Functional Requirements for a Colleges of Education Management Information System (CEMIS) in Ghana (Phase 1)

April 2016 revised February 2019

Allan Findlay, (Independent Consultant), April 2016

February 2019

Table of contents

List of abbreviations

CEMIS	Colleges of Educational Management Information System
DfID	Department for International Development
GES	Ghana Education Services
GPASS	Girls Participatory Approaches to Students Success
IoE	Institute of Education
MoE	Ministry of Education
NAB	National Accreditation Board
NCTE	National Council for Tertiary Education
NTC	National Teaching Council
PRINCOF	
T-TEL	Transforming Teacher Education and Learning
UCC	University of Cape Coast
CIC	CEMIS Implementation Committee

CEMIS Development Background Information

Transforming Teacher Education and Learning (T-TEL) Ghana is a six-year Government of Ghana Programme (2014 – 2020) to support the implementation of the new policy framework for Pre-Tertiary Teacher Professional Development and Management. This project, which started in November 2014, is funded by the UK Department for International Development (DFID) as part of its Girls Participatory Approaches to Students Success (PASS) Programme. T-TEL seeks to transform the delivery of pre-service teacher education in Ghana by improving the quality of teaching and learning through support to relevant national bodies and institutions and all 46 Colleges of Education. The programme is managed by Cambridge Education in collaboration with the Ministry of Education (MoE) through the National Teaching Council (NTC) and the National Council for Tertiary Education (NCTE).

There are 46 public Colleges of Education of education in Ghana and a number of private colleges. The Government is in discussion with some of the private colleges with a view to incorporating them in the existing public system. If this happens they will use the same systems and procedures as those planned for the existing public colleges.

As part of the support for the development of the 46 public colleges of education into fully functioning tertiary institutions, T-Tel wish to sponsor the development of a College Education Management Information System (CEMIS) that will be used to manage information on all 46 Public Colleges of Education to improve policy and planning, monitoring and evaluation and decision making and strengthen accountability. Essentially, the CMIS is expected to enhance information management by serving as:

1. College management and administrative module including a repository for data collection, processing, analysing and reporting of Colleges information including leadership, student teachers, tutors and support staff, enrolments and teaching resources.

2. College teaching and learning module including in an online platform that improves the visibility, availability and cross-sharing of resources among teacher education community in Ghana.

3. College assessment module for student teachers, tutors, programme accreditation and quality assurance.

4. A business intelligent tool for robust and comprehensive data analysis for policy development.

5. Backup, archiving and integration module including but not limited to application and enrolment data.

To further enhance monitoring it is proposed in this design to include monitoring of staff professional development and student teaching practice using the CEMIS.

Access to individual student data will be restricted from public access but will be required by college level and nationally. Students attending the colleges have to apply online through an application web site (http://admission.coeportal.edu.gh). This enrolment data will be made available annually as a feed into the CEMIS system to avoid unnecessary duplication of effort.

Students enroll for three years (Levels 100, 200 and 300) and if successful graduate with a Diploma in Education. They can then do further study to convert the diploma into a degree or a Masters. Every student is issued an id number that remains unchanged while at college and is used to identify student records (including payment of fees) after graduation.

The current college attendance for student teachers is three years (for those on the diploma programme and four years for those on the degree programme) with the diploma student teachers spending 2 years in college followed by a year's teaching practice: (in in out). It is proposed that this will change to 3 years (in, in ½ in/ ½ out).

Students do two full years plus one semester. A year is two semesters. Exams at end of each semester (5 in total (plus any re-sits). Colleges begin Aug/Sep. Semester one ends Dec, Xmas break, Semester 2 runs from Jan to June with exams held in June

Total student enrolment in year 1, across all 46 colleges is approx. 12,900. Overall student enrolment is 37,100 all years, all colleges – excludes private).

The 46 public colleges are located though out Ghana (See Annex A). An umbrella organization – PRINCOF exists which has representation from the principals of all the colleges. This group will assist in the adoption and planning the roll out of the CEMIS system and it is suggested that a subset of 5 or 6 colleges be selected as early adopters of the system for initial testing. These colleges are likely to include: Ola, Holy Child, and Aburi.

As part of the move to colleges becoming tertiary institutions, they will take on new roles and responsibilities as will the 10 Regions 216 Districts and Municipal Authorities – Each District will become responsible for advertising teacher vacancies and recruiting for posts.

During their training all teachers are taught Basic English, Mathematics/Science, and Social Science. In addition, the Ministry of Education is keen on early reading skills. Of the 46 colleges, 15 offer specialized Science and Mathematics.

NCTE are responsible for the Terms/Conditions of all college staff and for maintaining other terms and conditions and statutes.

Within the colleges there is now more emphasis being put on vocational training and Continuing Professional Development (CPD) of staff. Various models of CPD currently exist

but these are being streamlined and harmonized. CPD data will come into the CEMIS under phase 2.

Individual Colleges are run by Councils. Membership of these Councils vary with some political appointees. This includes outside members e.g. chiefs.

NAB, the National Accreditation Bureau are planning a greater role in accrediting colleges. They are likely to be interested on lots of data from the CEMIS system including facilities. There is an increased focus on providing disabled access.

Within the CEMIS there is no need to capture info on textbooks as students provide own.

Student exam data is required to be held by the CEMIS system - both individual scores 1-100 and mark A-F for each exam sat (one per semester). Exams are held at the end of each semester. Currently there is a single examining/marking body – University of Cape Coast. They are prepared to supply a data feed with all student results after every exam (including re-sits). All exam results need to be held against the respective individual student records.

Currently all exam results need to be available to senior college staff and nationally. Long term it is proposed students will be able to view their individual records but not amend any data.

Reporting is required by college on numbers of students achieving which grades (A-F)

This document specifies the functionality and data needs for the system

Overview of Requirements

The CEMIS system is required to provide facilities to capture data on a number of different areas of interest, support some key data feeds to and from external data sets and support a range of end users in a secure environment.

An overview of the key functions and users is as follows:
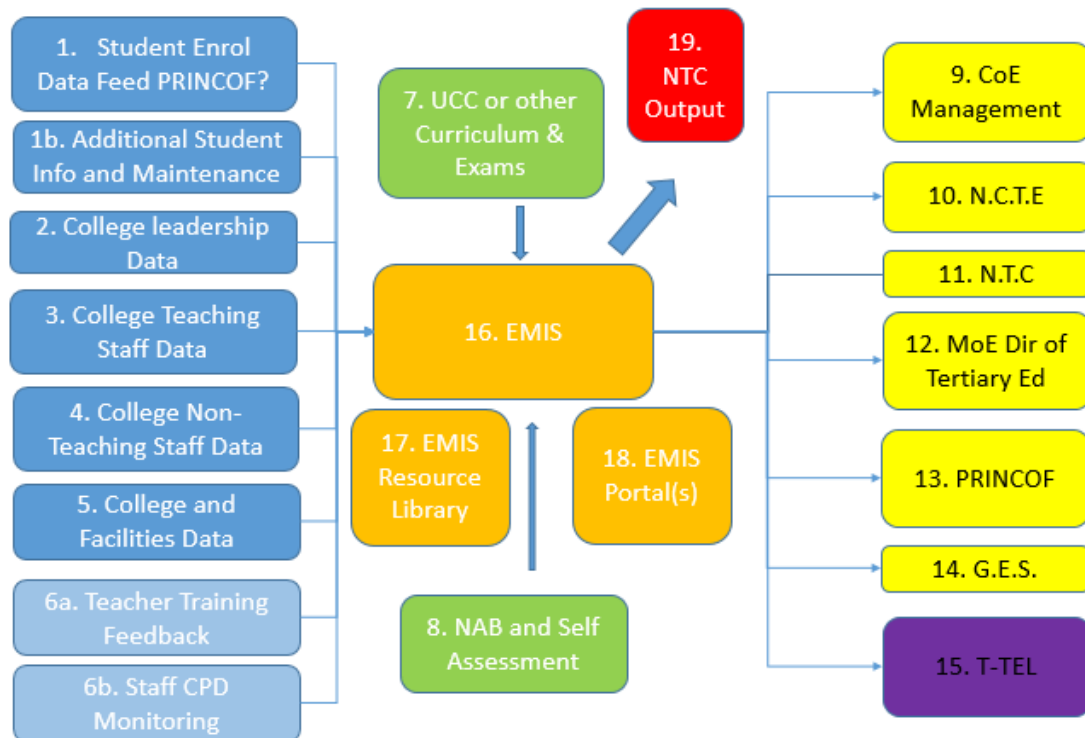
image: 1
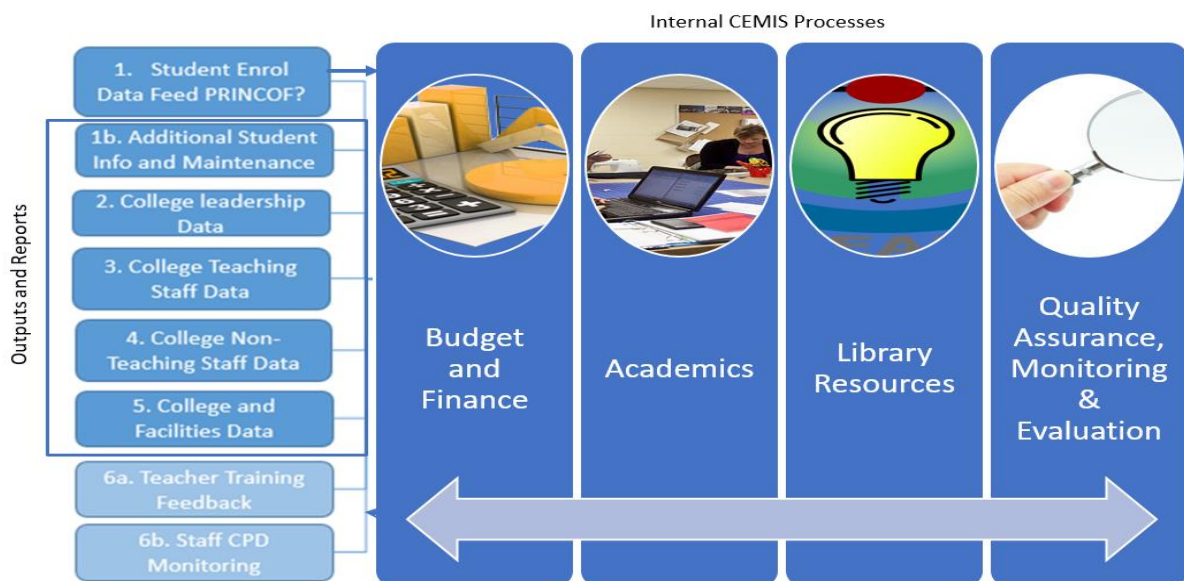
image: 2

1a. Student Enrolment Data Feeds from PRINCOF

All applications to enrol in public Colleges of Education in Ghana have been made on line since 2014. **Note: By the time the CEMIS system goes live the data on all students in the colleges will therefore be available.** The system for capturing this data was developed on behalf of PRINCOF under a Government of Ghana scheme - Ghana Investment Fund for Electronic Communications (GIFEC) –www.gifec.gov.gh

All applicants for teacher training must apply on-line through the portal: http://admission.coeportal.edu.gh/

<u>Student Application Data Captured.</u>

A. Applicant's Particulars   Application Number?
1. Surname
2. Other Name (s)
3. Sex
4. Marital Status (Married/Single/Divorced)
5. Date of Birth
6. Place of Birth
7. Home Town
8. District
9. Region
10. Nationality
11. Religious Denomination
12. Languages Spoken and Written
13. Ghanaian Language you intend to study at college
14. Contact Address
15. Telephone/email
16. State Physical Disability (if any)

17. Previous Education

No.	Name of School	Dates of Attendance		Office held (if any)
		From	To	
1.				
2.				
3.				
4				

18. Exam Results
19. Choice of Colleges
20. Choice of Academic Programme/Specialism
    a) General Teaching
    b) Mathematics/Science
    c) Science/Agriculture
    d) Science/Technical
    e) Mathematics/Technical
    f) Early Childhood
    g) French
21. Parent/Guardian Particulars
22. Student Declaration
23. Declaration by Professional person
24. Student Photo (Digital)

All of the data entered into the portal will be made available annually by PRINCOF (owners of the data) as a data feed (3 years' worth). The CEMIS system needs to upload this data creating new individual student records for each student by college attending. Going forward this will be an annual feed of new students.

Students are allocated unique IDs on enrolling for a college. This ID includes the college code and expected year of graduation. E.g. HCCE/0156/2018.

The three elements of the code identify the college e.g. HCCE – Holy Child CoE, the unique student number in the college/cohort – 0156 above. The maximum number of students in any college/cohort is approx. 700. The last part – 2018 above is the expected year of graduation.

1b. Additional Student Information and Maintenance

In addition to the core data provided through the application process in (1) above, the data on individual students will need to be maintained and updated during their time at college. Items such as change of address, contact phone number, marital status, next of kin etc. can all change. Where changes occur, there is a need to maintain a record of the previous data and who carried out the changes and when. Changes can only be made by authorised college staff trained in using the system.

In addition, information is required on any student with disabilities, course drop outs and reason(s) for such drop outs.

It is planned under Phase 2 that students will be able to view their individual student records through an on-line portal connected to the college data.

2. College Leadership Data

Data is required to be on all members of each college Leadership/Council Data

Record per member (not deleted – kept for historic)

- Names of Council Members
- Gender
- Contact Information for Council Members (Phone 1&2) email, postal address
- Sponsor of Council Members (Government, Community)
- Date Appointed (Latest post)
- Date Left (Historic records kept)
- Role?
- DoB

3. Lecturers/Staff/Tutors (Teaching Staff Only)

Data is required to be held on all staff in all colleges involved in teaching staff for all part time and full-time staff involved in teaching students. In addition, historic data needs to be maintained going forward.

- Lecturer Grade: Principal, Vice Principal, Lecturer, Senior Lecturer, Teaching Assistant (? Non-teaching staff)
- Main Admin Role (? More than one) Principal, Vice Principal, Council Member,
- Date of First Appointment
- Date of Current Appointment
- Academic Qualification (? Highest only)
- Certificate Number of Highest Academic Qual
- Teaching Qualification (? Highest only)
- Certificate Number of Highest Teaching Qual
- Staff File No./Slate No. (Unique Identifier)
- Name of staff
- Gender
- Source of salary
- Year of birth or DoB
- Year of first appointment
- Year of present appointment
- Year of posting to the college?
- Grade level / Step (or alternate)
- Subject of qualification
- Area of specialization
- Main subject taught
- Teaching type
- In Service Training/CPD (Need more info on)

4. College Non-Teaching Staff Data

Data is required to be held on all non-teaching staff employed by all colleges involved. Non-teaching staff include all care-takers, security staff, catering, drivers, etc. employed directly by the Colleges. In addition, historic data needs to be maintained going forward

Only aggregated data is required

- No. of Secretaries
- No. of Drivers
- No. of Handymen
- No. of Security Guards
- No. of Cleaners

4. College Non-Teaching Staff Data

5. College Facilities Data and Contact Data

Data is required to be held on all what facilities are available to each college as well as general contact information for each college

Colleges of Education General Data for on-line portal/contact information

a. Name,
b. Address,
c. Various Contacts/Info (Principal, VP, ICT System, Admin Officer)
d. GIS,
e. Phone,
f. email
g. Services offered, courses taught,

Facilities: Number of Following in each College of Education

Facility	Number
Toilets (?Staff only/Students)	
Computers	
Library	
Laboratories	
Gym	
Student Boarding Accommodation	

Note: This list can be expanded so allow for additional facilities. Also how best to capture things like Internet Access

Capturing CLASSROOM Data.

The following tables will be used to capture college and classroom data

Q1	How many <u>classrooms</u> are there in the school?	---------- *Number*
Q2	Are any classes held outside (because classrooms are unusable or insufficient)?	☐ Yes ☐ No

Number of rooms other than classrooms are there in the school by type of room

Q3	Staff rooms	____ *Number*.	Q6	Laboratories	___
Q4	Office	____ *Number*.	Q7	Store room	___
Q5	Library	____ *Number*.	Q8	Others	___

Q9   Information on all classrooms

Instructions

Record details for each individual classroom, regardless of whether or not they are in use. **Each row must correspond to a different classroom** (not a block). **If the number of classrooms is more than the space provided, photocopy this page and attach to the questionnaire.**

Present condition	1 – Good 2 – Needs minor repairs 3 – Needs major repairs 4 – Under construction 5 – Unusable
Floor material	1 – Mud/Earth 2 – Concrete 3 – Wood 4 – Tile/Terrazzo
Wall material	1 – Mud 2 – Cement/Concrete 3 – Wood/Bamboo 4 – Burnt bricks 5 – Iron sheets 6 – Stone
Roof material	1 – Mud 2 – Cement/Concrete 3 – Wood/Bamboo 4 – Ceramic tiles 5 – Iron sheets 6 – Asbestos
Seating	Are there enough seats for the students in this classroom? **1 – Yes 2 – No**
Disabled Access	Does the classroom have disabled access? 1 – Yes 2 – No

No.	Year of construction	Present condition	Length in metres	Width in metres	Floor material	Walls material	Roof material	Seating	Disabled Access
Example	*1976*	*1*	*7*	*5*	*3*	*3*	*3*	*1*	*1*
1									
2									
3									
4									
5									
6									
7									
8									
9									

6a. Teacher Training Feedback

One of the key roles Colleges of Education have in connection with their students is to monitor how the students perform during periods of teaching practice in the schools. Each student is assessed during his/her period of teaching practice.

Currently this system is being developed. The ability to capture feedback on each student, held against the individual student record using a standard assessment form will be required in phase 2 developments.

6b. Staff Continuing Professional Development Monitoring

All teaching staff employed in the Colleges of Education need to undergo approved continuing professional development and records of the modules undertaken and when need to be recorded. If teachers transfer to other public colleges in Ghana, their record needs to be copied to the new college.

Currently this system is being developed. The ability to capture CPD Module data on each member of staff, held against the staff record using a standard assessment form will be required in phase 2 developments.

7. Data Feeds on Student Exam Results and Curriculum

All students attending teacher training colleges sit exams at the end of each year. These results, from all 46 colleges plus some of the private ones sit the same exams for their given year. These exams are set and marked externally by the Institute of Education at Cape Coast University. IoE will provide a data feed with the exam grades and results for every trainee teacher. These records are linked to the candidate by their unique candidate number.

There is a requirement for the system to upload the data in this feed to individual student records after each terms exam and resit as appropriate. Data is required to be held against each student for all exams sat and kept historically.

8. NAB and Self-Assessment

The National Accreditation Bureau require reports on all facilities data captured in section 5 above.

9. End User Requirements – CoE Management

The College of Education Management have a number of roles to play. They need to see the following:

- An individual student record for students attending their college
- Stats on students by cohort, gender and specialism
- Stats on cohort exam performance
- Stats on numbers of students graduating in a given year by gender and specialism
- Student population profiling by age, gender and specialism

Note: Is graduation data just passing final exam?

10. End User Requirements – N.C.T.E

The National Council for Tertiary Education are the owners of the CEMIS system and will maintain the National database. They require the same reporting as CoE Management (9) above plus higher-level reports at Regional and National level.

Note: As owners they will require facilities to import college data (and colleges will need to be able to export it). The facility will need to allow for data to be merged without duplication.

NCTE will also be in control of data feed updates from PRINCOF on new students and UCC on exam result feeds and be able to create and export individual college files containing this data.

NCTE will also need facilities to provide the data exports to NAB, PRINCOF, GES, MoE T-TEL and NTC

11. End User Requirements – N.T.C.

The National Teaching Council have an interest in the likely feed of graduate teachers by specialism (See 19) and also high-level reports on graduate numbers by gender and specialism.

They also have an interest in other data such as numbers of potential teachers with disabilities

12. End User Requirements – MoE Dir of Tertiary Education

The Ministry of Education require information on all data held on CEMIS on students, staff (teaching and non-teaching), resources etc. They will require access to individual student records for all colleges including historical.

13. End User Requirements – PRINCOF

PRINCOF have a need similar to the Ministry of Education. They need to support their member colleges in terms of monitoring resources and performance. Their main focus will be on enrolment numbers by gender, specialism and disability and summary exam results by grade and college.

14. End User Requirements – G.E.S

Ghana Education Services have a need to understand the potential supply of new graduates. They will require access to summary reports on graduate numbers by gender and specialism.

They also have an interest in other data such as numbers of potential teachers with disabilities

15. End User Requirements – T-TEL

T-Tel have a requirement for the same reports as NTCE with a focus on enrolment and exam rates. They will also require access to historical reports to compare year on year changes

In Phase 2 they will be instrumental in agreeing the design and content of the information captured in "6a. Teacher Training Feedback" and "6b. Staff Continuing Professional Development Monitoring"

16. CEMIS Data Store/System

The CEMIS database should be developed in SQL for the both the colleges and the National database. It needs to hold all current and historic data and an update process is required to transfer updated data to the National database from each of the colleges of education

17. CEMIS Resource Library

The CEMIS Resource Library is a central file store on the CEMIS for relevant documents for College use. These include teaching guides and resources,

18. CEMIS Portals

The CEMIS Portals allow remote users to access data on the National and individual College systems.

Phase 1 development will be on the National system allowing access from users in the colleges and parastatals to run reports on the National data

Phase 2 will be on the College Systems to allow individual students to access their personal records (but no access to amend them) It will allow students to see their individual exam records and anonymised records of their cohort peers.

Depending on the quality and availability of data, consideration will be given to adding a pre-existing data query product to allow users to run their own bespoke reports
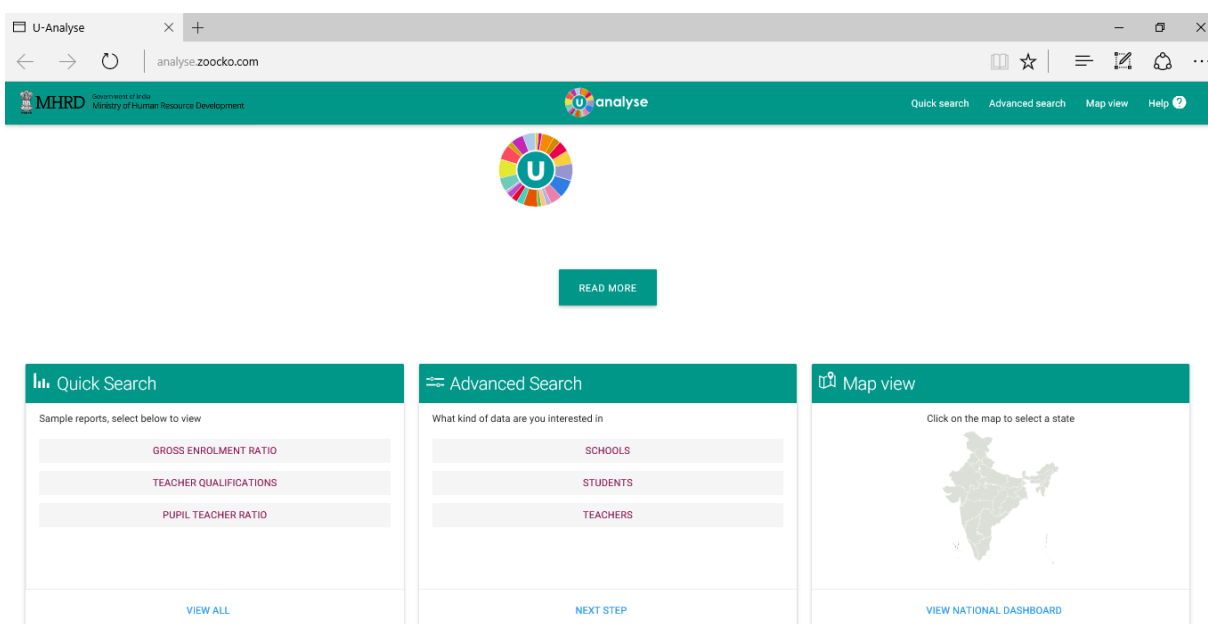
19 NTC Output

On successfully completing all teacher training, NTC have a requirement to licence teachers to teach. To facilitate this, they require a feed from CEMIS on each teacher graduating with his or her college record including examination results

Security and Levels of Access

Data Sharing between Colleges of Education and NCTE

NCTE are the owner of the CEMIS System. They will have overall responsibility for the successful installation and use of the system in each of the 46 colleges. They will be responsible for the distribution of data feeds (7 and 8 above)

They will hold copies of the data from all participating colleges and get regular updates (minimum monthly) from each college uploading all data to the National database and running national level reports.

System Reporting Requirements

The College, Regional and National reporting requirements can initially be met with a set of eight configurable reporting templates: **See attached spreadsheet for details.**

Report	Reporting Area
Report 1	Student Record
Report 2a	Student Numbers
Report 2b	Student Dropout
Report 3	Staff Record
Report 4	Teaching Staff Numbers
Report 5	Non-Teaching Staff Numbers
Report 6	Exam Result Numbers
Report 7	College Leadership
Report 8	College Facilities

Many of these reports can be run at a National, Regional or College level. National and Regional reporting will only be available to those users (PRINCOF and National Parastatals) who have access to the full National Data Set. Individual colleges will only hold their own data and only be able to run these reports pertaining to their own college.

The report layouts and variables are detailed in the attached spreadsheet. Most of the reports are configured by selecting from a drop-down menu the values for the required report variables.

The variables available and their options are shown in Annex 2

Report/User Summary

Ref	Report	Student	PRINCOF and Parastatals	CoE Management
Report 1	Student Record	√	X	√
Report 2	Student Numbers	X	√	√
Report 3	Staff Record	X	√	√
Report 4	Teaching Staff Numbers	X	√	√
Report 5	Non-Teaching Staff Numbers	X	X	√
Report 6	Exam Result Numbers	X	√	√
Report 7	College Leadership	X	√	√
Report 8	College Facilities	√	√	√

Phased Approach

Due to the lack of any integrated CEMIS and the learning and entry load on Colleges of Education a two phase development and roll out to the Colleges is required

Phase 1 will consist of the following areas:

- 1a. Student Enrolment Data Feeds from PRINCOF
- 1b. Additional Student Information and Maintenance
- 3. College Teaching Staff Data
- 5. College Facilities Data
- 7. Data Feeds on Student Exam Results and Curriculum
- 9. End User Requirements – CoE Management
- 10. End User Requirements – N.C.T.E
- 12. End User Requirements – MoE Dir of Tertiary Education
- 13. End User Requirements – PRINCOF
- 15. End User Requirements – T-TEL (Phase 1)
- 16. CEMIS Data Store/System (Phase 1)
- 18. CEMIS Portals (Phase 1)

Phase 2 will consist of the following areas:

- 2. College Leadership Data
- 4. College Non-Teaching Staff Data
- 6a. Teacher Training Feedback
- 6b. Staff Continuing Professional Development Monitoring

- 8. NAB and Self-Assessment
- 11. End User Requirements – N.T.C.
- 14. End User Requirements – G.E.S
- 15. End User Requirements – T-TEL (Phase 2)
- 16. CEMIS Data Store/System (Phase 2)
- 17. CEMIS Resource Library
- 18. CEMIS Portals (Phase 2)
- 19. NTC Output

Background on Teacher Training and the 46 Colleges of Education

Information of the 46 Colleges of Education and key contacts are provided in Annex A

Annex A – CoE and Contact Information

The current 46 Colleges of Education in Ghana are shown in the map below:
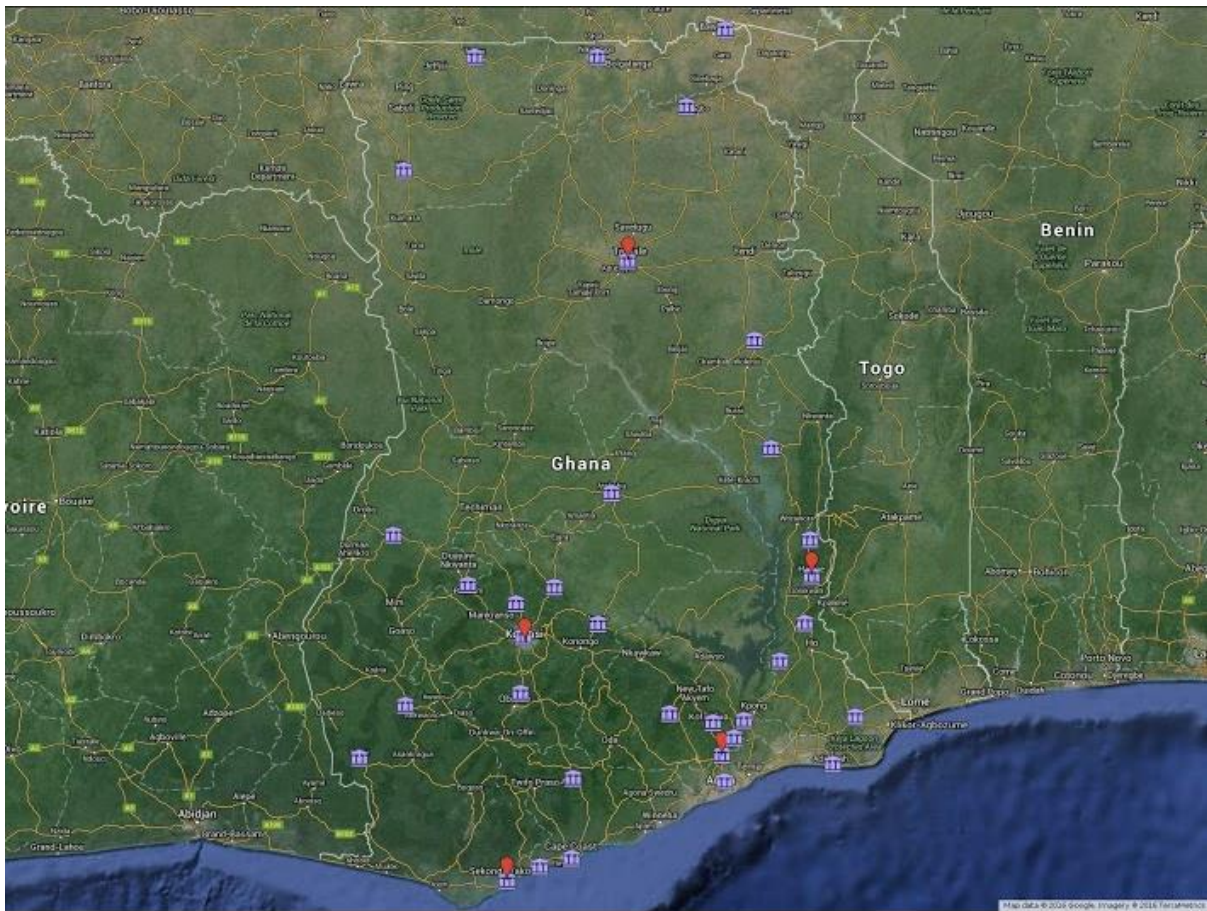
Full list of Colleges of Education

Northern Zone

1. Bagabaga College of Education
2. Gambaga College of Education
3. E.P College of Education (Bimbila)
4. Gbewaa College of Education
5. N.J Ahmadiya College of Education
6. St. John Bosco College of Education
7. Tamale College of Education
8. Tumu College of Education
9. St. Vincent College of Education
10. McCoy College of Education

Ashanti/ Brong Ahafo Zone

1. Akrokerri College of Education
2. Atebubu College of Education

3. Agogo College of Education
4. Berekum College of Education
5. Mampong Technical College of Education
6. Offinso College of Education
7. St. Joseph's College of Education
8. St. Louis College of Education
9. St. Monica's College of Education
10. Wesley College of Education
11. St. Ambrose College of Education
12. Al Faruq College of Education
13. Agona SDA College of Education

Volta Zone

1. Akatsi College of Education
2. E.P College of Education (Amedzofe)
3. Jasikan College of Education
4. Dambai College of Education
5. Peki College of Education
6. St. Theresa's College of Education
7. St. Francis College of Education

Eastern/Greater Accra Zone

1. Presbyterian College of Education (Abetifi)
2. Accra College of Education
3. Ada College of Education
4. Presbyterian College of Education (Akropong Akuapem)
5. Presbyterian Women's College of Education (Aburi Akwapim)
6. SDA College of Education
7. Mount Mary College of Education
8. Kibi College of Education
9. Methodist College of Education

Central/ Western Zone

1. Enchi College of Education
2. Komenda College of Education
3. Wiawso College of Education
4. Ola College of Education
5. Foso College of Education
6. Holy Child College of Education
7. Bia Lamp Lighter College of Education

Annex B – Reporting Variables

Report Variable/Term	
College/National Region	0) Ghana/National 1) Upper West 1a) College 1 in Upper West Region etc. 2) Upper East 3) Northern 4) Brong-Ahafo 5) Ashanti 6) Eastern 7) Volta 8) Greater Accra 9) Western 10) Central
Specialisation	1) All 2) General Teaching 3) Mathematics/Science 4) Science/Agriculture 5) Science/Technical 6) Mathematics/Technical 7) Early Childhood 8) French
Report Topic	Enrolment Drop Out Disabled
Year/Cohort	1) Year 1 - Level 100 1) Year 2 - Level 200 1) Year 3 - Level 300 1) Year 4 – Level 400
Semester	1) Semester 1 2) Semester 2
Exam Pass	1) Pass 2) Resit 1 3) Resit 2 4) Fail

Exam Bands	A-F
Lecturer Grade	1) Principal 2) Vice Principal 3) Senior Lecturer 4) Lecturer 5) Teaching Assistant
Gender	1) M 2) F
Academic Year	1) 2015/16 etc