recurring codes were clustered into main codes/themes, which led to the generation of identifiable codes/themes and sub-code/sub-themes of the factors that facilitated or impeded the institutionalisation of the innovation in the college. Data obtained were presented using simple descriptive statistics and codes. To ensure anonymity, pseudonyms were given to all participants. The background information on participants is presented in Table 1.

Table 1: Participant Demographics

Participant	Gender and Age	Years of Teaching	Subject of Instruction
Nelly	Female; 58 years	35 years	Principal
Ben	Male; 48 years	22 years	Science
Kweku	Male; 41 years	23 years	ICT /Technical Lead
Kingful	Male; 41 years	20 years	ICT/Former Project Lead
Alhassan	Male; 36 years	12 years	Science /Subject Coordinator
Martin	Male; 38 years	13 years	Science
Yaw	Male; 35 years	15 years	Social Studies /Current Project Lead

RESULTS

The data analysis yielded several themes grouped under two categories: facilitating factors; and impeding factors of institutionalising the TESSA Science OER. Some factors such as motivation, awareness, leadership interest and support, external support, availability of resources, established procedure, professional development, teacher attrition and the effect of introducing another innovation were identified to have facilitated or impeded change at specific phases (initiation, implementation and continuation) of the change process. Also, the findings revealed that all (100%) of the Science tutor participants experienced improvement in their Science pedagogy due to the use of the TESSA Science innovation. In this paper, I am focusing on only the continuation phase of the change process and the factors that facilitated or impeded change at this phase. Several sub-themes emerged regarding facilitating and impeded factors at the continuation phase of the institutionalisation of TESSA Science OER. These themes and sub-theme are thus discussed.

Facilitating Factors

Participants were interviewed to unearth factors that facilitated the continuation phase of the institutionalisation of the TESSA Science OER. Three main sub-themes emerged regarding facilitating factors: (1) leadership interest and support, (2) established procedures, and (3) committed staff.

Leadership interest and support

Participants specifically expressed how the interest and support of the Principal towards the TESSA Science innovation aided its continuation at the College. Provision of resources, monitoring and motivation for TESSA activities were the major forms of leadership support outlined by participants. Expressing his opinion on provision of resources, Kingful, a 38-year old ICT tutor and also the former TESSA Project Lead commented:

> *The Principal has seen to the provision of the wireless facility, which has improved internet accessibility in the college and since students access TESSA OER online, TESSA lessons are never disrupted. Through her leadership (referring to the Principal), we now have two*

computer laboratories with over 100 computers. This makes the teaching of TESSA lessons very easy and interactive.

The existence of the two computer laboratories and the presence of the many computers were observed during the field experience.

In connection with leadership support on motivation and monitoring, Alhassan, who was 36 years old and the TESSA Science coordinator also said that:

She (the Principal) has been calling from time to time to find out the programme of activities that we have for the TESSA Club and whenever we have a (TESSA) class, she comes around to talk to the students, motivating them about the need to involve themselves in TESSA activities so that the pedagogy of teaching Science will improve.

Martin, a 38-year old Science tutor also commented on the motivation provided by leadership thus:

The Principal has introduced the TESSA Awards on the College's graduation day so now many students are very interested in using the TESSA materials in teaching during on-campus and off-campus teaching practice. Everybody wants to win the award.

Established Procedures

Two forms of established procedures were revealed during the interview sessions. The first established procedure identified was TESSA on the College's timetable. All participants mentioned that putting TESSA OER on the College's timetable and maintaining it as a course to be studied by all first year students was a major established procedure that facilitated the continuation phase of the innovation at OLA. In this light, the Principal of the College commented:

After we had used the TESSA Science OER at the club level for a while, I decided to put it on the timetable to be studied by all first-year students. I did this because I saw that it was improving the teaching skills of the TESSA Club members.

Kingful also added: "The study of TESSA Science OER was initially done by only TESSA Club members but later the Principal saw the need for all students to study it so, she put it on the first year timetable". Ben, the Chemistry tutor, aged-48 years also said: "TESSA is on the timetable for all first years". Data obtained from the documentary analysis and observation confirmed that the innovation was on the College's timetable for all first years and was studied for a period of 60 minutes at the computer laboratory.

Professional development was the other established procedure mentioned by the Principal and three tutor participants. During an interview session with the Principal, she disclosed that she ensured that workshops on the use of the TESSA OER materials were organised at the beginning of every semester to refresh tutors' knowledge on the use of the innovation or introduce new tutors who had joined the staff to the educational change. Tutor participants also indicated that these workshops were organised at the beginning of each semester in confirmation to what the Principal said. Supporting this view, Kweku, who was 41 years old and the Technical Lead commented: "as a Technical Lead, I liaise with the Project Lead and other subject coordinators to organise workshops on TESSA at the beginning of every semester".

Skilled and committed staff

Results obtained from participants during the interview sessions also revealed that the Principal entrusted TESSA lessons into the care of ICT tutors and appointed subject coordinators who saw to

the running of TESSA activities in the College. This engendered skilled and committed tutors who led TESSA activities at the study site.

The TESSA Project coordinators consisted of the Project Lead, Technical Lead and subject coordinators.

> "*I am a member of the TESSA Project Committee and my main duty is in planning and organising TESSA workshops and other TESSA activities that goes on in the school",* said Alhassan, the Science Coordinator.

Kingful also added that as a former Project Lead, he documented TESSA activities as reports, videos and still pictures, which he sent to UK (Open University). This was evident in some TESSA newsletters and published articles collected from the school.

Impeding Factors

During the interview sessions, it came to light that the introduction of another innovation and teacher attrition/turnover were factors that impeded the continuation phase of the institutionalisation process of the TESSA Science OER at OLA College of Education.

Introduction of another innovation

The first impeding factor, which is the introduction of another innovation, Transforming Teacher Education and learning (T-TEL), a Government of Ghana initiative, was mentioned by all participants as the major factor that negatively affected the continuation phase of the change process involving the TESSA Science OER. Nelly, the 58 year-old principal of the College indicated that although the TESSA Science OER was the innovation of the TESSA Consortium, a non-governmental organisation, she decided to introduce it to her College because she realised it had the potential of improving the quality of teachers trained by her College. She continued:

> *The use of the TESSA Science OER has improved the teaching skills of student teachers who use it effectively during on-campus and off-campus teaching practice. I can say that most of these students are those who got first class. So you see, using the TESSA Science OER has yielded very good results and I don't regret introducing it into my College. I have even introduced TESSA to other colleges of education like Holy Child, Komenda and Foso".*

Nelly however said that the introduction of T-TEL, a Government of Ghana initiative spearheaded by the Ministry of Education (MOE) has negatively affected TESSA activities in OLA. She pointed out that T-TEL was introduced based on the achievement the College had made with the institutionalisation of the TESSA OER. The Principal further explained that the mandatory nature of T-TEL for all tutors in all colleges of education in Ghana has prevented TESSA activities from being organised. She concluded by saying: "This T-TEL that has come to spoil our TESSA". When asked how the introduction of another innovation has had a negative effect on TESSA, she said:

> *I say T-TEL has come to spoil TESSA because it is compulsory for every teacher. We cannot have the TESSA workshops now because all attention has shifted to T-TEL. We are now having workshops on T-TEL instead. But personally I feel TESSA activities have gone down with this T-TEL.*

Alhassan and Yaw confirmed the Principal's assertion as they commented that since the T-TEL professional development workshops commenced in the College, they, as TESSA coordinators had been unable to organise TESSA professional development workshops and other activities, which they

did previously regularly. Yaw, a 35 year-old Social Studies teacher and also the current Project Lead added: "Now everyone's attention and efforts are geared towards the successful implementation of T-TEL. Even the Principal is more focused on T-TEL than TESSA". These responses went to prove that most of the tutors were initially dedicated in organising TESSA activities at the study site. However, this dedication and interest seemed to have dwindled when another innovation, T-TEL was introduced into the College.

Teacher turnover/ attrition

A few participants (3 tutors) also talked about how teacher attrition/turnover has negatively affected the continuation phase of the innovation. The principal and two tutors pointed out that some tutors who began the TESSA Project and were very instrumental in the initial phases of the innovation had either left the College or taken up other positions in the College. According to the Principal, this situation required that new tutors were trained to use the TESSA OER. Confirming what the Principal said, Kweku said: "the original (former) coordinator has left for the T-TEL Project".

DISCUSSIONS

The interest I had in conducting this study was to find out the factors that either facilitated or impeded the continuation phase of the institutionalisation process of the TESSA Science OER. The institutionalisation of any change is not an easy feat to achieve and that of the TESSA Science OER particularly by higher education institutions in Sub-Saharan Africa is no exception. One major phase that is problematic in the institutionalisation process is the continuation phase. However, OLA College of Education in Ghana's feat at institutionalising the TESSA Science OER is worthy of note. Findings from this study show that factors such as leadership interest and support, established procedures and committed and skilled staff facilitated the continuation of the TESSA Science OER at the study site. It is however worth noting that among these facilitating factors, leadership of the school is seen as the paramount factor that enabled the other facilitating factors to come into play. Especially, the continuous interest and support of the Principal of the College in the innovation, even at the continuation phase, led to established procedures such as putting TESSA OER study on the College's timetable to be studied by all first years. Also, the Principal made resources available for the organisation of all TESSA related activities. The TESSA Project Committee also showed a lot of interest during the continuation phase and did not relent in their effort in teaching the course to the first year classes. This finding is therefore in alignment with Carlyon and Branson's (2018) assertion that the interest and support from school leadership are essential ingredients needed for change to be continued.

Despite the College's ability to continue the TESSA Science OER, the findings reveal that the introduction of another innovation at the continuation phase impeded the institutionalisation of the TESSA Science OER. This implies that because the use of the TESSA Science OER was a College-based initiative, its full institutionalisation was impeded when a government-initiated innovation, was introduced. T-TEL as a government policy supersedes institutional initiatives. Based on this, the activities on TESSA suffered a setback. This finding ties in with what Dickerson (2001) and Bukari (2007) pointed out that institutionalisation of an innovation could occur and be maintained when there is the existence of adequate and continuous support from national administrative organisations. However, because the institutionalisation of the TESSA Science OER was not a government policy, it did not receive support from them during the continuation phase.

CONCLUSION

The continuation phase of the institutionalisation process of the TESSA Science innovation was facilitated by many factors. However, the most significant factor that ensured the continuation of change was the interest and support it received from the leadership of the College in making sure that all the other factors were put in place. The findings also revealed that the continuation of the TESSA Science OER innovation encountered a major challenge, which adversely affected its institutionalisation because professional development workshops, which were organised regularly, were no longer regular as a result of the introduction of another innovation known as T-TEL. Unfortunately, the improvement in student teachers' pedagogic practice as envisaged by the Principal, for which reason she decided to institutionalise the TESSA Science OER, may not be long lived due to the challenges identified in this study.

RECOMMENDATION

The continuation of educational change, like any other change, revolves around institutional leadership. The interest and support of leadership is very critical for the successful continuation of change as seen in this study. The leadership of the College should take note of the factors that facilitated the continuation of the TESSA innovation and keep fostering them. However, when leadership roles are not shared or delegated when it becomes necessary, the continuation of change is bound to suffer setbacks no matter how successful it has been, as observed in this study. I recommend that the shared leadership model where the ultimate responsibility does not rest on only one person will be most appropriate for the continuation of scientific innovations.

In this study, the introduction of a government-initiated project unsettled the continuation of the TESSA OER innovation, because the Principal of the College could not delegate her leadership roles in relation to TESSA activities when that became necessary. Considering the seeming displacement of the TESSA Science project by the T-TEL innovation as a result of the shift in focus of the Principal, I recommend that she delegates her TESSA OER leadership roles to the TESSA Committee in place to manage and ensure its continuation alongside the T-TEL initiative. With this arrangement, all activities in relation to the continuation of the TESSA Science OER will go on for the full benefit of the TESSA innovation to be accrued. Further more, this arrangement will ensure that upon the transfer or retirement of the Principal, this fine innovation will not die with her but will continue and outlive her.

I also recommend that a thorough study of the T-TEL innovation should be done to find out how the TESSA Science OER activities could be merged with that of T-TEL, since both aim at improving the professional development needs of tutors. The TESSA OER, rather than being a competitor, can be fashioned to complement the implementation of T-TEL. For instance, during the T-TEL professional development sessions, the TESSA OER could be used to facilitate the sessions, as tutors are already familiar with it. The ready availability and adaptability of the TESSA OER is most suitable for improving the pedagogical skills of college tutors. This will eventually improve the quality of pre-service teachers trained by OLA College of Education.

The TESSA initiative has been established as a course of study for all first year students and this is a great achievement. However, it must be noted that it is during the second year that pre-service teachers take the Science Methods and On-Campus Teaching Practice courses in preparation for the yearlong Off-campus Teaching Practice. It is obvious that it is during the second year of study that the use of

the TESSA Science OER is most critical since the aim for its introduction is to improve pre-service teachers' quality of teaching. I therefore recommend that the leadership of the College should link the study of the TESSA Science OER to the Science Methods course. This will ensure that pre-service teachers immediately put into practice what they learn from the TESSA Science OER in the Science Methods course during the On-Campus Teaching Practice in the same year.

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